

FEEDING THE NON-BREASTFED CHILD 6-24 MONTHS OF AGE

Geneva, 8-10 March 2004

MEETING REPORT

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Introduction

According to current UN recommendations, infants should be exclusively breastfed for the first six months of life, and thereafter should receive appropriate complementary feeding with continued breastfeeding up to two years or beyond. However, there are a number of infants who will not enjoy the benefits of breastfeeding in the early months of life or for whom breastfeeding will not occur or will stop before the recommended duration of two years or beyond. A group that calls for particular attention is the infants of mothers who are known to be HIV positive. To reduce the risk of transmission, it is recommended that, when acceptable, feasible, affordable, sustainable and safe, these mothers give replacement feeding from birth. Otherwise, they should breastfeed exclusively and stop as soon as alternative feeding options become feasible. Another group includes those infants whose mothers have died, or who for some reason do not breastfeed.

Recommendations for appropriate feeding of breastfed infants from six months onwards have been summarized by PAHO in the publication *Guiding Principles for Complementary Feeding of the Breastfed Child*. Some of these guiding principles are not applicable to non breast fed children, others need adaptation. WHO convened this informal meeting to identify an analogous set of guiding principles for feeding of non-breastfed children after six months of age. For infants less than six months, guidelines for decision makers and a guide for health care manager are already available.

¹ PAHO. *Guiding Principles for Complementary Feeding of the Breastfed Child*. Washington: Pan American Health Organization, World Health Organization, 2003

² WHO/UNICEF/UNFPA/UNAIDS. HIV and infant feeding: Guidelines for decision-makers. WHO, 2003. and WHO/UNICEF/UNFPA/UNAIDS. HIV and infant feeding: A guide for health-care managers and supervisors. WHO, 2003.



Objectives of the meeting

Feeding the non-breastfed child is difficult, especially in a context of poverty, because the risk of illness and mortality associated with not breastfeeding is exacerbated. With the present epidemic of HIV/AIDS striking particularly resource constrained countries, especially in sub Saharan Africa, how to feed the non-breastfed infant and young child needs to be urgently addressed. With this in mind, participants were asked to:

- develop feeding recommendations for infants and young children 6-24 months of age who are not breastfed;
- discuss programme guidelines and tools for translating generic recommendations into locally appropriate feeding guidelines;
- discuss sustainable options for increasing access to nutritious foods and/or micronutrients in resource-poor settings.



Discussion themes

The meeting brought together about 20 experts from a variety of disciplines and agencies (List of Participants, Annex 1). In preparation for the meeting, a background paper used available information from five countries (Bangladesh, Ghana, Guatemala, Honduras and Peru) to identify appropriate and affordable feeding options for similar settings considering various scenarios:

- where infant formula is available;
- where animal milk products are available;
- where no animal milk products are available.

In each of these scenarios, analysis was carried out using linear programming to determine what dietary recommendations should be formulated assuming the availability or not of other animal source foods.

During the meeting, the current recommendations for feeding the breast fed child were first examined to determine which guiding principles needed adaptation to be applicable to the non breast fed child. Current recommendations for feeding HIV-positive infants and young children were also reviewed. Participants then reviewed up-to-date information on:

- scientific basis for guidelines on feeding non-breastfed children 6-24 months of age;
- caring for non-breastfed infants and young children;
- programmatic implications of feeding and taking care of non-breastfed infant and young children.

The agenda and a summary of the presentations are attached as Annex 2 and 3.

Working groups considered these inputs together with practical experiences of promoting appropriate feeding on a population basis and for children living in exceptionally difficult circumstances. The reports of the working groups are attached as Annex 4.



Conclusions

Participants agreed on the following Guiding Principles for Feeding the Non-breastfed Child 6-24 months of age:

Amount of foods needed

- Energy needs are approximately 600 kcal/day at 6-8 months, 700 kcal/d at 9-11 months, and 900 kcal/d at 12-24 months of age.

Meal frequency and energy density

- The appropriate number of feedings depends on the energy density of the local foods and the usual amounts consumed at each feeding. For the average healthy infant, meals should be provided 4-5 times per day, with additional nutritious snacks (such as a piece of fruit or bread or chapatti with nut paste) offered 1-2 times per day, as desired. Meals include milk-only feeds, other foods, and combinations of milk feeds and other foods. Snacks are defined as foods eaten between meals - usually self-fed, convenient and easy to prepare. If energy density or amount of food per meal is low, more frequent meals may be required.

Nutrient content of foods

- Feed a variety of foods to ensure that nutrient needs are met.
- Meat, poultry, fish or eggs should be eaten daily, or as often as possible, because they are rich sources of many nutrients such as iron and zinc. Milk products are rich sources of calcium and several other nutrients. Diets that do not contain animal source foods (meat, poultry, fish or eggs, plus milk products) cannot meet nutrient needs at this age unless fortified products or nutrient supplements are used.
- If adequate amounts of other animal source foods are consumed regularly, the amount of milk needed is ~200-400 mL/d; otherwise, the amount of milk needed is ~300-500 mL/d.

The following milks are acceptable sources of nutrients:

- Full cream milk, including goat, buffalo, cow, sheep, camel milk, Ultra High Temperature (UHT)
- Evaporated milk (reconstituted)
- Fermented milk
- Expressed breast milk (heat-treated if mother HIV positive)

The following products are unsuitable as major sources of nutrients:

- Condensed milk
- Skimmed and semi-skimmed milk (semi-skimmed milks may be acceptable after 12 months)
- Coffee creamer
- Soy milk (unless it is a soy-based infant formula)

Small amounts of these products are acceptable as a part of a varied diet with adequate quantities of acceptable milk products.

If milk and other animal source foods are not eaten in adequate amounts, both grains and legumes should be consumed daily, if possible within the same meal, to ensure adequate protein quality.

Provide diets with adequate fat content. If animal source foods are not consumed regularly, 10-20g of added fats or oils are needed unless a fat-rich food is given (such as foods or pastes made from groundnuts, other nuts and seeds). If animal source foods are consumed, up to 5g of additional fats or oils may be needed in some circumstances.

- The daily diet should include Vitamin A rich foods (e.g. dark coloured fruits and vegetables; red palm oil; vitamin A fortified oil or foods); vitamin C rich foods (e.g. many fruits, vegetables and potatoes) consumed with meals to enhance iron absorption; and foods rich in the B vitamins including riboflavin (e.g. liver, egg, dairy products, green leafy vegetables, soybeans), vitamin B6 (e.g. meat, poultry, fish, banana, green leafy vegetables, potato and other tubers, peanuts) and folate (e.g. legumes, green leafy vegetables, orange juice).

Dairy products are the richest sources of calcium. If dairy products are not consumed in adequate amounts, other foods that contain relatively large amounts of calcium, such as small fish (dried or fresh, with the bones) and lime-treated maize tortillas, can fill the gap. Other foods such as soybeans, cabbage, carrots, squash, papaya, green leafy vegetables, guava and pumpkin are useful additional sources of calcium.

- Avoid giving drinks with low nutrient value, such as tea, coffee and sugary drinks such as soda. Limit the amount of juice offered (e.g. < 250 mL/d), to avoid displacing more nutrient-rich foods.

Use of fortified products or vitamin-mineral supplements

- As needed, use fortified complementary foods or vitamin-mineral supplements (preferably mixed with or fed with food) that contain iron (8-10 mg/d at 6-12 mo, 5-7 mg/d at 12-24 months). If adequate amounts of animal source foods are not consumed, these fortified foods or supplements should also contain zinc, calcium and vitamin B12.

Fluid needs

- Non-breastfed infants need at least 400-600 mL/d of additional fluids (in addition to water contained in foods) in a temperate climate, and 800-1200 mL/d in a hot climate. Plain, clean (boiled, if necessary) water should be offered several times per day to ensure that the infant's thirst is satisfied.

Feeding during and after illness

- Increase fluid intake during illness and encourage the child to eat soft, varied, appetizing, favorite foods. After illness, give food more often than usual and encourage the child to eat more.

Responsive feeding

- Practice responsive feeding, applying the principles of psycho-social care. Specifically: a) feed infants directly and assist older children when they feed themselves, being sensitive to their hunger and satiety cues; feed slowly and patiently, and encourage children to eat, but do not force them; if children refuse many foods, experiment with different food combinations, tastes, textures and methods of encouragement; minimize distractions during meals if the child loses interest easily; remember that feeding times are periods of learning and love – talk to children during feeding, with eye to eye contact.



Safe preparation and storage of foods

- Practice good hygiene and proper food handling by a) washing caregivers' and children's hands before food preparation and eating, b) storing foods safely and serving foods immediately after preparation, c) using clean utensils to prepare and serve food, d) using clean cups and bowls when feeding children, and e) avoiding the use of feeding bottles, which are difficult to keep clean.

Participants also discussed the special needs for **Care** for mothers and children living in exceptionally difficult circumstances. For example, mothers living with HIV are challenged not only to feed their child adequately; they may also suffer from ill health and deteriorating socio-economic circumstances. This situation could greatly impair their caring capacity, and needs to be considered in interventions and programmes to improve infant and young child feeding.

Duration of exclusive breastfeeding in the context of HIV

A previous meeting examined the issue of infant feeding in the context of HIV/AIDS and concluded that when breast milk substitutes were not acceptable, feasible, affordable, sustainable and safe, then exclusive breastfeeding (breast milk only - no other foods or drink except vitamin and mineral drops, not even water) should be recommended for the first few months¹. In the present meeting, it was also acknowledged that the precise timing of breastfeeding cessation should be determined after examining the risks attached to cessation and continuation of breastfeeding. It was confirmed that the optimal time of breastfeeding cessation varies according to individual circumstances. Attention was drawn to the risk of recommending complete cessation of breastfeeding at six months for mothers with no safe option for infant feeding after that time.

Publications following the meeting

Following the meeting, the background document will be finalised and submitted for publication in a peer reviewed journal. The draft Guiding Principles will be further elaborated with their scientific rationale and later published as a separate WHO publication in the second semester of 2004.

¹ New Data on the Prevention of Mother-to-Child Transmission of HIV and their Policy Implications; Conclusions and recommendations; WHO Technical Consultation on Behalf of the UNFPA/UNICEF/WHO/UNAIDS Inter-Agency Task Team on Mother-to-Child Transmission of HIV; Geneva, 11-13 October 2000.

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- 15.15 – 16.00 - Turning nutritional recommendations into food based guidelines - the role of linear programming
(Dr André Briend and Prof. Kathryn Dewey)
Questions and answers

- 16.00 – 17.15 - Group work on feeding recommendations for non-breastfed children 6 – 24 months of age

Tuesday 9 March

- 09.00 – 9.15 - Summary of main issues discussed in day 1 from chairperson

Caring for non-breastfed infants and young children

- 09.15 – 09.45 - Care practices surrounding feeding the non-breastfed child – issues to consider
(Dr Ellen Piwoz)
- 09.45 – 10.15 - Improving care practices for feeding – experiences in India
(Dr Nita Bhandari)
- 10.15 – 10.45 Coffee/tea
- 10.45 – 11.15 Discussion
- 11.15 – 11.45 - Safe preparation and storage of foods for infants and young children – global recommendations and options
(Dr Peter Ben Embarek)
- 11.45 – 12.00 Discussion

Implications for programmes

- 12.00 – 12.30 - Possible use of spread instead of liquid milk diets to feed non- breastfed children aged 6 months or more
(Dr André Briend)
- 12.30 – 13.30 Lunch
- 13.30 – 14.30 - Increasing access to adequate foods and food supplements – possible mechanisms for rapid scaling up
(Dr Andrew Thorne-Lyman)
- Improving food security including in areas where HIV/AIDS is prevalent
(Ms Ellen Muehlhoff)
- Discussion on increasing access to food and/or micro-nutrients



- 14.30 – 14.45 Introduction of group work
- 14.45 – 15.00 Coffee, tea
- 15.00 – 17.30 Group work on three themes
- generic recommendations for feeding the non-breastfed child 6-24 months of age
 - programme guidelines and tools for translating generic recommendations in locally appropriate feeding guidelines
 - options for increasing access to nutritious foods and/or micro-nutrients in resource-poor settings and mechanisms to stimulate their sustainable implementation

Wednesday, 10 March

- 09.00 – 10.00 Reporting back from group work
- 10.00 – 10.30 - Adaptation of generic feeding guidelines: the role of formative research
(Dr Ellen Piwoz)
- 10.30 – 11.00 Coffee/tea
- 11.00 – 11.30 - Process for Promotion of Infant Feeding - *ProPan*
(Dr Chessa Lutter)
- 11.30 – 12.00 - Monitoring and evaluation of complementary feeding practices
(Dr Marie Ruel)
- 12.00 – 12.30 - Update on complementary feeding course
(Ms Randa Saadeh)
- HIV and infant feeding: putting recommendations into practice for counsellors
(Dr Cota Vallenias)
- 12.30 – 13.30 Lunch
- 13.30 – 14.15 Consolidation of recommendations for generic feeding guidelines (plenary discussion)
- 14.15 – 15.00 Consolidation of recommendations for programming (plenary discussion)
- 15.00 – 15.30 Coffee/tea
- 15.30 – 16.15 Research priorities (plenary discussion)
- 16.15 – 16.45 Next steps
- 16.45 Closing remarks
(Dr José Martines, Dr Bruno de Benoist)

Summary of presentations

Current recommendations for complementary feeding of the breastfed child

José Martines, WHO, CAH

The current recommendations for complementary feeding of breastfed children were reviewed and their relevance to non-breast fed children was discussed. The following suggestions were made:

- **Duration of exclusive breastfeeding:** Practice exclusive breastfeeding from birth to six months of age and introduce complementary foods at 6 months of age (180 days) while continuing to breastfeed.
Not applicable
- **Maintenance of breastfeeding:** Continue frequent, on-demand breastfeeding until two years of age or beyond.
Not applicable
- **Responsive feeding:** Practice responsive feeding, applying the principles of psycho-social care:
 - feed infants directly and assist older children when they feed themselves, being sensitive to their hunger and satiety cues
 - feed slowly and patiently, and encourage children to eat, but do not force them
 - if children refuse many foods, experiment with different food combinations, tastes, textures and methods of encouragement
 - minimize distractions during meals if the child loses interest easily
 - remember that feeding times are periods of learning and love - talk to children during feeding, with eye to eye contact**No change**
- **Safe preparation and storage:** Practice good hygiene and proper food handling by:
 - washing caregivers' and children's hands before food preparation and eating
 - storing foods safely and serving foods immediately after preparation
 - using clean utensils to prepare and serve food
 - using clean cups and bowls when feeding children
 - avoiding the use of feeding bottles, which are difficult to keep clean**No change**
- **Amount of complementary food:** Start at six months of age with small amounts of food and increase the quantity as the child gets older, while maintaining frequent breastfeeding. The energy needs from complementary foods for infants with "average" breast milk intake in developing countries are approximately 200 kcal per day at 6-8 months of age, 300 kcal per day at 9-11 months of age, and 550 kcal per day at 12-23 months of age. In industrialized countries these estimates differ somewhat (130, 310 and 580 kcal/d at 6-8, 9-11 and 12-23 months, respectively) because of differences in average breast milk intake.
Needs adaptation



- **Food consistency:** Gradually increase food consistency and variety as the infant gets older, adapting to the infant's requirements and abilities. Infants can eat pureed, mashed and semi-solid foods beginning at six months. By eight months most infants can also eat "finger foods" (snacks that can be eaten by children alone). By 12 months, most children can eat the same types of foods as consumed by the rest of the family (keeping in mind the need for nutrient-dense foods). Avoid foods that may cause choking (i.e., items that have a shape and/or consistency that may cause them to become lodged in the trachea, such as nuts, grapes, raw carrots).

No change

- **Meal frequency and energy density:** Increase the number of times that the child is fed complementary foods as he/she gets older. The appropriate number of feedings depends on the energy density of the local foods and the usual amounts consumed at each feeding. For the average healthy breastfed infant, meals of complementary foods should be provided 2-3 times per day at 6-8 months of age and 3-4 times per day at 9-11 and 12-24 months of age, with additional nutritious snacks (such as a piece of fruit or bread or chapatti with nut paste) offered 1-2 times per day, as desired. Snacks are defined as foods eaten between meals - usually self-fed, convenient and easy to prepare. If energy density or amount of food per meal is low, or the child is no longer breastfed, more frequent meals may be required.

Needs adaptation

- **Nutrient content:** Feed a variety of foods to ensure that nutrient needs are met. Meat, poultry, fish or eggs should be eaten daily, or as often as possible. Vegetarian diets cannot meet nutrient needs at this age unless nutrient supplements or fortified products are used. Vitamin A-rich fruits and vegetables should be eaten daily. Provide diets with adequate fat content. Avoid giving drinks with low nutrient value, such as tea, coffee and sugary drinks such as soda. Limit the amount of juice offered so as to avoid displacing more nutrient-rich foods.

Needs adaptation

- **Use of vitamin supplements:** Use fortified complementary foods or vitamin-mineral supplements for the infant, as needed. In some populations, breastfeeding mothers may also need vitamin-mineral supplements or fortified products, both for their own health and to ensure normal concentrations of certain nutrients (particularly vitamins) in their breast milk. [Such products may also be beneficial for pre-pregnant and pregnant women].

Needs adaptation

- **Feeding during and after illness:** Increase fluid intake during illness, including more frequent breastfeeding, and encourage the child to eat soft, varied, appetizing, favourite foods. After illness, give food more often than usual and encourage the child to eat more.

Needs adaptation

Current UN recommendations for HIV and infant feeding

Peggy Henderson, WHO, CAH

These recommendations are based upon the recognition that there is a risk of HIV transmission during breastfeeding, as shown by prevalence of HIV infection increasing with age among breast fed children born to HIV-infected mothers. This risk of transmission has to be balanced with the risk of not being breastfed, associated with a higher mortality, especially below the age of 6 months. The present recommendations for women who are HIV-negative or who do not know their status is to exclusively breastfeed for 6 months and to continue to breastfeed for 2 years or beyond. For HIV-positive women, when replacement feeding is acceptable, feasible, affordable, sustainable and

safe (AFASS), avoidance of all breastfeeding is recommended. Otherwise exclusive breastfeeding is recommended for the first few months of life. Use of replacement feeding should take place in accordance with the International Code of Marketing of Breast-milk Substitutes. HIV-positive mothers who choose to breastfeed should discontinue breastfeeding as soon as replacement feeding is AFASS for them and their infant, given the individual woman's situation and the risks of replacement feeding for the infant's age. General principles of complementary feeding are the same for a child receiving a milk source as for a child being breast-fed: non-breastfed infants and young children from six months of age should ideally continue to receive a suitable breast-milk substitute as well as complementary foods made from properly prepared and nutrient-rich family foods. These recommendations are described in detail in documents for decision makers and for programme managers. However, both at international and country levels, the need for more specific recommendations for feeding children of HIV-positive women after 6 months of age has been expressed. During the discussion, it was acknowledged that more guidance may also be needed for non breast fed children below 6 months.

Current nutritional recommendations for people living with HIV or AIDS (PLWHA)

Randa Saadeh, WHO, NHD

In asymptomatic HIV infections, energy needed to maintain body weight is increased by about 10%. In symptomatic HIV infection, energy needed to maintain body weight is increased by 20-30%. In growing children, energy requirements may be up to 50-100% higher to recover from weight loss during acute infection. There are insufficient data to support an increased protein requirement due to HIV infection. 12-15% of energy intake should come from protein in PLWHAs. There is no evidence to suggest that fat requirements are different because of HIV-infection. At present, data are insufficient to recommend daily micronutrient (MN) intakes above recommended daily allowance (RDA) levels for HIV-infected adults and children. Therefore, there are no special MN recommendations because of HIV. There is evidence suggesting that some high dose MN supplements – vitamin A, zinc, and iron – may have adverse effects in PLWHAs.

Expressing and heat-treating breast milk to reduce the risk of HIV transmission

Rajiv Bahl, WHO, CAH

Boiling breast milk may damage some of the nutrients contained in breast milk and does not seem an acceptable option. An adapted method of breast milk pasteurisation developed in Pretoria seems more suitable: boiling a pan of water, removing it from the heat source and immediately placing a covered glass jar of breast milk in water for 20 minutes seems to eliminate the HIV. Also, heating breast milk and water together in a water bath until the water begins to boil, and removing it immediately from water seems to eliminate the virus. Safety of these approaches needs further evaluation. Their acceptability remains an open question.

Options and issues in feeding the non-breastfed child 6-24 months of age considering various scenarios and based on results of linear programming

(Kay Dewey and Roberta J Cohen, University of California, Davis, USA)

Three scenarios were examined: 1) if breast-milk substitutes (infant formula) are available; 2) if animal milk products are available; 3) if no animal milk products are available. Each scenario was examined when other animal source foods (ASF) were or were not available.



The use of plain cow's milk (scenario 2) raises some concerns because of its low iron content and bioavailability, possible occult gastrointestinal blood loss and high potential renal solute load. These concerns should not prevent the use of cow's milk after the age of 6 months. Iron deficiency can be prevented by adequate supplementation. Occult blood loss decreases with age and usually disappears by the age of 12 months. Heat-treated cow's milk does not provoke blood losses. The potential renal solute load of cow's milk is indeed higher than for breast milk but this does not seem to be a problem in children aged > 6 months with a more mature kidney function, provided the child is regularly offered plain water.

During the discussion, it was stressed that the need to give additional water to non breastfed children receiving a diet with a high solute load should not create confusion with the current recommendation not to give any additional fluid, not even water, in children who are exclusively breastfed under the age of six months.

Fermented milk has the advantage of reducing the risk of bacterial contamination if accidentally contaminated and has reduced lactose content. Some bacterial strains used for preparing fermented milk may give some protection against diarrhoea. It is not known whether this applies to fermented milk heat-treated during packaging.

How best to provide all needed nutrients to non breastfed children within these three scenarios was examined by linear programming. This technique solves a series of linear equations that satisfy certain constraints, while minimizing an objective function, e.g. cost. Three data sets were used for this analysis: from Latin America (Peru, Guatemala, Honduras), Africa (Ghana) and Asia (Bangladesh). The maximum amount of a specific food allowed in each model was 90% of highest intake ever recorded in each region (but at least 20g). Energy content of diet had to be equal to energy requirements at each age (615, 686 and 894 kcal at 6-9, 9-12 and 12-24 mo). Fat content of diet had to contribute at least 30% of energy. Solutions had to meet or exceed recommended nutrient intakes for protein and nine potential "problem nutrients": vitamin A, thiamin, riboflavin, vitamin B6, folate, vitamin C, calcium, iron and zinc (niacin was not included because of difficulty estimating the amount from tryptophan). Recommended intakes were based on the latest WHO/FAO or IOM (DRI) recommendations (whichever was lowest). The analysis suggested that if commercial infant formula is available, affordable and can be safely used, the amounts needed at 6-12 mo are ~280-500 mL/d if other ASF are in the diet, and ~400-550 mL/d if not. If formula is not available or affordable animal milk such as cow's milk can be a good source of several key nutrients. Without fortified products, the amounts of milk needed range from < 200 to ~370 mL/d if other ASF are included, and ~300-500 mL/d if not. Iron supplements or fortified products are needed in nearly all situations, in amounts ranging from 1 to 8 mg Fe/d, depending on the age range and other foods in the diet. To meet other nutrient needs, animal source foods other than milk (1 egg and 14-75g of meat, poultry or fish) are also needed unless multiple micronutrient supplements or fortified products are provided. If animal source foods apart from milk are not available, supplements of zinc and calcium are needed in addition to iron. Grain products, legumes, fruits and vegetables should also be included in the diet. In general, 1-2 types of fruits and 1-3 types of vegetables per day can be recommended. If a fortified product is available, there is no need for infant formula or additional micronutrient supplements, and non-milk ASF are optional. If milk is included, the amount needed (0-335 mL/d) is less than when fortified products are not included. Cost comparisons indicate that a fortified grain-legume blend allows for the lowest cost diet (but this diet does not include fruits or vegetables). Limits of the models used to obtain these results should be considered when finalising guidelines. These linear programming analyses were based on only nine nutrients. There are uncertainties regarding RNIs during infancy. Food composition data are subject to error.

Bioavailability estimates are based on entire day's diet, not on each meal. The maximum amounts of individual foods allowed are based on a limited number of studies, with few children > 12 mo of age. Food cost estimates will vary by region. Also, the model is very sensitive to the maximum quantity of food allowed in the model, and the validity of current assumptions needs to be checked.

Experience of implementing present guidelines in Zimbabwe

Claire Zunguza, Harare City Health Department, Zimbabwe

Disclosure of HIV status of the mother to her close family, including her husband, is one of the major constraints influencing mothers' feeding mode choice. Also, the delay in diagnosing the status of the child is a major obstacle to take an informed decision. HIV status in Zimbabwe, as a result of cost constraints, is based on antibody measures, and cannot take place before about 18 months. The cost of full cream milk, infant formula and vitamin supplements is out of reach for most families. A tin of infant formula often cost more than 50% of the average salary in Zimbabwe. The cost of utensils, of fuel for preparing infant formulas and the time needed are also major constraints to replacement feeding. Currently, the Ministry of Health and most NGOs do not offer any milk substitute from birth. Some NGOs offer porridge (corn-soya blend) fortified with essential micronutrients. Accelerated development of feasible, affordable PCR or other virological testing technology for infants is suggested along with provision of milk from 6 months to at least 12 months to disadvantaged infants with provision of free micronutrient supplements.

Provision of free replacement food after six months

Arjan de Wagt, UNICEF

UNICEF supported free infant formula distribution in Benin, Burundi, Cote d'Ivoire, Kenya, Nigeria, Rwanda, Uganda and Zambia. Other countries, such as Botswana, Brazil, Cameroon, South Africa, Thailand used their own resources to purchase branded formula. UN guidelines (WHO/UNICEF/UNAIDS/UNFPA, 2003) state that infant formula should be provided only when AFASS –accessible, feasible, affordable, sustainable and safe. Implementation of the International Code of Marketing of Breast-milk Substitutes should be ensured. There should be guidelines specifying which women will receive it, under what conditions, how frequently and for how long. Trained counsellors should be in place who are skilled in providing non-biased counselling, guidance and support to all mothers. Health outcomes should be monitored. Formula should continue to be supplied for at least the first six months of age, followed by formula or some other kind of milk up to at least one year, and preferably up to two years. Support should also be provided to women who choose other feeding options to ensure equity. Experience from Botswana, Zambia and Rwanda showed that risk assessment was often poor and counselling often biased. When providing free formula, spill over should be prevented. This seems to be a real risk. In Botswana, 20% of HIV-negative mothers in infant formula distribution program areas practised exclusive breastfeeding, whereas 37% did in non-programme areas.

Meeting the dietary gaps – what is currently recommended in research settings

Nigel Rollins, University of Natal, South Africa

A survey was done in research projects where studies are carried out on prevention of mother-to-child transmission of HIV to examine what is currently promoted for feeding non-breastfed children beyond the age of six months. Information was obtained from Kenya, Zimbabwe, Côte d'Ivoire, Malawi, Zambia, South Africa and Uganda. There is currently a great variety of recommendations and practices in these different settings: commercial infant formula is provided in South Africa (national protocol), Kenya and Cote d'Ivoire, commercial infant formula and nutrient rich



complementary foods in Zambia, full cream unmodified cow's or goat's milk in Zimbabwe, nutrient rich ready to use food (spread) in Malawi, what mothers can afford – usually cow's milk- in Uganda. Mineral-vitamin supplementation is often recommended, but there are large variations in the range of vitamins contained in available preparations. Their mineral content is usually well below current recommended levels of intake. Fortified products, either spreads or blended flours, provide a more complete range of micronutrients.

The risk of providing iron supplements to children who are not iron deficient was raised during the discussion.

Experience with the use of heated expressed breast milk from South Africa (in Durban, (Anna Coutoudis) was also reported. The experience so far is limited to a small number of children: in a study sample of a total of 148 children only nine (6%) received heated expressed breast milk after the age of six months. Obstacles for using this method include lack of official endorsement, reduced amount of milk expressed and infant not satisfied, infant still demanding breast after feeds, stigmatisation, association with witchcraft, time constraints and readily available formula.

The role of linear programming to develop food based recommendations

André Briend, Institut de Recherche pour le Développement, Paris, France and Kay Dewey, University of California, Davis, USA

Linear programming is a mathematical method, which gives an answer to the key question of this meeting: What is the food combination fulfilling all nutritional requirements of a non-breastfed child at the lowest possible cost? Under this simple question lies a complex mathematical problem, which can only be solved with the help of a computer. In the specific context of feeding non-breastfed children, this method can be used to estimate the minimum quantity of milk or animal source foods which should be used to provide all nutrients at currently recommended levels. This approach also provides guidance re: the type of micronutrient supplement which should be recommended in different settings. This was illustrated by exploring different scenarios corresponding to different contexts.

Care practices surrounding feeding the non-breastfed child

Ellen Piwoz, Academy for Educational Development, Washington, USA

The rationale for early breastfeeding cessation when the mother is HIV-positive is the continuing risk of HIV transmission with breastfeeding: it is estimated that one half to two thirds of all breastfeeding transmission occurs after six months in some settings (if the first 4-6 weeks after birth are not taken into account). It should not be assumed, however, that breastfeeding should be stopped as soon as possible and as abruptly as possible in all settings. Breastfeeding cessation ideally should take place when the risk of transmission exceeds the risk associated with the absence of breastfeeding. This time is not easy to determine. The risk of transmission varies at least 4-fold in relation to the viral load and the CD4+ levels of the mother. Also, the risk of not being breastfed varies between populations, in relation to the level of hygiene, nutritional status of the child or infant mortality rates. A model has been developed to show how these factors interact and may change the age where breastfeeding cessation should be advised. Current pressure to give a universal age for breastfeeding cessation for HIV-positive mothers should be resisted.

Rapid early cessation of breastfeeding carries risks for the infant: dehydration, refusal to eat, loss of bonding with the mother, loss of sucking (comfort), psychological trauma, increased risk of neglect, malnutrition, illness or death.

In the mother, early cessation of breastfeeding may result in breast engorgement, mastitis, increased risks of pregnancy, depression and social stigma. Preparation towards stopping breastfeeding includes: discussing concerns with the mother, teaching cup feeding, comforting baby through physical contact without breastfeeding, managing night-time-crying/feeding without breastfeeding. To reduce breastfeeding, breast-feeds should be replaced with cup-feeds and solid foods should be introduced if the infant is old enough. Care, including responsive feeding and psychosocial stimulation, should be maintained after breastfeeding ends.

Improving care practices for feeding – Experience from India

Nita Bhandari, All India Institute of Medical Sciences, New Delhi, India

To evaluate the effectiveness of improving care practices, eight sub-centres with a population of 5000-7000 each were paired and then randomised to an intervention or a control group. In the intervention group, a series of messages promoting exclusive breastfeeding and improved complementary feeding practices were delivered through multiple channels by local NGOs working in collaboration with public health services. At the end of the study, there was an improvement of feeding practices in the intervention group compared to the control group along with an improvement in the linear growth of boys. Challenges included the difficulty of formulating nutritionally adequate diets in a low-income mainly vegetarian population.

Safe preparation and storage of foods for infants and young children – global recommendations and options

Peter Karim Ben Embarek, WHO, FOS

General rules of food safety include: 1) keep clean; 2) separate raw and cooked; 3) cook thoroughly; 4) keep food at safe temperature; 5) use safe water and raw materials. These rules are directly applicable to infant feeding. Education material already prepared by food contamination experts should be circulated among nutritionists writing guidelines for complementary feeding. This could be used as a starting point to develop guidelines re: the safe preparation of replacement feeding.

Contamination of infant food with *E. sakazakii* was flagged as a newly discovered problem for powdered infant formula.

During the discussion, the need to have more data on the role of food-borne illnesses on morbidity of PLWHA was stressed.

Use of spreads instead of liquid milk is a possible new option for feeding non breastfed children after 6 months of age

André Briend – Institut de Recherche pour le Développement, Paris, France

Spreads were initially developed to feed children recovering from severe malnutrition. The major advantage of a spread is that it does not contain water, and bacteria do not grow in it in case of accidental contamination. Water has to be given separately, but usually contamination of water is less important than food contamination as a result of bacterial proliferation in food stored in unhygienic conditions.



Absence of proper swallowing reflexes precludes the use of spreads for young infants, below the age of 6-8 months. Spreads are well accepted by malnourished children aged 6-8 months or more and result in higher weight gains than liquid feeds. In young severely malnourished children, the use of a spread with a formulation copied from the F100 recovery diet is associated with less treatment failures compared to the use of fortified cereal based complementary foods.

In theory, the spread developed to treat severe malnutrition could be used instead of liquid milk in non-breastfed children. In this case, a dose of 75g per day would be needed. Also, costs can be reduced by increasing the concentration of micronutrients and providing smaller quantities of spread (about 20g). This option is currently being tested to prevent malnutrition in breastfed children. It might be applicable to non-breastfed children.

Experience with spreads for feeding non-breastfed children is limited. These products should be tested in controlled settings before recommendations re: their use can be made.

Increasing access to adequate foods and food supplements for non-breastfed infants

Andrew Thorne-Lyman – World Food Programme, Rome, Italy

Translating nutritional recommendations into programmes raises several questions: i) will the same strategy apply to different populations with different standards of living? ii) infant feeding problems are not limited to non-breastfed children; how to make attention to them a part of a larger intervention? iii) cost is a critical issue and demand is needed to start a local production to reduce cost; are costs sustainable? Is local demand sufficient to support local production?

Cost comparisons of any product proposed to WFP will always be made with Corn Soy Blend (CSB). Efficacy studies are needed to justify the use of more expensive products.

PMCT programmes in the present situation have a very low coverage, 2-3%, in Africa. The cascade of service acceptance shows that at every stage of the process, from antenatal clinic attendance to the full acceptance of ARV drugs, the proportion of acceptors declines, reaching very low levels at the end. Reasons for the drop-off are multiple: lack of perceived benefit, no demand to know status, fear, concerns about stigma, insufficient quality of services.

WFP has a comparative advantage in delivering food aid targeted geographically to food-insecure parts of a country, transitory hunger. Its nutrition programmes have thus far gone through MCH programmes and supplementary/therapeutic feeding programmes in emergencies. It has limited experience working with MOH clinics where PMTCT services would be operated.

Meeting the food and nutrition needs of PLWHAs and their families

Ellen Muehlhoff, FAO, Rome, Italy

The AIDS epidemic has a major effect on food security. Also, hunger and malnutrition accelerate the epidemic. Food and nutrition security are central in addressing the epidemic. HIV/AIDS has an impact at i) the individual level: episodes of sickness, weight loss, weakness, loss ability to work, need for care, discrimination; ii) at the household level: decreased capacity to produce food, decreased capacity to buy food, sale of productive resources

for health care and funerals, limited time and attention for care of the vulnerable, loss of skills in agriculture and nutrition, children taken out of school; iii) community level: transmission of knowledge between generations undermined, change in production systems, including decrease in plant diversity and genetic resources, social safety nets are undermined, weak social, health and agricultural services and education. The FAO response is based on a two-pronged approach: i) to protect the nutritional status of PLWHAs; ii) to strengthen livelihoods and improve food security, access to and utilisation of nutritious foods for individuals and households infected and affected by HIV/AIDS. This response is explained in several guidelines, education and training documents and is associated with an advocacy campaign. In the field, this approach is based on food production, diversification, preservation, labour and time-saving technologies, income generation, access to credit, protection of productive assets through food aid, support to home-based care to provide nutritional care for PLWHAs, support to Nutribusiness (Namibia), food, nutrition and health education, communication and training. Field programmes also have a capacity-building component: training carers and orphans in vegetable production and nutritional care of younger children; building simple organisational and business skills; supporting training of community nutrition promoters. These programmes are conducted in collaboration with several leading UN organisations: UNAIDS, WFP, IFAD, WHO, UNICEF, UNESCO.

Process for the promotion of infant feeding ProPAN

Chessa Lutter, PAHO, Washington, USA

ProPAN is aimed at Ministries of Health, non-governmental organizations, and bilateral and international organizations interested in improving infant and young child feeding practices to prevent early childhood malnutrition. *ProPAN* describes a step-by-step process, with quantitative and qualitative methods, to identify dietary and feeding problems and the context in which problems occur and describes how to design and evaluate interventions to address problems identified. It is accompanied by software to aid in the analysis of quantitative data, including a 24-hour dietary recall. *ProPAN* has four modules: i) assessment; ii) creation of recipes and test of recommendations; iii) design of an intervention plan; and, iv) monitoring and evaluation. The strengths of *ProPAN* are that it includes assessment of both breastfeeding and complementary feeding practices, uses and integrates both quantitative and qualitative methods, explains how to analyze data, and provides guidance on how to convert the assessment into interventions that can be implemented. Modules can be used separately. The accompanying software can be used to analyze quantitative data and is designed around the dietary recommendations for children < 2 years. It can also be used to analyze 24-hr recalls, recipes, and market surveys. It includes a food composition table of ~1300 foods consumed in Latin America and the Caribbean.

An instant infant porridge (*Mi Papilla*) designed to provide all micro nutrients missing in poor families' diets was developed by the Ministry of Health in Ecuador in collaboration with PAHO. It is produced and distributed by several private Ecuadorian companies to poor children 6 to 24 months of age. The results of the impact evaluation of this porridge were presented. Children in the program had higher energy and iron intake, a lower prevalence of children being underweight, and a lower prevalence of anemia compared to non-programme children. During the discussion, the need to update current *Codex Alimentarius* specifications re: the recommended fortification levels and presence of antinutrients was raised.



Monitoring and evaluating complementary feeding practices

Marie T. Ruel, International Food Policy Research Institute, Washington, USA

Indicators of the quality of complementary feeding practices are needed for assessment, screening and targeting, programme monitoring and evaluation, global reporting, international comparisons, and to look at trends. Indicators must be valid (reflect the truth; be free of systematic error), reliable (replicable; free of day-to-day variability), responsive, non-reactive or non-subject to recall bias and easy to measure and standardize. Indicators are easy to design for some of the guiding principles such as duration of exclusive breastfeeding, continued breastfeeding, number of meals per day. For some other guiding principles, such as responsive feeding or appropriate amount of complementary food with adequate consistency or adequate energy density, developing appropriate indicators may be quite difficult or even impossible. Potential indicators for breastfed children have been developed and are currently tested. Testing includes analysing data from past studies and collecting new data from field studies for validations. For some guiding principles, there is a need to new set indicators for non breastfed children. For other guiding principles, indicators used for breastfed children will need adaptation.

Update on complementary feeding course

Randa Saadeh, WHO, NHD

In recent years, WHO has published a series of documents and guidelines on complementary feeding: Complementary feeding of young children in developing countries: a review of current scientific knowledge, 1998, WHO/NUT/98.1; Complementary feeding: Family Foods for breastfed children, leading to the development of a complementary feeding training course. The objectives of the course are to provide the knowledge and skills to enable health workers to: i) have up-to-date knowledge of complementary feeding; ii) counsel caregivers of young children; iii) contribute to standardization of feeding messages and sustainability in the health facility. This course complements other existing courses as breastfeeding counselling, IMCI, HIV and Infant feeding counselling or could stand alone. It uses similar terminology and structure as the other courses and can be used as part of the pre-service training of health workers. This is a 3-day course (6-7 contact hours/day) with 16-20 participants with 4-6 facilitators. Initial courses in each area will be preceded by 3 days of training of trainers. It includes 15 sessions, 2 field trips and one food demonstration.

Reports of the working groups

Working Group 1

Care practices and the non-breastfed child, with special reference to HIV

The risk of HIV transmission during breastfeeding continues for as long as breastfeeding is practised. The best available estimates suggest that this risk is, on average, at about 0.9 percent per month of breastfeeding. The optimal timing of breastfeeding cessation varies depending on the health of the mother, the health of the infant and the risks associated with not breastfeeding. The risks of mortality from not breastfeeding vary from setting to setting and are greater in settings with high infant mortality. These issues, and the balancing of risks, need to be addressed in counseling about the decision to stop breastfeeding early/safely transition to replacement foods.

Children born to HIV-positive mothers are extremely vulnerable because the caring capacity of their mothers may be affected, due to economic vulnerability, and exposure to HIV. Breast milk typically makes a significant contribution to infant nutrition after six months of age. This contribution is not fully appreciated. The importance of good nutrition for non-breastfeeding infants needs to be stressed in counseling about early breastfeeding cessation. Where economic constraints are a major factor in infant feeding decision-making, programmes for HIV+ women should consider providing women with replacement foods.

Early breastfeeding cessation may lead to poor caring practices and neglect, and may lead to undernutrition. The reasons for this may be varied but suggest the need for counseling and support to prepare for cessation and to prevent these problems.

Counseling and support should include: Cup-feeding, expressing and heat-treating breast milk, managing night feeding, managing infant crying, especially in public, managing family members' concerns and objectives, dealing with peer pressure to breastfeed, safe preparation of replacement feeds, finding ways to comfort infants that do not involve breastfeeding, ensuring that responsive feeding continues to be followed (this may be even more important for non-breastfed children), linking with community support and referral services.

The risks and challenges of early breastfeeding cessation are greater when the infant is younger, especially less than six months of age.

Research gaps/needs (group 1)

The timing and best way for HIV-positive mothers to stop breastfeeding are unknown. There is a need for further research on which strategies are most effective in promoting early cessation and good nutrition and health outcomes.

Given that the risk of HIV transmission depends very strongly on maternal disease status, there is a need for low-cost tests to screen women for low CD4+ or other clinical indicators to use in the infant feeding counseling process.

Low-cost means for early testing of infants for HIV are needed prior to finalizing feeding decisions.



Working Groups 2 and 3

Feeding recommendations for infants who do not consume milk or other ASF

Guiding principle 5: amount of food needed

Energy needs are approximately 600 kcal/d at 6-8 months, 700 kcal/d at 9-11 months, and 900 kcal/d at 12-24 months of age.

Guiding principle 7: meal frequency

The appropriate number of feedings depends on the energy density of the local foods and the usual amounts consumed at each feeding. For the average healthy infant, meals should be provided 4-5 times per day, with additional nutritious snacks (such as a piece of fruit or bread or chapatti with nut paste) offered 1-2 times per day, as desired. Snacks are defined as foods eaten between meals - usually self-fed, convenient and easy to prepare. If energy density or amount of food per meal is low, more frequent meals may be required.

Guiding principle 8: nutrient content of complementary foods

- Feed a variety of foods to ensure that nutrient needs are met. Meat, poultry, fish or eggs should be eaten daily, or as often as possible. Diets that do not contain animal source foods cannot meet nutrient needs at this age unless fortified products or nutrient supplements are used (see GP 9).
- If adequate amounts of other animal source foods are consumed regularly, the amount of milk needed is ~200-400 mL/d; otherwise, the amount of milk needed is ~300-500 mL/d
- If no animal source foods are used, both grains and legumes should be consumed daily, not necessarily in the same meal. It will be investigated whether roots/tubers can be substituted for grains and still have adequate protein quality.
- Vitamin C rich foods should be consumed daily (will list examples, such as fruits, vegetables and potatoes), with meals (to enhance iron absorption).
- If dairy products are not consumed in adequate amounts, dried fish and calcium rich plant foods should be consumed as often as possible (e.g. papaya, orange juice, guava, spinach, pumpkin).
- Vitamin A rich foods such as red palm oil, vitamin A fortified oils or other fortified foods should be mentioned.
- Fat or oil should be included in the diet daily, approximately 10-20g, unless a fat-rich food is given (such as foods or pastes made from groundnuts, other nuts and seeds).

The following milks are acceptable major sources of nutrients:

- Full cream milk, including goat, buffalo, cow, sheep, camel milk, Ultra High Temperature (UHT)
- Evaporated milk (reconstituted)
- Fermented milk
- Expressed breast milk (heat-treated if HIV positive)

The following products are unsuitable major sources of nutrients. They can be added in small quantities to other foods as part of a varied diet.

- Condensed milk
- Skimmed and semi-skimmed milk (semi-skimmed milks may be acceptable after 12 months)
- Coffee creamer
- Soy milk (unless it is a soy-based infant formula)

Guiding principle 9: Use of fortified foods or vitamin-mineral supplements

Use foods specially fortified for infants, or vitamin-mineral supplements (preferably mixed with or fed with food), that contain iron (8-10 mg/d at 6-12 mo, 5-7 mg/d at 12-24 mo). If adequate amounts of animal source foods are not consumed, these fortified foods or supplements should also contain zinc, calcium and vitamin B12.

Fluid needs

Non-breastfed infants need at least 400-600 mL of additional fluids (in addition to water contained in foods) per day in a temperate climate, and 800-1200 mL per day in a hot climate. This can be provided as water, juice, soup or porridge, but some plain (boiled) water should be offered several times per day to ensure that the infant's thirst is satisfied. Avoid giving drinks with low nutrient value, such as tea, coffee and sugary drinks such as soda. Limit the amount of juice offered (e.g. < 250 mL/d), to avoid displacing more nutrient-rich foods.

