

Birth Attendants Trained in “Prevention of Mother-to-Child HIV Transmission” Provide Care in Rural Cameroon, Africa

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Since 1984, Cameroon Baptist Convention Health Board’s Life Abundant Primary health care program has established primary health centers in remote villages and trained literate women in these villages as birth attendants to offer antenatal care, low-risk delivery, and triage of high-risk mothers to larger health facilities. In 2002, the birth attendants were trained to provide Prevention of Maternal-to-Child HIV Transmission (PMTCT) services, including counseling, voluntary testing, performing oral rapid HIV tests (OraQuick; OraSure Technologies, Inc., Bethlehem, PA), posttest counseling, and administering single-dose nevirapine to HIV-positive women, to be taken in labor, and to their newborns. Ongoing supervision is provided by nurse supervisors. Between July 2002 and June 2005, 30 PMTCT-trained birth attendants in 20 villages counseled 2331 pregnant women and tested 2310 (99.1%) for HIV. Eighty-two women had a positive OraQuick HIV test (3.5%). Forty-two of these mothers were delivered by the trained birth attendants, with 88.1% of mothers and 85.7% of newborns receiving single-dose nevirapine prophylaxis. Nevirapine-treated babies were tested after 15 months of age, and two of 13 HIV-exposed infants had a positive rapid HIV antibody test (15.3% transmission rate with treatment). Program challenges include: maintaining adequate supplies of HIV tests kits and medications, supervising and supporting the PMCT-trained birth attendants on a regular basis, and achieving exclusive breastfeeding and early weaning. *J Midwifery Womens Health* 2007; 52:334–341 © 2007 by the American College of Nurse-Midwives.

keywords: Cameroon, community health aids, health services (indigenous), HIV seroprevalence, maternal health services, nevirapine, perinatal care, rural health services

EDITOR’S NOTE:

This article describes the effectiveness of trained birth attendants as the point of service in a Prevention of Maternal-to-Child HIV Transmission Program (PMTCT). The following quote from one of the authors of this article illustrates the importance of this work:

I am one of 13 born to our mother in the house and in a village where there was no health facility and no motorable road until 1980. My family, like many others, depended on women who were skilled in assisting women in labour. I later came to know that these women are called traditional birth attendants. My father was one of them because he assisted our mother to give birth to some of us. In fact, our father told us that I was born when my mother was alone. I know of families in my village where women died at child birth, right at home, they died from bleeding, from retained placenta, or breech births. All the male circumcisions including mine were done by parents or neighbours. I lived through all this and remember some of the bloody sites from delivery with horror and depression. Many people, who only talk about this and never saw a difficult delivery in the 1960s and 1970s in a village, will not know what we are talking about.

Villages without roads and without health centers still exist in 2006. A well trained traditional birth attendant will do a lot of good to evaluate a high-risk pregnant woman and refer on time to the hospital. It takes days to move from one of these villages (Tinta) to the nearest hospital (Akwaya). Please, I wish to invite WHO and other advocates of the abolition of traditional birth attendants to live in one of these villages and have one baby there.

We do not talk of second best when there is only one. We know what the best antenatal care and OB/GYN care should be, but where these services can not be provided for whatever reason, what should we, working in those locations do to save life, using the limited resources in our hands?

In August 2006, I visited a village and was told that I was the first health authority to come there. These people are voiceless, powerless, and poor. Who will speak for them?

Thanks—Pius M. Tih, MPH, PhD

“Each day, 1800 children worldwide become infected with HIV, the vast majority of them newborns. In 2005, 9% of pregnant women in low- and middle-income countries were offered services to prevent transmission to their newborns.”¹

Mother-to-child transmission (MTCT) of HIV is almost entirely preventable where health care services are available and accessible. The current standard of care is to begin antiretroviral therapy when a HIV-infected woman becomes pregnant if she is not already receiving treatment.^{2,3} In the absence of treatment or prophylaxis, it is estimated that 13% to 42% of children born to HIV-positive women will become infected with HIV.⁴

The HIV/AIDS pandemic remains a major public health challenge in sub-Saharan Africa. In many of these resource-limited countries, testing pregnant women for HIV infection remains elusive, and providing antiretroviral treatment during the entire pregnancy is not feasible. It is known that the transmission of HIV can be reduced by as much as 47% with the administration of a single dose of nevirapine to HIV-infected mothers during labor and to their babies within the first 3 days of life.⁵

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Therefore, in these countries, Prevention of Maternal-to-Child HIV Transmission (PMTCT) programs primarily consist of providing this targeted “single dose” antiretroviral prophylaxis. Additionally, African PMTCT programs have focused upon urban areas, leaving pregnant women living in rural areas without access to HIV testing and prophylaxis.⁶

Ideally, deliveries should be attended by qualified health workers (skilled birth attendants).⁷ Other recognized types of birth attendants include traditional birth attendants (TBAs) and trained TBAs. TBAs are defined as local women with no or minimal training. The birth care they provide varies widely, and their role is dependent upon the community in which they reside. TBAs or other individuals selected by their community may complete a course of training to enhance their knowledge or abilities in a specific topic or skill. These individuals are now referred to as “trained traditional birth attendants.” At times, they are also called “trained birth attendants,” which is a non-standard, informal definition. In this article, the term “trained birth attendant” is used to refer to the birth attendants trained by the Life Abundant Primary health care program to provide perinatal services. This has been the commonly used term for the trained TBAs since the inception of the Life Abundant Primary health care program more than 20 years ago.

In sub-Saharan Africa, the presence of skilled birth attendants at all births is an unforeseeable goal. Skilled birth attendants conduct less than half of deliveries, with an estimated 22.2% of deliveries attended by traditional birth attendants, 26.8% by family members, and 5.9% of women delivering alone.⁸ Although TBAs are a significant workforce who have been shown to capably perform certain aspects of maternity care,^{9–11} their role remains controversial. Their role in HIV/AIDS prevention and control has been limited,¹² and their involvement in HIV/AIDS activities has been questioned and discouraged.^{13,14}

A literature search could not find reference to a program that has incorporated PMTCT care into the care provided by TBAs, trained TBAs, or trained birth attendants. This report describes the introduction, successes,

and challenges of implementing a PMTCT program using trained birth attendants. It was initially performed at the direction of the Director of the Cameroon Baptist Convention Health Board (CBCHB) to respond to persistent controversies and challenges raised by visiting international and governmental agencies regarding the ability of the CBCHB-trained birth attendants to provide PMTCT care. In addition to the program described here, TBAs were trained to be involved in PMTCT activities in Tanzania¹⁵ and Uganda (Dr. Marc Bulterys, Global Aids Program, National Center for HIV and Tuberculosis Prevention, Centers of Disease Control and Prevention, Lusaka, Zambia, written communication, July 2006).

BACKGROUND

Cameroon is a country in sub-Saharan Africa that is slightly larger than California. The climate varies with the terrain, from tropical forests along the coasts to semiarid and hot in the north. The population, estimated at more than 17 million, consists of many tribal groups, each with its own language and cultural uniqueness. In rural Cameroon, it is estimated that 44.2% of women are delivered by skilled birth attendants, 18.6% by traditional birth attendants, 29.7% by family members or others, and 7.3% of women deliver alone.¹⁶ Therefore, if PMTCT care is limited to being only clinic- or hospital-based, less than half of pregnant women would have access to PMTCT care. Additionally, not all hospitals and clinics in Cameroon have elected to offer a PMTCT program.

In Cameroon, it is estimated that 505,000 individuals are presently living with AIDS; 61% are women.¹⁷ In 2004, the seroprevalence of HIV in Cameroon was 5.5%, with the highest prevalence of HIV infection among women in the North-West province (11.9%). The HIV prevalence rate is slightly higher among pregnant women than the overall prevalence among women (7.4% vs 6.8%, respectively). Until 2000, there were minimal health activities within Cameroon that addressed MTCT.

The CBCHB is a private, faith-based health care system consisting of 3 hospitals, 22 integrated health centers, and 42 primary health centers. In 2000, the CBCHB developed and initiated a PMTCT program with a grant from the Elizabeth Glaser Pediatric AIDS Foundation. By December 2004, this program was actively functioning in 115 facilities in 6 of the 10 provinces in Cameroon (44 CBCHB health facilities, 38 government, 9 private/occupational, and 24 other private hospitals and clinics).¹⁸ The majority of these PMTCT programs were started and continue to function within hospitals and health centers in larger towns and cities.

In 2002, the CBCHB PMTCT program was expanded to their primary health centers in an effort to reach the more isolated rural populations. CBCHB rural health care services are provided by the Life Abundant Primary health care program through primary health centers.¹⁹

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These community-sponsored and -maintained health facilities provide basic outpatient care and perinatal services in rural villages, many of which are very remote. The primary health center is managed by a local village health committee and is staffed by health promoter(s) and trained birth attendants. Using standing orders, the health promoter provides limited outpatient medical care treating common illnesses. All maternity care is provided at the primary health center by the trained birth attendants, including antenatal, labor and delivery, and postpartum care. In villages with primary health centers, almost all women give birth at the primary health center and are attended by the trained birth attendants. These village health care workers are selected by the community and reside within the community. To be accepted for birth attendant training, the individual must be literate, well-respected in the community, of positive moral attitude, and have given birth or fathered babies. Though most of these birth attendants are females, gender is not a selection criterion.

The CBCHB Life Abundant Primary health care program provides both initial and ongoing training plus supervision and technical support to the village health committees and primary health center staff through nurse supervisors, who visit each site on a regular basis. On their periodic visits, nurse supervisors administer immunizations and evaluate more complicated patients.

TRAINED BIRTH ATTENDANT PMTCT PROGRAM DESCRIPTION

A PMTCT program is initiated in a primary health center through a defined process. First, the supervisory staff meets with the village health committee and educates them about HIV and PMTCT. After the presentation and discussion, the village health committee is offered the option of integrating PMTCT care into the existing maternity care. If the committee accepts, the trained birth attendant is sent to complete additional formal training in the PMTCT protocol. This protocol includes confidential HIV counseling (group pretest and individual posttest counseling techniques), performing an oral fluid rapid HIV antibody test (OraQuick; OraSure Technologies, Inc., Bethlehem, PA), and peripartum administration of nevirapine to the mother and baby. Specific training is provided on how to explain the negative and the positive HIV test, which includes description of the small possibility that the test is false-positive and will require additional HIV testing. If the OraQuick test is positive, the nurse supervisor performs a second rapid HIV test on venous blood (Determine; Abbott Diagnostic Division, Hoofddorp, The Netherlands) during a regular visit to the primary health center. In the case of discordant test results, the mother is sent to a hospital or health center for a third “tiebreaker.” The Centers for Disease Control and Prevention (CDC) has evaluated the rapid HIV tests performed by the CBCHB PMTCT program and found

serial HIV testing with two rapid HIV Tests (Determine and Hemastrip [Perle Medical, Inc., Melbourne, FL]) to be 97.6% sensitive and 99.7% specific.²⁰

The CBCHB PMTCT Program uses an “opt out” approach when providing HIV testing. In the primary health centers, women are referred to alternate facilities for common antenatal blood tests, but many are unable to get to these facilities because of poverty and limited transportation. HIV testing is the only laboratory test performed at the primary health center. The basic program guidelines for the training of PMTCT counselors²¹ were minimally modified in both counseling and laboratory techniques for the trained birth attendant training.

The protocol for nevirapine administration follows common recommended regimes.^{22,23} Pregnant women who have a positive HIV test (OraQuick) are given one 200-mg nevirapine tablet to take during labor. Nevirapine should be taken by the mother between 2 and 48 hours before birth to assure transplacental passage to the fetus. The dose should be repeated if taken earlier than 48 hours before birth. The trained birth attendant gives the newborn 2 mg/kg nevirapine syrup within 72 hours after birth. If the primary health center has no baby scale, the trained birth attendant gives a standard dose of 0.6 mL of nevirapine. If the maternal dose was not taken within the appropriate time frame, the trained birth attendant gives the newborn 2 doses (one immediately after birth and a second at 48–72 hours). Beginning in 2006, infants and mothers were no longer given second doses of nevirapine because of the length of the half life of the drug.

Mixed feeding is commonly practiced in rural Cameroon.²⁴ There are multiple physical barriers to bottle feeding, including the lack of available formula and potable water. Additionally, there is strong cultural pressure on women to mix feed their infants with breast milk and locally-available food.

Although the trained birth attendants are taught to educate the women about the transmission of the HIV virus through breast milk, few women in these rural villages have the support and capability to provide formula to their children. The issue of formula feeding being “acceptable, feasible, affordable, sustainable and safe” (AFASS criteria) has been addressed by the WHO in a Consensus Statement published in October 2006.²⁵ Several recent studies in African countries identified an increase in infant morbidity and mortality when the infants of HIV-infected mothers were weaned at 4 to 6 months of age. Unless replacement feeding is “AFASS”, it is now recommended that HIV-infected women continue to breastfeed after 6 months with supplementation of complementary foods. Each mother and infant should be assessed at frequent intervals, and all breastfeeding should be stopped once the infant can be provided a nutritionally adequate and safe diet without breast milk.

Table 1. Follow-up Determine Testing of 82 Women With Positive OraQuick HIV Antibody Tests

Test Results	n (%)
Positive Determine test	49 (59.7)
Negative Determine test	3 (3.7)
Reason the Determine test was not done	
Test kit not available	10 (12.2)
Family left village after positive oral test	6 (7.3)
Patient/family refused further tests	5 (6.1)
Unable to identify why test not done	9 (11.0)
Total	82 (100.0)

PROGRAM REVIEW

Common PMTCT program data were analyzed from the data collection forms maintained by trained birth attendants at each program site, as well as data from a defined verbal interview of each trained birth attendant. These data were collected in a 1-week period of time by the authors and include all data from the initiation of PMTCT care in July 2002 through June 2005.

In June 2005, PMTCT care had been initiated in 21 primary health centers. One site was inactive, because the trained birth attendant died. The following data were collected from the 30 trained birth attendants working in the 20 active PMTCT primary health center sites.

Between July 2002 and June 2005, the trained birth attendants counseled 2331 women, with 2310 (99.1%) accepting initial OraQuick testing. Eighty-two of the 2310 women (3.5%) were OraQuick-positive.

Of the 82 women who tested positive via the initial OraQuick test, 52 (63.5%) had a second rapid blood HIV antibody test with the Determine HIV test. Forty-nine women had a positive second rapid HIV test, and three tested negative. Of the three women who had a negative Determine test, one had a negative tiebreaker test, one refused a third test, and one was referred to the hospital with the test result unknown. Table 1 presents the follow-up of the women with positive OraQuick tests.

The trained birth attendants were taught to presumptively give prophylaxis to all women who had a positive OraQuick test and to their newborns at delivery. Of the 62 women who gave birth to live babies, 42 were delivered by trained birth attendants at the primary health centers. Of these 42 women, 37 (88.1%) received nevirapine prophylaxis, and 5 women did not receiving prophylaxis at delivery. The reasons medication was not given included: 1) nevirapine tablets were not available at two deliveries; 2) two mothers refused prophylaxis; and 3) one woman delivered when the trained birth attendant was not present and no other staff was trained to provide prophylaxis. Sixteen of the 62 women gave birth in other facilities with 11 (68.8%) receiving prophylaxis. Four of these 16 women were referred by the trained birth attendant, including two women transferred

because of twin gestations and two women for PMTCT prophylaxis when no medication was available at the primary health center. The remaining four women gave birth at home. Each of these women had been referred to an alternate facility by the TBA because no medication was available at the primary health center. These women and/or their families selected home birth rather than delivery elsewhere. Prophylaxis was not possible for 20 women because 10 had not yet delivered, one delivered at a previable gestation, one delivered a premature baby at home who died soon after birth, two delivered stillborn infants, and six women moved to unknown locations.

Two women delivered twins. Therefore, a total of 62 women delivered 64 live infants. Of the 42 newborns delivered by the trained birth attendants, 36 (85.7%) were treated after birth. The reasons why six newborns were not treated included: 1) nevirapine syrup was not available at four deliveries; 2) one mother refused to have her baby treated; and 3) one delivery occurred when the trained birth attendant was not present with no other available staff trained to provide prophylaxis. The trained birth attendants were able to treat 35 mother and baby pairs following the PMTCT protocol in which they were trained.

The CBCHB PMTCT program attempts to perform polymerase chain reaction (PCR) testing in infants born to mothers who are HIV positive during the first 6 weeks of life. Because of the difficulty of drawing infant blood and shipping it for testing, PCR testing is not performed at the primary health centers. Instead, a rapid antibody test is performed (OraQuick or Determine) when the child reaches 15 months of age. Of the 64 children whose mothers had a positive OraQuick test, 29 (45.3%) were 15 months of age or older in June 2005. Fourteen (48.3%) of the 29 children were tested for HIV. Thirteen of these 14 children had received nevirapine prophylaxis at birth. Eleven of these thirteen children had negative HIV tests and two had positive tests (15.3%). One of the HIV-positive children was alive, and one had died at 23 months. One child, who had not received prophylaxis, tested negative. The mother of this child refused to return

Table 2. Postpartum Health Condition of Mother and Child—July 2005

Health Status	Mother n (%)	Baby n (%)
Alive and well*	68 (82.9)	55 (85.9)
Alive: Unknown status	2 (2.4)	2 (3.1)
Alive: Sick†	4 (4.9)	1 (1.5)
Dead	3 (3.7)	6 (9.4)
Unknown status	5 (6.1)	—
Total	82 (100)	64 (100)

*Alive and well was defined as being without obvious signs of illness and able to perform common activities of daily living.

†Sick was defined as having signs/symptoms of any illness and unable to consistently perform common daily activities.

to clinic following the positive OraQuick test and delivered at an alternate facility that did not have PMTCT care. Ten infants were not tested because either their family refused further testing or their family did not return to the primary health center for further care. Two children were managed at alternate facilities for their health care with their HIV test result unknown. One child was not tested because tests kits were not available. Finally, the reason why two children were not tested could not be identified. Table 2 presents the health status of the 82 women who were HIV-positive via the OraQuick test at the time of birth, and their 64 live born infants as of June 2005.

DISCUSSION

The acceptance rate of HIV testing varies greatly among populations. In the CBCHB PMTCT program, 91.2% of women accepted HIV testing following counseling in 2005.²⁶ In the primary health centers, the acceptance rate (99.1%) was significantly higher ($P < .0001$). A number of factors likely contribute to this acceptance rate. First, there is a national policy in Cameroon encouraging HIV testing, which has been widely publicized including in rural areas.¹⁷ Second, the PMTCT training curriculum provides a comprehensive knowledge base, including understanding why the program is important to each woman, family, and the general community. The trained birth attendants are taught to provide positive and accurate information first in a group session followed by private, individual counseling. Training emphasis is placed on why confidentiality is necessary and how to maintain confidentiality. Presenting information in a positive, sensitive, and confidential manner has also been shown to influence the acceptability of voluntary HIV testing in other African populations.²⁷ Additionally, the trained birth attendants are highly regarded and trusted within these communities, which contributes to women being more accepting of the counseling and testing. Finally, cultural factors may influence this high acceptance rate. PMTCT programs are initiated with the involvement and support of the village health committee and village chief. In these community-based and -supported clinics, women may feel pressure from these authorities to utilize the primary health center services, including any testing provided.

An oral rapid HIV antibody test was used for the initial screening test because it was the most user-friendly and acceptable to the trained birth attendants who did not perform any type of blood testing during perinatal care. We found that a recurrent program barrier was maintaining an adequate supply of OraQuick test kits. Both the oral and blood HIV rapid tests have a sensitivity of more than 97%, but the OraQuick oral fluid assay has a relatively short shelf-life and is more expensive than the more commonly-used rapid blood HIV assays in Africa. The

Determine test has a longer shelf life and is donated, which reduces program costs. Although there are gaps, the supply of HIV blood assay kits is more stable. In response to findings of this review and the encouragement of a visiting team from Zambia and the United States,²⁸ the program began training the trained birth attendants to perform Determine HIV blood tests in 2006. After helping the nurse supervisors perform the Determine test and seeing the simple procedure, the trained birth attendants were receptive to using the blood test. All have now been trained to perform the initial screening with the Determine HIV test.

Only 63.5% of the women with a positive OraQuick test had a second Determine test. We identified multiple barriers to providing further testing, including geographic isolation, manpower limitations, and difficulty in obtaining test kits. It was initially assumed that the nurse supervisors could visit the primary health centers monthly to support the PMTCT program, which included performing the second rapid test, giving the patient the final test results, and counseling the patient and family. Unfortunately, most nurse supervisors were unable to visit their assigned primary health centers monthly secondary to the geographic isolation and their multiple other duties. Transportation remains a major challenge, especially during rainy season when roads and trails are often impassable. Additionally, program transportation is limited and local transportation is sporadic and unreliable. Finally, Determine HIV test kits were not always available, secondary to supply problems.

We found it problematic that a low proportion of women were not receiving the second HIV test. Although both the oral and blood tests have a high sensitivity and specificity, slightly more false-positive and false-negative results occur with the oral fluid than the whole blood (Dr. Marc Bulterys, Global Aids Program, National Center for HIV and Tuberculosis Prevention, Centers of Disease Control and Prevention, Lusaka, Zambia, written communication, July 2006).

Ideally, the nurse supervisors should be present to assist with the HIV test and posttest counseling. A positive HIV test is life changing for each woman and often emotionally difficult for the trained birth attendant to present to her neighbor, whom many times she has known and interacted with since childhood. Unfortunately, having the nurse supervisor present is not always possible, and the program is currently evaluating the possibility of the trained birth attendant performing the second test and presenting the final test results to the woman. If instituted, further training will be required for each trained birth attendant with the understanding that not everyone may be able to perform the second test and counseling required. Despite these problems, the percentage of HIV-positive mothers treated with nevirapine by the trained birth attendants (88.1%) at the primary health centers is greater than that of mothers

receiving nevirapine in all 155 CBCHB PMTCT facilities in 2005 (74.1%).

A continued challenge for the CBCHB PMTCT program has been prophylaxis of the newborn of HIV-infected mothers. In 2005, 41.3% of newborns received nevirapine at birth in all facilities served by the CBCHB PMTCT program. A significantly higher proportion of the newborns (85.7%) of HIV-infected mothers were treated by the trained birth attendants in the primary health centers ($P < .0001$), compared to the newborns of mothers who were not infected with HIV.

We found that a primary reason women and/or their babies were not treated by the trained birth attendants was the lack of medication. The geographic isolation of the primary health centers contributes to the challenge of maintaining medication supplies. During the review period, the CBCHB PMTCT protocol changed, allowing program staff to dispense a nevirapine tablet to each mother at the time of the initial antenatal positive HIV screening test and to instruct her to take the tablet in active labor. This change in policy and the increased attention by PMTCT program administration to maintaining adequate supplies of nevirapine tablets has improved the percentage of mothers receiving prophylaxis since this analysis was completed.

Maintaining an adequate supply of nevirapine syrup at each primary health center has been more challenging, because the syrup cannot be stored in small amounts for distribution and has a short shelf life of 1 month once opened. CBCHB Pharmacy continues to seek a cost-effective methodology in which the syrup can be kept in small (e.g., 5-dose containers) or in individual droppers or syringes at the primary health center, maintaining nevirapine syrup at PMTCT sites continues to remain a primary problem facing the program.

In this program, 42 women were successfully delivered by trained birth attendants at the primary health centers. Women who are HIV-positive and asymptomatic are not referred to deliver elsewhere. The trained birth attendants are taught to recognize risk factors and physical signs and symptoms of HIV/AIDS. Women with risks or symptoms are referred to alternative facilities for delivery. The trained birth attendants and nurse supervisors must base their judgment on physical findings, because they do not have laboratory capability to detect advancing disease.

The goal of any PMTCT program is to prevent HIV infection in children. The final outcome of this program is that 15.3% of these infants had positive HIV tests after 15 months of age, which is comparable to that of the original nevirapine study (15.7%) in Uganda²⁹ and the initial MTCT study (13%) in Cameroon.³⁰ This outcome must be interpreted cautiously because of the small number of children included in the population. However, it is a remarkable outcome, because of the known use of mixed feeding in this Cameroonian population. The

finding that HIV transmission was prevented in 85.7% ($n = 11/13$) of the infants who were given nevirapine and whose test results were available reaffirms the benefit of PMTCT programs.

Stigmatization remains a challenge in Cameroon,¹⁷ and this review confirms the risks of disclosure of HIV serostatus. It is not uncommon for marital violence to occur, for women to be forcibly driven from their homes, or for women to be abandoned by their husbands and families with the disclosure of the woman's positive HIV test³¹ (J. Wepnji, CBCHB Support Groups General Coordinator, written communication, July 2006). In this group of women, 11 (13.4%) did not receive further testing because the families left their community after the initial positive OraQuick test. Denial is also evident, as some believe nothing will happen to the mother, child, and family if further testing is not done. This may partially explain why 34.4% of families declined testing of their child at 15 months. A challenge for a number of the trained birth attendants has been that other individuals or family members have been accused of causing the mother's positive HIV test through witchcraft. Although the trained birth attendant does their best to explain that HIV/AIDS is a medical illness, witchcraft remains a center of African traditional religions in many of these communities. A final challenge to HIV prevention programs is that, in much of Africa, the myth remains that HIV can be cured by sexual intercourse with a virgin. All HIV/AIDS program workers, including the trained birth attendants, continue to work to eliminate this myth. In the villages served by the primary health centers, the HIV-infected mother frequently seeks the support and assistance from the primary health center staffs who do their best to positively assist these women, their children, and their families, as well as serving as their advocate within the community.

CONCLUSION

The impact of HIV in Africa continues to be disheartening. The prevalence of HIV-positive women in the Life Abundant Primary health care PMTCT program (3.5%) is similar to that found in other rural areas of Cameroon (4.0%). However, it is less than the HIV prevalence among all antenatal patients who receive PMTCT services through the Cameroon Baptist Convention Health Board (8.2%). It is important to note that 4.0% of the HIV-positive women have died since their positive HIV test, each being a notable loss to these small villages. Of hope to their families is the survival of most of the children aided through the PMTCT program. In the present circumstances, these are now children who will eventually face life without their mothers and usually without their fathers. Though antiretroviral treatment is

becoming more available and affordable, it remains unattainable to those individuals living in these isolated rural areas.

Finally, the role of TBAs and trained birth attendants in maternity care remains controversial. In the 1980s and 1990s, many TBAs were given training as part of the WHO Safe Motherhood initiative. However, their training seemed to have no impact on decreasing maternal mortality with WHO now advocating for skilled care in pregnancy and the postnatal period.³² There have been multiple publications questioning the benefit of TBA training programs as compared to other health investments.^{33–35} There have been an equal number of publications showing the positive value of incorporating TBAs in managing neonatal sepsis,³⁶ malaria chemoprophylaxis,³⁷ and tuberculosis control.³⁸ A recent study conducted in Pakistan trained TBAs to conduct births with clean delivery kits. There was a significant decrease in perinatal and maternal mortality in the geographic areas services by trained TBAs when compared to the areas where birth attendants were not trained.³⁹

In many countries that carry the burden of HIV/AIDS, there is a critical shortage of health care workers, including skilled birth attendants. Especially in many rural areas, the TBA is often the only person willing and available to assist mothers before, during, and after birth. We believe that with sensitive and intensive training, TBAs and other health care workers can be successfully trained to offer quality PMTCT care in rural areas in Africa, positively impacting the infant mortality rate, as well as supporting positive HIV/AIDS educational efforts. For such a program to be successful, ongoing supervision and support by health care professionals must be provided. Program challenges include maintaining an adequate supply of test kits and medication. Additional resources must be identified to comprehensively address the medical, spiritual, and psychosocial needs of HIV-infected women and their families in rural communities throughout Africa.

This paper is dedicated to the memory of Menjara Elisabeth, trained birth attendant; her dedication to and care for her people continue to serve as a positive example to us. We wish to recognize and thank each trained birth attendant who has implemented the PMTCT program in her village. This is very difficult work, which they have willingly and selflessly assumed in addition to their other duties and tasks of daily living. These trained birth attendants receive no financial compensation for performing PMTCT care but do so solely to save the children and help their neighbors. The authors recognize and appreciate the able support and assistance of the nurse field supervisors who are pivotal to this program's success. We also wish to recognize Ruby Eliason, DrPH, and Laura Edwards, MD, who worked tirelessly in training and supporting trained birth attendants from the Life Abundant Primary health care program's inception in 1984 until their tragic death in a motor vehicle crash in Cameroon during a primary health center site visit in 2000. They developed the organizational infrastructure that made this program possible. We appreciate and

acknowledge the Cameroon Baptist Convention Health Board AIDS Control Program's ongoing support for implementing and maintaining PMTCT in rural areas, and especially the leadership provided by Joseph Nkfusai, BSc, Program Director, and Drs. Tom and Edie Welty, Associate Directors. We recognize Mr. Tancho Sam and his able training of the trained birth attendants to perform the HIV testing. Finally, a special thanks to the Elizabeth Glaser Pediatric Foundation, which funds the PMTCT program and Bread for the World, which provides financial support and encouragement to the Cameroon Baptist Convention Health Board Life Abundant Primary health care program. As required by the Cameroon Baptist Convention Health Board, approval of manuscript submission for publication was requested and granted by the Cameroon Baptist Convention Health Board Institutional Review Board on March 3, 2006.

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