

# Preventing mother-to-child transmission: factors affecting mothers' choice of feeding — a case study from Cameroon

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## ABSTRACT

This paper reports on factors influencing the decision of mothers regarding the type of feeding method for their babies in a rural setting in Cameroon. The aim of the study was to ascertain the proportion of mothers choosing the different methods of feeding, to determine the various factors influencing their choices, and to ascertain the relationships of these factors to their respective choices. Questionnaires were used on 108 HIV-positive mothers who had delivered babies and who were administered nevirapine at least 3 months prior to the study. A focus group discussion with mothers also took place. Findings were that more mothers (84%) chose breastfeeding than artificial feeding (16%), while a minority (4%) selected mixed feeding. Factors found to militate against artificial feeding were cost (69%), stigma (64%), family pressure (44%), inconvenience in preparation/administration (38%), prior education from health workers (23%), and loss of special attention from family (8%). On the other hand, advice of health worker (44%), ill health (19.5%), free milk (12.5%), job pressure (12.5%) and loss of beauty (12.5%) were found to militate against breastfeeding. A direct relationship was also found between age, educational level, income size, marital status and choice of feeding. Policies targeting stigma reduction and socio-cultural factors affecting the choice of feeding are needed to optimise uptake of the less risky methods of feeding which could in turn contribute to a reduction in transmission.

*Keywords: HIV/AIDS, mother-to-child transmission prevention, feeding.*

## RÉSUMÉ

Cette communication présente des facteurs qui influencent la décision des mères concernant la méthode d'allaitement de leur nourrissons, en zone rurale au Cameroun. Le but de cette étude était de s'assurer de la proportion de mères qui choisissent de méthodes différentes d'allaitement, de déterminer les facteurs influençant leur choix et d'étudier la relation entre ces facteurs et les méthodes d'allaitement choisies. Pour recueillir des données, un questionnaire a été utilisé auprès de 108 mères séropositives qui ont des nourrissons. Ces mères étaient sur le traitement de la névirapine depuis au moins 3 mois avant le début de cette étude. Une discussion d'un groupe de foyer de mères a eu lieu. Les résultats ont montré que plus de 84% de mères ont choisi l'allaitement maternel contre 16% qui ont choisi l'allaitement artificiel alors qu'une minorité (4%) ont choisi l'allaitement mixte (maternel et artificiel). Les raisons contre l'allaitement artificiel sont les suivants: le coût (69%); la stigmatisation (64%); les pressions familiales (44%); les inconvénients liés à la préparation et l'administration du lait artificiel (38%); une éducation préliminaire de la part du personnel soignant (23%) et le manque de soins particuliers de la part de la famille (8%). D'autre part, les facteurs qui favorisent l'allaitement artificiel sont les suivants: les conseils du personnel de santé (44%); la mauvaise santé (19.5%); du lait artificiel gratuit (12.5%) et la perte de beauté (12.5%). Nous avons constaté une relation entre l'âge de la femme, le

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niveau d'éducation, le niveau du revenu, le statut civil et le choix d'allaitement. Il est nécessaire de mettre en place des politiques visant la réduction de la stigmatisation et les facteurs socioculturels qui influencent le choix d'une méthode d'allaitement afin de maximiser une compréhension de méthodes d'allaitement à moindre risque qui par la suite pourrait contribuer à la réduction de transmission.

*Mots clés : VIH/SIDA, prévention de la transmission mère-enfant, allaitement.*

### Introduction

The majority of people living with HIV/AIDS are women. Women aged 15 and older make up 58% of the 42 million people who are living with HIV/AIDS (UNAIDS, 2002). Over 90% of these women live in the developing world. Mother-to-child transmission (MTCT) of the virus — also known as vertical transmission — is the main route of HIV infection in children under 10 years of age, with more than 600 000 infants becoming infected with HIV yearly. Since the beginning of the epidemic, an estimated 5.1 million children worldwide have been infected. Of those, the overwhelming majority are in Africa. This is due to high fertility rates and high HIV prevalence in pregnant women, reaching levels of 40% in some cases (UNICEF/UNAIDS, 1999). The virus can be transmitted during pregnancy, labour and delivery (perinatal transmission), or through breastfeeding. Among infected infants who are not breastfed, two-thirds are believed to have contracted HIV around the time of delivery. Some conditions that may increase risk of transmission during breastfeeding are the advanced disease stage of the mother, maternal vitamin A deficiency, breast abscesses or infections, certain patterns of breastfeeding, and oral infection in the infant.

Until recently, there was no means of preventing MTCT for those HIV-positive women who wished to give birth. Two interventions using antiretrovirals (nevirapine and zidovudine) concurrently with feeding adjustments have proven to be very effective in reducing MTCT of HIV (Guay, Musoke, Fleming *et al.*, 1999; Shaffer, Chuachoowong, Mock *et al.*, 1999; UNAIDS, 1999). The successful implementation of these programmes is highly dependent on the choice and effective implementation of an appropriate feeding regimen. For women who are HIV-negative, breastfeeding is the preferred child survival strategy for providing nutrition and avoiding infectious diseases during the first 2 years of life. When a baby of an HIV-positive mother is breastfed and given other

liquids or solids, there is continued concern that if no drugs are administered, the risk of infection is about 30 - 35%. The risk is reduced to 20% if the child is not breastfed. Complete avoidance of breastfeeding (using artificial feeding) is considered the most reliable way to avoid neonatal transmission. There is evidence to suggest that exclusive breastfeeding for the first 3 months may result in lower transmission rates than mixed feeding (Coutsoudis, Pillay, Spooner, Kuhn & Coovadia, 1999). Improper use of breast-milk substitutes (if mixed with tainted water or if over-diluted) can cause severe malnutrition and fatal infectious diseases. The risks associated with replacement feeding may outweigh the benefits. In sub-Saharan Africa, diarrhoea is the leading cause of death in children under 5 years. A sound assessment of the safety of replacing breastfeeding depends on access to clean water, a reliable supply of formula, and availability of instruction.

The World Health Organisation (WHO) recommends the following for mothers with HIV:

- avoid breastfeeding entirely when replacement feeding is acceptable, feasible, affordable, sustainable and safe
- breast-milk should be fed exclusively during the first months in cases where the mother chooses to breastfeed
- if mothers choose not to breastfeed from birth or stop breastfeeding later, they should be provided with specific guidance and support for at least the first 2 years of the child's life to ensure adequate replacement feeding.

Other preventive measures jointly proposed by the WHO, UNICEF and UNAIDS include the expression of colostrum, artificial feeding with formula or animal milk, pasteurisation of maternal milk, reduction of breastfeeding duration or resorting to a seronegative wet-nurse (WHO, 1998a; WHO, 1998b; UNAIDS, 2001).

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As is the case with most countries south of the Sahara, prevention of MTCT (PMTCT) is a target of Cameroon's National Aids Control Committee. The country's 11.8% HIV prevalence reflected a drastic rise among pregnant women between 1998 and 2000, and almost doubled from 6% to 11% among those aged 20 – 24 (UNAIDS, 2002). With pilot sites set up as early as 2000, a gradual scaling up is taking place. One province (North West) had 16 sites as at June 2002 (Kube, 2002). The policy with regard to choice of feeding is artificial feeding as a first choice and exclusive breastfeeding if the first is not feasible. Even though nevirapine is given free of charge, the mothers have to pay for artificial food and other related costs, including treatment with antiretrovirals (ARV).

Even though the WHO/UNAIDS guidelines on feeding in HIV/AIDS settings are quite clear, many factors affect mothers' choice of feeding. Desclaux and Taverne (2000) have argued that preventive measures applied successfully in developed countries cannot be generalised. Some of these measures (like formula feeding) entail infectious and nutritional risks in health contexts of low-income countries, where they are not economically or socially accessible for all women. Furthermore, HIV/AIDS-related stigma, and its associated discrimination, is known to negatively affect all aspects of HIV prevention, diagnosis, treatment and care (Brown, Trujillo & Macintyre, 2001). Increased uptake of PMTCT services in general and improved adherence to optimum feeding practices can be attained if factors affecting the choice of feeding of mothers are identified and appropriate interventions put in place. This has not been done in Cameroon. Thus the current study seeks to identify such factors and suggest plausible interventions for improved uptake.

### Methodology

The St Martin De Porres Catholic Mission Hospital Njinikom is located in the North West part of Cameroon. More than 90% of the inhabitants of the area are subsistence farmers with over 76% living on less than \$1 per day. The institution provides health care services to over 170 000 people. In late 2001 an HIV/AIDS prevention, treatment and care programme (Inter Care/Njinikom Project Hope) was put in place with the help of the British-based organisation Inter Care, Medical Aid for Africa. PMTCT has been a core component of the project. Free voluntary counselling

and testing (VCT) surveys indicated 16.2% seropositivity with 12.2% prevalence among pregnant women. Over the years (since November 2000) 2 864 mothers have been counselled and tested for HIV in the health institution, and over 166 have been administered nevirapine during labour. The programme currently has a nevirapine coverage rate of 63% (ascertained within the past year), as many mothers deliver elsewhere where their HIV status is not known.

The study was carried out using questionnaires. Trained health personnel administered tested questionnaires to 104 mothers, and a randomly selected focus group discussion with 18 mothers was held. The purpose of the study was explained to the mothers and their consent sought prior to administration of the questionnaire. The criteria excluded mothers who refused to participate and those who were too sick to take part or had lost their babies. The inclusion criterion was all mothers who participated in the PMTCT programme, i.e. had been counselled, tested positive, administered nevirapine and delivered live babies at least 3 months prior to the study.

### Results

Of the 348 mothers who had tested positive for HIV prior to the study, 144 had been lost (had moved, delivered their babies elsewhere or died). A total of 38 had not yet been delivered of their babies and 62 were either not eligible for the study or did not participate. Results indicated that the majority of mothers in the study (84%) were breastfeeding their children, while the remaining 16% were using formula feed. However it emerged from the focus group discussion (FGD) that some mothers had initially used formula feeding before switching to breastfeeding.

The age group 20 – 30 years had the highest number of mothers (39%), followed by the age group of less than 18 years (30%), with fewest mothers in the age group above 40 years (7%). Table 1 shows the correlation of age of the mothers involved in the study and the choice of feeding. Exclusive breastfeeding was found to decrease with increasing age and conversely an increase of artificial feeding was observed with increasing age.

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**TABLE 1. AGE OF MOTHERS AND CHOICE OF FEEDING**

Age	Number	Artificial milk	Breastfeeding
< 18	29 (30%)	3 (11%)	26 (89%)
18 - 30	38 (39%)	4 (11%)	34 (89%)
31 - 40	24 (24%)	7 (30%)	17 (70%)
> 40	7 (7%)	2 (29%)	5 (71%)

The relationship between the income-earning capacities of the respondents and their choice of feeding is shown in Table 2. Most of the mothers earned less than 1US\$ per day. It was observed from the FGD that some of the mothers did not carry out any income-generating activity and were totally dependent on their husbands or partners. Overall an increase in income was observed to relate directly to an increase in the number of mothers opting for artificial milk. The relationship to income was not very strong for those who decided to breastfeed their babies.

**TABLE 2. INCOME OF MOTHERS AND CHOICE OF FEEDING**

Income	Number	Artificial milk	Breastfeeding
< 1 US\$/day	52 (53%)	6 (12%)	46 (88%)
1 - 2US\$/day	23 (24%)	4 (18%)	19 (82%)
2 - 5US\$/day	13 (11%)	4 (37%)	10 (70%)
5 - 10US\$/day	7 (7%)	1 (15%)	6 (86%)
> 10US\$/day	3 (3%)	1 (33%)	2 (67%)

Table 3 shows the educational levels of the respondents with their choice of feeding method. A large proportion (41%) had less than 7 years of formal education. This was closely followed by those with 8 - 12 years of formal education (29%). The smallest group (3%) was those with above 18 years' formal education, who held university degrees. Higher education was found to relate directly to decreased use

**TABLE 3. EDUCATIONAL LEVEL AND CHOICE OF FEEDING**

Formal education	Number	Artificial milk	Breastfeeding
1 - 7 years	41 (41%)	8 (20%)	33 (80%)
8 - 12 years	29 (29%)	5 (18%)	24 (82%)
13 - 14 years	16 (16%)	2 (13%)	14 (87%)
14 - 17 years	9 (9%)	1 (12%)	8 (88%)
> 18 years	3 (3%)	—	—

of artificial milk. Conversely it was observed that the more educated the mother, the greater the chances of her choosing breastfeeding.

Table 4 shows the marital status of the respondents and their choice of feeding. A majority of respondents (55%) were married (71% of them from monogamous homes and 29% of them from polygamous homes). Widowed mothers constituted 19% of the group and it emerged from the FGD that some of them accepted that their husbands had died of HIV/AIDS. It was also revealed from the FGD that some of the widows had been inherited by their brothers-in-law, while some had remarried. In half of the cases the present husbands did not know the HIV status of their wives prior to marriage. It was observed that a greater proportion of single mothers involved in the study chose to breastfeed their babies than the married mothers. This was much higher among those who were widows.

**TABLE 4. MARITAL STATUS AND CHOICE OF FEEDING**

Marital status	Number	Artificial milk	Breastfeeding
Single	17 (17%)	3 (18%)	14 (82%)
Married	55 (55%)	10 (19%)	45 (81%)
(Monogamous = 39, polygamous = 15)			
Divorced (separated)	8 (8%)	1 (13%)	7 (87%)
Widowed	19 (19%)	2 (11%)	17 (89%)

Table 5 demonstrates the occupation of the mothers and feeding choice. A majority (40%) were farmers, followed by housewives (22%). The FGD revealed that some housewives were also farmers and a clear-cut demarcation was not possible. Furthermore some housewives also responded that they had no occupation. No direct relationship was observed between mode of feeding and occupation. It was however observed that among those who choose breastfeeding, the highest number were teachers followed by farmers and housewives.

**TABLE 5. OCCUPATION AND CHOICE OF FEEDING**

Occupation	Number	Artificial milk	Breastfeeding
Housewives	22 (22%)	4 (19%)	18 (81%)
Farmers	39 (40%)	7 (18%)	32 (82%)
Teachers	11 (11%)	1 (9%)	10 (91%)
Students	14 (14%)	2 (15%)	12 (85%)
Other civil servants	6 (6%)	0 (0%)	6 (100%)
No occupation	6 (6%)	2 (33%)	4 (67%)

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**Table 6. FACTORS MILITATING AGAINST ARTIFICIAL FEEDING**

Cost	57 (69%)
Stigma	53 (64%)
Family pressure	36 (44%)
Inconvenience in preparation/administration	31 (38%)
Prior education from health workers	19 (23%)
Loss of special attention from family	6 (8%)

Table 6 reports some of the factors that militate against artificial feeding. The most common factor was found to be cost (69%), closely followed by stigma (64%). It emerged from the FGD that on average the cost of a tin of artificial feed on the local market was 4 US\$ and a baby needed approximately 36 tins within the first 3 months. Furthermore some mothers had resorted to over-diluting the milk so that it would last longer. The FGD also indicated that the perception of stigma was greater than actual experience of stigma. Most mothers had not directly experienced stigma as such. Their fears were mostly based on experiences of friends and colleagues. The FGD highlighted the connection between artificial feeding and stigma. Historically, health workers have told mothers (and the community) that breastfeeding was the healthiest choice for the baby. Many people are now aware that breastfeeding is not recommended for HIV-positive mothers. Therefore if a mother is using artificial feed, relatives and neighbours suspect the reason is HIV-related. Furthermore it emerged from the FGD that breastfeeding mothers had a prominent status in the society, so that they were given special food (sweet palm wine which is erroneously thought to replace artificial milk) and a special diet that included eggs. Mothers on artificial milk automatically lost this status.

Table 7 presents some of the factors that militate against breastfeeding. The most prominent factor (44%) was advice from health workers on the risk involved in breastfeeding the baby. Some mothers (19.5%) were too sick to breastfeed their babies, while others ascribed not breastfeeding their babies to their jobs and also the availability of free milk at the initial stage of the programme. Notable too were the mothers who would not breastfeed their babies (12.5%) because they were concerned that the appearance of their breasts would change and they would look less attractive.

**Table 7. FACTORS MILITATING AGAINST BREASTFEEDING**

Advice of health worker	7 (44%)
Sickness	3 (19.5%)
Free milk	2 (12.5%)
Job	2 (12.5%)
Physical appearance	2 (12.5%)

### Discussion

Breastfeeding prior to the advent of HIV/AIDS was popular and this is reflected in the fact that the majority of mothers were breastfeeding their babies. Mothers who initiated formula feed and switched to breastfeeding reportedly did so because of cost and stigma. The fact that mothers took this decision in spite of the awareness of the consequences of such a decision shows the strong role these factors (cost and stigma) have to play in choice of feeding.

A majority of the mothers were less than 30 years of age, which reflects the fact that in the area of study women get married at an early age. Most of the teenage mothers were not yet married and the majority preference here for breastfeeding could be attributed to the fact that choosing artificial feeding was synonymous to a declaration of their seropositive status and thus could decrease their chances of getting married. Furthermore strong family support has been shown to increase adherence to feeding method and the older mothers, most of whom were married, could more comfortably adhere to artificial feeding as a result of support from their immediate family, unlike the spouses of single mothers who in some cases refuse to accept their parental roles (Bassett, 2000). The programme in place encourages spouses to come for testing, and 36% of legally married husbands had responded to this, while less than 5% of the unmarried spouses of HIV-positive mothers had been tested. Thus the legally married mothers had more family support and were more predisposed towards choosing artificial feeding.

With 52% of mothers earning less than \$1 per day it was difficult for mothers to raise the \$144 needed for a 3-month supply of exclusive formula feed. However the fact that some mothers resorted to diluting the milk rather than breastfeeding their babies showed a strong commitment to adhering to artificial feeding in spite of the stigma. Increased level of education was

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expected to lead to an increased understanding of the greater risk of transmission in artificial feeding. However the study found that the higher the level of education, the less the chance of choosing breastfeeding. It is likely that the educated mothers interacted with peers of a similar education level who might have been more informed regarding the rationale for artificial feeding and thus more prone to stigma. Thus reticence to use artificial milk may be a result of stigma and cost rather than the level of education.

The fact that more single mothers than married mothers chose to breastfeed their babies shows the strong role that support from the family plays in choice of feeding. The external family system provides a strong financial resource, which is available when a relative is sick. It would thus be expected that these married mothers would have greater access to artificial milk than their unmarried colleagues. Unfortunately in situations where stigma is high, it would be difficult for mothers to disclose their status, thus making it difficult for family or friends to help (Muko, Ngwa, Chingang, Anke & Shu, 2003). In the area of study it is not uncommon for the disease to be referred to as 'women's disease', an implication that women are solely responsible for the infection of their children, which contributes to misconceptions about the disease and its effects, even though women often become HIV-positive without ever having another relationship outside of their marriage. It has been suggested that parent-to-child transmission (PTCT) would be a more realistic description that may lessen the stigma women experience (Brown *et al.*, 2001).

The preference for breast-milk in this study was associated more with stigma than cost. However more widows chose to breastfeed their babies, probably because they did not have strong financial support from their families, compared with their married colleagues. In the area where the study was conducted, the death of a husband entails huge expenditure on funerals. Thus in most cases, the family finances would be spent on treatment for the deceased husband.

Career mothers with stable jobs preferred to breastfeed rather than to give their babies artificial milk, in spite of the fact that they would be expected to do so less, due to the time spent at work. These

mothers were more aware of the impact of their sero-status on their lives as a result of increased education. In the area of study, the higher the educational level, the greater the chances of getting a job, thus 'working mothers' are generally more educated. This is not the case with the farmers, most of whom had fewer years of formal education.

Apart from cost and stigma, which have been discussed as factors militating against breastfeeding, pressure from family relatives was observed to be a strong factor (44%). The FGD disclosed that relatives who were aware of the importance of artificial feeding in an area where breastfeeding was the norm were worried that their families would be subjected to stigma. Most members of the FGD felt that there was no difference in perception between a mother who gave the infant expressed milk and one who was feeding the infant with artificial milk. This was because the societal stigma would still be there and in some cases would be accentuated for a mother who gave the infant expressed milk. Furthermore, the inconvenience of preparing artificial milk (38%) was mostly attributed to lack of time, rather than other drawbacks to artificial milk, such as the fear of diseases, e.g. diarrhoea and unavailability of clean water, as reported in other studies (Desclaux & Taverne, 2000). Prior to the advent of HIV/AIDS, a great deal of emphasis was placed on the importance of breastfeeding; thus it will take many years for people to accept artificial feeding as a valid alternative free of stigma.

In the study, a mother who had recently delivered was given special status in the community. This was accentuated for those who were breastfeeding, and included a special diet with eggs, sweet palm wine, less work, etc. Mothers reportedly felt that giving the child artificial food would lead to loss of this special status.

Apart from the advice for mothers not to breastfeed given by the counsellors in the health institutions, the clinical state of mothers was another factor. Less than 2% of mothers were on ARV therapy, thus the chances of infection from opportunistic diseases were great for a majority of mothers. The fact that some mothers would give their children artificial milk if it was free further accentuates the issue of cost and availability as factors that could discourage breastfeeding. Few mothers (12.5%) attributed their decision to give

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artificial milk to their babies to pressure from their jobs and some (12.5%) felt that breastfeeding would cause them lose their beauty. Interestingly, these were the younger mothers who were not yet married.

### Conclusion

The study has shown that apart from cost and stigma, other sociocultural factors affect mothers' choice of feeding. For seropositive mothers, this decision is an inherent determinant of the immediate risk of transmission of HIV from mother to child. The benefits of many PMTCT programmes may be insignificant if children who are protected during pregnancy and delivery are contaminated during breastfeeding. The MTCT policies in place in Cameroon and other sub-Saharan countries do not adequately address some of these issues, especially the strong influence of stigma. Utilising the terminology 'parent-to-child transmission' may be helpful in this regard. However, the focus of interventions should not only be on saving the child and providing for the long-term medical and psychological needs of the mother, but also on the father and if possible the entire family. Furthermore, the provision of breast-milk substitutes by the health care services and the issue of cost need to be addressed. Given the diverse socio-economic and cultural resources available to women in Cameroon, it would be inappropriate to assume that blanket policies would be effectively implemented with expected impact in all areas. Health care workers should be given a central role in identifying what works in their specific regions. Evidence-based practices should be adopted in national policies. With increased availability of ARV treatment it would

be naïve to assume that a pregnant mother could be taking ARVs and replace breastfeeding with artificial milk without her relatives knowing her status. The traditional values and their impact need to be recognised and impact-mitigation interventions put in place.

### References

- Bassett, M.T. (2000). Psychosocial and community perspectives on alternatives to breastfeeding. *Annals of the New York Academy of Sciences*, 918, 128-135.
- Brown, L., Trujillo, L. & Macintyre, K. (2001). *Interventions to reduce HIV/AIDS stigma: What have we learned?* Horizons Program, Tulane University. pg 15 available at <http://www.popcouncil.org/horizons/horizons.html> (accessed 03/06/04).
- Coutsoudis A, Pillay K, Spooner E, Kuhn L & Coovadia HM. (1999) Influence of infant-feeding patterns on early mother-to-child transmission of HIV-1 in Durban, South Africa: a prospective cohort study. South African Vitamin A Study Group. *Lancet* 354 (9177): 471-476.
- Desclaux, A. & Taverne, B. (eds) (2000). *Allaitement et VIH en Afrique de l'ouest. De l'anthropologie à la santé publique*. Paris: Karthala.
- Guay, L., Musoke, P., Fleming, T. *et al.* (1999). Intrapartum and neonatal single-dose nevirapine compared with zidovudine for prevention of mother-to-child transmission of HIV-1 in Kampala, Uganda: HIVNET 012 randomized trial. *Lancet*, 354, 795-802.
- Kube, M. (2002). Preventing mother to child transmission. *Biostatistics and Therapeutics*, 17, 3 -12.
- Muko, K.N, Ngwa, V.C, Chingang, L.C, Anke, M. & Shu, E.N. (2003). Treatment with highly active anti-retrovirals (HAART): Willingness to pay for HAART. *Biostatistics and Therapeutics*, 22(3), 3-37.
- Shaffer, N., Chuachoowong, R., Mock, P.A. *et al.* (1999). Short-course zidovudine for perinatal HIV-1 transmission in Bangkok, Thailand: A randomized controlled trial. *Lancet*, 353, 773-780.
- UNAIDS (1999). *Prevention of HIV Transmission from Mother-to-Child: Strategic Options*. Geneva: UNAIDS.
- UNAIDS (2001). *New data on the prevention of mother-to-child transmission of HIV and their policy implications*. Geneva: UNAIDS.
- UNAIDS/AIDS (2002). *Epidemic Update*. Geneva: UNAIDS/WHO.
- UNAIDS/UNICEF/WHO (1998). *HIV and infant feeding. Guidelines for decision makers*. Geneva: WHO.
- UNICEF/UNAIDS. (1999). *Children orphaned by AIDS: Front-line responses from Eastern and Southern Africa*. New York: UNICEF/UNAIDS.
- WHO (1998a). *Guidelines for health care managers and supervisors*. WHO/FRH/NUT 98.1. Geneva: WHO.
- WHO (1998b). *A review of HIV transmission through breastfeeding*. WHO/FRH/NUT 98.3. Geneva: WHO.