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HIV-1 Transmission and Infant Feeding:
An Annotated Bibliography

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Expanded Promotion of Breastfeeding (EPB) Program

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A

HIV-1 Transmission and Infant Feeding:
An Annotated Bibliography

"The finding that HIV-1 is transmissible through breastfeeding has complicated advice on infant feeding in some settings." Nicoll et al, AIDS 1995;9:107-119

Current estimates show that more than one million children have been infected with HIV, most of whom have acquired the infection from their mothers. Transmission of HIV-1 occurs in 15% to 30% of infants born to HIV-1 infected mothers. Research shows that this transmission may occur in utero, during birth, and postnatally via breastmilk. Unfortunately, to date there are many more questions than answers regarding the risks of HIV-1 transmission through breastmilk. For example, virtually nothing is known about how risk of transmission may vary with infant age (e.g., are preterm or older children particularly at-risk?), specific breastfeeding practices (colostrum versus mature milk, exclusive breastfeeding versus mixed feeding in infants less than six months of age, mixed feeding versus no breastmilk among infants greater than six months of age), other infant risk factors (nutritional status, other infections), and other maternal risk factors (stage of infection, other infections, or nutritional status). Given that many women in HIV-1 prevalent areas have no choice but to breastfeed, there is very little information to enable them to breastfeed in such a manner that maximizes the benefits to the infant while reducing the risk of HIV-1 transmission. Information is needed on the risks associated with specific breastfeeding practices, as well as other factors that may modify these risks.

To evaluate the extent to which information is available that enables mothers, clinicians, and policy makers to make informed infant feeding decisions/recommendations, an annotated bibliography was developed. Studies are reviewed with respect to a pre-determined framework that includes the following factors: research location, study design, study population, research question, breastfeeding definition, mother-child characteristics, findings, methodological limitations, and programmatic implications. The literature base for this bibliography was constructed by searching the following databases: MEDLINE (Johns Hopkins University), REFLINE (National Library of Medicine), and PROCITE (Family Health International, Wellstart International). The search is inclusive of literature published between 1985, when the first reports of a relationship between HIV-1 transmission and infant feeding surfaced, and March 1996. In addition, a number of individuals involved in HIV-1 and breastfeeding research were contacted. A total of 123 articles, letters to the editors, and other publications are reviewed.

Breastfeeding is a complex behavior that not only varies between women, but varies within an individual woman over time. The bibliography reveals that research to date does not provide enough information on actual infant feeding practices to be programmatically useful: 91% of the articles failed to define "breastfeeding" at all. In most studies the time of infection could not be ascertained; infants classified as infected through breastfeeding could have been infected in utero or during birth. Although the rapid medical and scientific advances of diagnosing HIV-1 infection are readily incorporated into study designs, very little change is observed in these same studies with respect to how infant feeding practices are measured and classified. Research to date fails to provide the kind of information needed by mothers, clinicians, and policy makers to enable informed infant feeding decisions/recommendations. To be programmatically useful, future research needs to incorporate the physiological and behavioral complexities of breastfeeding into study designs and interpretation. Research is also needed to determine feasible and ethical methods for incorporating the results of such research into public health policy.

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B

Author : Acheson D.

Date : 7/30/88

n :

Title : HIV Infection, Breastfeeding, and Human Milk Banking - Letter

Journal : Lancet. July 30, 1988: 278

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Response to an editorial in the Lancet (HIV Infection, Breastfeeding, and Human Milk Banking. Lancet, July 16, 1988: 143 - 144). Defends the United Kingdom Department of Health policy and states that the issues in contention in the document cited, such as guidance for women in high risk groups, have not been endorsed by the United Kingdom Department of Health.

Design issues :

Programmatic implications :

Author : Ades AE, Davison CF, Holland FJ, Gibb DM, Hudson CN, Nicholl A, et al.

Date : 5/15/93

n : 527.00

Title : Vertically Transmitted HIV Infection in the British Isles

Journal : British Medical Journal. Vol 306, May 15, 1993: 1296 - 1300

Country : United Kingdom

Study design : Surveillance Study

Study population : Children born to mothers with HIV infection.

Research questions :
To describe the epidemiology of vertically acquired HIV-1 infection in the British Isles, including:
- The level of under-reporting;
- The vertical transmission rate; and,
- The clinical spectrum of pediatric AIDS.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
5.1% of women whose infection status had been known before delivery had breastfed their children as compared to 41.3% of women whose infection was not ascertained until after delivery. This pattern was consistent irrespective of the mother's exposure category except in IV drug users.

As a result of these findings, the authors encourage ante-natal HIV testing because it provides an opportunity to counsel infected women against breastfeeding.

Design issues :

Programmatic implications :
In countries where safe alternatives exist, the recommendation is for HIV-infected mothers not to breastfeed. In these settings, these findings would support the advocacy of ante-natal screening for HIV.

Author : Ades AE, Newell M-L, Peckham CS - Coordinators of the European Collaborative Study.

Date : 2/2/91

n : 600.00

Title : Children Born to Women with HIV-1 Infection: Natural History and Risk of Transmission

Journal : Lancet. Vol 337 (8736), Feb 2, 1991: 253 - 260

Country : Europe

Study design : Prospective Study

Study population : 600 children born to HIV-seropositive women in ten European centers

Research questions :
To study the natural history and vertical transmission rate of perinatal HIV infection.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The authors report a vertical transmission rate from this study of 12.9%.
Only 5% of the children in this cohort were breastfed for periods between 1 and 30 weeks.

Design issues :

Programmatic implications :

Author : Arnold L, Larson E.

Date : 1/1/93

n :

Title : Immunologic Benefits of Breastmilk in Relation to Human Milk Banking

Journal : American Journal of Infection Control. Vol 21, 1993: 235 - 242

Country :

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Reports that exclusively breastfed infants have a strongly acidic environment in their intestines, accumulating acetic acid in the form of an acetate buffer. Discusses issues of milk banking in the context of HIV.

Design issues :

Programmatic implications :

Author : Arnold L.

Date : 1/1/93

n :

Title : HIV and Breastmilk: What it Means for Milk Banks

Journal : Journal of Human Lactation. Vol 9 (1), 1993: 47 - 48

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Review of research on HIV and breastfeeding in the light of the implications of such research on milk banking.

Raises the issue of the benefits of exclusive breastfeeding in limiting virus transmission via breastmilk. Notes that HIV-1 is an acid labile virus and cites research that indicates that the introduction of even one bottle of artificial feeding product can decrease the acidity of the stomach thereby potentially increasing the likelihood of infection considerably.

The author points out that most of the research does not address the degree of exclusivity of breastfeeding or the frequency of other practices such as prelacteal feeds, gastric suction, or gastric lavage which may also compromise mucosal integrity and may increase the risk of infection.

The author also highlights the research on the antiviral properties of breastmilk which survive the heat treatment that milk banks commonly use, and concludes that breastmilk donor programs should be considered as possible inhibitors of HIV rather than transmitters.

Design issues :

Programmatic implications :
This article raises a very crucial issue. A number of researchers have recommended discarding colostrum as a means of limiting the risk of virus transmission through breastmilk. That practice, however, will most likely result in the infant receiving artificial feeds until the transition to mature milk is complete. If the hypothesis presented by this author is confirmed through research, it would counter the previous suggestion.

This presents a valid justification for researchers to pay attention to the definition of breastfeeding as used in epidemiologic research in regard to vertical transmission.

Author : Baumslag N.

Date : 8/15/87

n :

Title : Breastfeeding and HIV Infection - Commentary

Journal : Lancet. August 15, 1987: 401

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Commentary criticizes CDC policy that discourages breastfeeding by HIV-positive women. The author points out that there is not enough hard evidence to support such a policy. Goes on to outline the state of the knowledge and questions that still need to be answered as well as pointing out the known advantages of breastfeeding and the potential impact of such policy especially in developing countries.

Raises issues such as:
- Was the infant in the report by Ziegler et al. (Lancet. April 20, 1985: 896 - 897) exclusively breastfed?
- Could the HIV virus survive the infant's GI tract?
- Is colostrum protective or more infective than later milk?

Concludes that more studies are necessary to answer these and other questions.

Design issues :

Programmatic implications :
This article raised important considerations in the debate over the role of breastfeeding in HIV transmission and the need to limit the panic that preliminary findings were creating until more was definitively known.

Author : Belec L, Bouquety J-C, Georges AJ, Siopathis MR, Martin PMV.

Date : 6/1/90

n : 19.00

Title : Antibodies to Human Imunnodeficiency Virus in the Breastmilk of Healthy, Seropositive Women

Journal : Pediatrics. Vol 85 (6), June 1990: 1022 - 1026

Country : Central African Republic

Study design :

Study population : 15 healthy seropositive (as determined by Western blot) breastfeeding mothers and 4 seronegative control subjects.

Research questions :
What factors possibly limit HIV transmission through breastmilk?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The authors were able to demonstrate the presence of specific antibodies of both IgG and IgA isotypes against HIV-1 viral antigens in the breastmilk of all the HIV-1 seropositive women tested, establishing that the virus elicits a local response in seropositive individuals. The breastmilk from the seronegative mothers showed no such response.

They suggest further investigation of the neutralizing capabilities of antibodies in breastmilk.

Design issues :

Programmatic implications :
This is potentially valuable information for researchers trying to solve the dilemma of breastfeeding by HIV-positive mothers. If these antibodies are found to play an important role in inhibiting transmission via breastfeeding, then efforts could be channeled into research on possible vaccines or other techniques to enhance this antibody response in HIV-positive individuals.

Author : Black RF.

Date : 3/1/96

n :

Title : Transmission of HIV-1 in the Breastfeeding Process

Journal : Journal of the American Dietetic Association. Vol 96 (3), March 1996: 267 - 274

Country :

Study design : Review Article

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Cites previous studies for risks of transmission through breastmilk.

Design issues :

Programmatic implications :
Comprehensive review article that addresses issues relevant to both developed and developing country settings.

Author : Blanche S, Rouzioux C, Guihard Moscato M-L, Veber F, Mayaux M-J, Jacomet C, et al.

Date : 6/22/89

n : 308.00

Title : A Prospective Study of Infants Born to Women Seropositive For Human Immunodeficiency Virus Type 1

Journal : New England Journal of Medicine. Vol 320 (25), June 22, 1989: 1643 - 1648

Country : France

Study design : Prospective Observational

Study population : 308 HIV-1 positive women and their infants.

Research questions :
To determine the frequency of perinatal transmission of HIV infection.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Breastfeeding was significantly associated with HIV-1 transmission, however, only six infants were breastfed. Risk of perinatal transmission was 83% for breastfed versus 25% for formula fed.

Design issues :

Programmatic implications :

Author : Bradbeer CS.

Date : 9/30/89

n :

Title : Mothers With HIV: Risks to Baby Need to be Balanced Against Benefits of Breastfeeding

Journal : British Medical Journal. Vol 299, September 30, 1989: 806 - 807

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Reviews recent articles on the risk of HIV transmission through breastfeeding and concludes that given the fact that the risk of transmission through breastmilk seems highest for infants whose mothers seroconvert after delivery, the small additional risk for the baby born to the mother with established HIV infection may be outweighed by the benefits of breastfeeding. The responsibility of the doctor is therefore to explain as fully as possible to the mother the current medical evidence as they relate to her circumstance, and leave the decision about whether or not to breastfeed up to her.

Design issues :

Programmatic implications :

Author : Bulterys M, Chao A, Dushimimana A, Saah A.

Date : 10/1/94

n : 6.00

Title : HIV-1 Seroconversion After 20 Months of Age in a Cohort of Breastfed Children Born to HIV-1-Infected Women in Rwanda

Journal : AIDS. Vol 9 (1), 1995: 93 - 94

Country : Rwanda

Study design : Prospective

Study population : Six mother-infant pairs in Rwanda who breastfed for at least 24 months.

Research questions :
What is the probability of late seroconversion among breastfed children of HIV-1-positive women?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
Advanced maternal HIV disease and related immunosuppression appeared strong determinants of HIV-1 seroconversion among children aged >20 months. However three of the six women reported unprotected sexual intercourse with multiple partners during the two-year period after delivery of the index child. Suggests that "the risk of acquiring HIV-1 infection through prolonged breastfeeding (e.g. beyond twelve or eighteen months) may well outweight the benefits of breastfeeding at this age, even in areas with high childhood mortality due to respiratory and diarrheal pathogens."

Design issues :
Half of the women in the study engaged in risky behavior.

Programmatic implications :
Women should be counseled about the risk of transmitting HIV through breastmilk if they acquire an HIV infection while breastfeeding.

Author : Buranasin P, Petchlai B, Wichukchinda N, Kunakorn M, Raksakait K, Jirapinyo M, Thongcharoen P.

Date : 1/1/93

n :

Title : Detection of Human Immunodeficiency Virus Type 1 (HIV-1) Proviral DNA in the Breastmilk and Colostrum of Seropositive Mothers

Journal : Journal of the Medical Association of Thailand. Vol 76 (1), January 1993: 41 - 44

Country : Thailand

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Reports the detection of HIV-1 DNA by PCR on breastmilk and colostrum samples of 8 of 18 (44%) HIV-1 seropositive women. The samples from the seronegative controls were negative.

The authors suggest that this demonstration further supports the theory that HIV can be transmitted via breastmilk.

Design issues :

Programmatic implications :
While this finding may further support the theory of the infectivity of breastmilk, the authors rightly suggest that recommendations against breastfeeding be weighed against the alternatives for poor families.

Author : Burkman RT.

Date : 1/1/93

n :

Title : Puerperium and Breastfeeding

Journal : Current Opinion in Obstetrics and Gynecology. Vol 5, 1993: 683 - 687

Country :

Study design : Review Article

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Includes only a short review section on breastfeeding and risk of HIV transmission.

Design issues :

Programmatic implications :

Author : Christman A.

Date : 1/1/95

n :

Title : Medication Use in HIV-Positive Mothers Who Breastfeed

Journal : Journal of Human Lactation. Vol 11(2), 1995: 133 - 135

Country :

Study design : Review Article

Study population :

Research questions :
What medications commonly taken for maternal HIV infection are safe for breastfed infants?

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Describes indications that are considered safe and those that are contraindicated during breastfeeding. Does not discuss risk of vertical transmission.

Design issues :

Programmatic implications :

Author : Cocchi P, Cocchi C.

Date : 2/27/88

n :

Title : Postnatal Transmission of HIV Infection - Letter

Journal : Lancet. February 27, 1988: 482

Country : Italy

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Comments on the finding that HIV infection of Langerhans cells of the skin and mucous membranes has been reported and suggests repeated skin contact as a possible mode of postnatal HIV transmission.

Design issues :

Programmatic implications :
This hypothesis needs to be further investigated but it would introduce another variable not only into the investigation of the role of breastfeeding but also into all other studies on HIV transmission.

Author : Colebunders R, Kapita B, Nekwei W, Bahwe Y, Lebughe I, Oxtoby M, Ryder R. **Date :** 12/24/88 **n :** 2.00

Title : Breastfeeding and Transmission of HIV - Letter

Journal : Lancet. December 24/31, 1988: 1487 **Country :** Zaire

Study design : Case Reports

Study population : Infants of mothers who were HIV seronegative during pregnancy but subsequently received transfusions with HIV seropositive blood postpartum; a child breastfed by an HIV-positive wet nurse.

Research questions :

Breastfeeding definition :
Two of the children were reported as "almost exclusively breastfed." There is however no definition of this term as it is used in the article.

Mother-child Characteristics :
The mother of one infant received tainted blood transfusion post delivery. The wet nurse was symptomatic for AIDS and was seemingly at an advanced stage of disease.

Findings :

The authors report the cases of three women who were HIV seronegative during pregnancy and received HIV seropositive blood transfusions postpartum due to a three-hour lag period in obtaining results of ELISA testing of donor blood. All three women breastfed their infants. In two of the cases, the tranfusion occured immeditely postpartum and in these two, despite breastfeeding almost exclusively for nine months, the infants were seronegative on testing at six and nine months.

The third woman was transfused following neurosurgery at 11 months. She was still breastfeeding and continued to do so for another seven months. The mother tested positive three months later and the child tested positive at four and seven months post transfusion.

There is also a report of a woman who died during cesarean delivery of her fifth child. Her husband was seronegative and the mother had no history indicative of HIV infection. Her child was wetnursed by the mother's sister whose infant had died of prolonged fever. The wet nurse was experiencing fever and weight loss when she began nursing the child. She continued for twelve months at which time the child had generalized lymphadenopathy and failure to thrive. On testing both were seropositive. There were no other reported risk factors for HIV infection in the child and breastfeeding was the suspected route of transmission.

The authors suggest that these are unusual cases in which the infants are especially susceptible because newly infected persons and persons in advanced stages of illness may be especially infectious and these infants did not have the chance to receive transplacental antibody which might affect transmission rates.

They recommend HIV antibody testing of wet nurses and breastmilk donors as well as pastuerisation of donor milk.

Design issues :
The authors have not indicated how it was determined that these women were HIV seronegative prior to the transfusion.

Programmatic implications :
These findings would seem to indicate that HIV antibody testing is very important in choosing a wet nurse for an infant. It may not be as important for milk banks because of the option of pastuerisation of donor milk.

Author : Collareda NL, Frota AC, Silva-Oliveira RH, Schechter M.

Date : 8/1/93

n : 71.00

Title : Maternal Clinical Status, Breastfeeding, and Vertical Transmission of HIV-1 in Rio de Janeiro

Journal : Pediatric AIDS and HIV Infection: Fetus to Adolescent. Vol 4 (4), August 1993: 195 -197

Country : Brazil

Study design : Prospective Study

Study population : Children aged 0 - 11 years born to mothers with confirmed HIV-1 infection prior to delivery seen in the pediatric outpatient clinic of an AIDS referral center in Rio de Janeiro.

Research questions :
What is the relative contribution of breastfeeding to the vertical transmission rate of HIV-1 among women known to be infected prior to delivery?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The authors report that breastfeeding was significantly associated with HIV transmission - OR 8.42 (Ci 1.51 - 84.21, $p<0.02$). This association was found to be independent of maternal clinical status.

Design issues :
Though described as prospective, thus study design was mostly retrospective. Breastfeeding history was determined retrospectively and in children who were up to eleven years of age there is a very significant possibility of recall bias. Similar concerns would also apply to determining maternal clinical status during pregnancy.

The confidence limits on the odds ratio for the effect of breastfeeding were very wide. The authors report that it was due to relatively small sample sizes, but they undermine the use of these findings to precisely determine the risk of transmission associated with breastfeeding.

Programmatic implications :

Author : Committee on Pediatric AIDS

Date : 11/1/95

n :

Title : Human Milk, Breastfeeding, and Transmission of Human Immunodeficiency Virus in the United States

Journal : Pediatrics. Vol 96 (5), November 1995: 977 - 979

Country : USA

Study design : Policy Statement

Study population :

Research questions :
Because the number of women with HIV-infection in the reproductive age range is increasing rapidly, the importance of understanding the potential risk of HIV transmission to infants via human milk is critical.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
States that "Current OSHA standards do not require gloves for the routine handling of expressed breastmilk." States that "Women who are known to be HIV-infected must be counseled not to breastfeed."

Design issues :

Programmatic implications :

Author : Cullinan T.

Date : 10/31/92

n :

Title : Breastfeeding and HIV - Letter

Journal : Lancet. Vol 340, October 31, 1992: 1095

Country : Malawi

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Comment on the article by Dunn et al (Lancet. Vol 340, September 1992: 585 - 588). This author points out other benefits of breastfeeding in developing countries which were not mentioned in the article, particularly economic considerations.

Design issues :

Programmatic implications :

Author : Cutting WAM.

Date : 10/3/92

n :

Title : Breastfeeding and HIV Infection: Advice Depends on Circumstances.

Journal : British Medical Journal. Vol 305, October 3, 1992: 788 - 789

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The author reviews information on the risk of HIV transmission via breastmilk. Emphasizes the importance of breastfeeding for child survival in many developing countries and reiterates the WHO recommendation that "where the primary causes of death are infectious diseases and malnutrition, breastfeeding should remain the standard advice given to women, including those that are HIV positive."

Design issues :

Programmatic implications :

Author : Cutting WAM.

Date : 1/1/94

n :

Title : Breastfeeding and HIV in African Countries - Letter

Journal : Lancet. Vol 343 (8893), February 5, 1994: 362

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Reaction to the commentary by Ziegler JB (December 1993).

Presents a good summary of issues involved in advising mothers with HIV regarding breastfeeding. Highlights the difficulty of HIV antibody testing in many countries and the economic burden of bottle feeding. Reiterates the WHO/UNICEF guidelines.

Design issues :

Programmatic implications :

Author : Cutting WAM.

Date : 2/1/94

n :

Title : Breastfeeding and HIV: A Balance of Risks

Journal : Journal of Tropical Pediatrics. Vol 40, February 1994: 6 - 11

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Review of the research on the risks of death from not breastfeeding particularly in developing countries and the risk of vertical HIV transmission via breastfeeding.

Agrees that HIV infection may be transmitted via breastfeeding with increased risk if the mother acquired infection during lactation, but concludes that the risk of infant death by not breastfeeding in a poor environment outweighs the risk of transmission of HIV via breastfeeding.

The author therefore supports the WHO recommendations and suggests that vertical transmission can be reduced if women avoid high risk activities during pregnancy and especially lactation. He notes, however that most poor HIV-positive mothers will never hear the guidelines and will continue to feed their babies in the most convenient, economic, and familiar way - at the breast.

Design issues :

Programmatic implications :

Author : Cutting WAM.

Date : 4/1/94

n :

Title : Breastfeeding During the HIV Epidemic. The Dilemma: Preventing Vertical Transmission or Preventing Death - Editorial

Journal : Journal of Tropical Pediatrics. Vol 40, April 1994: 64 - 65

Country : Edinburgh

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Summary of current research and issues concerning HIV transmission via breastfeeding. Points out that because there are still important unanswered questions about the timing and mechanism of vertical transmission, and tests for infected cells and specific immunoglobulin levels are still unavailable, it is impossible to give advice which is appropriate for all circumstances.

Concludes that it is the responsibility of health workers to advise patients in each individual circumstance in light of the WHO/UNICEF recommendations.

Also points out that preventing vertical transmission to infants depends on preventing horizontal transmission to mothers.

Design issues :

Programmatic implications :
In light of this report program planners may want to consider paying more attention to HIV prevention efforts in mothers than to discouraging breastfeeding.

Author : Dabis F, Msellati P, Dunn D, LePage P, Newell M-L, Peckham CS, et al.

Date : 7/1/93

n :

Title : Estimating the Rate of Mother-to-Child Transmission of HIV - Report of a Workshop on Methodological Issues

Journal : AIDS. Vol 7 (8), 1993: 1139 -1148

Country : Ghent, Belgium

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
A common methodology was developed for studies on mother-to-child transmission of HIV in order to provide a standardized approach to research on the subject.

Design issues :

Programmatic implications :

Author : Datta P, Embree J, Kreiss J, Ndinya-Achola J, Braddick M, Temmerman M, et al.

Date : 11/1/94

n : 728.00

Title : Mother-to-Child Transmission of HIV-1: Report from the Nairobi Study

Journal : Journal of Infectious Diseases. Vol 170, November 1994: 1134 - 1140

Country : Kenya

Study design : Prospective Study

Study population : 365 children of seropositive mothers and 363 controls enrolled in a study of mother-to-child transmission of HIV-1 and AIDS in Nairobi, Kenya.

Research questions :
To determine the frequency and risk factors of mother-to-child transmission of HIV-1 in a cohort of children born to HIV-seropositive women before December 31, 1990.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The authors report an overall vertical transmission rate of 42.8% determined by serologic evidence of infection after twelve months and excess mortality in the HIV-exposed group. They also report that in 44% of children ultimately infected, the antibody pattern implied intrapartum or postnatal exposure to HIV-1.

A substantial fraction of the excess mother-to-infant transmission was found in children who became seronegative and later seroconverted. This was thought to be as a result of prolonged breastfeeding. The percentage of HIV infection attributable to breastfeeding longer than fifteen months was reported as 32%.

The authors concluded that prolonged breastfeeding was probably the reason for the high rate of mother-to-child transmission of HIV in this cohort and the risk of HIV-1 transmission possibly exceeds the benefits for infants of HIV-1 infected mothers. They suggest that women who did not transmit the virus in utero or intra partum may be initially unlikely to transmit via breastfeeding, but potential infectivity may increase or appear intermittently over time. This would be in concordance with a finding of increased risk of transmission associated with prolonged breastfeeding.

Design issues :

Programmatic implications :
The practice of prolonged breastfeeding or resumption of breastfeeding after the birth of another child is often done to ease the blow on the child who has lost her position as the last-born child. The findings in this study may be an indication for efforts to curb that practice.

Author : Datta P, Embree J, Kreiss J, Ndinya-Achola J, Muriithi J, Holmes K, et al.

Date : 11/1/92

n : 1.00

Title : Resumption of Breastfeeding in Later Childhood: A Risk Factor for Mother-to-Child HIV-1 Transmission

Journal : The Pediatric Infectious Disease Journal. Vol 11(11), November 1992: 974 - 976

Country : Kenya

Study design : Case Report

Study population :

Research questions :

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The authors report the case of the first born child of an HIV-infected Kenyan mother who, having initially been breastfed and weaned at age seven months, resumed breastfeeding at eleven months following the medical termination of a subsequent pregnancy. Breastfeeding continued until 25 months when the mother again became pregnant. After the birth of the third child the mother resumed breastfeeding the index child intermittently with the newborn for another eighteen months.

The index child had been seropositive at birth and had lost antibody when tested at ages twelve and eighteen months by ELISA, Immunoblot, and PCR. On retesting at 44 and 48 months, he tested positive for HIV. The child had no other known risk factors.

The authors concluded that having escaped both perinatal infection and infection through breastmilk the first time around, this child was subsequently infected through his mother's breastmilk, possibly because she was then at a more advanced stage of disease, a condition which is known to carry a higher risk of infection.

Design issues :

Programmatic implications :
The authors recommend that the practice of resumption of breastfeeding following the birth of another child be discouraged in instances where the mother is known to be HIV infected or in areas of high HIV prevalence.

Author : Davis MK.

Date : 1/2/89

n :

Title : The Role of Human Milk in Human Immunodeficiency Virus Infection

Journal : Breastfeeding, Nutrition, Infection, and Infant Growth in Developed and Emerging Countries. ARTS Biomedical Publishers and Distributors, St. John's, Newfoundland, Canada, 1989.

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
A summary of evidence in published literature for HIV transmission through breastfeeding. Concludes that no firm conclusions can be made on the basis of these case reports. The determinants and timing of vertical transmission need to be further explored in any study investigating the possible increase in transmission of HIV through breastfeeding. Raises issues for consideration in future research.

Design issues :

Programmatic implications :

Author : De Clercq A.

Date : 1/1/94

n :

Title : Breastfeeding and HIV in African Countries - Letter

Journal : Lancet. Vol 343 (8893), February 5, 1994: 362

Country : Rwanda

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Reaction to the commentary by Ziegler JB (December 1993).

Notes that the article does not address all the practical differences between breastfeeding and bottle feeding for developing countries. Highlights the economic constraints as well as the cost to society of the resulting loss of the contraceptive benefits of breastfeeding.

Design issues :

Programmatic implications :

Author : De Martino M, Tovo P-A, Galli L, Gabiano C - Coordinators Italian Register for HIV Infection in Children

Date : 11/1/94

n :

Title : Human Immunodeficiency Virus Type 1 Infection and Breastmilk

Journal : Acta Pediatrica Suppl. Vol 400, 1994: 51 - 58

Country : Italy

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors review the evidence in the literature for the role of breastfeeding in mother-to-infant HIV transmission.

They review the guidelines for infant feeding in developing and industrialized countries as presented by the WHO and other agencies, and present rationale for the difference in policies in the different settings.

Design issues :

Programmatic implications :

Author : De Martino M, Tovo P-A, Tozzi AE, Pezzotti P, Galli L, Livadiotti S, et al.

Date : 5/26/92

n : 961.00

Title : HIV-1 Transmission Through Breastmilk: Appraisal of Risk According to Duration of Feeding

Journal : AIDS. Vol 6, 1992: 991 - 997

Country : Italy

Study design : Prospective Study

Study population : 961 at-risk children of known infection status: 168 breastfed and 793 bottle fed children of HIV-seropositive mothers enrolled in the Italian Multicenter Study.

Research questions :
To estimate the risk of HIV transmission through breastmilk in children born to HIV-positive mothers.
To determine the relationship between duration of breastfeeding and risk of transmission.

Breastfeeding definition :
Breastfeeding was defined as a history of having breastfed for one day - Ever Breastfed.

Mother-child Characteristics :

Findings :
Breastfeeding was found to increase the risk of transmission: the estimated odds ratio of ever breastfed versus bottle fed was 1:19.

The odds ratio for HIV infection for breastfeeding versus bottle feeding increased with the natural logarithm of the duration of breastfeeding. This finding would appear to support the biological significance of this route of transmission.

Design issues :

Programmatic implications :

Author : De Martino M, Tovo P-A.

Date : 1/1/93

n :

Title : Quantifying the Risk of HIV-1 Transmission via Breastfeeding - Reply

Journal : AIDS. Vol 7 (1), 1993: 134 - 135

Country : Italy

Study design : Prospective and Retrospective Cohort

Study population : HIV-1 positive women and their infants.

Research questions :
What is the additional duration-dependent transmission risk associated with breastfeeding by an HIV-1 infected mother?

Breastfeeding definition :
Duration of any breastfeeding.

Mother-child Characteristics :
Only includes women infected perinatally.

Findings :
Efficiency of transmission through breastmilk appears to be low. However, estimates of additional risk of transmission via breastfeeding are around 14%.

Design issues :

Programmatic implications :

Author : Del Fante P, Jenniskens F, Lush L, Morona D, Moeller B, Lanata CF, and Hayes R.

Date : 1/1/93

n :

Title : HIV, Breastfeeding, and Under-5 Mortality: Modelling the Impact of Policy Decisions For or Against Breastfeeding

Journal : Journal of Tropical Medicine and Hygiene. Vol 96, 1993: 203 - 211

Country :

Study design : Computer Simulation

Study population :

Research questions :
A computer model was developed to assess the impact on under-5 child mortality of breastfeeding practices in developing countries in the context of HIV infection.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
Using parameter values for a hypothetical East African country, cessation of breastfeeding in urban areas predicted an increase of under-5 child mortality of 108% for children of mothers HIV-1-negative at birth, and 27% for those HIV-1-positive at birth.

Design issues :
Assumed a protective effect of breastfeeding on child mortality (relative risk = 4) only in the first year of life.

Programmatic implications :
Breastfeeding should be promoted even in high prevalence areas and among HIV-1 positive mothers.

Author : Dunn DT, Newell M-L, Ades AE, Peckham CS.

Date : 9/5/92

n :

Title : Risk of Human Immunodeficiency Virus Type 1 Transmission Through Breastfeeding

Journal : Lancet. Vol 340, September 1992: 585 - 588

Country : United Kingdom

Study design :

Study population : Five studies in which the mothers acquired HIV infection prenatally, and four in which the infection was acquired postnatally.

Research questions :
To estimate the extra risk of transmission of HIV-1 through breastfeeding following either prenatal or postnatal maternal infection.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors undertook a metanalysis of published studies of HIV transmission via breastfeeding in order to estimate the attributable risk as a result of breastfeeding. Based on four studies in which the mothers were infected with HIV postnatally, the estimated summary transmission rate was 29% which is presumed to be as a result of breastfeeding.

There is also a reported attributable risk of HIV transmission via breastfeeding of 14% in cases where the mother was infected prenatally.

As a result of these findings the authors recommend that where there are safe alternatives, women known to be infected with HIV should not be encouraged to breastfeed.

Design issues :
The distribution of risk factors in developing and developed countries is likely to be different. It is therefore difficult to directly compare groups of women and children form both settings to obtain an estimate of attributable risk for breastfeeding in HIV transmission.

Programmatic implications :

Author : Dunn DT, Newell M-L.

Date : 1/1/93

n :

Title : Quantifying the Risk of HIV-1 Transmission via Breastmilk - Letter

Journal : AIDS. Vol 7 (1), 1993: 134

Country : Italy

Study design : Critique of Publication

Study population : HIV-1-positive women and their infants.

Research questions :
What is the risk of HIV transmission through breastmilk?

Breastfeeding definition :
Duration of any breastfeeding.

Mother-child Characteristics :

Findings :
Critical of findings of study (De Martino et al. AIDS. Vol 6, 1992: 991 - 997) on methodological grounds, such as poorly defined groups, missing data, and ill-defined analyses.

Design issues :
Children were enrolled after birth, which may have resulted in bias.

Programmatic implications :
None for breastfeeding.

Author : Duprat C, Mohammed Z, Datta P, Stackiw W, Ndinya-Achola J, Kreiss J, et al. **Date :** 1/2/94 **n :** 63.00

Title : Human Immunodeficiency Virus Type 1 IgA Antibody in Breastmilk and Serum

Journal : Pediatric Infectious Disease Journal. Vol 13 (7), 1994: 603 - 608 **Country :** Kenya

Study design :

Study population : Mothers enrolled in a study of perinatal HIV-1 transmission in Nairobi, Kenya.

Research questions :
To detemine the prevalence of HIV-1 IgA in the breastmilk of seropositive mothers.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
See study population.

Findings :
The authors in attempting to define the attributable risk and the possible protective role of breastfeeding in HIV transmission, sought to investigate the prevalence of specific antibodies to HIV-1 in breastmilk which might inhibit HIV-1 transmission. They report that 59% of HIV-seropositive women had anti-HIV-1 sIgA in their breastmilk. They found no protective effect of these antibodies regarding HIV transmission in this study, but recommend further studies to fully determine the effect of these antibodies on the efficacy of HIV-1 transmission.

They found no difference in the frequency of anti-HIV-1 sIgA and the time elapsed since delivery as was reported by Van de Perre et al. (1988) who found a higher prevalence of the antibodies in eighteen month samples as opposed to fifteen day samples; however they note that all of the samples in this study were collected in the first three months postpartum.

They conclude that the small number of infants followed in this study does not permit a definitive evaluation of the correlation between the presence of anti-HIV-1 sIgA in breastmilk and HIV-1 transmission through breastfeeding.

Design issues :

Programmatic implications :

Author : Editorial.

Date : 7/16/88

n :

Title : HIV Infection, Breastfeeding, and Human Milk Banking - Editorial

Journal : Lancet. July 16, 1988: 143 -144

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The subject is the UK Department of Health Policy on infant feeding by HIV-positive women. The editorial takes issue with the recommendation that all "high risk women including those not tested and those who test negative but who could still be converting" be discouraged from breastfeeding. Points out the difficulties in identifying such groups as well as the potential problems if these recommendations are practiced in other settings, particularly developing countries.

Design issues :

Programmatic implications :

Author : Eglin RP, Wilkinson AR.

Date : 5/9/87

n :

Title : HIV Infection and the Pastuerisation of Breastmilk - Letter

Journal : Lancet. May 9, 1987: 1093

Country : United Kingdom

Study design :

Study population :

Research questions :
The investigators sought to find out if patuerisation of breastmilk would inactivate the Human Immunodeficiency Virus (HIV).

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Pastuerisation of breastmilk at 56 C for 33 minutes was found to inactivate the virus thereby eliminating the risk of HIV transmission though breastmilk.

Design issues :

Programmatic implications :
This is an important finding because the risk of virus transmission through donor milk had been one of great concern and had raised the issue of screening breastmilk donors for HIV. The authors fear that this would discourage many donors. The finding that pastuerisatiuon makes donor breastmilk safe would preclude the need for this screening.

Author : Espanol T, Garagol I, Bertran JM.

Date : 2/27/92

n :

Title : Postnatal Transmission of HIV Infection - Letter

Journal : New England Journal of Medicine. Vol 326 (9), February 27, 1992: 642

Country : Spain

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors comment on the article by Van de Perre et al (New England Journal of Medicine. Vol 325, Augusut 29, 1991: 593 - 598) regarding the findings of a study of postnatal transmission of HIV from mothers, who seroconverted postpartum, to their infants via breastfeeding.

Points out that although the mothers were seronegative and PCR tests were negative at the time of delivery, that finding does not amount to the absence of infection.

Expresses doubt that the women who seroconverted within three months postpartum were virus free at the time of delivery.

Design issues :

Programmatic implications :

Author : Finger WR.

Date : 10/1/92

n :

Title : Should the Threat of HIV Affect Breastfeeding?

Journal : Network. October 1992: 12 -14

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Review of the current information on HIV transmission via breastfeeding in view of media publicity on the issue. Notes that while HIV transmission via breastfeeding is possible, bottle feeding can pose more serious hazards. Discusses the policy implications of the research as well as the potential impact of some emerging findings.

Mentioned recent results of a study by Ruff et al. trying to determine the timing of virus transmission. The researchers were able to isolate P24 antigen in 24% of colostrum samples and none of the samples collected after four days postpartum from HIV-infected women. This would seem to indicate that the greatest risk is from colostrum rather than mature milk. The result of the confirmation of this finding may be that women are advised to discard colostrum rather than stop breastfeeding altogether. There remain, however, many issues to be resolved before such a conclusion is reached.

The author recommends that policy makers develop flow charts to guide health care providers and mothers regarding the relative risks and benefits of breastfeeding in light of possible transmission of HIV.

Design issues :

Programmatic implications :
The findings referred to in this article, if confirmed, would indicate that the risk of transmission is from colostrum rather than mature milk. Program efforts may therefore be directed at advising women to discard colostrum rather than give up breastfeeding altogether.

This may be a partial solution to the problem, but more research is neccesary to determine the cost to the infant of forfeiting the recognized protective properties of colostrum as compared to the benefit of avoiding possible HIV infection via breastmilk.

Author : Gabiano C, Tovo P-A, De Martino M, Galli L, Giaquinto C, Loy A, et al.

Date : 9/3/92

n : 1887.00

Title : Mother-to-Child Transmission of Human Immunodeficiency Virus Type 1: Risk of Infection and Correlates of Transmission

Journal : Pediatrics. Vol 90 (3), September 1992: 369 - 374

Country : Italy

Study design : Prospective Observational

Study population : 1,887 children born to HIV-1 positive mothers including 1,045 infants followed prospectively from birth.

Research questions :
To examine risk factors associated with HIV-1 transmission.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
Only 22 infants were breastfed.

Findings :
The development of symptoms in the mother before delivery and breastfeeding were significantly and independently associated with a higher transmission rate.

Design issues :

Programmatic implications :
None for breastfeeding.

Author : Gangakhedkar RR.

Date : 7/1/91

n :

Title : Breastfeeding by HIV-Infected Mothers - A Dilemma

Journal : Carc Calling. Vol 4(3), July - Sept 1991: 13 - 15

Country : India

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The author reviews the state of the knowledge about the risk of HIV transmission through breastmilk and discusses the issues in the context of the low prevalence of HIV infection in India.

Recommends that:
- Breastfeeding continue to be promoted and supported in India;
- Seropositive women of higher socio-economic status be advised against breasfeeding; and,
- Poorer seropositive women be advised to breastfeed.

Design issues :

Programmatic implications :
Such recommendations as these are likely to create practical ethical dilemmas on a large scale. It could conceivably be seen as discriminatory against women of low socio-economic status.

Author : Gerold M, Adler R.

Date : 9/30/91

n :

Title : Manifestations of Pediatric AIDS: Proposed Mechanisms of Transmission

Journal : Medical Hypotheses. Vol 37, 1992: 205 - 212

Country :

Study design : Review Article

Study population :

Research questions :
Mechanisms of vertical transmission.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Suggests various mechanisms whereby a nursing infant could be infected with HIV-1.

Design issues :

Programmatic implications :

Author : Gilks CF.

Date : 11/28/92

n :

Title : Breastfeeding and HIV Infection - Letter

Journal : British Medical Journal. Vol 305, November 28, 1992: 1367

Country : Kenya

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
This author questions the value of studies to determine rates of transmission of HIV via breastfeeding in developing countries. Points out that even if policy were implemented based on a confirmation of this risk, few women were likely to be willing or able to comply with it. One of the issues raised is that to bottle feed rather than breastfeed in the wake of such a recommendation in a breastfeeding culture, may be tantamount to advertising their own HIV status.

Design issues :

Programmatic implications :

Author : Goldfarb J.

Date : 3/1/93

n :

Title : Breastfeeding, AIDS, and Other Infectious Diseases

Journal : Current Controversies in Perinatal Care II. Vol 20 (1), March 1993: 225 - 243

Country :

Study design : Review Article

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
"At present, the risks of not breastfeeding in the developing world heavily outweigh the risks of HIV transmission by this route. In areas of the world where bottle feeding is safe and affordable, however, the HIV-infected woman should be advised against breastfeeding."

Design issues :

Programmatic implications :

Author : Guay L et al - Case Western Reserve University

Date : 10/1/94

n : 400.00

Title : Personal Communication

Journal :

Country : Uganda

Study design : Prospective Study

Study population : 400 infants of HIV-seropositive mothers.

Research questions :
To determine if there is a correlation between the demonstration of human immunodeficiency virus in breastmilk, by testing by PCR for HIV DNA and testing for p24 antigen in breastmilk, and HIV status of the children.

Breastfeeding definition :
The definition of breastfeeding used in this study is Any Breastfeeding. In gathering data, the investigators asked questions about other definitions of breastfeeding, but for analysis they are only using "Any Breastfeeding" as a measure of exposure.

Mother-child Characteristics :

Findings :
Study still in progress. It is a study of vertical transmission of HIV and breastfeeding is only a part of the study. Data has been collected and is now being reviewed.

Design issues :

Programmatic implications :

Author : Halsey N, Boulos R, Holt E, Ruff A, Brutus J-R, Kissinger P, et al.

Date : 10/24/90

n : 4588.00

Title : Transmission of HIV Infections from Mothers to Infants in Haiti: Impact on Childhood Mortality and Malnutrition

Journal : JAMA. Vol 264 (16), October 24/31, 1990: 2088 - 2092

Country : Haiti

Study design : Prospective Study

Study population : 4588 pregnant women in a Haitian population where breastfeeding is known to be practiced by over 99% of mothers for at least one month.

Research questions :
What is the impact of maternal HIV infection on birth weight, gestational age, malnutrition, and child survival in a high risk population?
Were there differences in rates of HIV transmission from mother to infant in a developing country with a well-established community health care program as compared to reported rates from developed countries?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
Maternal HIV infection was associated with an 11.7% increase in overall infant mortality. The estimated rate of mother-to-infant HIV transmission in this breastfeeding population was 25%, similar to the rates reported for the non-breastfeeding populations of USA and Europe.

Design issues :

Programmatic implications :
The finding of similar transmission rates in this breastfeeding population to the transmission rates in non-breastfeeding populations would seem to indicate that the incremental risk of HIV transmission via breastfeeding if any, is probably very small.

The authors note that although reports indicate that HIV-1 may rarely be transmitted via breastfeeding by women who recently acquired the infection, there does not appear to be any incremental risk for women who were seropositive throughout pregnancy. In light of this fact, there would be no advantage to recommending that women who are HIV positive in pregnancy refrain from breastfeeding.

Author : Hari P, Kalra V, Verma IC, Ahuja R.

Date : 6/1/94

n :

Title : Probable Breastmilk Transmission of HIV to an Infant

Journal : Indian Pediatrics. Vol 31, June 1994: 709 - 711

Country : India

Study design : Case Report

Study population :

Research questions :

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
Mother had no known risk factors but was transfused with two units of blood postpartum that was not screened for HIV. Infant was breastfed for twelve weeks. Father was seronegative.

Findings :
Child had multiple infections suggestive of AIDS.

Design issues :
Child was not tested for HIV infection. HIV status of mother prior to transfusion was unknown though presumed to be negative.

Programmatic implications :
None for breastfeeding.

Author : Heymann SJ.

Date : 11/1/90

n :

Title : Modeling the Impact of Breastfeeding by HIV-Infected Women on Child Survival

Journal : American Journal of Public Health. Vol 80 (11), November 1990: 1305 - 1309

Country : USA

Study design : Decision Analysis

Study population :

Research questions :
How high would the rate of HIV transmission through breastmilk need to be before public health officials should recommend that HIV-positive women use alternative feeding practices?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The survival outcomes for children born to HIV-infected mothers who are breastfed, bottle fed, or wet nursed was analyzed in a decision analysis model. It was estimated that given the relative risk of alternatives to maternal milk in developing countries, the probability of HIV transmission via breastmilk in a community with an under-five mortality rate from non-HIV causes of 200/1000 would need to be at least 27% before alternative feeding practices should be recommended even to the known HIV-infected mother who has an available feeding alternative with a relative risk of 2:1.

Raises the issue that sometimes, such as in cases of advanced AIDS, infant and maternal health promotion may be in conflict because the task of breastfeeding may prove at best exhausting or at worst detrimental to the mother's health status.

Recommends further research focused on accurately determining the HIV transmission rate via breastfeeding and the relative risk of alternative feeding practices and breastfeeding by HIV-infected mothers.

Design issues :

Programmatic implications :
This analysis appears to provide further support to the WHO recommendation of continued breastfeeding promotion regardless of HIV status.

Author : Hira SK, Mangrola UG, Mwale C, Chintu C, Tembo G, Brady WE, et al.

Date : 9/1/90

n : 1954.00

Title : Apparent Vertical Transmission of Human Immunodeficiency Virus Type 1 by Breastfeeding in Zambia

Journal : The Journal of Pediatrics. Vol 117 (3), September 1990: 421 - 424

Country : Zambia

Study design : Prospective Study

Study population : 1954 women admitted into the labor ward of the University Teaching Hospital in Lusaka, Zambia.

Research questions :
What are the risk factors for maternal HIV infection in Zambia?
What is the probability of transmission by breastfeeding?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
The three cases of HIV infection of interest were in children of mothers who were seronegative at the time of delivery and seroconverted in the one year post delivery.

Findings :
Of the initial study population, 1720 of them were seronegative for HIV at delivery. 634 of these were screened at one year post partum and nineteen had become seropositive. Among their nineteen children, there were three incident cases of HIV infection in the one year. None of the infants had any other reported risk factors for HIV infection and it was suggested that some of these infants may have been infected after birth by human milk since all were breastfed. The possibility that the mothers were latently infected and passed on the infection in utero or during delivery was judged to be unlikely.

Such women who seroconverted during follow up had some risk factors as compared to women who did not. Notably, they were more likely to have husbands who had been seropositive at the time of delivery.

Design issues :
The nineteen incident cases of HIV in the mothers in this cohort were detected at one year follow up. There is no indication of what point during the year the seroconversion took place. Since these women also had a higher probability of being married to partners who were seropositive at the time of delivery, it is possible that they were latently infected and transferred the infection during pregnancy or delivery and themselves seroconverted after delivery. Knowledge of approximately what point during the year the seroconversion occured would have been helpful in ruling out or strenthening this possibility.

Programmatic implications :

Author : Holmes W.

Date : 10/31/92

n :

Title : Breastfeeding and HIV - Comment

Journal : Lancet. Vol 340, October 31, 1992: 1094 -1095

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The author comments and raises questions about the analysis reported by Dunn et al. on estimates of the risk of HIV transmission through breastfeeding. Suggests other issues that need to be investigated such as the impact of practices (e.g., prelacteal feeds) on transmission rates.

Design issues :

Programmatic implications :

Author : Hu DJ, Heyward WL, Byers RH, Nkowane BM, Oxtoby MJ, Holck SE, Heymann DL.

Date : 10/5/92

n :

Title : HIV Infection and Breastfeeding: Policy Implications Through a Decision Analysis Model

Journal : AIDS. Vol 6 (12), 1992: 1505 - 1513

Country : USA

Study design :

Study population :

Research questions :
To develop a model to compare mortality associated with HIV transmission via breastfeeding with the mortality associated with not breastfeeding in different populations.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors present a model which indicates breastmilk alternatives should only be considered in cases where the seroprevalence of HIV is high and the relative risk of mortality due to not breastfeeding is close to 1, which is usually the case in developed countries where infectious diseases are not the primary cause of infant mortality. Otherwise breastfeeding should continue to be protected, promoted, and supported.

Design issues :

Programmatic implications :
These findings support the recommendations by the WHO, CDC, and other agencies in the developed world.

Author : Hutto C, Parks WP, Lai S, Mastrucci MT, Mitchell C, Munoz J, et al.

Date : 3/1/91

n : 192.00

Title : A Hospital-Based Prospective Study of Perinatal Infection with Human Immunodeficiency Virus Type 1

Journal : The Journal of Pediatrics. Vol 118 (3), March 1991: 347 - 353

Country : USA

Study design : Prospective Study

Study population : 82 infants of HIV-positive women and 110 infants of HIV-seronegative women born in Haiti, who were delivered at Jackson Memorial Hospital in Miami.

Research questions :
To provide an estimate of transmission rates of HIV infection from mother to infant.
To study the natural history of pediatric HIV infections.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
The mothers were all Haitian-born women living in Miami.

Findings :
Breastfeeding was not associated with an increased risk of HIV infection in this group of infants.

Design issues :

Programmatic implications :
This study shows similar mother-to-child transmission rates of HIV to studies conducted in Haiti and in other industrialized populations.

Author : IBFAN.

Date : 3/1/88

n :

Title : Breastfeeding Endorsed: IBFAN Africa Statement on AIDS

Journal : IBFAN Africa News. No 20, March 1988: 1, 4 - 5

Country :

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
A review of the current evidence about HIV transmission through breastfeeding. Concludes that there is insufficient conclusive evidence to discourage mothers from breastfeeding. Supports the WHO recommendation that breastfeeding by the biological mother should be the first choice for infant feeding regardless of her HIV status.

Design issues :

Programmatic implications :

Author : International Planned Parenthood Federation (IPPF).

Date : 1/1/88

n :

Title : HIV Mothers Should Breastfeed.

Journal : AIDSWATCH. Number 4, 1988: 3

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Supports the WHO recommendation that breastfeeding by the biological mother should be the feeding method of choice regardless of HIV status.

Design issues :

Programmatic implications :

Author : Jelliffe DB, Jelliffe EFP.

Date : 11/11/89

n :

Title : Mothers With HIV - Letter

Journal : British Medical Journal. Vol 299 (6709), 1989: 1219

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Concurs with the letter by Bradbeer C (British Medical Journal. Vol 299, Sept 30, 1989: 806 - 807) and further expounds upon the benefits of breastfeeding.

Design issues :

Programmatic implications :

Author : Jelliffe DB, Jelliffe EFP.

Date : 2/27/92

n :

Title : Postnatal Transmission of HIV Infection - Letter

Journal : New England Journal of Medicine. Vol 326 (9), February 27, 1992 : 642 - 643

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Raises questions about the conclusions reached in the article by Van de Perre et al. (New England Journal of Medicine. Vol 325 (9), August 29, 1991: 593 - 598). Concludes that while in utero and intrapartum transmission have been proven to have major roles in the vertical transmission of HIV, the role of breastfeeding as a route of transmission remains doubtful and at worst, miniscule.

Design issues :

Programmatic implications :

Author : Kennedy KI, Fortney JA, Bonhomme MG, Potts M, Lamptey P, Carswell W.

Date : 6/12/88

n :

Title : Do the Benefits of Breastfeeding Outweigh the Potential Risk of Postnatal Transmission of HIV via Breastmilk?

Journal : Presented at the IV International Conference on AIDS in Sweden, 1988.

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors present a model formally analyzing the risks and benefits of breastfeeding in a developing country if the mother is HIV positive but has not transmitted the infection to her infant in utero. Using different rates of infant mortality (5%, 10%, and 15%), different probabilities of HIV transmission (1%, 5%, 10%, and 20%) as well as a number of other assumptions, they calculated that the rate of transmission through breastmilk had to be about 20% before the number of deaths from this mode of HIV transmission approached the number of deaths associated with bottle feeding.

The authors also point out that since the advice not to breastfeed cannot apply until the mother has developed antibodies that can be detected on testing, the admonition would not have prevented any of the reported cases in the literature because these women became infected postpartum.

Recommend that more research is needed but until such time, especially in populations with high or medium infant mortality, infected mothers should be encouraged to continue breastfeeding as the consequences of bottle feeding would result in more deaths than would arise from HIV infection through breastfeeding.

Design issues :

Programmatic implications :
This supports the recommendations of WHO for women to breastfeed regardless of HIV status because the countries where WHO recommendations are targeted are precisely the ones with the high and medium mortality rates.

Author : Kennedy KI, Fortney JA, Sokal DC.

Date : 2/11/89

n :

Title : Breastfeeding and HIV - Letter

Journal : Lancet. February 11, 1989: 333

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors address the uncertainty surrounding the issue of HIV transmission through breastfeeding and suggest that policy makers may serve the public better if they refrained from making statements about breastfeeding as a route of infection because there are still many unanswered questions. They suggest that attention be paid to the the two high titre windows of opportunity for HIV infection - newly infected individuals and those with advanced HIV illness. If recommendations are limited to these two groups, the authors feel that it may be possible to retain the life-giving benefits of breastfeeding especially in developing countries.

Design issues :

Programmatic implications :

Author : Kennedy KI, Visness CM, Rogan WJ.

Date : 6/1/92

n :

Title : Breastfeeding and AIDS: A Health Policy Analysis

Journal : AIDS and Public Policy Journal. Vol 7 (1), Spring 1992: 18 - 27

Country : USA

Study design :

Study population :

Research questions :
The authors present a mathematical, spreadsheet model for estimating the impact of policy and changes in policy regarding breastfeeding by HIV-positive women.

Breastfeeding definition :
Breastfeeding was described as "any exposure to breastmilk" (i.e. Ever Breastfed).

Mother-child Characteristics :

Findings :
They conclude that if breastmilk transmission is a rare occurence, as the literature would seem to indicate, and if there is a carryover effect against breastfeeding by seronegative women, then the CDC policy is unlikely to result in saved lives.

They point out that research shows that the risk of transmission of HIV to infants through breastmilk is presumably highest at the time of seroconversion of the mother, at which time the mother will have no way of knowing that she is infected.

They recommend that each woman's risk of transmitting HIV to her infant be assessed individually and a decision whether or not to breastfeed be a personal one made by the woman with the advice of her well-informed health worker.

Design issues :

Programmatic implications :

Author : Kreiss J et al. - University of Washington, Seattle.

Date : 10/1/94

n : 400.00

Title : Personal Communication

Journal :

Country : Kenya

Study design : Randomized Clinical Trial

Study population : 400 infants born to HIV-seropositive mothers determined during pregnancy at several community hospitals.

Research questions :
To compare the rates of HIV infection in and overall morbidity and mortality from AIDS between infants of HIV-positive mothers randomly assigned to bottle feeding or breastfeeding and tested every three months until the age of two years.

To determine frequency of transmission and factors affecting transmission.

There are also concurrent side studies to detect HIV DNA in breastmilk samples of these mothers tested at intervals and attempts to culture the HIV virus in breastmilk.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Study still in progress.

Design issues :

Programmatic implications :

Author : Kuhn L, Stein ZA.

Date : 1/1/95

n :

Title : Mother-to-Infant HIV Transmission: Timing, Risk Factors, and Prevention

Journal : Paediatric and Perinatal Epidemiology. Vol 9, 1995: 1 - 29

Country :

Study design : Review Article

Study population :

Research questions :
Evidence is reviewed as to whether transmission occurs prepartum (early or late in gestation), intrapartum, or postpartum with breastfeeding.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
Transmission through breastfeeding can occur if a mother is infected postpartum and seems to pose some additional risk if she is already infected at parturition. Does not cite new data. Provides a good review of the disease etiology and laboratory issues involved in detecting the time of transmission.

Design issues :

Programmatic implications :

Author : Le Page P, Van de Perre P, Carael M, Nsengumuremyi F, Nkurunziza J, Butzler J-P, et al.

Date : 8/15/87

n : 2.00

Title : Postnatal Transmission of HIV from Mother to Child

Journal : Lancet. August 15, 1987: 400

Country : Rwanda

Study design : Case Reports

Study population : Two mother-infant dyads that were part of a study of HIV infection in children and their families.

Research questions :

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
Both mothers recieved transfusions possibly of tainted blood following delivery.

Findings :
The first case was that of a previously healthy Rwandan mother in whom severe postpartum bleeding following the delivery of her first child necessitated transfusion of two units of blood. She had no other documented risk factors for HIV infection. Twelve months later mother and infant tested positive for HIV. Her husband was sero-negative. On testing, one of the blood donors was found to be HIV positive. The infant had been breastfed with no record of breastfeeding difficulties.

The second case was also a previously healthy Rwandan woman who had also been transfused with two units of blood following cesarean delivery of her infant. At ten months both mother and baby tested positive for HIV. She had no other documented risk factors and her husband and older child were sero-negative. One of her two blood donors was seropositive. She had also been breastfeeding with no reported problems.

The authors suggest that postnatal transmission probably through breastmilk was responsible for both cases. The authors also point out that these two case reports do not provide enough evidence to discourage women from breastfeeding.

Design issues :
Case reports such as this present the problem that there is no guarantee that the mother was not infected with the virus prior to delivery although the absence of other risk factors as well as the absence of infection in the spouses would seem to indicate that they were indeed virus free prior to the blood transfusions.

By the same token, it is difficult to rule out other possible contacts between the infant and the mothers' body fluids after maternal infection which could conceivably be routes of infection as opposed to breastmilk.

Programmatic implications :

Author : Lederman SA.

Date : 2/1/92

n :

Title : Estimating Infant Mortality from Human Immunodeficiency Virus and Other Causes in Breastfeeding and Bottle Feeding Populations

Journal : Pediatrics. Vol 89 (2), February 1992: 290 - 296

Country : USA

Study design :

Study population :

Research questions :
To determine whether breastfeeding or bottle feeding will result in a lower overall mortality in areas of different HIV prevalence, based on estimates of several determining variables.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The author presents a mathematical model for quantifying and evaluating the relative risks of breastfeeding and bottle feeding in HIV-positive women. She concludes that the benefits of breastfeeding over bottle feeding can substantially outweigh any putative risk of HIV transmission through breastfeeding unless the HIV prevalence is quite high or the difference in mortality between breastfed and bottle fed infants is very low.

Also notes that because we often do not know which women are HIV positive, any strategy to discourage breastfeeding in order to limit transmission, is likely to be directed at all women at risk and failure to promote breastfeeding in this group could have a bigger impact on a much larger number of uninfected women than on the relatively small number of infected women.

Design issues :

Programmatic implications :
The author raises an important issue which needs to be taken into consideration by policy makers. In many cases women who are HIV infected often go undetected. In order to discourage breastfeeding by HIV-positive mothers, strategies would have to be directed toward women at risk. This is a problematic characterization to make and may have an impact on many more uninfected women than infected.

Author : Logan S, Newell M-L, Ades T, Peckham CS.

Date : 6/11/88

n :

Title : Breastfeeding and HIV Infection - Letter

Journal : Lancet. June 11, 1988: 1346

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Commentary criticizes the UK Department of Health policy that in addition to discouraging women who are HIV positive from breastfeeding, also recommends that women in "high risk" groups whose HIV status is unknown and women who are seronegative "but could still be seroconverting" should also be discouraged from breastfeeding. Expresses concern that the ambiguity of the classification could result in all women in high risk groups being discouraged from breastfeeding which would pose a serious problem as these are precisely the women whose infants would benefit most from breastfeeding. Points out that although the policy states that the recommendations apply only to the UK, there is a strong possibility that it may influence views elsewhere.

Design issues :

Programmatic implications :

Author : Lucas A.

Date : 5/9/87

n :

Title : AIDS and Human Milk Bank Closures - Letter

Journal : Lancet. May 9, 1987: 1092 - 1093

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The author comments on the debate to close human milk banks based on the fear raised by the article by Ziegler et al. (Lancet. April 20, 1985: 896 - 897) about the risk of HIV transmission through breastmilk. He suggests that there needs to be more evidence of that risk and a balance of that risk against the benefits of breastmilk for the infants, before a decision is taken to close milk banks on that account. He suggests careful selection of donors and emphasis on the routine pastuerisation of breastmilk which has been found to inactivate the virus.

Design issues :

Programmatic implications :

Author : Malaviya AN, Pande I, Adya CM, Kumar A, Kakkar R, Khan MA.

Date : 1/1/92

n : 1.00

Title : Circumstantial Evidence of HIV Transmission via Breastmilk - Letter

Journal : Journal of Acquired Immune Deficiency Syndromes. Vol 5, 1992: 102

Country : India

Study design : Case Report

Study population : A mother and child in New Delhi, India.

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :

The authors report the case of a 21-year old woman who was found to be HIV infected on routine antenatal screening. On testing, her one and a half year old child was also found to be positive although her husband was found to be antibody negative.

She gave a history of having been transfused two units of blood as a result of postpartum haemorrhage following the birth of the older child. Fifteen days after the transfusion she had a moderately severe febrile illness that lasted one month and was undiagnosed. She breastfed her infant right through this illness. She had no other reported risk factors for HIV infection.

The authors submit that she contracted the virus from the transfusion and showed suspicious acute seroconversion illness follwing the transfusion. They conclude that she probably infected her infant by breastfeeding during this period of high viraemia. They however note that this is an uncommon situation and for the general public, the WHO recommendations must remain the guide.

Design issues :

Programmatic implications :

Author : Matusa R.

Date : 1/2/94

n : 1.00

Title : The Transmission of HIV from Child to Parent

Journal : Pediatric AIDS and HIV Infection: Fetus to Adolescent. Vol 5 (3), 1994: 190

Country : Romania

Study design : Case Report

Study population : A mother and infant dyad in Romania.

Research questions :

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
The infant received a blood transfusion at age five months. There were no other reported risk factors for HIV infection in mother or child.

Findings :
The author reports the case of the first born child of a healthy 21-year old Romanian mother who, having been born apparently healthy by spontaneous vaginal delivery, developed at age five months severe bronchopneumonia with septic shock and had to be transfused with 100ml of blood. The infant was still being breastfed and continued to do so until seven months of age. The mother complained of chronic cracked nipples. There was no report of stomatitis or bleeding gums in the child. Two months following transfusion the infant was admitted to the hospital with a diagnosis of transfusion-acquired acute hepatitis B. At this time she tested positive for HIV by ELISA and Western blot. Both parents tested negative. Five months later the mother developed generalized lymphadenopathy and tested positive for HIV by ELISA and Western blot. The father remained negative for another two months before HIV infection was also confirmed in him.

The authors submit that the infant acquired HIV from the blood transfusion and infected the mother via breastfeeding.

Design issues :
The authors did not confirm that the blood transfusion was indeed tainted with HIV although the diagnosis of Hepatitis B certainly increases the probability of that being the case. The HIV virus has not been found to be effectively transmitted through saliva, which would have been the medium if indeed the transmission of the virus to the mother occured through breastfeeding her infected infant. It is possible that the mother became infected via a different route and during the period of high viraemia transmitted the virus to her infant but did not herself seroconvert until after her child did.

Programmatic implications :
In most cases the virus is transmitted from the mother to the child, however this is an important finding to bear in mind if a child has been otherwise exposed to the virus as in this case.

If these findings are confirmed they will have a significant impact on the practice of wetnursing, as a healthy wet nurse of an HIV-infected child or one who is at risk for HIV infection would be considered exposed to the virus.

Author : Mok J.

Date : 4/10/93

n :

Title : Breastmilk and HIV-1 Transmission - Commentary

Journal : Lancet. Vol 341, April 10, 1993: 930 - 931

Country :

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
This is a commentary on the article by Van De Perre et al. (Lancet. Vol 341, April 10, 1993: 914 - 918) on the infective and anti-infective properties of breastmilk.

Reviews the findings of that study and reiterates the statement made by the authors in the article, indicating that the findings should not be interpreted as universal promotion of formula feeding, because in many parts of the world especially where infection and malnutrition are major causes of death, breastmilk is still the safest mode of infant nutrition regardless of maternal HIV status.

Points out that the posssibility remains that breastmilk could protect the the infant who is already infected at birth and may even delay progression to AIDS. Emphasizes the need for more research on the timing and mechanism of HIV transmission.

Design issues :

Programmatic implications :

Author : Munyakho D.

Date : 6/18/88

n :

Title : Breastfeeding and HIV Infection - Letter

Journal : Lancet. June 18, 1988: 1394 - 1395

Country : Kenya

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The author addresses the United Kingdom Department of Health policy on breastfeeding by HIV-infected women. Disagrees with the United Kingdom Department of Health and refers to a statement issued by IBFAN which endorses breastfeeding.

Design issues :

Programmatic implications :

Author : Nagelkerke NJD, Moses S, Embree JE, Jenniskens F, and Plummer FA.

Date : 1/1/95

n :

Title : The Duration of Breastfeeding by HIV-1-Infected Mothers in Developing Countries: Balancing Benefits and Risks

Journal : Journal of Acquired Immune Deficiency Syndromes. Vol 8 (2), 1995: 176 - 181

Country :

Study design : Mathematical Model

Study population :

Research questions :
To compare the age-specific risks of mother-to-child HIV transmission versus the excess mortality due to not breastfeeding.

Breastfeeding definition :
Does not differentiate between any and exclusive breastfeeding in the model.

Mother-child Characteristics :

Findings :
In the mathematical model, the two hazards of the risk of not breastfeeding and the risk of HIV transmission intersect at three to seven months depending on the assumptions used.

Design issues :
Model assumes mothers know HIV status and ignores increased protective effect of exclusive breastfeeding on mortality. It assumes that no recommendation on breastfeeding policy for the general population with unknown HIV status can be derived from it.

Programmatic implications :
This study argues that pregnant women should be tested for HIV infection and that HIV-positive women should limit the duration of breastfeeding to less than seven months.

Author : Newburg DS, Viscidi RP, Ruff A, Yolken RH.

Date : 1/1/92

n :

Title : A Human Milk Factor Inhibits Binding of Human Immunodeficiency Virus to the CD4 Receptor

Journal : Pediatric Research. Vol 31 (1), 1992: 22 - 28

Country : USA and Haiti

Study design :

Study population : 34 milk and colostral samples from HIV-seropositive and HIV-seronegative women from Baltimore, Massachussetts, and Haiti.

Research questions :
To determine if human milk and colostrum contains anti-HIV activity.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The researchers found that all the breastmilk and colostrum samples contained high levels of a material that inhibits the interaction of CD4 receptors with Mab that recognize HIV epitopes: an important interaction for infection to take place. This activity was found in the breastmilk of HIV-positive as well as HIV-negative women but not in cow's milk or significantly in serum.

The authors question the efficiency of breastmilk as vehicle of infection and recommend further research on this factor.

Design issues :

Programmatic implications :

Author : Newell M-L, Dunn DT, Peckham CS, Ades AE, Pardi G, Semprini AE - European Collaborative Study.

Date : 4/25/92

n : 721.00

Title : Risk Factors for Mother-to-Child Transmission of HIV-1

Journal : Lancet. Vol 339, April 1992: 1007 - 1012

Country : Europe

Study design : Prospective Study

Study population : 721 children of 701 HIV-positive mothers enrolled in various centers as part of the European Collaborative Study.

Research questions :
To investigate the role of factors that may be associated with the vertical transmission of HIV-1 infection, including the role of breastfeeding.

Breastfeeding definition :
Breastfeeding was defined as Ever Breastfed.

Mother-child Characteristics :
All the mothers were advised against breastfeeding but a few did so anyway.

Findings :
36 (5%) of the 721 women breastfed their infants despite being discouraged from breastfeeding as all of the women were. Among these, 11 (31%) of the infants became infected as compared to 93 (14%) of the remaining 683, resulting in an odds ratio for vertical transmission of 2.25 in breastfed versus never breastfed children.

Design issues :
It is difficult to draw definitive conclusions from this group of women because the number of breastfeeding women was so small relative to the rest of the study population. They were women who elected to breastfeed despite having been advised to the contrary and consequently have introduced a selection bias to this subset which makes it difficult to generalize the findings.

Programmatic implications :

Author : Newell M-L, Peckham CS.

Date : 1/1/93

n :

Title : Risk Factors for the Vertical Transmission of HIV-1 and Early Markers of HIV-1 Infection in Children

Journal : AIDS. Vol 7 (suppl. 1), 1993: S91 - S97

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The article reviews the research on the risk of vertical transmission of HIV-1 in-utero, intra-partum, and postpartum.

With respect to breastfeeding, the authors refer to the articles by Van de Perre et al. (New England Journal of Medicine. Vol 325 (9), August 29, 1991: 593 - 598) that report the findings in a cohort of women who seroconverted after birth. They also refer to the metanalysis reported by Dunn et al. (Lancet. Vol 340, September 1992: 585 - 588) which estimates that the risk of HIV transmission in women who were infected postnatally is 29% and for women who were infected prenatally, the additional risk of transmission through breastfeeding is 14%. The difference between these two groups is attributed to the possible protective effect of maternal antibodies and the fact that unless they are symptomatic, women who were prenatally infected are probably less infectious than those who are infected postnatally.

The authors reiterate the WHO recommendations governing breastfeeding.

Design issues :

Programmatic implications :

Author : Newell M-L, Peckham CS.

Date : 1/1/94

n :

Title : Vertical Transmission of HIV Infection

Journal : Acta Paediatrica Suppl. Vol 400, 1994: 43 - 45

Country :

Study design : Review Article

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Cites an added risk of transmission of HIV through breastmilk from a mother who was already HIV positive during pregnancy to be 14% (Dunn et al., Lancet Vol 340, 1992: 585 - 588) and a risk of transmission when a woman becomes infected in the first trimester after pregnancy of 29% (Dunn et al.)

Design issues :

Programmatic implications :

Author : Nicoll A, Killewo JZJ, Mgone C.

Date : 7/1/90

n :

Title : HIV and Infant Feeding Practices: Epidemiological Implications for Sub-Saharan African Countries.

Journal : AIDS. Vol 4 (7) 1990: 661 - 665

Country : Tanzania

Study design :

Study population :

Research questions :
What is the infomation available concerning the risk of HIV transmission from breastfeeding?
What are the probable consequences of changes in feeding practices?

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors undertook a review of the literature on the risk of transmission of HIV-1 through breastfeeding and calculations of the consequences of any population-level change to bottle feeding. They conclude that a change to bottle feeding would result in more deaths from infectious causes which would substantially increase the number of child deaths directly attributable to HIV-1 infection.

They recommend the continued promotion of breastfeeding by policy makers and health care providers despite the AIDS epidemic.

Design issues :

Programmatic implications :
This analysis further supports the WHO recommendations.

Author : Nicoll A, Machera F.

Date : 1/1/86

n :

Title : Children, HIV Infection, and AIDS

Journal : AIDS Action. Issue 5: 2-3

Country : Tanzania

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors give a summary of the issues involved in pediatric AIDS and the WHO recommendations. Notes that there have been very few cases in which HIV was reported to have been transmitted by breastfeeding and in those cases there were unusual circumstances such as the mother being infected by transfusion after birth and seroconverting while breastfeeding which would have resulted in an unusually infectious state.

The authors reiterate the WHO recommendation to breastfeed regardless of HIV status because the risk of bottle feeding would outweigh the risks of transmission of HIV through breastfeeding based on the information currently available.

Design issues :

Programmatic implications :

Author : Nicoll A, Newell M-L, Van Praag E, Van de Perre P, Peckham CS. **Date :** 1/1/95 **n :**

Title : Infant Feeding Policy and Practice in the Presence of HIV-1 Infection

Journal : AIDS. Vol 9 (2), 1995: 107 - 119 **Country :**

Study design : Review Article **Study population :**

Research questions :
To describe the contribution of breastfeeding to maternal and child health, the requirements for minimizing the risks associated with artificial feeding and recent knowledge relating to trends and determinants of feeding practices. Evidence for breastfeeding transmission is discussed together with the impact of feeding practices and HIV-1 infection through breastfeeding on child mortality.

Breastfeeding definition :
Addresses the need for studies to examine relative risk associated with colostrum use and exclusive breastfeeding.

Mother-child Characteristics :

Findings :

Design issues :

Programmatic implications :
The concept of "settings" rather than countries is desirable so that policy can vary according to the pre-eminent causes of infant mortality and the feasibility of delivering adequate artificial feeding and voluntary confidential testing. In determining local policy, information needs to be gathered on those factors that influence the public health rationale. Where the risks of artificial feeding can be minimized, a policy of recommending artificial feeding for women known to be HIV-1-infected is to be recommended. Where breastfeeding is the norm, infant mortality is high, hygiene and nutritional conditions are poor, and infant formula expensive, a policy to promote breastfeeding for all mothers is the only responsible option.

Author : Nieburg P, Hu DJ, Moses S, Nagelkerke N.

Date : 1/1/95

n :

Title : Contribution of Breastfeeding to the Reported Variation in Rates of Mother-to-Child HIV Transmission

Journal : AIDS. Vol 9 (4), 1995: 396 - 397

Country :

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Argues that the contribution of breastmilk to vertical transmission of HIV-1 must be included in the calculation of mother-to-child transmission. Cites an estimate of the added risk of transmission through breastmilk to be 14% among HIV-infected mothers who breastfeed (Dunn et al. Lancet Vol 340, 1992: 585 - 588). Urges investigators in perspective mother-to-child transmission studies to take advantage of the increased availability of polymerase chain reaction, genetic sequencing, and other molecular techniques to more precisely ascertain the time at which mother-to-child transmission occurs.

Design issues :

Programmatic implications :

Author : Orloff SL, Wallingford JC, McDougal JS.

Date : 5/22/93

n :

Title : Inactivation of Human Immunodeficiency Virus Type 1 in Human Milk: Effects of Intrinsic Factors in Human Milk and of Pasteurization

Journal : Journal of Human Lactation. Vol 9(1), 1993: 13 - 16

Country : USA

Study design :

Study population :

Research questions :
To document the efficiency of pastuerization in destroying infectivity of HIV-tainted breastmilk.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Pastuerization of breastmilk at 62.5 C for 30 minutes was found to effectively inactivate the infectivity of both cell-free HIV-1 and HIV-1 infected cells.

The authors also report that human milk contains one or more intrinsic components that inactivate HIV-1.

Design issues :

Programmatic implications :
These findings support the continued practice of human milk banking since the risk of HIV infection is eliminated by pastuerization.

Author : Oxtoby MJ. **Date :** 1/1/88 **n :**

Title : Human Immunodeficiency Virus and Other Viruses in Human Milk: Placing the Issues in Broader Perspective

Journal : The Pediatric Infectious Disease Journal. Vol 7 (12), 1988: 825 - 835 **Country :** USA

Study design : **Study population :**

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The author gives a review of the available knowledge, including a summary of case reports, about the risks of HIV transmission through breastfeeding, outlines the protective effects of breastfeeding, and summarizes current policy statements on breastfeeding and breastmilk banking. She also highlights areas needing further research particularly with regard to viral and immunological content of breastmilk and the effect of heat treatment on the virus in milk. Recommendations include:

1) that special attention be paid to the careful investigation of events, such as a mother transfused postpartum with infected blood, to document the circumstances and evaluate other possible routes of infection; and,

2) that complete information be gathered in ongoing prospective studies of children born to HIV-infected mothers to assess the possible relationship between breastfeeding and infection as well as possible protective effects of breastfeeding in disease progression where children are already infected.

Concludes that meanwhile, the strong evidence of the benefits of breastfeeding should continue to be the basis on which broad public health policies are made.

Design issues :

Programmatic implications :
This article gives a good summary of what is and is not known about the risk of HIV transmission through breastfeeding. It makes an important recommendation that decisions should continue to be based on the benefits of breastfeeding which are known with more certainty than the risks of HIV transmission which are yet to be fully defined.

Author : Palasanthiran P, Ziegler JB, Stewart GJ, Stuckey M, Armstrong JA, Cooper DA, et al.

Date : 2/1/92

n : 11.00

Title : Breastfeeding During Primary Maternal Human Immunodeficiency Virus Infection and Risk of Transmission from Mother to Infant

Journal : The Journal of Infectious Diseases. Vol 167, February 1993: 441 - 444

Country : Australia

Study design : Prospective study

Study population : Eleven women whose primary HIV infection was in the postpartum period. Ten of them with no other known risk factors were infected via blood transfusion postpartum and one of them shared needles for IV drug use and seroconverted 6-10 months postpartum.

Research questions :
To determine HIV transmission rates in a cohort of breastfeeding Australian women whose primary HIV infection was in the postpartum period.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
All the mothers were believed to have had their primary HIV infection in the postpartum period.

Findings :
Three of the eleven babies at risk became infected resulting in a transmission rate estimate of 27% for breastfeeding during primary maternal infection.

Design issues :

Programmatic implications :

Author : Peckham CS, Ades AE, Newell M-L.

Date : 8/1/89

n :

Title : Perinatal Transmission of Human Immunodeficiency Virus - Letter

Journal : The Pediatric Infectious Disease Journal. Vol 8 (8), Aug, 1989: 540

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Reaction to an editorial on the findings of the Italian Multicenter Study of HIV and AIDS in children. Points out that the study is a surveillance study rather than a prospective study and as such transmission rates cannot be be estimated due to a lack of a denominator.

Also points out that risk factors cannot be concluded from such a study for the same reason.

Design issues :

Programmatic implications :

Author : Peckham CS, Senturia YD, Ades AE, Newell M-L - European Collaborative Study.

Date : 11/5/88

n : 271.00

Title : Mother-to-Child Transmission of HIV Infection

Journal : Lancet. November 5, 1988: 1039 - 1042

Country : Europe

Study design : Prospective Study

Study population : Infants born to mothers who tested positive for HIV. Enrolled at eight different centers in Europe.

Research questions :
What are the rates of transmission of HIV from a mother to her infant?
What factors influence transmission such as mode of delivery, breastfeeding, maternal clinical status during pregnancy?
What is the natural history of perinatal HIV infection?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The estimated vertical transmission rate was 24%. There was no evidence at this time that mother's clinical status in pregnancy, the mode of delivery, or breastfeeding affected transmission rates.

Design issues :

Programmatic implications :

Author : Peckham CS.

Date : 3/1/95

n :

Title : Human Immunodeficiency Virus Infection and Pregnancy

Journal : Sexually Transmitted Diseases. Vol 21 (2) Suppl, March-April 1994: S28 - S31

Country :

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Argues that no single factor can predict transmission of HIV infection to the infant, and that perinatal infection is a multifactoral process. Cites previous studies to report a 14% additional risk of transmission from breastfeeding. The article only has a small section on breastfeeding.

Design issues :

Programmatic implications :

Author : Quinn TC, Ruff A, Halsey N.

Date : 1/29/92

n :

Title : Pediatric Acquired Immunodeficiency Syndrome: Special Considerations for Developing Nations

Journal : The Pediatric Infectious Disease Journal. Vol 11 (7), 1992: 558 - 568

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Review of the issues regarding HIV-infected children in developing nations.
Reiterates the WHO recommendation that breastfeeding by the biological mother should be the first choice of feeding method for these children.

Design issues :

Programmatic implications :

Author : Ramasethu J.

Date : 1/1/95

n :

Title : Commentary on Maternal Vitamin A Deficiency and Mother-to-Child Transmission of HIV-1

Journal : Pediatric AIDS and HIV Infection: Fetus to Adolescent. Vol 6 (5), 1995: 303 - 304

Country :

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Semba et al. (Lancet. Vol 343, June 1994: 1593 - 1597) postulated that compromised T cell and B cell function secondary to vitamin A deficiency could contribute to higher viral load crossing the placenta or in the breastmilk. Vitamin A deficiency may have an effect on the mucosal integrity of the birth canal and/or the placenta, and breaches of the same would contribute to higher transmission rates.

Design issues :

Programmatic implications :

Author : Report of a Consensus Workshop, Siena, Italy, January 17-18, 1992.

Date : 1/18/92

n :

Title : Maternal Factors Involved in Mother-to-Child Transmission of HIV-1

Journal : Journal of Acquired Immune Deficiency Syndromes. Vol 5 (10), 1992: 1019 - 1029

Country :

Study design : Review Article

Study population :

Research questions :
Epidemiology, immunology, virology, and health issues associated with maternal HIV transmission were discussed.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Wide differences (10%-39%) in HIV transmission seen at different locations may be explained by multiple risk factors. The timing of transmission of HIV may be further complicated by viral burden and other cofactors.

Design issues :

Programmatic implications :

Author : Riordan J.

Date : 1/1/93

n :

Title : AIDS and Breastfeeding: The Ultimate Paradox

Journal : Journal of Human Lactation. Vol 9 (1), 1993: 3 - 4

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Reviews the information and literature on HIV transmission via breastmilk and the anti-infective properties of breastmilk. Highlights the personal misery and emotional pain of HIV-positive women trying to do what is best for their children.

Recommends:
- All HIV positive women should be made aware of the the WHO recommendations as they apply to them.
- They should be reassured that casual contact such as holding and kissing will not infect their children.
- They should be referred to support groups.

Design issues :

Programmatic implications :
This is one of the few articles to address the social implications of the debate over the role of breastfeeding in HIV transmission. The author makes some valid recommendations that certainly bear further consideration.

Author : Rogers MF.

Date : 11/28/87

n :

Title : Breastfeeding and HIV Infection - Letter

Journal : Lancet. November 28, 1987: 1278

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Response to the commentary by Baumslag N (Lancet. August 15, 1987: 401). Defends the CDC policy discouraging breastfeeding by HIV-positive mothers on the grounds that the policy was designed for the United States where safe alternatives to breastfeeding are available. Agrees on the need for more research.

Design issues :

Programmatic implications :

Author : Rubini N, Passman LJ.

Date : 8/1/92

n : 1.00

Title : Transmission of Human Immunodeficiency Virus Infection from a Newly Infected Mother to Her Two-year Old Child by Breastfeeding

Journal : The Pediatric Infectious Disease Journal. Vol 11(8), August 1992: 682 - 683

Country : Brazil

Study design : Case Report

Study population :

Research questions :

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
A previously healthy white female was transfused two units of blood following cesarean delivery of her second child. The infant was breastfed for a short period of time because he did not suckle well and the lactating mother opted to breastfeed her two-year old first-born child.

Five years later the mother was hopitalized, tested HIV positive and died of AIDS. The first-born child tested positive for HIV at age twelve and subsequently died of AIDS. She had no other reported risk factors for HIV infection and her father and two younger siblings tested negative for HIV.

The authors conclude that she was infected via breastmilk from her newly infected mother at age 24 months.

Design issues :
There is a lot of room for recall bias in this case. There is also no documentation that any of the units of blood with which the mother was transfused was positive or likely to be positive for HIV.

Programmatic implications :

Author : Ruff A, Coberly J, Halsey NA, Boulos R, Desormeaux J, Burnley A, et al.

Date : 1/2/94

n : 71.00

Title : Prevalence of HIV-1 DNA and p24 Antigen in Breastmilk and Correlation with Maternal Factors

Journal : Journal of Acquired Immune Deficiency Syndromes. Vol 7(1), 1994: 68 - 73

Country : Haiti

Study design :

Study population : 53 seropositive and 18 seronegative women enrolled in a longitudinal study of perinatal HIV infection in Haiti.

Research questions :
To investigate the presence of HIV-1 p24 antigen and viral DNA in the breastmilk of seropositive and seronegative mothers.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
HIV-1 DNA was detected by PCR in 70% of 43 breastmilk specimens from HIV-seropositive women at zero to four days post partum and 51% at twelve months post partum. p24 antigen was present in 24% of milk specimens at zero to four days and in no subsequent specimens.

The presence of viral DNA or p24 antigen was not associated with stage of disease as defined by CD4 lymphocyte count or fulfillment of the AIDS clinical case definition.

The authors note that the the presence of HIV viral DNA or p24 antigen in breastmilk cannot be assumed to be correlated with infectiousness because breastmilk is known to contain inhibitory activity. They conclude that the data indicate the need for further research.

Design issues :

Programmatic implications :

Author : Ruff A, Halsey NA, Coberly J, Boulos R.

Date : 8/1/92

n :

Title : Breastfeeding and Maternal Infant Transmission of HIV

Journal : The Journal of Pediatrics. Vol 121(2), August 1992: 325 - 327

Country : USA

Study design :

Study population :

Research questions :
To review and summarize existing virological and epidemiological information on HIV transmission through breastfeeding.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors review all the reported cases of postpartum HIV transmission probably via breastfeeding and other research supporting that probability.

They conclude that in settings where the infant mortality rate is high, the benefits of breastfeeding exceed the potential added risk of HIV transmission by breastfeeding.

They recommend that additional studies need to be conducted in various communities to shed more light on the matter. The need for studies to evaluate the potential impact and risk of anti-HIV chemotherapeutic agents on transmisssion or progression of HIV-1 infection in breastfed infants is also raised.

Design issues :

Programmatic implications :

Author : Ruff A, Hamzeh F, Lietman P, Siberry G, Boulos R, Bell K, et al.

Date : 1/2/94

n : 6.00

Title : Excretion of Zidovudine (ZDV) in Human Breastmilk

Journal : Abstract #111 - AIDS in Women and Children Conference, 1994

Country : Haiti

Study design :

Study population : 6 of 13 women enrolled in a study of ZDV excretion in breastmilk.

Research questions :
To determine whether Zidovudine (ZDV) is excreted in human breastmilk.

Breastfeeding definition :

Mother-child Characteristics :

Findings :
The authors report the cases of six HIV-seropositive women who were given a single 200mg dose of the antiviral drug Zidovudine. In all of the women ZDV was detected in breastmilk samples collected at two, four, and six hours post dose.

The authors suggest that the levels of the drug excreted in breastmilk may be sufficient to reduce the viral load in milk thereby decreasing the potential risk of HIV transmission through breastmilk in developing countries.

Design issues :

Programmatic implications :
The findings of this study potentially offer a solution to the dilemma of breastfeeding by HIV-seropositive women in developing countries. If one dose of the antiviral drug, ZDV, is able to reduce the risk of transmission to the infant then the benefits of breastfeeding may be maintained for the children whose lives may very well depend on it. However the cost of the intervention is likely to prove prohibitive even for just one dose of the drug.

Author : Ruff A.

Date : 12/1/94

n :

Title : Breastmilk, Breastfeeding, and Transmission of Viruses to the Neonate

Journal : Seminars in Perinatology. Vol 18 (6), December 1994: 510 - 516

Country :

Study design : Review Article

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Determination of the fraction of HIV-1 transmission attributable to breastfeeding is confounded by the limited ability of available diagnostic assays to establish the timing of infant infection; in most cases, it is difficult to distinguish among in utero, intrapartum, and postpartum transmission. It is also not known whether the risk of transmission is constant throughout lactation.

Design issues :

Programmatic implications :

Author : Ruff A.

Date : 1/1/95

n :

Title : Infant Feeding Policy and Practice in the Presence of HIV-1 Infection - Commentary

Journal : Pediatric AIDS and HIV Infection: Fetus to Adolescent. Vol. 6 (5), 1995: 305 - 310

Country :

Study design : Commentary

Study population :

Research questions :
Summarizes Nicoll et al. (AIDS. Vol 9, 1995: 107 - 119) article.

Breastfeeding definition :

Mother-child Characteristics :

Findings :

Design issues :

Programmatic implications :
Argues that it is critical to rationally approach the issue of HIV and breastfeeding, to generate appropriate scientific data, and to continue to modify public policy as appropriate based on the availability of additional data.

Author : Ryder RW, Manzila T, Baende E, Kabagabo U, Behets F, Batter V, et al.

Date : 6/1/91

n : 337.00

Title : Evidence from Zaire that Breastfeeding by HIV-1-Seropositive Mothers is Not a Major Route for Perinatal HIV-1 Transmission but Does Decrease Morbidity

Journal : AIDS. Vol 5 (6), 1991: 709 - 714

Country : Zaire

Study design : Prospective Study

Study population : 106 HIV-seropositive women and their infants and 231 HIV-seronegative women and their infants recruited at a Kinshasa maternity hospital serving mothers of relatively high socio-economic status.

Research questions :
To determine rates of perinatally acquired HIV infection and subsequent morbidity in children born to either HIV-seropositive or seronegative mothers who breastfed and/or bottle fed their infants during the first twelve months of life.

Breastfeeding definition :
The study subjects are divided into:

- Exclusively breastfed
- Mixture of breastfed and bottle fed
- Exclusively bottle fed

There is no description of what an infant who is classified as being exclusively breastfed is allowed to receive.

Mother-child Characteristics :

Findings :
This study did not demonstrate any increased risk for perinatal HIV infection associated with breastfeeding. Of the 106 children born to HIV-positive women, the rate of transmission was 21% in infants exclusively breastfed, 19% in infants breastfed and bottle fed and 0% in infants exclusively bottle fed.

They also report significantly lower morbidity from common childhood diseases in non-HIV-1 infected breastfed infants with either HIV-1-seropositive or negative mothers.

Design issues :

Programmatic implications :

Author : Scott GB.

Date : 6/23/87

n :

Title : Consultation on Breastmilk and HIV Infection

Journal : Unpublished - Submitted to WHO, Geneva, 1987

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
A review of the available knowledge about the risk of HIV transmission through breastmilk and the published reports on the issue by Ziegler JB et al. (Lancet. April 20, 1985: 896 - 897) and by Thiry L et al. (Lancet. October 19, 1985: 891 - 892). Concludes that there needs to be further research done to conclusively implicate breastfeeding as a mode of transmission.

Design issues :

Programmatic implications :
This report served as a background paper for the meeting at which the WHO recommendations were derived.

Author : Seltzer V, Benjamin F.

Date : 4/1/90

n :

Title : Breastfeeding and the Potential for Human Immunodeficiency Virus Transmission

Journal : Obstetrics and Gynecology. Vol 75 (4), April 1990: 713 - 715

Country : USA

Study design :

Study population :

Research questions :

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
Reviews the evidence for possible transmission of HIV through breastfeeding and recommends the following strategy:

- In areas where HIV is endemic, screening and counselling of all women of reproductive age should be encouraged.
- Where HIV is rare, high risk women should be identified and screened.
- HIV-positive women should be counselled so that they do not transfer the infection to their partners and they should be advised of the considerable risk of transfer to their newborn if they become pregnant; they should be advised not to breastfeed.
- In developing countries HIV-positive women should continue to breastfeed.
- If a woman in a high risk area or population in the US should refuse to be screened, she should be advised not to breastfeed.

Design issues :

Programmatic implications :
This article essentially summarizes the policies concerning HIV and breastfeeding as given by the WHO, CDC, and other agencies in the developed world.

Author : Semba RD, Miotti PG, Chiphangwi JD, Saah AJ, Canner JK, Dallabetta GA, Hoover DR.

Date : 6/25/94

n : 567.00

Title : Maternal Vitamin A Deficiency and Mother-to-Child Transmission of HIV-1

Journal : Lancet. Vol 343, June 1994: 1593 - 1597

Country : Malawi

Study design : Prospective Observational

Study population : 567 HIV-1 infected mothers and their infants.

Research questions :
To determine the effect of maternal vitamin A status on vertical transmission of HIV-1.

Breastfeeding definition :
Duration of any breastfeeding.

Mother-child Characteristics :
Mothers had low vitamin A status.

Findings :
Overall vertical transmission rate was 21.9%. Duration of breastfeeding was not related to transmission however 99% of mothers were still breastfeeding when their infant was one year old.

Design issues :
There was not enough variation in breastfeeding practices to evaluate the role of breastfeeding in the relationship between maternal vitamin A status and risk of HIV-1 transmission.

Programmatic implications :
Nutritional intervention to improve vitamin A status among pregnant women may reduce the risk of vertical transmission.

Author : Senturia YD, Ades AE, Peckam CS.

Date : 8/15/87

n :

Title : Breastfeeding and HIV Infection - Commentary

Journal : Lancet. August 15, 1987: 400-401

Country : United Kingdom

Study design : Prospective Study

Study population : Infants born to HIV-positive mothers.

Research questions :

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
Commentary on the possible role of breastfeeding in HIV transmission. The authors describe the preliminary findings of the European Collaborative study of infants born to HIV-positive mothers. 11 of the 83 subjects enrolled (13%) are breastfeeding and of those 2 are infected and are thought to have contacted the infection in-utero. The authors suggest that breastfeeding shortly after infection such as in the case of postpartum transfusions may carry a higher risk of viral transfer because of high viraemia, than is the case in mothers who were seropostive before delivery, and the relative contribution of breastfeeding to HIV transmission under the latter conditions is probably small compared to in utero transmission.

They conclude that it is not justified in light of available knowledge to discourage seropositive mothers from breastfeeding.

Design issues :

Programmatic implications :

Author : Senturia YD.

Date : 1/1/87

n :

Title : AIDS and Primary Health Care: Breastfeeding

Journal : AIDS Action. Issue 1: 3

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Review of the information available about the risk of transmission of HIV through breastfeeding. Suggests that there is not enough evidence to advise mothers to stop breastfeeding their children particularly in developing countries.

Design issues :

Programmatic implications :

Author : Simonon A, Le Page P, Karita E, Hitimana D-G, Dabis F, Msellati P, et al.

Date : 5/1/94

n : 536.00

Title : An Assessment of the Timing of Mother-to-Child Transmission of Human Immunodeficiency Virus Type 1 by Means of Polymerase Chain Reaction

Journal : Journal of Acquired Immune Deficiency Syndromes. Vol 7 (9), 1994: 952 - 957

Country : Rwanda

Study design : Cohort

Study population : HIV-infected and uninfected women in Rwanda and their infants

Research questions :

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
Postnatal transmission accounts for a minimum of 4.9% and a maximum of 17.6% of all vertical transmission.

Design issues :
PCR performed before the first month of life is positive in only one third to one half of the children further shown to be infected. Hence it is difficult to ascertain the proportion of infection that results postpartum.

Programmatic implications :
Suggests that known HIV-1-infected mothers who can afford and safely use artificial feeding may be counseled individually against breastfeeding.

Author : Steihm ER, Vink P.

Date : 3/1/91

n : 1.00

Title : Transmission of Human Immunodeficiency Virus Infection by Breastfeeding

Journal : The Journal of Pediatrics. Vol 118 (3), March 1991: 410 - 412

Country : USA

Study design : Case Report

Study population :

Research questions :

Breastfeeding definition :
Breastfeeding for this infant was described as exclusive for three months and with supplementation for another five months. There is no description of what is meant by exclusive.

Mother-child Characteristics :
Mother had blood transfusions postpartum.

Findings :
A healthy 34 year-old white female with no known risk factors for HIV infection received a transfusion of eight units of packed red cells and four units of plasma following cesarean delivery of her first child. The infant was breastfed exclusively for three months and with supplementation for another five.

She remained healthy until age four when she was hospitalized for severe anaemia and was transfused with blood from a donor who was negative for HIV. At age five she tested positive for HIV. On testing the symptom-free mother, father, and two-year old brother, only the father was HIV negative. Subsequently the donors of the blood products given to the mother all tested negative except for one of the four plasma donors who was not located for testing. He was a homosexual man who engaged in high risk activity.

The authors suggest that the mother was infected by transfusion of HIV-positive blood postpartum and subsequently transferred the infection to her infant through her breastmilk.

Design issues :

Programmatic implications :

Author : Tedder RS.

Date : 8/20/88

n :

Title : HIV and Breastfeeding - Commentary

Journal : Lancet. August 20, 1988: 453

Country : United Kingdom

Study design :

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
This author feels that there is enough evidence to discourage breastfeeding by HIV-positive mothers and women at risk of HIV infection. States that other retroviruses such as HTLV-1 have been shown to be transmitted through breastmilk and HIV is very likely to be similar.

The author also feels that pastuerization as it is usually carried out is insufficient to make donor breastmilk safe and recommends screening of breastmilk donors.

Design issues :

Programmatic implications :

Author : Thiry L, Sprecher-Goldberger S, Jonckheer T, Levy J, Van de Perre P, Henrivaux P, et al.

Date : 10/19/85

n : 3.00

Title : Isolation of AIDS Virus From Cell-Free Breastmilk in Three Healthy Virus Carriers

Journal : Lancet. October 19, 1985: 891 - 892

Country : Belgium. Cases from Zaire, Rwanda, and Belgium.

Study design :

Study population : Three breastfeeding mothers at risk for HIV infection. Clinically healthy. Two of them tested positive by ELISA.

Research questions :
To investigate virus carriage in breastmilk.

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :
See study population.

Findings :
The researchers were able to detect free virus in filtered cell-free portion of the breastmilk of all three women.

Design issues :
The detection of free virus in breastmilk does not necessarily indicate that the breastmilk is contagious.

Programmatic implications :
This seemed to confirm the fears raised by the initial report of possible vertical transmission via breastfeeding. The presence of virus in breastmilk lent more weight to the suspicion of risk.

Author : Tovo P-A, De Martino M - Coordinators of the Italian Multicenter Study.

Date : 11/5/88

n : 486.00

Title : Epidemiology, Clinical Features, and Prognostic Factors of Pediatric HIV Infection

Journal : Lancet. November 5, 1988: 1043

Country : Italy

Study design : Prospective Study

Study population : Children with HIV infection or born to HIV-seropositive mothers at fifty-two centers in Italy.

Research questions :
What are the rates of transmission of HIV from mother to infant?
What factors affect transmission?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The estimated rate of vertical transmission in this study was 32% with a higher rate in children who were born by vaginal delivery and then breastfed.

Design issues :

Programmatic implications :

Author : Tozzi AE, Pezzotti P, Greco D.

Date : 1/1/90

n : 117.00

Title : Does Breastfeeding Delay Progression to AIDS in HIV-Infected Children?

Journal : AIDS. Vol 4 (12), 1990: 1293 - 1294

Country : Italy

Study design : Prospective Study

Study population : Children with AIDS registered in the Italian National Registry of AIDS as of February 1990.

Research questions :
Does breastfeeding delay progression to AIDS or affect survival rates in HIV-infected children?

Breastfeeding definition :
No definition of breastfeeding given.

Mother-child Characteristics :

Findings :
The authors found a longer incubation period, defined as time from birth to the onset of associated diseases meeting the case definition of AIDS for surveillance purposes, among vertically infected children who had been breastfed (median - 19.0 months) as opposed to their bottle fed counterparts (median - 9.7 months). They did find that the survival curves for these two groups ultimately overlapped by about age 60 months.

They also report that breastfed infants appear to have a longer survival time, defined as time from diagnosis to death, than their bottle fed counterparts.

The authors recommend that these findings be further explored by means of a prospective study.

Design issues :
The authors address important limitations of their study and suggest that a prospective study may deal with these issues more conclusively.

Programmatic implications :
These findings could potentially have very important implication for policy decisions regarding breastfeeding by HIV-infected mothers. They appear to support the possibility of a protective role of breastfeeding even in HIV-infected children, and therefore present another argument for the continued protection, promotion, and support of breastfeeding regardless of HIV status.

Author : UK Department of Health.

Date :

n :

Title : HIV and Breastfeeding

Journal :

Country : United Kingdom

Study design : Policy Statement

Study population :

Research questions :

Breastfeeding definition :

Mother-child Characteristics :

Findings :
Amendment to the original circular on the subject which was published in April 1988.

- Women who are HIV positive: Should be advised of the possibility that babies not infected in utero or during delivery may be infected through breastfeeding and it is therefore prudent for them to avoid breastfeeding and be given assistance in the safe and successful use of infant formula.
- Women at risk for HIV infection who have been tested and found to be negative: Should receive counselling as indicated by personal and clinical circumstances.
- Women at risk who decline testing: Should receive counselling as seems appropriate including information about the risks of breastfeeding if she is antibody positive.
- Human Milk Banking: Donors should be given a leaflet explaining why women at risk of HIV should not donate milk and should sign a form saying they understand the information. They must then be tested and found to be antibody negative before their milk can be accepted.

Emphasizes that the guidance is meant only for the UK and may be inappropriate in other settings.

Design issues :

Programmatic implications :
The guidelines may be intended only for the United Kingdom but they are likely to have effect in other countries and they may pose a particular problem in developing countries.