

## Trends in the uptake of Antenatal Voluntary Counselling and Testing for HIV and HIV Prevalence among Childbearing Women in Barbados, 1993–2004: Evidence to Gauge the Effectiveness of HIV Prevention Measures

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### ABSTRACT

**Objectives:** To describe the long term trends on the uptake of antenatal voluntary counselling and testing (VCT) for Human Immunodeficiency Virus (HIV) and on the HIV prevalence among pregnant women. These data were used to gauge the impact of the National Acquired Immunodeficiency Syndrome (AIDS) Intervention Programme on preventing mother-to-child transmission (PMTCT) in Barbados.

**Methods:** This was a population based study. Data for this report were drawn from the HIV Surveillance Programme for the mother-to-child transmission of HIV. The study population comprised all pregnant women who attended the various antenatal care clinics throughout Barbados during the period between 1993 and 2004.

**Result:** The uptake of the VCT for HIV among the pregnant women in Barbados has increased from 39.9% in 1993 to over 89.7% in 2004 ( $p < 0.0001$ ). Mean annual HIV prevalence decreased from 10.53 per thousand women screened in 1993–1996 to 8.23 during 2001–2004 ( $p = 0.121$ ). Mean annual incidence rate of newly diagnosed HIV infection among the pregnant women declined from 8.83 per thousand women screened during 1993–1996 to 4.53 per thousand pregnant women screened during 2001–2004 ( $p = 0.004$ ). Mean annual incidence rate of newly diagnosed HIV infection among the pregnant women aged less than 25 years during the corresponding period declined from 10.17 per thousand women aged less than 25 years screened to 4.75 per thousand women screened ( $p = 0.003$ ).

**Conclusion:** There has been a significant decline in the prevalence and incidence of HIV since the late-1990s. Although new infections are still occurring, the numbers are small. The decline may partly be explained by the impact of PMTCT and the general preventive measures on the spread of HIV among this population.

## Tendencias en el Interés por el Asesoramiento y Prueba Voluntarios Prenatales para el VIH, y Prevalencia del VIH entre las Embarazadas de Barbados, 1993–2004: Evidencia para Evaluar la Efectividad de las Medidas para Prevenir el VIH

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### RESUMEN

**Objetivos.** Describir las tendencias a largo plazo en relación con el interés en el asesoramiento y prueba voluntarios (APV) prenatales para el virus de la inmunodeficiencia humana VIH, así como en relación con la prevalencia del VIH entre las embarazadas. Estos datos fueron usados para evaluar el impacto del Programa Nacional de Intervención del Síndrome de Inmunodeficiencia Adquirida (SIDA) en la prevención de la transmisión de madre a hijo (PTMH) en Barbados.

**Métodos.** Se trató de un estudio poblacional. Los datos para este reporte fueron tomados del Programa de Vigilancia del VIH para la transmisión madre a hijo del VIH. El estudio poblacional abarcó a todas las embarazadas que asistieron a las distintas clínicas de atención prenatal en todo Barbados durante el período comprendido entre 1993 y 2004.

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**Resultado.** *El interés mostrado por el APV del VIH entre las embarazadas de Barbados, ha aumentado de 39.9% en 1993 a más de 89.7% en 2004 ( $p < 0.0001$ ). La media anual de prevalencia del VIH disminuyó de 10.53 por cada mil mujeres sometidas a pesquiasaje en 1993–1996 a 8.23 durante 2001–2004 ( $p = 0.121$ ). La tasa de incidencia anual media de infección por VIH de diagnóstico reciente entre las embarazadas descendió de 8.83 por cada mil mujeres embarazadas sometidas a pesquiasaje durante 1993–1999 a 4.53 por cada mil mujeres sometidas a pesquiasaje durante 2001–2004 ( $p = 0.004$ ). La tasa de incidencia anual media de infección por VIH de diagnóstico reciente entre las embarazadas menores de 25 años de edad durante el periodo correspondiente disminuyó de 10.17 por cada mil mujeres menores de 25 años de edad sometidas a pesquiasaje, a 4.75 por cada mil mujeres sometidas a pesquiasaje ( $p = 0.003$ ).*

**Conclusión.** *Ha habido un descenso significativo en la prevalencia e incidencia del VIH desde los finales de 1990. Aunque todavía se están produciendo nuevas infecciones, su número es pequeño. El descenso puede explicarse en parte por el impacto del PTMH y las medidas generales de prevención de la difusión del VIH entre esta población.*

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## INTRODUCTION

At national and regional levels, Human Immunodeficiency Virus (HIV) prevalence data continue to be the main source for monitoring the pandemic and assessing the impact of interventions to reduce transmission. Prevalence data may be collected in population-based surveys or by monitoring sentinel populations. Pregnant women are considered especially important for this surveillance because they are often taken to be representative of all women, or both men and women, in the child-bearing years (1, 2). Time trends in maternal prevalence reflect the general prevalence of HIV infection (3). Outside sub-Saharan Africa, Caribbean countries have the highest prevalence of Human Immunodeficiency Virus-type-1 (HIV-1) infection, characterized by a predominant heterosexual mode of transmission (4, 5). In these countries, the greatest increase in new cases is occurring among the women of child-bearing age. However, the lack of information on HIV seroprevalence or incidence has limited, both the understanding of the current dynamics of HIV and the possibility of forecasting future trends in this region (6–9).

In demonstration of its strong commitment to the control of the HIV/AIDS pandemic, the Government of Barbados, since the early nineties, has accorded high priority to the implementation of the HIV/AIDS prevention programmes. General measures adopted centred on public education on HIV infection and ways to prevent its transmission, and promotion of voluntary testing for HIV among the general public coupled with interventions specifically targeted at prevention of mother-to-child transmission of HIV. There is a comprehensive HIV Surveillance Programme to monitor the mother-to-child transmission of HIV in this country. This programme has given us the opportunity to study the possible impact of the above mentioned interventions on HIV prevalence among pregnant women. In this study, the long term trends on the uptake of antenatal VCT for HIV and on the HIV prevalence among pregnant women are described in the setting of this middle income resource limited developing country of the English-speaking Carib-

bean. These data are used to gauge the impact of the National AIDS Intervention Programme on PMTCT in this country. These data would be valuable for targeting prevention efforts into the third decade of the pandemic and are the only continuous population-based data on HIV prevalence among pregnant women in the Caribbean.

## SUBJECTS AND METHODS

Barbados has a population of 272 000 (2001 census) and a per capita Gross National Product of \$14 010.00 Barbadian (2001 estimate). Services at the Government facilities are free of cost at the point of delivery. It is to be noted that: 1) 95% of pregnant women enrol in antenatal care and had at least two antenatal visits, 2) antenatal care and HIV testing are free, 3) there is one laboratory that conducts HIV testing for antenatal screening, 4) over 99% of all deliveries in Barbados are conducted at a hospital and over 95% take place at the Queen Elizabeth Hospital (QEH) while most of the remainder are conducted at a private facility, and 5) all HIV infected pregnant women receive antiretroviral prophylaxis for prevention of mother-to-child transmission of HIV free of charge.

This was a population based study. Data for this report were obtained from the HIV Surveillance Programme for the mother-to-child transmission of HIV that operates from the Department of Paediatrics at the QEH. This report is based on observations during the 1993–2004 period. The study population comprised all pregnant women who attended the various antenatal care clinics throughout Barbados during the period between 1993 and 2004. Throughout the study period, the uptake antenatal care in this country has been over ninety-five per cent. The Institutional Review Board at The QEH attached to the School of Clinical Medicine and Research, Cave Hill Campus, The University of the West Indies, approved the study design and the methods used for this study.

Data regarding antenatal HIV screening of pregnant women were collected from the Department of Pathology at

the QEH. At their first visit to the antenatal clinic, all pregnant women who opted for voluntary counselling and testing for HIV had a whole blood clotted sample drawn for HIV screening. All blood samples drawn for the antenatal HIV screening at various facilities across this island that provide antenatal care are sent to the Department of Pathology at QEH for HIV testing along with a written request indicating pregnancy as the reason for the screening. A woman was reported HIV positive if her blood tested positive by HIV ELISA test (ABBOTT HIV 1/2 go EIA kit, Abbott Laboratories, Germany) and confirmed by another HIV ELISA test using a different brand kit (Vironostika HIV Uni-Form II Ag/Ab Kit, Organon Teknika, Germany). Further confirmation by Western Blot test was performed in cases where the HIV ELISA screening result was indeterminate.

For all HIV infected women, additional data including the age, parity, year when diagnosis of HIV infection was made for the first time, any repeat pregnancies since she was known to be HIV infected were all collected at the time of their deliveries or shortly thereafter. Data on the total number of women delivering, their age distribution and number of women who received antenatal care was obtained from the labour and birth register at the QEH and the Bay View Hospital.

The main outcome measured was the uptake of VCT for HIV, the prevalence of HIV among the pregnant women screened for HIV and the incidence of the newly diagnosed HIV infection among the pregnant women screened for HIV. The uptake of VCT was estimated by dividing the number of pregnant women screened for HIV during the given year by the total number of women who delivered during that year. The annual HIV prevalence among pregnant women was calculated as the number of HIV-positive women divided by the total number of HIV-positive and HIV-negative women who were counselled and tested for HIV during the given year. Women who had repeated pregnancy were included in the calculation of the prevalence rate in more than one given year. However, women who had repeated pregnancy after being known to be HIV-infected were excluded from the calculation of the incidence rate. Incidence of newly diagnosed HIV-infection among the pregnant women was calculated by dividing the number of women diagnosed to be HIV-positive during the current pregnancy and who were not known to be HIV-positive prior to their pregnancy by the total number of pregnant women who were screened for HIV during the given year of study.

The annual HIV screening rate, overall HIV prevalence and the incidence rate for newly diagnosed HIV-infection among pregnant women was assessed for each year from 1993 to 2004. The change in all these parameters was evaluated by comparing the data second for the first 4 years (1993–1996), next four years (1997–2000) and last four years (2001–2004) of the study. This categorization into these three periods coincided with the implementation of antenatal

VCT in 1991, provision for antiretroviral prophylaxis in late 1996 and provision for antiretroviral treatment of HIV-infected women in late 2000, the major intervention targeted at reducing mother to child transmission of HIV in this country. The relative risk and 95% confidence intervals (CI) were used to determine if there was a statistically significant change in prevalence during the last two periods using the 1993 to 1996 period as the referent group. Chi-square (trend) was used to determine any significant change in the screening rate, prevalence and incidence rate trends.

## RESULTS

During the twelve-year study period, there were a total of 39 476 deliveries in Barbados, with an average of 3289 deliveries per year. There were 187 HIV-positive women who delivered during this 12-year period and of this, 172 (92%) were diagnosed to be HIV-positive from antenatal voluntary counselling and testing. The remaining 8% of these women were tested for HIV for reasons other than pregnancy and were known to be HIV-positive before their pregnancy. From among the 187 HIV-positive women who delivered during the study period, 61 (35.5%) had one or more repeat pregnancies after knowing that they were infected. Selected demographic characteristics of the HIV-infected pregnant women are shown in Table 1.

Table 1: Selected demographic characteristics of the HIV infected pregnant women.

Profile	Nos. (%)
<b>Age at enrolment for ANC (years)</b>	
≤ 20	41 (25.5)
21–25	58 (36.2)
26–30	39 (24.3)
>30	22 (13.7)
<b>Marital Status</b>	
Single	143 (89.3)
Married	13 (8.1)
Divorced	4 (2.5)
<b>Nationality</b>	
Barbadian	149 (93.1)
Guyanese	7 (4.4)
Others	5 (2.5)

ANC = Antenatal clinic

The annual screening rate for HIV among the pregnant women in Barbados has increased from 39.9% (95% CI = 38.2, 41.6) in 1993 to 89.7% (95% CI = 88.6, 90.7) in 2004 (Fig. 1). This increasing trend was significant (chi-square for trend,  $p < 0.0001$ ). These time trends were essentially the same when the analysis was confined to the pregnant women who were younger than 25 years of age throughout the period of study. Mean annual screening rate for HIV increased nearly twofold from 51.4% during the 1993–1996 period to 86.7% during the 2001–4 period (Relative risk = 0.59, 95% CI = 0.58, 0.60).

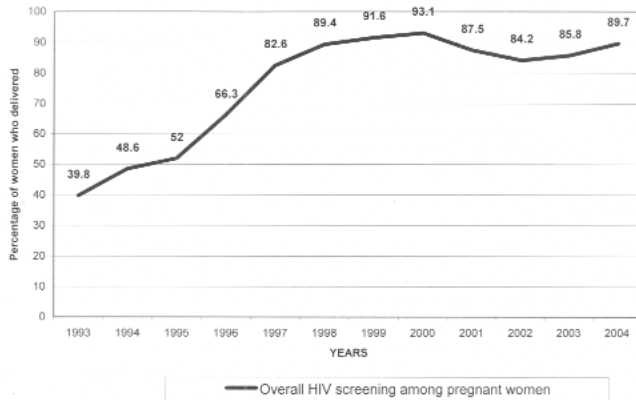


Fig. 1: Trends in HIV screening among pregnant woman in Barbados, 1993–2004.

Overall, annual HIV prevalence varied between 6.4 and 11.5 per thousand pregnant women screened as shown in Fig. 2 (chi-square for trend  $p = 0.121$ ). Mean annual HIV

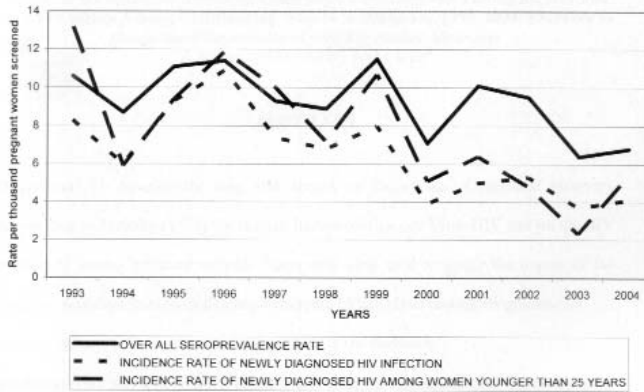


Fig. 2: Trends in prevalence rate and the incidence rate of newly diagnosed HIV infection among pregnant women in Barbados during 1993–2004.

prevalence decreased from 10.53 per thousand women screened in 1993–1996 to 8.23 per thousand women screened during 2000–2004 (Relative risk = 1.28, 95% CI = 0.94, 1.74). Change in HIV prevalence and incidence rates among pregnant women from 1993 to 1996 v/s 2001 to 2004 is shown in Table 2. Mean annual incidence rate of newly diagnosed HIV-infection among the pregnant women nearly halved from 8.83 per thousand women screened during 1993 to 1996 to 4.53 per thousand pregnant women screened during 2001–2004 (Relative risk = 1.95, 95% CI = 1.34, 2.82). Mean annual incidence rate of newly diagnosed HIV-infection among the pregnant women aged less than 25 years during the corresponding period declined by more than half from 10.17 per thousand women aged less than 25 years screened to 4.75 per thousand women screened (Relative risk = 2.14, 95% CI = 1.26, 3.63).

Table 2: Change in HIV prevalence and incidence rate among pregnant women from 1993 to 1996 v/s 2001 to 2004

	1993–96	2001–04	RR (95%CI)
Overall Prevalence (rate per thousand women delivered)	10.53	8.23	1.28 (0.94, 1.74)
Incidence of newly diagnosed HIV infected women (rate per thousand women delivered)	8.83	4.53	1.95 (1.34, 2.82)
Prevalence of HIV among women < 25 years (rate per thousand women delivered)	11.86	7.41	1.60 (1.02, 2.52)
Incidence of newly diagnosed HIV infected women < 25 years (rate per thousand women delivered)	10.17	4.75	2.14 (1.26, 3.63)
Proportion of HIV infected women who knew their HIV positive status prior to their conceiving	16.17	44.89	0.36 (0.20, 0.65)

**DISCUSSION**

This study reports on the only nationwide population-based HIV prevalence data currently available for pregnant women; these data have been a valuable tool for monitoring trends, targeting resources and evaluating programmes and policies. This study assumes added significance being the only report of the long-term trend in HIV-infection among pregnant women from the Caribbean region which has the second highest prevalence of HIV in the world. HIV incidence and prevalence trends among young women are of particular relevance for monitoring the AIDS pandemic (4–7, 5, 10–16).

Since the early nineties, a number of interventions were used to target the mother to child transmission of HIV in this country. These included antenatal voluntary counselling and testing (VCT) for HIV-infection since 1991, provision of antiretroviral drugs for perinatal prophylaxis since 1996 with a dramatic decline in the rate of perinatal transmission of HIV in this country (17). These measures were followed-up by the availability of free antiretroviral treatment for all eligible HIV-infected individuals in this country since 2000. This has been coupled with intervention for the general public in the form of education on HIV/AIDS.

A significant rising trend in the uptake of voluntary counselling and testing for HIV, with over four-fifths of all pregnant women who delivered being tested for HIV since 1997, could be gauged as a good measure of the success of the PMTCT programme in this country. The rate of uptake of the VCT for HIV in this country doubled between 1993 and 1997. This rapid rise in the uptake of VCT for HIV may have resulted from the availability of antiretroviral medications for perinatal prophylaxis for all HIV-infected pregnant women in this country since 1996. Other studies have also shown that implementing programmes for universal access to

VCT and provision of antiretroviral prophylaxis for perinatal prevention is associated with high uptake of HIV screening among pregnant women (18–20). Overall, increase in the public awareness of HIV prevention and changing attitude of people toward this illness could have also contributed to the increased uptake of VCT for HIV in this population. Interventions aimed at educating patients about vertical transmission reduction and promising new therapies for HIV-infection is associated with increased rate of HIV screening in pregnancy (21).

The continued decrease in the overall prevalence of HIV-1 infection among pregnant women in Barbados is encouraging. However, data from this study are too limited to determine what factors are responsible for the decreasing trends. Factors that may contribute to these decreasing trends include the following: (1) women with HIV-infection are dying prematurely or are too ill to conceive; however, data supports the contrary and women in Barbados are living longer and have better quality of life since 2000 with the availability of antiretroviral therapy to all eligible HIV-infected women; (2) there are no data to support an increase of HIV-infected populations migrating out of the country (3). Women with HIV may intentionally be opting not to conceive or carry to term if they become pregnant; however, further analysis of data shows an increase in the proportion of HIV pregnant women who knew their HIV status prior to their pregnancy; (4) finally, there may be a decrease in the number of child-bearing women becoming infected, an indication that HIV prevention efforts are working. Therefore, this decline, especially the decline in the prevalence among younger (those less than 25 years of age) pregnant women, could be a sign of the overall decline in the prevalence of HIV in this population. Several studies have recommended continued surveillance of the pandemic based on antenatal clinic patients as a sentinel population (1–3, 22, 23).

Two major limitations of this study were: 1) the incidence estimates are really the number of new infections among repeatedly tested women and not true incidence in this population since not all women were tested and only women previously tested are included, and 2) the percentage of women who were tested in the two time-periods differed so remarkably that those differences could account for the observed trends and not the national prevention programme.

This survey of pregnant women, given the above mentioned limitations, is a valuable epidemiological tool for assessing the magnitude of the HIV burden among pregnant women as well as following the trend in this population. Although the information collected for this study is too limited to make causal inferences between observed trends and specific prevention efforts, it has been extremely valuable in highlighting that overall prevention efforts appear to be working.

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