

# Successful Introduction of Routine Opt-Out HIV Testing in Antenatal Care in Botswana

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**Background:** Botswana has high HIV prevalence among pregnant women (37.4% in 2003) and provides free services for prevention of mother-to-child transmission (PMTCT) of HIV. Nearly all pregnant women (>95%) have antenatal care (ANC) and deliver in hospital. Uptake of antenatal HIV testing was low from 1999 through 2003. In 2004, Botswana's President declared that HIV testing should be "routine but not compulsory" in medical settings.

**Methods:** Health workers were trained to provide group education and recommend HIV testing as part of routine ANC services. Logbook data on ANC attendance, HIV testing, and uptake of PMTCT interventions were reviewed before and after routine testing training, and ANC clients were interviewed.

**Results:** After routine testing started, the percentage of all HIV-infected women delivering in the regional hospital who knew their HIV status increased from 47% to 78% and the percentage receiving PMTCT interventions increased from 29% to 56%. ANC attendance and the percentage of HIV-positive women who disclosed their HIV status to others remained stable. Interviews indicated that ANC clients supported the policy.

**Conclusions:** Routine HIV testing was more accepted than voluntary testing in this setting and led to substantial increases in the uptake of testing and PMTCT interventions without detectable adverse consequences. Routine testing in other settings may strengthen HIV care and prevention efforts.

**Key Words:** Africa, antenatal care, Botswana, HIV testing, prevention of mother-to-child transmission, routine HIV testing

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Botswana's HIV prevalence has been among the world's highest since 1995.<sup>1</sup> National HIV surveillance in 2003 estimated prevalence among antenatal care (ANC) clients to be 37.4%.<sup>2</sup> Botswana's stable and relatively well-resourced government has provided extensive resources to combat the HIV epidemic and started Africa's first national program for prevention of mother-to-child transmission (PMTCT) of HIV in 1999, providing short-course zidovudine (AZT) for mothers and infants and infant formula at no cost to clients. The program became available in every public antenatal clinic in 2002. Single-dose nevirapine (NVP) was added in 2003, and triple-drug antiretroviral (ARV) therapy became widely available for people with AIDS in 2003 and 2004. Depending on which interventions are actually received, this program can reduce vertical transmission from 35% to 40% to 1% to 5%.<sup>3</sup>

Despite the availability of PMTCT and ARV services, HIV test acceptance was low in the first years of the PMTCT program. Nationwide, >95% of pregnant women have at least 1 ANC visit and deliver in a health facility,<sup>4</sup> offering ample opportunity for provision of PMTCT interventions. A review of records of 500 pregnant women in Francistown (Botswana's second largest city) in 2002 showed that the median length of gestation at the first antenatal visit was 22 weeks, 85% of antenatal clients were tested for hemoglobin and syphilis, and 82% received at least 1 tetanus immunization (2002, unpublished data, Francistown District Health Team). In this context, PMTCT services should have been easily delivered. In 2003, however, only 47% of the expected number of HIV-positive pregnant women knew their HIV status before delivery at Francistown's referral hospital, and only 29% of the estimated total number of HIV-positive women had received any AZT (unpublished data, Nyangabgwe Hospital, 2003). Similar low levels of testing and intervention were documented throughout the national PMTCT program (unpublished data, Botswana national PMTCT program, 2002–2003).<sup>5</sup>

HIV enzyme-linked immunosorbent assay (ELISA) testing has been available in Botswana's public health system since the mid-1990s under a "voluntary counseling and testing" (VCT) paradigm, but there have been barriers to HIV testing in this environment, including stigma leading to reluctance among patients and providers to discuss HIV,<sup>6,7</sup> a shortage of trained counselors, concerns about confidentiality in small communities, results taking several weeks to return, and population mobility leading to many unclaimed results.

HIV testing for PMTCT was initially offered by the midwives providing routine ANC, who received HIV and counseling training and were expected to weigh risks and benefits of testing with each client. In this context, many women were not offered, and most women refused, HIV testing. In late 2002, "lay counselors" (secondary school graduates with 4 weeks of counseling training) were employed to provide dedicated counseling services for PMTCT in public clinics. Testing uptake improved somewhat, but many women remained untested and untreated.

### ROUTINE OR "OPT-OUT" HIV TESTING

Most medical tests, such as tests for diabetes or cancer, are offered and explained by health providers in a manner that results in nearly all patients agreeing to have the test; patients are told that they need a particular test, why they need the test, and what is going to be done if the test indicates disease, and testing proceeds unless the patient specifically objects. HIV testing has been approached differently since the beginning of the epidemic in the 1980s, and the "HIV exceptionalism" and VCT paradigms developed in the United States were adopted by other countries as they began to offer HIV testing.<sup>8,9</sup> Patients receiving VCT discuss the decision to have an HIV test with a health care provider or counselor before deciding whether to have a test. Such counseling may include discussion of sexual behaviors and number of partners, perception of risk from sexual and other sources, fears about the consequences of a positive test result, and anticipation of the reactions of others to a positive test result. In many settings in the developing world, doctors who discuss other serious medical tests with clients each day do not discuss HIV testing, leaving this for nurses or other less trained personnel. In some settings, HIV testing requires the signing of a consent form, which is rarely required for tests for other diseases. These practices have separated HIV care from other medical care in the minds of providers and patients around the world for many years, and in this context, many people with a clear medical need for testing have not been tested.

In 2001, the US Centers for Disease Control and Prevention (CDC) recommended making an HIV test a routine part of ANC.<sup>10</sup> Other countries have also adopted this policy, and HIV testing is now routine for pregnant women throughout the developed world.<sup>11-13</sup> Until recently, however, HIV testing in most of Africa has remained largely voluntary and outside the purview of normal medical practice, with many patients in clinics and hospitals all over the continent remaining untested.<sup>14</sup>

Advocacy for increasing and normalizing HIV testing in Africa has come from many quarters.<sup>14-19</sup> Concerns have been raised, however, that making HIV testing routine would deter people from seeking medical care and that people tested when they were not "ready" would not return for their test results, utilize care and treatment services, or disclose their HIV status to partners. Concerns have also been raised that such testing would inevitably result in more women than men learning their HIV status and that tested women would be the victims of more violence and psychologic stress as a result of knowing their HIV status.<sup>20,21</sup>

In December 2003, Botswana's President Festus Mogae published a New Year message to the nation, in which he stated that beginning in 2004, HIV testing in health care facilities would be "routine but not compulsory" and that "healthcare workers will test for HIV unless you decline to be tested." He encouraged citizens to accept HIV testing and utilize free HIV care and treatment. A memo was sent to medical facilities instructing them to "routinely" test people with signs and symptoms of HIV, patients with tuberculosis (TB), pregnant women, persons with sexually transmitted infections, and persons receiving routine medical examinations.<sup>22</sup>

As part of support to improve PMTCT program uptake and effectiveness, the BOTUSA project (a collaboration between the Botswana government and CDC) maintains an operational research site in Francistown. In January 2004, a project was undertaken to support the systematic introduction of routine HIV testing in antenatal clinics and to compare HIV testing rates, PMTCT intervention rates, and ANC attendance before and after the introduction of routine testing.

### METHODS

Routine testing was introduced systematically by CDC staff at 4 clinics in Francistown, and detailed data were collected at these sites. Aggregate data from the regional hospital and the national PMTCT program were also used to examine the impact of the nationwide introduction of routine testing on the PMTCT program.

### Routine Testing Procedures

Four clinics in Francistown were chosen by district health staff to participate in the evaluation on the basis of high patient volume, availability of consistent staff, and willingness to participate. Services offered to pregnant women in clinics that were not chosen for the evaluation were the same as those provided in the clinics that were chosen. All new clients attending these clinics for ANC during the evaluation period were included in the evaluation.

Clinic staff who provided pretest counseling (primarily dedicated PMTCT counselors with more than 1 year of experience) were trained to conduct group or individual pretest educational sessions with a flip chart and were provided with scripts on how to introduce the HIV test as part of a package of routine antenatal services. The flip chart included basic information about HIV transmission, PMTCT, and ARV therapy; a brief explanation of all tests done during ANC (hemoglobin, syphilis, HIV, glucose, and blood pressure); and a statement that all tests are routine but that patients have the right to refuse tests they do not want. Group discussion was encouraged by questions provided on the flip chart. Patients who did not want any of the tests were instructed to speak with the counselor.

Patient flow in each clinic was reviewed and modified as necessary to ensure that routine HIV testing was incorporated into normal services. Per national policy, off-site ELISA testing was used for women at <28 weeks of gestation and off-site rapid testing was used for women at ≥28 weeks of gestation. Clients were told to return for results in 1 month (ELISA test) or 1 week (rapid test). The essential content of

posttest counseling for HIV-positive and HIV-negative women was reviewed with all staff. We sought to improve the referral system for HIV-positive women and to ensure that they were appropriately evaluated for ARV therapy. A patient handout was created that included the date each woman was to start AZT and instructions on being evaluated for ARV therapy. A flow chart for the new testing system was provided for staff (Fig. 1).

### Data Collection and Analysis at 4 Project Clinics

Data on ANC visit attendance, HIV testing, pre and posttest counseling, HIV status, and medications given are normally kept in antenatal clinic logbooks, with one line for each woman used throughout her pregnancy. These logbooks were the primary source of data for this evaluation.

The 5 months before routine testing started (September 2003–January 2004) were used as the control or “voluntary” period, and the 8 months after routine testing started (February–September 2004) were used as the intervention or “routine” period. The routine period was longer than the control period because not all clinics began routine testing at the same time, and we wanted to ensure that every clinic had at least 6 months of data collection after routine testing began. Data from all 4 clinics were used to compare testing uptake and services delivered in the voluntary and routine periods directly.

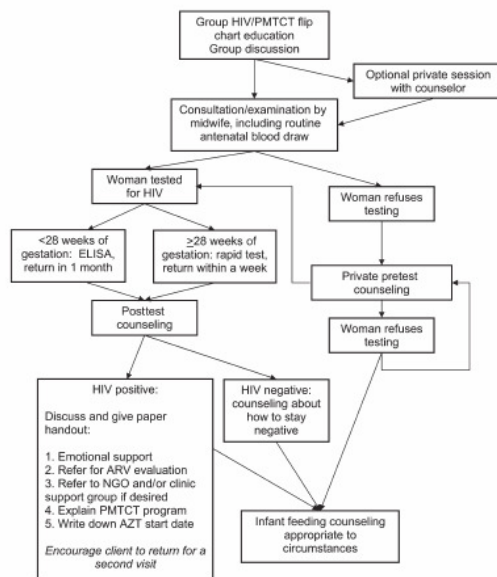


FIGURE 1. Flow chart for routine HIV testing procedures in antenatal clinics, Francistown, Botswana, 2004. NGO indicates nongovernment organization.

### Client Interviews

After routine testing had been in place for 6 months, women who received ANC at any of the 4 routine testing project clinics were identified in delivery logbooks at 2 delivery sites in Francistown. All women from these clinics who started ANC after February 2004 were approached for interview by study staff until a target sample of 50 women was reached. Women were interviewed using an instrument that was similar to an instrument we used to survey pregnant and postnatal women in August through September 2003 in all clinics in Francistown (including the 4 project clinics).<sup>23</sup> Participants were asked about their knowledge of PMTCT and their HIV testing experiences, choices, and outcomes. Responses to the survey were compared with 2003 responses. Specific questions about the routine testing policy and procedures were also asked.

### Data From Other Sources

To describe the impact of the national routine testing policy beyond the 4 clinics in which we conducted training, data were also collected from the regional referral hospital in Francistown and at the national level. HIV testing and PMTCT intervention uptake were recorded from delivery logbooks at the regional hospital, which provides delivery care for women receiving ANC in Francistown and other areas in northern Botswana. National PMTCT program monitoring data were also examined to determine if the national impact of routine HIV testing was similar to that in Francistown.

This evaluation was reviewed by the CDC and determined to be a nonresearch program evaluation, and it was approved by Botswana's Health Research Development Committee.

### Statistical Methods

Data were double-entered into an Epi-Info 6.02 database (Centers for Disease Control, Atlanta, GA). Univariate analysis was conducted using SPSS 12.0 for Windows (SPSS, Chicago, IL).

## RESULTS

### Antenatal Care Attendance and HIV Testing in Pilot Project Clinics

As shown in Table 1, the routine testing period showed a significant increase, from 76% to 95%, in the percentage of ANC clients who accepted an HIV test and the percentage of tested women who received their results (from 72%–82%) compared with the voluntary testing period. There was no change in the number of women coming for first ANC visits or returning for more visits. HIV-positive women identified through routine testing received AZT for PMTCT at the same rate as women identified through voluntary testing (see Table 1).

Some women in both groups did not receive their test results or posttest counseling despite returning for ANC after being tested. Although some women may have intentionally avoided receiving their results, logistic factors, including difficulty in finding results when the client returned, long

**TABLE 1.** ANC Attendance and PMTCT Service Uptake Before and After the Introduction of Routine HIV Testing in ANC, Francistown, Botswana, 2003 Through 2004

	Voluntary Testing Period (N = 492)	Routine Testing Period (N = 964)	P*
Mean no. new antenatal clients per month (4 clinics)	111	121	—
Percentage of new clients tested for HIV	377/492 (76%)	914/964 (95%)	<0.001
Percentage of tested clients who returned for subsequent antenatal visits after being tested	323/377 (86%)	809/914 (89%)	0.1
Percentage of tested clients who received results	272/377 (72%)	753/914 (82%)	<0.001
Percentage of newly diagnosed HIV-positive women who started AZT for PMTCT	87/125 (70%)	144/220 (66%)	0.6

\*Pearson  $\chi^2$  test.

laboratory turn-around times, and counselor absences, were reported to contribute to some women never learning their HIV status. ELISA results took an average of 21 days to be returned to the clinic during the voluntary period and 18 days during the routine period, and off-site rapid tests took 27 days (only 15 rapid tests were done during the voluntary period) and 10 days, respectively. The average time between testing and posttest counseling was 53 days during the voluntary period and 38 days during the routine period. HIV prevalence among tested women was 47% in the voluntary period and 43% in the routine period ( $P = 0.16$ ).<sup>24</sup>

**Group Versus Individual Education**

Of 967 women, 57% received group education, 42% received individual education, and 0.7% received both. There was no difference between group-educated and individually educated women in the percentage who were tested for HIV, returned for more ANC after testing, received results, or started AZT (data not shown).

**Client Interviews**

All women from project clinics were approached after delivery on their identification in a delivery logbook, and all agreed to be interviewed. Table 2 compares the responses and characteristics of interviewed women with those of 504 women interviewed in mid-2003 during the voluntary testing period. The routine testing clients were less likely to be married or have a partner and had a higher median number of ANC visits than women interviewed during the voluntary testing period. Age, educational level, employment, parity, whether the pregnancy was planned, and whether the woman's partner had been tested for HIV did not differ between the 2 groups. There was no difference in the percentage of women in each group who had discussed HIV testing with someone close to them before coming for ANC.

Routine testing clients had slightly higher mean scores on a 10-item PMTCT knowledge test and were more likely to

**TABLE 2.** Characteristics and Responses of Clients in 2003 (Voluntary Period) and 2004 (Routine Period) Surveys on PMTCT, Francistown, Botswana

Characteristic	Voluntary Testing Clients (n = 504)	Routine Testing Clients (n = 52)	P*
Survey refusal rate	12%	0%	
<b>Demographic characteristics</b>			
Age (median)	23.0	22.5	0.49†
Educational level at least junior secondary	84.9%	88.5%	0.49
Works outside the home	32.6%	42.0%	0.16
Married	9.0%	0.0%	0.02
Has a partner	96.1%	86.5%	0.002
Lives with partner	37.4%	51.1%	0.07
Mean (median) no. pregnancies	2 (2)	2 (2)	0.48†
Mean (median) no. ANC visits	4.5 (4)	6.2 (6)	<0.001†
<b>Social characteristics</b>			
Current pregnancy was planned	38.9%	36.5%	0.74
Partner has been tested for HIV	26.0%	36.2%	0.13
Discussed HIV testing with someone before coming for ANC	50.8%	53.8%	0.7
<b>HIV and PMTCT knowledge, opinions, and choices</b>			
Woman tested for HIV during this pregnancy	69.4%	92.3%	0.001
Mean (median) no. questions correct in 10-item PMTCT knowledge test	7.4 (8)	8.2 (8)	<0.001†
Thinks all pregnant women should have an HIV test	94.6%	100%	0.09
	(n = 73)	(n = 20)	
<b>Experiences of HIV-positive women</b>			
Disclosed HIV status to someone	84.9	84.2	0.94
Disclosed to family	34.2	62.5	0.04
Disclosed to partner	63.0	61.1	0.88
Domestic violence since disclosure	6.1%	0.0%	0.4
Knows what to do to be evaluated for ARV therapy	21.9	68.4	<0.001
Knows of community organizations that provide support	45.6%	68.4%	0.08
Interested in support group for HIV-positive women	84.5	94.7	0.34

\*Pearson  $\chi^2$  test, except where otherwise noted.  
†T-test.

have been tested for HIV during this pregnancy than women interviewed in the voluntary testing period. Among HIV-positive women, there was no difference in the percentage of women who disclosed their HIV status to someone (85%) or to partners (~62%) between the 2 testing periods. No women in the routine testing period reported experiencing domestic violence after disclosing their HIV status to their partner compared with 6% in the voluntary period (not significant). Women tested routinely were more likely to have disclosed their status to other family members and to be aware of procedures for enrolling in the ARV program.

Routine testing clients reported that after their pretest information session, 88% felt more like having an HIV test. All those who were tested were glad they had been tested, and no woman reported that she felt “forced” to have an HIV test. Women who refused testing (n = 3) reported that it was not difficult for them to refuse.

### HIV Testing and Prevention of Mother-to-Child Transmission Interventions at the Regional Referral Hospital

Figure 2 shows PMTCT service delivery data from the regional referral hospital, which performs deliveries for most of Francistown’s pregnant women as well as for many women from outlying areas in which routine testing was introduced by the Ministry of Health during 2004. The percentage of all HIV-positive women who knew their status at the time of delivery increased from 47% to 78%, and the percentage receiving AZT increased from 29% to 56% from 2003 to 2004. The routine use of on-site rapid HIV tests in ANC clinics, starting in 2005, ensured that nearly all tested women received their results, and intervention uptake increased even further, with 75% of women receiving AZT in 2005 and increasing numbers of women receiving NVP and ARV therapy.

### HIV Testing and Prevention of Mother-to-Child Transmission Interventions Nationwide

Figure 3 shows national PMTCT uptake data for 2002 through 2005, which closely resemble the data from Francistown. HIV testing and intervention uptake have increased dramatically since routine testing began, nearly 80% of all HIV-positive pregnant women in Botswana now receive appropriate PMTCT interventions, and many are receiving ARV therapy during pregnancy.

## DISCUSSION

An essential step in PMTCT is antenatal HIV testing, and after 5 years of offering traditional VCT during ANC, Botswana’s program was unable to reach high testing levels.

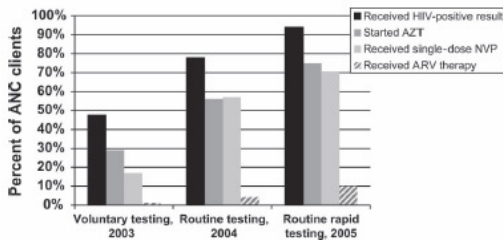


FIGURE 2. PMTCT services received by all HIV-infected women delivering at the regional referral hospital before and after the introduction of “routine” HIV testing, Francistown, Botswana, 2003 through 2005. The denominator of all HIV-infected women was calculated from the total number of deliveries at the hospital each year multiplied by the HIV prevalence among women tested during that year. For 2003, N = 1630; for 2004, N = 1626, and for 2005, N = 1578.

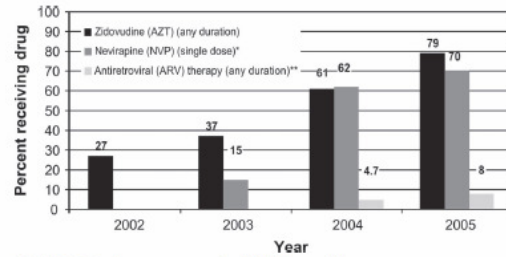


FIGURE 3. Percentage of all HIV-positive pregnant women receiving ARV prophylaxis or treatment during pregnancy, Botswana National PMTCT Program, 2002 through 2005. The denominator for each year was calculated from the total number of deliveries nationwide multiplied by the HIV prevalence from surveillance data. The average denominator was 14,200 pregnancies among HIV-positive women per year. \*NVP uptake estimated from Francistown district data because national data were incomplete. \*\*Women with a CD4 count of <200 cells/ $\mu$ L receive ARV therapy.

The shift to routine HIV testing resulted in a dramatic increase in testing and in PMTCT service delivery without measurable adverse effects. The subsequent addition of on-site rapid testing led to further improvement to 95% testing coverage. Similarly, high testing coverage was reported after the simultaneous introduction of routine HIV testing and PMTCT in a large African program in Cameroon,<sup>25</sup> a country with much lower HIV prevalence, but the Botswana data provide encouragement that successful paradigm shifts can be made even in programs that have long been bound to VCT methodologies.

After this successful demonstration project, representatives from all Botswana’s health districts attended study tours in Francistown to see the successful implementation of routine testing and to learn to provide services the same way in their own clinics. Educational flip charts were distributed to counselors nationwide. At the time of this report, routine testing has been standard practice in Botswana for nearly 3 years. The PMTCT program is a strong implementer of the policy, and PMTCT program uptake is now the highest of any national program in Africa.

The introduction of ARV therapy in Botswana in 2001 was followed by substantial increases in visits to VCT centers before testing in health facilities became routine.<sup>26</sup> In this context, the declaration by Botswana’s President that testing would be routine met with widespread public approval.<sup>27</sup> Radio talk shows had call-in sessions to discuss the subject, and many callers expressed relief at the new policy, saying that they had never wanted HIV to be treated differently in the first place and that health workers were the source of HIV stigma. Removing pretest counseling, highly personal discussions about sexual behavior and HIV risk, and special consent as prerequisites to testing and care was well accepted. Efforts are currently being made to improve implementation of the routine testing policy for patients with TB and other medical conditions for which routine HIV testing is indicated.

**Limitations**

This evaluation focused on the impact of routine HIV testing on ANC and PMTCT in 1 city, and the number of women interviewed after the intervention was small. The dramatic increase in HIV testing and PMTCT uptake seen at the regional hospital and nationwide closely resemble our evaluation data, however, and the conclusions presented here are thought to represent the situation in Botswana accurately. It is possible that given another year of increasing public HIV education and advocacy for HIV programs, HIV testing would have increased without the introduction of routine testing. The primary purpose of this evaluation was to identify any adverse consequences from the introduction of routine HIV testing, however, and none were found. Botswana's high-level government commitment to HIV programs and the increasing local availability of HIV care and treatment services almost certainly contributed to the acceptability of the new policy and may limit the generalizability of Botswana's success to countries with fewer available HIV services.

A provider-initiated routine approach to HIV testing may be appropriate in many settings around the world as PMTCT, ARV treatment, and other types of HIV care become widely available. Normalizing HIV testing is likely to have maximal impact if it is introduced throughout the health system, including in ANC clinics, delivery settings, maternal-child health clinics, and general medical clinics. This approach, which is being taken in Botswana, allows the benefits of HIV testing and opportunities for stigma reduction to reach the entire population and not to focus solely on women. We encourage programs providing routine HIV testing to provide public education about the meaning of routine testing, ensure that patients are not tested without their knowledge, reassure patients that they can refuse testing and treatment they do not want, and raise awareness about the substantial benefits of HIV care and treatment. This strategy may facilitate the successful integration of HIV into normal medical practice in other countries highly affected by the HIV epidemic.

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