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ON INFANT FEEDING
A Panel of Experts
Takes a New Look





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**Recommendations from the Expert Meeting on
OPTIMAL INFANT FEEDING PRACTICES
September 24-25, 1990**

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I. Introduction

The Topic: Optimal Infant Feeding

Spring 1990 marked a burgeoning of international recognition for breastfeeding's unique contribution to maternal and infant health. In May, the United States Agency for International Development (A.I.D.) issued its strategy paper, "Breastfeeding for Child Survival," which committed the Agency to "promoting and protecting breastfeeding for the survival and well-being of children and mothers, and as a most precious, natural resource." The *Innocenti Declaration*, produced and adopted by participants at the WHO/UNICEF policymaker's meeting co-sponsored by A.I.D. and the Swedish International Development Authority held in Florence in August 1990, states:

As a global goal for optimal maternal and child health and nutrition, all women should be enabled to practice exclusive breastfeeding and all infants should be fed exclusively on breast milk from birth to four to six months of age. Thereafter, children should continue to be breastfed, while receiving appropriate and adequate complementary foods, for up to two years of age or beyond. This child-feeding ideal is to be achieved by creating an appropriate environment of awareness and support so that women can breastfeed in this manner.

Both the A.I.D. strategy and the *Innocenti Declaration* call for concrete actions, including enhanced dialogue with policymakers, staff training in skills related to breastfeeding, hospital reform, community-based activities, and maternal care, as well as research, communication, and social mobilization strategies to support these operational goals. The result would be country-specific breastfeeding programs that increase the proportion of infants who are (1) breastfed within one hour of delivery.

(2) exclusively breastfed from birth through four to six months of age, (3) fed appropriate complementary foods in addition to breastmilk by the end of their sixth month, and (4) breastfed for one year or longer (the goal of the A.I.D. Breastfeeding Strategy).

The words in these important policy documents are meant to empower and encourage national breastfeeding committees and coordinators. However, their job of gaining widespread support for the recommendations among medical professionals and other decisionmakers will require a concerted effort. In many countries there is a thin layer of recognition of the problems and little consensus about the solutions, as well as a wide disparity between infant feeding as commonly practiced and the ideal. Situations range from the most detrimental, in which the infant receives no breastmilk to those where suboptimal feeding practices prevail even among infants who are breastfed.

For example, in many parts of the world,

- Newborns are given water, glucose water, teas, honey, butter, or other liquids instead of being put to the breast immediately, and colostrum is often discarded;
- Breastfed infants are also supplemented with water, teas, and other non-nutritive liquids;
- Breastfed infants are also bottle-fed breastmilk substitutes and given other foods in early infancy; and
- Health care agents often advise mothers to give children complementary foods beginning as early as the first month. These recommendations reflect deeply held concerns with either children's growth patterns or maternal depletion.

Some of these practices are recent adaptations to changing economic and environmental conditions -- including growing participation of women in the workforce -- while others derive from traditions that are thought to have ensured group survival for generations. Clearly there are problems that must be addressed, and information that must be shared, before peoples around the world embrace what the scientific community now defines as optimal infant feeding. For the scientific community, there is a need to continue to find technical solutions that respond to the economic, social, and cultural realities of people's lives.

Nutrition Communication Project Expert Meeting

In collaboration with the A.I.D. Office of Nutrition, the Nutrition Communication Project (NCP) of the Academy for

Educational Development convened an Expert Meeting on September 24-25, 1990, to discuss issues related to application of the A.I.D. Breastfeeding Strategy and the *Innocenti Declaration* at the country level. A multidisciplinary panel (see Appendix 1: List of Participants) was asked to review recent literature and technical thinking and reach a consensus where possible, to guide NCP's future work in infant feeding. Participants were also asked to highlight those issues requiring additional research or analysis before specific actions could be safely recommended.

The four broad issues addressed during the meeting included the following:

- Relationship between breastfeeding and maternal nutritional status;
- Growth of exclusively breastfed infants;
- Use of supplemental water, teas, and other liquids; and
- Timing of the introduction of complementary foods.

The Expert Panel answered several key questions formulated by NCP and agreed on the recommendations to make, given the current level of scientific knowledge and experience.

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Report Format

NCP has formatted this report of the Expert Meeting in response to international practitioners' needs for specific information relevant to programmatic decisions. Each of the four topics discussed during the meeting is presented as follows:

- Summary of Issue (as framed by NCP)
- Questions and Answers
- Summary of Group Discussion
- Recommendations for Further Action Research

NCP has also prepared a selective compendium of background documents, including those that were provided to the Expert Panel before the meeting together with additional documents recommended by the panel. The list of references, which is limited to articles considered most useful from a field perspective, can be found in Appendix 2.

Conclusion

NCP and the Expert Panel view the meeting and this report as a springboard for continuing dialogue and analysis. It is hoped that readers will be stimulated to contribute their perspectives on issues affecting the successful programming of infant feeding initiatives.





II. The Relationship between Breastfeeding and Maternal Nutritional Status

ISSUE:

Many women in developing countries experience marginal nutritional status as a result of inadequate dietary intake and high energy expenditures in physical activity. Although birth rates vary throughout the world, it is estimated that many women spend 35% to 48% of their reproductive years (ages 15 to 45) experiencing the still higher energy and nutrient demands of pregnancy and lactation. Few communities have developed long-term solutions for improving women's nutritional status (increasing energy intake) or reducing women's workload (decreasing energy expenditure). This energy equation has been viewed as chiefly an economic problem.

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Given these conditions, many health care personnel and national policymakers argue that unless birth intervals are lengthened and family size reduced, women's diets are supplemented, or women's workloads reduced, women cannot be expected to breastfeed adequately or sustain breastfeeding for a long period. Consequently, they recommend supplementing infants with breastmilk substitutes and/or introducing complementary foods before four (sometimes three) months of age.

Although the established international recommendation calls for the introduction of complementary foods between four and six months of age, there is currently a movement in the scientific community to extend the recommendation for exclusive breastfeeding "through the sixth month of life."

Before we can expect to see compliance with present recommendations for exclusive breastfeeding, a number of concerns about maternal nutritional status will need to be addressed.

Does maternal nutritional status affect a woman's ability to produce breastmilk of sufficient quantity and quality during the first six months of her infant's life?

The great majority of women can produce enough breastmilk to nourish their infants. Except under conditions of *severe* undernutrition (e.g., women with weights less than 85% of reference weight for height), there is little evidence that maternal nutritional status substantially compromises the quantity of breastmilk produced. The quality of breastmilk, in terms of protein, carbohydrate, and minerals, is also relatively unaffected by maternal nutrition, although the fat and vitamin content do reflect dietary adequacy. Therefore, based on this knowledge, maternal nutritional status should not be a deterrent to the promotion of exclusive breastfeeding through the first six months of life. Additionally, it should be noted that even in cases of *severe* undernutrition, breastmilk quantity and quality have been found to be adequate through the first four months of life or longer, and thus exclusive breastfeeding -- at least through four months -- should be promoted, coupled with efforts to improve women's nutritional status so that they may exclusively breastfeed through six months.

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How much of a factor should the stress of breastmilk production on maternal nutritional status (sometimes referred to as maternal "depletion") be in deciding whether or not to recommend (1) supplementation of the infant with breastmilk substitutes and/or the introduction of complementary foods prior to six months, or (2) supplementation of the mother?

All available data indicate that the positive impact of six months of exclusive breastfeeding on both maternal and child health may far outweigh both the short- and long-term nutritional consequences for the mother. The hormonal effect of exclusive breastfeeding can actually enhance the opportunity for repletion of maternal nutrient stores by extending the interval between pregnancies and thus the recuperative period between births. An additional consideration is the relatively high morbidity and mortality risks for the infant who is not exclusively breastfed. Both perspectives present strong arguments in favor of extending the currently recommended four to six months through six months, or until the middle of the first year. The best response to maternal undernutrition is to increase the dietary intake of the mother (possibly through supplementation) while promoting continued exclusive breastfeeding.

What recommendations can be made concerning women of marginal nutritional status in order to reduce the nutritional stress imposed by exclusive breastfeeding during the first four to six months?

There are currently two recommendations related to reducing nutritional stress. First, all pregnant and lactating women, especially those who are undernourished, should be encouraged to consume more food. It should be noted that the adequacy of nutrient intake before and during *pregnancy* is critical for laying down the fat stores needed during lactation. A special diet is not required, nor are expensive, high-protein foods necessary. (Energy-rich foods, however, are preferable to bulky, low-calorie foods.) Another means by which undernourished women can reduce overall energy demands is to reduce their level of activity as much as possible, especially during the early weeks postpartum, until milk production is firmly established. The traditional practice of "lying-in" following the birth of a child, which still exists in many cultures, should be promoted and supported. A reduced workload conserves calories, and is especially important where dietary energy intake may be inadequate.

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Discussion:

The belief that women need to use substitutes or supplements for their own breastmilk during the early months of their infants' lives has had a devastating impact on both maternal and child health, especially in the developing world. According to the participants in the Expert Meeting, the fat (or caloric) content of breastmilk, along with some micronutrients, may vary from woman to woman depending on various factors, but in general, virtually all women can produce enough breastmilk of adequate quality to nourish their infants well. True breastmilk insufficiency is extremely rare and is related to glandular or hormonal insufficiency conditions.

Although our present understanding of the long-term nutritional impact of frequent reproductive cycling (episodes of pregnancy and/or lactation) is still limited, the available scientific evidence supports the conclusion that women should be encouraged to exclusively breastfeed for at least the first six months. The experts concluded that a mother's best strategy for replenishing her fat and nutrient stores is to delay her next pregnancy. From a maternal health perspective, perhaps the most striking consideration is the fact that exclusive breastfeeding, especially during the early months postpartum, causes a hormonal suppression of ovulation

and menstruation. This suppression contributes to improved iron status by delaying menstruation with its accompanying blood loss. It can also effectively extend the recuperative period between pregnancies, and thus enhance the opportunity for adequate repletion of maternal nutrient stores. A woman who exclusively breastfeeds, day and night, or only very infrequently gives one or two swallows of non-breastmilk liquids or foods during the first six months postpartum is more than 98% protected from pregnancy, if her menses have not returned. (This specific set of criteria is sometimes referred to as the Lactational Amenorrhea Method of child spacing, or LAM.)

In order to protect herself against a new pregnancy, a woman should start using a reliable, complementary family planning method as soon as one of the following occurs: the baby reaches six months of age, menses returns, complementary foods, water, or other liquids are introduced, or the baby no longer nurses at night. Even after the baby reaches six months, however, or complementary foods or other liquids are introduced, frequent breastfeeding continues to reduce a woman's chances of becoming pregnant, and therefore should be strongly encouraged. Breastfeeding, however, can no longer be relied on as a child spacing method.

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The protective effects of exclusive breastfeeding with the timely introduction of a reliable family planning method are especially important to the mother because research indicates that continuing to breastfeed after becoming pregnant creates an additional drain on the mother's nutritional stores. Optimally, a woman should not become pregnant until six months *after* weaning is completed. If a woman becomes pregnant while still breastfeeding, she should be discouraged from abruptly weaning the child and encouraged to replace breastmilk with other appropriate foods to limit the negative nutritional impact on the child. She should be encouraged to eat additional calories and reduce her workload.

The promotion of exclusive breastfeeding for the first six months of life and the timely introduction of a complementary family planning method also contribute to child health. If all births were spaced at least two years apart, infant mortality rates would drop by 10%. Older siblings would also benefit, because they are one-and-a-half times more likely to die if another child is born within two years of their birth. A subsequent pregnancy generally results in the displacement -- often abrupt -- of the older child from the breast and thus complete dependence on weaning foods and liquids of questionable nutritional value. When another child is born, there is also increased competition for maternal attention.



An additional consideration is the potential health threat to the infant under six months of age who is exposed to inadequate and/or unhygienic breastmilk substitutes, supplements, or weaning foods. The greatly elevated health risks faced by an infant who is not exclusively breastfed during the first six months include diarrhea and respiratory infection-related morbidity and mortality. These risks are generally greater than the nutritional risks to the exclusively breastfeeding mother, such as a reduction of fat, calcium, and micronutrient stores; weight loss; and general fatigue. Increasing maternal food intake is a more cost-effective and less risky option for ensuring nutritional adequacy for both mother and infant than supplementing the infant with special formulas or other breastmilk substitutes of questionable quality.

Given these various perspectives, if it is determined or suspected that an exclusively-breastfed infant under six months of age is growing suboptimally, every attempt should be made to offer breastfeeding support and encouragement, and possibly extra food, to the mother before recommending supplementation or introduction of complementary foods to the infant. A general recommendation is to encourage the mother to breastfeed more frequently to promote the production of more breastmilk, while also encouraging her to consume more calories and reduce her level of activity.

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The Expert Panel agreed that there are currently enough data on the positive impact for the mother of exclusive breastfeeding to focus global attention on the well-established benefits of child spacing, rather than to emphasize the poorly defined risk of maternal depletion. This consensus, however, does not negate, but rather underscores, the need for future biological/epidemiological research on the relative long-term impact of both pregnancy and lactation on maternal health. The benefits of breastfeeding on child health have been studied more carefully than the maternal impact. Currently, we have little scientific understanding of the complex physiological mechanisms that regulate the mobilization of maternal nutrient stores over consecutive reproductive cycles. We do, however, have concrete evidence to support the consensus that women can replenish fat and nutrient stores over time and thus have the potential to recover from short-term nutritional stresses imposed by exclusive breastfeeding for four to six months following birth.

Action Research 1:

Conduct operational research related to examining the feasibility of reducing the workload of women and increasing their dietary intake by promoting or supporting the traditional "lying-in "

period, especially in cultures in which this practice still exists. Also, carry out ethnographic research on the role of the woman's partner, other family members as well as policymakers in this regard.

Action Research 2:

Conduct operational research examining the feasibility of improving maternal dietary intake during the early postpartum period. One component of this research would be the identification of energy-dense foods that could be encouraged as especially appropriate and important for women during the first year following a birth.

Action Research 3:

10 Analyze existing data on the relationship between duration of exclusive breastfeeding, lactational amenorrhea, and birth intervals, which should serve to underscore the positive impact of exclusive breastfeeding on child spacing. (Note: Caution should be taken to ensure that (1) the proper definition of "exclusive" is used, (2) the Lactational Amenorrhea Method guidelines are followed for maximizing the contraceptive effects of breastfeeding, and (3) the use of other family planning methods is described.)

Action Research 4:

Conduct qualitative research to better understand women's experience and perceptions of breastfeeding (e.g., they may feel depleted and introduce supplements, even if there is no physiological basis for this feeling) and their perception of the economic, social, or cultural factors that influence their capacity to breastfeed exclusively for up to six months.







III. The Growth of Exclusively Breastfed Infants

ISSUE:

The growth patterns of exclusively breastfed infants are different from currently used reference standards which were developed based on the growth of predominantly bottle-fed infants in industrialized countries. Recognition of this fact, and a general agreement that this growth "deviation" is normal, has come after many countries have invested in the development and dissemination of growth charts reflecting these previously established reference standards. The problem this situation poses is that babies growing normally may be falsely identified as faltering. Consequently, until or unless a growth standard for exclusively breastfed infants is developed, tested, and implemented, emphasis must be placed on training health practitioners in the correct interpretation of growth patterns and in the provision of appropriate infant feeding recommendations that promote and protect exclusive breastfeeding, at least through the fourth month of life and preferably through the sixth.

Based on what is currently known about the growth patterns of exclusively breastfed infants, what guidance can be given to health care providers concerning the appropriate interpretation of infant growth plotted against current growth curves, and corresponding counseling of mothers?

Until or unless growth standards are developed for exclusively breastfed infants, health care providers should be trained to expect a normal decrease in the rate of growth around three months of age. This means that breastfed children should (on a month-to-month basis) *continue to gain weight steadily*, but that they may, around three to four months of age, appear to deviate slightly from the curve they were previously following. This pattern of deviation should not be automatically interpreted as growth faltering, and breastmilk supplements or complementary foods should not be routinely recommended as a first-step intervention. Rather, every effort should be made to protect and promote frequent and exclusive breastfeeding through the end of the sixth month and to encourage the appropriate introduction of nutritious and uncontaminated complementary foods thereafter.

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What are the indicators that an exclusively breastfed child is in fact faltering or growing suboptimally?

It is now generally recognized that infants who are exclusively breastfed frequently and on demand grow steadily and rapidly from birth through the first three months of life, continue to grow steadily during the subsequent three months -- but at a somewhat slower rate -- and usually double their birth weight by the end of the sixth month. Although we have no clear cutoff to use to identify faltering, cases in which an infant is not gaining weight (or is in fact losing weight) indicate faltering under any definition, and the underlying causes of such cases should be carefully examined. (Causes may include infection, suboptimal breastfeeding practices, or severe maternal undernutrition.)

What advice should be given to a mother whose infant under six months of age appears to be faltering?

First, a distinction must be made between growth faltering related to lactational failure or milk insufficiency and faltering due to diarrhea or infection. A health care provider should determine if frequent or periodic illness is a factor and, if so, work with the mother to treat the illness

and prevent future episodes if possible. Regardless of whether the reason for suboptimal growth is related to illness or lactation insufficiency, the appropriate first-step intervention should always be to encourage the mother to breastfeed exclusively *and to offer the breast more frequently*, both day and night, in order to stimulate milk production and "catch-up" growth. Demand feeding may not be sufficient in that the infant may be weak or anorexic and, therefore, may not be inclined to suckle as frequently as is necessary to increase the milk supply. In such cases, the mother should take a proactive role in offering the breast more often. To minimize the stress of increased milk production on maternal nutritional status, the mother should be encouraged to consume additional food and rest as often as possible.

Discussion:

Over the past two decades, various scientific studies have documented the difference in growth between exclusively breastfed and bottle-fed infants, especially during the first six months of life. Generally speaking, exclusively breastfed infants grow as rapidly or more rapidly during the first three months, but then begin to grow more slowly than their bottle-fed counterparts. Participants in the Expert Meeting recognized that this pattern has been observed in a small number of healthy, economically privileged populations, and thus that the available reference data (based on the growth patterns of predominantly bottle-fed infants with similar population characteristics) may be inappropriate for breastfed infants. A strong recommendation was made by the Expert Panel, therefore, that new growth standards for breastfed infants be developed and widely disseminated. The first step would be to compile available data sets on the growth of exclusively breastfed infants in affluent, well-nourished populations where diarrhea is not a problem in order to generate a growth curve specific to breastfed infants in optimal circumstances.

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This call from the scientific community for a new growth standard coincides with the burgeoning of growth monitoring efforts throughout the world. Mothers and health workers alike are often trained to interpret deviation from the growth curve as an indication that breastmilk alone is no longer sufficient, and that supplementation is necessary or that complementary foods should be introduced to improve the growth of the infant. Given the evidence that a relative slowing of growth after three months of age is normal, participants in the Expert Meeting expressed concern that mothers who are exclusively breastfeeding healthy infants may be given a totally inappropriate cue or message from health care providers who observe a change in the rate of growth.

Equal concern was expressed over the fact that mothers of breastfed infants who are actually growing suboptimally will not be given appropriate information, support, and encouragement to enable them to increase their own milk production. Breastfed infants who are already physiologically compromised (perhaps because of low birth weight or exposure to infection in the household environment) may be abruptly subjected to the often life-threatening risks of inappropriate or unhygienically prepared breastmilk substitutes or supplements of questionable nutritional value, instead of being given the opportunity to increase their breastmilk intake. In many cases, early supplementation is rapidly followed by a premature and unintended complete weaning from the breast.

Action Research 1:

Conduct operational research designed to examine the feasibility and impact of appropriate counseling on the incidence and duration of exclusive breastfeeding or as a first-step intervention to improve the growth of breastfed infants. This counseling would include encouraging a mother whose child is experiencing growth faltering to (1) breastfeed the infant more frequently, (2) increase her own caloric intake, and/or (3) decrease her level of activity rather than supplement the infant before six months.

Action Research 2:

Identify and test possible feedback mechanisms for measuring milk sufficiency -- ones that can be taught easily to both healthcare workers and mothers.

Action Research 3:

Compile community-based data on the growth of exclusively breastfed infants in both developed and developing countries to compare with currently available data sets from affluent, well-nourished populations and for possible consideration in the development of a specific reference standard for assessing the growth of exclusively breastfed infants.

Action Research 4:

Conduct situational analysis of current infant feeding practices to determine the prevalence of exclusive breastfeeding. (Note: Caution should be taken to ensure that the proper definition of "exclusive" is used.)





IV. Use of Supplemental Water, Teas, Juices, and Other Liquids

ISSUE:

Current, internationally established recommendations on infant feeding advocate exclusive breastfeeding for the first four to six months, with no supplemental water, teas, juices, or other liquids. Throughout the world, however, a variety of liquids are routinely given to infants from an early age. The reasons are varied and complex. In hot, arid climates, mothers and pediatricians alike believe that supplemental water is essential. In many societies, herbal teas are commonly given to very young infants in the belief that they promote proper digestion or contribute in some other way to the health of the child. Often, water or other substitutes are given in an effort to postpone a breastfeeding or to allow someone else to feed the infant during the absence of the mother or while she is occupied with other responsibilities.

These strongly held beliefs and practices have created tremendous resistance to the promotion and acceptance of exclusive breastfeeding as the optimal infant feeding practice during the first six months of life. A substantial volume of recent data confirms the fact that a relatively small percentage of infants are exclusively breastfed beyond the first months of life and that many infants receive additional liquids immediately after birth. The result is the unfortunate reduction of potential benefits of exclusive breastfeeding for both maternal and child health, as well as child spacing.

Is there sufficient evidence to warrant encouraging mothers to withhold water and other liquids from breastfed infants?

It was the consensus of the Expert Panel that physiologically speaking, exclusively breastfed infants, even those living in extremely hot, dry climates, do not require additional water or fluids, (with the possible exception of low-birth-weight infants who may have difficulty with nursing and/or the ability to concentrate urine). Studies conducted in a variety of settings have shown conclusively that healthy infants receiving only breastmilk maintain satisfactory fluid balance. Furthermore, introducing water, or other fluids, reduces the immunological protection of breastmilk and increases the relative risk of exposing an infant unnecessarily to life-threatening bacteria and viruses. Water or other liquids given to infants or the apparatus used for feeding (bottles and artificial nipples) are often contaminated. In the unusual event that an exclusively breastfed infant develops diarrhea, additional oral rehydration fluid might be required. (See the discussion below.)

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Until what age should mothers avoid giving water or other liquids to their breastfed infants?

Avoiding the use of supplemental water and other liquids is recommended until after six months of age because by the end of that time, most infants (regardless of whether or not they are receiving supplemental liquids) are exposed to a variety of contaminants through the introduction of complementary foods or because they are more mobile and are beginning to explore their immediate environment by putting objects in their mouths. Physiologically speaking, by six months of age, infants are better able to drink from a cup and thus may be able to avoid the dangerous use of bottles and artificial nipples, which are more difficult to clean, especially when access to clean running water is limited.

Do breastfeeding mothers need to increase their own consumption of water to produce a sufficient quantity of breastmilk?

Contrary to earlier teachings, the quantity of fluid a woman consumes does not affect the quantity of breastmilk she is capable of producing. Breastfeeding mothers should, however, be encouraged to drink enough liquid to satisfy their own thirst.

Are there behavioral or physical cues that the mother can use to assure herself that her exclusively breastfed infant is getting sufficient liquid?

Generally speaking, an infant who is receiving a sufficient quantity of liquid through the exclusive intake of breastmilk will wet eight to ten "diapers" (if a covering is customarily used) in a 24-hour period. Even in cultures in which diapers are not used, mothers are generally aware of their infants' urinary output and could be encouraged to keep track of how often the infant urinates.

What are the relative risks of infection from different liquids potentially offered to an infant? Do water, teas, and juices, for example, pose a different risk from cow's milk or other breastmilk substitutes?

Available research data do not conclusively establish the relative risks of various liquids, but the following assertions can be made with some degree of certainty. Water (or sugar water) that has not been boiled will pose greater risk than boiled water, herbal teas, or other infusions made from boiled water. Fruit juices, depending on the level of acidity, may be safer than water that has not been boiled, unless they have been prepared by adding water that has not been boiled or are left to stand *open* and unrefrigerated for a number of hours. Generally speaking, cow's milk or other breastmilk substitutes pose the greatest relative risk because they are easily contaminated over a short period of time and because they dramatically alter the physiology of the infant's digestive system. (The protein and carbohydrate in "artificial" milk provide a conducive environment for bacterial growth before ingestion and are substantially different from breastmilk in the way they are digested in the gut.) Powdered milks, if safely stored and prepared in small quantities with boiled water for the immediate consumption of the infant, may pose less relative risk than "fresh" or prepared milks that must be refrigerated to reduce or slow bacterial growth.

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Does the way in which water or other liquids are stored over a period of time, or the manner in which they are fed to an infant, affect their relative risk of transmitting infection?

Generally speaking, any liquid, boiled or not boiled, can be contaminated, especially if left uncovered, because of the microbes present on the container or in the air.

Covering storage containers and, whenever possible, refrigerating all liquids intended for infants will slow microbial growth. Current research indicates that there is less danger of infection if an infant is given a liquid from a cup, or cup and spoon, rather than from a bottle with an artificial nipple, which is much more difficult to clean properly.

Does offering a newborn infant water or liquids of any kind "until a mother's milk comes in" or in order to postpone a feeding reduce the amount of breastmilk that a mother produces or that a child consumes?

Research indicates that during the first few days and weeks postpartum, feeding the infant any liquid may interfere with the proper establishment of breastfeeding. Infants should be put to the breast within the first hour postpartum. The medical practice of routinely giving glucose water to newborns is no longer considered appropriate. Ideally, infants should be fed "on demand" both day and night to stimulate the hormones related to breastmilk production. Therefore, replacing or delaying a breastfeeding, especially by offering a bottle, may result in an inadequate supply of breastmilk and subsequent adverse consequences. These include the unnecessary early supplementation of an infant who is not receiving sufficient breastmilk, and thus the probable exposure to a variety of contaminants, and/or a decrease in breastmilk production or early cessation of breastfeeding by the mother, thereby resulting in an early return of maternal fertility. The use of artificial nipples during the first few weeks may also cause what is commonly known as "nipple confusion," which often results in the infant's rejecting the breast.

Does offering an infant water or other non- or low-caloric liquids, for whatever reason, reduce the amount of breastmilk that a mother produces or that a child consumes?

Recent research suggests that supplementation *may* reduce breastmilk intake, thus leading to reduced total caloric intake. It is well established that as the infant takes in less breastmilk, the mother produces less, so water supplementation may lead to a reduction in the amount of breastmilk a mother produces. Although water supplementation is generally practiced in the belief that it will increase fluid intake and improve hydration status, research suggests that offering water to breastfed babies may, paradoxically, reduce total fluid intake.

Does offering an older infant caloric liquids, for whatever reason, reduce the amount of breastmilk that a mother produces or that a child consumes?

Offering a breastfeeding infant caloric liquids such as juices, breastmilk substitutes, cow's milk, or cereal-based beverages may substantially reduce the amount of breastmilk that the child demands. An infant receiving this type of supplement may, in fact, be consuming sufficient calories, but insufficient protein, fat, vitamins, and so on, with severe nutritional consequences. The infant may also be exposed to contaminants from the liquid or the feeding apparatus. A decrease in demand for breastmilk by a child who is satisfied calorically or who is suffering from diarrhea or infection generally results in decreased production by the mother and may ultimately result in a premature weaning of the infant from the breast, with a possible return of maternal fertility.

Do exclusively breastfed infants ever require oral rehydration solution during bouts of diarrhea?

The question of whether to use oral rehydration solution (ORS) as home treatment to prevent dehydration caused by diarrhea during the early months of exclusive breastfeeding was not definitively resolved during this Expert Meeting. Even though exclusively breastfed infants are less likely to develop diarrhea, they sometimes do, because of environmental conditions. There are many issues that must be carefully addressed in light of current research findings related to the advantages of exclusive breastfeeding before broad recommendations can be made concerning the promotion and use of oral rehydration solutions during the early months of exclusive breastfeeding. WHO recommends that ORS be used to rehydrate a *dehydrated* infant, but asserts that breastmilk is still the "best" ORS *maintenance* solution for the infant. Frequent breastfeeding should be continued, or breastmilk should be given along with ORS (administered by cup or cup and spoon) when that treatment is indicated. (See the discussion below.)

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What advice should be given to mothers concerning breastfeeding during bouts of infant diarrhea?

Experts agree that continuing to breastfeed during episodes of diarrhea is critical, because it helps prevent dehydration and reduces the severity of the episode while

nourishing the baby with a complete food that is appealing and easy to digest and absorb. It is also widely recognized that breastfed infants -- especially those who have been exclusively breastfed -- will often reject other liquids (including ORS) during illness and exhibit a definite preference for breastmilk. Generally speaking, breastfed infants will often desire to suckle more frequently during episodes of diarrhea and other illnesses, perhaps because of the need to increase their fluid intake or the security of the mother's arms. Therefore, a mother should be encouraged to offer the breast whenever the infant indicates a desire to suckle, both day and night, even though this requires additional time.

Discussion:

Participants in the Expert Meeting reached consensus on four main issues related to the use of water, teas, juices, and other liquids during the first six months of life.

24 ■ The exclusively breastfed infant (with the possible exception of the low-birth-weight infant and the exceptional infant with severe diarrhea) does not require additional water during hot weather, regardless of the level of humidity. Studies conducted in Jamaica, Peru, Argentina, Israel, India, and Cameroon (where average daily temperatures in centigrade were 28°, 26°, 35°- 39°, 37°- 41°, and 28°- 45°, respectively) confirm this assertion. Because nitrogen, sodium, chloride, and potassium are present in low concentrations in breastmilk, only a relatively small amount of water is required for the excretion of waste products. In view of the known ability of healthy infants to concentrate urine, the low renal solute load of breastmilk theoretically provides a considerable margin of safety.

■ Research has clearly documented the negative health consequences for the infant exposed to microbial contaminants. The early introduction of water and other liquids under conditions where water quality is questionable and household hygiene unsatisfactory often results in the unnecessary exposure of the infant to bacteria and viruses present in the fluid or feeding apparatus or both. The relatively immunologically defenseless infant may easily contract life-threatening respiratory infections or diarrhea, with consequential negative impact on growth and nutritional status. Such exposure is also associated with a higher relative risk for infant mortality.

Offering a newborn infant any liquid during the early weeks may, in addition to exposing the infant to contaminants, negatively affect the establishment of breastfeeding. Frequent on-demand feedings, both day and night, are required to ensure adequate milk production.

Offering other liquids to a newborn, therefore, often results in an inadequate supply of breastmilk and a vicious cycle of supplementation. Mothers without adequate knowledge or support, who believe that their infants are not receiving enough breastmilk, may become dependent on breastmilk substitutes; the result is often continued milk insufficiency or weaning from the breast entirely. Insufficient milk production may also result in an early return of maternal fertility.

Offering high-caloric liquids such as juices, cereal-based beverages, and breastmilk substitutes will generally reduce the infant's intake of breastmilk, thereby causing a negative impact on the infant's nutritional status and growth. High-caloric liquids may satisfy the infant's caloric needs (i.e. satisfy hunger) without providing adequate protein, fat, and other nutrients required for proper mental and physical growth and development. In addition, a decrease in demand for breastmilk by the infant, results in a decrease in maternal supply, with significant repercussions related to the continuation of lactational amenorrhea.

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One additional issue addressed by the Expert Panel was the administration of oral rehydration solutions to exclusively breastfed infants who develop diarrhea. Participants noted the growing recognition that current recommendations related to the use of oral rehydration solutions during episodes of diarrhea may cause confusion with the promotion of exclusive breastfeeding during the first six months of life. Resolving the existing contradictions in breastfeeding and diarrheal control messages given to mothers was seen as critical and timely. A suggestion was made that an Expert Meeting dealing specifically with this issue be held in the near future.

Even though the participating experts did not rule out the use of oral rehydration solutions for treating diarrhea during the period of exclusive breastfeeding, they did highlight a number of issues related to its use. The consensus was that administering oral rehydration solutions to an exclusively breastfed infant who is less than six months old may be of questionable value because (1) the infant may not really need additional fluid and salts if the mother is able to breastfeed on demand and the baby's intake is therefore sufficient to prevent dehydration; (2) the infant may reject (or

waste) the solution; (3) the mother may be unknowingly encouraged to use some kind of container (bottle or cup and/or spoon) in the future for unnecessary and potentially dangerous fluids, such as water or breastmilk substitutes; and (4) ORS administration may displace breastfeedings and lead to reduced breastmilk production.

Action Research 1:

Test the relative infection load of bottles, nipples, cups and spoons, and pacifiers or other items related to infant feeding in popular use in the community.

Action Research 2:

Test the microbial content of water, teas, juices, and other liquids commonly offered to infants under a variety of environmental/household conditions over a 24-hour period to determine their relative levels of safety.

Action Research 3:

26 Test the concentration of urinary output of exclusively breastfed infants during different seasons of the year and in various locales with differing climatic conditions.

Action Research 4:

Conduct qualitative research to determine who is influencing mothers' decisions related to the use of water and other liquids, and identify resistance points to the promotion of exclusive breastfeeding.

Action Research 5:

Conduct studies of exclusively breastfed infants to determine the incidence and severity of diarrhea. Examine infants with varying degrees of diarrhea to determine to what extent breastfeeding can prevent or overcome dehydration.

Action Research 6:

Test the concentration of urinary output of exclusively breastfed low-birth-weight babies to determine at what birth weights and under what circumstances supplemental fluids are necessary.

Action Research 7:

Conduct situational analysis of current infant feeding practices to determine the prevalence of exclusive breastfeeding. (Note: Caution should be taken to ensure that the proper definition of "exclusive" is used.)

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V. Timing the Introduction of Complementary Foods

ISSUE:

Current internationally established infant feeding recommendations suggest that complementary foods initially be given to an exclusively breastfed infant between four and six months of age. The rationale for this recommendation is the premise that most infants throughout the world require extra calories and nutrients, in addition to breastmilk, around the end of the sixth month, while others apparently require supplementation earlier. Given this range in physiological need, the current norm of four to six months for exclusive breastfeeding was established in order to safely cover individual differences. Health practitioners often argue, however, that the range of months is too vague and difficult to communicate, and consequently has resulted in a number of unintended, often unfortunate practices and subsequent repercussions.

What are the health consequences of introducing complementary foods during the first six months of life?

There are three well-documented consequences of introducing complementary foods during the first six months of life. First, research on the relationship of infant feeding to infection suggests that infants who receive any additional foods during the first six months of life have a higher incidence of respiratory infection and diarrhea than infants who are exclusively breastfed through six months of age. Second, breastmilk production may decrease after the initiation of complementary foods, and, therefore, the positive hormonal impact of exclusive breastfeeding on child spacing is potentially reduced. A woman who begins supplementing or complementing her breastmilk may experience an earlier return of menses and ovulation than she would have had she exclusively breastfed through six months. Finally, studies have shown that solid foods may displace breastmilk without resulting in an actual increase in a child's nutrient intake, especially when such foods are less nutritive, caloric sources. The weaning foods introduced may have less or lower quality protein than breastmilk and result in a lower intake of protein with negative repercussions on infant growth.

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What is the expert consensus on changing the current recommendation of exclusive breastfeeding for four to six months to "through the sixth month"?

Participants in the Expert Meeting, after carefully weighing the evidence concerning the many interrelated health consequences for both mother and child, felt that for the vast majority of infants, there is no physiological or biological reason to recommend the introduction of complementary foods before the end of the sixth month of life. In exceptional cases where true growth faltering exists despite optimal breastfeeding practices (as apposed to a false diagnosis based on using inappropriate growth standards), or where prolonged exclusive breastfeeding is unlikely in the near future, basic safeguards should be in place if complementary foods are to be added at four months of age. Information and resources should be provided to help mothers ensure (1) availability of a safe and hygienic home environment, with reasonable access to clean water; (2) availability of acceptable, affordable, and nutritious complementary foods; and (3) availability and use of acceptable, affordable, safe, and effective contraceptives.

What behavioral or physical cues might be used to justify the introduction or withholding of complementary foods?

Unfortunately, there are no universal behavioral or physical cues to indicate absolute readiness for complementary foods. Because of the fact that the physical and mental development of infants varies tremendously, especially between the fourth and sixth month of life, it is extremely difficult to pinpoint any one cue. In the past, a change in rate of growth has been used to indicate readiness. Based on current knowledge concerning the normal growth patterns of exclusively breastfed infants, however, minor deviations in growth may be a misleading cue. An apparent lack of satisfaction soon after nursing is often cited as the reason for introducing supplements or complementary foods. It may be difficult, however, to distinguish hunger from other reasons for fussiness. A demand to nurse more often cannot be relied on as an accurate cue because a periodic increase in demand occurs normally in response to growth spurts. The appearance of teeth, the ability of an infant to sit up without support, and the ability to reach out and grab an object are cues that are more likely to occur close to six months of age. Given the diversity in development, however, they cannot be applied to all infants.

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Discussion:

Currently, there are no precise guidelines or clear behavioral or physical cues to determine when an infant physiologically requires additional foods. Consequently, there is a high degree of confusion at the community level concerning the most appropriate age at which to initiate complementary foods. Given the vagueness of the internationally promoted four to six-month range for exclusive breastfeeding, many health care workers encourage the introduction of complementary foods by four months of age "to be safe." In order to act on this recommendation, many mothers actually begin offering an infant "tastes" of foods by two or three months of age (or earlier) so that they will be "eating well" by the fourth month. This practice has several potential adverse consequences, including (1) exposure of the infant to environmental or food contaminants, thus resulting in a vicious cycle of illness and malnutrition; (2) displacement of breastmilk by less nutritive calories, resulting in malnutrition and/or reduced immunological protection; and (3) subsequent reduction in breastmilk production and related hormones by the mother, thereby resulting in an early return of fertility and pregnancy, often before the infant is six months old.



Another issue related to the vagueness of the current norm of four to six months for exclusive breastfeeding is the fact that mothers who perceive that they are not producing enough breastmilk, or that their infant is not satisfied with their breastmilk (regardless of whether or not the infant is growing well), will often initiate supplementation, even soon after birth, rather than try to increase their milk production and the infant's intake by breastfeeding more frequently. The inherent vagueness of the current recommendation implies that there is no real harm in starting early supplements, especially when medical or familial support and information concerning the benefits of exclusive breastfeeding is inadequate or lacking.

Clearly, in trying to decide when to recommend complementary foods, health care practitioners must consider the interaction between the level of potential exposure of the infant to environmental and food contaminants, the appropriateness and availability of complementary foods, the availability and use of acceptable and effective contraceptives, and mothers' time constraints. Employment outside the home, for example, may require daily periods of separation of mother and child that make it difficult, if not impossible, for the mother to nurse frequently on demand. Also, several factors related to postponing the initial introduction of complementary foods until the end of the sixth month must be taken into consideration. These factors include a potential compromise in the physical and behavioral development of the infant, which to date has not been thoroughly examined, and the possibility of poor acceptance of complementary foods, which has occasionally been observed in infants who are exclusively breastfed for prolonged periods beyond six months of age. The Expert Panel, therefore, encouraged continued research related to these issues in particular, in order to define any negative repercussions more clearly.

Based on the considerations outlined above, and after carefully weighing all the *available* evidence, the participants in the Expert Meeting concurred that there is no reason not to recommend extending the current norm of four to six months of exclusive breastfeeding to "through the sixth month of life," recognizing that individual differences in the growth and development of infants do exist and that individual circumstances may affect a mother's ability to exclusively breastfeed for six months. Participants agreed, however, that extending the current recommendation through the sixth month would significantly reduce the number of infants receiving complementary foods during the first four months of life. It would also reduce the level of confusion over this issue for individual mothers, health care providers, and national policymakers. Eliminating the vagueness of the current recommendation would greatly strengthen international efforts to



promote exclusive breastfeeding, even if the recommendation has to be moderated in response to individual circumstances.

Action Research 1:

Evaluate the impact of a government recommendation to breastfeed exclusively for six months on infant feeding practices in a given population, with attention to maternal constraints on compliance with such a recommendation.

Action Research 2:

Explore alternative feeding patterns that can realistically be used by women employed outside the home. This exploration might include researching the feasibility and acceptability of encouraging the infant to nurse more at night than during the day when the mother is away (reverse rhythm nursing), or the expression and storage of breastmilk that can be given to the infant by a childcare provider using a cup, or cup and spoon, rather than a bottle.

Action Research 3:

Conduct contextual research on feeding-related terminologies and signs/cues used by mothers to determine when to introduce complementary foods. Are there local, developmental indicators that can be used to establish simple, appropriate guidelines at the community level?

Action Research 4:

Study the impact of negative (don'ts) as well as positive messages in motivating mothers to maintain exclusive breastfeeding through the sixth month of life (or at least through the fourth month).

Action Research 5:

Conduct knowledge, attitudes, and practices surveys related to infant feeding in general and the introduction of weaning foods in particular. Use such surveys along with other quantitative methodologies to identify and evaluate the nutritional quality, quantity, and timing of weaning foods that are locally available and generally acceptable in a community or culture. Assess these foods in relation to the breastmilk that is theoretically displaced by their introduction.





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Answers presented in this document are based on the views and recommendations of the following group of experts:

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