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**WORKSHOP ON FAMILY PLANNING
AND
REPRODUCTIVE HEALTH**

**Novosibirsk, Russia
Vladivostok, Russia**

**TRAINING CURRICULUM
FOR
BREASTFEEDING AND LAM SESSIONS**

May - June 1996



MotherCare



U. S. Agency for International Development



SEATS

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**Curriculum Guide for Health Provider Education
In Breast-feeding and Lactational Amenorrhea Method (LAM)**

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A USAID supported collaborative project of
MotherCare/John Snow, Inc. and
the American College of Nurse-Midwives

Contract No HRN-5966-Q-00-3039-00
Project No 936-5966

This publication was made possible through support provided by the Office of Health,
United States Agency for International Development, under the terms of
Contract No. HRN-5966-C-00-3038-00 and John Snow, Inc.

The opinions expressed herein are those of the author(s) and do not
necessarily reflect the views of USAID and JSI.

Acknowledgments

Financial support for this curriculum guide was provided through contract number 5966-C-00-3038-00 from the United States Agency for International Development (USAID). The views expressed in the curriculum are those of MotherCare and the American College of Nurse-Midwives and do not necessarily reflect those of USAID. The material in this curriculum is in the public domain and can be used or adapted by anyone.

This document heavily utilizes excellent existing materials already translated into Russian on the subject. They are molded to fit a prototypic three day curriculum offered in Novosibirsk, Russia. The intended audience is health care providers. This was developed by Margaret Marshall, CNM, EdD, MPH.

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April 1996

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Introduction

The following is a prototype three day curriculum for training in breastfeeding management and the Lactational Amenorrhea Method of family planning. It is divided into twelve one and a half hour lessons over a three day period. This breastfeeding and LAM curriculum is part of a two week family planning training to be held in Russia under the SEATS (Service Expansion and Training) project.

Each lesson plan contains the learning objectives for the session, time estimate for each activity, content, teaching methodology, materials needed, and evaluation methods utilized to determine how well the material was learned.

For sessions where more information is needed or where assistance with finding the content material in the handouts would be helpful, trainer's notes have been added.

At the end of the twelve sessions is a pre/post test with key. The key has the correct answers highlighted in bold print.

At the end are a glossary of frequently used terms and a bibliography of all the handouts utilized in the training.

A serious attempt has been made to have the sessions as participatory as possible. Teaching methodologies utilized include guided discussions, role plays, interviews, counseling sessions, clinical observation, drawings, use of diagrams and models, experiential exercises, small group work, etc. By keeping communications as horizontal as possible, it is possible to address attitudes and work on attitude change where needed.

The clinical experiences in the classroom, nursery and post-partum wards address skills acquisition. In addition to information sharing throughout the three day program, an extensive compendium of handouts has been organized into a notebook for knowledge acquisition as well as to serve as a reference as policy, education program, and service changes are progressing.

In three days it is not possible to train to levels of mastery of all material. Thus, monitoring and supervision post-training is an essential ingredient for program success.

SEATS/MotherCare Russia
Breastfeeding and LAM Training

Day One	Day Two	Day Three
Session 1: Welcome, Introductions. Breastfeeding- an introduction; Russian experience Pre-test	Session 5: Review of any questions from yesterday. Observation exercise in neonatal ward	Session 9: Review of any questions from yesterday. Lactational Amenorrhea Method (LAM): Scientifically Sound and Practical
<i>Break</i>	<i>Break</i>	<i>Break</i>
Session 2: Anatomy and physiology of the breast; Biochemistry of breastmilk	Session 6: Post-conference	Session 10: Counseling session on post-partum ward: Teaching supportive breastfeeding techniques; teaching LAM to mothers, couples
<i>Lunch</i>	<i>Lunch</i>	<i>Lunch</i>
Session 3: Advantages and disadvantages of breastfeeding Helping mothers initiate, breastfeeding; Counseling breastfeeding mothers	Session 7: Creating baby-friendly and family-friendly institutions	Session 11: Develop an Action Plan to: -integrate LAM into FP and Postpartum programs -create a more baby-friendly hospital
<i>Break</i>	<i>Break</i>	<i>Break</i>
Session 4: Management of common problems & special situations	Session 8: Role plays of counseling breastfeeding women	Session 12: Post-conference, wrap up Post-test
Homework: Read Handouts 29, 30, 31, 32.	Homework: Read Handout 36, Do breastfeeding interview	Homework: Continue to read from Handout Notebook

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 1: Welcome, Introductions; Breastfeeding throughout history, Russian Experience; Pre-Test

Learning Objectives

By the end of this session, the participants will be able to:

1. Explain the value of breastfeeding in the reduction of infant mortality and morbidity worldwide.
2. Describe the role of breastfeeding historically in Russia.
3. Discuss some of the common breastfeeding practices seen today.

Session 1

Time Allotted	Content	Methodology	Materials Needed	Evaluation
30 minutes	Welcome, Introductions	Each individual introduces self including interesting little known fact.	Handout 1: MotherCare-Maternity Care Programs: Saving the Lives of Women and Newborns	Group starts to relax and interact.
30 minutes	Pre-test	True/false test. See attached.		
30 minutes	<p>Introduction to Breast-feeding: value in reducing infant mortality and morbidity worldwide. (Opinions from the audience)</p> <p>Practices noted in Russia.</p> <ul style="list-style-type: none"> - lack of suckling first hour of life. - almost universal breastfeeding first days/weeks. - supplementation with glucose water within 24 hours. - use of formulas. - use of pacifiers. - separation of mothers and newborns. <p>Decline of morbidity and mortality</p>	Guided discussion. See trainer's notes.	<p>Handout 2: Maternal and Infant Mortality: A Global Overview</p> <p>Handout 3: Breastfeeding: A Natural Resource for Food Security</p> <p>Pre/post tests for participants</p>	Participants are willing to share knowledge and some individual experiences.

Trainer's Notes: Session 1

The group is likely to be quite diverse in their knowledge base, experience in supporting breastfeeding and LAM both philosophically and practically, and attitudes toward breastfeeding. This initial session is "ice breaking" in getting participants to think about their own culture, attitudes, and health care system. Some questions which might be used in the guided introductory session could be developed around their own experience followed by discussion of some of the practices which have been noted to be wide spread in Russia.

Introduction to breastfeeding:

- a large body of new research on breastfeeding has been generated by the scientific community including:
 - role of breastmilk in infection prevention in infants
 - value of initiating breastfeeding within one hour of birth
 - optimal benefits for mother and infant if infant is exclusively breastfed for the first six months of life. No water supplementation is needed.

Contribution to the economy.

- breastfeeding is a major source of food for greater than 140 million infants or 3% of the population

Handout #3 pp. 1-7, USSR graph p. 8

Contribution to decreased mortality and morbidity.

- helps prevent micronutrient deficiencies
- breastmilk has anti-infective properties which protect the intestinal epithelial surfaces
- consumption of other foods such as cow's milk changes the pH in the intestine and can allow bacteria to survive
- studies in Brazil among infants less than two months show a 25 times lower rate of death for exclusively breastfed infants versus bottlefed infants

Handout #3 p. 11, 15

Contribution to decreasing fertility.

- exclusive breastfeeding is 98% effective in preventing pregnancy during the first six months of life when the woman has not resumed menses
- analysis using data from the Malaysian Family Life Survey found that breastfeeding had a considerably greater effect on preventing short birth intervals than did contraceptive use
- theoretical calculations show that a large increase in contraceptive use would be needed to offset decreased in breastfeeding

- it has been shown that breastfeeding prevents more births in Africa and many parts of Asia than contraception

Handout #3 p. 17

Improved nutritional status.

- increased birth intervals are also associated with improvements in nutritional status of the children born either prior to or subsequent to the enhanced birth interval
- when birth intervals are increased, the preceding child has a greater chance of receiving better care and feeding from the mother, and the second child is more likely to be born at normal birth weight

Handout #3 p. 19

Guided Discussion questions on role of breastfeeding historically in Russia:

How many of you were breastfed as infants? Do you know how long? What has your mother/family shared with you about that experience?

As a child growing up, did you commonly see breastfeeding women in your home, community? How were they viewed? Could women breastfeed freely in public- at the neighbors? Parks? At work?

Who gave advice and set the standards for weaning, solving problems, etc? Health providers? Women themselves? The woman's mother? Mother-in-law? Other?

Practices/attitudes which have been noted in Russia: *

- lack of suckling in the first hour of life
- almost universal breastfeeding during the first days/weeks
- supplementation with glucose water within the first 24 hours of life
- frequent use of formulas
- use of pacifiers (dummies, soothers)
- separation of mothers and newborns (central nurseries)

- excellent infra-structural support for maternity/breastfeeding leave without serious economic consequences
- housing and feeding of mothers of premature and sick infants so that mother and infant can remain together facilitating maintenance/initiation of breastfeeding
- skepticism regarding the use of the "kangaroo method" for keeping premature mothers and newborns in optimum contact for frequent short (non-strenuous) feeds
- belief that the vast majority of Russian women are "high risk" and sickly, therefore not good candidates for breastfeeding in many instances.

* These observations are based on the MotherCare Needs Assessment trip to Russia in October 1995 by Margaret Marshall and Colleen Conroy.

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 2: Anatomy and Physiology of the Breast; biochemistry of breastmilk

Learning Objectives

By the end of this session, the participants will be able to:

1. Describe the normal anatomy and physiology of the female breast in the pregnant and non-pregnant woman.
2. Compare breast milk with artificial supplementation.
3. Discuss the potential for contamination of breast milk.

Session 2

Time Allotted	Content	Methodology	Materials Needed	Evaluation
1.5 hrs.	<p>Draw normal non-pregnant and pregnant breast.</p> <p>Discuss why changes occur.</p> <p>Discuss role of progesterone, estrogen, prolactin, and cortisol.</p> <p>Describe changes in breast milk composition from 20 weeks gestation to one month post partum (44 weeks) and reasons for these changes.</p> <p>Compare human milk to cow's milk and artificial formulas.</p> <p>Implications of milk contamination- no need to stop breastfeeding</p>	<p>Trainer invites participants to draw non-pregnant and pregnant breast in their own notebooks as a review. Trainer then reveals large diagrams of each on sheet paper and uses for review.</p> <p>Guided discussion</p>	<p>Chalkboard or sheet paper, tape and markers to draw breast</p> <p>Handout 4: Bulletin of the World Health Organization: Infant Feeding: The Physiological Basis</p> <p>Handout 5: Management of Successful Breastfeeding</p> <p>Handout 6: Environmental Contaminants and Their Significance for Breastfeeding in the Central Asian Republics.</p> <p>Handout 7: Levels of Dioxin, Dibenzofurans and Other Chlorinated Xenobiotics in Human Milk from the Soviet Union</p>	<p>Post test questions</p> <p>Effectively counsels post-partum women during clinical experience (sessions 8 and 12)</p> <p>Central Asian Republics contaminants similar to rest of world.</p> <p>Elicit from participants advantages to breastfeeding.</p>

Session 2 (cont.)

Time Allotted	Content	Methodology	Materials Needed	Evaluation
	<p>- dioxin levels less than US or Germany. breastfeeding: - dibenzofuran levels less than US or Germany</p> <p>Central Asian Republics contaminants similar to rest of world.</p>		<p>Handout 8: No Need for Water Supplementation for Exclusively Breast-fed Infants Under Hot and Arid Conditions</p>	

Trainer's Notes Session #2

1. Describe the normal anatomy and physiology of the female breast in the pregnant and non-pregnant woman.

Handout # 4 pp. 19-21

By way of review, participants are invited to draw a pregnant and non-pregnant breast. This leads into the trainer displaying large diagrams of the same. This review leads into a guided discussion as follows:

Discuss the role of hormonal changes (progesterone, estrogen, cortisol, prolactin).

Handout #4 pp.21-22,

Discuss changes in the composition of human milk from 20 to 44 weeks and the reasons for this.

Handout #4 pp. 25-34, 55-62, 72-81

2. Compare breast milk with artificial supplementation.

Handout #4 pp. 62-65, 85-91

3. Discuss the potential for contamination of breast milk.

What do current studies of USSR show?

As a general rule and with the current evidence, there is no need to discontinue breastfeeding in Russia

dioxin levels less than US or Germany. Handout #7 pp. 929-934

dibenzofuran levels less than US or Germany (except Moscow), Handout #7 pp. 929-934

Central Asian Republics contaminants similar to rest of world, Handout #6: pp. 3-8

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 3: Advantages and Disadvantages of Breastfeeding; Helping Mothers Initiate Breastfeeding

Learning Objectives

By the end of this session, the participants will be able to:

1. Discuss at least five advantages and five disadvantages of breastfeeding to the infant, mother, family, and society.
2. Explain at least four ways to assist the new mother get started with nursing.
 - change position of infant.
 - positions of comfort for mothers.
 - need for fluids and keeping them close by during breastfeeding.
 - avoidance of nipple confusion.
 - influence of room temperature, stimulation, wakefulness, etc.
 - allowing for letdown reflex.
 - cabbage leaves and other folk remedies for engorgement, increasing supply, etc.
3. List counseling skills critical to assist clients to breastfeed.

Session 3

Time Allotted	Content	Methodology	Materials Needed	Evaluation
30 minutes	The trainer elicits from the group advantages and disadvantages of breastfeeding from the point of view of the infant, mother, family, and society.	Small group work. Divide the group into four. Each group is given 10 minutes to discuss advantages and disadvantages of breastfeeding and then write their ideas on sheet paper. The groups are assigned to infant, mother, family, or societal point of view. Group work is shared and critiqued in the larger group.	Sheet paper, tape, and markers. Handout 9: Good Nutrition for the Breastfeeding Mother and Baby Handout 10: Maternal Nutrition, Breastfeeding Practices and Lactation Performance	Quality and quantity of ideas from group work. Post-test

Session 3 (cont.)

Time Allotted	Content	Methodology	Materials Needed	Evaluation
45 min.	The group discusses how to initiate breastfeeding with a new mother. Topics included are: maternal diet, nipple preparation, nursing positions, signs of satiety, individual personalities of babies	<p>Guided discussion.</p> <p>Give everyone a hard candy. Discuss what that adult sucking action is like. Compare to the normal suckling of a newborn.</p>	<p>Handout 11: Management of Successful Breastfeeding</p> <p>Handout 12: Basic Postpartum Counseling for the Breastfeeding Family</p> <p>Handout 13: Counseling Principles</p>	
15 min.	<p>List counseling skills critical to assist clients to breastfeed.</p> <ul style="list-style-type: none"> - check mother's knowledge base. - use of body language -non-judgmental approach - correcting misinformation - allowing for individuality - the essential role of follow-up 	Guided discussion	Handout 14: Breastfeeding Counseling Cue Cards	

Trainer's Notes Session #3

The participants are divided into four groups. They appoint their own recorder. The group is given 10 mins. to list the pros and cons of breastfeeding on sheet paper with markers using their assigned point of view (infant, mother, family, society). They then come together as a group and report out on their findings.

1. Discuss at least five advantages and five disadvantages of breastfeeding to the infant, mother, family, and society.

Some advantages they might list are:

- it is free
- always the right temperature
- no need to get up at night
- correct formulation for human infant
- decreased allergies
- decreased diarrhea and other infectious diseases
- faster maternal weight loss post-partum
- highly effective family planning protection
- intense bonding with infant

Some disadvantages they might list are:

- only the mother is able to feed the infant
- difficulties in returning to workplace
- vaginal dryness/dyspareunia
- breast discomfort, cracked nipples
- leaking/embarrassment/increased laundry

Handout # 9 p. 1

2. Explain at least four ways to assist the new mother who is starting to breastfeed
- give encouragement to the new mother that she will be successful in breastfeeding
 - unless a mother is severely lacking in vitamin intake, she will produce nutritious breastmilk no matter what she eats. An additional 500 calories is advised.
 - need for fluids; suggest drinking a beverage every time she breastfeeds. Milk or juice are most nourishing
 - change position of infant (see drawings in Handout 36, pgs. 51-52)
 - positions of comfort for mothers.
 - avoidance of nipple confusion (avoid bottle feeding and pacifiers).
 - influence of room temperature, stimulation, wakefulness, etc.
 - allowing for letdown reflex.
 - cabbage leaves and other folk remedies for engorgement, increasing supply, etc.

See attached Handout 12: Basic Postpartum Counseling for the Breastfeeding Family for additional ways to assist the new mother who is starting to breastfeed.

Handout # 4 pp. 22-25,

Handout # 11 pp. 1-6

Handout # 12 pp. 1-2

Handout # 13 p. 1

Handout # 36, pp. 51-61.

3. List counseling skills critical to assist clients to breastfeed

See attached Handout 13: Counseling Principles

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 4: Management of Common Problems

Learning Objectives

By the end of this session, the participants will be able to:

1. Identify counseling skills used by the health provider in the role play.
2. Describe management of common breastfeeding problems including-
 - assessing adequacy of breastmilk intake and reassuring mothers
 - increasing milk supply
 - inverted, retracted, and flat nipples
 - nipple trauma
 - engorgement
 - clogged ducts
 - mastitis
 - jaundice
 - difficulty breastfeeding
3. Explain management of special situations including-
 - Cesarian section births
 - premature infants
 - the ill mother or infant
 - diarrhea
 - HIV/AIDS
 - cleft lip/palate
 - multiple births

Session 4

Time Allotted	Content	Methodology	Materials Needed	Evaluation
20 minutes	1. Review of counseling skills through use of role play followed by discussion.	Sample counseling session between two volunteer participants. Situation: This 19 year old married primipara is 12 hours post-partum. She appears anxious and doesn't know how to go about breastfeeding.	Handout 15: Management of the Most Frequently Encountered Problems Handout 16: Indicators of Adequate Breastmilk Intake Handout 17: Increasing Milk Supply	Quality of discussion and ideas. Post test.
50 minutes	2. Discuss management of common breastfeeding problems including- assessing adequacy of breastmilk intake and reassuring mothers increasing milk supply inverted, retracted, and flat nipples nipple trauma engorgement clogged ducts mastitis jaundice	Guided discussion	Handout 18: Jaundice and Breastfeeding: Overview Handout 19: Suitability of Human Milk for the Low Birth Weight Infant	

Session 4 (cont.)

Time Allotted	Content	Methodology	Materials Needed	Evaluation
25 minutes	Management of breastfeeding in special situations including: Cesarean section births premature infants ill mother or infant diarrhea HIV/AIDS cleft lip/palate multiple births	Guided discussion	Handout 20: Why Promote Breastfeeding in Diarrhoeal Disease Control Programs? Handout 21: Breast-feeding and Health in the 1980's: A Global Epidemiological Review Handout 22: Hand Expression of Breastmilk Handout 23: Milk Storage Handout 24: Mechanical Milk Expression Handout 25: Mother to Infant Biochemical and Immunological Transfer Through Breast Milk Handout 26: WHO/UNICEF Consultation on HIV Transmission and Breastfeeding	Counseling session: Did participant check client knowledge base, use good verbal and non-verbal behavior, provide factually correct information?

Trainer's Notes: Session #4

1. Review counseling skills critical to assist clients to breastfeed.

See Handout # 13, attached to Session 3.

2. Describe management of common breastfeeding problems including-
 - difficulty breastfeeding
 - assessing adequacy of breastmilk intake and reassuring mothers
 - increasing milk supply
 - inverted, retracted, and flat nipples
 - nipple trauma
 - engorgement
 - clogged ducts
 - mastitis
 - jaundice

See attached Handout # 16, Handout # 17, Handout # 15, portions of Handout # 14 for detailed information.

Handout # 24, p.1.

Handout # 22, p.1-2.

Handout # 18, pp. 1-6.

3. Explain management of special situations including-
 - Cesarian section births
 - premature infants
 - ill infants
 - diarrhea
 - HIV/AIDS
 - cleft lip/palate
 - multiple births

See attached portions of Handout 36 for detailed information.

Additional information on diarrhea:

- evidence that breastfeeding can protect against the adverse nutritional effects of diarrhea.
- children are usually eager to breastfeed when they have diarrhea, even though they may refuse solid foods
- energy intake derived from breast milk does not usually decline during episodes of diarrhea and other illnesses, whereas that from other food sources is often reduced.

- studies show that breastfeeding protected substantially against death from diarrhea; no breast milk versus exclusive breastfeeding = relative risk of death from diarrhea during the first six months was 25. For partially and exclusively breastfed infants = median relative risk of death from diarrhea was 8.6.

Additional information on low birth weight (LBW) infants:

- even partial human milk feeding should be encouraged because of the protection afforded.
- the mother produces secretory IgA antibody when exposed to foreign antigens and is stimulated to make specific antibodies which are elaborated at mucosal surfaces, including her milk. By ingesting the milk containing specific IgA antibody, the infant receives specific passive immunity. Encourage skin to skin contact between mother and infant to facilitate maternal production of protective antibodies, specific antibody directed against the nosocomial flora of the neonatal unit.
- avoid feeding restricted volumes of milk.
- protocols should be designed that avoid any losses of fat and to use hindmilk to provide optimum energy content for the infant.

Additional information on HIV/AIDS: portions of the Consensus statement from WHO/UNICEF consultation on HIV transmission and breastfeeding

- Where the primary causes of infant deaths are infectious diseases and malnutrition, infants who are not breastfed run a particularly high risk of dying from these condition. In these settings, breastfeeding should remain the standard advice to pregnant women, including those who are known to be HIV-infected, because the baby's risk of becoming infected through breast milk is likely to be lower than its risk of dying of other causes if deprived of breastfeeding. The higher a baby's risk of dying during infancy, the more protective breastfeeding is and the more important it is that the mother be advised to breastfeed...
- In settings where infectious diseases are not the primary causes of death during infancy, pregnant women known to be infected with HIV should be advised not to breastfeed but to use a safe feeding alternative for their babies. Women whose infection status is unknown should be advised to breastfeed. In these settings, where feasible and affordable, voluntary and confidential HIV testing should be made available to women along with pre- and post-test counselling, and they should be advised to seek such testing before delivery.

Handout # 19, pp. 1-4.

Handout # 26, pp.1-2.

Handout # 25, p. 332

Handout # 21, p. 662.

Handout # 20, p. 374-5.

Handout # 4, pp. 88-92.

Handout # 36, pp. 55-56.

Role Play

This role play is to help establish what are the routine things women need to learn and have assistance with during their first several breast feeds. The volunteers use the information presented during the session and play act the situation of a primigravida who is anxious and needing of support and information. The trainer encourages all participants contribute to the discussion. The trainer clarifies and corrects any misinformation and then summarizes the role of the health provider in assisting a new mother to start a successful breastfeeding experience.

WELLSTART INTERNATIONAL LACTATION MANAGEMENT EDUCATION PROGRAM

MANAGEMENT OF THE MOST FREQUENTLY ENCOUNTERED PROBLEMS

INVERTED, RETRACTED, OR FLAT NIPPLES

Cause:

- persistence of original invagination of mammary dimple

Management:

- Hoffman's exercises?
- breast shells
- breast pump (if pregnant, use only under direction of primary care giver)
- pre-nursing nipple stimulation
- side-sitting position
- avoid bottle nipples and pacifiers



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INVERTED NIPPLES

Inverted nipples are rare and some prenatal and postnatal measures may be helpful in order to facilitate breastfeeding.

- Prenatal Measures

- Breast shells
- Breast pump (If pregnant, use only under the direction of your primary care giver.)

- Postnatal Measures

- Pre-nursing nipple stimulation
- Breast pump prior to attachment
- Put baby to breast as soon as possible after delivery
- Side-sitting position
- Avoid artificial nipples and pacifiers
- Breast shells

If you need further assistance, please call the Wellstart Helpline at 295-5193.

NIPPLE TRAUMA

Causes:

- incorrect positioning and technique
- engorgement
- oral-motor dysfunction
- irritants such as soaps or lotions
- Candidiasis
- contact dermatitis
- short frenulum (rare)

Management:

- apply moist heat and massage before feedings
- stimulate pre-suckling milk ejection reflex
- begin each feeding on the least involved side
- frequent, short feedings
- proper positioning, attachment, and removal technique
- assure lips are flanged out
- expressed breast milk to nipples post nursing
- air/sun exposure
- avoid engorgement; nurse more frequently, not less
- oral-motor evaluation when appropriate
- mild analgesic
- avoid irritating substances
- treatment for Candidiasis
- dermatitis treatment
- avoid plastic lining in bra and pads
- supportive bra
- last resort (rarely necessary): interrupt nursing for 24 - 36 hours; must express
- clip frenulum (rarely necessary)



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NIPPLE TRAUMA

Tenderness and soreness of the nipple when breastfeeding are usually the result of trauma or irritation. Incorrect attachment of the baby to the breast is the major cause of nipple trauma. In general, the following measures will help relieve the problem.

- Before feedings:
 - Make yourself comfortable and relax
 - Apply moist heat to the affected breast and nipple 3 - 5 minutes before each feeding
 - Express a small amount of milk to soften the areola and to stimulate the milk ejection reflex before your baby begins to nurse
- During feedings:
 - Offer the least affected breast first
 - Make sure the baby is properly positioned at the breast
 - Change the position of the baby at each feeding (cradle, side-sitting position)
 - Nurse frequently, at least every 2 - 3 1/2 hours or sooner
 - When removing the baby from the breast, gently break the suction by inserting your finger between the baby's gums
- After feedings:
 - Gently express a few drops of milk onto your nipples and allow to air dry
 - Expose nipple briefly to heat (sunlight, hair dryer, 40 watt light bulb). **BE CAREFUL NOT TO BURN YOURSELF**
 - Remove plastic liners from bras and pads
 - Use a fresh nursing pad after each feeding

Remember:

- AVOID using drying agents such as soaps or alcohol on your nipples
- AVOID using nipple creams — your skin produces its own lubricants
- You may use tylenol without harm to your baby

If the nipple pain is extreme, you can stop breastfeeding for 24 hours on one or both breasts. In order to avoid engorgement, it is important to express at the same frequency as your baby would eat. Regular expression will help prevent further complications. Hand expression is more gentle on the breast tissue, but if you choose to use a pump, make certain that your nipple is centered properly in order to avoid additional trauma.

If the problem worsens or does not improve within 24 hours, call the Wellstart Helpline: 295-5193

CANDIDIASIS

Causes:

- Thrush or candidal diaper rash in the infant
- Recent history of antibiotics in mother or infant
- Recurrent candidal vaginitis in the mother

Management:

- For mother
 - Apply medication to nipples after every feeding for 14 days
 - Keep area dry: expose nipples to air or sun and use a fresh bra liner after every feeding
 - Wash clothes and other articles that come into contact with breasts (e.g., towels) in very hot water
 - Wash hands well, especially after changing infant's diaper
 - Consider treating partner also if infection persists
- For infant
 - Apply oral medication directly to affected areas for 14 days
 - Boil articles that come in contact with infant's mouth (e.g., cup) for 20 minutes daily
 - Treat diaper rash until healing is complete



CANDIDIASIS

Candidiasis is a fungal infection which is common in infants. Known as "thrush," this infection results in inflammation of the baby's mouth or diaper area. When breastfeeding, the mother's nipples may also become infected. Medication will be prescribed for both mother and baby. The following measures are also important in helping to clear the infection.

For Mother:

- Use a light film of _____ on your nipples after every feeding for 14 days. It is not necessary to wash off before feeding.
- Air dry and/or expose nipples to sun after each feeding.
- Use a fresh bra liner (e.g., pad, tissue, handkerchief, or paper towel) after each feeding for several days.
- Wash bras, nightclothes, sheets, towels, and washcloths in very hot water.
- Good handwashing after changing the infant's diapers and after using the bathroom.
- When bathing, use a different washcloth for the genital area.
- Your partner may need to be treated also.

For Baby:

Oral Thrush:

- Use oral medication four times a day (after feeding) for 14 days.
- Use your finger, gauze, or a cotton-tipped swab to apply the medicine well onto the inside of the baby's mouth, including cheeks, gums, and tongue.
- Boil breast pump pieces, pacifiers, and any other artificial nipples for 20 minutes daily.

Diaper Rash: Use cream four times a day until healing is complete.

ENGORGEMENT

Causes:

- inadequate and/or infrequent milk removal
- inhibited milk ejection reflex

Management:

- moist warm packs or warm shower before feeding
- massage and hand express or pump to relieve areolar engorgement before feeding to facilitate attachment
- frequent and effective nursing
- cold packs after feeding
- stress reduction/relaxation techniques
- neck and back massage
- "comb the breast"
- "Kenyan salute"
- mild analgesic



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ENGORGEMENT

Engorgement is an accumulation in the breasts of increased amounts of blood and other body fluids, as well as milk. For some mothers the breasts become only slightly full, while for others they become very full, tender and lumpy. Engorgement may cause the nipple to flatten, making it difficult for your baby to nurse effectively. The following measures will help relieve the problem, usually within 24 to 48 hours.

- Apply moist heat to the breasts 3 - 5 minutes before a feeding, followed by gentle massage and stroking the breast towards the nipple
- By hand or mechanical methods, express enough milk to soften the areola making proper attachment of your baby easier
- Nurse frequently, every 2 - 2½ hours or sooner for at least 15 - 20 minutes per side after your let-down has occurred
- Feed your baby in a quiet, relaxing place
- Be sure to wear a supportive bra
- You may take Tylenol, if needed, for pain
- Cool compresses may be used after feedings

If the problem does not improve within 24 hours or if you have further questions, please call the Wellstart Helpline: 295-5193

OBSTRUCTED LACTIFEROUS DUCT

Causes:

Milk stasis secondary to:

- infrequent nursing
- incomplete emptying
- local pressure

Management:

- moist warm packs to area before nursing
- massage prior to and during nursing
- proper positioning, attachment, and removal technique
- more frequent nursing
- offer baby involved breast first
- check fit of clothing



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OBSTRUCTED LACTIFEROUS DUCT

An obstructed lactiferous duct results in a tender area or painful lump in the breast occurring for a variety of reasons, such as:

- Skipped or delayed feedings
- One-sided breastfeeding
- Pressure from tight clothing or bra
- Pressure from forming an "air-hole" for the baby to breathe
- Sleeping in a position that puts pressure on one area of the breast
- Weaning

Generally, the following measure will relieve the problem, regardless of the cause. However, if gone untreated, a blocked duct can lead to mastitis.

- Apply moist heat to the involved breast 3 - 5 minutes before a feeding
- Breast feed on the involved breast first, to allow for more complete emptying of the ducts
- Be sure your baby is properly attached at the breast
- Gently massage the involved area while nursing
- Change the position of the baby at each feeding (cradle, side-sitting position) to allow for more complete emptying of the ducts
- Nurse frequently, at least every 2 - 2½ hours or sooner for 15 - 20 minutes per side
- Be sure to get plenty of rest
- Check the fit of your nursing bra
- When ready to wean your baby — do it gradually

If the problem worsens or does not disappear within 24 hours, call the Wellstart Helpline: 295-5193

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MASTITIS

Causes:

- usually preceded by nipple trauma
- untreated obstructed lactiferous duct or engorgement
- contributing factors:
 - stress
 - fatigue

Management:

- DO NOT DISCONTINUE NURSING
- nurse more frequently
- offer baby involved breast first
- proper positioning, attachment, and removal technique
- moist warm packs
- bed rest for 24 hours
- mild analgesic
- antibiotic
- drink fluids to thirst



MASTITIS

Mastitis is an infection of the breast tissue surrounding the milk ducts. Symptoms include a tender, reddened area of the breast accompanied by fever, chills, headache and generalized achiness. The following measure will help relieve the symptoms usually within 24 hours.

- Go to bed with your baby for 24 hours — rest is essential!
- Apply moist heat to the involved breast 3 - 5 minutes before each feeding
- Nurse frequently, every 2 - 2½ hours or sooner for at least 15 - 20 minutes per side, offering the affected side first
- Change the position of the baby at each feeding (cradle, side-sitting position) to allow for proper emptying of the ducts
- Drink fluids to satisfy your thirst (if you have a fever, you will be more thirsty)
- Take antibiotics as prescribed:

Medication _____

Dosage _____

Frequency _____

Duration _____

Remember: Mastitis is an infection of the breast tissue, not the milk; therefore, the milk is safe for your baby. Abrupt weaning or temporary interruption of nursing may slow healing or lead to further complications.

If condition worsens or does not improve within 24 hours, please call the Wellstart Helpline: 295-5193

INITIATE BREASTFEEDING WITHIN ABOUT 1 HOUR OF BIRTH

A newborn should be offered the breast as soon after delivery as possible, preferably within one hour of birth. Nothing, nothing at all except breastmilk, should be given to a young infant.

- Early and frequent feeding may bring in mother's milk more quickly.
- The infant will immediately benefit from the protective effect of the concentrated amounts of antibodies present in colostrum. The colostrum is like a first immunization.
- The mother will benefit. The sucking action can help expel the placenta and reduce post-partum hemorrhage.
- The infant has been part of the mother for nine months. Birth is the moment of separation, but immediate breastfeeding eases the abruptness of separation, and helps establish an emotional bond between mother and child.
- No feeds, including water, should be given to a newborn. They are unnecessary; they may be contaminated; and they can interfere with the establishment of sucking.
- If mother delivers by Caesarean section, put the infant to the breast as soon as she wakes up.

Remember: Even if the mother feels that little milk is coming out, there will be enough for a newborn baby if it is allowed to suckle frequently.



WELLSTART INTERNATIONAL ■ Expanded Promotion of Breastfeeding Program

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FEED AN INFANT ONLY BREASTMILK FOR AROUND 6 MONTHS

For optimal health benefits for mother and child, an infant should be breastfed exclusively -- fed nothing but breastmilk -- for approximately the first six months of life. No water, teas, milks, or porridge should be given.

- Infants who are exclusively breastfed have fewer infections. Giving the child anything in addition to breast milk greatly increases the risk of exposure to bacteria and other pathogens. Infants who are not exclusively breastfed have significantly higher rates of diarrhea and other illnesses, and significantly higher mortality rates than other infants.
- Exclusive breastfeeding insures perfect nutrition. Every child, rich or poor, can have the same start in life.
- Breast milk is perfectly adapted to the nutritional needs of an infant, and actually changes in composition to meet the needs of the growing child.
- Breast milk contains antibodies which help protect the child against illness. Exclusive breastfeeding insures that the child will take in the maximum amount of antibodies to protect it until it can produce enough of its own, around the age of six months.
- Frequent feedings keep up a mother's milk supply. If an infant is given anything else, it will not suckle as often and the mother may begin to produce less milk.
- Exclusive breastfeeding maximizes the contraceptive effect to the mother, thus contributing to birth spacing. By delaying the return of menses, exclusive breastfeeding also helps protect the mother against anemia induced by monthly blood loss.
- Virtually all women can exclusively breastfeed for six months. Only in cases of extreme deprivation are women unable to produce enough milk to fully breastfeed. Where food is in short supply, it should be given to the mother; that way, two can eat. If given to the infant, only the infant eats.
- Exclusive breastfeeding saves families money.



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INDICATORS OF ADEQUATE
BREASTMILK INTAKE
(Early Postpartum Weeks)

1. Audible swallowing during a feeding.
2. Breasts full before feeding and softer afterwards.
3. Let-down sensation in mother's breasts.
(It is normal for some women not to feel this.)
4. Wet nappies/diapers: 6 or more/24 hours.
5. Bowel movements: 4-8 in 24 hours.
6. Contented baby between feeds.
7. Average weight gain:
18-30 grams/day (3/4-1 ounce/day)
125-210 grams/week (4-7 ounces/week)



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INCREASING MILK SUPPLY

- Moist heat to breasts 3-5 minutes before feeding.
- Massage breasts before and during feeding.
- Gently stimulate the nipple and areola.
- Feed or express milk frequently, 8-12 times in 24 hours.
- Relaxation techniques while feeding/pumping:
 - Deep breathing
 - Visual imagery of a pleasant place or of milk flowing to baby
 - Music or relaxation tape
- Express or pump milk between feedings.
- Eat a nutritious diet, following the Daily Food Guide for Breastfeeding Women.
- Drink to thirst each time you feed your baby or pump.
- Your weight loss should be no more than 2 - 4 pounds per month.
- It takes 4 - 7 days to see an increase in milk supply once you begin more frequent feeding or pumping.
- Keep a record of feedings/pumpings to monitor your situation.

ADDITIONAL INSTRUCTIONS

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**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Sessions Number 5 and 6: Observation exercise and post conference in neonatal ward

Learning Objectives

By the end of this session, the participants will be able to:

1. Recognize that health care providers are subject to their own culture and belief systems.
2. Define baby friendly and mother friendly.
3. Describe the practices observed which are baby and/or mother friendly.
4. List the practices that need to be improved.

Session 5

Time Allotted	Content	Methodology	Materials Needed	Evaluation
1.5 hours	<p>Participants go in trios to the newborn nursery and post-partum wards. They observe interactions, methods of care. One person takes the baby's point of view, one the mother's, and the third the health care provider's point of view.</p> <p>Half of the groups go to the nurseries and half to the ward. After 45 minutes they change places.</p> <p>(See learning activity guide #3)</p>	Observation	<p>Permission from institution authorities for observation experience and obtain access to classroom for post-conference.</p> <p>Wear clothing required by institution protocol (white lab coats, booties, etc.)</p> <p>Handout 27: Psychosocial and Cultural Aspects of Breast-feeding</p> <p>Handout 28: Current Knowledge About Skin to Skin (Kangaroo) Care for Preterm Infants</p>	<p>Participants are able to differentiate between practices and beliefs particular to Russia versus universals.</p> <p>Participants are able to discern positive and negative practices from the various points of view assumed.</p> <p>Participants are able to move from observing what is the current practice to discussing potential changes in practice.</p>

Trainer's Notes: Sessions 5 and 6

Students are sent in trios into the nursery for an observation experience. One student assumes the role of the nursery staff, one assumes the role of the new mother, and one assumes the role of the newborn. Keeping their individual assumed roles, they watch all that occurs in the nursery.

At the clinical post-conference of students, the three students respond to questions from the teacher and other classmates. Some of the things one would want to know include:

How did each of you feel?

Is this nursery a baby-friendly environment? Is it mother friendly?

Does this nursery operate for the efficiency and convenience of the staff?

Does this nursery operate for the comfort of the mother and infant?

Did you see baby bottles and pacifiers in use? If yes, why? How do you feel about that?

When an infant cries, how is it comforted? Is it given a bottle, pacifier, taken to its mother, diaper changed, other? How do you feel about how this was handled?

Do you feel this nursery environment is one of support for early and exclusive breastfeeding?

Did you see any client-provider counseling/education related to breastfeeding?

How could the support for breastfeeding be improved within the current physical environment?

Are there physical or structural changes which could be made in the nursery or postpartum ward to make these areas more baby and family friendly?

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3. What Information and Support About Breastfeeding Does a Mother Need Immediately After Delivery?

Learning Objectives

At the end of this lesson, you will be able to:

- ☐ State what breastfeeding information and skills a woman needs to learn after delivery.
- ☐ Identify what information on LAM and other family planning methods a woman needs to learn after delivery.
- ☐ Describe the information on maternal health a woman needs to learn after delivery about breastfeeding.
- ☐ Describe the information on infant health a woman needs to learn after delivery about breastfeeding.

What Help Does a Mother Need at the First Breastfeedings?

If the baby and mother have not begun breastfeeding on their own, it is very important for health workers to assist the mother to begin breastfeeding within an hour after birth. When the baby is delivered (after the cord has been cut and bound), place her or him on the mother's chest while waiting for the placenta to deliver. Breastfeeding soon after delivery causes uterine contractions which can decrease postpartum bleeding. The first breastmilk is called colostrum and is yellowish, not white, in color. Colostrum is the baby's first immunization (protection against childhood illnesses). It contains special immunization factors for infants and a laxative which helps them to pass their first bowel movement, called "meconium."

Assure mothers that the first breastfeeding is a trial run which may not go perfectly. The first few breastfeedings are a time for the mother and baby to learn something new. The mother will need to find the most comfortable positions for breastfeeding and the proper way to offer and support the breast for her newborn. The newborn needs to learn how to identify

and grasp the nipple. Assure the mother that it is normal if at first the newborn is not interested in breastfeeding, as she or he may be sleepy and not yet feeling hungry.



Encourage mothers while they breastfeed the first few times. New breastfeeding moms can get discouraged if they have difficulty. Many women feel that breastfeeding should come naturally, that she and her infant should be able to figure it out easily. When problems are encountered these women can feel that something is wrong with them or their infants. Information and an encouraging word from a health worker can go a long way.

How Often Should a New Baby be Fed?

Explain to mothers that they should breastfeed whenever the baby is hungry. For newborns this is about every one to two hours. At night there may be longer times between feeds, however feeding the infant at night is important to maintain and establish the mother's milk supply and to provide protection against pregnancy. Sleeping with the baby or having the baby nearby will make night feeds more convenient.

Holding the Baby

There are two different positions which are convenient for holding the baby during breastfeeding the cradle hold and the side hold. (See illustrations on the following pages.) Mothers can breastfeed while lying down, sitting or standing. Instruct mothers to try several different positions to find out which are most comfortable. Mothers should breastfeed infants in different positions early on so that the infant does not become accustomed to just one position.

Cradle Hold



The mother should lay the baby across her lap so that her or his face, chest, stomach and knees face her (see figure above). The baby's head rests in the bend of her elbow and her arm supports her or his back and buttocks. A pillow or blanket roll can be placed on the mother's lap to raise the baby up nearer to her breast.

Side Hold



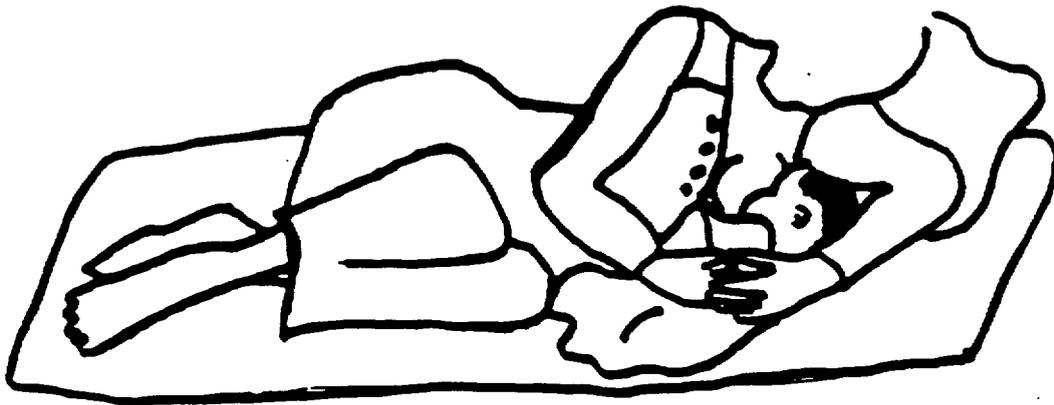
The mother is sitting up with her baby's head facing the breast and her or his body tucked under her arm at her side. The position gives the mother more control of the baby's head and she can see better as she latches the baby on to the breast. The baby's head is cradled in her hand while her forearm supports the baby's back.

Sitting



Breastfeeding while sitting can be comfortable (see figure above). The mother should make sure her back is supported to avoid back pain. Placing a pillow or blanket roll under the baby can bring the mother and baby closer together.

Lying in Bed

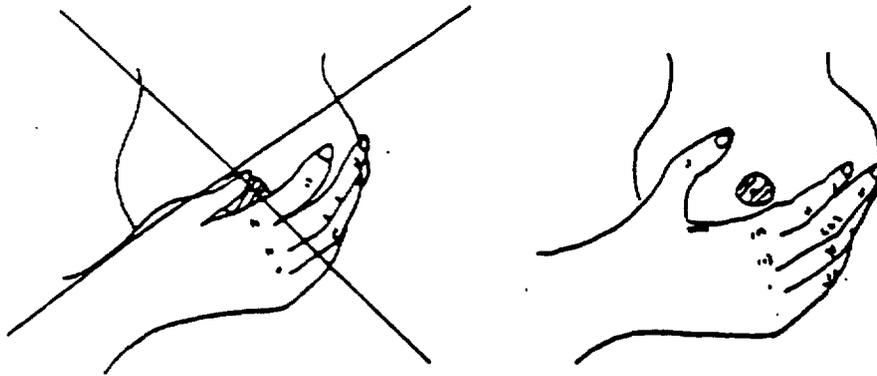


Lying in bed is a convenient position especially after delivery when a mother is tired. Later it is a convenient position when the baby wakes up at night.

Steps in Breastfeeding

Health workers should share the following information with mothers about breastfeeding:

- Place the baby in one of the positions described above or another if it is comfortable. You'll know that the baby is positioned correctly if you look down and see that the baby's ear, shoulder and hips are in line.
- If necessary, you can support your breast with your hand by placing your hand outside of the areola with four fingers cupping underneath your breast, while the thumb rests on top (see following figure).



Make sure your hand is not touching the areola. The baby will need to grasp both the nipple and areola. If she or he grasps the nipple alone it can cause nipple soreness. ♀

- Next, if needed to make the baby's mouth open wide, touch her or his lips and cheeks with your nipple. You may have to do this several times when you are first starting to breastfeed – touch gently, then wait and try again. Generally, if the baby is ready to breastfeed, this will not be necessary. When the baby's mouth opens wide like a yawn, pull her or him close to you. Position the baby's knees to your stomach and mouth on your breast so that her or his jaw goes past the nipple and onto the areola or breast. The baby's nose, flared lips and chin should all be touching the breast.
- Always bring the baby to the breast.



If the baby is grasping only the nipple or her or his mouth is not centered on the nipple, take the baby off the breast and reposition her or him. ♀

- If you should have to interrupt a feed or change your baby to your other breast, remember to break the suction first if the baby does not, as this helps prevent sore nipples. To break the suction, slip your clean finger along your breast and into the corner of the baby's mouth. After the suction has been broken you can easily remove the baby from your breast.
- Babies vary in the amount of time they want to feed. It is best if the baby finishes the first breast before switching to the second breast. This will help insure that the baby gets the two kinds of mother's milk, the "foremilk" and the "hindmilk." The first milk that comes out of the mother's breast is foremilk which is thirst quenching. Foremilk is followed after a few minutes by hindmilk which is thicker, higher in fat and calories, and takes longer to digest.
- It is preferable that at each feeding your baby suckle at each breast. When the baby is done feeding on one breast she or he should be burped and then placed on the other breast. If the baby only nurses from one side at a feeding, remember to start with the other breast at the next feed.

How Can I Help Mothers Who Have Had Cesarean Births Breastfeed?

Mothers who have had cesarean sections can breastfeed just as well as women who have vaginal deliveries. Because of the cesarean procedure and the anesthesia used, mothers may feel tired and have difficulty moving because of weakened stomach muscles. The hospital health worker should share the following information with women who have delivered by cesarean section:

- Remain in bed and use the side lying position for nursing.
- Use pillows behind your back and between your knees to support your incision site.
- Burp your baby by rolling, not lifting, your baby onto your chest and rubbing her or his back.
- It is all right for you to take medication that health workers recommend for pain. Although some of the medication will pass to your baby, it is not harmful. It may, however, make the baby sleepier than normal. The less strong the medication the better for the baby.
- Keep the baby in the same room with you. Have your partner or a relative or friend stay with you to carry the baby to you when it is time to nurse and to help care for the infant.

What Assistance in Breastfeeding Does a Mother of a Premature or Ill Baby Need?

Premature or ill babies have a special need for the nutrition and immunizing agents provided by mother's milk and for the physical closeness provided by breastfeeding. The milk produced by the mother is special and different from that produced by a mother who carries a baby to term. If the baby has to be separated from the mother and/or is unable to suck milk from the breast, the mother should be taught how to hand express milk. The milk that she expresses can then be given to the infant by a cup or spoon. Premature babies should be fed frequently, at least every one to two hours.

What Help Does a Mother of Twins Need to Breastfeed?

Assure the mother that she does have enough breastmilk to feed both infants. Then help her to find the most comfortable position to breastfeed her infants. Some women with twins prefer to feed both infants at the same time, others feed first one infant and then the other. Instead of switching breasts, each infant may feed from just one breast. Twins are a lot of work. Health workers should talk to mothers, their partners and families about how the family can help decrease the mother's workload so that she has time to rest and breastfeed.

What Help Does a Mother of an Infant with a Cleft Lip or Palate Need to Breastfeed?

Most babies with cleft lips and some with cleft palates can breastfeed successfully. Their mothers will need information from health workers on how to breastfeed their infant and they also will need the health worker's support and encouragement. The mother should try to breastfeed. If the baby has a cleft lip there is a chance that the breast will cover the cleft and there will be no difficulty. If the baby has a cleft palate, position the baby so she or he is more upright. This will make it less likely that the baby will choke. If it is not possible to breastfeed the baby, expressed breastmilk can be used. Sometimes it is necessary to use a nasogastric tube (a tube that is inserted through the nose into the stomach).

How Do Women Express Milk?



Every woman should learn to express milk since she may need to do this at home if her baby is sick, or if her breasts are engorged or she needs to leave her baby for several hours. ♀

Expressing milk is a technique that is useful not only to mothers of premature or sick infants. Mothers will also want to know this technique to relieve breast engorgement and leaking breasts, to stimulate milk production by draining the milk ducts adequately, and to leave breastmilk for the baby when the mother and baby must be separated.

Expressing milk by hand is effective, and it is the most inexpensive and convenient method. There are also hand, electric and battery breast pumps which work well but are not easily available. One hand pump, sometimes called a bicycle pump (see figure below), which may be available in some pharmacies (chemists), should not be used to collect breastmilk to feed

infants. Breastmilk collected by the bicycle pump can easily become contaminated, since the pump cannot be easily cleaned, and cause illness if given to an infant. The bicycle pump could be used to relieve breast engorgement, but the milk should be thrown away.

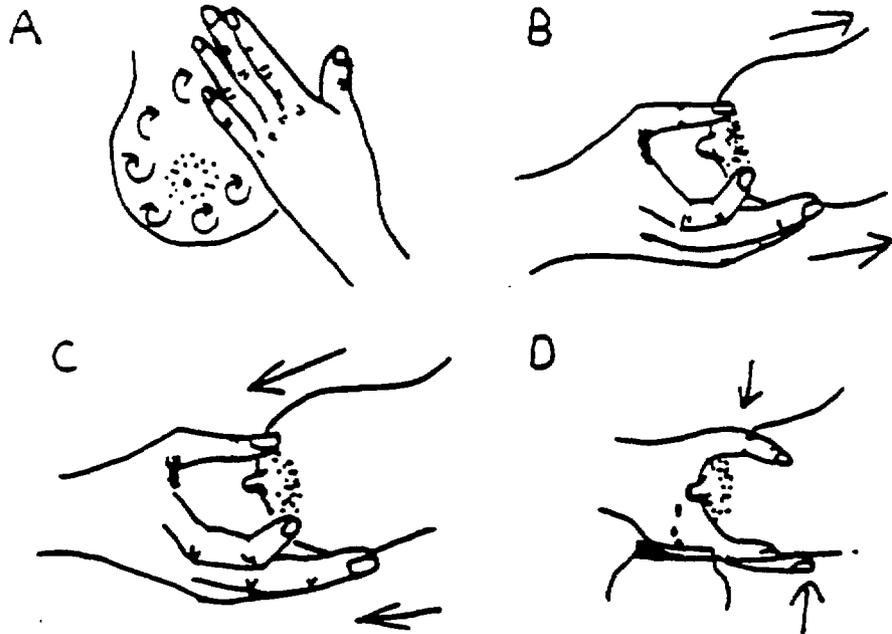


For expressing milk by hand, share the following information with the mother:

EXPRESSING MILK BY HAND

- * Prepare a glass, cup or jar with a wide mouth to collect the milk. Wash the container with soap and water and then let it dry in the sun. This can be done the day before, if the cup is covered while stored. If possible, just before expressing milk, fill the container with boiling water and let it sit for five to ten minutes. Pour the water out of the cup when you are ready to express milk.
- * Wash your hands before expressing milk, so that dirt and germs that could make your baby sick do not accidentally get in the milk.
- * For the milk to let down you will find it easier if you relax, hold your baby or think about your baby. Warming your breast with a hot compress or massaging your breast forward toward the nipple can help. It also helps you to relax if your husband or a family member or friend can massage your back and shoulders.
- * Massage the breasts, moving the hands in a circular motion. (See figure A following.)
- * Stimulate the nipples with your fingers and hand.
- * Get into a comfortable sitting or standing position.
- * Place or hold the container near your breast.

- * Hold the edge of your areola with your thumb above the nipple and your first finger below the nipple. Press your hand and breast towards your chest. (See figure B below.)
- * Next press the edge of the areola between the finger and thumb. Press and release. (See figure C below.) You may need to press and release several times before milk comes out. When it does come out it may drip out or come out in a stream. (See figure D below.)



Adapted from: *La Liga de la Leche Materna de Guatemala, Manual Para Monitoras en Lactancia Materna*, Guatemala City, Guatemala, 1992.

.....
 If your nipple becomes sore, check the position of your fingers. You may be holding your nipple, not your areola.

- * Next move your fingers so that they are pressing on the sides of the areola. Continue pressing and releasing. This is important as you need to stimulate and empty all the glands in your breast.
- * You should express milk from one breast for at least three to five minutes, until the milk flow slows, before switching to the other breast. You can switch your hand any time if your hand gets tired.
- * Switch breasts every three to five minutes, but continue expressing milk for 20 to 30 minutes.

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 7: Creating baby-friendly and family-friendly institutions

Learning Objectives

By the end of this session, the participants will be able to:

1. Discuss the WHO/UNICEF guidelines for baby friendly hospitals.
2. Compare the guidelines with policies noted during the observational experience.
3. Develop a strategy regarding what can be done to improve institutional sensitivity to wishes of families (or create a more baby-friendly and family-friendly institution).
4. Identify barriers to implementing the strategy to create a more baby-friendly and family-friendly institution.
5. Solicit the input of clients regarding their wishes regarding breastfeeding policy.

Session 7

Time	Content	Methodology	Materials	Evaluation
45 minutes	Utilizing the definitions developed in session #6, the group will explore/discuss ways of making health institutions more baby and family friendly. They will then identify barriers to making these changes.	Facilitated discussion with the large group. Group is informed that suggested changes and barriers identified will form the basis for developing an Action Plan later in training.	Chalkboard or sheet paper, tape, and markers. Handout 29: Baby Friendly Hospital Initiative Part I: European Action Plan	Participants are able to recognize ways in which care can be improved.
45 minutes	In groups of three, participants will develop a short questionnaire seeking clients desires regarding breastfeeding support/policy. (They will have an opportunity to utilize this questionnaire in the clinical situation in session # 11. Utilizing the questionnaire as a base, for homework, each will interview at least one person (man or woman) who is a parent regarding their experience with breastfeeding: - what were the positive parts of the breastfeeding experience? - who gave you support, advice, information? - what would have helped make it a better experience?	Interview or small focus group.	Handout 30: Baby Friendly Hospital Initiative Part II: Hospital Level Implementation Handout 31: Model Hospital Breastfeeding Policies for Full-Term Normal Newborn Infants Handout 32: Key Elements for Promotion of Breastfeeding In the Continuum of Maternal and Infant Health Care	Participants are able to create a questionnaire soliciting input from parents regarding their desires in care received

Session 7 (cont.)

Time Allotted	Content	Methodology	Materials Needed	Evaluation
			Handout 33: Maternal Assistance and Support in Labor: Father, Nurse, Midwife, or Doula? Pens and paper. Break out room(s).	

Trainer's Notes: Session 7

The groups should use the following information as a part of the basis for their discussions:

Excerpts from the Baby Friendly Hospital Initiative - Hospital Implementation

The Global Criteria: Summary of 10 Steps

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breastfeeding.
4. Help mothers initiate breastfeeding within a half-hour of birth.
5. Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breastmilk, unless medically indicated.
7. Practice rooming-in -- allow mothers and infants to remain together -- 24 hours a day.
8. Encourage breastfeeding on demand.
9. Give no artificial teats or pacifiers (also dummies or soothers) to breastfeeding infants.
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Policy Issues:

Evaluation of institutional situation and barriers to creating baby and family friendly institutions:

- existing decrees, standards which are not baby or new mother or family friendly.
- possible need for sharing international research with staff to convince staff of safety of non-separation of mothers/infants, no need to disinfect nipples, et cetera and sharing of other countries research results.
- need to reorganize space on ward to permit optimal mother/infant contact (This is not knocking down walls but usually rather reorganizing minds on how use of current space can be modified.

Service Issues:

- Determine how all personnel will be trained and on what schedule.
- Determine how client records are to be kept so that 1) clients receive good care, and 2) enough/appropriate information is kept that service indicators can be tracked for program evaluation.

- Determine need for new counseling, IEC, and client education materials for staff and client (e.g. perhaps a breast diagram for post-partum ward, client information pamphlets on use of LAM or solution of common breastfeeding problems, etc.)

Review discussions and findings from the observations in the nursery and postpartum ward. Ask persons from other institutions to describe the situation in their institutions.

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 8: Role plays of counseling breastfeeding women

Learning Objectives

By the end of this session, the participants will be able to:

1. Provide practical, correct advice to breastfeeding women.
2. Assist mothers with the common problems related to breastfeeding.
3. Present information in a caring sensitive manner.

Session 8

Time Allotted	Content	Methodology	Materials Needed	Evaluation
20 minutes	<p>Participants are assigned a client situation for which they must develop a role play of a counseling session. Situations addressed include:</p> <ol style="list-style-type: none"> 1. mother with cesarian section (immediate and 24 hr. postpartum) 2. need to express milk while at work 3. mother with cracked, sore nipples 4. mother with flat nipples and severe engorgement 	<p>Small group work to develop role play.</p>	<p>Break out room for small groups to work.</p> <p>Sheet paper, tape, and markers.</p> <p>Handout 22: Hand Expression of Breastmilk</p> <p>Handout 23: Milk Storage</p> <p>Handout 24: Mechanical Milk Expression</p>	<p>Participants use the principles of counseling taught in session # 4 including checking the client's knowledge base.</p> <p>Participants show knowledge of management of common problems related to breastfeeding.</p> <p>Post test.</p>
70 minutes	<ol style="list-style-type: none"> 5. mother with twins 	<p>Small groups put on their role play. Large group critiques quality of counseling.</p>	<p>Sheet paper, tape, and markers</p>	

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 9: Lactational Amenorrhea Method (LAM): Scientifically Sound and Practical

Learning Objectives

By the end of this session, the participants will be able to:

1. List the three essential criteria for utilizing LAM as a family planning method.
2. Discuss how the LAM algorithm is used for clinical management.
3. Define the level of breastfeeding required for effective utilization of LAM as a family planning method.
4. Discuss the options for complementary family planning methods for use after six months postpartum.
5. Discuss the advantages and limitations of LAM as a family planning method.
6. Identify barriers to integration of LAM into MCH/FP services.

Trainer's Notes: Session 9 Lactational Amenorrhea Method

LAM is the abbreviation for Lactational Amenorrhea Method. This is a temporary post-partum form of family planning which is 98% effective during the first six months post delivery if:

- the woman is fully, or nearly fully, breastfeeding day and night (not giving the infant any other regular supplement of liquid or food).
- the woman is not menstruating (bleeding before 56 days is not considered menstrual bleeding).
- the infant is less than six months old.

Breastfeeding is important not only for the health benefits for the mother and infant, but also for the family planning benefits when she is fully breastfeeding.

Historically the definitions describing breastfeeding have been confusing and imprecise. It is important that participants are clear on these definitions in order to counsel women properly. The key definitions which are increasingly used as a standard are:

Breastfeeding- a method of feeding an infant from the milk of a mother's breast. It is most often the mother, although sometimes another woman called a "wet nurse" is used.

Exclusive Breastfeeding- the practice of feeding an infant only breast milk, no other liquid or solid is given.

Fully Breastfeeding- includes the practices of both exclusive and early exclusive breastfeeding.

Almost Exclusive Breastfeeding- the infant is only given small quantities (no more than once or twice a day and no more than one or two swallows) of liquids or solids other than breast milk.

Nearly Fully Breastfeeding- the vast majority of the feeds are breastfeeds, with no intervals greater than six hours between breastfeeds.

Lactational Amenorrhea- the absence of menstrual periods during the time that a woman is breastfeeding.

Handout # 34 p. 96.

It is important that women are offered LAM as an option for family planning when counseling for all methods is given. There are a number of very practical advantages for women using this method. It doesn't cost anything. There is nothing which must be inserted, swallowed, injected, or implanted. It doesn't damage the environment. It doesn't have harmful side effects for mother or baby. It is reversible. The key to effective use of LAM as a method, is excellent breastfeeding counseling.

Handout # 35 p. 969 algorithm for use of LAM as a family planning method.

Handout # 36 p. 14.

Handout # 36 pp.18-19. After six months, the preferred family planning choices for women who are still lactating are:

Non Hormonal contraceptive methods compatible with breastfeeding:

- Condom
- IUCD
- Natural Family Planning
- Vaginal Spermicides
- Diaphragm
- Voluntary Surgical Contraception

Hormonal contraceptive methods which are compatible with breastfeeding:

- Progestin-only pills
- Progestin-only Injectables
- Norplant

Policy Issues:

Evaluation of institutional situation and barriers to implementation of the LAM into MCH/FP services.

- existing decrees, standards which are not baby or new mother or family friendly.
- possible need to convince staff of the value and effectiveness of LAM.
- lack of optimal breastfeeding practices to enhance the effectiveness of LAM.
- is record keeping adequate to monitor if you have successfully integrated LAM into your services? (need for new columns on statistical reports, need for revision of client record to assure that LAM statistics are being kept, need to include LAM as an option on counseling sheets).

Service Issues:

Lack of training of staff?

Are client records are to be kept so that 1) clients receive good care, and 2) enough/appropriate information is kept that service indicators can be tracked for program evaluation? If not, is it a barrier?

Do you have need for new counseling, IEC, and client education materials for staff and client (e.g. perhaps a breast diagram for post-partum ward, client information pamphlets on use of LAM or solution of common breastfeeding problems, etc.) Is it a barrier to have inadequate education materials?

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 10: Counseling session on post-partum ward: Teaching supportive breastfeeding techniques and teaching LAM to mothers, couples

Learning Objectives

By the end of this session, the participants will be able to:

1. Counsel women to use LAM as a highly effective family planning option.
2. Provide constructive critique to colleagues on their counseling techniques.

Session 10

Time Allotted	Content	Methodology	Materials Needed	Evaluation
60 minutes	<p>Participants visit the post-partum wards and counsel individual mothers regarding LAM as a family planning method including breastfeeding advice regarding exclusive breastfeeding.</p>	<p>Participants do counseling at the bedside or in the common room with postpartum women or antenatal women.</p>	<p>Sheet paper, tape, markers Breast model or diagram</p>	<p>Quality of teaching observed.</p>
30 minutes	<p>Several participants administer the questionnaire developed in session #7. These findings are also used in post-conference to enrich the discussion as it focuses on women's desires.</p>	<p>Post-conference The group provides constructive feedback on the quality of counseling/teaching offered.</p>		<p>Utilizes counseling principles covered in session #3.</p>

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 11: Discussion: How to integrate LAM and baby/family-friendly breastfeeding practices into ongoing family-planning and post-partum services. How to monitor and evaluate these service activities.

Learning Objectives

By the end of this session, the participants will be able to:

1. Identify and select breastfeeding and LAM service indicators to monitor and evaluate whether LAM and baby and family-friendly practices are being successfully implemented.
1. Construct an action plan for integration of baby/family-friendly breastfeeding practices and LAM into the institutional environment including:
 - a review of record keeping to include LAM and breastfeeding practices
 - a review of counseling and education sessions for breastfeeding and LAM to make certain these topics is well integrated
 - consider how client information might be developed, e.g. pamphlets, poster, etc.
 - specific activities to make the health institution more baby and family friendly (using activities identified in Session 7 to make institutions more baby and family-friendly)

Session 11

Time Allotted	Content	Methodology	Materials Needed	Evaluation
20 minutes	Service Indicators for breastfeeding and LAM -selection of indicators by group -how to collect of data -reevaluate indicator if cannot collect data	Guided discussion	Copies of antenatal, intrapartum, post partum, and family planning records from each institutional in which participants practice	Quality of action plans developed
50 minutes	The participants with assistance from the trainers, develop an action plan for implementation of LAM and creation of a more baby and family friendly environment into MCH and FP services. Issues to address include: <u>LAM</u> - record keeping -modifying counseling sessions - modifying or creating patient pamphlet, etc. <u>Baby friendly</u> - using ideas and suggestions made during Session 7, identify activities or changes to make in the health institution for a more baby and family friendly institution	Small groups are formed of participants from the same institution *The groups develop Action Plans to create more baby/family friendly institutions and integrate LAM into MCH/ FP services, using suggestions for changes (from Session 7) and the barriers identified. Indicators included. The highlights of each Action Plan are shared with the whole group.	Handout 37: Breastfeeding and Child Spacing Sheet paper, tape, and markers Sample Action Plan format	
20 minutes		Discussion		

* Integration of LAM into MCH/FP services may begin immediately but is optimized by a Baby Friendly environment. Making an institution "Baby Friendly" is a longer term goal but very important.

Trainer's Notes Session 11

The participants are divided into groupings by institution. As a group they develop an action plan for the integration of LAM and enhanced breastfeeding in their institutions. Components of the plan developed should include the following items which were also discussed in Sessions 7 and 9:

Policy Issues:

Evaluation of institutional situation and barriers to implementation of the program.

- existing decrees, standards which are not baby or new mother or family friendly.
- possible need for local studies to convince staff of safety of non-separation of mothers/infants, no need to disinfect nipples, et cetera and sharing of other countries research results.
- need to reorganize space on ward to permit optimal mother/infant contact (This is not knocking down walls but usually rather reorganizing minds on how use of current space can be modified.
- address record keeping issues (need for new columns on statistical reports, need for revision of client record to assure that LAM statistics are being kept, need to include LAM as an option on counseling sheets).

Service Issues:

Determine how all personnel will be trained and on what schedule.

Determine how client records are to be kept so that 1) clients receive good care, and 2) enough/appropriate information is kept that service indicators can be tracked for program evaluation.

Determine need for new counseling, IEC, and client education materials for staff and client (e.g. perhaps a breast diagram for post-partum ward, client information pamphlets on use of LAM or solution of common breastfeeding problems, etc.)

Setting up a monitoring and evaluation plan which can give feedback to service providers as well as policy makers.

It is important to be able to determine if your program is successful. The following are indicators which can serve as monitoring tools for breastfeeding and LAM services.

Service Output Indicators:

Exclusively breastfed by natural mother rate.

Breastmilk substitutes and supplies receipt rate.

Rooming in rate.

Breastfed rate at (x weeks or months).

Timely first suckling rate within first hour of life.

Exclusively breastmilk fed rate .

Bottlefed rate.

Pacifier use rate.

Number of women who respond that LAM was one of the family planning methods offered as an option.

Number of women selecting LAM as their postpartum method.

Number of women who have selected LAM as their family planning method at the time of discharge from the hospital.

ACTIVITY	WHO RESPONSIBLE	DATE TO BE COMPLETED	MONITOR. & EVALUATION TOOLS (INDICATORS)	WHERE COLLECT DATA	WHO AND WHEN TO COLLECT DATA

**SEATS/MotherCare Russia
Breastfeeding and LAM Training**

Session Number 12: Post-conference, wrap-up, post-test.

Learning Objectives

By the end of this session, the participants will be able to:

1. Clarify any issues which are not clear.
2. Begin to articulate how the new materials can be adapted and adopted to suit their needs.

Session 12

Time Allotted	Content	Methodology	Materials Needed	Evaluation
30 minutes	Review any content area not covered well or found to be confusing.	Questions and Answers	None	Participants seem satisfied that all is covered in sufficient detail.
30 minutes	Post-test	Written post test	Test	Final evaluation form.
30 minutes	Discussion of how to integrate new material into their own programs and services.	Facilitated discussion		Participants are able to articulate how they plan to adapt and adopt the new materials including a monitoring and evaluation plan (see trainer's notes session 10).

4. Colostrum is

Yellowish tinged due to the high beta-carotene content.	True	False
Rich in antibodies.	True	False
Has low cholesterol levels.	True	False
Produced at about the rate of 250 cc in the first 24 hours.	True	False

5. Transitional milk

Is produced approximately 7 to 14 days post-partum.	True	False
Has rising levels of immunoglobulins and protein.	True	False
Varies widely in composition over 24 hours.	True	False
Water soluble vitamins decrease and fat soluble vitamins increase.	True	False

6. Indicators of adequate breastmilk intake in the early post-partum weeks include

Four or more wet diapers in twenty-four hours.	True	False
Four to eight bowel movements in twenty-four hours.	True	False
An average weight gain of 125-210 grams (4-7 ounces) per week.	True	False
Audible swallowing during a feeding.	True	False

7. Ways to help mothers increase their milk supply include

Massage the breasts before and during feeding.	True	False
Apply cold compresses to the breast 3-5 minutes before feeding.	True	False
Take a drink every time you feed your baby or pump.	True	False
Breastfeed or express milk frequently, 8-12 times in 24 hours.	True	False

8. Policies which promote baby-friendly hospitals include

The infant is encouraged to nurse at least 8-12 times in 24 hours.	True	False
Pacifiers are used to help keep the baby comforted between feeds.	True	False
The mother is given a can of formula when she is discharged.	True	False
Babies are kept with their mothers 24 hours per day.	True	False

9. To use the Lactational Amenorrhea Method (LAM) as a family planning method it is necessary that

The baby be under four months of age.	True	False
The mother is exclusively or almost exclusively breastfeeding	True	False
The mother's menstrual periods have not resumed.	True	False
The baby weighs at least three kilos at birth.	True	False

10. Advantages of using Lactational Amenorrhea Method include

It is free.	True	False
It can be practiced anywhere.	True	False
It does not effect the quality of breast milk production.	True	False
It is 98% effective for the first year of life if the baby is exclusively breastfed.	True	False

11. If women are no longer exclusively breastfeeding, the better family planning choices for her are

Condoms	True	False
Combination birth control pills	True	False
Spermicides	True	False
Injectibles	True	False
Subdermal implants	True	False

12. Evaluate the following statements

UNICEF estimates that breastfeeding saves at least 6 million infants lives per year.	True	False
Women with inverted nipples are physically unable to breastfeed.	True	False
Breastfeeding causes suppression of ovarian follicle development.	True	False
Lactational Amenorrhea Method can be used if the mother breastfeeds at least 75% of the time.	True	False
Almost exclusive breastfeeding means vitamins, mineral water, juice, or ritualistic feeds are given infrequently in addition to breastfeeds.	True	False

Each correct answer receives 2 points for a possible total of 100 points.

SEATS/MotherCare Russia
Breastfeeding and LAM Training
Pre/post Test

Name _____

Date _____

Circle the best answer for each of the following questions.

1. The following mothers should continue to breastfeed.

- | | | |
|---|------|-------|
| Those mothers with clogged ducts. | True | False |
| Those mothers who are HIV positive. | True | False |
| Mothers who are pregnant again. | True | False |
| Mothers who are ill with the influenza. | True | False |

2. Normal breast changes during pregnancy include:

- | | | |
|---|------|-------|
| Increase in sprouting, branching, and lobular formation of ducts. | True | False |
| A rise in prolactin and a decrease in progesterone. | True | False |
| Secretion of colostrum. | True | False |
| An increase in size and weight. | True | False |

3. Human milk

- | | | |
|--|------|-------|
| Is composed of over 200 constituents. | True | False |
| Remains constant in its makeup. | True | False |
| Has 3 stages of development-colostrum, transitional, and mature. | True | False |
| Has less lactose than cow's milk. | True | False |

4. Colostrum is

Yellowish tinged due to the high beta-carotene content.	True	False
Rich in antibodies.	True	False
Has low cholesterol levels.	True	False
Produced at about the rate of 250 cc in the first 24 hours.	True	False

5. Transitional milk

Is produced approximately 7 to 14 days post-partum.	True	False
Has rising levels of immunoglobulins and protein.	True	False
Varies widely in composition over 24 hours.	True	False
Water soluble vitamins decrease and fat soluble vitamins increase.	True	False

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Four to eight bowel movements in twenty-four hours.	True	False
An average weight gain of 125-210 grams (4-7 ounces) per week.	True	False
Audible swallowing during a feeding.	True	False

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Take a drink every time you feed your baby or pump.	True	False
Breastfeed or express milk frequently, 8-12 times in 24 hours.	True	False

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Pacifiers are used to help keep the baby comforted between feeds.	True	False
The mother is given a can of formula when she is discharged.	True	False
Babies are kept with their mothers 24 hours per day.	True	False

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Almost exclusive breastfeeding means vitamins, mineral water, juice, or ritualistic feeds are given infrequently in addition to breastfeeds.	True	False

Each correct answer receives 2 points for a possible total of 100 points.

Glossary/terms

An extensive glossary can be found at the back of the publication:

Institute for Development Training, Training Course in Women's Health. (1993). Module 7. Breast-feeding and the Lactational Amenorrhea Method of Family Planning, 2nd Edition. Chapel Hill, North Carolina

The most important terms for use here include:

Breast-feeding terms:

Breast-feeding- a method of feeding an infant from the milk of a mother's breast. It is most often the mother. although sometimes another woman called a "wet nurse" is used.

Exclusive Breast-feeding- the practice of feeding an infant only breastmilk, no other liquid or solid is given.

Fully Breast-feeding- includes the practices of both exclusive and early exclusive breast-feeding.

Almost Exclusive Breast-feeding- the infant is only given small quantities (no more than once or twice a day and no more than one or two swallows) of liquids or solids other than breastmilk.

Nearly Fully Breast-feeding- the vast majority of the feeds are breastfeeds, with no intervals greater than six hours between breastfeeds.

Lactational Amenorrhea- the absence of menstrual periods during the time that a woman is breast-feeding.

Lactational Amenorrhea Method (LAM)- a postpartum family planning method. A woman who is breast-feeding fully or nearly fully, not having her monthly period, and has delivered within the past six months is 98% protected from pregnancy.

Other:

Evaluation- a review of your program to see if you were successful. This often means seeing a change in behavior, attitude, skill, or knowledge.

Impact- the result achieved by your intervention/training. This might be an improved attitude, new knowledge, or a new skill.

Informed choice or consent- the person has enough background information to consider all options and then chooses the best option for him or herself without pressure from others.

Objective- a statement of what you plan to do or achieve. Objectives are stated as you plan your training as they help you to stay focused. They are also used after the training to evaluate whether or not you have been successful.

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Optional Participatory Activity Which Might be Tried with Various Audiences.

Activity #1

Do a visualization activity with students. Turn out the lights, invite students to get as comfortable as possible, eliminate extraneous noise. Have them close their eyes, breathe deeply, and relax a few moments. In a "crooning" soft voice invite students to think of the perfect breast. Say to them- (Keep the pace very slow.)

Think about what the perfect breast looks like. What does this breast look like?

What temperature is it?

What is the shape? Size?

Notice the skin. What is the texture? Color?

Is it a male or female breast you see?

What does the nipple look like? How does it feel? Run your fingers over it in your mind.

Does this breast have milk in it?

Is it a healthy breast?

Add other questions.....

Invite the students to slowly sit up straight, a few more deep breaths, and turn the lights back on.

Invite the students to share their observations. The teacher now leads a guided discussion. Points you may be interested in include:

What do these observations tell us about our culture?

Do we view the breast in a healthy way?

How are our views of the breast effected by mass media, our individual ages, whether or not we have breastfed ourselves, our knowledge of environmental pollutants in our oblast, etc?

Wrap up:

While respecting each individual's contribution, during the summary we want to make linkages between the students feelings and observations with caring for women in our communities. Some of these summary points might include:

- We and our clients have a very personal relationship with our breasts and diverse feelings about them.
- We often worry about what is normal and need information and reassurance as to what are normal changes throughout the life cycle including puberty, pregnancy, lactation, using various family planning methods, and menopause. We need to know about breast self exam, periodic mammograms, breast care during pregnancy and lactation.
- Women are adults who come to our classes or counseling sessions with a lot of life experience. We need to hear from them what they already know as well as what more they would like to know.
- What other points would you like to make in this session?

Optional Participatory Exercise Which Might be Tried with Various Audiences.

Activity #2

Ask the students to take paper and markers/crayons home with them. They are to ask up to three people (no restrictions on sex, age, schooling, etc.) to draw a picture of a women's breast both non-lactating and lactating. These are the only instructions they give to the artist.

On the back of the paper the student records the sex, age, and level of education of the artist, and whether or not the person has ever breastfed (or partner has breastfed). This information is not shared with the classmates.

At the next class the pictures are hung around the room. Students walk around the room and develop their own opinions of which are drawn by men/women, youth/adults, breastfeeders/non-breastfeeders, etc.

The teacher now leads a guided discussion. Points you may be interested in including:

- Who pictures the outside of the breast versus the inside?
- How do men differ from women? Youth from adults? Breastfeeders from non-breastfeeders?
- Do we look at an idealized image or individual more real images?
- What does the choice of colors used in the drawings tell us?
- What does this tell us about our culture?
- What does it tell us about our attitudes towards breastfeeding?
- Do these pictures convey health or illness? Pride? Other attitudes?

Wrap up:

While respecting each individual's contribution, during the summary we want to make linkages between the students feelings and observations with caring for women in our communities. Some of these summary points might include:

- We and our clients have a very personal relationship with our breasts and diverse feelings about them.
- We often worry about what is normal and need information and reassurance as to what are normal changes throughout the life cycle including puberty, pregnancy, lactation, using various family planning methods, and menopause.
- Women are adults who come to our classes or counseling sessions with a lot of life experience. We need to hear from them what they already know as well as what more they would like to know.
- What other points would you like to make in this session?

Because breastfeeding is an issue that can be addressed at multiple entry points of the health care system, the United States federal Department of Health and Human Services has developed guidelines to support the practice of breastfeeding in the context of the U.S. health care system. Though parts are not applicable within the Russian system with extended post-partum in hospital care, it does help to present many of the elements of care we may utilize to maximize our teaching opportunities in offering breastfeeding support.

Key Elements for Promotion of Breastfeeding
In the Continuum of Maternal and Infant Health Care

1. Primary-care settings for women of childbearing age should have:
 - . a supportive milieu for lactation
 - . educational opportunities (including availability of literature personal counseling, and information about community resources) for learning about lactation and its advantages
 - . ready response to requests for further information
 - . continuity allowing for the exposure to and development over time of a positive attitude regarding lactation on the part of the recipient of care.
2. Prenatal-care settings should have:
 - . a specific assessment at the first prenatal visit of the physical capability and emotional predisposition to lactation. This assessment should include the potential role of the father of the child as well as other significant family members. An educational program about the advantages of and ways of preparing for lactation should continue throughout the pregnancy
 - . resource personnel- such as nutritionists/dietitians, social workers, public health nurses, La Leche League members, childbirth education groups-for assistance in preparing for lactation
 - . availability and utilization of culturally suitable patient-education materials.
 - . Availability and utilization of culturally suitable patient-education materials.
 - . An established mechanism for a predelivery visit to the newborn care provider to ensure initiation and maintenance of lactation
 - . A means of communicating to the in-hospital team the infant feeding plans developed during the prenatal course.
3. In-hospital settings should have:
 - . A policy to determine the patient's infant-feeding plan on admission or during labor
 - . A family- centered orientation to childbirth including the minimum use of intra-partum medications and anesthesia.
 - . A medical and nursing staff informed about and supportive of ways to facilitate the initiation and continuation of breastfeeding (including early mother-infant contact and ready access by the mother to her baby throughout the hospital stay)
 - . The availability of individualized counseling and education by a specially trained breastfeeding coordinator to facilitate lactation for those planning to breastfeed and to counsel those who have not yet decided about their method of infant feeding.
 - . Ongoing in service education about lactation and ways to support it. This program should be conducted by the breastfeeding coordinator for all relevant hospital staff.
 - . Proper space and equipment for breastfeeding in the postpartum and neonatal units. Attention should be given to the particular needs of women breastfeeding babies with special problems.
 - . The elimination of hospital practices/policies which have the effect of inhibiting the lactation process, e.g. rules separating mother and baby.
 - . The elimination of standing orders that inhibit lactation, e.g. lactation suppressants, fixed

Key Elements for Promotion of Breast-feeding
in the Continuum of Maternal and Infant Health Care (continued)

- . The development of policies to support lactation throughout the hospital units (e.g. medicine, surgery, pediatrics, emergency room, etc.)
- . The provision of continued lactation support for those infants who must remain in the hospital after the mother's discharge.
- 4. Post-partum ambulatory setting should have:
 - . A capacity for telephone assistance to mothers experiencing problems with breast-feeding
 - . A policy for telephone follow-up 1-3 days after discharge
 - . a plan for an early follow-up visit (within first week after discharge)
 - . The availability of lactation counseling as a means of preventing or solving lactation problems
 - . Access to lay support resources for the mother.
 - . The presence of a supportive attitude by all staff.
 - . A policy to encourage bringing the infant to postpartum appointments.
 - . the availability of public/community -health nurse referral for those having problems with lactation.
 - . A mechanism for the smooth transition to pediatric care of the infant, including good communication between obstetric and pediatric care providers.

From *Report to the Surgeon General's Workshop on Breast-feeding and Lactation*. Presented by US Department of Health and Human Services, June 11 and 12, 1984, DHHS pub. No HRS-D-MC, 84-2.

Maternity Care Programs: Saving the Lives of Women and Newborns

Reducing the 500,000 maternal deaths by half by the year 2000 is the primary goal of Safe Motherhood programmes. If effective, such programmes are likely to reduce also the 7 million perinatal deaths by a third to a half, reduce other problems resulting from the perinatal period such as cerebral palsy that affects over 2 million children annually, decrease acute pregnancy-related morbidities suffered by over 50 million women, as well as chronic long-term disabilities (e.g., fistula, prolapse) now burdening millions more women.

An example of a successful maternal care programme is the Matlab Maternity Care Project in rural Bangladesh where maternal mortality declined substantially over the past ten years. Project elements include effective community-based family planning which reduced mortality by decreasing the total numbers of pregnancies. Added to this was a maternity care programme which trained midwives who assisted women with births in their homes if requested. The midwives provided prenatal care, carried supplies to stabilize or treat women with obstetrical complications, and had access to transport and referral services for cases they could not manage in the home. This maternal care programme reduced the risk of dying once pregnant (maternal mortality ratio) by two thirds. The combination of basic family planning and maternal care cut the maternal mortality rate by more than half (Fauveau *et al.* 1991).

Other projects have contributed to our knowledge of effective or ineffective programme elements aimed at reducing maternal and perinatal mortality and related morbidities. Examples include:

- In Indonesia and the Gambia, trained traditional birth attendants (TBAs) alone, without the support of skilled back-up services, did not decrease the risk of maternal mortality once pregnant (maternal mortality ratio) (Alisjahbana 1991; Greenwood *et al.* 1987; Greenwood 1991).
- In Ethiopia, maternity waiting homes (homes located close to a referral facility where high risk pregnant women can go when near to term) contributed to maternal mortality reduction when communities participated in their planning, development and management (Poovan *et al.* 1990).
- In Zaire, women's lives were saved by delegating responsibility from medical doctors to obstetric nurses to perform essential obstetric care (e.g., Caesarian section, repair of ruptured uterus) in places where there were no or insufficient numbers of physicians (White *et al.* 1987).

Learning from these and other projects, the specific elements of a maternity care programme that can contribute to reducing mortality include:

- * **Information/Education and Communications** aimed at
 - increasing appropriate and timely use of services—family planning, prenatal, delivery and postpartum care;

appropriate use of maternity care. Between these two extremes are places where women access public health facilities (e.g., health centers with medical assistants and nurses) for prenatal and child care, but only infrequently use such facilities for delivery. Enhancing and coordinating the available services and communicating with women and families about appropriate and timely use of services is the best strategy in these areas.

Among these three types of setting examples, the most cost-effective effort is the last--where a public health system already exists but is little used for delivery care: strengthening this system would cost approximately \$1,000 per maternal and perinatal death averted.

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December 14, 1992

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**MATERNAL AND INFANT MORTALITY:
A Global Overview**

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This is one of the technical background papers prepared for the International Conference on Better Health for Women and Children through Family Planning, held in Nairobi, Kenya, October 5-9, 1987.

The views expressed in this paper are those of the authors and do not necessarily reflect the views of the World Health Organization.

Maternal and Infant Mortality: A Global Overview

Introduction

The health of women and children forms a continuum from one generation to another. It reflects not only the vulnerabilities inherent in the biological and behavioural aspects of reproduction, growth, development and maturation, but also the social, ecological and historical situation of societies. The successful and healthy transition from one critical stage of life to the next is enhanced in societies that have made a commitment to social justice and provide a minimum level and appropriate distribution of resources for health and social development. The health of women and children is threatened by imbalances in the distribution and access to resources, by discrimination against women and illiteracy. Social changes such as urbanization, economic crises, and natural and man-made disasters all leave an imprint on the health of women and children.

The Status of Women

Women's life long health can be compromised by discriminatory treatment in childhood. Traditionally many cultures prefer male children. Sons are perceived as an economic asset to the family, contributing productive labour. Girls on the other hand are seen as a burden, who often have to be provided with a costly dowry and whose economic productivity will benefit their husband's family rather than that of their parents. Sons usually have the main responsibility for the care of their parents in old age. Girls may get less food, be sicker before they are taken for curative health care, and receive less preventive health care. Evidence of such practices include poorer nutritional status of girls than boys, fewer girls than boys immunized, higher case fatality among girls brought to hospital, and higher mortality overall. (Table 1) Significantly where women's economic productivity is high, the preference for sons is less pronounced.

Women's education is also an important determinant of their own health and that of their children. In every economic setting the children of literate women have a better chance of survival than those of illiterate women. Educated women tend to marry later, delay the onset of childbearing and are more likely to practice family planning. They generally have fewer children with a wider spacing between births. Women with no schooling, on

average have almost twice as many children as those with seven or more years schooling.¹

TABLE 1. INFANT, TODDLER AND CHILD MORTALITY RATES, RATIOS (M/F) and PREFERENCE FOR SEX OF CHILDREN

<u>Country</u>	<u>Infant</u>	<u>Toddler</u>	<u>Child</u>	<u>Index of Son Preference</u>
Senegal	1.16	0.99	1.00	1.5
Nepal	1.03	0.89	0.95	4.0
Bangladesh	1.03	0.73	0.84	3.3
Pakistan	1.05	0.63	0.68	4.9
Cameroon	1.07	1.04	0.99	1.2
Egypt	1.01	0.71	0.94	1.5
Turkey	1.10	0.62	0.94	1.4
Ivory Coast	1.24	1.19	1.11	1.2
Indonesia	1.30	1.15	1.31	1.1
Morocco	1.06	0.88	1.11	1.2
Kenya	1.10	1.17	1.02	1.1
Ghana	1.22	1.15	0.95	1.0
Colombia	1.19	0.75	0.83	1.0
Tunisia	1.02	1.05	1.25	1.3
Mexico	1.25	0.86	0.88	1.2
Thailand	1.08	1.42	0.65	1.4
Syria	0.92	1.05	0.64	2.3
Sri Lanka	1.24	0.68	0.87	1.5
Jordan	0.85	0.81	0.99	1.9
Venezuela	1.27	1.14	0.90	0.8
Fiji	1.19	0.92	1.04	1.3
Jamaica	1.36	1.07	1.17	0.7
Malaysia	1.31	1.41	1.19	1.2
Portugal	1.49	1.52	0.59	1.0

Source:²

- Notes: a) Countries are ordered by level of under five mortality
 b) Index of son preference (from the World Fertility Survey) - Ratio of the number of mothers who prefer the next child to be male to the number of mothers who prefer the next child to be female

In many parts of the world a woman's status is directly dependent on her fertility; the larger her family the higher her social status. The more educated women become, the greater their economic independence and their participation in decision-making, and the lesser their need to affirm their status through childbearing.

Maternal mortality and morbidity

During their adult years women's health is closely linked and affected by their reproductive role. In the absence of family planning women can spend the majority of their adult years pregnant or lactating. For women in most developing countries, pregnancy carries with it a very real risk of dying. In some rural areas pregnancy-related causes account for one in two deaths of women in the reproductive ages.

Each year at least half a million women die from causes related to pregnancy and childbirth.³ All but about 6,000 of these deaths occur in developing countries. (Table 2) Maternal mortality rates are highest in Africa, with community rates of up to 1000 per 100,000 live births reported in several rural areas. The risk of dying from maternal causes is somewhat lower in the urban areas of Africa, but rates of over 500 have been reported in several cities. High maternal mortality rates are compounded by high fertility.

TABLE 2. ESTIMATES OF MATERNAL MORTALITY

Region	Live births (millions)	Maternal Mortality rate (per 100,000 live births)	Maternal deaths (thousands)
AFRICA	23.4	640	150
ASIA	73.9	420	308
Western	4.1	340	14
Southern	35.6	650	230
Southeastern	12.4	420	52
East	21.8	55	12
LATIN AMERICA	12.6	270	34
OCEANIA	0.2		2
DEVELOPING COUNTRIES	110.1	450	494
DEVELOPED COUNTRIES	18.2	30	6
WORLD	128.3	390	500

Source: 2

Maternal mortality rates have declined significantly in almost all developed countries in recent years. Table 3 shows such trends for selection of countries.

TABLE 3. CHANGES IN MATERNAL MORTALITY IN SELECTED COUNTRIES

Country	1965	1975	change	Latest
USA	32	13	-59%	9 (1980)
France	23	20	-13%	13 (1980)
FRG	69	40	-42%	11 (1983)
Czechoslovakia	35	18	-49%	8 (1982)
Greece	46	19	-59%	12 (1982)
Portugal	85	43	-48%	5 (1984)
Japan	88	29	-67%	15 (1983)
Romania	86	121	+41%	149 (1984)
Romania excl. abortion	65	31	-52%	21 (1984)

Source:⁴

Sri Lanka is an interesting success story. From a level of 522 in 1950-5 the maternal mortality rate, excluding abortions, fell to 260 ten years later and to 87 in 1980.⁵ No doubt the fact that 85% of the births in Sri Lanka are attended by trained attendants and 76% take place in institutions provides at least part of the explanation. Over the same period the total fertility rate fell from 5.3 in 1953 to 3.8 in 1977; and, contraceptive prevalence rose from 32% in 1975 to 48% in 1981/82.⁵

As overall maternal mortality has fallen it has usually been deaths from sepsis that have declined first. In Sri Lanka in 1950-55 one quarter of the maternal deaths were due to sepsis. By 1977 the proportion had fallen to 10%.⁵ In China, where overall rates have fallen from several hundred to 49 in 1984 deaths from sepsis now account for only some 6% of all maternal deaths. Such declines reflect both improvements in the standard of delivery care, such as for example the emphasis on the three cleans (clean hands, clean delivery surface, clean cord care) and the lower case fatality resulting from the availability of antibiotics.⁶ Deaths from haemorrhage are usually slower to decline. The short time between the onset of serious bleeding and death means that access to life saving interventions is crucial.

Hypertensive disorders of pregnancy (HDP) remain one of the more common morbid conditions of pregnancy. The death rate due to HDP seems to fall more slowly than that from sepsis. The prevalence of HDP and eclampsia vary widely.⁷ It is noteworthy that the fall of mortality from HDP in such countries as Sweden was not a function of a decline in the incidence of eclampsia but was the result of the decline in the case fatality rate from 14%

in 1950-55 to 3% in 1971-80.⁸ Given that in Sweden very few births took place, even in the 1950s, outside of hospital, these figures demonstrate unequivocally that the only way to prevent deaths from this cause is the diagnosis of toxæmia prenatally - which implies full coverage of prenatal care and effective referral of women with early signs of toxæmia.

TABLE 4. PROPORTION OF MOTHERS WITH PRE-ECLAMPSIA AND ECLAMPSIA

	Pre-eclampsia %	Eclampsia %
Viet Nam	1.5	0.34
Burma	4.4	0.40
Thailand	7.5	0.93
China	8.3	0.17

Source: 7.

Most of the women giving birth in developing countries are not in good health. Nutritional anaemia, for example, is widespread among women of childbearing age. When not pregnant, regular menstrual blood loss constitutes a continuing drain of nutrients which have to be replaced, while pregnancy increases the requirements to meet the needs of the growing fetus. Although women have higher requirement of iron than men, in most societies women's diets, at any given level of poverty, are frequently more deficient than men's. When this inherent vulnerability is combined with other stress factors, such as poverty, poor environmental health and lack of health care (especially prenatal care), the situation of millions of women becomes precarious.

Severe anaemia in pregnancy contributes greatly to maternal morbidity and mortality. In rural India in 1981 anaemia was given as the second most important cause of maternal mortality, after haemorrhage, where it is usually a contributing factor.⁹ Together these two causes accounted for 41% of maternal deaths. In one study from India the risk of a maternal death was increased 14 fold when the woman had a haemoglobin level of less than 8 gm%.¹⁰

On the basis of a review of all information available in 1979, it was estimated that in 1975 there were some 230 million anaemic women in the world; about half the non pregnant women living in developing countries and two thirds of those pregnant. The highest proportion of women with haemoglobin concentrations below the WHO norm is in Asia, followed by Oceania and Africa.¹¹

Depending on which contraceptive methods are being used in a

programme, family planning may play a significant role in either improving or exacerbating anaemia. The oral hormonal contraceptives decrease the amount of menstrual blood loss by about 50%, with a significant reduction of diagnosed iron deficiency anaemia.¹² On the other hand, anaemia may be aggravated or a woman may become anaemic as a consequence of the increased blood losses associated with IUDs. That risk, however, can be reduced by the use of copper containing IUDs.¹³ Sterilization has no effect on menstrual blood loss.¹³

Very young age is an added risk in childbearing the world over. Teenage marriage is wide-spread in the developing world, with the highest recorded incidence in Bangladesh, where 90% of women are married before they are 18 years old. By the age of 17 almost half of all women in Bangladesh are mothers and by the age of 19 one third have at least two children.¹⁴ In Bangladesh girls aged 10 to 14 had a maternal mortality rate 5 times higher than, and women aged 15 to 19 twice as high a rate as, women aged 20 to 24.¹⁵ Even in the USA girls under 15 have maternal mortality rate three times that of women aged 20 to 24.

TABLE 4. MATERNAL MORTALITY AND TEENAGE PREGNANCY
Rate per 100,000 live births

<u>COUNTRY/YEARS</u>	<u>Age group: 15-19</u>	<u>20-34</u>
Argentina 1980-1981	55	50
Brazil 1984	106	80
Indonesia 1980-1982	1100	575
India 1978-1982	380	255
Bangladesh 1982-1988	860	479
Nigeria 1983	526	223
Ethiopia 1981-1983	1270	436
Egypt 1981-1983	268	155
Algeria 1971-1980	205	78

Source: ¹⁶

The risks of adolescent pregnancy can be reduced with prenatal care, as was shown in Nigeria. Young adolescents, i.e. those aged less than 17 years, had a much lower risk of dying when they had received prenatal care when compared to those who received none.¹⁷

The same studies have also shown markedly higher reproductive morbidity among adolescents, particularly eclampsia and vesiculo-vaginal fistula.

The coexistence of poor nutritional status, anaemia and poor weight gain during pregnancy does not bode well for the mother who has yet to attain her full adult stature. In the series of studies from Nigeria, chemoprophylaxis for malaria and supplementation with iron and folate improved the anaemia, was

associated with an increase in birth weight and also with greater growth in height during pregnancy as compared to those who received no such supplementation.

The social impact of adolescent pregnancy is felt throughout a woman's life. Usually, if in school, the girl's education, and often subsequent opportunity for training, comes to an abrupt halt. If employed, she is likely to lose her job, unless protected by legislation.

While sex education programmes in a formal setting constitute one of the best ways of reaching a broad adolescent audience, it is also true that, throughout the world, a large number of those who need to be reached do not have the chance of formal education. Other ways of reaching them must be sought, but the laws regarding the public dissemination of information on sexual health are often restrictive. Contraception is, in the opinion of many, the keystone of any rational approach to the problem of the sexually active adolescent. It is here that law and policy are important. The law determines who has access to contraception and under what conditions. Even where contraception is acceptable for adolescents, it is not always available to those who are unmarried.

Not all teenage pregnancy results from premarital conception. In many parts of Asia and Africa in particular, it is the custom of young girls to be married at, or shortly after, menarche. The social pressure to prove fertility makes any attempt to postpone a first birth unacceptable. As contraceptive prevalence surveys have confirmed, the use of contraception by married teenagers in traditional societies is very low. Under such circumstances the only feasible form of family planning is the postponement of marriage, either by legislation (although this is not always effective, see reference to Bangladesh above), or by decreasing the need for early marriages by formal education and employment opportunities for girls. A remarkable example of the efficacy of this approach is Kerala,¹⁸ which has a female literacy rate of 64% compared to 25% in the rest of India, an average age at marriage for women of 23 compared to 17 for India, and an infant mortality rate one-third of India's. Clearly education for girls is not the only factor in Kerala's success story; better coverage of health services, including family planning, and a generally more egalitarian society are also important features.

The children of adolescent mothers

The risk of complications at pregnancy and childbirth, including infant death, is known to be particularly high for very young mothers. World Fertility Survey data from 3 Asian countries demonstrate the risks to the infant.¹⁹ The infant mortality rate, according to the mother's age at birth, was analysed for all first births occurring between 10 and 7 years before the survey. The results clearly show that the infant mortality rate is highest for the youngest mothers. In Bangladesh, for example, the risk of both neonatal and post-neonatal mortality for mothers aged less than 16 is double that for mothers aged 18 and 19. In Indonesia the ratio is similar and in Sri Lanka the contrast is even greater. In each of the countries, the lowest neonatal mortality rates are those of infants born to mothers aged 20 to 24.

In Bangladesh the minimum rate occurs slightly earlier but this may be due to the fact that parities at each age will be higher there. The most favourable age with respect to post-neonatal mortality, which is less influenced by the biological attributes of the mother and more by the quality of maternal care, is the 18-19 age group in all four countries.

Although many studies show a relationship between low birth weight and adolescent pregnancy, few such studies take into account the growth and nutritional status of the adolescent. In a review and secondary analysis, once adjusting for smoking, pre-pregnancy weight, height and weight gain during pregnancy, the effect of age under 20 years disappears as a factor in low birth weight.²⁰

The adolescent couple or single mother often lacks the maturity to provide the stimulation and caring needed for optimal child growth and development. In extreme circumstances this may even lead to "battered" and neglected children. Tragically, the pattern is cyclical, with battered and neglected girls becoming, in turn, teenage mothers neglectful of their children.

Unwanted Pregnancy and Abortion

A considerable proportion of the very high fertility observed, in particular in developing countries, is unwanted. If all women who said they wanted no more children were actually able to stop childbearing, the number of births would be reduced by an average of 35% in Latin America, 33% in Asia and 17% in Africa.²¹

The incidence of abortion and its consequences and complications represents a public health problem of major dimensions in a large number of countries regardless of whether the procedure is legally available and accessible or not. In all settings its occurrence and persistence reflects the failure to satisfy the fertility regulating desires and needs of women. That failure may represent a combination of societal actions or inaction (policies, access to information and services, etc), personal health behaviour and choice, and contraceptive failure.

Even an estimate of the incidence of legally induced abortion is difficult to obtain, while estimates of illegally induced abortion are generally unreliable. However, estimates based on either official reporting or secondary data sources, suggest that there are some 33 million legally induced abortions performed annually (with a low of 30 million and a high of 40 million). The Soviet Union and China account for fully 25 million of these cases.²² Estimates of the number of illegally induced abortion are highly speculative. The total number of abortions is estimated to be between 40 and 60 million. On a global basis that level of abortion would suggest there are from 24 to 32 induced abortions for every 100 known pregnancies.¹⁶

From the available studies on the causes of maternal mortality, even in the rural areas of south Asia, as many as 20 to 25 percent of the maternal deaths are attributable to the consequences of induced abortion, usually clandestine. Thus it can be reasonably estimated that there are at least

70,000 to 90,000 abortion-related deaths each year in Asia. Hospital based studies in India during the period just after the legalization of termination of pregnancy in the years 1972 - 1978 indicated the induced abortion, in most instances illegally induced despite the legalization, accounted for between 15 and 26 percent of maternal mortality.

Hospital based studies using a standardized definition of illegally induced abortion indicate that case fatality rates range from 0.02 to 4.0 percent²³, although studies reported in the literature describe rates as high as 30 or 40 percent.²⁴ Thus, using the standardized criteria, and based on the proportion of maternal mortality attributable to abortion, there are probably, at the least, 2.25 million women with complications of illegally induced abortions a year in Asia. What proportion have had an illegally induced abortion without any occurrence of complications is difficult to estimate and varies quite widely with the safety of performance of the induced abortion. In Turkey, where before legalization of induced abortion, most abortions in urban areas were performed by professional health workers, barely one case in 20 sought subsequent care for complications.²⁵ Case fatality rates in hospitalized cases of septic or induced abortion in India range from as low as 1.0 to as high 17 percent. However the denominator in these estimates is likely to have been grossly underestimated, the definitions having been based on existing hospital coding practices and not according to WHO criteria. In 1980/81 there were over 380,000 legal abortions reported in India.²⁶

The effect on maternal mortality of a change in the legal status of abortion has been well documented in several countries. In Romania, where abortion had been widely available and practiced, after it was made illegal both the birth rate and the maternal mortality rate rose sharply. The maternal mortality rate has stayed high, with 80 per cent of maternal deaths being abortion related (Table 3), while the birth rate has gradually returned to the low levels of the early 1960s. In Cuba, between 1968 (when abortions were first permitted in hospitals) and 1976, about half of the decline in maternal mortality from 85 to 46 was attributed to the decline in abortion associated deaths.²⁷

Perinatal Mortality

Perinatal mortality rates, although difficult to obtain, serve as a powerful indicator of the health status of the mother and the quality of care she receives during pregnancy and delivery. Information on perinatal mortality is often unreliable and difficult to obtain because of incompleteness of reporting and variations in the definitions used. Under-reporting of perinatal or even neonatal mortality is far more common than the under-reporting of infant mortality, and may have contributed to the failure of health authorities to recognize both the importance of the problem and the possible options for action.

TABLE 5. ESTIMATES OF PERINATAL MORTALITY

Region	Live births	Perinatal Mortality	Perinatal
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	(millions)	rate (per 100,000 live births)	deaths (thousands)
AFRICA	22.5	81	1831
ASIA	76.1	59	4489
Western	4.2	55	232
Southern	37.0	87	3204
Southeastern	12.8	52	666
East	21.8	20	465
LATIN AMERICA	12.6	54	674
OCEANIA	0.2	13	7
DEVELOPING COUNTRIES	110.1	62	7135
DEVELOPED COUNTRIES	18.2	18	163
WORLD	128.3	57	7298

Source²⁸

High perinatal mortality rates, between 80 to 100 per 1,000 live births, are found among the least developed and most disadvantaged countries; and, moderately high rates i.e., 35 to 60/1,000 live births are found in most developing countries. In most developed countries and a number of developing countries with strong programmes of maternal health care the perinatal mortality rate is in the low 20s; and, in a few instances such as Japan, the Nordic countries and the Federal Republic of Germany, the rate is below 10.

Because birth weight itself is such a major determinant of perinatal mortality, comparisons of perinatal mortality must make an adjustment for differences in birth weight distribution.²⁹

Even in many of the least developed countries as much as 40 to 50 per cent of the infant mortality occurs during the first month of life, largely in the first week.

Perinatal mortality rates within a country are a very sensitive indicator of the impact of programme interventions and are useful as an indicator of the quality of care in different populations and areas of a country. The timing of a perinatal death, i.e. antepartum, intrapartum and post-partum, also provides a good measure of the quality of maternal health care services. In European countries with perinatal mortality rates around 10/1000 live births, the ratio of fresh stillbirths to macerated stillbirths is 0.2. In two developing countries where special studies were carried out the ratios were much higher, suggesting inadequate referral and management of pregnancies at risk of complications.²⁴

In a number of developed countries and a few small developing countries perinatal mortality has decreased by half over the period from 1965 through 1980. (Table 6) Investment in

TABLE 6. PERINATAL MORTALITY RATES (per 1000 live births) FOR SELECTED COUNTRIES, 1965 - 1984

Year	Sweden	Singapore	England & Wales	France	Japan	Mauritius
1965	19.9	25.8	27.3	28.2	30.1	82.0
1970	16.5	21.7	23.8	23.7	21.7	60.9
1975	11.3	16.7	19.9	18.3	16.0	61.1
1980	8.7	13.5	13.4	13.0	-	39.5
1984	6.8	10.4	10.1	11.3	8.0	32.1

(1985)

Source:

high technology is not the only way such declines have come about. Regionalization of perinatal care, the application of a risk approach and a greater understanding of the pathophysiological basis of perinatal morbidity and mortality, with better management of pregnancy and delivery, have in many instances contributed to this decline without major investments in facilities and equipment. Even within a four year period of time, with no increase in medical or maternity expenditures, a reduction of over 50 percent in perinatal mortality and in stillbirth rates was accomplished through a primary health care programme among plantation workers and their families in South India. (Table 7)³⁰ In contrast to post neonatal infant mortality, social, economic and environmental improvements have far less of an impact during this period, except insofar as they affect maternal health and low birthweight.

TABLE 7. COMPREHENSIVE LABOUR WELFARE SCHEME ESTATES: DATA ON STILLBIRTH AND PERINATAL MORTALITY RATES* (Per 1000 Live births)

<u>Year</u>	<u>Still birth rate</u>	<u>Perinatal mortality rate</u>
1979	69.8	109.7
1980	44.3	82.5
1981	36.6	73.2
1982	27.9	47.7

Source: 25

*Total population covered by the CLWS was over 250,000

Low birth weight and pre-term delivery

Although this paper is intended to examine maternal, perinatal and infant mortality it is useful to give a brief consideration to the problem of low birth weight (LBW), since under many circumstances it may be a more sensitive indicator than maternal or infant mortality for evaluating MCH intervention strategies by the health or other sectors. The birthweight of an infant is the single most important determinant of its chances of survival and healthy growth and development. Because birth weight is conditioned by the health and nutritional status of the mother the proportion of low birth weight infants closely reflects the health status of the communities into which they are born.

Low birthweight can be caused by short gestation and/or by retarded intrauterine growth. Although etiologically distinct, both have an important effect on fetal and neonatal mortality. A review carried out in 1984 led to an estimate of 20 million LBW infants, or 16% of the those born in 1982. This constitutes a fall, in both relative and absolute terms when compared to estimates for 1979 of 21 million LBW infants making up 16.8% of the 122 million born that year.³¹

The incidence of LBW, by region, ranges from 31.1% in South Asia and 19.7% in Asia as a whole, to 14.0% in Africa, 10.1% in Latin America, 6.8% in North America and 6.5% in Europe. There is no evidence of any improvement in South Asia, the region where the problem is most acute. Rates in that region remain between 20% and 50%.²³

Infant and Child Mortality

While not as great as the differentials in maternal mortality the differences between the infant and child mortality in the poorest countries and the most privileged are up to 30 fold. On average one in 12 infants in the developing countries dies before reaching the age of one, compared to one in 71 in the industrialized countries. For children under 5 the ratios are one in 8 compared to one in 56.

Differentials are not confined to comparisons between countries, for even within developed countries there are two to threefold differences in infant, neonatal and post-neonatal mortality rates between the most and least socially advantaged groups.

In 1986 over 14 million children died before reaching their fifth birthday, two-thirds of them aged less than one year. Ninety-nine per cent of all infant and child deaths in the world are in the developing countries, although these countries account for only 85% of all children under the age of 5 (67).

Nevertheless, considerable progress has been made over the last 30 years. Despite the fact that the annual number of births has increased from 86 million in 1950 to 130 million in 1986 the annual number of infant deaths has fallen from 16 million in 1950 to some 14 million in 1986. The infant mortality rate for developing countries as a whole fell from 188 in 1950 to 92 in 1980 and 81 in 1986; the under 5 mortality rate fell from 295 in 1950 to

142 in 1980 and 124 in 1986. The UN Population Division projects a further reduction of some 30% in the infant mortality rate of developing countries between 1985 and 2000, to a level of 61. A similar fall is projected for the developed countries, to a level of 11 in 2000.

The main killers of young children in high-mortality countries are the infectious diseases.

TABLE 8. CAUSES OF DEATH OF CHILDREN UNDER FIVE

	<u>Million p.a.</u>
Acute diarrhoea and related causes	5.0
Malaria	3.0
Measles	2.1
Neonatal tetanus	0.8
Pertussis	0.6
Acute respiratory infections	4.0
Typhoid fever	0.5

Source: 32

Infant and Child Mortality from Immunizeable Diseases

In many developing country societies, the common pattern is that of repeated infectious diseases during childhood, with as much as 30 to 40% of a child's life spent suffering gastro-intestinal, respiratory or other infections.

In 1974, when the Expanded Programme on Immunization (EPI) was established by the WHO, less than 5 percent of infants in the developing world were fully immunized. In 1988, 50 percent of the infants in the developing world now receive the third dose of DPT or polio and more than 60 percent receive at least the first dose. However vaccine coverage in the developing world is lowest for the two EPI diseases which cause the highest number of deaths, measles and neonatal tetanus. These two diseases account for over 80 percent of the 3.4 million deaths annually attributable to the EPI target diseases. Measles immunization is at the level of 35 percent, while immunization of pregnant women against tetanus is at the level of 16 percent.³³

Measles affects seventy million children yearly in the developing countries. About two million of these cases end fatally. Protein energy malnutrition commonly increases the risk of death and is often an important factor in growth retardation. Although the case mortality rate in developed countries is not high, complications are not infrequent. About one per cent of cases are hospitalized and encephalitis affects one case in 2000, with frequent sequelae of permanent brain damage and mental retardation. Case fatality rates are often over one percent in the developing world.

Mortality from neonatal tetanus in some areas of the world has been as high as from 100 to 260/1,000 live births. In Haiti, the introduction and

improvements in the training of traditional birth attendants had reduced those rates by as much as half by 1962. The subsequent introduction of immunization of pregnant women and later of all women in an outreach programme eliminated the disease as a public health problem.³⁴ Similar marked reduction in neonatal tetanus was found in China with the simple adherence to the principles of the "three cleans" in the training of the traditional birth attendants: clean hands, clean delivery surface and clean cutting and care of the umbilical cord. (WHO 1985)

Of an expected 850,000 deaths from pertussis, approximately 30 percent have been prevented through immunization. Of an expected 365,000 cases of poliomyelitis, nearly 40 percent have been prevented. In a follow-up of the EPI programme in Indonesia the decline in the morbidity rate of diphtheria corresponded to the level of coverage achieved with two doses of DTP.³⁵

Diarrheal disease mortality and morbidity

The incidence and case mortality rates for diarrheal disease have been difficult to obtain and difficult to compare over time and between different countries. Nevertheless, the Diarrheal Control Programme of WHO has summarized the results of 193 surveys in 49 countries in which the standardized WHO/CDD methodology was used. (Table 9) The median number of diarrheal episodes per year for children globally is estimated to be 3.6, with the Americas region surveys showing a median of 6.2 and the Western Pacific surveys having a median of 2.2. Globally it is estimated that one-third of the child deaths are associated with diarrhea.³⁶

TABLE 9. SUMMARY OF RESULTS OF 193 DIARRHOEA MORTALITY, MORBIDITY,
AND TREATMENT SURVEYS OF CHILDREN AGED 0-4 YEARS,
1981-1986

WHO Number Region	Mortality rates/1000 of children (Median) All Diarrhea- causes	Percentage		Annual of deaths (episodes/ Associated child/year)	Incidence
		Diarrhea- Associated	Diarrhea- Associated		
Surveys (countries)					
AFR	40 (17)	32.0	11.5	41.1	4.7
AMR	6 (6)	11.0	3.9	34.9	6.2
EMR	32 (9)	15.7	6.7	43.2	3.8
SEA	67 (9)	13.7	3.6	28.3	3.2
WPR	48 (8)	8.4	2.2	22.4	2.2
Total	193 (49)	18.0	5.6	36.0	3.6

Source: 29)

Coverage of Maternal and Child Health Care, including Family Planning

Almost everywhere there is a dearth of systematic, comprehensive and critical reviews and evaluations of programme coverage, performance and effectiveness. Wide variations in the proportion of women receiving prenatal care exist both between and within geographic areas. In Africa the proportions range from 33% to 90%, in Latin America from 20% to 81% and in Asia from 5% to 98%³⁷.

Maternal Care

In a significant number of cases, and especially in rural areas, the percentage of women receiving prenatal care (by a trained attendant) exceeds the percentage receiving skilled intrapartum care. This discrepancy between high levels of prenatal care coverage and somewhat lower levels of supervised delivery care coverage in some instances may be related to the geographic inaccessibility due to lack of transport and the distances and time necessary to travel once a woman goes into labour. But in many settings cultural preference and distances may play an equally if not greater role. Hassouna has described how even the majority of non-professional health workers are delivered by a traditional birth attendant in Cairo, despite the availability and their knowledge of the delivery care facilities³⁸. A similar preference for traditional birth attendants, who are more like family birth attendants, has been noted in Zimbabwe³⁹.

On the basis of available information it is possible to build up estimates for the coverage of maternity care in the various regions of the world. These estimates show that only some 55% of the births in the world are attended by trained personnel. Even fewer take place in an institution. This means that some 58 million of the 128 million infants born in 1983 were delivered with the help of untrained traditional birth attendants, family members or by the

mother alone.

In the developed world nearly all births are attended by trained personnel but in the developing world, where 85% of the world's births take place, fewer than half were so attended.

TABLE 10. COVERAGE OF MATERNITY CARE
Estimated number of births and percentage
attended by trained personnel around 1983

<u>Region</u>	<u>Numbers of births (in millions)</u>	<u>Percentage of births attended by trained personnel</u>
Africa	23.4	34
Latin America	12.6	64
Asia*	73.9	49
Oceania*	0.2	34
Europe	6.9	97
North America	4.4	100
USSR	5.1	n/a
Developing World	110.1	48
Developed World	18.2	98

Notes: *Japan, Australia and New Zealand have been excluded from the regional estimates, but are included in the total for developed countries

Source: 30

The coverage of child health care is extremely difficult to quantify. If one uses immunization protection as a measure, many countries have shown spectacular progress. However, the use of immunization coverage as a surrogate for overall infant and child health care coverage is only possible in situations where immunizations are provided almost exclusively by the organized health services. Social mobilization and mass campaigns, while admirably raising the level of protection in a relatively short period of time, and intended to lead to sustainability through the health system, do not really reflect overall care for children. Thus, for example, a recent evaluation of MCH services in Tanzania suggested that apart from immunization coverage, which ranged from 70% for BCG to 30% for measles, the programmes were having limited if any impact on the main problems of mothers and children

Family Planning

From only a few countries with family planning programmes in the beginning of the 1960s, currently 120 governments now support either directly or indirectly such programmes. About 95% of people in the developing world live in countries which provide some form of public support for family planning programmes, generally as part of maternal and child health

programmes. Contraceptive prevalence, as a measure of family planning programme effectiveness, has increased. In over 75 countries, with 60% of the world's women, contraceptive prevalence rates of 30% or above prevail. However, in over 50 countries with 20% of the world's women, prevalence rates are below 10%⁴¹.

Despite the apparently high contraceptive prevalence rates in some countries there does not appear to be a commensurate change in fertility. This somewhat paradoxical observation has been attributed to high discontinuation and failure rates of certain contraceptive methods, and at times to over-reporting of acceptor rates in some programmes. Another contributing factor to an apparent lack of effect on birth rates despite an increased rate of contraceptive prevalence is the use of such methods by older couples who are already at a low risk of pregnancy.⁴² The World Fertility Survey has shown a marked discrepancy in many countries between current fertility, numbers of unwanted births per woman and contraceptive prevalence. In Africa only 23% of women not wanting any more births are practising contraception, in Asia it is 43% and in Latin America 57%. Evidently, in many circumstances and in many countries either the methods and/or the services are not accessible and/or acceptable in physical, cultural or personal terms. As a consequence, deaths from illegally induced abortion continue to constitute from 25 to 50% of maternal mortality in many countries.

The pattern of use of different methods of contraception, often a consequence of availability, varies widely. For example, in Thailand, of the 65% of the women practising family planning, fully 90% are protected from unwanted pregnancies by such methods as sterilization, oral or injectable hormonal contraceptives or IUDs. On the other hand, in Bulgaria, although 76% are

TABLE 11. CONTRACEPTION: ESTIMATED PERCENTAGE OF MARRIED
WOMEN OF REPRODUCTIVE AGE PRACTICING CONTRACEPTION
1980-1981

	<u>Percent</u>
World total	45
Total excluding China	38
Developing regions:	
Total	38
Total excluding China	24
Africa	11
Asia	42
East Asia	69
South Asia	24
Latin America	43
Developed regions:	
Total	68

Source: 43

practising family planning, these effective methods are being used by less than 10% of contracepting women. Globally about 325 million couples out of 800 million of reproductive age are using an effective method of contraception, namely:

135 million - sterilization
 70 million - IUD
 55 million - oral hormonal contraceptives
 37 million - condoms
 30 million - injectable hormonal contraceptives,
 barrier methods and other modern
 methods.

Another 20 to 40 million use traditional methods such as periodic
 abstinence or withdrawal.⁴³

Primary Health Care and Maternal and Child Health, including Family Planning

Primary health care has inherent to it the concept of placing the appropriate technologies at the most appropriate level of the system. Over the last several years both research and experience has shown that many of the appropriate technologies in MCH/FP can be successfully transferred to families and communities. Such successful transfers have included: community-based distribution of contraceptives and of oral rehydration salts; home preparation of ORT; growth monitoring and follow-up action by women's organizations, teachers and others; home-based monitoring of pregnancy and of child health and growth through the use of home-based records; and, the identification and referral by traditional birth attendants of pregnancies at potential risk of complications.

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Since some of the essential technologies for MCH/FP cannot be made available at the PHC level, they must be available and accessible at the level of first referral. Thus, for example, without the availability of the skills, supplies and equipment for an assisted delivery, cesarian section, the provision of blood, etc, little progress will be made in significantly lowering the very high maternal mortality rates found in many countries.

If the different levels of care are not integrated and mutually supportive, although all the technologies may be appropriately placed, there will be only a limited impact, particularly in such areas as maternal health.

The field of MCH/FP experienced the debate for many years as to whether and how to integrate the MCH and FP components. In most countries that debate has been resolved, although functional integration continues to elude many countries, in large part due to the legacy of discrepancies in policies, resource allocation (including external resources), management support, training, etc. More recently major advances in the development and adaptation of other appropriate MCH/FP technologies has come about, such as those related to immunization and oral rehydration therapy. However, many countries have failed to learn the lessons of the MCH and FP debate, once again developing vertical structures for the delivery of these services.

Does the emphasis on one technology or programme area have a beneficial spill over effect, a detrimental or no effect on the other aspects of MCH/FP? A recent evaluation of MCH services in Tanzania suggested that apart from immunization coverage, which ranged from 70 percent for BCG to 30 percent for measles, the programmes were having limited if any impact on the main problems of mothers and children.⁴⁴ There was no "spill-over" effect.

The needs for the future in maternal and child health, including family planning have been aptly summarized in the WHO Expert Committee report on MCH/FP⁴⁵. "If the focus of health care is to shift from the hospital to the community, and from selected coverage to total coverage, community and family health, particularly MCH care, must be made the central objective of basic and continuing education for all members of the health team. Moreover, to ensure the integration of MCH care in the general community health services, the MCH content should be incorporated into the curricula for the basic and postgraduate preparation of health personnel in universities and professional or vocational schools. This calls for a vast expansion and reorientation of the educational system for health personnel and for basic changes in the philosophies of medicine, nursing, and allied health professions, coupled with the reformulation and reshaping of curricula and methods of teaching."

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**BREASTFEEDING:
A NATURAL RESOURCE FOR FOOD SECURITY**

ACKNOWLEDGEMENTS

This paper was prepared by Sandra L. Huffman, Sc.D.; Elizabeth Rasmusson, M.P.H.; Vicky Newman, M.S., R.D.; and Chloe O'Gara, Ed.D. Work on this paper was supported under the Expanded Promotion of Breastfeeding Project, funded by the U.S. Agency for International Development, Bureau for Research and Development, Office of Health, Cooperative Agreement No. DPE-5966-A-00-1045-00. The views expressed by the authors do not necessarily reflect the views of A.I.D.

June 29, 1992



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EXECUTIVE SUMMARY

Breastfeeding benefits infant health. Breastmilk is the major source of food for the over 140 million infants born each year, who constitute nearly 3% of the world's population. Since breastfeeding helps increase birth spacing and reduce fertility, it is doubly advantageous in promoting food security. Because it is a complete food, breastmilk helps to prevent micro-nutrient deficiencies and is especially important in promoting vitamin A intake among infants and young children.

This paper discusses breastfeeding practices throughout the world, and illustrates the importance of breastfeeding as a means to ensure food security among infants and young children and to reduce population growth. For the developing world as a whole, the amount of breastmilk consumed is over 25,000,000 metric tons annually. Because of its importance for optimal child nutrition, health, and birth spacing, breastfeeding promotion measures need to be given high priority in the International Conference of Nutrition Plan of Action. Areas in which action is required include:

■ **Household Food Security**

- 1) Breastmilk should be included in calculations of the country's food supply, including Food Balance Sheets;
- 2) Promotion of breastfeeding should be part of a country's food security plan.

■ **Micro-nutrient Deficiencies**

- 1) Breastfeeding should be promoted as a means of reducing vitamin A deficiency, particularly:
 - a) Provision of colostrum as an especially rich source of vitamin A;
 - b) Provision of preterm milk to preterm infants.
- 2) Lactating women should be a focus of nutritional education and supplementation programs to enhance the micro-nutrient content of breastmilk and their own levels of micro-nutrients.

■ **Breastfeeding and Birth Spacing**

Breastfeeding should be promoted as a means of enhancing birth spacing which is associated with improved nutritional status of young children.

■ **Infectious Disease Prevention**

Exclusive breastfeeding for 4-6 months and continued breastfeeding for at least 2 years should be more actively promoted because breastfeeding reduces illnesses among infants.



■ **Breastfeeding Promotion needs to include the following:**

- 1) Policy strategies;
- 2) Training of health professionals in lactation management, and community-based workers in breastfeeding promotion;
- 3) Outreach to women and peer support within the community;
- 4) Social marketing to create a more supportive cultural context for breastfeeding;
- 5) Employment policies that enable working women to breastfeed;
- 6) Adoption and enforcement of International Code of Marketing for Breastmilk Substitutes;
- 7) Monitoring of breastfeeding rates to be conducted and collected by governments on a regular basis.

■ **Exclusive Breastfeeding**

Because of the high quality of breastmilk and its importance in preventing illness among infants, exclusive breastfeeding should be promoted as the mode of feeding infants aged 4-6 months.

■ **Breastfeeding and First Foods**

Along with the consumption of appropriate First Foods (weaning foods), breastfeeding should be continued through the second year of life or longer as an important contributor of food security for toddlers.



BREASTFEEDING: A NATURAL RESOURCE FOR FOOD SECURITY

INTRODUCTION

Breastfeeding plays an important role in reducing morbidity among infants. In addition, breastmilk is a major source of food for over 140 million infants born each year, nearly 3% of the world's population.

By delaying the return of menses, breastfeeding also protects millions of women from pregnancy each year, helping to reduce fertility and control population growth. This paper discusses breastfeeding practices throughout the world, and illustrates the importance of breastfeeding in protecting food security among infants, helping to prevent micro-nutrient deficiencies, and in reducing population growth.

BREASTFEEDING PRACTICES

Various measures can be used to assess breastfeeding rates, including the percentage of women who initiate breastfeeding (incidence), the duration of breastfeeding, the duration of exclusive breastfeeding, and the use of supplemental liquids or foods in addition to breastmilk.

Incidence

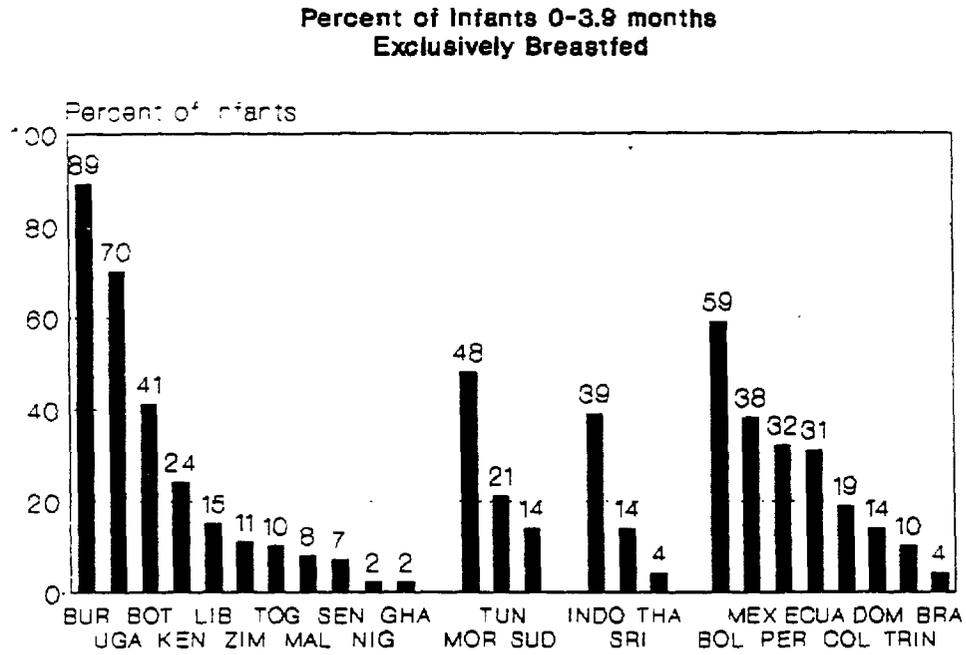
Most infants are breastfed at birth, except a significant percentage of infants born in industrialized countries.

The percentage of women who breastfeed their newborn infants in most developing countries is high (Figure 1). Data from the nationally representative Demographic and Health Surveys (DHS) conducted in the 1980s illustrate that the percentage of women initiating breastfeeding in 25 countries ranges from a low of 84% in Mexico to over 95% in most countries in Asia and Africa. Comparisons of data collected in the World Fertility Surveys (WFS) in the 1970s show that the incidence of breastfeeding has not been declining in the last decade, but rather in general has remained quite stable. This is in contrast to evidence of declines in the 1960s, when major reductions in breastfeeding rates were seen in many parts of the world (Berg, 1973).

There are some exceptions, however. For example, in the Philippines where national surveys have been conducted in addition to the WFS, there was a decrease in the incidence of breastfeeding from 89% in 1973 to 84% in 1983 (Williamson, 1990). These declines in breastfeeding in the Philippines are of concern and have led to programs to encourage breastfeeding (Gonzalez, 1990). Reversal of declines in breastfeeding have been shown to occur with programmatic efforts.



Figure 1
Incidence of Breastfeeding in Developing Countries



Ref: DHS, 1992

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Increases in the incidence of breastfeeding have also been reported where breastfeeding campaigns have been conducted (O'Conner, 1988). For example, in Trinidad and Tobago, the incidence of breastfeeding increased from 80% to 89% from 1977 to 1988. Data from developed countries show much lower rates of initiating breastfeeding than in developing countries. In the U.S., currently only 52% of women initiate breastfeeding (Ryan et al., 1991). Many European countries have higher rates, with Sweden (1987), for example, having 97% ever breastfeeding (Helsing, 1990), and Norway at 95% in 1985. However, in Ireland only 35% of women breastfeed (1985); in Belgium, 53% (1983); and in the UK, 63% ever breastfeed (1985).

While breastfeeding rates have in general held constant, recent declines have been noted in the U.S. (Figure 2) (Hendershot, 1984). While in both Europe and the U.S., breastfeeding declined following World War II to the lowest-level in the early 1970s, it increased into the early 1980s. However, breastfeeding in the U.S. peaked at 62% in 1982, and has declined 10% since then (Ryan et al., 1991). This can be contrasted to Norway, a country that has done much to promote breastfeeding, where rates have risen and stayed high.

Differentials in the Incidence of Breastfeeding

Urban/rural differences in breastfeeding initiation

In many developing countries, urban women are less likely to breastfeed than those living in rural areas. In Peru, the DHS analyses illustrate that in 1986 the percentage of infants ever breastfed varied from a low of 94% for Lima, to 98% for rural women (Elo and Grummer-Strawn, 1991), and 97% for those who lived in the countryside or in towns, compared to 93% for those who lived in cities. The decrease in the incidence of breastfeeding mentioned above in the Philippines was especially noticeable in the Manila region, where the percentage of women ever breastfeeding declined from 76% to 66% (Williamson, 1990). Since 42% of the population (1989) live in urban areas, and urbanization is increasing, the lower rates of breastfeeding in urban areas are a major concern in the Philippines, as well as in many developing countries that have similar patterns of rural to urban migration.

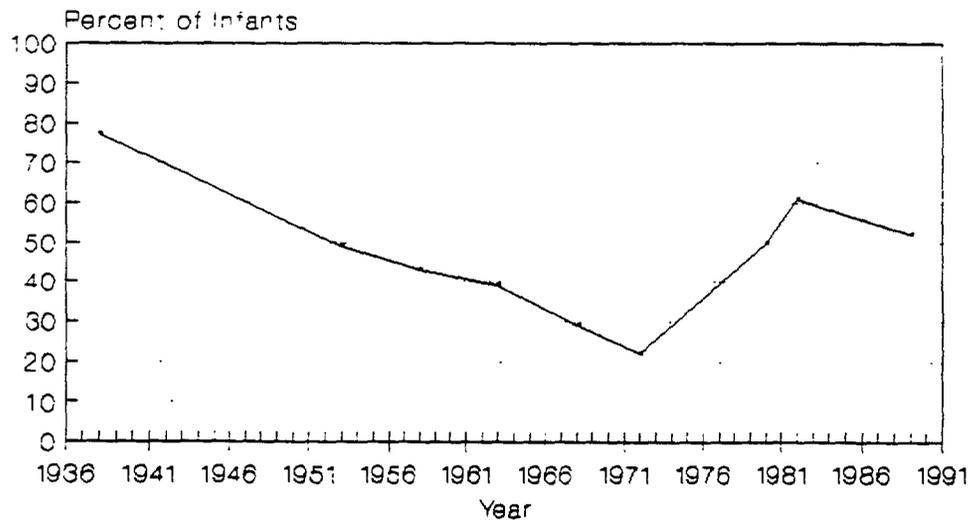
Differences in Breastfeeding initiation by Socio-economic status

Maternal levels of education and family household income have been shown to be related to the incidence of breastfeeding, although in opposite directions in the developed and developing world. For example, in the U.S. in 1989, 71% of mothers with a college education started breastfeeding compared to 32% for those with only a grade school education. Twenty-nine percent (29%) of women in families with incomes less than \$7000 per year breastfed compared to 66% for those with incomes above \$25,000 (Ryan et al., 1991). In France in 1981, 38% of women with primary education breastfed, compared to 71% for those with a college education (Rumeau-Rouquette and Crost, 1988). In contrast, in developing countries poor women with less education are more likely to initiate breastfeeding than those with higher educations. For example, in Peru 99% of women with no education breastfed in 1986, compared to 94% for those with secondary education.



Figure 2

Percent of Infants Breastfed in the U.S. (1936-1989)





Duration of Breastfeeding

Mothers stop breastfeeding infants and young children any time between the day of birth and several years of age. The benefits of breastfeeding are significantly reduced when breastfeeding is stopped too early, especially when breastfeeding ends in the first six months.

The average duration of breastfeeding varies greatly throughout the world. For the countries included in the DHS surveys (Figure 3), most have median¹ durations of breastfeeding of over one year, with those in Africa averaging 19 months -- ranging from 15 months in Morocco to 25 months in Burundi (Trussell et al., 1991). In Asia and the Pacific regions, the median duration was 19 months -- ranging from 15 months in Thailand, 20 months in Sri Lanka, and 24 months in Indonesia. Since the DHS was conducted in only three countries in Asia, it is helpful to examine the additional country studies in the World Fertility Studies in the 1970s. From these studies which include Fiji, Jordan, Korea, Malaysia, Nepal, Pakistan, the Philippines, Syria and Turkey, the range in duration of breastfeeding is from three months in Malaysia to 31 months in Bangladesh, with an average of 17 months.

Countries in Latin America show considerably shorter median durations of breastfeeding, on average only 11 months (ranging from five months in Brazil to 20 months in Guatemala). In the U.S. and most European countries, the median duration of breastfeeding for women who ever breastfeed is only about three months; in Sweden, where breastfeeding duration is the longest for developed countries, it averages about six months (Helsing, 1990). Data from Europe show that only in Norway and Sweden are more than 50% of women still breastfeeding at three months postpartum (Figure 4).

Differentials in the Duration of Breastfeeding

Urban/rural differences in breastfeeding duration

In developing countries, in general urban women breastfeed for shorter durations than their rural counterparts (Figure 5). In Latin America, for example, the median duration combining data from both the WFS and DHS surveys is 7 months for urban women, compared to 12 months for rural women; in Asia, 9 months compared to 13 months; and in Africa, 16 months compared to 19 months (Trussell et al., 1991).

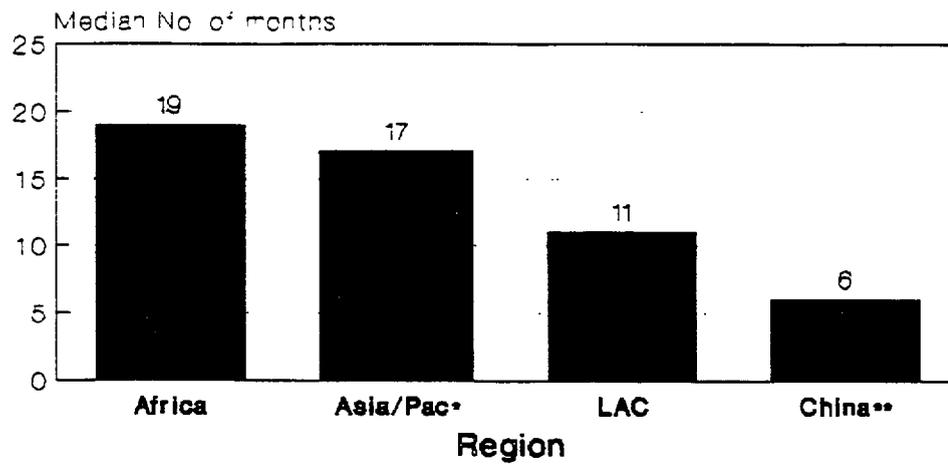
In Peru the mean duration of breastfeeding for women with surviving infants was 17 months for the total DHS sample, varying from 13 months in Lima and 14 months in other urban areas, to 21 months in rural areas (Elo and Grummer-Strawn, 1991). As with the incidence of breastfeeding, the shorter duration of breastfeeding in urban areas is a concern because of the often high rates of rural to urban migration in many developing countries.

¹ Data reported here from the DHS include a median duration of 0 for women who never breastfed. In countries where the percent never breastfeeding is quite low, the median duration for all women will be similar to that for breastfeeding women. While we would like to know the median durations for breastfeeding women only, many analyses are not conducted in this manner. For countries where there are higher rates of never breastfeeding, the median durations calculated as above will be lower than the actual durations for breastfeeding women. This is an issue to keep in mind when examining median duration data from developed countries. For example, the WFS in Portugal in 1979 showed that 68% of infants were ever breastfed, and the median duration was 1 month. In actuality, it is unlikely that women who did breastfeed, only breastfed for one month on average. The same was true for Costa Rica (1976), which had on average 74% of women initiating breastfeeding, with a median duration of 2 months, and in Malaysia (1974), where the percent ever breastfeeding was 75% and the median duration was only 3 months.



Figure 3

Median Durations of Breastfeeding By Region



DHS 1986-1989

* Average WFS n=13 countries and DHS n=3

** Estimate of median duration



Differences in Breastfeeding Duration by Socio-economic status

There is also a decrease in the duration of breastfeeding in developing countries as the educational level of the mother increases. Figure 6 shows this trend by region. In general, women in the highest educational category have a 4-6 month lower duration of breastfeeding than those in the lowest educational category. For example, in Peru the mean duration of breastfeeding was 23 months for women who have received no education compared to 13 months for those with secondary or higher education.

In many developed countries, however, the opposite trend exists, with women who have received higher education having greater durations of breastfeeding than those with a lower level of education. For example, in the US, at 5-6 months postpartum, 29% of college educated women were breastfeeding compared to only 12% of those with a grade school education (Ryan et al., 1991).

Breastmilk as a food source

Given the generally high rates of breastfeeding in the developing world, breastmilk is a major source of food which is overlooked by governments as they assess their food needs and food supply. Table 1 gives an estimate of the amount of breastmilk currently produced throughout the developing world to feed infants. These amounts are based on the number of births per region (minus infant deaths), an estimate of the median duration of breastfeeding based on recent DHS analyses (Trussell et al., 1991)², and the assumption that on average, a woman produces 500 ml. of milk per day when breastfeeding (Jelliffe and Jelliffe, 1978; Brown et al., 1986; Huffman and Combest, 1990; Paul et al., 1986; Neville et al., 1991).

For example, in Peru, with 697,500 births (1992) and an infant mortality rate of 76/1000 live births, we estimate that 644,000 infants survive through the first year of life. The median duration of breastfeeding in Peru is 13 months. If infants consume on average 500 ml of breastmilk per day (or 15 liters per month), an average Peruvian child consumes 195 liters of breastmilk during its lifetime. For all of Peru, therefore, each year breastfeeding is thus estimated to provide 125,560,000 liters of milk or 125,560 metric tons. **This can be compared to the total production of fluid cow's milk in Peru annually of only 665,000 metric tons** (Foreign Agricultural Service, 1990)!

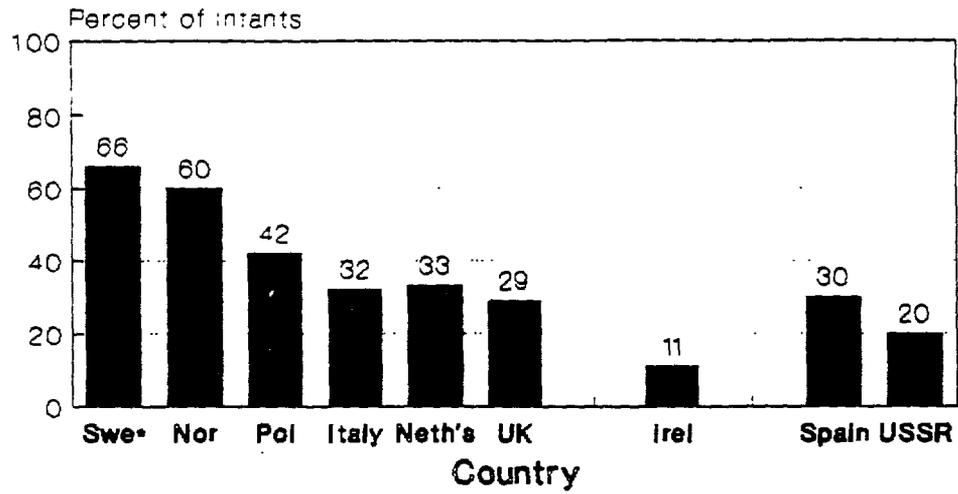
In contrast, in Brazil the median duration of breastfeeding is only 5 months. With 3,920,000 infants born annually (3,650,000 surviving to 1 year), breastmilk production is estimated at 273,700,000 liters (273,700 metric tons). **The annual cow's milk production in Brazil is 13,800,000 metric tons.** Increasing the median duration of breastfeeding in Brazil would reduce the amount of cow's milk needed for infant feeding. Reducing the number of cows would reduce environmental impacts and open new land use options.

² No data were available to assess the duration of breastfeeding in China. We have conservatively estimated the median to be six months. Because only three countries were included in the DHS in Asia, we used the average duration of DHS and WFS combined.



Figure 4

Percent of Infants Breastfed at 3 Months in Europe (1982-1987)

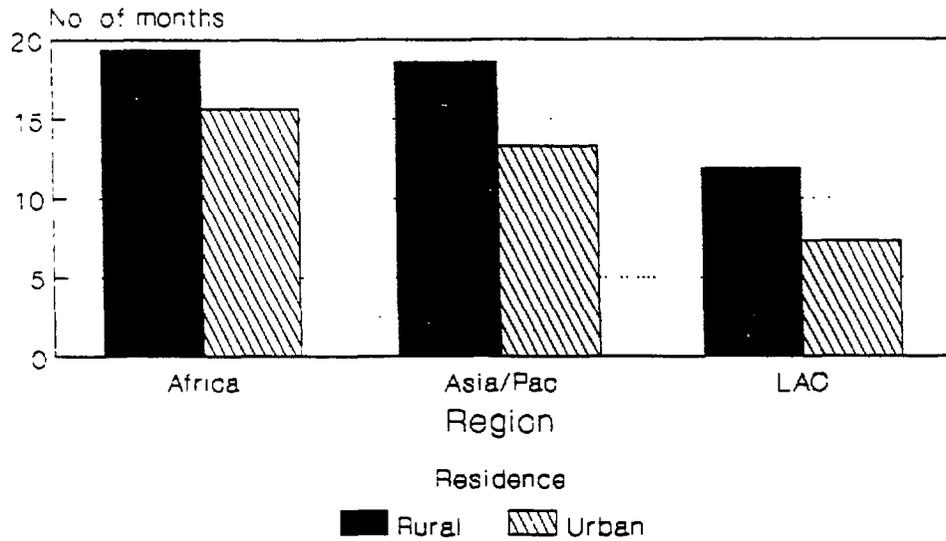


Helsing, 1990
* At 4 months



Figure 5

Median Duration of Breastfeeding By Urban Rural Residence

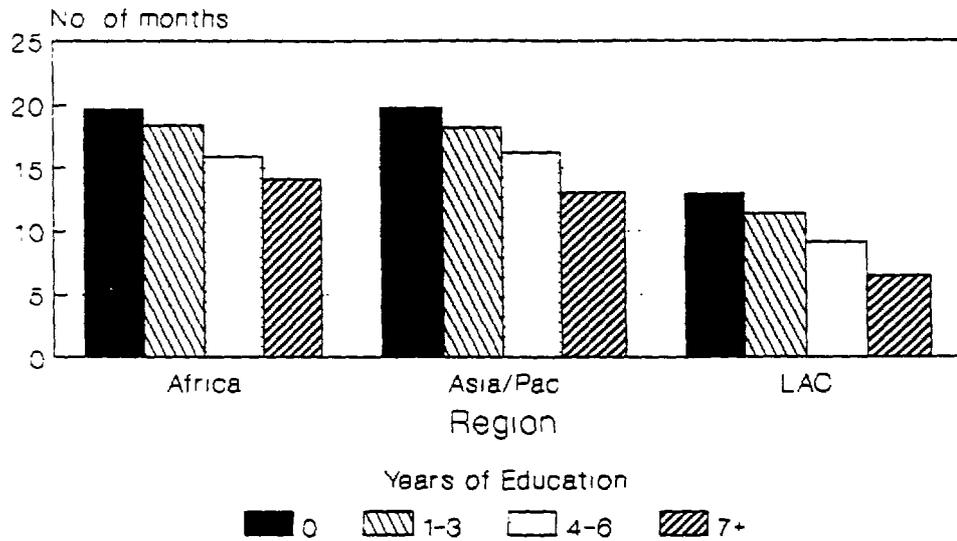


Averages of WFS (1974-1979) and
DHS (1986-1989); Trussell et al, 1990



Figure 6

Median Duration of Breastfeeding By Maternal Education



Averages of WHS (1974-1979) and
DHS (1986-1989), Trussell et al, 1990

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As shown in Table 1, for Africa the total amount of breastmilk consumed is about 7,200,000 metric tons; in Asia and the Pacific 14,300,000 metric tons; in Latin America and the Caribbean 1,980,000 metric tons; and in China 2,027,000 metric tons. For the developing world as a whole, this represents over 25,000,000 metric tons of milk. The total fluid cow's milk consumption in the world by both children and adults is estimated at 217,300,000 metric tons (Foreign Agricultural Service, 1990). **The amount of breastmilk consumed by young infants and young children represents over 10% of all fluid cow's milk consumed by infants, children and adults in the world.**

Therefore:

- **Because of the high quality of breastmilk and its importance in preventing illness among infants, exclusive breastfeeding should be promoted as the mode of feeding infants aged 4-6 months;**
- **Promotion of breastfeeding should be part of a country's food security plan.**

Exclusive breastfeeding in the first 4-6 months of life

What is Exclusive Breastfeeding?

Infants should be exclusively breastfed from birth until about 4-6 months of age. Exclusive breastfeeding is defined as the consumption of only breastmilk, with no other liquids (including water) or solids given. Other liquids introduced to the infant can be detrimental for several reasons.

Why is Exclusive Breastfeeding Needed?

When a newborn receives only breastmilk, the anti-infective properties contained in breastmilk, but not in cow's milk or formula, protect the intestinal epithelial surfaces. This protection lasts until the infant's intestines mature at about 2 years of age and are able to produce the appropriate antibodies (including sIgA). The consumption of other foods such as cow's milk can be more detrimental to the infant as it changes the pH of the intestinal contents and subsequently the types of bacteria that survive. The many anti-infective characteristics of breastmilk, combined with the reduced intake of pathogens from contaminated water or milk, results in exclusively breastfed infants experiencing lower rates of illness (including diarrhea, acute respiratory infections, and other illnesses) and mortality. Even the consumption of boiled water can lead to increases in these illnesses, (due to the presence of contaminants) (Brown et al., 1988; Popkin et al., 1990). Studies in Brazil among infants less than two months of age have shown 25 times lower rates of death for exclusively breastfed infants compared to bottle-fed infants (Victoria et al., 1989).

In addition, exclusive breastfeeding enhances breastfeeding's effect on birth spacing.



Table 1
Estimates of Breastmilk Production in the Developing World

Region	Births (Millions)	Infant Deaths	Number of Surviving Infants (Millions)	Duration of Breastfeeding	Liters of Breastmilk per Month	Total Breastmilk produced (millions of liters)	Metric Tons
Africa	28.122	2,784,000	25.338	19	15	7,221	7,221,000
Asia/Pacific	61.230	4,960,000	56.270	17	15	14,349	14,349,000
Latin Amer. /Caribbean	12.684	685,000	11.999	11	15	1,970	1,970,000
China	23.320	793,000	22.527	6	15	2,027	2,027,000
LDC's	125.356	9,222,000	116.134			25,577	25,577,000

Reference: Population Reference Bureau, 1992; Trussell et al. (1991).



Prevalence of Exclusive Breastfeeding

As Figure 7 shows, the prevalence of exclusive breastfeeding during the early months of life is extremely low throughout most of the world. Thus while the incidence and duration of breastfeeding are high in the developing world, much needs to be done to promote exclusive breastfeeding. In many countries, other liquids given to infants are water, herbal teas, or other non-nutritive liquids. In other countries, the low rates of exclusive breastfeeding are caused by consumption of cow's milk, formula, or other substitutes (such as corn starch mixtures that are not suitable for infant feeding). The consumption of other milks by infants can lead to a decrease in amount of breastmilk produced by the mother, since the major factor affecting breastmilk output is frequency of suckling. She then must depend even more on other milks to feed her infant.

Peru provides an example of inadequate exclusive breastfeeding. The mean duration of exclusive breastfeeding reported from the DHS for Peru as a whole was 2.1 months, based on the use of any other liquids or foods on the day preceding the survey. Figure 8 shows the types of different liquids given to infants in Peru. In Brazil (1986), only 4% of infants under age 4 months were exclusively breastfed, and 16% received only breastmilk or water. All other infants received bottles alone or in addition to breastmilk (DHS, 1992). In Ghana, (1988), 2% of young infants (under age 4 months) were exclusively breastfed, but 63% received only water in addition to breastmilk.

Therefore:

- **Exclusive Breastfeeding**

Because of the high quality of breastmilk and its importance in preventing illness among infants, exclusive breastfeeding should be promoted as the mode of feeding infants aged 4-6 months.

BREASTFEEDING AND FIRST FOODS

After the age of 4-6 months, infants need to receive other foods in addition to breastmilk to meet their nutrient requirements. While many populations use cow's milk as a source of food for the second year of life, if breastfeeding is continued other milks are not needed. Infants can grow well on complementary foods consisting of grains, legumes or nuts, fruits and vegetables, and vegetable fats as long as the infant is breastfed. Breastmilk provides an essential source of animal protein that is important for growing infants and provides vitamins and nutrients that help promote growth. In terms of the food chain, breastfed infants can grow well on adequate foods lower in the food chain, as long as they continue to be breastfed.

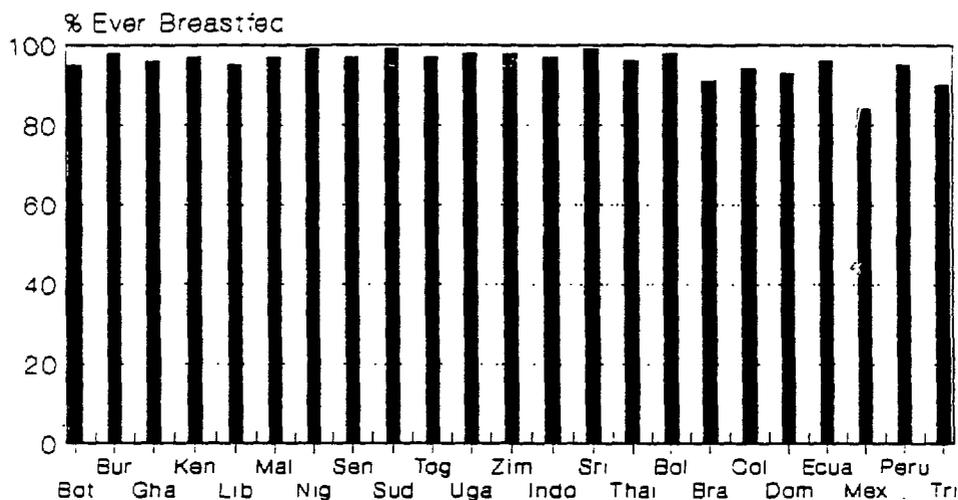
Actions needed include:

- **Breastfeeding and First Foods**

Along with the consumption of appropriate First Foods (weaning foods), breastfeeding should be continued through the second year of life or longer as an important contributor of food security for toddlers.

Figure 7

Percent of Infants Ever Breastfed
in Developing Countries



Ref: DHS, 1992



BREASTFEEDING AND VITAMIN A

Vitamin A deficiency is rare among breastfed infants, even in parts of the world where vitamin A deficiency is endemic (Sommer, 1982; Tarwotjo, 1982, Cohen, 1983; Mahalanabis, 1991). The protective effect appears to continue after breastfeeding is discontinued (Sommer, 1982; West, 1986), presumably because some of the vitamin A provided by human milk is stored in the infant's liver. A recent study of 2687 children aged six months to three years attending a diarrhea treatment center in Bangladesh. Mahalanabis (1991) reported a 74% reduction in the risk of vitamin A deficiency among breastfed children, after controlling for a large number of confounding variables. The estimated reduction of risk did not decline with age, as children between 24 and 35 months who were still being breastfed (49% of the children in this age group) had a 65% reduced risk of vitamin A deficiency.

Because human milk changes to meet the changing needs of the growing infant, colostrum and transitional milk are particularly rich in vitamin A to complement the low liver reserves of newborn infants. The vitamin A concentration in breast milk during the first two weeks of lactation is double that at one month (Newman, 1992). Preterm milk is even higher in vitamin A than term milk during the first several months (Newman, 1992), which is significant considering the particularly low vitamin A liver reserves of most preterm infants.

Human milk in developing countries provides sufficient vitamin A on average to prevent deficiency through the first 12 months of life, but does not provide sufficient vitamin A to allow liver storage after approximately six months of life (Newman, 1992). In developing countries, breast milk continues to be one of the most important sources of vitamin A in the infant's diet throughout the second year, supplying an average of approximately 130 micrograms of Retinol Equivalence of vitamin A daily from 13 through 24 months (Newman, 1992).

Improving the vitamin A status of lactating women, promoting the use of colostrum (earliest milk, days 1-3), encouraging exclusive breastfeeding for the first four to six months of life, and the addition of appropriate First Foods after that time while breastfeeding continues, are important strategies for improving the vitamin A status of young children. Along with insuring adequate vitamin A levels in breast milk for the infant, improving the vitamin A status of lactating women is also likely to benefit maternal health directly.

Actions needed include:

■ Micro-nutrient Deficiencies

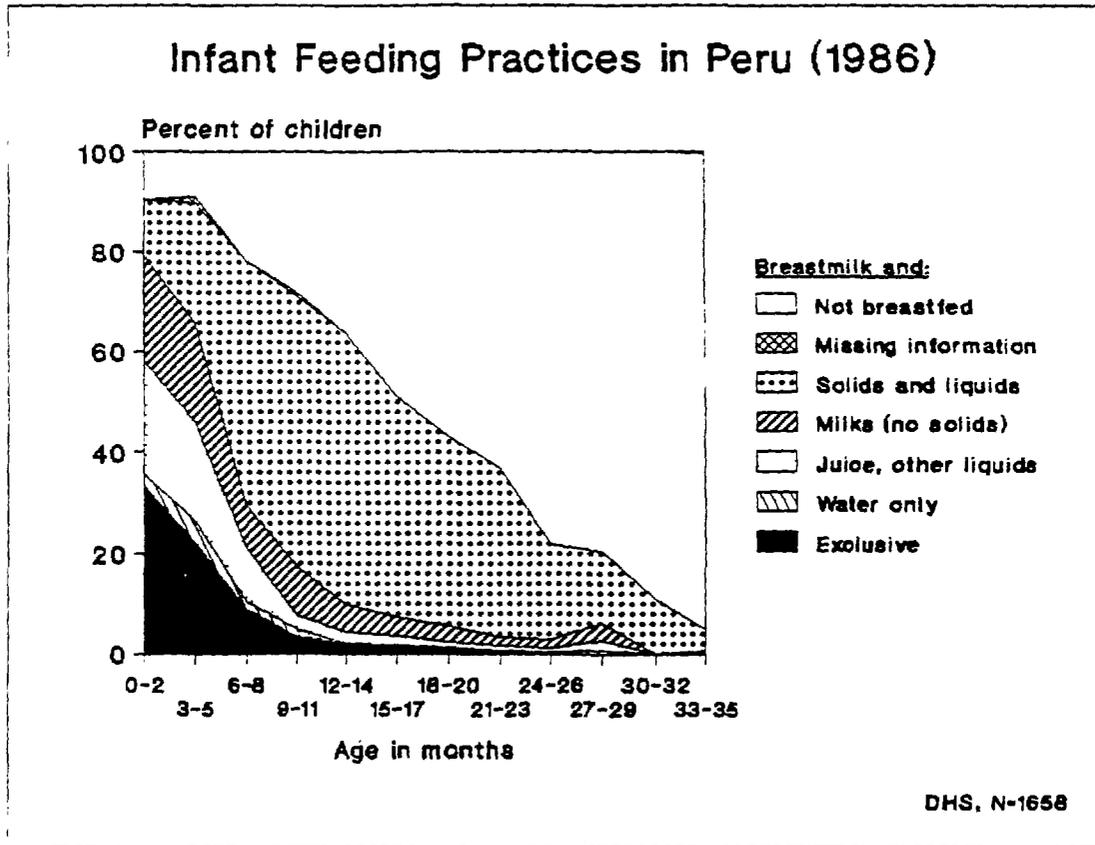
- 1) Breastfeeding should be promoted as a means of reducing vitamin A deficiency, particularly:
 - a) Provision of colostrum as an especially rich source of vitamin A;
 - b) Provision of preterm milk to preterm infants.
- 2) Lactating women should be a focus of nutritional education and supplementation programs to enhance the micro-nutrient content of breastmilk and their own levels of micro-nutrients.



Figure 8

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BREASTFEEDING AND AIDS

A recent WHO/UNICEF (1992) meeting has recommended that the "breastfeeding of babies should be promoted and supported in all populations, irrespective of HIV infection rates." Roughly 1/3 of infants born to HIV-infected mothers become infected themselves, primarily through pregnancy and delivery. While HIV has been associated with several cases of infection of infants breastfed by mothers who were recently infected, other studies show that in populations where infectious diseases are the primary cause of infant deaths, infants are at much greater risk of dying if they are not breastfed.

Research suggests that HIV positive infants who are breastfeeding have a less rapid and severe cause of progression to AIDS. The benefits of breastfeeding for HIV infected children is currently under study.

BREASTFEEDING AND POPULATION GROWTH

Breastfeeding, because it leads to extended durations of amenorrhea following birth and subsequent lower rates of ovulation and conception, has a major impact on reducing fertility in the developing world (Huffman, 1991).

Exclusive breastfeeding is 98% effective in preventing pregnancy during the first six months of life, when the woman has not resumed menses (Family Health International, 1988). The lactational amenorrhea method of family planning, or LAM, can be compared to a use effectiveness rate of 80-97% for oral contraceptives (Potter and Williams-Deane, 1990). In Mexico, of the 48% of women six months postpartum not using contraception, half were breastfeeding and amenorrheic (DHS, 1991) (Figure 9). In Senegal, a country with low rates of contraceptive use, at six months postpartum 82% were not using contraception, but nearly 90% of those were breastfeeding and amenorrheic.

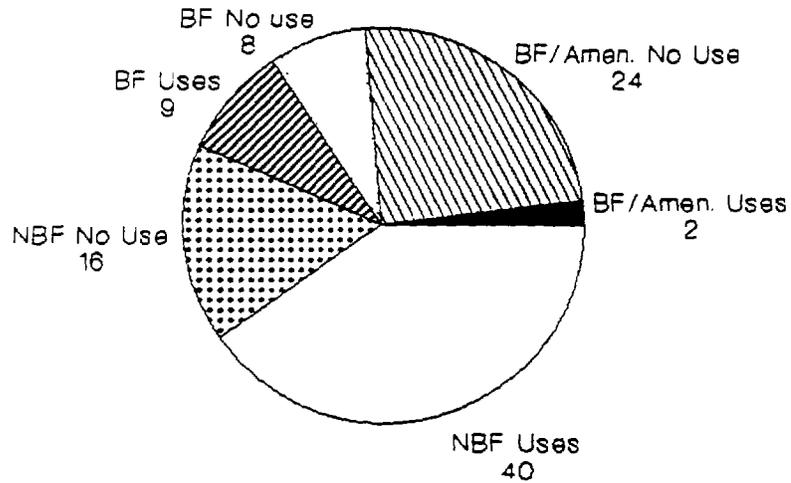
A recent analysis using data from the Malaysian Family Life Survey found that breastfeeding had a considerably greater effect on preventing short birth intervals than did contraceptive use. The analysis showed that many independent variables affected breastfeeding and contraceptive use in opposite directions, with no significant net effect on the likelihood of a short birth interval. For example, having a family planning clinic nearby was associated with less breastfeeding. This offset whatever positive effects family planning clinics had on contraceptive use in terms of short birth intervals, because they were also associated with reduced breastfeeding (DaVanzo et al., 1991)!

Education, another independent variable, was negatively related to the probability that a woman breastfeeds and positively related to the probability that she uses contraceptives, with no significant net effect on the likelihood that the pregnancy interval will be less than 15 months. Simulating the proportion of short intervals with alternative combinations of breastfeeding and contraceptive use in the population, breastfeeding was shown to have a considerably greater effect on preventing short birth intervals than did contraceptive use. Since many women do not want to use contraception until menses have resumed, promotion of breastfeeding practices that will optimize the fertility reduction effect of breastfeeding should be an important family planning objective.



Figure 9

Breastfeeding and Contraception At Six Months Postpartum-Mexico, 1987



DHS, 1991



Increased birth intervals are also associated with improvements in nutritional status of the children born either prior to or subsequent to the enhanced birth interval (Rutstein, and Sommerfelt (1989); Sommerfelt et al. (1989)). When birth intervals are increased, the preceding child has a greater chance of receiving better care and feeding from the mother, and the second child is more likely to be born at normal birth weight (Fleming, 1987). Keeping the current child alive, of course, is another important goal for family planning, because a child's death is likely to be soon followed by another birth. We also have historical examples of increases in fertility associated with the decline in breastfeeding (Dyson, 1988). Theoretical calculations have also shown that a large increase in contraceptive use would be needed to offset decreases in breastfeeding (WHO/NRC, 1983; Thapa et al., 1989). Significantly increased contraceptive use is not a realistic probability. In developing countries, breastfeeding is still the major determinant of birth intervals and hence, the major restraint to population growth.

The promotion of breastfeeding is not associated with decreases in modern use of contraception. For example, in Honduras the promotion of breastfeeding through the PROALMA project in the 1980s resulted in increases in breastfeeding for a net decrease in total fertility (Bailey et al., 1988).

The need for family planning programs to include breastfeeding as an option is illustrated by data from both the WFS and the DHS that show a large proportion of women at six months postpartum who neither are breastfeeding nor using contraception. For example, in Mexico, where family planning usage is relatively high (51% of married women of reproductive age at six months postpartum), the DHS found that 16% were not breastfeeding nor using contraception. There is therefore a role for exclusive breastfeeding and its contraceptive effect for women currently protected by neither breastfeeding nor contraceptive use. Data from the other DHS countries illustrate a range from 2% to 18% of such women (Figure 10). Family planning programs have been more successful in reducing higher parity births; they are not generally associated with increasing birth intervals. In fact, based on analyses of 39 WFS countries comparing low (0-10% of married women of reproductive age), medium (10-40%) and high (40-60%) rates of contraceptive prevalence, the percent of births that have a birth interval less than two years increases from 25% for countries with low contraceptive prevalence to 30% and 36% for higher contraceptive use countries, respectively (Bongaarts, 1987; Haaga, 1989).

Thapa et al. (1989) have shown that breastfeeding prevents more births in Africa and many parts of Asia than contraception. Families with high rates of infant mortality are also less likely to use contraception. Breastfeeding's impact on child survival therefore also leads to families being more receptive to family planning, since their children will be more likely to survive the early years of life if they are breastfed.

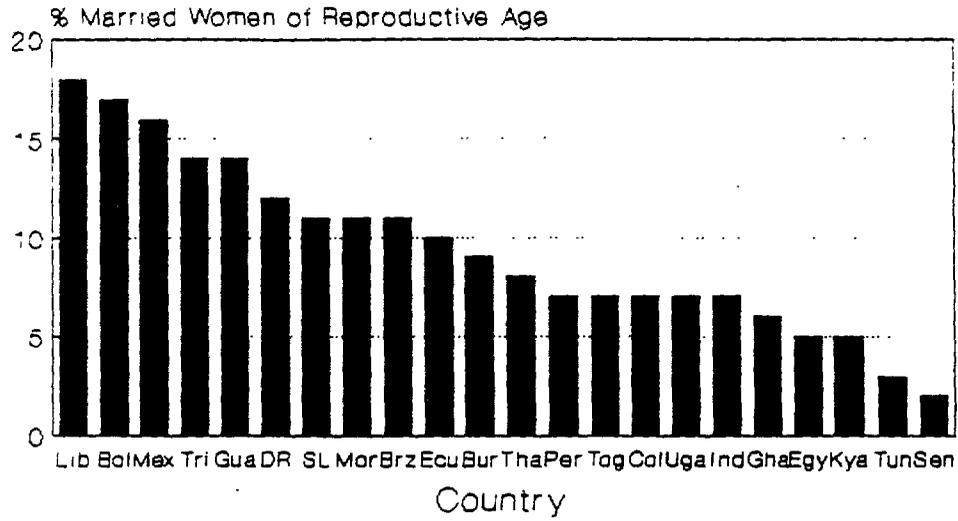
■ **Breastfeeding and Birth Spacing**

Breastfeeding should be promoted as a means of enhancing birth spacing which is associated with improved nutritional status of young children.



Figure 10

Not BF and Not Using Contra. At Six Months Postpartum



DHS, 1991

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ACTIONS NEEDED TO PROMOTE BREASTFEEDING

Breastfeeding often appears to be the concern of many and the priority of none. Only with broad commitment will national breastfeeding promotion be sustainable and become a permanent, dynamic feature of programs for public health and the well-being of women and children. The design and implementation of multisectoral, integrated national programs are needed to promote breastfeeding. While in the past, most breastfeeding promotion has centered around training of health professionals, changes in hospital and clinic procedures and expertise are necessary but not sufficient features of successful breastfeeding programs. To support widespread changes in breastfeeding behaviors and to sustain those changes over years, other coordinated interventions are also needed.

Policy Strategies

Enhanced support among policy makers focussing attention on the problems associated with inadequate breastfeeding is important in order to help provide the political will and necessary resources for breastfeeding promotion. Legislative changes to support breastfeeding require a supportive policy environment. Breastfeeding commissions have proven effective at initiating policies to promote ideal infant feeding in several countries. Marketing of breast milk substitutes is generally detrimental to improving breastfeeding practices; codes regulating the marketing of substitutes and their use in hospital settings can be instrumental in preventing the adoption of unhealthy feeding practices.

Actions needed include:

- Adoption and enforcement of the International Code of Marketing of Breastmilk Substitutes;
- Establishment and financial and logistical support for independent Commissions on Breastfeeding Promotion.

Training and Education of Health Professionals

Training programs are needed to empower key policy makers and medical professionals with the knowledge, skills, and resources they need to give mothers the information and support required to make and follow through on informed choices. Effective training programs are an essential elements to improve the knowledge, attitudes and practices of health workers, who have direct contact with mothers.

Hospital practices are particularly influential in determining whether women breastfeed during the first few hours and days postpartum. Promotion of the Baby Friendly Hospital Initiative (initiated by UNICEF) will help to ensure that hospital practices are supportive of breastfeeding, and that women receive optimal help in breastfeeding. In addition, after the postpartum period, health professionals working with mothers and children in diarrheal, growth monitoring, immunization and family planning programs should be trained to give continued support for appropriate breastfeeding.



Actions needed include:

- Ongoing training in lactation management of health professionals who work with pregnant and postpartum women and infants should be given priority;
- Competency-based curricula which incorporate adult learning skills should be adapted or developed for training programs for a variety of target audiences;
- All hospitals should meet the Baby Friendly Hospital Criterion established by UNICEF.

Social Marketing

Research and program experience have improved our understanding of why women choose not to initiate breastfeeding or, as is more likely the case, why they do not breastfeed optimally (by delaying the initiation of breastfeeding, by breastfeeding their infants for a short duration, or by supplementing breastmilk with other liquids or foods too early). Communication activities on breastfeeding can be a critical part of programs to improve breastfeeding practices.

Communication programs can achieve various objectives. They can raise awareness or create a climate for acceptance of new ideas and practices, educate beneficiary groups, teach skills, provide motivation for changing behavior, and reinforce positive health practices. Different groups can be targeted as appropriate to a given situation: policy makers, opinion leaders, health personnel, mothers and fathers.

An effective communication campaign contains the following elements:

- 1) *Formative or planning research* is necessary to identify the relevant factors affecting mothers' breastfeeding practices. Barriers to optimal breastfeeding as well as opportunities for change need to be identified. Further, mothers' contact with various potential communication channels (radio, print, interpersonal) needs to be assessed as a basis for planning the structure of the intervention.
- 2) Once the intervention is planned, *testing* of concepts, messages, and materials takes place. What are the problems women have that prevent them from exclusively breastfeeding? How do mothers interpret a proposed message or slogan? Do the prototype posters, handouts, radio spots, etc. convey what they are intended to convey?
- 3) Once a program is launched, continuous *monitoring* needs to take place so that any problems which arise can be dealt with as soon as possible, and, if warranted, mid-course corrections can be made in program plans.



Actions needed include:

- As complete an understanding as possible, given available resources, as to why mothers do not optimally breastfeed;
- Creation of action strategies to address obstacles identified;
- An assessment of existing materials to determine whether they are effective, whether they address the most important knowledge and behavioral objectives, whether they are adequately distributed, and whether they are in adequate supply.

Outreach to Women and Peer Support

Enhancing community support for breastfeeding through peer counseling and support groups is another means needed to enhance breastfeeding. Community based and mother-to-mother support systems promote breastfeeding outside of the health system. They reach mothers who do not have contact with the cosmopolitan health care system; they impart knowledge about breastfeeding to mothers and families when they need it, in their own environments; they offer hands-on help and advice on breastfeeding techniques; and they give sustained emotional and logistic support which the health care system cannot provide. That mothers need support to breastfeed successfully is universally acknowledged, but poorly understood. Much ethnographic information attests to the critical roles of families, friends, and local experts in supporting the initiation and continuation of lactation. With rapid demographic change mothers now face new challenges, more alternatives, and generally much less support for breastfeeding. As traditional and informal sources of information and skills breakdown, organized community based outreach and support activities have tried to fill the gap.

Actions needed include:

- Training and supervision of influential community members and mothers as peer counselors in breastfeeding support;
- Development and backing of mothers' support groups.

Working Women and Breastfeeding

The proportion of women in the formal labor force in most developing countries is relatively low; however the little information available suggests that those who choose to breastfeed and have at least 40 days of leave to establish lactation, breastfeed as long and as successfully as "unemployed" mothers. There is a critical need for applied research to analyze how the majority of the world's women successfully work and breastfeed, what can be done to help them prolong exclusive breastfeeding, and why some women fail to initiate or sustain lactation.



Maternity leaves, nursing breaks, creches at the workplace, and other union and employer initiatives may be important in some contexts, especially where there are large numbers of women in the formal labor force.

Actions needed include:

- Enforcement of Maternity Leave Legislation and establishment of part time work, work-sharing and other means to help women accommodate work with breastfeeding;
- Applied research to assess what interventions are needed to help women in both the formal and the informal sectors to breastfeed.

Monitoring and Evaluation

Incorporation of breastfeeding parameters into health statistics that are collected on a regular basis is essential to assure ongoing interest in the subject on the part of health policy leadership. Knowing trends in breastfeeding helps to point to areas where increased activity is needed. Evaluation of breastfeeding promotion efforts helps to illustrate successful programs that can be replicated, and provides policy makers with information needed to allocate resources to more successful activities and to improve others.

Actions needed include:

- Monitoring of breastfeeding rates should be conducted and collected by governments on a regular basis;
- Breastfeeding promotion activities should be evaluated for costs and impacts.

CONCLUSION

Breastmilk provides an important food source for infants. If breastfeeding were to be practiced exclusively for the first 4-6 months of life, and continued at least through the second year of life as recommended by WHO and UNICEF (Innocenti Declaration, 1991), it could save millions of tons of cow's milk currently used for infant feeding. In the past, this important food source has been ignored in the calculation of a nation's food supply.

In the long run enhanced breastfeeding will save money. The savings associated with increased breastfeeding include reductions in expenditures for cow's milk and formula; decreases in illnesses and costs of treatment; decreases in hospital costs associated with delivery (Levine and Huffman, 1990); and reductions in environmental consequences associated with the production and distribution of cow's milk. All of these benefits far outweigh the costs of promotion. We can not solve the world's population problem without supporting breastfeeding. Breastfeeding helps feed the world's children, helps to space births and reduce fertility.



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Management of Successful Breastfeeding

Wellstart International
Lactation Management Education Program

Antenatal Period

Antenatal Breast Examination

1. Privacy is important: consider modesty issues
2. Breasts
 - Size and shape
 - Note potential problems (e.g., very large, pendulous)
 - Reassure mother that very small or very large breasts all produce milk
 - Reassure mother that breastfeeding does not spoil her figure
 - Identification of evidence of past breast surgery
 - Identification of possible pathology
 - Masses, asymmetry, dimpling, etc.
 - Refer if indicated
3. Nipples
 - Types of nipples
 - Ordinary, long, flat, pseudo-inverted, inverted
 - How to test for protractibility:
 - Rub nipples to stimulate erection
 - Gently squeeze areola to test for protractibility
 - Inverted nipples
 - Build the mother's sense of confidence and tell her that exercise can be helpful
 - Techniques that may be helpful: ***Caution:** these exercises may be contraindicated if there is risk for preterm labor. They should not be initiated until the 8th month of pregnancy.
 - Stretch and roll
 - Hoffman's exercises ???
 - Someone else sucking, if culturally acceptable
 - Breast shells, if available
 - Cut small hole in brassiere
 - Pumps, if available

Antenatal Preparation

1. Nature prepares breasts
 - Montgomery's glands produce lubrication; therefore wash breasts without soaps, avoid creams or lotions
 - Expressing colostrum not recommended
2. Nutrition
 - Guidelines are important both for pregnancy and lactation (Reinforce national guidelines for nutrition during pregnancy)
 - Adequate intake of protein, vitamins, other essential nutrients
 - Correction of iron, iodine or Vitamin A deficiencies
3. Avoidance of alcohol, tobacco, excessive caffeine, other drugs

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4. Importance of regular exercise
5. Wear well-fitted bra (if culturally appropriate and available)

Essential Antenatal Education

1. Importance of exclusive breastfeeding for first 6 months if infant is growing well
 - Nutritionally perfect for infant
 - Protective properties of breastmilk
 - Dangers of bottle feeding/formula
 - Healthier for mother
 - Prevention of hemorrhage
 - Quicker return to pre-pregnant shape
 - Emotional/bonding benefits
 - Child-spacing benefits
 - Economical/convenient
2. Importance of early initiation of breastfeeding
 - Colostrum — the first immunization
 - Bonding period in first 2 hours post delivery
 - Prepare mother to ask to have infant right after delivery: discuss how normal newborns usually act in first 1-2 hours
 - Avoid any prelacteal feeds: discuss cultural practices in the country
3. Importance of proper positioning/attachment
 - Positioning/attachment are critical to preventing:
 - Nipple trauma
 - Engorgement
 - Inadequate milk supply
 - Demonstrate removal of infant from the nipple — ask mother(s) for return demonstration
4. Importance of "on demand" (also called "on request") feeding
 - Need for frequent suckling/emptying in early hours and days to facilitate lactogenesis
 - "On request"
 - Infant feeds to hunger
 - Mother feeds if breasts become full
 - The schedule is determined by the individual needs of that infant and that mother
 - Rooming-in/bedding-in in hospital
 - Ensures on-request feeds
 - Reinforces bonding/closeness
 - Should continue at home
 - Importance of avoiding artificial teats, pacifiers, dummies

Antenatal Counseling

1. Importance of family support
 - Help mother identify key "support people" among close family members or friends
 - Help mother identify the non-supportive family members: try to arrange to meet with them during antenatal period to discuss topics under Section III above
2. Identify reasons for previous breastfeeding difficulty(ies)

3. Anticipate any reasons for separation of mother and infant
4. Separation from infant
 - Using mother's own breast, demonstrate manual expression
 - Demonstrate use of hand pump, if available
 - Briefly discuss breastmilk storage and emphasize that refrigeration isn't necessary

Labor and Delivery

Labor Management

1. Fear, pain, fatigue can inhibit progress of labor and delivery
 - WHO (Felanuela) Recommendations for appropriate technology in birth
(See handout: "16 Recommendations on Appropriate Technology for Birth")
 - Benefits of supportive person with laboring woman
 - Foster easier labor
 - Lower incidences of c-section
 - Better outcome for infant
 - Examples of support people
 - Relative like mother, sister, or spouse
 - TBA or village midwife
 - Nursing student
 - Minimizing pain
 - position changes
 - relaxation/breathing techniques
 - massage
 - emotional support
 - disadvantages of analgesia and/or anesthesia
 - Maintenance of hydration during labor
 - No routine episiotomy
 - Drawbacks of lithotomy position BOTH for easy second stage of labor and for initiation of breastfeeding on the delivery table

Immediate Post Delivery

1. Nature's plan was for immediate initiation of breastfeeding
 - Oxytocin: secretion of oxytocin from suckling also causes uterine contraction and controls excessive bleeding
 - Rooting and sucking reflexes
 - Rooting reflex occurs when infant's mouth or cheek is stroked gently. In response, the infant turns toward the stimulus and simultaneously draws the stimulus into the mouth
 - Sucking reflex occurs when nipple or gloved finger is put in infant's mouth and infant responds by movement of the jaw and tongue in a backward "stripping" motion, creating a negative pressure within the mouth
 - Particularly strong immediately after a normal delivery
 - Imprinting and bonding between mother and infant
 - Strongest in first 1-2 hours
 - At 3-4 hours, babies often go to sleep
 - Warmth provided by skin-to-skin contact
 - Colostrum
 - Affords passive immunity to infant
 - Natural cathartic for clearing the meconium from infant's gut

- Colonization of Gut
 - Mother's microorganisms will colonize infant's gut if mother is first to hold infant (rather than microorganisms of nurse, doctor, or others)
2. Saves time
 - Time taken by maternity staff to help with early initiation of breastfeeding will save time in the long run by establishing successful breastfeeding techniques
 3. Routines can be delayed for 1-2 hours
 - Delaying the first bath until after first breastfeed allows for the vernix to soak into infant's skin which lubricates and protects it
 - baby's thermoregulation system is more mature after 1-2 hours
 - Eye prophylaxis can irritate baby's eyes, interferes with bonding
 - Weighing, measuring, can be easily deferred as they won't change in a few hours
 - By three hours, babies often drop into deep sleep—not a good time to initiate breastfeeding

Caesarean Sections

In recovery room

1. Positioning more difficult, but possible options include:
 - Side-lying in bed
 - Best position for avoiding pain in first hours
 - Allows breastfeeding even if head must be down after spinal anesthesia
 - Sitting-up with pillow over incision
 - Lying flat with infant lying on top of mother
2. Importance of a supportive health care provider
 - Mother may still be sleepy or under influence of anesthesia
 - I.V. tubing may need adjustment to allow for positioning infant
 - Rooming-in with infant as soon as possible
 - Success at breastfeeding may help those mothers who have a sense of failure that they weren't able to deliver vaginally

Drugs That Interfere With Breastfeeding

1. Ergometrine
 - Some evidence that alkaloid metabolites may interfere with prolactin production
 - Hospitals may want to reevaluate any policy on routine use of oxytocics with normal deliveries if mother breastfeeds immediately after delivery
Example: Fabella Hospital in Philippines stopped giving routine injection of ergometrine to mothers after normal deliveries and put newborn infants to mother's breast instead
2. Pain medications and sedatives
 - All common postpartum analgesics are secreted in the breastmilk in some amounts (avoid narcotics — codeine — and dipyrone if possible; paracetamol or ibuprofen are preferred)
 - Advantages to the mother of analgesia (if she had a C-section or painful episiotomy) must be weighed against any minimal effect they may have on the infant.
 - Sedatives (e.g. Valium, barbiturates)
 - Not well metabolized in infant's liver and tend to accumulate
 - Can cause drowsiness and lethargy in newborns

Hospital may want to evaluate any use of sedatives during labor and delivery, as well, for this reason

Early Postpartum Period

1. Awake, alert mother and infant.
2. Immediate (delivery or recovery room) nursing.
3. Proper infant positioning, attachment, technique, and removal.
4. Frequent, on-request feeding, usually approximately every 2½ to 3 hours around the clock during first several weeks.
5. Sufficient post-ejection reflex nursing (i.e., 10 minutes or more per side).
6. Use both breasts at each feeding. Alternate starting side.
7. No supplements.
8. No artificial nipples or nipple shields.
9. Continue proper breast and nipple care.
 - Breast milk to nipples after feeding.
 - Adequate air drying after feeding.
 - Only water for cleansing of nipple and areola.
 - Well-fitted nursing bra.
10. Physical and psychological comfort.
11. Adequate rest — rest or sleep when the baby sleeps.

Good Maternal Nutrition and Hydration

1. Follow Daily Food Guide for Pregnant/Lactating Women (see attached).
2. Adequate liquids; drink to satisfy thirst.
3. Continue using a well-balanced daily vitamin-mineral supplement.
4. No universal food restrictions. Avoid high-calorie/low nutrient foods.
5. Limit postpartum weight loss to ½ pound per week (2 - 3 pounds per month). Do not drop below ideal weight for height.

Late Postpartum Period — Support System

1. Routine telephone follow-up within 24 to 48 hours after discharge.
2. Scheduled evaluation visit for mother and infant 5 to 7 days after discharge, or sooner if needed.
3. "Help-line" for immediate problem solving.

4. Public Health or Visiting Nurse referral.
5. Family friend or helper.
6. Mothers support groups

ENVIRONMENTAL CONTAMINANTS
AND THEIR SIGNIFICANCE FOR BREASTFEEDING
IN THE CENTRAL ASIAN REPUBLICS



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**ENVIRONMENTAL CONTAMINANTS
AND THEIR SIGNIFICANCE FOR BREASTFEEDING
IN THE CENTRAL ASIAN REPUBLICS**

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July 1993

This activity was funded by the U.S. Agency for International Development(A.I.D.), Bureau for Research and Development, Office of Health, through Cooperative Agreement No. DPE-5966-A-00-1045-00.



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EXECUTIVE SUMMARY

Breast milk contamination is an issue of concern among health professionals and the general population in the Central Asian Republics. Possible sources of contamination are agricultural pesticides, industrial chemicals, and radioactive materials. A review of the English literature and a limited review of the Russian literature on breast milk contamination in this area reveals a weakness in existing data. Published reports are not based on scientific analyses of breast milk samples. They often fail to specify the contaminant or provide details on the site. No information is available on infant outcomes from breast milk contaminants in the Central Asian Republics.

Previously unpublished data collected in three of the republics in 1988-89 provide useful information on substances found in breast milk samples from the area, including the range of concentration and the number of positive samples. In spite of the fact that DDT had been restricted in the former USSR, the presence of DDT and its metabolites suggests continuing use of this pesticide. The amount of toxicants found in breast milk in the Central Asian Republics is similar to amounts reported in breast milk from other areas of the world.

While most observers are aware of the potential risk of contamination through breast milk, there is less recognition of the importance of *in utero* exposure and direct exposure on infant outcomes. Sources that contribute to the mother's exposure may pose a greater risk to the fetus than to the breastfeeding child. Breast milk substitutes, water and food can be sources of contamination for young children. Drinking water is the major source of nitrate exposure for children.

For many substances, limiting breastfeeding is likely to have a small impact on the child's total body burden. For very stable, non-metabolized, fat-soluble materials like PCBs and DDT or its metabolites, breastfeeding may contribute disproportionately to the infant's exposure. However, studies conducted elsewhere report that chronic, low-level maternal exposures to environmental toxicants such as lead, nitrate, DDT, and PCBs have not resulted in measurable health effects in children who were exposed through breastfeeding.

There are several isolated cases in the world where high body burdens of chemicals have been found in infants, they were generally the result of maternal poisoning that occurred through acute exposure in the work place or accidental food contamination during processing activities. The greater concern than acute intoxicants, some believe, is the long-term carcinogenic effect of exposure to breast milk contaminants. Researchers using a model to estimate the potential cancer deaths from environmental chemicals in breast milk concluded that the lifetime risk of cancer mortality is significantly less than the loss of life due to deaths associated with bottle feeding.

While questions remain regarding the subtle and long-term impact of environmental contaminants on health outcomes, there is clear and documented evidence of the nutritional, immunological, contraceptive, and cost benefits from breastfeeding. A decline in breastfeeding rates in the Central Asian Republics would likely result in higher infant mortality and morbidity rates, and higher maternal fertility rates.

Based on current knowledge of risks and benefits, breastfeeding should be supported and encouraged by policy makers and health professionals in the Central Asian Republics. Health professionals and the



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public should be informed of the advantages of breastfeeding and the risks associated with failure to breastfeed. Rigorous research is urgently needed to determine whether contaminants in breastmilk constitute a problem in the Central Asian Republics, and if so, the scope of the problem. Available evidence and models suggest that potential declines in breastfeeding associated with fear of contaminants constitute a much greater threat to infant health than do contaminants in breastmilk. Environmental rehabilitation efforts should get underway to reduce contaminants and the risk of exposure to infants and all members of society.



ENVIRONMENTAL CONTAMINANTS AND THEIR SIGNIFICANCE FOR BREASTFEEDING IN THE CENTRAL ASIAN REPUBLICS

INTRODUCTION

In recent years, considerable attention has been focused on the environmental damage associated with industrial and agricultural practices in the former Soviet Union. As a result of *glasnost* and a developing ecological movement, information about environmental problems and their potential consequences has appeared in both professional literature and the lay media. A recent book is devoted solely to the environmental problems of the former USSR (Feshbach and Friendly, 1992).

This attention to environmental issues has stimulated scientific concern, raised public awareness and, perhaps, contributed to changes in practices that were harmful to the environment and its inhabitants. However, since the available data are often inadequate for an accurate assessment, some of the information may have exaggerated certain environmental hazards and diverted attention from more familiar and possibly avoidable problems. To some extent, this seems to be the case in reports of breast milk contamination.

In the Central Asian Republics (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan), most women initiate breastfeeding with initiation rates ranging between 80 and 90 percent. Health personnel have expressed concern about environmental contaminants in breast milk. There has been discussion of discouraging breastfeeding in highly polluted areas and providing breast milk substitutes. At the same time, there is concern about the effect of lower breastfeeding rates on infant morbidity and fertility. Health officials in all five republics report declining rates of breastfeeding initiation and duration (Welsby, 1993).

This paper looks at both concerns: the possible impact of breast milk contaminants on infant health and the potential effect of declining breastfeeding rates. Sources consulted were reports in the English literature on environmental and breast milk contamination in the Central Asian Republics, a limited evaluation of the Russian literature on the subject¹, unpublished data collected in the Central Asian Republics, and reports of breast milk contamination in other areas of the world.

A review of the English and Russian literature demonstrates the limitations of existing data. Assertions of breast milk contamination in the Central Asian Republics are not based on scientific analyses of breast milk samples. Reports lack specificity and numerical data. For example, many authors and reporters write in generalities, referring to "pesticides," "minerals," or "salts" as major environmental problems. When specific compounds were identified as contaminants in certain areas, there were rarely any detailed descriptions of the site. Furthermore, it is unclear whether these reports of environmental contaminants were based on assumptions or actual measurements.

The review also found that the connection between environmental contamination and illness was asserted without scientific substantiation. The environmental science literature, which covers the contamination of sites, tended to be separate from the literature describing health conditions.

¹ The Russian articles consulted are cited at the end of the reference list.



Recognizing the limitations of the published data, an attempt was made to identify other sources of information. With the help of physician Susan Welsby, a Wellstart consultant in Moscow, and the cooperation of several major scientific organizations in the Central Asian Republics², Wellstart International was able to obtain data based on actual analysis of contaminants in breast milk, cow's milk, and some food items from the Central Asian Republics. These previously unpublished data provide a firmer foundation for assessing the risks of breastfeeding and bottle feeding in the Central Asian Republics.

This paper begins with a literature review of environmental and breast milk contaminants in the Central Asian Republics and a discussion of their potential effect on infant health and development. This review is followed by a discussion of implications for public policy.

ENVIRONMENTAL CONTAMINANTS IN THE CENTRAL ASIAN REPUBLICS

The four most frequently cited sources of environmental contaminants in the Central Asian Republics are agricultural pesticides, industrial chemicals, radioactive materials, and human waste. Contaminants from any of these sources can affect the health and development of children. With the exception of human waste, they are all potential vehicles for breast milk contamination.

For female agricultural laborers in the Central Asian Republics, agricultural production could be a significant source of their exposure to contaminants. Pesticides, herbicides and fertilizers are used in cotton production³, the primary agricultural activity in the Central Asian Republics. Although there has been little industrial development in the Central Asian Republics, the possible toxic effect of exposure to industrial processes cannot be overlooked. In the few cases in the world reporting toxicity through breast milk, industrial exposures or poisonings were identified as the source of contamination. Prevention of such poisonings is largely dependent on the development and enforcement of health standards in the work place.

In addition to occupational risks, women are exposed to contaminants in their home and surroundings. Orchan Makhmudov, director of the Republican Scientific Research Institute for Pediatrics in Tashkent, Uzbekistan, reported that the breast milk of women living down wind of the Tajik Aluminum Works had fluorine contents four times above the acceptable norm (Welsby, 1993). The environment can be polluted by radioactive materials. Poorly monitored hazardous waste disposal sites are located in the Central Asian Republics. Potential household hazards include contaminated food and water and household

² The Institutions and the people who provided data include: Dr. Turegeldy Shurmanov, Director of the Almaty Scientific Research Institute on Regional Nutrition Problems; Dr. Viktor Radzinsky, Director of the Turkmenistan Republican Institute for Maternal and Child Health Protection; Dr. Kafan Subanbaev, Deputy Minister of Health for Kyrgyzstan; and E.M. Butaev, Chief of the laboratory of the Scientific Research Institute of Pediatrics of the Ministry of Health of Uzbekistan; and researchers: Sh.A. Bakanov, Botagoz Kadirsizova, V.I. Korolkova, B.Zh. Kusainovam, Dr. Murat Kuzhukeev, Satbek Musabekov, P.S. Nikov, Stanislav Peotrovsky, Gulnara Semenova, R.M. Smailova, Sh.S. Tazhibayev, G.S. Trepak, Y.S. Turdiev, V.A. Uzbekov, Dr. Vigdorovich; and translators: Dr. Bauyrzhan Amirov and Dr. Murat Kuzhukeev.

³ Ekstrom and Akerblom (1990) list pesticides that have been used on cotton crops in various part of the world. The list includes: carbendazim, DDT, diuron, DSMA, fluometuron, methyloxyethyl mercury, monocrotophos, MSMA, phosalone, and trifluralin. These authors list monocrotophos as highly hazardous (WHO classification), DDT and phosalone as moderately hazardous, and DSMA as slightly hazardous.

Pesticides used in cereal, dairy, and meat production in Northern Kazakhstan (Almaty Scientific Research Institute on Regional Nutrition Problems/WHO Collaborating Centre for Nutrition, 1986 Annual Report) include "metaphos, carbophos, chlorinophos, cyodrine, coral, trolen, TCM-3 (trichlorinemetaphos-3), 2,4 dichlorinephenol, DDT, alpha and gamma hexachlorinercyclohexanes, heptachlorine, and aldrine."



pesticides. Due to cumulative, continuous exposure, household pesticides may contribute disproportionately to contamination levels in the body.

Tables 1 A-D provide a list of substances used in the former Soviet Union that could pollute the water, air, soil or food. The list, which is not exhaustive, does serve to demonstrate that there are many substances that may raise concerns about environmental contamination. In general, there are few published data indicating that these substances have, in fact, contaminated the environment of the Central Asian Republics.

The large number of substances in this partial list makes it difficult to evaluate their importance as toxicants. The array of chemicals used in industrial societies is very broad. Many chemicals are fat soluble and would, theoretically, accumulate in human adipose tissue⁴. However, reports from other countries indicate that few have proven to be significant human contaminants. It should be noted, though, that not all fat-soluble chemicals have been studied.

BREAST MILK CONTAMINANTS IN THE CENTRAL ASIAN REPUBLICS

The extent to which environmental contaminants are present in the breast milk of women in the Central Asian Republics is unclear. Published information is limited as well as dated. Previous studies on breast milk contaminants of women in the former USSR mention DDT, DDE, and methylene chloride (Jensen, 1983).

Table 2 shows that these substances are only a few of the ones that have been reported in breast milk studies in other parts of the world. This table does not provide information on the quantitative significance of these substances; however, it does indicate that many materials have been documented to enter breast milk. The failure to identify a wider range of contaminants in breast milk in the Central Asian Republics undoubtedly reflects the paucity of studies rather than the absence of other substances in milk.

Recent unpublished data, presented in Tables 3 to 8, expand the list of substances found in some breast milk samples in the Central Asian Republics. The data, collected in 1988-89, are from studies of human milk donated by healthy, lactating women attending maternal and child health centers in different regions of Tajikistan, Turkmenistan and Kazakhstan⁵. Improvements in analytic techniques, rather than the presence of new contaminants, may account for the longer list. Although the number of "positive samples" for certain pesticides may appear high, the sensitivity of the assays that were used is not stated. In some cases, very low quantities were detected, indicating that a sensitive method was used.

The studies checked for DDT, several of its metabolites, and other pesticides and herbicides. Of the substances studied, three were not found in any samples (aldrin, propanide or "PRPD," and celtan). Tables 3 to 8 show the range of concentration and the number or percentage of positive samples.

⁴ In general, the majority of organic materials listed are fat soluble. Minerals are unlikely to be fat soluble unless bound in an organic form, such as methyl mercury. Reference works detailing chemical and known biological properties of these substances are available to assist in evaluating the hazardousness of specific materials.

⁵ For other data, sample selection and other details were not provided.



A few general conclusions can be drawn from the data. First, the presence of DDT and its metabolites DDD and DDE in a large portion of samples in the areas of study in Turkmenistan, Tajikistan, and Kazakhstan suggests that DDT continues to be used. The use of DDT was restricted in the former Soviet Union. Secondly, the use of pesticides may vary substantially in different regions, locales and households. Tables 4 to 7 show that pesticides appeared in breast milk samples from certain areas of Kazakhstan but not in others. Substances ranged widely in concentration (10- to 20 fold). Some substances were found in the breast milk of a small portion of women. High levels in individual women may indicate that they used fewer precautions during pesticide use.

Data from a study of the Taldy-Kagan and Almaty areas of Kazakhstan offer a comparison of contaminants in breast milk, cow's milk or water in samples collected during the same time period (Table 7). The analyses tested for more pesticides than previous studies. In the Taldy-Kagan samples, many different pesticide residues were identified. Most of these residues were found in both breast milk and water, although in some samples the level of concentrations was very low. Data on breast milk from the Almaty area showed somewhat fewer pesticides. For those pesticides found in breast milk in both Taldy-Kagan and Almaty, concentrations tended to be higher in breast milk samples from Almaty. In another study in Kazakhstan of pesticides in breast milk and cow's milk, contamination levels were much higher in cow's milk (Tables 6 and 11).

INFANT EXPOSURE AND ASSOCIATED RISKS

Exposure to Environmental Contaminants

Infant exposure to environmental contaminants can occur in utero, through breast milk, or by direct exposure. Theoretical estimates of exposure to toxic substances often overestimate the contribution of breast milk for two reasons. First, the duration of breastfeeding may be much less than assumed. Second, supplementary foods may substantially reduce breastmilk intake as well as contribute significantly to the baby's intake of pesticides (Tables 7, 8, 10, 11).

While most observers are aware of the potential risk of contamination through breast milk, there is less recognition of the importance of *in utero* exposure and direct exposure on infant outcomes. In situations where the concentration of environmental contaminants is high in breast milk, sources that contribute to the mother's exposure may pose a greater risk to the more vulnerable fetus than to the breastfeeding child. Increased maternal infertility, stillbirths, malformations and fetal growth retardation (low birth weight) are some of the possible prenatal manifestations of maternal (or for some outcomes, paternal) contamination.

Postnatally, the infant can be directly exposed to contaminated air, food, or water in the surrounding environment. In some areas of the Central Asian Republics, lack of proper sewage treatment facilities results in widespread contamination of water supplies. Drinking water and breastmilk substitutes prepared with this water can be a source of infant exposure to contaminants.

Drinking water is the major source of nitrate exposure for children. Water standards for nitrate (<45ppm) "appear adequate for protection against methemoglobinemia," but much higher levels are present in water in some areas of the former Soviet Union (Fan et al., 1987). High levels of nitrate in water are of greatest concern for infants and young children who get proportionately more of their total nitrate intake from water. Adult exposure is primarily through consumption of vegetables contaminated by fertilizers. Nitrates do not appear to concentrate in breast milk; milk levels parallel plasma levels.



Breastfeeding may protect infants from excess nitrates because it reduces water consumption, but available data are too limited to prove this hypothesis.

For many substances, limiting breastfeeding is likely to have a small impact on the child's total body burden. However, for very stable, non-metabolized, fat-soluble materials like PCBs and DDT or its metabolites, breastfeeding may contribute disproportionately to the infant's exposure. PCB use is largely limited to specific industrial applications where it is enclosed. DDT is now withdrawn or severely restricted in most countries, including the former USSR. (Jensen, 1983)

Potential Infant Outcomes

When high body burdens of chemicals are found in infants, they are generally the result of maternal poisonings from chemical exposure in the work place, manufacturing accidents, or accidental food contamination during processing activities. Listed below are associations that have been made between maternal poisonings and infant outcomes.

- *Mercury*: poorer cognitive function
- *Copper, lead, or cadmium*: stillbirth
- *Pesticides or radiation*: low birth weight
- *PCBs*: skin rash and discoloration, lethargy, and joint pain in the infant
- *Tetrachlorodibenzodioxin (TCDD)*: malignant neoplasm 20 or more years after exposure.

Reported effects of general environmental exposures are fewer. While environmental contaminants may not result in overt poisoning, they could contribute to disease and disability in widespread yet subtle ways. Below are specific associations cited in the literature.

- *Lead*: reduced IQ and attention deficits in children
- *DDT*: decreased lactation duration
- *Maternal dioxin*: altered newborn thyroid metabolism and an increased incidence of hemorrhagic disease
- *PCBs*: low birth weight
- *Nitrates*: methemoglobinemia (a condition that reduces the oxygen carrying capacity of the blood).

For most toxicants, the values found in breast milk in the Central Asian Republics are similar to values reported in breast milk from other areas of the world (Table 9). The U.S. Committee on Pesticides in the Diets of Infants and Children found no major study demonstrating that pesticide-concentrations had led to adverse health outcomes in children exposed through breastfeeding (National Research Council, 1993). At present, information on infant outcomes from breast milk contaminants is not available in the Central Asian Republics. Until such reports are available, information from studies in other areas of the world on infant exposure to environmental contaminants and health outcomes can help to inform policy decisions.



To date, chronic, low-level maternal exposures to environmental toxicants such as lead, nitrate, DDT, and PCBs have not resulted in measurable health effects in children who were exposed through breastfeeding. Of these environmental toxicants, only lead has been clearly implicated for affecting cognitive function and behavior in children who have been exposed to common environmental levels of contamination. None of the several well-controlled studies on the subject has identified breast milk as the source of this contamination. Even though the total exposure to PCBs is greater during breastfeeding, it is believed that prenatal exposure is largely responsible for associations between PCB exposure and functional outcomes. (Rogan, 1986)

In cases where breast milk contaminants have been associated with negative health outcomes, exposure was *acute* as a result of maternal poisoning. A greater risk, some believe, is the long-term, carcinogenic effect of exposure to breast milk contaminants. Below is a summary of the literature on accidental poisoning of infants through breast milk and the long-term effects on cancer outcomes.

Accidental Poisonings

Jensen (1983) summarizes several cases of accidental poisonings that occurred in various parts of the world. In one case, a mother was acutely exposed to perchloroethylene while visiting a dry cleaning facility. As a result, her breastfed child developed jaundice and abnormal liver function. Symptoms disappeared when breastfeeding was temporarily suspended.

In the early 1900s, several of the infants born to a woman employed in the lead industry died. Contaminated breast milk was implicated (but not demonstrated) as the cause of death. In 1933, infant lead poisoning was traced to maternal use of a contaminated toilet powder. It should be noted that the lead content of human milk is normally lower than the lead content of milk formulas (Jensen, 1983) but can be raised by chronic, high exposure. In general, blood lead levels are higher in formula-fed infants.

The literature mentions several other unique cases of accidental poisonings. In Turkey, grain intended for planting was treated with HCB (hexachlorobenzene). This treated grain was made into flour. Infant fatalities were reported among lactating women who had consumed the flour. HCB is now banned in many countries.

Food was also the source of breast milk contamination in another study. During the manufacturing process, PCB (polychlorinated biphenyl) contaminated the rice oil. PCB poisonings ("Yusho" disease) resulted in various skin and nail abnormalities and other symptoms in breastfed infants and infants exposed in utero. Adverse long-term effects on reproductive function have been observed in monkeys exposed to PCB.

In another incident, occurring several decades ago in Michigan, PBBs (polybrominated biphenyls) accidentally contaminated animal feed and created a major public concern about breastfeeding. No clinical effects, however, were demonstrated during the childhood of infants who had been exposed through breast milk.

Cancer Outcomes

Since several fat soluble environmental contaminants are carcinogens, many observers are concerned that exposure will subject breastfed children increased cancer rates during their lifetime. Long-term studies of breastfed and bottle-fed children, which could refute these fears, are not available. However, estimates by Rogan *et al* (1991) of potential cancer deaths from environmental chemicals in breast milk suggest that



the lifetime risk of cancer mortality is less significant than the loss of life due to deaths associated with bottle feeding.

Rogan *et al* synthesized current knowledge to estimate cancer deaths resulting from potential breast milk exposure to environmental toxicants. They compared these estimates with the estimates of life lost due to bottle feeding under relatively ideal conditions. Using data reported in the literature, they estimated the effects of six toxicants (DDE, dieldrin, heptachlor epoxide, oxychlorane, PCBs, TCDD). The 90th percentile values for all of these toxicants were assumed to be present in breast milk from the same woman. Milk intake was based on full breastfeeding (700g/day) for 9 months. Comparative death rates among bottle-fed and breastfed infants were based on mortality data from England. Carcinogenicity of the six listed breast milk contaminants was estimated from animal data⁶. Death was assumed to result shortly after onset of cancer, generally in adulthood.

Each of these assumptions is "conservative," tending to give maximal estimates of breastfeeding risk. No consideration was given to the carcinogenic role of aflatoxin in powdered milk or formula, the possible impact of pesticides in cow's milk on later cancer development, or the role of bottle feeding in increased incidence and thus disability and death from other diseases such as diabetes and Crohn's disease. Even with these maximal risk estimates, survival rates were higher for adults who had been breastfed in infancy⁷. In the Central Asian Republics, where the differences in death rates of breast and bottle-fed infants are probably greater than in England, the survival advantage for breastfeeding would be even more notable.

BENEFITS OF BREASTFEEDING

While questions remain regarding the long-term impact of environmental contaminants on health, there is clear and documented evidence of the health, contraceptive, and cost benefits from breastfeeding. These benefits are briefly discussed below.

Health Benefits

In the Central Asian Republics, infant mortality is between 40 and 60 per thousand, according to the U.S. Agency for International Development Health Profiles. Diarrhea and upper respiratory diseases are major contributors to infant mortality in these countries. Breastfeeding protects infants from contracting diarrhea and acute respiratory infections while water and breast milk substitutes can expose infants to bacteria and environmental contaminants. Water has been identified as a factor in the propagation of viral hepatitis, typhoid, and diphtheria.

The antibodies present in breastmilk serve as a child's first immunization. In view of recent declines in immunization rates in the Central Asian Republics, the immunities passed to the child through breast milk are very important. In addition to protecting infants against disease, breast milk meets all of an infant's nutritional requirements for growth and development for about the first six months of life.

⁶ Note, however, that these substances are generally not demonstrated human carcinogens.

⁷ Furthermore, there is substantial disagreement about the methods used for estimating carcinogenicity and potential cancer deaths from environmental chemicals. Gold *et al.* (1992) have pointed out that natural food ingredients are as likely as pesticides and other synthetic chemicals to be carcinogenic in tests with rodents. Yet the natural chemicals are present in foods at concentrations thousands to tens of thousands times as high as all pesticides combined. Thus pesticide cancer risk may be greatly exaggerated by rodent tests.



Contraceptive Benefits

Breastfeeding modulates maternal fertility and improves birth spacing, particularly where contraception is not available or not practiced. In the Central Asian Republics, fertility is high, and contraceptive use is low. In 1990, total fertility rates, when adjusted for under reporting, were estimated to be as follows: Kyrgyzstan, 3.9 children per woman; Kazakhstan, 2.9; Turkmenistan, 4.4; and Tajikistan, 5.2 (US Bureau of the Census).

Family size and population growth are high in the Central Asian Republics, resulting in high dependency ratios. Population growth in the 1980s ranged from more than 3% in Kazakhstan, Turkmenistan and Tajikistan to 2.0% in Kyrgyzstan. These rates were considerably higher than the 0.7% growth rate of the former USSR. If birth spacing were to decrease, the economic and health burden of feeding infants with breast milk substitutes would become even greater. Population growth would require increased agricultural productivity, but some individuals are concerned that local agriculture would not be able to meet these demands due to shrinking water resources and deteriorating land quality.

Cost Savings

Breast milk, with its ideal composition and sterile packaging, is inexpensive. Breast milk does not require special resources (like refrigeration) or cash for purchase. It can be produced from all indigenous diets suitable for adults, without technological know-how or industrial development.

If breast milk substitutes are available, their price may be prohibitive. Hard currency is in short supply in the former Soviet Union, limiting purchases of breast milk substitutes from other countries. Purchase of breast milk substitutes diverts needed resources away from other family members, thus, increasing their poverty and undernutrition. For many families, low family income precludes formula use.

IMPLICATIONS OF BREAST MILK CONTAMINATION FOR PUBLIC POLICY

Some observers assume that if toxic substances can be demonstrated in breast milk, breastfeeding should be prevented or discouraged. This position is not supported by the information reported in this literature review. The conclusion of various studies of breast milk contaminants is that the known risks of adverse health effects are small while the benefits of breastfeeding are great.

If breastfeeding is allowed to decline, serious undesirable consequences can occur. In the Central Asian Republics, these consequences will include increased infant mortality, increased demands on the curative health care system, increased demand for hard currency to buy breast milk substitutes and, most likely, increased birth rates as a result of shorter birth intervals.

The findings of this review have the following policy implications for education, research, and environmental rehabilitation.

Education

The idea that breast milk is "toxic" should be disputed. Knowledge of the immediate advantages of breastfeeding, both nutritionally and immunologically, should be widely disseminated so that informed evaluation can be made of any suspected or verified risks. It is important for the public to understand that if breastfeeding is allowed to decline, serious undesirable consequences will result.



The public should be aware that whole cow's milk is not an appropriate nutritional substitute for breast milk. Furthermore, if milk is from local cows or is diluted with local water, it will be contaminated (often at higher levels) with the same toxicants found in maternal milk in the area. Additional contamination of breast milk substitutes can come through enteric bacteria and other pathological organisms in the water.

The public should also be informed of ways to reduce their exposure to environmental contaminants, including the proper use of pesticides and dietary changes. DDT and PCBs can be ingested through consumption of contaminated fish and animal fat. Studies indicate that vegetarian women have lower levels of fat-soluble pollutants than do omnivorous women. Limiting weight loss during lactation could help to reduce mobilization of fat-soluble toxicants such as DDT, DDE and PCBs. In areas where maternal lead exposure is a problem, bone and lead mobilization might be reduced by ensuring adequate intake of vitamin D and calcium during pregnancy and lactation.

Research

Efforts must be made to collect more scientific data on the actual level of contamination in breast milk, other milks and foods, and water. Due to the paucity of factual information, early work should focus on identifying the most serious environmental toxicants. Work in other countries has shown the need to carefully and fully document the scope of the problem, educate the public about the most serious issues, and work on the most hazardous problems first.

Research is urgently needed to specify levels of contaminants in breast milk in highly polluted areas and to investigate any consequences for children. Population-based studies of breastfeeding practices in the

Central Asian Republics were not found in the literature. Such information, gathered from a representative population sample, is important for determining infant exposure during breastfeeding.

To appropriately assess the public health effect of breast milk contaminants, the following information is needed:

- maternal demographic characteristics (age, parity, precise geographic areas of residence)
- maternal history of exposure (risk status), including occupational and household exposure and dietary contributors
- breastfeeding practices (incidence, frequency, and duration of exclusive and partial breastfeeding)
- infant exposure through other sources such as breast milk substitutes and water
- levels of breast milk contamination, and
- maternal and infant health outcomes and functional outcomes.

Any reports on breast milk analysis should indicate the range of concentration in positive samples using a specific variance indicator such as standard deviation. Reports should state the analytic methods that were used and give the lower limit of detection under standard conditions of analysis. Studies of breast milk are likely to discourage public support for breastfeeding unless they are carefully designed and



responsibly reported. The benefits of breastfeeding should be considered along with data about contamination.

In addition to breast milk analysis, routine blood tests and the analysis of tissue samples obtained during surgeries could provide useful information. If collected with attention to good sampling principles, data from tissue and blood analysis could be more representative of the population than breast milk analysis. Consideration should be given to the development of procedures for routine tissue and blood sample collection and examinations. Monitoring direct infant exposures to environmental contaminants is another research activity that should be considered.

Environmental Rehabilitation

The possible subtle effects of environmental contamination on health and development can be reduced if policies are enacted to rehabilitate the environment. Rigorous studies of breast milk contamination could serve to raise awareness among professionals about more widespread environmental problems. Studies have demonstrated that 6 to 12 months of breastfeeding is generally responsible for a limited amount of exposure compared to 60 to 70 years of direct exposure to environmental contaminants. Existing concern about infant exposure to toxins provides an opportunity to educate the public about other environmental health problems and to mobilize support for corrective actions.

Information collected in studies in other countries and approaches field-tested elsewhere could help to inform public policy and minimize delays in undertaking programs to rehabilitate the environment.

The previously unpublished data presented in this paper indicate that banned substances are still in use in the Central Asian Republics. An early step in rehabilitation efforts should be to reduce use of previously banned chemicals and enforce regulations on pesticide use.

In summary, the actions suggested by this review are as follows:

- **Support breastfeeding.** Educate health professionals and the general public about the nutritional, immunological, contraceptive and economic benefits of breastfeeding.
- **Define the scope of the problem.** Include total lifetime exposure risks when examining infant exposure risks. Begin research studies of the biological loads of the most hazardous substances in an area. Examine alternative (breastmilk substitute) and additional (e.g., air, water, and weaning food) sources of exposure for infants. Monitor breastfeeding practices and sources of exposure.
- **Reduce contaminants.** Identify local sources of contaminants and take action to prevent continued build-up. Enforce existing regulations for chemical use, including bans on certain substances. Use data from other countries as well as local data to develop rehabilitation plans based on a formal set of priorities.
- **Reduce risk of exposure.** Observe maximum safety measures in the work place, at hazardous waste disposal sites, and at home. Improve water and sewage treatment facilities.

Environmental problems are numerous and sometimes severe. Perseverance will be needed in an effort that requires costly input as well as long-term commitment.



TABLE 1A

ENVIRONMENTAL CONTAMINANTS IN AREAS OF THE FORMER USSR:^{1,2}

Contaminated medium not specified
(possibly in soil, food, water, and/or air)

<u>Generic:</u> salts, bacteria, fertilizers, pesticides, and defoliants
<u>Elements/minerals:</u> aluminum, antimony, arsenic, asbestos, chloride, chromium, cobalt, fluorite, fluorides, lead, manganese, mercury, molybdenum, nitrite, phosphate, selenium, silver, tellurium, titanium, tungsten, uranium, vanadium, zinc
<u>Organic materials:</u> aldrin, alkenyl substituted benzenes, benzene hexachloride, butifos, DDT, fazolone, fenitrothion, gardon, hexamethylene diamine, lindane, malathion, methyl styrene, mono and di-nitrobenzoates, Mg-ammophos, nitrobenzene, nitrotoluenes, omate, opoka dust, pentachloronitrobenzene, phenols, phthalate esters, polychlorophenols, prometrine, propoxur, styrene, treflane, viroden

TABLE 1B

ENVIRONMENTAL CONTAMINANTS IN AREAS OF THE FORMER USSR:

Air polluting substances

<u>Elements/minerals:</u> Arsenic, beryllium, bismuth, cobalt, cadmium, chromium, copper, fluorine, mercury, nickel, lead, selenium, thorium, uranium, vanadium, ozone, sulfur dioxide, nitrogen dioxide, other nitrogen oxides, carbon monoxide, ash ³ , asbestos, hydrogen sulfide, hydrochloric acid, hydrofluoric acid, carbon disulfide
<u>Organic materials:</u> acetaldehyde, ambush, azocene, benzopyrene, CFCs, chlorinated hydrocarbons, dichlorpinacolin, 1,2 dichloroethane, dimethylformamide, dioxins, formaldehyde, freon, mercaptan, polycyclic aromatic hydrocarbons, phenols, PCBs, permethrine, sevin, trichodermin



TABLE 1C

**ENVIRONMENTAL CONTAMINANTS IN AREAS OF THE FORMER USSR:
Water polluting substances**

<u>Elements/minerals:</u> Arsenic, calcium, cadmium, chlorine, cesium ¹³⁴ , copper, mercury, iodine ¹³¹ , magnesium, ammonia nitrogen, lead, strontium ⁹⁰ , sulfite, zinc, nitrates, nitrites, potassium
<u>Leached with acid rain:</u> Arsenic, beryllium, cadmium, cobalt, copper, nickel, lead, zinc
<u>Salt:</u> (sodium chloride specifically, as well as other mineral salts) is a major problem of rivers and other water bodies. The Aral Sea is said to contain 27 g (one ounce!) of salt per liter. Human milk contains about 0.37 g/l and cow's milk about 1.1 g/l
<u>Organic materials:</u> bacteria, benzopyrene, chlorinated phenols, hexachlorane, hydrocarbons, fatty acids, lignin, mono and difurfurylidene acetone, PCBs, pesticides, phenols, phthalimide, polychloronaphthalenes, polycyclic aromatic hydrocarbons, prothiophos, trifluralin (a dinitroaniline herbicide)

TABLE 1D

**ENVIRONMENTAL CONTAMINANTS IN AREAS OF THE FORMER USSR:
Food contaminants cited in the literature**

aflatoxin, benzopyrene, dimethoate, fenitrothion, formothion, fosmet, malathion, phenthoate, phosalone, patulin, nitrite, nitrates
--

Notes for Tables 1A-D:

1. Several pesticides and other substances such as DDT, aldrin, dieldrin, butifos, chlordane, hexachlorobenzene, PCBs, mirex, toxaphene, endrin, and heptachlor are either no longer manufactured, are restricted in use, or are outlawed in the U.S. and elsewhere. The USSR reportedly banned aldrin, dieldrin, endrin, chlordane, heptachlor, DDT, thimet, azinphos-methyl, dialiphos, dicrotophos, isofenphos, Ultracide, Namacur, isodrin, carbamates, Temik, dioxicarb, dithiocarbamates, ziram, maneb, bipyridiliums, parathion, demeton, methyl demeton, Ekatin, Thiocron, dinoseb, and paraquat, and restricted the use of DDD. Whether all of these restrictions are observed or enforced is disputed.

2. This list has been culled from a variety of published sources (see bibliography). Some of these sources provided only abstracts or lacked documentation for their claims of contamination. Major sources consulted for this list are Golovleva, 1992; Kutz et al., 1991; Goldberg, 1989; Feshbach and Friendly, 1992; "The Quest for Clean Water" (unknown author); Levy, 1991; Technical University of Budapest, 1992; Bobak and Leon, 1992, and Keller, 1990.

3. Substances such as ash, asbestos, nitrogen dioxide, and ozone may have an adverse effect on lung function when inhaled but no adverse effect through breastfeeding.



TABLE 2

SOME SUBSTANCES THAT HAVE BEEN IDENTIFIED IN HUMAN MILK (WORLD-WIDE)

aldrin	dieldrin	lindane (gamma HCCH)	pentachlorobenzene
arsenic	DDT, DDE, DDD	mercury	perchloroethylene
benzene	Freon 113	methylene and its chloride	PBB, PCB, PCT
benzaldehyde	halothane	methyl mercury	polychlorinated terphenyls
bromide	heptachlor and its epoxide	Mirex	polonium 210
cadmium	hexachlorobenzene	naphthalene	toluene
carbon disulfide	hexachlorocyclohexanes	nicotine	selenium
cesium 137	iodine 129	nitrate	TCDD (a dioxin)
chlordane	kepone (chlordecone)	t-nonachlor	zinc compounds
chloride	Kerb (herbicide)	oxychlordane	
chlorofluoromethanes	lead 210	parathion	
chloroethylenes	limonene	paroxon	
chloroform			
cyclic alkanes			

From Wilson et al., 1980; Kanja et al. (Nairobi), 1992; Kutz et al., 1991; Rogan et al., 1991; Jensen, 1983; Schrieber, 1992, and others.



TABLE 3

PESTICIDES IN WHOLE HUMAN MILK* [(mg/l) x 100]
(Range of values and number positive)

REPUBLIC	Turkmenistan		Tajikistan
Region	Ashgabat	Uly-tan	Dushanbe
Period	May-July '89	May-July '89	July-Sept '89
	N = 16	N = 8	N = 43
PESTICIDE TESTED:			
Hexachlorocyclohexane (HCCH):			
gamma HCCH	0.02 ¹ (1/16) ²	—	0.007-9.2 (23/43)
alpha HCCH	0.28-6.3 (16/16)	—	0.016-0.35 (19/23)
DDT and Metabolites:			
pp DDT	0.06-0.5 (13/16)	0.07 (7/8)	1.0-1.1 (29/43)
op DDT	—	—	—
pp DDE	—	—	0.14-0.28 (8/43)
op DDE	—	—	—
pp DDD	0.28-6.3 (16/16)	0.043;2.3 (8/8)	0.21-12 (43/43)
op DDD	0.08 (1/16)	—	—
Others:			
metaphos	—	—	0.48 (1/43)
carbophos	—	—	—
TCM-3 ³	—	—	—
thiodane	—	—	0.16-0.64 (7/43)
Bi-58	—	—	—

Data from the Almaty Scientific Research Institute on Regional Nutrition Problems/WHO Collaborating Centre for Nutrition.

¹To convert numbers to mg/liter, divide number by 100.

²The numbers in parentheses indicate the number of positive samples over the total number of samples analyzed.

³TCM-3 is trichlorinemetaphos-3.

*Whole human milk was tested, rather than the fat-fraction of human milk.

— Double dashes indicate that no samples were positive.



TABLE 4

PESTICIDES IN WHOLE HUMAN MILK [(mg/l) x 100]

REPUBLIC	Kazakhstan					
Region	Atyrau	Atyrau	Chimkent	Chimkent	Dzhambul	Kzylorda
Period	Aug '88	1990	Aug '88	1990	Aug '88	Aug '88
	N = 11	N = 21	N = 22	N = 44	N = 8	N = 14
PESTICIDE TESTED:						
HCCH:						
gamma HCCH	1 ¹ (2/11) ²	0.014	0.6-13 (16/22)	0.18	-	-
alpha HCCH	3 (1/11)	0.02	0.03-8 (2/22)	0.03	-	0.01- 0.03 (2/14)
DDT and metabolites:						
pp DDT	6-8 (3/11)		-		-	-
op DDT	-		1-10 (2/22) [^]		1.6-3 (2/8) [^]	5-10 (2/14) [^]
pp DDD	3-14 (4/11)		[^]		[^]	[^]
op DDD	-		4-68 (14/22) ⁺⁺		0.1-13 (7/8) ⁺⁺	1-30 (13/14) ⁺ ⁺
pp DDE	6-98 (9/11)		⁺⁺		⁺⁺	⁺⁺
op DDE	-		-		-	-
DDT metabolites		1.9		1.2		
Others:						
metaphos	-	-	-	-	0.8 (1/8)	1-10 (2/14)
carbophos	4-22 (7/11)	0.47	-	5.3	3-20 (7/8)	-
TCM-3	-	-	-	-	0.3-0.5 (2/8)	1.3 (1/14)



Region	Atray	Atyrau	Chimkent	Chimkent	Dzhambul	Kzylorda
thiodane	--		--		--	--
Bi-58	0.8-15 (2/11)	0.1	--	--	0.08-3 (3/8)	0.02-23 (4/41)

Data from the Almaty Scientific Research Institute on Regional Nutrition Problems/WHO Collaborating Centre for Nutrition. For Tables 4 and 5, data for 1986 and 1990, the mean of the analyzed samples is given.

¹To convert numbers to mg/liter, divide number by 100.

²For 1988 data, the range of concentrations in positive samples is given. The numbers in parentheses indicate the portion of positive samples.

-- Double dashes indicated that no samples were positive.

-- Indicates that the measurement was of both isomers combined (o,p DDD & p,p DDE).

^ Indicates that the measurement was of both isomers combined (o,p DDT & p,p DDD).



TABLE 5

PESTICIDES IN WHOLE HUMAN MILK [mg/l] x 100]

REPUBLIC	Kazakhstan							
Region	Almaty	Almaty	Kustanai	Kustanai	Akmola	Akmola	Kokchetav	North Kazakhstan
Period	Aug '88	1990	Aug '88	1986	Aug '88	1990	1986	1986
	N = 14	N = 26	N = 7	N = ?	N = 11	N = 10	N = ?	N = ?
PESTICIDE TESTED:								
HCCII:								
gamma HCCH	0.2-2 ¹ (4/14) ²	0.015	10 (1/7)	0.13 (100%)	0.04-1 (7/11)	0.083	0.26 (100%)	0.35 (80%)
alpha HCCH	0.06 (1/14)	0.0005			0.07 (1/11)	0.005		
DDT and metabolites:								
pp DDT	0.6 (1/14)		--		--			
op DDT	2-4 (3/14) [^]		--		--			
pp DDD	[^]		--		--			
op DDD	1.3-23 (6/14)++		4-130 (3/7)++		1.4-48 (7/11)++			
pp DDE	++		++		++			
op DDE	--		--		--			
DDT metabolites		0.5				1.6		



Region	Almaty	Almaty	Kustanai	Kustanai	Akmola	Akmola	Kokchetav	North Kazakhstan
Others:								
metaphos	0.1 (1/14)	0.09	--		3.7-10 (3/14)	0.13		
carbophos	--	1.4	8-310 (2/7)		--	--		
TCM-3	0.9 (1/14)	0.005	--		0.1 (1/14)	--		
thiodane	--		--		--			
Bi-58	--	--	--		--	--		

Notes: See Table 4.

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TABLE 6

PESTICIDES IN HUMAN MILK BY SEASON [mg/l) x 100]

REPUBLIC	Kazakhstan				
Region	North Kazakhstan				
Period	1986				
	N = 74				
	Mean¹	Percentage of positive samples			
		Fall (N = 20)	Spring (N = 14)	Summer (N = 20)	Winter (N = 20)
PESTICIDE TESTED:					
HCCH:					
gamma HCCH	0.5	90% +	88% +	45% +	20% +
alpha HCCH	0.5	60% +	93% +	100% +	20% +
DDT and metabolites:					
"DDT"	1	60% +	14% +	15% +	10% +
"DDD"	2	100% +	35% +	80% +	90% +
"DDE"	0.5	80% +	7% +	15%	5% +
Others:					
	Mean¹	Fall (N = 20)	Spring (N = 14)	Summer (N = 20)	Winter (N = 20)
metaphos	0.19	20% +	35% +	35% +	5% +
carbophos	0.08	0% +	7% +	80% +	0% +



Region	Kazakhstan				
TCM-3 ²	0.5	55% +	35% +	35% +	0% +
heptachlor	0.1	50% +	7% +	20% +	30% +
aldrin	0.2	15% +	7% +	0% +	0% +

¹To convert mean to mg/liter, divide number by 100.

²Mean shown is an unweighted simple mean of values from the 4 seasons.



TABLE 7

PESTICIDES IN WHOLE HUMAN MILK, WATER, AND COW'S MILK [(mg/l) x100]
(Range of values and number positive)

REPUBLIC	Kazakhstan			
Region	Taldy-Kalgan		Almaty	
Period	Apr-Jun '92		Dec '87	
	Breast milk	Water	Breast milk	Cow's milk
	N = 24	N = 37	N = 26	N = 19
HCCH:				
gamma HCCH	—	0.04-0.0009 (22/37)	0.1-5 (5/26)	0.01-2 (11/19)
alpha HCCH	—	—	0.01-1 (16/26)	—
DDT and metabolites:				
pp DDT	0.0005 (1/24)	—	0.2-40 (10/26)	1 (1/19)
op DDT	0.003-14 (5/24)^	—	1-15 (10/26)^	0.5-2 (2/19)^
pp DDD	^	—	^	^
op DDD	0.25-8 (19/24)++	0.00002-0.006 (3/37)++	5-72 (25/36)++	0.5-2 (2/19)++
pp DDE	++	++	++	++
op DDE	0.009-3.4 (3/24)	0.0001-0.002 (8/37)	5 (1/26)	—
Others:				
metaphos	0.16-0.5 (3/24)	0.001-0.02 (9/37)	0.4-8 (8/26)	0.3-2 (9/19)
carbophos	0.01-3.3 (8/24)	0.0006-0.004 (12/37)	—	—
TCM-3	0.2 (1/24)	—	—	0.06 (1/19)
	N = 24	N = 37	N = 26	N = 19
thiodane	0.6 (1/24)	0.0003-0.02 (12/37)	—	—
Bi-58	—	—	—	—



Region	Taldy-Kalga		Almaty	
Propanide	0.25 (1/24)	0.002-0.02 (10/37)	-	-
Heptachlorine	-	-	-	-
Saturn	14-50 (2/23)	-	-	-
Akreks	-	0.01-0.05 (9/37)	-	-
A30	0.2-24 (10/24)	0.002-0.6 (13/37)	-	-
Kaltin	0.005-0.8 (8/24)	0.0001-0.002 (6/37)	-	0.03 (1/19)

Notes: see Table 4.



TABLE 8

PESTICIDES IN WHOLE HUMAN MILK AND COW'S MILK [(mg/l) x 100]
(Range of values and number positive)

REPUBLIC	Kazakhstan			
Region	Almaty		Almaty	
Period	Mar '88		July '88	
	Breast milk	Cow's milk	Breast milk	Cow's milk
	N = 13	N = 10	N = 7	N = 11
HCCH:				
gamma HCCH	1-5 (6/13)	0.6-0.7 (2/10)	0.3 (1/7)	0.2-3 (10/11)
alpha HCCH	-	-	0.3 (1/7)	0.2-11 (11/11)
DDT and metabolites:				
pp DDT	1 (1/13)	-	1-9 (3/7)	1-9 (2/11)
op DDT	2-6 (10/13)^	0.5-5 (9/10)^	1-5 (3/7)^	3-19 (3-11)^
pp DDD	^	^	^	^
op DDD	2-10 (12/13)++	1-3 (4/10)++	9-27 (4/7)++	11-12 (2/11)++
pp DDE	++	++	++	++
op DDE	-	-	-	2-31 (2/11)
Others:				
metaphos	-	-	-	-
carbophos	-	-	-	-
TCM-3	-	-	-	1 (1/11)
thiodane	-	-	-	-
Bi-58	-	-	-	-
Propanide	-	-	-	-
Heptachlorine	-	-	-	-
Saturn	-	-	-	-
Akreks	-	-	-	-
A30 (chlorobiphenyl)	-	-	-	-



Region	Almary		Almary	
	N = 13	N = 10	N = 7	N = 11
Kaltin	-	-	0.005-0.8 (8/24)	0.0001-0.002 (6/37)

Notes: see Table 4.



TABLE 9

PESTICIDES IN HUMAN MILK IN OTHER COUNTRIES [(mg/l) x 100]

Region	United States	Canada	Kenya (Nairobi)	Austria (Vienna)	Belgium	Denmark (Aarhus)	Japan	Japan
			1986	1973-4	"1968?"	1965	1971	1979
				N = 22	N = 20	N = 6	N = 644	N = 35
Data Source ⁺⁺	Calabrese, 1982 (from Rogan et al, 1980) ("typical levels")	Same	Kanja et al, 1992	Jensen, 1983	Same	Same	Same	Same
HCCH:								
alpha HCCH		0.3	<0.0002 (1/8)**					
sum of HCCH							7.2 ¹	3.5 ¹
DDT and metabolites:								
pp DDT				4	4.7 [2- 7.5]	2.9		
pp DDE				12.2	7.2 [4- 10.5]	5.0		



Region	United States	Canada	Kenya (Nairobi)	Austria (Vienna)	Belgium	Denmark (Aarhus)	Japan	Japan
sum of DDT metabolites	5-20	13	15.4 [2.6-32.7]** (8/8)	16.2 [7.7-35.8]		8.5 (6/6)		

¹To convert tabulated numbers to mg/liter, divide number by 100.

^{**}References cited here include data from other sources cited in the references.

^{**}Numbers in () parentheses are number of samples positive over total number of samples. Numbers in [] brackets show range of values in positive samples.



TABLE 10

PESTICIDES IN COW'S MILK AND MEAT [(mg/l) x 100]

REPUBLIC	Kazakhstan				
Region	North Kazakhstan				
Period	1986				
	Mean ¹	Mean	% positive	Mean	% positive
	Breast milk	Cow's milk		Cow meat	
	N = 74	N = 43		N = 33	
HCCH:					
gamma HCCH	0.5	2	80%	0.1	95%
alpha HCCH	0.5	5.7	96%	0.7	90%
DDT and metabolites:					
"DDT"	1	3.9	27%	2.2	32%
"DDD"	2	2	42%	0.1	85%
"DDE"	0.5				
Others:					
metaphos	0.19	0.5	50%	0.6	50%
carbophos	0.08				
TCM-3	0.5	0.8	50%	0.9	64%
heptachlor	0.1				
aldrin	0.2				

Data from the Almaty Scientific Research Institute on Regional Nutrition Problems/WHO Collaborating Centre for Nutrition. Means shown for breast milk are the same as shown in Table 6, and are the unweighted simple mean of values from the 4 seasons.

¹To convert mean to mg/liter, divide number by 100.
Blanks indicate no data were reported.



TABLE 11

PESTICIDES IN COW'S MILK BY SEASON [(mg/l) x 100]

REPUBLIC	Kazakhstan				
Period	1986				
	Mean ¹	Percentage of positive samples			
	N = 43	Fall (N = 15)	Spring (N = 8)	Summer (N = 10)	Winter (N = 10)
HCCH:					
gamma HCCH	2	66%	88%	100%	70%
sum of HCCH	7.7	93%	100%	100%	90%
DDT and metabolites:					
"DDT"	3.9	78%	0%	30%	0%
"DDD"	1.7	86%	12%	60%	10%
"DDE"	8	79%	0%	30%	10%
sum of DDT metabolites	5	86%	12%	80%	10%
Others:					
metaphos	0.52	88%	63%	40%	10%
carbophos	13.5	60%	88%	100%	0%
TCM-3 ²	0.8	62%	78%	60%	0%
chlorinephos	267	73%	0%	40%	10%
aldrin	0.2	28%	0%	0%	0%
2,4 dichlorinephenol	—	—	—	—	—

Data from the Almaty Scientific Research Institute on Regional Nutrition Problems/WHO Collaborating Centre for Nutrition. Unpublished annual report, 1986.

Note: First column of data are the same data as shown in the first column of data in Table 10.

¹To convert mean to mg/liter, divide number by 100.



TABLE 12

ALFLATOXIN CONTAMINATION OF DAIRY PRODUCTS IN SOUTH EAST KAZAKHSTAN (1990)

FOOD ITEM	# Samples		Aflatoxin levels [(mg/l) x 100]			
	Total #	# (%) contam.	B1 range	B1	G1	M1
Whole cow's milk	41	--	--	--	--	--
Powdered milk	119	21 (18%)	0.01-0.08	0.075	0.13	0.02
Hard Cheese	63	5 (8%)	++	0.63	0.10	--
Butter	45	13 (29%)	0.01-0.08	^	--	--
INFANT FORMULAS:						
Malysh	52	13 (25%)	0.01-0.08	1.25	0.18	--
Maylutka	7	2 (28%)	0.08	^	^	--
Vitalak	31	7 (23%)	0.02-0.08	^	^	--
Detolact	25	1 (4%)	^	0.54	0.58	--
"4Molocnaya smesi"	12	--	--	--	--	--
Total N	395					
Total positive		62 (15.6%)		55	7	3

Data from Almaty Scientific Research Institute on Regional Nutritional Problems/WHO Collaborating Centre for Nutrition. Unpublished annual report, 1990.

Note: table provided had several inconsistencies, making data hard to interpret.

-- Substance not found in food named.

++ Data provided were not useable.

^ No data provided.



TABLE 13

**CADMIUM IN BREAST MILK AND DRINKING WATER [(mg/l) x 100]
ARAL SEA REGION OF TURKMENISTAN
(Summer 1990)**

	Whole Breast milk	Drinking Water
	N = 10	N = 10
Cadmium concentration	0.4	290-730

Data from Turkmenistan Institute for Maternal and Child Health Protection, and the Chemical Institute. Dr. Viktor Radzinsky, Director of Institute for MCH Protection. Researchers: D. Orazvalieva (Inst. for MCH Protection), Mr. Iskanderov (Chemical Institute).

Note: only one figure was provided for breast milk but a range was provided for water. I assume the breast milk value is a mean.

TABLE 14

CADMIUM IN HUMAN MILK IN OTHER COUNTRIES [(mg/l) x 100]

Region	Vienna, Austria	Munster, Germany	Uppsala, Sweden	Cinn. Ohio, USA
	1975	1976	1978-9	1968
	N = 20	N = 5	N = 41	N = 22
Cadmium	4.3 [2.8-9.5]	1.0 [0.3-3.5]	0.01 (median) [0.05-0.38]	1.9

Data Source: Jensen, 1983.



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LEVELS OF DIOXINS, DIBENZOFURANS AND OTHER CHLORINATED XENOBIOTICS IN HUMAN MILK FROM THE SOVIET UNION

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KEYWORDS: Dioxins, Dibenzofurans, Human milk, Soviet Union, Chlorinated Xenobiotics, Siberia
ABSTRACT

This paper documents, for the first time, levels of PCDD/Fs in human tissue from the Soviet Union. Levels of dioxins and PCBs are lower than in some heavily industrialized countries such as West Germany (FRG). Dibenzofurans, in contrast to dioxins, are usually similar, in milk from most FRG, the United States (U.S.), and Soviet Union (USSR) locations. Only PCB congener number 28 is higher than in the FRG. Levels of DDT and alpha and beta HCH are higher in the USSR samples than in FRG or U.S. samples. Regional differences are noted within and between countries. Dioxin equivalents usually average slightly higher in West Germany, followed by the U.S., with the USSR slightly lower.

INTRODUCTION

This study is part of an ongoing international investigation of human milk PCDD/F levels. One objective is to determine differences in levels between various geographical areas. Dietary and other variables such as industrialization may lead to differing values.

A collaborative international scientific pilot study began in 1988 which included scientists from the Soviet Union, Finland, the U.S., and the Federal Republic of Germany. The purpose of the study was to characterize the existence of chlorinated dioxins, dibenzofurans, PCBs, and other chlorinated chemicals in the Soviet Union in human tissue, food, wildlife and the environment. In the Soviet Union, the Academy of Sciences of the USSR, especially the Siberian branch, was the lead agency, with the Academy of Medical Sciences playing a supportive role. A number of institutes participated in this joint venture, including the Institute of Organo Element Compounds in Moscow, the Limnology Institute in Irkutsk, the Institute of Bio-organic and also the Institute of Organic Chemistry in Novosibirsk, and the Institute for Ecological Toxicology in Baikalsk.

A practical purpose constitutes an underlying rationale for this study. When documentation of avoidable contamination with dioxins is found, it is the hope of scientists affiliated with the Academies of Sciences and also of Medical Sciences to help design

affiliated with the Academies of Sciences and also of Medical Sciences to help design preventive, therapeutic and remedial programs, to avoid future contamination and to begin action to lower present levels, where objectionably elevated. The results are compared to our previous studies on dioxins in human milk, performed independently and jointly, and partially done in collaboration with WHO studies. (1-10)

METHODS

Two working trips to the Soviet Union were made by one of the authors, (AJS), in September, 1988, and in July, 1989. Specimens were collected at hospitals from volunteers in chemically cleaned glass containers, most with Teflon lined caps. Generally, samples were pooled before analysis. The cities included Moscow, Novosibirsk, Irkutsk, Listvianka, and Baikal City (Baikalak), among others. In particular, the "Acadengorodok" (academic town or city) of Novosibirsk served as a base of operations, as did Moscow. The samples were prepared and analyzed in general, as soon as obtained. The specimens were frozen and kept frozen until delivered to the laboratory.

The dioxin analytic methodology follows. PCDDs, PCDFs, and other chlorinated xenobiotics were extracted along with fat and other lipophilic compounds by means of organic solvents. An aliquot of the fat was fortified with seven ¹⁴C-labelled dioxins and furans. Gel permeation chromatography on Bio-Beads S-X 3 was used for removal of fat followed by column chromatography on florisil, charcoal, and acid alumina. Except for 2,3,7,8-TCDD, all other congeners were determined by combined capillary gas chromatography/mass spectrometry by use of negative chemical ionization (NCI) in SIM mode (selected ion monitoring). For the determination of 2,3,7,8-TCDD a mass selective detector (MSD) was used operating in electron impact mode (EI). Analysis of PCBs and organochlorine pesticides was performed using a capillary gas chromatograph equipped with an electron capture detector (ECD) on two columns with different polarity. (6-8,13)

RESULTS

A. DIOXINS AND DIBENZO-FURANS

The results are presented in three tables and four graphs. Table I lists dioxin and dibenzofuran congeners in the first column, findings from Moscow in the second column, Baikal City or Baikalak next, followed by Irkutsk, Novosibirsk, and Kechug. For reference, our previous findings from Binghamton, New York; Los Angeles, California; and the Federal Republic of Germany are listed next. Fat content and total dioxin amounts and "International Dioxin Toxic Equivalents" (11,12) in parts per trillion are listed at the bottom of the columns.

The OCDD mean value is markedly lower in these specimens from the Soviet Union than from the FRG and the U.S., with levels from 30 to 88 ppt. fat basis from the USSR, compared with a mean of 185 from the FRG and 163 and 301 from two pooled samples from the United States.

The average heptachlorinated dioxin value is also much lower, varying from 5 to 16 PPT in the USSR, and 34 to 50 PPT in the FRG and the U.S.

For the three hexachlorinated dioxins the same pattern holds, with lower values, reflecting less pollution, in the Soviet samples.

For the 1,2,3,7,8 HxCDD, however, the values from the U.S. and Moscow are almost identical at 6.2 and 7.2 PPT for the U.S. and 6.1 PPT for the Moscow specimen. The West German mean value is a bit higher, at 9.1, but the Soviet samples from the 4 Siberian cities vary from 2.2 to 3.9, possibly reflecting the more recent industrialization seen in Siberia, with less accumulated pollution to date.

For the most toxic of the dioxins and dibenzofurans, 2,3,7,8-TCDD, the three values from the U.S. and the FRG of 3.5, 3.1 and 3.0 are similar to the 1.9 to 3.4 levels seen in the Siberian samples, but lower than the one sample from Moscow, which is 8.7 PPT.

For OCDF, the Soviet samples are all below the levels of the U.S. and FRG levels, although one sample, from Irkutsk, at 2.0 PPT, is similar to the Los Angeles level of 2.7 PPT. That sample, from Irkutsk, contains the highest level of this congener among the Russian specimens, from Siberia and also from Moscow.

For HpCDF, the Soviet mean levels are less than the levels of the US and West German samples usually, although the level of 2.6 from Irkutsk is higher than the level from Binghamton of 2.4 PPT. The range from 0.6 to 2.6 PPT is below the range of 2.4 to 5.7 from the U.S. and the West German mean of 9.9. The FRG range in their series of 150 individual milk samples analyzed varied from less than one to 20 PPT.

For 1,2,3,4,7,8 HxCDF, the range of values from the pooled specimens from the USSR varies from 4.0 to 15, with Irkutsk again having the highest value. The values from the U.S. and the FRG vary from 5.3 to 7.3.

In a similar fashion, 1,2,3,6,7,8 HxCDF values are relatively similar in the USSR, the

U.S. and the FRG in this series. The USSR values for this congener vary from 2.2 to 5 PPT, with Irkutsk having the high value; the US values are 3.4 and 3.0, and the German mean is 5.9

For 2,3,4,6,7,8 HxCDF, the Soviet values range from 0.6 to 1.8 (Irkutsk), compared to 2.2 and 1.5 for the U.S. and 3.2 for the West German mean. Thus, the values are similar, but the Soviet levels are somewhat less for this congener.

For 1,2,3,7,8 PnCDF, the value for Irkutsk is the highest, at 2.3 PPT, with Baikalsk and Kachug also being higher at 1.3 and 1.0 than the 0.6 and 0.3 for the U.S. and 0.7 for the West German levels. For unknown reasons, higher levels of this congener appear in Soviet samples than in the others, possibly due to sampling or different pollution patterns.

For the highly toxic 2,3,4,7,8 PnCDF, the West German level, at 24 PPT, exceeds the US values of 8.4 and 6.2 or the Soviet levels of 7.4 to 19 PPT. Again, Irkutsk has the highest level for this congener of the Soviet specimens, reflecting a contamination pattern from a presently unknown source.

For 2,3,7,8 TCDF, levels appear similar in all three countries, on average, but the value of 6.3 from Irkutsk again stands out as being somewhat higher than the other values.

Table II converts to the "Dioxin Equivalents" using a currently popular weighting scheme (11,12) for the values found and described in Table I.

The PCDD, PCDF, and TEQs data is presented in four graphs. The Total PCDD graph shows that Los Angeles has the highest mean levels of dioxins, followed by the Federal Republic of Germany, followed by Binghamton and all of the USSR with markedly lower levels for this series of samples.

The second graph presents total PCDFs only, with Germany having the highest value, followed by Irkutsk with almost equal levels. There is little difference in total furan levels between Binghamton, Los Angeles, Baikalsk, Moscow, Novosibirsk, and Kachug.

The third graph combines total PCDDs and PCDFs, and we see that the Los Angeles sample has the highest level of contamination, followed by the FRG and Binghamton, with Novosibirsk, Baikalsk, and Kachug being the least. This graph also shows the relatively lower levels of total PCDD/Fs in human milk in the USSR in general, compared to the U.S. or the FRG.

The fourth graph compares "International" dioxin toxic equivalents, and we see that the FRG has the higher levels, followed by Moscow (N = 1, however), then Irkutsk, Binghamton and Los Angeles, followed by Novosibirsk, Baikalsk, and Kachug.

B. ORGANOCHLORINE PESTICIDES IN HUMAN MILK FROM THE USSR

Table III presents data on the organochlorine pesticides and PCBs from the Soviet Union and compares them to values from the Federal Republic of Germany and one series from Binghamton.

CONCLUSIONS AND DISCUSSION

This study documents the existence of dioxins, dibenzofurans and other chlorinated chemicals in human tissue and breast milk in the Soviet Union for the first time. The data comes from a series of (usually) pooled samples from a wide geographic area, from European to Asian regions of the Soviet Union, from Moscow in the west to Novosibirsk, Irkutsk, Kachug, in the east, and Baikal City or Baikalsk, on the southern edge of Lake Baikal, one of the world's largest (up to 85 miles wide and 400 miles long and up to 1600 meters in depth) and least contaminated fresh water lakes.

Our findings suggest levels and a pattern of dioxin and dibenzofuran congeners which permit "fingerprinting" of Soviet tissues from humans in comparison to the countries we have studied up until now.

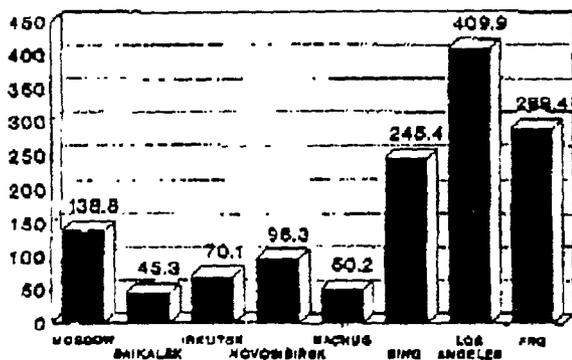
The levels of total dioxins from the Soviet Union are lower than in the U.S. or the FRG, although PCDF levels are similar in the USSR and U.S. cities, except for relative elevation in the FRG and in Irkutsk. Dioxin equivalent levels are usually below the U.S. and West German levels. However, the congener pattern is not identical to either the FRG or the U.S.

Likewise, regional differences are noted within the Soviet Union. Irkutsk specimens frequently had higher levels of certain congeners than did other pooled specimens from other cities. In Moscow, in a specimen from one woman, we found relatively elevated 2,3,7,8-TCDD. Kachug and Baikalsk, in the far east, in Siberia, showed lowest levels of PCDDs and Toxic equivalents.

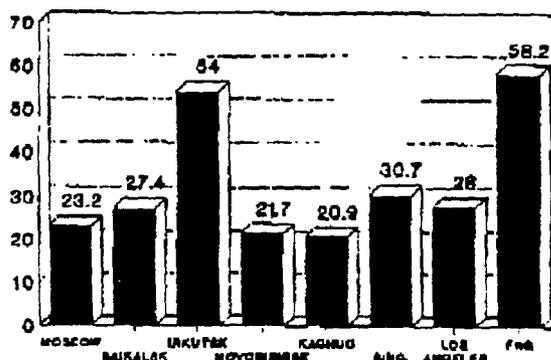
Certain expected congener elevations were not noted among the persons sampled. For example, Baikal City, or Baikalsk, is a small city in a remote part of Siberia along the southern part of Lake Baikal. Recently, however, a very large pulp mill has dominated the area and has been polluting Lake Baikal with its discharge. Chlorine bleaching was employed at the

DIOXINS IN HUMAN MILK FROM THE USSR,
THE USA, AND THE FRG (PPT, LIPID)

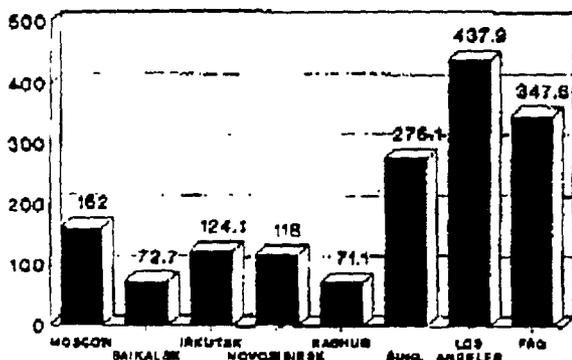
GRAPH I: TOTAL PCDD



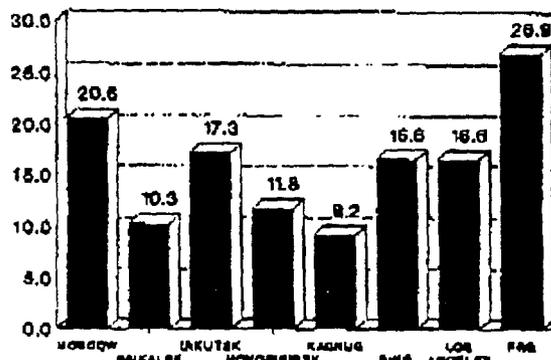
GRAPH II: TOTAL PCDF



GRAPH III: TOTAL PCDD/F



GRAPH IV: TOXIC EQUIVALENTS



INTERNATIONAL TOXIC EQUIVALENTS

plant before measures to prevent environmental contamination were undertaken. The mill is to be converted to a more environmentally sound factory in the near future. We have not observed an elevation of 2,3,7,8-TCDF and 2,3,7,8-TCDD, as expected from previous publications concerning dioxins and dibenzofurans produced during chlorine bleaching of paper and pulp products. Sampling may have contributed to this, or possibly intake into persons was low or absent. Discharge into Lake Baikal, which is of enormous size, might have caused dilution.

ACKNOWLEDGEMENTS

We wish to thank the Soviet women who participated in this study. Thanks are also extended to Academicians Kopyyug, Valatski, Fokin, and Grachav; Doctors Grigory Baran, Boris Bocharov, Boris Derendyaev, Alexis Filippovitch Kolomists, Vyacheslav Lyakhovich, Vladimir Mishin, Alexis Prokofjev, Vladimir Rumak, Vladimir Evgenjevich Sokolov, Vladimir Shemyskin, Ilya Tayrlav, Valentin Vlassov, and Svetlana Doronina of the Soviet Union. Also to the many scientists and others, including interpreters, from Viet Nam and the USSR who helped with this work. We are especially grateful to funding assistance for portions of this work from The Christopher Reynolds Foundation, the Samuel Rubin Foundation and the CS Fund.

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No need for water supplementation for exclusively breast-fed infants under hot and arid conditions

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Abstract

This study was conducted in 4 villages in India during the hottest and driest season of the year to determine whether exclusively breast-fed infants need additional water under extremely hot and dry climatic conditions. The ambient temperature was 35–40°C and the relative humidity 10–35%, except during the early morning hours. 63 urine samples were collected from 31 infants below 6 months of age and 28 samples from 13 infants aged 6–10 months, all of whom were receiving nothing but breast milk. Specific gravity (and corresponding osmolality) of urine samples from the younger group ranged from 1.004 (66 mosmol/litre) to 1.036 (1234 mosmol/litre), with a mean of 1.011 (322 mosmol/litre). For the older group the range was 1.005 (103 mosmol/litre) to 1.029 (978 mosmol/litre) and the mean was 1.015 (468 mosmol/litre). These values are well below levels of urine concentrations known to be attainable by infants of corresponding ages. Thus, even under hotter and drier climatic conditions than have previously been studied, healthy exclusively breast-fed infants do not require additional water. Exclusive breast feeding for the first 4–6 months is therefore a reasonable public health recommendation; it is imperative in areas where contaminated drinking water may contribute to infant morbidity, diarrhoeal disease in particular.

Introduction

Water and other supplements are commonly offered to breast-fed infants during the early months of life. Health professionals generally agree that for the first 4–6 months an infant has no nutritional need for supplementation. However, there appears to be less certainty with respect to the need for supplemental water in order to maintain water balance, especially during hot weather. Where drinking water is contaminated and boiling entails a significant cost in terms of time and fuel, the definite risk of infection via supplemental water (PORTOLAN-SHUHAIBER, 1986) must be weighed against the potential risk of disturbed water balance and possible dehydration.

Because the concentrations in breast milk of nitrogen, sodium, chloride and potassium are low, only a relatively small amount of water is needed for the excretion of the resulting waste products. Theoretical calculations (ALMROTH, 1978) suggest that this low renal solute load ought to provide a considerable margin of safety in view of the known capacity of healthy infants to concentrate urine (PRATT *et al.*, 1948; WINBERG, 1959; DRESCHER *et al.*, 1962; POLACEK *et al.*, 1965). This inference has been supported by empirical evidence from several studies.

The Table summarizes findings of the field studies which have been reported so far (including the present study). The first study in Jamaica (ALMROTH, 1978) showed that no additional water was needed by exclusively breast-fed infants in a hot and humid climate, a finding which was confirmed in Argentina (ARMELINI & GONZALEZ, 1979) and Peru (BROWN *et al.*, 1986) under similar climatic conditions, and in Israel (GOLDBERG & ADAMS, 1983) in somewhat higher temperatures and considerably lower humidity.

The present study examined the ability of exclusively breast-fed infants to manage under even hotter and drier conditions with no supplemental water.

Subjects and Methods

Setting

The study took place in the southern Indian state of Andhra Pradesh, in 4 villages about 150 km south of Hyderabad, the state capital. It was conducted in 1985 at the end of April and the beginning of May before the onset of the monsoon season, the hottest and driest time of the year.

Temperature and humidity

An Assam psychrometer was used to record wet and dry bulb temperatures, from which the relative humidity of the air was calculated using standard procedures. Readings were taken at regular intervals throughout the day, twice hourly from 06:00 to 22:00 h when possible.

Water contamination

Samples of water were taken from all 22 wells and all 3 hand pumps in the 4 villages in the study area. A commercial laboratory performed bacteriological determinations, including the most probable number of coliform bacteria per 100 ml, and the presence of *Escherichia coli*.

Table. Summary of studies on water requirements of exclusively breast-fed infants

Country	Temperature (°C)	Humidity (%)	No. of infants	Age (months)	No. of samples	Osmolality (mosmol/litre)
Jamaica ^a	24–28	62–90	16	0.5–4	48	103–468
Argentina ^b	20–39	60–80	8	0.5–2	24	105–199
Israel ^c	32–37	13–41	15	1–5	15	55–320
Peru ^d	24–30	45–96	40	0.2–6	40	30–544
India ^e	27–42	10–60	31	1–5	63	66–1234
			13	6–10	28	103–978

^a ALMROTH (1978).

^b ARMELINI & GONZALEZ (1979).

^c GOLDBERG & ADAMS (1983).

^d BROWN *et al.* (1986).

^e Present study.

Subjects

Mothers of young infants were visited in their homes and asked about the feeding of their infants. To be eligible for participation in the study, infants had to be exclusively breast-fed or only occasionally receiving supplements of water or a biscuit. If the infant was eligible, the mother was asked whether she wanted to participate in the study. Mothers of the very few infants who received something besides breast milk also had to agree to withhold any supplements for 24 h before, as well as during, the study. Older infants were excluded from the study if their mother said they consumed anything besides breast milk.

Physical examinations were performed by trained paramedical personnel to ensure that enrolled infants were not ill. The weight of each infant was determined using a digital step-on scale; an adult was weighed with and without the infant and the difference calculated.

Ages of the 44 infants who participated in the study ranged from one to 10 months. Thus a number of infants who ought to have been receiving food in addition to the breast milk were included. Though we do not approve of the late introduction of foods, this is common in the study area. Results for the 31 infants below 6 months of age are reported separately from results for the 13 infants above that age.

Urine collection and analysis

Urine from the infants was collected in their homes using adhesive plastic urine collection bags. We attempted to obtain at least 2 samples at different times of the day from each infant, and were largely successful. Three samples were obtained from each of 6 infants, 2 samples from each of 35 infants, and one sample from each of 3 infants, resulting in a total of 91 samples (63 samples from infants below 6 months of age and 28 samples from infants above 6 months old).

The specific gravity of the urine was determined with a hydrometer. For about half of the samples, the quantity was too small to allow direct measurement; the specific gravity was then measured on a mixture of known, pipetted quantities of the urine and distilled water. Temperature measurements were made to allow for calculation of the temperature correction factor of 0.001 for each 3°C above 15°C, the temperature at which the hydrometer was calibrated. In the absence of glucosuria or albuminuria, specific gravity provides a reasonable estimate of the concentration of solutes in the urine (JONES *et al.*, 1972) and is linearly related to osmolality (WINBERG, 1959), physiologically the most appropriate measure of urine concentration. In order to allow for the conversion of specific gravity to osmolality, the urine was tested for glucose and albumin with Ames Clinistix[®] and Albustix[®] respectively.

Results and Discussion

Temperature and humidity

Temperature and humidity, during 9 days of recordings, are plotted in Figs 1 and 2 respectively. They show that, except for early morning hours, the ambient temperature was 35–40°C and the relative humidity 10–35%.

Water contamination

E. coli, a sign of faecal contamination, was found in

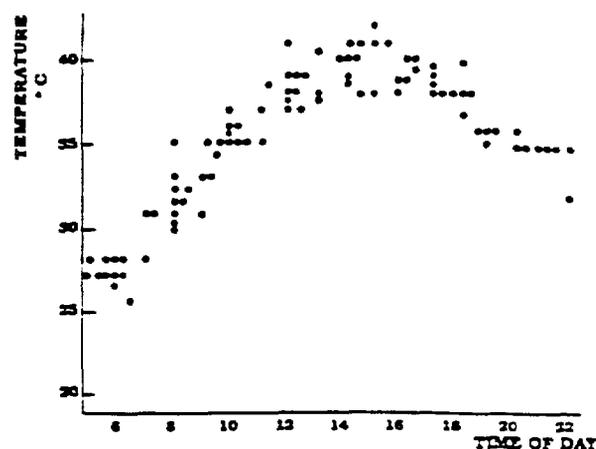


Fig. 1. Ambient temperature during the study, by time of day (hours).

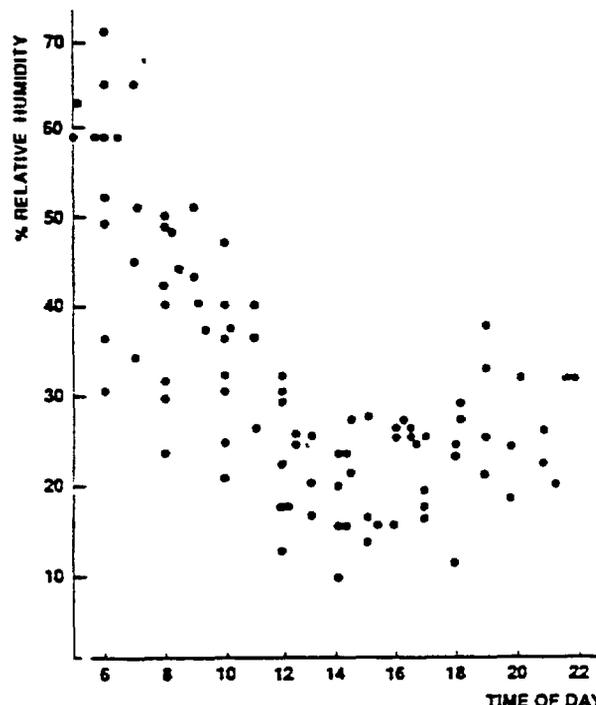


Fig. 2. Relative humidity during the study, by time of day (hours).

all well-water samples, but in none of the samples from the hand pumps. The most probable number of coliform bacteria was 2400 or more (the maximum countable), in all well-water samples and varied between 50 and 500 in the hand pump samples.

Subjects

During the course of the study, none of the infants showed any sign of dehydration. About half of the infants below 6 months of age had weights which were at least 2 standard deviations below the median of the US National Center for Health Statistics reference (WHO, 1983). Of the infants who were older than 6 months, nearly all had similarly low weights. Previous studies in this area have documented similarly high proportions of underweight children (BIDINGER *et al.*, 1986).

Specific gravity of the urine

The specific gravity and calculated osmolality of the

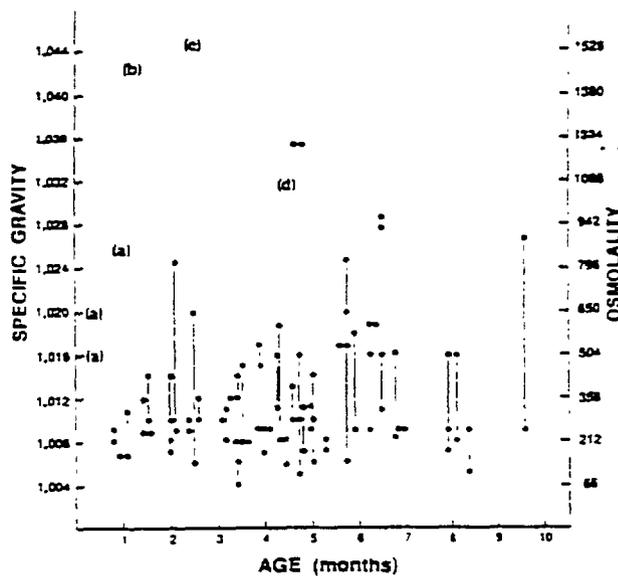


Fig. 3. Specific gravity and calculated osmolality (mosmol/litre) of urine samples by age of child. Each point represents a separate urine sample; vertical lines connect values for samples from the same child; letters in parentheses refer to urine concentration values obtained on healthy children by previous researchers as follows: (a) POLACEK *et al.* (1965), (b) PRATT *et al.* (1948), (c) DRESCHER *et al.* (1962) and (d) WINBERG (1959).

urine, and the age distribution of the infants, are shown in Fig. 3. The specific gravity of the urine samples ranged from 1.004 to 1.036, with a mean of 1.011 for infants below 6 months of age. For those above 6 months, the range was 1.005–1.029, with a mean of 1.015. Since all the samples were free from glucose and albumin, corresponding osmolalities could be calculated using an equation from WINBERG (1959). The corresponding range and mean osmolalities were 66–1234 and 322 mosmol/litre, respectively, for infants below 6 months of age. For older infants the corresponding range and mean osmolalities were 103–978 and 468 mosmol/litre, respectively.

Upper ranges of infant urine concentrations, as reported in the literature, are also indicated in Fig. 3. POLACEK *et al.* (1965) recorded urine osmolalities of 515 mosmol/litre on the third day of life, 663 on the sixth day and 896 at 2–4 weeks. PRATT *et al.* (1948) observed concentrations up to 1473 mosmol/litre at 35 days, DRESCHER *et al.* (1962) observed 1570 mosmol/litre at 73 d, and WINBERG (1959) reported 1088 mosmol/litre at 4.5 months. POLACEK *et al.* (1965) and WINBERG (1959) stated that it was likely that the infants in their studies were capable of concentrating urine beyond the levels they measured. Based on these data, the urine concentrations obtained in the present study fall within the range of what can be attained by healthy infants.

POLACEK *et al.* (1965) and WINBERG (1959) have shown that the maximum concentrating capacity of

the kidney increases exponentially with age. Since the data in Fig. 3 do not show an incremental urine concentration with age, we conclude that most infants were not being forced to concentrate their urine maximally.

Thus, even under hotter and drier climatic conditions than have previously been studied, healthy exclusively breast-fed infants do not require additional water. Exclusive breast feeding for the first 4–6 months is therefore a reasonable public health recommendation; it is imperative in areas where contaminated drinking water may contribute to infant morbidity, diarrhoeal disease in particular.

Acknowledgements

We thank B. Nag for substantive assistance in the field, the International Crops Research Institute for the Semi-Arid Tropics and the Indian National Institute of Nutrition for kindly loaning us equipment, and the late Rowena Day for her financial support.

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Received 18 September 1989; revised 2 January 1990; accepted for publication 10 January 1990

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ABC'S OF GOOD NUTRITION

Good nutrition can be achieved by choosing foods you like that supply the nutrients you and your baby need.

A At least three meals a day.

B Beverages. Every time your baby breastfeeds, drink a nutrient-containing beverage such as milk or juice.

C Consume at each meal at least:

One serving of milk products *plus*

Two servings of each of the following food groups:

Protein foods
Breads, cereals, grains
Fruits and vegetables

TIPS FOR THE CALORIE CONSCIOUS

PROTEIN FOODS

- Choose poultry and fish often. Remove skin before eating.
- Avoid breaded and fried varieties (like fish sticks, fish cakes, chicken nuggets).
- Choose only the leanest cuts of meat and trim away any visible fat before eating.
- Bake, broil, poach, or simmer instead of fry.
- Avoid high-fat processed meats (like hot dogs, luncheon meats, sausages).
- Limit peanuts, peanut butter, nuts, and seeds.

MILK PRODUCTS

- Use nonfat or lowfat milk.
- Limit use of cheese, and use cheeses made with some nonfat milk as much as possible.
- Limit sweetened milk products (like yogurt with fruit, chocolate milk, custard, ice cream, pudding).

BREADS, CEREALS, GRAINS

- Emphasize whole-grain breads, cereals, and grains (like whole-wheat bread, oatmeal, and brown rice).
- Limit sweetened breads and cereals.
- Limit those products made with added fat (like crackers, muffins, pancakes, waffles).

FRUITS AND VEGETABLES

- Choose fruits rather than juices (to feel full on fewer calories).
- Limit sweetened fruits and juices.
- Limit those with added sauces, butter, or margarine.
- Avoid fried vegetables (like fried potatoes).

FATS AND SWEETS

- Limit visible fats (like butter, margarine, oil, mayonnaise, salad dressings).
- Limit fried snack and fast foods (like potato and corn chips).
- Limit sweets (like candy, cake, cookies, pie).
- Limit sodas and other sweetened beverages.

For more information about nutrition and getting back into shape please contact Wellstart International at (619) 295-5192.

PREPARED BY:

Vicky Newman, MS, RD

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Good Nutrition for the Breastfeeding Mother and Baby



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DAILY FOOD GUIDE FOR BREASTFEEDING WOMEN

Food Group	One Serving Equals		Recommended Minimum Servings
<p>PROTEIN FOODS Provide protein, iron, zinc, and B-vitamins for growth of muscles, bone, blood, and nerves. Vegetable protein provides fiber to prevent constipation.</p>	<p>Animal Protein: 1 oz. (30 g) cooked meat or poultry 1 oz. (30 g) or ¼ cup fish or seafood 1 egg 2 hot dogs 2 slices luncheon meat</p>	<p>Vegetable Protein: ½ cup cooked dry beans, lentils, or split peas 3 oz. (90 g) tofu (soy curd) 1 oz. (30 g) or ¼ cup peanuts, pumpkin, or sunflower seeds 1½ oz. (45 g) or ½ cup other nuts 2 tbsp. (30 g) peanut butter</p>	<p>7</p> <p>At least one serving of vegetable protein daily</p>
<p>MILK PRODUCTS Provide protein and calcium to build strong bones, teeth, healthy nerves and muscles, and to promote normal blood clotting.</p>	<p>8 oz. (240 ml) milk or yogurt 1½ cups cream soup (made with milk) 1½ oz. (45 g) or ⅓ cup grated cheese (like cheddar)</p>	<p>1½-2 slices presliced processed cheese 4 tbsp. (20 g) dry cheese (parmesan) 2 cups cottage cheese 1 cup custard or pudding 1½ cups ice milk, ice cream, or frozen yogurt</p>	<p>3</p>
<p>BREADS, CEREALS, GRAINS Provide carbohydrates and B-vitamins for energy and healthy nerves. Also provide iron for healthy blood. Whole grains provide fiber to prevent constipation.</p>	<p>1 slice bread 1 dinner roll ½ bun, bagel, pita 1 small (15 cm) tortilla ¾ cup dry cereal ½ cup cooked cereal</p>	<p>½ cup rice ½ cup noodles or spaghetti 1 4-inch (10 cm) pancake or waffle 1 small muffin 8 medium crackers 3 cups popcorn</p>	<p>7</p> <p>At least four servings of whole-grain products daily</p>
<p>VITAMIN C-RICH FRUITS AND VEGETABLES Provide vitamin C to prevent infection and to promote healing and iron absorption. Also provide fiber to prevent constipation.</p>	<p>6 oz. (180 ml) orange or grapefruit juice 6 oz. (180 ml) tomato juice 1 orange 1 kiwi fruit 1 mango ½ grapefruit ½ cantaloupe ½ cup papaya</p>	<p>2 tangerines ½ cup strawberries ½ cup cooked or 1 cup raw cabbage ½ cup broccoli, Brussels sprouts, or cauliflower ½ cup sweet peppers or tomato puree</p>	<p>1</p>
<p>VITAMIN A-RICH FRUITS AND VEGETABLES Provide vitamin A to prevent infection and to promote wound healing and night vision. Also provide fiber to prevent constipation.</p>	<p>3 raw or ¼ cup dried apricots ¼ cantaloupe ¼ mango 1 small or ½ cup sliced carrots ½ cup cooked or 1 cup raw spinach ½ cup sweet potato</p>	<p>½ cup cooked greens (amaranth, beet, chard, collards, dandelion, kale, mustard) ½ cup pumpkin or other yellow squash ½ cup yams</p>	<p>1</p>
<p>OTHER FRUITS AND VEGETABLES Provide carbohydrates for energy and fiber to prevent constipation.</p>	<p>6 oz. (180 ml) fruit juice (if not listed above) 1 medium or ½ cup sliced fruit (apple, banana, peach, pear, tomato) ½ cup berries (other than strawberries) ½ cup cherries or grapes ½ cup pineapple or watermelon ¼ cup dried fruit (except apricots)</p>	<p>½ cup sliced vegetable (asparagus, beets, green beans, celery, corn, eggplant, mushrooms, onion, peas, potato, summer squash, zucchini) ½ artichoke 1 cup lettuce</p>	<p>3</p>
<p>UNSATURATED FATS Provide vitamin E to protect tissue.</p>	<p>¼ med. avocado 1 tsp. (5 ml) margarine 1 tsp. (5 ml) mayonnaise</p>	<p>1 tsp. (5 ml) vegetable oil 2 tsp. (10 ml) salad dressing</p>	<p>3</p>

Note: This food guide may not provide all the calories you require. The best way to increase your intake is to include more than the minimum servings recommended

January 13, 1993
12:15-12:30
MCH Seminar
Alma Ata, Kazakhstan

Maternal Nutrition, Breastfeeding Practices and Lactation Performance

Mary Ann Anderson
AID/Washington, Office of Health

- A. There are small difference in volume of breastmilk produced between mothers in developed and developing countries, but these are less than would have been expected given the large differences in maternal anthropometry and birth weight of babies between countries.
- B. Undernutrition also has very little effect on the composition of breastmilk in terms of protein and lactose, but fat content may be reduced and vitamin content does vary by maternal dietary intakes. The lower fat content of breastmilk in severely undernourished women may be offset in terms of energy intake of the infant by more frequent suckling.
- C. Maternal undernutrition exerts its biggest effect on the fetus in utero and is manifest in a high incidence of low birth weight (<2.5 kg). Relative to this prenatal effect, it has very little SUBSEQUENT effect on breastmilk output or composition.
- D. The primary determinant of breastmilk output is the frequency of suckling by the infant (DEMAND) and the presence or absence of supplements to breastmilk.

GOLDEN RULE: THE MORE THE BABY NURSES, THE MORE MILK THERE WILL BE.

In the past, mothers were told to wait three hours between breastfeeds so that their breasts would "fill up." Many a mother and baby had a short-lived breastfeeding experience due to this advice which modern science has now found to be erroneous. It is now understood that breastmilk is produced almost continuously, and that the more often the baby nurses, the more milk there will be. Frequent nursing at the breast signals the mother's body to produce correspondingly increased amounts of milk.

- E. The danger of the "Triple Nipple Syndrome" for Triggering the Insufficient Milk Cycle (Hypogalactemia).
- F. It is far more cost-effective and healthy to supplement

the mother's diet to facilitate optimal breastfeeding than to give breastmilk substitutes directly to the baby.

G. An infant is getting enough breastmilk if:

1. He has 6-8 really wet diapers and 2-5 bowel movements per day and is receiving nothing but breastmilk- no supplemental water, glucose-water or formula.

2. He is gaining weight at an average of at least 115 grams per week or 453 grams per month. Caution- growth curves used in U.S. and promoted by WHO were based on bottle-fed infants and are not accurate for assessing the adequacy of growth in breastfed infants. New growth curves are currently being developed for breastfed infants.

3. He is nursing frequently (on demand) on both breasts at each feeding. Most newborns nurse every two to three hours or 8 to 12 times in a 24 hour period. This is an average and some babies may nurse less frequently while others nurse more often.

4. He appears healthy- has good color and resilient skin, is "filling out" and growing in length, and is alert and active with good muscle tone.

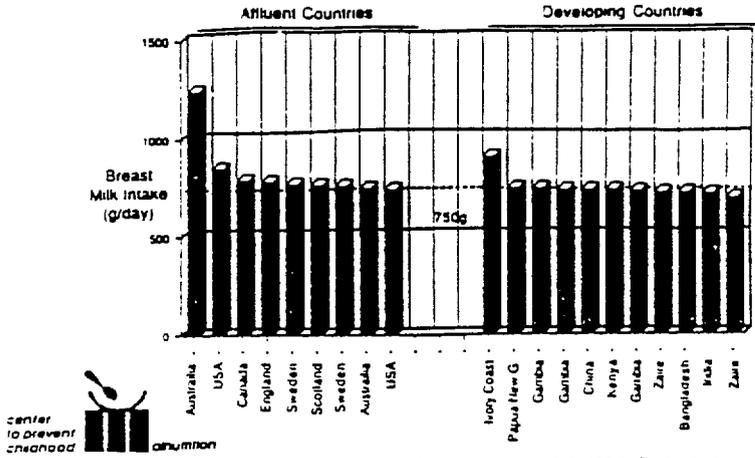
CONCLUSION

What is needed most is:

1. To promote early initiation (within the first hour after birth) and continued frequent and exclusive breastfeeding during the first 6 months of life and provide mothers with the education and support they need to breastfeed in this manner. The "Triple Nipple Syndrom" should be stopped.

2. To assure that maternal prepregnancy weight and pregnancy weight gain and diets during pregnancy and lactation are adequate so that birth weights are normal and mothers' nutrient requirements and those of their breastfed infants are met.

Breastmilk Intake of Infants - Age 3 Months



Ref. Prentice et al. in Human Lactation 2, Harare (ed) 1986

BODY MASS INDEX (weight kg/ height m²) OF NON-PREGNANT WOMEN IN VARIOUS REGIONS OF THE WORLD

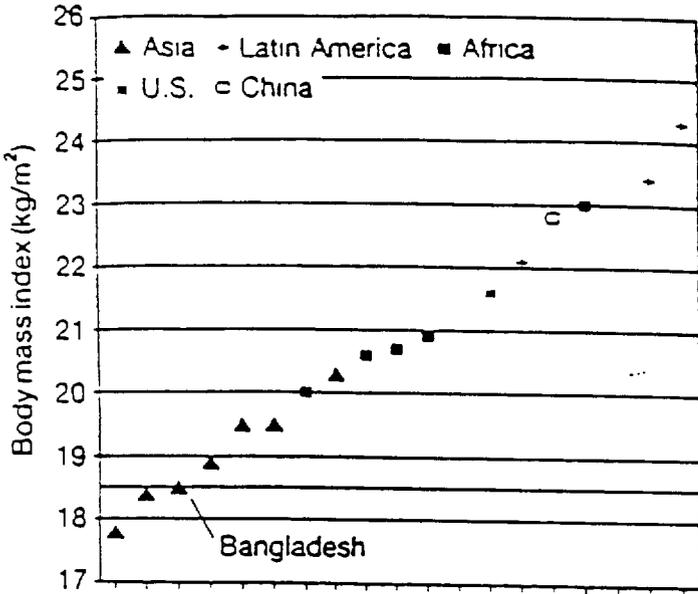


FIG. 1

Anderson, M A 1989

GOLDEN RULE OF BREASTMILK PRODUCTION

The more the baby breastfeeds, the more breastmilk there will be.

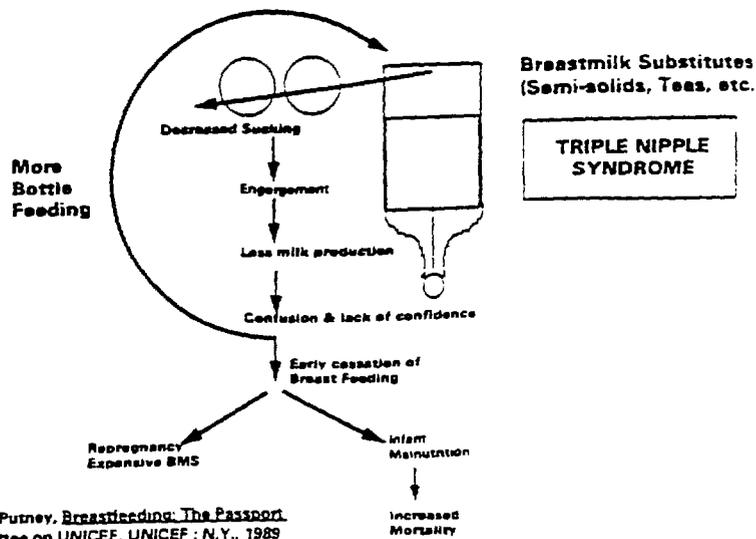
SUPPLY AND DEMAND

Definition of Exclusive Breastfeeding

- Breastmilk Only
- Nursing Begins Within an Hour of Birth
- Demand Feeding
- Colostrum
- Frequent Feeding in 24 Hours (plus night feeds)
- Duration 4 to 6 Months

Source: Baumslag & Putney, Breastfeeding: The Passport to Life, NGO Committee on UNICEF, UNICEF : N.Y., 1989

"Insufficient Milk" Cycle



Source: Baumslag & Putney, Breastfeeding: The Passport to Life. NGO Committee on UNICEF, UNICEF: N.Y., 1989

RECOMMENDATIONS

1. Assure that women enter pregnancy with adequate weight for height and that they gain sufficient weight during pregnancy.
2. Assure that pregnant and lactating women consume an adequate diet to meet their increased nutrient requirements.
3. Promote early initiation (1st hour) and continued, frequent and exclusive breastfeeding during first six months of life.
4. Educate and support mothers for optimal breastfeeding practices.
5. Shift away from fixed schedule for breastfeeds to demand feeding.
6. Stop the "Triple Nipple Syndrome."

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Basic Postpartum Counseling for the Breastfeeding Family

Wellstart International
Lactation Management Education Program

Breastfeeding is a learned and sensitive behavior. This guide is intended for use by the health professional as a reminder of the basic information that all breastfeeding mothers need to know.

Technique

Positioning:	how to hold the breast how to hold the baby
Attachment:	use of rooting reflex to help with attachment signs of proper attachment (baby attached on areola, not nipple; lips rolled out; nose touching breast; feeding is comfortable)
Breaking suction	
Suckling pattern:	discuss normal pattern teach mother how to listen for swallowing
Burping	
Breast massage	
Hand expression:	demonstrate to mother how to do hand expression (see handout) and have her do a return demonstration

Law of Supply and Demand

The development of an adequate milk supply to assure a satisfactory infant weight gain is primarily the result of sufficient demand. Nursing should occur at least every 2½-3 hours or sooner during both day and night (8-12 times within 24 hours). Feed from each breast at each feeding. Alternate starting sides. Do not limit the time at the breast.

Partnership

Remember that breastfeeding is a partnership between the mother and baby and either partner may request a feeding. At times, a normal infant may need to eat sooner than 2 hours and this should be allowed (more demand means more supply). On the other hand, a new mother is likely to become engorged if the interval exceeds 3½-4 hours and engorgement should be avoided. It is acceptable for a mother to awaken her infant and initiate a feeding if the interval is growing too long.

Baby Concerns

How to tell if a baby is getting enough:

6-8 wet diapers in 24 hours;
many loose stools daily;
contented after a feeding.

What to do if baby is sleepy and it's time to feed:

Take blanket off. Dress the baby lightly. Sit the baby in your lap. Place one hand around the chest and gently rub the baby's back or feet. Lightly stroke under the baby's chin. Gently rub the baby's hair from the front to the back of the head.

What about supplements of formula or water?

In general, supplements, either formula or water, undermine successful breastfeeding. Breastmilk is a complete food and is nearly 90% water. Formula reduces the baby's hunger; he will sleep long and will not want to suckle at the breast. Therefore, the mother may become engorged and/or her milk supply will drop. Water gives a baby a false sense of fullness and therefore reduces suckling at the breast. Early use of formula may lead to allergies in the baby.

What about nipple adaptation problems?

In general, bottle nipples and pacifiers should not be given to breastfed babies for at least the first month of life. The flow of milk from the mother's breast and the bottle are different. The feel of the mother's soft nipple and the bottle nipple and pacifier are different. Some infants will not accept the mother's nipple after having experienced the flow and feel of the bottle nipple.

Mother Concerns

What about breast and nipple care?

After every feeding, express a few drops of milk onto the nipple. Spread the milk over the nipple and air dry. Nipple creams are not necessary. Use clean breast pads without plastic liners. Wear a good bra without wires or plastic liners. Avoid drying agents like soap. Use only water for cleansing. Cleansing breast before each feeding is not necessary.

Nutrition

To help meet the increased dietary needs of lactation, a nursing mother should consume an extra 500 calories per day and drink a nutrient-containing beverage every time she feeds her baby. She should eat a variety of foods using the Daily Food Guide for Lactating Women. Lactating women do not need to avoid certain foods, unless they are allergic to them.

Rest

Adequate maternal rest is very important to the development and maintenance of a good milk supply. Rest when the baby is resting.

Counseling Principles

Wellstart International
Lactation Management Education Program

ACTIVE LISTENING

- observe with full attention
- ask open ended questions (ex. what do you think about breastfeeding?)
- assess what the patient knows

BODY LANGUAGE

- put patient at ease
- use eye contact without barriers
- convey respect
- counsel in a private setting

CARE AND EMPATHY

- acknowledge patient's feelings
- answer questions without signs of judgment
- use a warm manner

DECISION MAKING

- identify source of patient's information or misinformation
- inform patient about facts
- assist the patient to make best decision for her life's situation

ENCOURAGE FOLLOW-UP

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COUNSELING PRINCIPLES HANDOUT

COUNSELG.HNE: 4/17/95

WHAT IS OPTIMAL BREASTFEEDING?

- Initiation of breastfeeding within about one hour of birth
- Frequent, on-demand feeding (including night feeds)
- Exclusive breastfeeding until the infant is about 6 months of age
- Complementation of breast milk with appropriate local foods when the infant is about 6 months of age
- Sustained breastfeeding well into the second year of life or beyond



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INITIATE BREASTFEEDING WITHIN ABOUT 1 HOUR OF BIRTH

A newborn should be offered the breast as soon after delivery as possible, preferably within one hour of birth. Nothing, nothing at all except breastmilk, should be given to a young infant.

- Early and frequent feeding may bring in mother's milk more quickly.
- The infant will immediately benefit from the protective effect of the concentrated amounts of antibodies present in colostrum. The colostrum is like a first immunization.
- The mother will benefit. The suckling action can help expel the placenta and reduce post-partum hemorrhage.
- The infant has been part of the mother for nine months. Birth is the moment of separation, but immediate breastfeeding eases the abruptness of separation, and helps establish an emotional bond between mother and child.
- No feeds, including water, should be given to a newborn. They are unnecessary; they may be contaminated; and they can interfere with the establishment of suckling.
- If mother delivers by Caesarean section, put the infant to the breast as soon as she wakes up.

Remember: Even if the mother feels that little milk is coming out, there will be enough for a newborn baby if it is allowed to suckle frequently.



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YOUNG INFANTS SHOULD SUCKLE FREQUENTLY

An infant should suckle frequently, both day and night. Many mothers do not offer the breast frequently enough. Frequent feeds are needed because:

- An infant's stomach is small and can only take in a limited quantity of breast milk at any one time. The small stomach needs to be refilled often.
- Breast milk is perfectly adapted to the baby. This means it is more easily and quickly digested than other foods, and the infant will need to feed often.
- Since the supply of breast milk is dependent on demand, frequent feeds are needed to keep up a mother's milk supply.
- Frequent suckling maximizes the contraceptive benefit to mothers and helps delay the return of menses.

Remember: An infant should be put to the breast 8-12 times per 24 hours, for about 10-20 minutes on each breast. Ideally, an infant should sleep with the mother so that it can feed "on demand."



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INFANTS WHO ARE BREASTFED FREQUENTLY DO NOT NEED WATER

Giving water to an infant under 6 months of age is unnecessary and can be dangerous.

- **Infants who are frequently breastfed get plenty of water from breast milk. Approximately 90% of breast milk is water.**
- **The risk of infection in the infant is greatly increased by giving water. The risk of introducing bacteria and other pathogens is tremendously increased by giving water (or anything else except breast milk). Contamination may come from the water itself or from the utensils used to give the water (bottle, cup, spoon). Infants who are not exclusively breastfed have higher rates of diarrhea and other illness than exclusively breastfed infants. Only the water found in breast milk is pure enough for a young infant.**
- **If given water, an infant will be less well nourished than it should be. An infant's stomach is small. When water is given, the infant cannot consume as much breast milk, and therefore will take in less energy and fewer nutrients.**
- **The infant will not receive as many antibodies as it should. Breast milk contains anti-bacterial and anti-viral agents, and acts like a first immunization for the child. If water displaces breastmilk, the infant will not receive maximum protection against illness.**
- **The mother's milk supply may diminish. The supply of maternal milk depends mostly on demand. If an infant is receiving water and suckling less, the mother will begin producing less milk.**
- **Giving water threatens the contraceptive protection of breastfeeding. An infant given water will feel full and is likely to suckle less. Frequent suckling is needed for maximum contraceptive effect, and the mother will not be protected from another pregnancy for as long a time as she would if she didn't give water.**
- **If an infant has mild diarrhea, breastfeed more frequently. If the diarrhea is moderate or severe, breastfeed more frequently but also give oral rehydration fluids.**

Remember: A normal infant should be given nothing but breastmilk for around six months. If a mother believes that her infant is thirsty, she herself should drink water and breastfeed more.



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MOTHER AND BABY UNDERGO A CHANGE AROUND 3 MONTHS, BUT CONTINUE GIVING ONLY BREASTMILK

A baby should be fed only breastmilk until around six months of age. Many mothers believe that when a young baby cries, it means that the baby is not satisfied with breastmilk and needs other foods. Other mothers say that they feel they don't have enough milk after a few months. Normal changes in the baby and mother can take place when the baby is a few months old, but these changes do not mean that the baby needs to be given supplementary foods or liquids.

- At around three months, a baby is likely to be going through a growth spurt. It may cry more or want to be fed more often. This is normal and temporary. It does not mean that the baby is unsatisfied with breastmilk. Feeding more often will increase the mother's milk supply to keep up with the infant's needs.
- At around three months, mother's breasts will begin to feel less full, even though they are producing more than enough milk for the baby. This is normal. It does not mean that mother has insufficient milk.
- By three months, baby will be more efficient at suckling, and may finish breastfeeding sooner than before. Some mothers believe that when baby finishes quickly he is dissatisfied, but this is not the case!
- A baby may start to become distracted by things in the environment at around three months of age. Thus, baby may not "concentrate" on breastfeeding in the same way as before.
- A baby cries for many reasons. When baby cries, it does not mean that it needs to have solid foods. A baby can cry because it wants to breastfeed, because it is wet, because it has gas, or because it needs comforting.
- The mother will know that a baby is getting enough milk if it wets at least six times a day and has frequent soft bowel movements.
- At three months, a baby may not gain weight as quickly as during the first months of life. This is a normal growth pattern, and does not mean that breastmilk is not enough for the baby.
- Breastmilk cannot cause diarrhea. Some babies get diarrhea at around three months because they touch things and put their hands into their mouths. No matter what a mother eats, no matter what her emotional state, her breastmilk will not "spoil."



BEST AVAILABLE COPY NO BOTTLES FOR YOUNG INFANTS!

Young infants should not be given a bottle. Bottles are unnecessary, and they can be dangerous. An infant should get nothing at all except breastmilk for the first six months of life.

- Bottle fed infants have much higher rates of illness than exclusively breastfed infants.
- Breastmilk is perfect nutrition for the infant, and actually changes in composition to meet the changing needs of the infant. It is also more easily digested than anything else. Even the best formula can not equal breastmilk.
- Breastmilk is always pure and perfectly clean. Bottles and nipples which are not thoroughly sterilized are likely to carry disease-causing germs. Milks, formulas, porridges and other foods which might be given to the infant in a bottle can never be as pure and clean as breastmilk.
- The mother who gives her infant a bottle may begin to lose her milk supply, because the infant may not suckle at the breast as frequently as one given only breastmilk.
- A mother who believes that she has insufficient milk should breastfeed more often to build up her milk supply. Giving the baby a bottle to "supplement" the mother's milk will make the problem worse.
- Giving a young baby a bottle can create "nipple confusion" because the sucking action required to get milk from a bottle is different from the suckling needed to get it from the breast. Babies who are given a bottle tend to stop breastfeeding sooner than other babies.
- Once a baby is given a bottle, the mother is less protected against becoming pregnant again too soon. It is frequent breastfeeds that help delay the return of the menstrual cycle.
- Breastfeeding is more convenient than bottle feeding. Breastmilk is always ready and always at the perfect temperature. Bottles require a lot of time for proper sterilization. Formulas and other foods require time to prepare.
- Breastfeeding is more economical than bottle feeding. Formula is extremely expensive. Once a mother starts buying formula, she must continue to do so, because she may start losing her own milk.
- Even a mother who must work outside the home can continue to give her infant breastmilk while she is away. When a mother has to be separated from her baby, she can express her milk and put it in a clean, covered container in the coolest place she can find. In hot climates, unrefrigerated milk will keep for four hours. Refrigerated milk will keep for at least 24 hours. The breast milk should be fed to the infant with a cup and spoon, not a bottle.



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INSUFFICIENT MILK -- THERE IS A REMEDY!

It is only in rare cases that a mother is physiologically unable to produce sufficient milk to breastfeed exclusively for at least four months. Almost all complaints of insufficient milk are due to problems in the way the infant is being breastfed.

- Supply of milk is largely regulated by demand. The more an infant nurses, the more milk the mother will have. Common reasons for insufficient milk are:
 - insufficient suckling (not breastfeeding often enough or long enough)
 - poor attachment (infant has only the nipple in its mouth rather than the nipple and areola)
 - waiting too long between feeds
 - giving foods or liquids other than breastmilk before the infant is around six months of age

- The remedy in almost all cases is more frequent breastfeeding, day and night. Giving a young infant (under six months of age) supplementary foods will only worsen the situation.

- Some mothers may be helped by applying moist heat (cloths with warm water) to the breasts before and during feeding, or by massaging breasts before and during feeding.

- Once a mother begins breastfeeding more, it will take 4-7 days to see an increase in supply.

- Mothers who eat even only a basic diet are capable of producing more than enough milk for their infants. A mother should try to eat a variety of foods, but even if she cannot, she should be able to produce an adequate amount of milk if she breastfeeds frequently. It is only in cases of extreme malnutrition that a mother's ability to produce milk is compromised.



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IT IS IMPORTANT TO WEAN A BABY GRADUALLY

Breastmilk is an important part of a baby's diet into the second year of life. Breastfeeding can be continued for several years if baby and mother wish to do so. No matter what age breastfeeding stops, the process should be gradual.

- Sudden cessation of breastfeeding can cause a nutritional shock to the infant. Breastfeeding should be decreased little by little.
- If breastfeeding is stopped abruptly, it can cause an emotional shock to the infant and to the mother.
- Sudden weaning can cause mother's breasts to become engorged and painful, and it may cause a breast infection to develop.
- When, at around the age of six months, it is time to begin to start giving the infant other foods besides breastmilk, small amounts of food should be offered after breastfeeding. As the amount of food is slowly increased over time, the amount of milk a mother produces will slowly decrease.
- A mother can continue to breastfeed even if she becomes pregnant. Her milk is just as pure as always. (However, the mother will need to eat extra food for the new pregnancy.)



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MOST BREAST PROBLEMS ARE EASILY TREATED

Breast problems are usually very easily treated. For all problems listed here, the continuation of breastfeeding is not only safe, but can help remedy the problem.

ENGORGEMENT

Common cause: Insufficient frequency of breast feeds
Insufficient emptying of the breast
Poor positioning or poor attachment to the breast

Treatment: Breastfeed more frequently and/or for longer periods
Express breast milk by hand following feeds
Use moist heat (cloths with hot water, massage)
Improve infant positioning and attachment

CRACKED/SORE NIPPLES

Common cause: Poor positioning of infant on the breast
Use of antiseptics and harsh soaps for cleaning the nipples

Treatment: Position baby so that its mouth covers as much of the areola as possible
Continue breastfeeding
After each suckling, apply some breastmilk to the sores and let air dry
Avoid using ointments except for candidiasis

MASTITIS

Common cause: Insufficient emptying of the breast

Treatment: Relieve inflammation, pain, and fever
Take antibiotics if mastitis is infectious
Nurse more frequently (mastitis is an infection of the breast, not the milk)
Apply moist heat for several minutes before each feeding
Drink more fluids, especially if fever is present
Rest

ABSCCESS

Common cause: Infection

Treatment: A doctor or nurse should incise and drain the abscess
Take appropriate antibiotic and anti-inflammatory
Mother should rest
Depending on location of wound, breastfeed or express milk



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FEED AN INFANT ONLY BREASTMILK FOR AROUND 6 MONTHS

For optimal health benefits for mother and child, an infant should be breastfed exclusively -- fed nothing but breastmilk -- for approximately the first six months of life. No water, teas, milks, or porridge should be given.

- Infants who are exclusively breastfed have fewer infections. Giving the child anything in addition to breast milk greatly increases the risk of exposure to bacteria and other pathogens. Infants who are not exclusively breastfed have significantly higher rates of diarrhea and other illnesses, and significantly higher mortality rates than other infants.
- Exclusive breastfeeding insures perfect nutrition. Every child, rich or poor, can have the same start in life.
- Breast milk is perfectly adapted to the nutritional needs of an infant, and actually changes in composition to meet the needs of the growing child.
- Breast milk contains antibodies which help protect the child against illness. Exclusive breastfeeding insures that the child will take in the maximum amount of antibodies to protect it until it can produce enough of its own, around the age of six months.
- Frequent feedings keep up a mother's milk supply. If an infant is given anything else, it will not suckle as often and the mother may begin to produce less milk.
- Exclusive breastfeeding maximizes the contraceptive effect to the mother, thus contributing to birth spacing. By delaying the return of menses, exclusive breastfeeding also helps protect the mother against anemia induced by monthly blood loss.
- Virtually all women can exclusively breastfeed for six months. Only in cases of extreme deprivation are women unable to produce enough milk to fully breastfeed. Where food is in short supply, it should be given to the mother; that way, two can eat. If given to the infant, only the infant eats.
- Exclusive breastfeeding saves families money.



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ALMOST ALL MOTHERS ARE SUFFICIENTLY NOURISHED TO BREASTFEED

Lactating mothers need to eat more than usual, but they do not need expensive or fancy foods. A variety of local foods are very nutritious.

- A nursing mother should eat at least three meals per day.
- A mother should drink a beverage every time she breastfeeds her baby. Milk or juice are most nourishing.
- A variety of foods should be eaten at every meal. Ideally, a meal would consist of a milk product, protein foods, breads/cereals, and fruits/vegetables.
- No foods are prohibited for the lactating mother. There is no such thing as a food which will spoil breastmilk or make it bad for her baby. (But she should drink little or no alcohol.)
- Unless a mother is severely lacking in vitamin intake, she will produce nutritious breastmilk no matter what she eats.
- Some mothers may not feel like eating much during the first two weeks after delivery. In this case, she should "push herself" to eat as much as she can. A nursing mother also needs to rest. Family members can help by taking over the mother's duties at least for a few weeks.
- Almost all mothers are sufficiently nourished to produce enough milk for their infants. Unless a mother is extremely deprived or ill, she can breastfeed exclusively for around six months.



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LACTATION MANAGEMENT EDUCATION PROGRAM

MANAGEMENT OF THE MOST FREQUENTLY ENCOUNTERED PROBLEMS

INVERTED, RETRACTED, OR FLAT NIPPLES

Cause:

- persistence of original invagination of mammary dimple

Management:

- Hoffman's exercises?
- breast shells
- breast pump (if pregnant, use only under direction of primary care giver)
- pre-nursing nipple stimulation
- side-sitting position
- avoid bottle nipples and pacifiers



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INVERTED NIPPLES

Inverted nipples are rare and some prenatal and postnatal measures may be helpful in order to facilitate breastfeeding.

- Prenatal Measures
 - Breast shells
 - Breast pump (If pregnant, use only under the direction of your primary care giver.)

- Postnatal Measures
 - Pre-nursing nipple stimulation
 - Breast pump prior to attachment
 - Put baby to breast as soon as possible after delivery
 - Side-sitting position
 - Avoid artificial nipples and pacifiers
 - Breast shells

If you need further assistance, please call the Wellstart Helpline at 295-5193.

NIPPLE TRAUMA

Causes:

- incorrect positioning and technique
- engorgement
- oral-motor dysfunction
- irritants such as soaps or lotions
- Candidiasis
- contact dermatitis
- short frenulum (rare)

Management:

- apply moist heat and massage before feedings
- stimulate pre-suckling milk ejection reflex
- begin each feeding on the least involved side
- frequent, short feedings
- proper positioning, attachment, and removal technique
- assure lips are flanged out
- expressed breast milk to nipples post nursing
- air/sun exposure
- avoid engorgement; nurse more frequently, not less
- oral-motor evaluation when appropriate
- mild analgesic
- avoid irritating substances
- treatment for Candidiasis
- dermatitis treatment
- avoid plastic lining in bra and pads
- supportive bra
- last resort (rarely necessary): interrupt nursing for 24 - 36 hours; must express
- clip frenulum (rarely necessary)



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NIPPLE TRAUMA

Tenderness and soreness of the nipple when breastfeeding are usually the result of trauma or irritation. Incorrect attachment of the baby to the breast is the major cause of nipple trauma. In general, the following measures will help relieve the problem.

- Before feedings:
 - Make yourself comfortable and relax
 - Apply moist heat to the affected breast and nipple 3 - 5 minutes before each feeding
 - Express a small amount of milk to soften the areola and to stimulate the milk ejection reflex before your baby begins to nurse
- During feedings:
 - Offer the least affected breast first
 - Make sure the baby is properly positioned at the breast
 - Change the position of the baby at each feeding (cradle, side-sitting position)
 - Nurse frequently, at least every 2 - 2½ hours or sooner
 - When removing the baby from the breast, gently break the suction by inserting your finger between the baby's gums
- After feedings:
 - Gently express a few drops of milk onto your nipples and allow to air dry
 - Expose nipple briefly to heat (sunlight, hair dryer, 40 watt light bulb). **BE CAREFUL NOT TO BURN YOURSELF**
 - Remove plastic liners from bras and pads
 - Use a fresh nursing pad after each feeding

Remember:

- AVOID using drying agents such as soaps or alcohol on your nipples
- AVOID using nipple creams — your skin produces its own lubricants
- You may use tylenol without harm to your baby

If the nipple pain is extreme, you can stop breastfeeding for 24 hours on one or both breasts. In order to avoid engorgement, it is important to express at the same frequency as your baby would eat. Regular expression will help prevent further complications. Hand expression is more gentle on the breast tissue, but if you choose to use a pump, make certain that your nipple is centered properly in order to avoid additional trauma.

If the problem worsens or does not improve within 24 hours, call the Wellstart Helpline: 295-5193

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CANDIDIASIS

Causes:

- Thrush or candidal diaper rash in the infant
- Recent history of antibiotics in mother or infant
- Recurrent candidal vaginitis in the mother

Management:

- For mother
 - Apply medication to nipples after every feeding for 14 days
 - Keep area dry: expose nipples to air or sun and use a fresh bra liner after every feeding
 - Wash clothes and other articles that come into contact with breasts (e.g., towels) in very hot water
 - Wash hands well, especially after changing infant's diaper
 - Consider treating partner also if infection persists
- For infant
 - Apply oral medication directly to affected areas for 14 days
 - Boil articles that come in contact with infant's mouth (e.g., cup) for 20 minutes daily
 - Treat diaper rash until healing is complete



CANDIDIASIS

Candidiasis is a fungal infection which is common in infants. Known as "thrush," this infection results in inflammation of the baby's mouth or diaper area. When breastfeeding, the mother's nipples may also become infected. Medication will be prescribed for both mother and baby. The following measures are also important in helping to clear the infection.

For Mother:

- Use a light film of _____ on your nipples after every feeding for 14 days. It is not necessary to wash off before feeding.
- Air dry and/or expose nipples to sun after each feeding.
- Use a fresh bra liner (e.g., pad, tissue, handkerchief, or paper towel) after each feeding for several days.
- Wash bras, nightclothes, sheets, towels, and washcloths in very hot water.
- Good handwashing after changing the infant's diapers and after using the bathroom.
- When bathing, use a different washcloth for the genital area.
- Your partner may need to be treated also.

For Baby:

Oral Thrush:

- Use oral medication four times a day (after feeding) for 14 days.
- Use your finger, gauze, or a cotton-tipped swab to apply the medicine well onto the inside of the baby's mouth, including cheeks, gums, and tongue.
- Boil breast pump pieces, pacifiers, and any other artificial nipples for 20 minutes daily.

Diaper Rash: Use cream four times a day until healing is complete.

ENGORGEMENT

Causes:

- inadequate and/or infrequent milk removal
- inhibited milk ejection reflex

Management:

- moist warm packs or warm shower before feeding
- massage and hand express or pump to relieve areolar engorgement before feeding to facilitate attachment
- frequent and effective nursing
- cold packs after feeding
- stress reduction/relaxation techniques
- neck and back massage
- "comb the breast"
- "Kenyan salute"
- mild analgesic



ENGORGEMENT

Engorgement is an accumulation in the breasts of increased amounts of blood and other body fluids, as well as milk. For some mothers the breasts become only slightly full, while for others they become very full, tender and lumpy. Engorgement may cause the nipple to flatten, making it difficult for your baby to nurse effectively. The following measures will help relieve the problem, usually within 24 to 48 hours.

- Apply moist heat to the breasts 3 - 5 minutes before a feeding, followed by gentle massage and stroking the breast towards the nipple
- By hand or mechanical methods, express enough milk to soften the areola making proper attachment of your baby easier
- Nurse frequently, every 2 - 2½ hours or sooner for at least 15 - 20 minutes per side after your let-down has occurred
- Feed your baby in a quiet, relaxing place
- Be sure to wear a supportive bra
- You may take Tylenol, if needed, for pain
- Cool compresses may be used after feedings

If the problem does not improve within 24 hours or if you have further questions, please call the Wellstart Helpline: 295-5193

OBSTRUCTED LACTIFEROUS DUCT

Causes:

Milk stasis secondary to:

- infrequent nursing
- incomplete emptying
- local pressure

Management:

- moist warm packs to area before nursing
- massage prior to and during nursing
- proper positioning, attachment, and removal technique
- more frequent nursing
- offer baby involved breast first
- check fit of clothing



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OBSTRUCTED LACTIFEROUS DUCT

An obstructed lactiferous duct results in a tender area or painful lump in the breast occurring for a variety of reasons, such as:

- Skipped or delayed feedings
- One-sided breastfeeding
- Pressure from tight clothing or bra
- Pressure from forming an "air-hole" for the baby to breathe
- Sleeping in a position that puts pressure on one area of the breast
- Weaning

Generally, the following measure will relieve the problem, regardless of the cause. However, if gone untreated, a blocked duct can lead to mastitis.

- Apply moist heat to the involved breast 3 - 5 minutes before a feeding
- Breast feed on the involved breast first, to allow for more complete emptying of the ducts
- Be sure your baby is properly attached at the breast
- Gently massage the involved area while nursing
- Change the position of the baby at each feeding (cradle, side-sitting position) to allow for more complete emptying of the ducts
- Nurse frequently, at least every 2 - 2½ hours or sooner for 15 - 20 minutes per side
- Be sure to get plenty of rest
- Check the fit of your nursing bra
- When ready to wean your baby — do it **gradually**

If the problem worsens or does not disappear within 24 hours, call the Wellstart Helpline: 295-5193

MASTITIS

Causes:

- usually preceded by nipple trauma
- untreated obstructed lactiferous duct or engorgement
- contributing factors:
 - stress
 - fatigue

Management:

- DO NOT DISCONTINUE NURSING
- nurse more frequently
- offer baby involved breast first
- proper positioning, attachment, and removal technique
- moist warm packs
- bed rest for 24 hours
- mild analgesic
- antibiotic
- drink fluids to thirst



MASTITIS

Mastitis is an infection of the breast tissue surrounding the milk ducts. Symptoms include a tender, reddened area of the breast accompanied by fever, chills, headache and generalized achiness. The following measure will help relieve the symptoms usually within 24 hours.

- Go to bed with your baby for 24 hours — rest is essential!
- Apply moist heat to the involved breast 3 - 5 minutes before each feeding
- Nurse frequently, every 2 - 2½ hours or sooner for at least 15 - 20 minutes per side, offering the affected side first
- Change the position of the baby at each feeding (cradle, side-sitting position) to allow for proper emptying of the ducts
- Drink fluids to satisfy your thirst (if you have a fever, you will be more thirsty)
- Take antibiotics as prescribed:

Medication _____

Dosage _____

Frequency _____

Duration _____

Remember: Mastitis is an infection of the breast tissue, not the milk; therefore, the milk is safe for your baby. Abrupt weaning or temporary interruption of nursing may slow healing or lead to further complications.

If condition worsens or does not improve within 24 hours, please call the Wellstart Helpline: 295-5193



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INCREASING MILK SUPPLY

- Moist heat to breasts 3-5 minutes before feeding.
- Massage breasts before and during feeding.
- Gently stimulate the nipple and areola.
- Feed or express milk frequently, 8-12 times in 24 hours.
- Relaxation techniques while feeding/pumping:
 - Deep breathing
 - Visual imagery of a pleasant place or of milk flowing to baby
 - Music or relaxation tape
- Express or pump milk between feedings.
- Eat a nutritious diet, following the Daily Food Guide for Breastfeeding Women.
- Drink to thirst each time you feed your baby or pump.
- Your weight loss should be no more than 2 - 4 pounds per month.
- It takes 4 - 7 days to see an increase in milk supply once you begin more frequent feeding or pumping.
- Keep a record of feedings/pumpings to monitor your situation.

ADDITIONAL INSTRUCTIONS

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INDICATORS OF ADEQUATE
BREASTMILK INTAKE
(Early Postpartum Weeks)

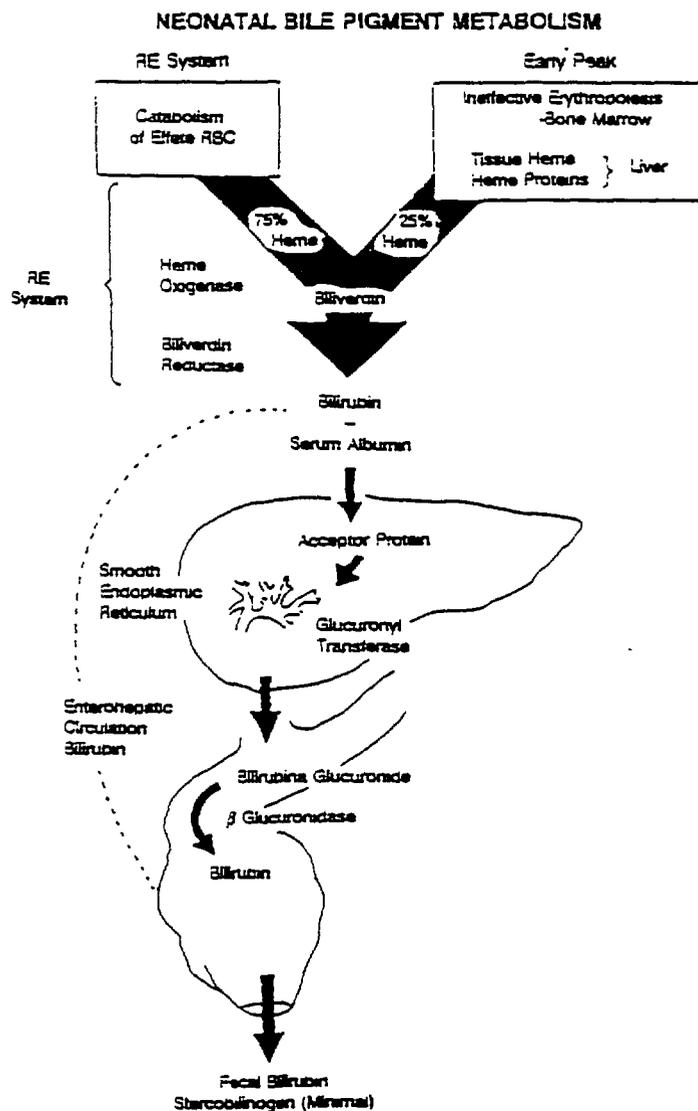
1. Audible swallowing during a feeding.
2. Breasts full before feeding and softer afterwards.
3. Let-down sensation in mother's breasts.
(It is normal for some women not to feel this.)
4. Wet nappies/diapers: 6 or more/24 hours.
5. Bowel movements: 4-8 in 24 hours.
6. Contented baby between feeds.
7. Average weight gain:
18-30 grams/day ($\frac{3}{4}$ -1 ounce/day)
125-210 grams/week (4-7 ounces/week)

**WELLSTART INTERNATIONAL
LACTATION MANAGEMENT EDUCATION PROGRAM
JAUNDICE AND BREASTFEEDING - OVERVIEW**

RECENT CONTROVERSY REGARDING NEONATAL JAUNDICE

An association between breastfeeding and jaundice has long been recognized, although many aspects of this association have been confusing and misunderstood. Two very recent articles have reviewed neonatal jaundice in depth, proposing new and controversial guidelines (Newman, 1992 and Oski, 1992). Neither article, however, clearly articulates the breastfeeding/breastmilk association, which if clearly understood, could allow us to lower the bilirubin levels of breastfed infants as a preventive measure.

What is all of the controversy about and what do we actually accomplish by evaluating numerous healthy full-term infants without hemolysis?



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Pediatrics in Review, Vol. 3, No. 10, April 1982.

1988
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NEGATIVE CONSEQUENCES OF OVER-DIAGNOSING JAUNDICE IN HEALTHY NEONATES

Anyone involved in the promotion of breastfeeding is aware of the very common practice of suspending breastfeeding unnecessarily for jaundice. Several authors have reported decreased duration of breastfeeding associated with this practice (Kemper).

Maisels and Newman (1990) point out that blood sampling is painful for infants. We know that there have been other physical complications from blood drawing, IV's, and phototherapy. More than ONE MILLION babies in the U.S. have one or more bilirubin determinations (costing at least 25 million dollars). Approximately 350,000 receive phototherapy. At the same time, these authors point out, there is no evidence of a direct relationship between bilirubin levels and cognition, neurologic abnormalities, or hearing loss in healthy full-term infants.

Kemper reports that infants jaundiced as newborns were more likely to have extra checkups and sick-visits (contributing further to higher medical expenditures). Their mothers exhibited several other characteristics that would place the infants at risk for vulnerable child syndrome. As Kemper states, "we must carefully weigh the risks of treatments such as early termination of breastfeeding before recommending therapy for a generally benign condition."

A review of the basic pathophysiology of jaundice, along with a review of the literature pertinent to breastfeeding and jaundice, will lead to an understanding of the subject within a clinical/problem-solving context.

PHYSIOLOGIC OR PATHOLOGIC?

The physiology of bilirubin production and elimination is well summarized by Maisels' diagram (1982) on the previous page.

Pediatricians are familiar with the concept of "pathologic jaundice" as opposed to "physiologic" jaundice. The classical characteristics of "pathologic jaundice" include the following from the 1985 Manual of Neonatal Care:

1. Clinical jaundice in the first 24 hours of life
2. Increase of total serum bilirubin concentrations **more than 5 mg/100 ml** per day
- *3. Total serum bilirubin concentration over 12.9 mg/100 ml in full-term infant or over 15 mg/100 ml in premature infant
4. Direct serum bilirubin exceeding 1.5 - 2 mg/100 ml
- *5. Clinical jaundice persisting after the 1st week of life

*Controversial points

Indeed, the redefinition of "normal" bilirubin levels has resulted in newer guidelines (Manual of Neonatal Care, 1991):

1. Clinical jaundice prior to 36 hours of age.
2. Serum bilirubin concentrations increasing by more than 5 mg/dL per day.
3. Total serum bilirubin level greater than 15 mg/dL in a formula-fed term infant.
4. Total serum bilirubin level greater than 17 mg/dL in a breast fed term infant.
5. Clinical jaundice persisting after eight days in a term infant.

There has been some on-going controversy about whether or not breastfeeding is indeed associated with high bilirubin levels. Early studies in the mid 1960's to 1970's indicated there was no association, but a number of studies from 1974 through 1986 fairly clearly demonstrate a definite association between breastfeeding and increased bilirubin levels (Gartner, 1987 and Maisels, 1986). The early controversy was marked by the issues we will be reviewing today, including the age of onset of the jaundice, the frequency of the feedings, the use of supplementary or complementary feedings, and the elimination pattern of the infant.

Jaundice associated with breastfeeding can be divided into two fairly distinct syndromes, which may at times overlap: early onset and late onset jaundice.

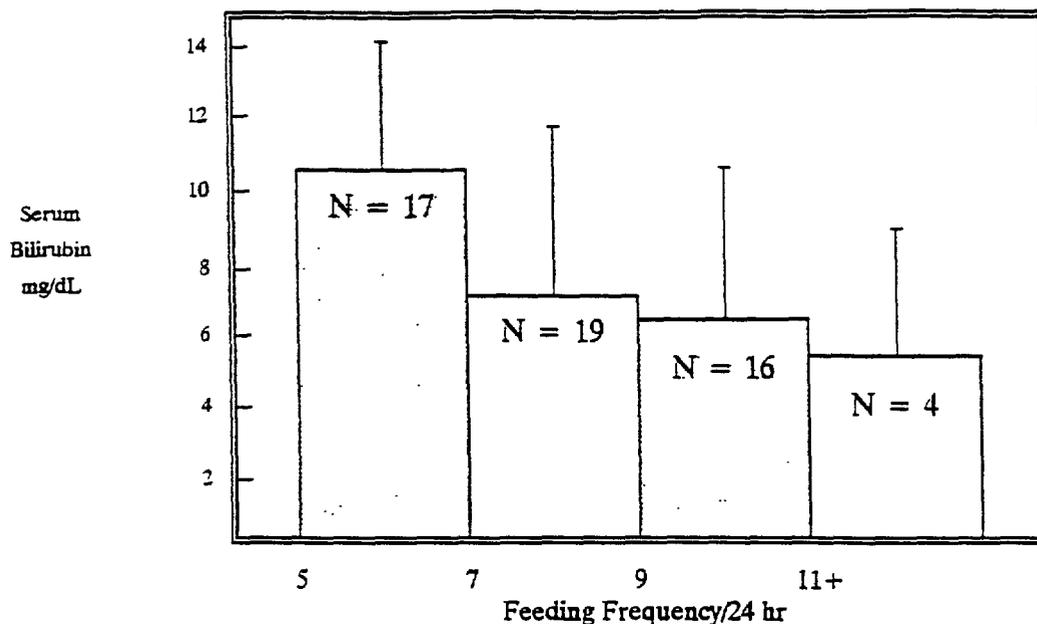
The "early onset jaundice" which occurs within the first 3 to 4 days of life, has also been called "exaggerated physiologic jaundice," "lack of breastmilk jaundice," or more recently, "breastfeeding jaundice."

The "later onset jaundice," occurring toward the end of the first week is the classical "breast milk jaundice syndrome."

BREASTFEEDING JAUNDICE

A recent and fairly well-known study by Maisels, in 1986, studied over 2,000 normal term infants. Of those infants only 3% has idiopathic hyperbilirubinemia of greater than 12.9 mg/100 ml. However, of these 3%, 83% were breastfed. Maisels interprets his data such that all of the infants were "normal," were healthy, were vigorous, and had no other cause for their jaundice. He proposes a "double standard" for evaluation of hyperbilirubinemia. In the bottle fed infant, a level of greater than 12.4 mg% would be considered "pathologic." However, in a breastfed infant, hyperbilirubinemia would not be considered "pathologic" until it is greater than 15.7 mg%. The qualifying condition is that the infants are healthy and vigorous term infants.

One factor related to bilirubin levels in the breastfed infant is the oral administration of glucose water. At least five different studies have demonstrated that the use of glucose water will result in the same or higher bilirubin levels compared to exclusive breastfeeding (DeCarvalho, Kuhr, Nicoll, Saigal, Hall).



DeCarvalho, 1982

A second factor related to jaundice is the frequency of breastfeeding. DeCarvalho (1982) demonstrated that a higher frequency of breastfeeds correlated with lower bilirubin levels.

A third factor demonstrated by DeCarvalho (1985) and others is that increased fecal weight correlated with lower bilirubin levels.

Although Maisels addresses the issue of feeding frequency, his study did not record infant feeding practices. He seems to assume that infrequent feedings are the norm. However, some data from Emde in 1975 showed that normal infants awaken 4 - 9 times in the first 10 hours after birth. This number of feedings would correlate with relatively low bilirubins in DeCarvalho's (1982) study. So, perhaps we should not assume that breastfed infants feed infrequently and are more jaundiced; perhaps infants should be given the opportunity to feed more frequently, in order to achieve bilirubin levels more similar to our current standard.

The primary treatment of breastfeeding jaundice lies in its prevention:

Prevention of Breastfeeding Jaundice

1. Frequent feedings day and night: 8 - 12 (or more) times per 24 hours
2. Effective suckling for sufficient length on both sides; observed by experienced staff
3. Monitor stooling pattern
4. Prohibit complementary or supplementary fluids

If, for some reason, the infant is not able to suckle frequently, then within 24 to 48 hours after delivery, the mother's milk should be expressed and fed to the infant by another method until the infant is able to suckle at the breast.

BREAST MILK JAUNDICE SYNDROME

Breast milk jaundice syndrome is characterized by the following features:

1. Less than 1-2% of healthy full-term breastfed neonates
2. Appears toward the end of the first week of life
3. Peaks between the 5th and 15th days of life
4. Persists from 3 weeks - 3 months
5. If breastfeeding continues uninterrupted, bilirubin concentrations slowly return to normal
6. Brief interruption of breastfeeding results in a significant decline in bilirubin levels
7. With continued breastfeeding, levels rise slightly, but not to previous levels

There have been a number of theories proposed to explain breast milk jaundice syndrome, which currently are only of historical interest. These are listed below:

1. Progesterone Metabolite
(5-Beta --Pregnane -- 3-Alpha, 20-Beta -- diol):

Possibly decreases hepatic excretion of conjugated bilirubin

Arias, 1963
2. Non-esterified (free) long-chain fatty acids:

Inhibits glucuronyl transferase

Bevan, 1972
3. Lipase:

Releases free fatty acids to inhibit glucuronyl transferase

Jalili, 1985
4. Beta-glucuronidase

The most recent theory explaining persistent indirect hyperbilirubinemia in the breastfed infant is presented in the work of Gourley, from *The Lancet* in 1986. This study of 34 breastfed infants and 15 bottle fed infants detected increased levels of beta-glucuronidase in maternal milk, as well as in infant stools among those infants with higher bilirubin levels. The beta-glucuronidase within the gut acts to cleave conjugated bilirubin and allow increased enterohepatic recirculation. These infants were studied on day 3 and on day 21, and so, there may be some degree of overlap among breastfeeding jaundice and breast milk jaundice. This study has not been confirmed in other labs (personal communication, M. Hamosh).

The management of breast milk jaundice syndrome will vary with the philosophy, experience, and judgement of the practitioner. One reasonable way to manage this syndrome is as follows:

1. Exclude other common causes of jaundice

2. If bilirubin is ≥ 20 mg/100 ml, interrupt nursing for 12 - 48 hours (mother continues expressing her milk)
3. If infant appears lethargic or is feeding poorly, more aggressive therapy is indicated and **another diagnosis must be considered**
4. No reason to interrupt nursing to make the diagnosis if bilirubin is ≤ 20 mg/100 ml

Other options may be acceptable, as each case is considered individually.

SUMMARY

In summary, the relationship between breastfeeding, breastmilk, and jaundice is fairly clear cut and can be understood in terms of the known physiology. The prevention and management of this syndrome requires thoughtful attention to feeding patterns and the differential diagnosis of hyperbilirubinemia, as well as to individual variations in management styles. Interruption of breastfeeding should rarely, if ever, be indicated.

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SUITABILITY OF HUMAN MILK FOR THE LOW BIRTH WEIGHT INFANT

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INTRODUCTION

When we consider human milk feeding for the low birth weight (LBW) infant in the United States, we think of the infant with a birth weight less than 1500 grams, the very low birth weight (VLBW) infant. Because their survival has been increasing dramatically in the last several years, now >90%, the attention has shifted recently to the provision of optimal nutrition. Although we emphasize the VLBW infant in our studies, we remain uncertain as to how to nourish the larger LBW infant, weighing 1500 to 2500 g at birth. For that population much of the nutrient needs have been extrapolated from the VLBW infant data.

SPECIAL CONSIDERATIONS FOR LBW INFANTS

A discussion of particular feeding regimens for LBW infants (<2500 g at birth) must consider their special nutritional needs, their immature gastrointestinal development, and their immature host defense. In the first 2 months after birth the LBW infant experiences a very rapid growth rate (weight gain 16 to 22 g/kg/d) vs the term infant (7 to 11 g/kg/d)^{1,2}. When one looks at the Lubchenco³ intrauterine growth chart we note that infants born between 25 and 30 weeks gestation are at the bottom of that growth curve. Postnatally, the LBW infant is faced with a great need for appropriate nutrition to compensate for a lack of sufficient nutrient stores in order to resume the intrauterine rate of weight gain⁴.

NUTRIENT SUITABILITY

Protein: In the first month after birth, the total nitrogen content of milk from mothers who deliver preterm infants ("preterm milk") is greater than milk obtained from women delivering term infants ("term milk")⁵. The total nitrogen content in both milks declines similarly to approach what we call "mature milk."⁶ The nitrogen concentration differences between preterm and term milk are most notable in the first two weeks after birth.

The protein quality (proportion of whey and casein) of human milk is particularly suitable for the LBW infant. Human milk contains 30% casein and 70% whey.⁷ Bovine milk is 82% casein (casein-dominant). Differences between human and bovine milk protein are observed not only in the proportion of whey but also in the type of proteins comprising that fraction. The major human whey protein is α -lactalbumin, a nutritional protein in the infant and a component of mammary gland lactose synthesis. Lactoferrin, lysozyme, IgA, and secretory IgA, are specific human whey proteins involved in the infant's host defense. Those proteins particularly may be suitable for the LBW infant who is exposed to multiple pathogens in the nursery environment. Those proteins are present in trace quantities in bovine milk. The major whey protein in bovine milk is β -lactoglobulin, the protein thought responsible for bovine milk protein allergy.

Clinical studies^{8,9,10} conducted in Finland have investigated the benefits of whey vs casein dominant milks for LBW infants. LBW infants fed casein dominant milk had higher plasma amino acid concentrations of phenylalanine, tyrosine, and methionine each week of the 8 to 12 week study. Hepatic immaturity may be responsible for the elevated concentrations of those amino acids; amino acids whose concentrations are greater in casein than whey. From animal studies we infer that those amino acids may be toxic to brain development. If we extrapolate that concept to the LBW infant there may be a concern when feeding a casein dominant formula. A whey dominant protein source appears to be more suitable for LBW infants and has been adopted as the major protein source in formulas for LBW infants. Importantly, the Finnish studies demonstrated that the lowest concentrations of phenylalanine, tyrosine, and methionine were obtained in the LBW infants fed human milk.

Non-protein energy sources: The lipid system in human milk particularly suits the LBW infant. Because of the pattern of fatty acids, their distribution on the triglyceride molecule, and the presence of bile salt-stimulated lipase, the fat absorption from human milk is high. It is important also to stress that the superior fat absorption from human milk is reported only when unprocessed milk is fed. Human milk lipase is heat-labile.

The lipid system in human milk has been tested in formula-fed infants. A mixture of 40% human milk and 60% infant formula reportedly resulted in an increase in the fat absorption of LBW infants, from 89% to 95%.¹¹ Most infant formulas have attempted to modify their fat blends to mimic the superior fat absorption from human milk.

Recently, research has focused on the distribution of very long chain polyenic fatty acids, specifically, 22:6n3, docosahexaenoic acid, which is found in human milk but not in bovine milk. This fatty acid is a component of phospholipids found in brain and red cell membranes. Supplementation of the diet of formula-fed LBW infants with fish oil (high concentrations of 22:6n3) results in red blood cell concentrations of 22:6n3 that parallel those of similar infants fed human milk.¹² Follow-up studies of supplemented LBW infants also suggest improvements in visual acuity.¹³ Further studies are needed to assess the affects of this fatty acid and its importance to LBW infant nutrition.

The carbohydrate composition of human milk is important as a nutritional source of lactose and for the presences of oligosaccharides. LBW infants generally have the capacity to absorb the lactose in human milk.¹⁴ Oligosaccharides are carbohydrate polymers which may be digested but are important in the host defense of the infant because their structure mimics specific bacterial antigen receptors. By preventing bacterial attachment to the host mucosa, oligosaccharides serve a protective role for the compromised LBW infant.

GASTROINTESTINAL CONSIDERATIONS

Gastric emptying is better with human milk than commercial formula. Many factors in human milk tend to stimulate gastrointestinal growth, gastrointestinal motility, and enhance maturity of the gastrointestinal tract. We believe that even small amounts of human milk may be beneficial in its stimulatory effects on the gastrointestinal tract. Postprandial plasma hormone concentrations also are more mature following the feeding of human milk than commercial formula.

HOST DEFENSE CONSIDERATIONS

Specific factors such as secretory IgA, lactoferrin, lysozyme, oligosaccharides, growth factors, and cellular components may affect the host defense of the LBW infant. The enteromammary immune system essentially summarizes the protective nature of human milk. In this system the mother produces secretory IgA antibody when exposed to foreign antigens and is stimulated to make specific antibodies which are elaborated at mucosal surfaces, including her milk. By ingesting the milk containing specific IgA antibody, the infant receives specific passive immunity. The system is active in full-term infants against a variety of antigens. To what extent the enteromammary immune system functions in the LBW infant-mother dyad is unknown. This is quite relevant because the mother of a LBW infant, being relatively isolated from her infant, is prevented from acquiring the microorganisms in her infant's environment. Because current nursery protocols in most hospitals tend to ignore mother-infant contact, studies are needed that focus on mother-infant skin to skin contact to try to develop this enteromammary pathway for the LBW infant.

Evidence is beginning to accumulate to suggest that human milk protects the LBW infant from disease. In her New Delhi nursery study, Dr. Narayanan¹⁵ reported that a lower incidence of infections in LBW infants fed their mothers' milk during the daytime (and formula at night) compared with similar infants fed formula exclusively. Yu¹⁶ reported that fewer human milk-fed LBW infants developed necrotizing enterocolitis than similar infants fed formula exclusively. Recently, Lucas¹⁷ reported a marked reduction in the incidence of necrotizing enterocolitis in LBW infants fed human milk, either exclusively or partially, compared with similar infants fed formula.

One intriguing controlled trial in Vienna¹⁸ reported a decreased incidence of necrotizing enterocolitis in LBW infants fed an IgA and IgG preparation. Although the IgA-IgG preparation was derived from serum, the striking results bear repeating. The infants fed the IgA preparation had a significantly higher fecal excretion of IgA, suggesting the local protective effect throughout the gastrointestinal tract. Studies in our Center evaluated the fecal and urinary lactoferrin and IgA excretion in human milk-fed and formula-fed infants.¹⁹ We found that human milk-fed infants also had elevated fecal excretion of IgA similar to that reported in the Vienna study. We observed almost undetectable levels of IgA in the feces of formula-fed LBW infants. These results suggest that human milk may enhance the LBW infants' host defense.

PROBLEMS ENCOUNTERED WITH FEEDING LBW INFANTS HUMAN MILK

We and other investigators have observed that human milk-fed LBW infants had slower growth rates²⁰ and inadequate specific nutrient intakes to meet their greater needs (see table below). The variability in the milk content, of protein, sodium, and fat has been a factor. Nutrient inadequacy, specifically deficient intakes of calcium, phosphorus, protein, and sodium may be a problem for the human milk-fed LBW infant (see table below). Skeletal x-rays may reveal inadequate bone mineralization and rickets in the LBW infant fed human milk for a long duration. The concentrations of calcium (25 mg/dl) and phosphorus (14 mg/dl) generally are stable in "preterm" vs "term" human milk and in early vs late lactation. These quantities are far below the mineral needs for the LBW infant. We observed that serum P (low) and alkaline phosphatase activity (high) are markers of calcium and phosphorus deficiency. Lucas²¹ reported that the majority of infants having an elevated serum alkaline phosphatase activity were fed human milk. Moreover, at 9 and 18 months follow-up growth in length and weight were significantly lower in the group that had the higher serum activity of alkaline phosphatase in the neonatal period.

Units/kg/d	Preterm milk week of lactation			Mature milk	Estimated needs
	1	2	4		
Energy (kcal)	120	120	120	120	120
Fluid volume (ml)	180	180	180	190	150
Protein (g)	3.9	3.4	2.8	2.4	3.5
Sodium (mmol)	4.0	2.7	1.8	2.0	3.0
Calcium (mg)	53	46	42	47	160-200
Phosphorus (mg)	25	27	23	26	80-100

Lower protein intakes in human milk-fed LBW infants also are a concern, as evidenced by the lowest serum phenylalanine, tyrosine, and methionine plasma amino acid concentrations and serum albumin concentrations when compared with any of four groups of formula-fed infants in the Finnish studies⁸⁻¹². Moreover, in the human milk-fed infants serum total protein concentrations declined through 10 weeks of study. These data suggest protein inadequacy.

There are also concerns regarding the milk banking aspects of feeding human milk to LBW infants. Fat, the major energy source in human milk, is the most variable constituent and is particularly sensitive to milk banking strategies. Women may express only foremilk (lower in fat) and the fat may adhere to collection containers, feeding syringes, and feeding tubes, all devices commonly used when supplying the LBW infant with expressed milk. Although proper counseling could avoid this problem, procedures should be adopted

to prevent losses in the collection and preparation for feeding. Lacto-engineering strategies that advocate the use of "hindmilk" in selected cases may provide the LBW infant with additional energy.²²

HOW DO WE OVERCOME THE PROBLEMS OF FEEDING LBW INFANTS HUMAN MILK?

The data concerning the protective effects of feeding LBW infants human milk are exciting. It should be emphasized that even partial human milk feeding should be encouraged because of the protection afforded. The emerging host defense data warrant extraordinary efforts to provide nutritionally adequate milk to this high risk population. We should attempt to avoid feeding restricted volumes of milk. Protocols should be designed that avoid any losses of fat and to use hindmilk to provide optimum energy content for the infant. We should encourage skin to skin contact between mother and infant to facilitate maternal production of protective antibodies, specific antibody directed against the nosocomial flora of the neonatal unit.

The smallest LBW infants may require additional nutritional support. Prolonged feeding may result in protein and mineral deficiencies. These deficiencies should be anticipated and biochemical monitoring of those infants at greater risk should be encouraged. Selected infants may require nutritional fortification of their mother's milk.

HUMAN MILK FORTIFICATION

Growth rates and serum protein and BUN concentrations in LBW infants reportedly are increased when human milk feedings are fortified with protein²³⁻²⁴. Our studies²⁴ at Baylor College of Medicine have focused on calcium and phosphorus fortification. We evaluated two concentrations, of calcium and phosphorus; 40 mg Ca/22 mg P and 85 mg Ca/45 mg P per 100 ml. The second concentration (85/45) provided the greatest net retention of calcium and phosphorus which nearly approached the intrauterine estimate for accretion of these minerals. Biochemical measurements indicated that the 85/45 group had higher serum P concentrations and lower serum alkaline phosphatase activity. Thus, the data suggest that a selected group of LBW infants benefit from protein, calcium, and phosphorus fortification of their mothers' milk.

Despite fortification of human milk during hospitalization, we have observed that rates of bone mineralization were lower in human milk-fed LBW infants than in infants fed formula after hospital discharge.²⁵ Our data suggest that the intrauterine mineral accretion rate should be achieved during hospitalization and that failure to do so results in a cumulative deficit of calcium and phosphorus during 8 to 12 weeks of hospitalization. Thus, it is clear that a select group of LBW infants need mineral fortification of their mothers' milk.

CURRENT GUIDELINES FOR HUMAN MILK FORTIFICATION

Current recommendations in our Center are to fortify mothers' milk for all LBW infants with a preparation that minimally includes (per 100 ml of milk): protein, predominantly whey (1 g), calcium (50 mg), and phosphorus (25 mg). Hindmilk is used and milk volumes, if possible are not restricted. Multivitamin and iron supplements always are indicated.

Calcium lactate provides 13 mg elemental Ca/100 g powder, Ca gluconate (10% solution) provides 9 mg Ca/ml. Sodium phosphate dibasic powder is 22% P and 32% Na; sodium phosphate monobasic is 26% P and 19% Na. Sodium monobasic-dibasic phosphate solution (1 ml) provides 90 mg P and 4 mEq Na. Calcium caseinate (1 g powder) provides 0.9 g protein, 16 mg Ca, and 8 mg P, and may be adequate if whey protein is unavailable. Most authorities agree that phosphorus should be added to the milk and mixed before the calcium is added. These guidelines await experimental verification.

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Why promote breastfeeding in diarrhoeal disease control programmes?

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The improvement of case management practices is the cornerstone of national programmes to control childhood diarrhoea and can lead to a rapid reduction in diarrhoeal mortality. There is, however, increasing interest in the development of interventions that can reduce diarrhoeal morbidity, especially in countries where case management activities are well established. The Diarrhoeal Disease Control Programme of the World Health Organization recommends that breastfeeding be promoted as one of the most important measures for preventing diarrhoea. There is now conclusive evidence that breastfeeding confers significant protection against illness and death associated with diarrhoea, and minimizes its adverse nutritional effects. Breastfeeding promotion has been demonstrated to be an efficient measure for preventing diarrhoea, and has many other important social, economic and health benefits. This paper summarizes the evidence and describes the Programme's ongoing and planned activities in support of efforts to promote breastfeeding.

Introduction

Diarrhoeal diseases are a major cause of morbidity and mortality among infants and young children. It is estimated that there are approximately 1.3 thousand million episodes and almost 4 million deaths in children younger than 5 years of age in the developing world each year: most of them occurring in children aged 6 months to 2 years old (Claeson and Merson 1990). Since its inception, the Diarrhoeal Disease Control (CDD) Programme of the World Health Organization (WHO) has recommended that national efforts to control diarrhoeal diseases focus on improving case management practices, since the primary objective of the programme is to reduce mortality from diarrhoeal diseases, and it is believed that correct case management could prevent up to 90% of such deaths (Claeson and Merson 1990). The programme has also formulated approaches to achieve its second objective - to reduce morbidity from diarrhoeal diseases and associated ill-effects, particularly malnutrition (Feachem 1986). These include promotion of breastfeeding, promotion of improved weaning practices, and of hygiene, and measles immunization.

The beneficial effects of breastfeeding, both in general and in reducing diarrhoeal morbidity and

mortality, are well known and substantial (Huffman and Combest 1990), and programmatic experience in the promotion of breastfeeding in various settings is rapidly accumulating (Jelliffe and Jelliffe 1988). It is becoming increasingly clear that the promotion of breastfeeding can make a major contribution to efforts to control diarrhoeal diseases. For these reasons, WHO has decided that it should be given importance as an intervention.

Breastfeeding and the risk of diarrhoea

Impact on morbidity

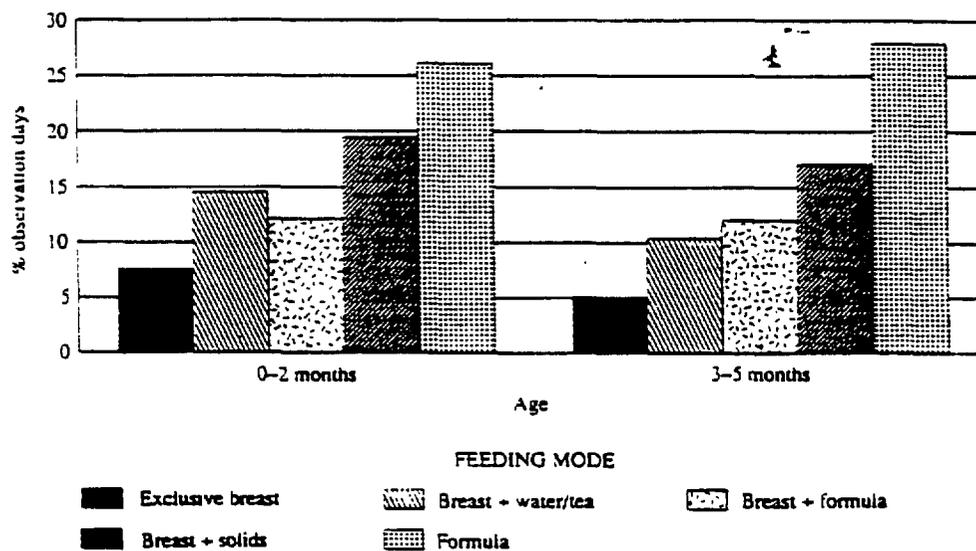
Feachem and Koblinsky (1984) reviewed 35 studies which investigated the association between mode of infant feeding and diarrhoeal morbidity. Most of the studies found that infants who received no breast milk were at greater risk of diarrhoea than infants who were partially breastfed, while infants who were partially breastfed were at greater risk than infants who were exclusively breastfed. When infants who were receiving no breast milk were contrasted with infants on exclusive or partial breastfeeding, the median relative risks were 3.0 for those aged 0-2 months, 2.4 for those aged 3-5 months, and 1.3 to 1.5 for those aged 6-11 months. When infants who were receiving no

breast milk were contrasted with infants on exclusive breastfeeding, the median relative risks were 3.5 to 4.9, in the first six months of life.

An exclusively breastfed infant is defined as an infant who is given no other liquid or solid (Labbok and Krasovec 1990). Providing young infants with clear fluids such as water and tea in addition to breast milk is a very common practice, although it is not necessary and should not be recommended, even under extreme climatic conditions (Almroth 1978; Almroth and Bidinger 1990; Armelini and Gonzalez 1979; Brown et al. 1986). The significant benefits of exclusive breastfeeding over other forms of feeding in which the infant is given water, tea, or juice in addition to breast milk, have only recently been documented. In a study conducted in a poor urban community in Lima, Peru (Brown et al. 1989), the overall incidence of diarrhoea was found to be very high among infants (about 10 episodes per child per year throughout the first year of life), despite nearly universal initiation of breastfeeding and 86% prevalence of continued breastfeeding at one year of age. Unfortunately, exclusive breastfeeding was very unusual; by the time 83% of infants were a month old, they had received water or tea in addition to breast milk, and almost 40% were regularly receiving non-human milk of one kind or another. The in-

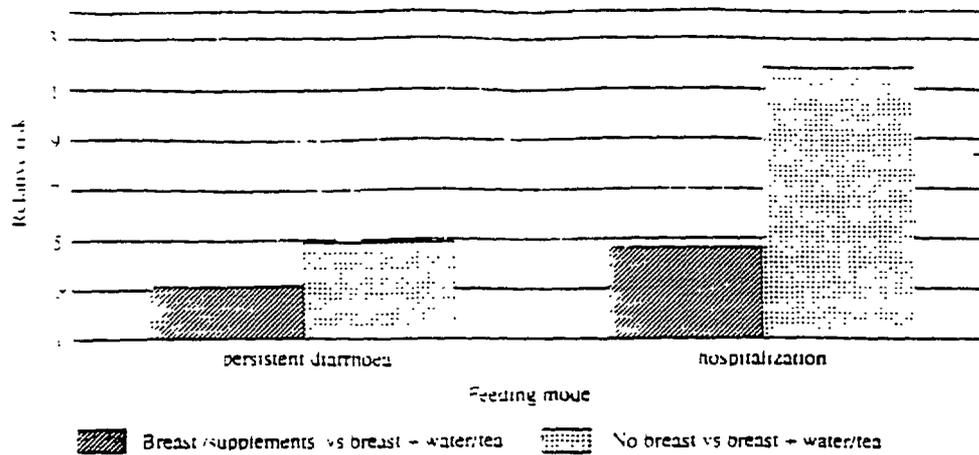
cidence and prevalence rates of diarrhoea in infants younger than 6 months were significantly lower among those who were exclusively breastfed than among those who received water and tea in addition to breast milk. The diarrhoea prevalence rates *doubled* with the addition of these other fluids (Figure 1). Similar findings have been reported from the Philippines (Popkin et al. 1990).

Breastfeeding appears to be particularly protective against persistent or severe diarrhoea. In a study conducted by one of us (José Martines) in southern Brazil, infants who started to receive milk supplements in addition to breastfeeds in the first week of life were 3 times more likely to have persistent diarrhoea, and 5 times more likely to be hospitalized for diarrhoea before the age of 3 months, than infants of the same age who were breastfed without milk supplements (Figure 2). The risks were even greater among the non-breastfed. Infants who stopped breastfeeding during the first week of life had a 5 times higher risk of having persistent diarrhoea and a 12 times higher risk of hospitalization for diarrhoea before the age of 3 months, than infants who were breastfed without food or milk supplements. Breastfeeding has also been associated with a substantial reduction in the risk of severe cholera and shigellosis in Bangladesh (Clemens et al. 1986, 1990).



Source: Brown et al. (1989)

Figure 1. Prevalence of diarrhoea by feeding mode (Huascar, Peru)



Source: Martines, J unpublished data

Figure 2. Relative risks of persistent diarrhoea and hospitalization for diarrhoea by feeding mode among infants under 3 months of age (Pelotas, Brazil)

Infant formula provided in feeding bottles seems to be particularly dangerous. In a case-control study conducted in an urban setting in Iraq (Mahmood et al. 1989), the early introduction of bottle-feeding was associated with a greatly increased risk of severe diarrhoea during the first year of life. Bottle-fed infants aged 2-3 months were 55 times more likely to be hospitalized for diarrhoea than exclusively breastfed infants of the same age.

Among young infants, therefore, exclusive breastfeeding is clearly associated with the lowest risk of diarrhoea. However, any breastfeeding is better than none at all, and breastfeeding continues to protect against diarrhoea after foods are introduced between 4-6 months of age.

Protection against the nutritional impact of diarrhoea

Of the infectious diseases, diarrhoea and febrile illnesses such as malaria and lower respiratory tract infections seem to have the greatest negative effect on childhood growth (Black, in press). The nutritional impact of diarrhoea depends on a number of factors, including age, dietary intake, aetiology of the infection, and breastfeeding status. There is evidence that breastfeeding can protect against the adverse nutritional effects of diarrhoea (Rowland et al. 1988; Watkinson 1981). Children are usually eager to breastfeed when they have diarrhoea, even though they may

refuse solid foods (Bentley et al. 1991; Huffman, personal communication), and the frequency and duration of breastfeeding appear to be little affected during diarrhoea (Brown et al. 1990; Dickin et al. 1990). The energy intake derived from breast milk does not usually decline during episodes of diarrhoea and other illnesses, whereas that from other food sources is often reduced (Brown et al. 1990; Hoyle et al. 1980). Since breast milk provides a substantial proportion of dietary energy intake in infancy, breastfeeding offers greater protection against the nutritional impact of diarrhoea during this period (Brown et al. 1985).

Impact on mortality

In their review, Feachem and Koblinsky (1984) found limited (mostly pre-1950) literature on the relative risks of mortality in infants on different feeding modes. Most of the studies showed that breastfeeding protected substantially against death from diarrhoea. When infants who were receiving no breast milk were contrasted with infants on exclusive breastfeeding, the median relative risk of death from diarrhoea during the first 6 months of life was 25. When partially and exclusively breastfed infants were contrasted, the median relative risk of death from diarrhoea was 8.6.

In a recent case-control study of infant mortality in southern Brazil (Victora et al. 1987), infants

who received no breast milk were 14 times more likely to die of diarrhoea than infants who were fed breast milk without food supplements, after allowing for confounding variables, including age (Figure 3). Also, infants who received cow's milk or milk formula in addition to breast milk were three to four times more likely to die of diarrhoea than infants who were fed breast milk without food or milk supplements; even feeding with water, tea or juice, in addition to breast milk, was associated with an increased risk of diarrhoeal death (Victoria et al. 1989). A dose-response relationship was observed in which each additional daily breastfeed was associated with a substantial decrease in the risk of diarrhoeal death.

Mechanisms of protection

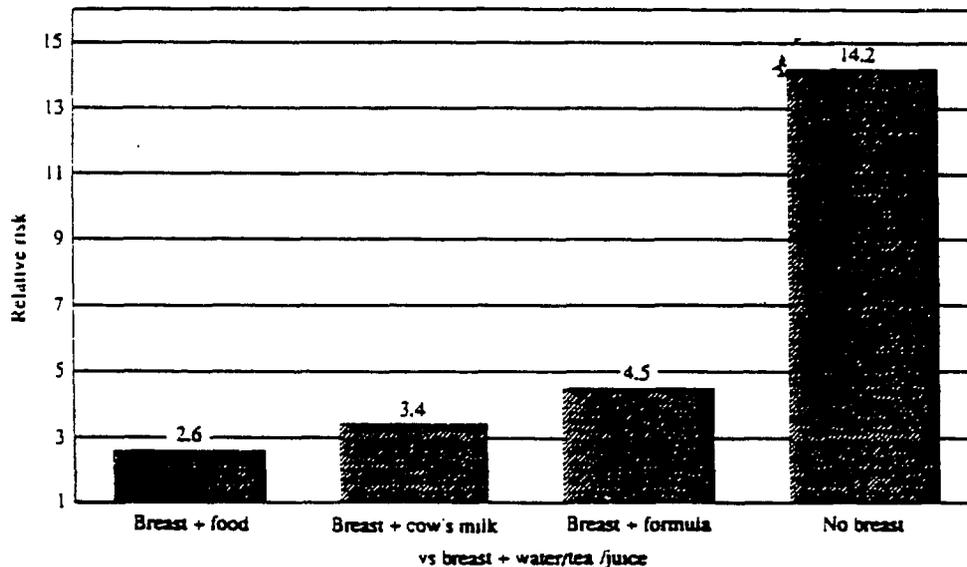
Breast milk has unique anti-infective properties (Akre 1989) and seems to protect children of all ages against diarrhoea, especially severe diarrhoea, even when given in small amounts. Data from Bangladesh suggest that continued breastfeeding may protect against diarrhoeal morbidity and mortality well into the third year of life (Briend et al. 1988; Clemens et al. 1986, 1990). Most studies indicate that protection is conferred only while breastfeeding continues. Persistence of protection after the cessation of breastfeeding is suggested in one study con-

ducted in Scotland, but is not clearly demonstrated in the analysis, which does not exclude the possibility that a misclassification of feeding status and uncontrolled confounding could explain this finding (Howie et al. 1990).

Breastfeeding is also associated with improved growth, at least during the first months of life (Rowland 1986; Seward and Serdula 1984; Whitehead and Paul 1984), thereby reducing the risk of severe and persistent diarrhoea, and diarrhoeal death which is associated with poor nutritional status (Feachem 1983).

Some of the protection against severe illness and death offered by breastfeeding may also be related to its role in the prevention and management of diarrhoea-related dehydration. A clinical trial (Khin-Maung et al. 1985) showed that children with moderate or severe dehydration who continue to breastfeed throughout their illness pass fewer stools, have reduced total stool output, require a smaller volume of Oral Rehydration Salts (ORS) solution, and recover sooner.

Finally, breastfed children have reduced exposure to contaminated foods and fluids. Bacteria grow readily in weaning foods (Barrell and Rowland 1979; Black et al. 1982; Henry



Source: Victoria et al. (1987)

Figure 3. Relative risk of diarrhoea mortality by feeding mode during infancy (Porto Alegre and Pelotas, Brazil)

et al. 1990) and may rapidly contaminate even boiled water and tea if they are kept in unclean receptacles. The hazards of bottle-feeding have been clearly documented in studies conducted in Peru and the Philippines, which assessed the levels of contamination in feeds given to infants. In Peru, 35% of bottle teats and 23% of the feeding bottles sampled in a poor urban community were found to be faecally contaminated (Black et al. 1989). In the Philippines, between 63% and 80% of the feeds served to infants in feeding bottles were found to be faecally contaminated (Saniel, personal communication). Such findings may explain why breastfeeding is especially protective in poor environmental conditions (Habicht et al. 1988) and among the children from low income families and with less educated mothers (Martines, unpublished data).

Effectiveness and cost-effectiveness of breastfeeding promotion in the control of diarrhoeal diseases

Effectiveness

Theoretical calculations made by Feachem and Koblinsky in their review (1984), indicate that the promotion of breastfeeding could reduce diarrhoeal morbidity rates by 8–20%, and diarrhoeal mortality rates by 24–27% in the first 6 months of life. Data from Costa Rica and Brazil indicate that these estimates are reasonable. In Costa Rica, a 36% reduction in the incidence of diarrhoea was noted in infants aged 0–5 months in a population exposed to intensive breastfeeding promotion (Mata 1981). In Brazil, infant mortality rates in São Paulo fell by about 33% between 1980 and 1987. It was estimated that changes in breastfeeding practices associated with the Brazilian breastfeeding promotion programme, which was launched in 1981, accounted for about one-third of the observed decline in infant mortality (Monteiro et al. 1990). The programme is believed to have led to a 32% reduction in infant deaths caused by diarrhoea.

Costs

Information on the cost of breastfeeding promotion activities is scarce. In a study of the cost and cost-effectiveness of selected interventions for the control of diarrhoeal diseases commissioned by the WHO's CDD Programme, Phillips et al. (1987) estimated the probable cost of

delivering a package of breastfeeding promotional activities, including: (a) changes in hospital routine; (b) face-to-face education and support; (c) promotion through the mass media and; (d) legislation to control the marketing of breast-milk substitutes. The costing method attempted to take into account all the resources used in the implementation of breastfeeding programmes and to value them in a consistent manner. The delivery costs were estimated to be between US\$1.00 and US\$10.00 per mother exposed to such activities.

Cost effectiveness

Phillips and her colleagues (1987) combined these cost estimates with the effectiveness data computed by Feachem and Koblinsky to calculate the probable cost-effectiveness of the intervention for the control of diarrhoeal diseases. The cost per diarrhoea case averted ranged from US\$2.4 (high impact, low-cost programme, 'transitional' pattern of breastfeeding) to US\$143 (low impact, high-cost programme, 'modern' pattern of breastfeeding) (Table 1). For the least expensive package of interventions (at about US\$1.00 per mother), the cost per diarrhoea case averted was less than US\$15, even for low impact programmes in settings with a low level of exclusive breastfeeding.

The cost per diarrhoea death averted ranged from US\$87 to US\$10753. For the less expensive package of interventions (at US\$1.00 per mother), the cost per diarrhoea death averted was US\$400 or less, except for low impact programmes in settings with a low level of exclusive breastfeeding. For high impact programmes, the cost can be under US\$100 per diarrhoea death averted.

For purposes of comparison, the results of the cost-effectiveness analysis performed by Phillips et al. on selected diarrhoeal disease control interventions are summarized in Table 2. The authors cautioned that these results should not be used to select any one intervention in preference to another on the grounds of superior efficiency in preventing either diarrhoea episodes or diarrhoea deaths. The ranges of results overlap, and the number of observations from which medians are derived is generally too small to allow generalizations to be made with any confidence. The authors concluded that none of the

Table 1. Cost per diarrhoea episode and diarrhoea death averted through breastfeeding promotion in children under 5 years (US\$1982)

Pre-inter- vention breast- feeding ² pattern	Cost per mother exposed to promotion	Cost per diarrhoea episode and diarrhoea death averted ¹			
		Morbidity		Mortality	
		High impact	Low impact	High impact	Low impact
A	10.00	37.0	142.9	2500	10753
	1.00	3.7	14.3	250	1075
B	10.00	23.6	96.2	1188	4000
	1.00	2.4	9.6	119	400
C	10.00	26.4	106.4	874	2747
	1.00	2.6	10.6	87	275

¹Breastfeeding pattern A ('modern') is one of high rates of partial and no breastfeeding; pattern C ('traditional') has relatively high rates of exclusive breastfeeding; and pattern B ('transitional') is mid-way, with a substantial proportion of children partially breastfed (Feachem and Koblinsky 1984).

²Using effectiveness results derived from Feachem and Koblinsky (1984).

Source: Phillips et al. (1987).

interventions could, on the evidence then available, be dismissed as inefficient approaches to reducing childhood morbidity and/or mortality.

The analysis of Phillips et al. strongly suggests, therefore, that breastfeeding promotion is a cost-effective intervention to reduce diarrhoeal morbidity and mortality in childhood. It also has an impact on severe forms of diarrhoea, some of which are more difficult to treat, such as persistent diarrhoea and severe shigellosis.

Furthermore, it should be borne in mind that this analysis only considered the costs of breastfeeding promotion programmes and the effects of such programmes on diarrhoeal morbidity and mortality. The costs incurred by women and their families are not included; however, studies of the maternal and time costs of breastfeeding compared with bottle-feeding have shown that the former results in substantial savings at the household and national level (Greiner et al. 1979). The costs to the health authorities of promoting breastfeeding may be largely offset by the savings associated with reductions in the purchase of formula and feeding bottles and in staff time (Levine et al. 1990). The introduction of changes in practices in a maternity hospital in the Philippines to facilitate breastfeeding has produced annual savings to the hospital of more than US\$100 000 (Gonzales 1990). In addition, breastfeeding reduces morbidity and mortality from a range of causes and is associated with improved birth-spacing (Consensus Statement

Table 2. Cost-effectiveness of diarrhoeal disease control interventions¹

Intervention	Cost (US\$1982) per diarrhoea episode averted in under-5s range (and median)		Cost (US\$1982) per diarrhoea death in under-5s range (and median)	
	Breastfeeding promotion	2-143	(45)	87-10753
Rotavirus immunization	3-30	(5)	141-1401	(220)
Measles immunization	3-60	(7)	66-1156	(140)
Cholera immunization (in Bangladesh)	90-1450	(174)	1075-16710	(2000)
Promotion of improved weaning practices	-	-	50-2000	(1070)
Hygiene promotion	5-500	(10)	-	-
Oral rehydration	-	-	100-8000	(220) ²

¹Based on a table in Phillips et al. (1987).

²Based on data from Shepard and Brenzel (1985).

1988; Thapa et al. 1988). The savings to families and the health services associated with these other benefits may be considerable. Finally, breastfeeding is recognized to be a human right (World Health Organization/United Nations Children's Fund 1990) and breastfeeding promotion, protection and support activities help to safeguard the rights of children and contribute to the empowerment of women, who are enabled to make their own choices concerning the feeding and nurture of their children. When these other health and social benefits are taken into account, the public health value of breastfeeding promotion becomes even more evident.

Breastfeeding promotion as a component of diarrhoeal disease control programmes

Rationale

Health workers often have to deal with cases of diarrhoea that are associated with poor breastfeeding practices. The mother's contact with the health facility offers an opportunity to promote and help her with breastfeeding as part of diarrhoea case management. Many hospitals have oral rehydration therapy (ORT) 'corners' and inpatient wards occupied primarily by diarrhoea cases, while major hospitals throughout the world have now established diarrhoea training units to train health workers in correct case management. In these units there is opportunity to encourage mothers to breastfeed, and to deal with any breastfeeding problems through personal communication, support and demonstration. Promoting the use of cups and spoons rather than feeding bottles for giving ORS and other fluids during diarrhoea can help to discourage bottle-feeding. Arrangements can be made in outpatient and inpatient units where cases with diarrhoea are received to ensure that breastfeeding mothers are not separated from their children. These units are often a highly respected part of the paediatric service and health professionals managing diarrhoea have access to policy-making administrators and maternity services staff, who may all need to be convinced about the changes in hospital practices that are needed to promote, protect and support breastfeeding (World Health Organization/United Nations Children's Fund 1989).

Many CDD programmes are active in the training of personnel at all levels of the health service

and are becoming increasingly involved in the pre-service education of health professionals. They are therefore in an excellent position to contribute to breastfeeding programmes within the health sector. In many countries there are also public health communication efforts to promote improved management of diarrhoea in the home (including continued breastfeeding during and after the episode), which could be harnessed to promote breastfeeding in public places.

Ongoing and planned activities of the WHO CDD programme

In the last few years, the programme has begun to increase its activities in the area of diarrhoea prevention. Its widely used training courses on supervisory skills and on programme management, each contain a module devoted to interventions for the prevention of diarrhoea. These modules provide a summary of current knowledge about breastfeeding, improved weaning practices, use of clean water, hand-washing, use of latrines, disposal of children's stools, and measles immunization. These summaries are followed by specific suggestions on how to identify and implement the interventions that are most needed, in collaboration with other responsible sectors. The development of preventive interventions is encouraged in areas where case management activities are well established.

During 1989, the programme formulated a strategy of the strengthening of breastfeeding activities through national CDD programmes, in collaboration with the WHO Task Force on Nutrition and interested groups outside WHO. Support can be provided for the planning and implementation of activities within the following areas: (a) in-service training of health workers; (b) pre-service curriculum development for health professionals; (c) changes in maternity services; (d) support to non-governmental organizations, in particular, mother-to-mother support groups; (e) promotion of changes that facilitate breastfeeding among working women; (f) action to give effect to the principles and aims of the International Code of Marketing of Breast-milk Substitutes; (g) public health communication and education and; (h) research to facilitate the implementation of breastfeeding programmes, and dissemination of research results. WHO plans to support implementation research that will (a) evaluate selected activities

that are believed to be particularly cost-effective for the promotion, protection, and support of breastfeeding (such as the training of health workers in lactation management and the activities of mother-to-mother support groups), and (b) describe breastfeeding patterns and factors that might influence these patterns, where a situation analysis is required to assist in the development of a plan of action.

The choice of activities to be supported through the national CDD programme in a particular country will be made by the relevant authorities based on available information regarding infant feeding practices, the constraints and opportunities for women to breastfeed, and an analysis of existing promotional activities and the resources available for supporting them. The WHO/CDD Programme can play a role in supporting these activities by preparing materials for use in more than one country, building upon its extensive experience in activities for diarrhoeal disease control.

Endnote

¹ In effecting these activities, the CDR Programme collaborates and draws upon the experience and expertise of other WHO Programmes, including Nutrition, Food Safety, Maternal and Child Health and Family Planning, and the Office of the Legal Counsel.

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Acknowledgements

An earlier version of this paper was presented at the WHO/UNICEF Technical Meeting 'Breastfeeding in the 1990s', Geneva, 25-8 June 1990. We thank James Tulloch, Manam Claeson, Robert Hogar, and Michael Merson for their guidance and support; Ann Martinez and Daphne Salmon for their technical assistance; and Mary-Ann Anderson for her helpful comments on the manuscript.

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THE JOURNAL OF PEDIATRICS

MAY 1991

Volume 118

Number 5

MEDICAL PROGRESS

Breast-feeding and health in the 1980s: A global epidemiologic review

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In 1968, Lee Forrest Hill¹ observed that "formula feeding has become so simple, safe, and uniformly successful that breast-feeding no longer seems worth the bother." His comments were intended for physicians and the American middle class, but his words have been overtaken by events. Mothers in poor countries have bottle fed increasingly, with disastrous results.² Mothers in industrial nations have breast fed increasingly, permitting clinicians among the well-to-do to rediscover the advantages.³ Much new research has permitted scientists to discover previously unappreciated benefits of breast-feeding. For example, immunologists and cell biologists have found an increasing range of protective factors in human milk.^{4,5} When the last decade began, the medical benefits of breast-feeding in the United States and other industrial nations were considered to result mainly from the absence of bacterial contamination and from limited immunologic protection against microbial agents in the gastrointestinal tract. In 1981 the U.S. government commissioned a task force to review the scientific evidence relating infant feeding practices to infant health.⁶ The task force concluded that breast-feeding prevented infantile gastrointestinal infections in all settings and improved infant survival rates in poor countries.

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9/18/28189

Although the praises of breast-feeding are widely sung, there are recent signs of ambivalence. An articulate minority doubts its importance in industrial nations,⁷ and this view has been widely publicized. Coincidentally, there is evidence that the prevalence of breast-feeding is declining.⁸ In response to these events, some American manufacturers of proprietary formulas have begun advertising directly to consumers, rather than marketing their products through health professionals.⁹ The resulting furor has generated a good deal of rhetoric from both professionals and manufacturers.¹⁰

Is breast-feeding "worth the bother"? The epidemiologic evidence is strongly affirmative. Important protection against gastrointestinal infections in every setting has been confirmed and reconfirmed; most clinicians now accept such observations. Many clinicians, however, are surprised to learn that breast-feeding is associated with significant reductions in nongastrointestinal infections, including pneumonia, bacteremia, and meningitis, and with a reduced frequency of certain chronic diseases later in life. Much of the important data concerning the health benefits of breast-feeding appeared in the last decade and are not widely known, so we provide here a global cross-section of the published information. We tried to select articles that are readable, practical, and methodologically sound, emphasizing the impact of feeding methods on the incidence of nongastrointestinal diseases.

LOWER RESPIRATORY TRACT ILLNESS

The toll exacted by diarrhea from unsanitary bottle feeding in the Third World has drawn attention away from the fact that bottle feeding imposes an increased risk of respiratory disease as well. A marked increase in respiratory deaths among bottle-fed infants was repeatedly documented in North America and Western Europe before the Second World War.¹¹ Since then, an excessive frequency of respiratory illness among bottle-fed infants has continued,¹¹ and during the 1970s one of us observed a fivefold excess of lower respiratory tract infections in bottle-fed infants from a largely middle-class population.¹² Any uncertainty about the relevance of these observations was removed by well-controlled observations during the last decade.

The risk of dying from lower respiratory tract infection is nearly four times higher among infants who are not breast fed in the urban environment of developing nations. In a meticulous case-control study, Victora et al.^{13, 14} investigated all deaths of infants aged 7 to 364 days during 1985 in two southern Brazilian cities. Twins and infants weighing <1500 gm at birth, infants with major congenital malformations, and those with illnesses in the newborn period were excluded. The study controlled for age and a wide variety of socioeconomic, environmental, biologic, and health care factors. The feeding method before the fatal illness was carefully ascertained. The relative risk of supplementing breast-feeding with bottle feeding was 1.6. There was little difference in the risk imposed by cow milk or formula, but supplementation of breast-feeding or bottle feeding with solid food was, surprisingly, found to reduce the risk of death threefold, perhaps as a result of improved nutrition. Other significant risk factors included low birth weight, the presence of young siblings, and limited paternal education. Of the 127 respiratory deaths studied, 82 could be attributed to bottle feedings.^{14, 15}

Hospitalization for respiratory infections is also more frequent in bottle-fed infants. This has been shown in at least three well-controlled studies from Newcastle, England,¹⁶ Dundee, Scotland,¹⁷ and Shanghai, China.¹⁸ The relative risk is more than twofold, and the cohort studies from Dundee and Shanghai permit us to estimate that as many as 7% of all infants are hospitalized for respiratory infections primarily because of the added risk of bottle feeding. When respiratory infections develop in breast-fed infants, the illnesses are likely to be less severe. Depending on the circumstances, this effect can be dramatic. In Rwanda, where the general infant mortality rate exceeds 100/1000, the case-fatality rate for minimally or partially breast-fed infants admitted to the hospital for respiratory illness is half the rate for infants who are completely weaned (13% vs 27%).¹⁹ Even in fully industrialized nations with low infant mortality rates, breast-feeding's protection against dying of respiratory infections is an im-

portant consideration. Respiratory syncytial virus is the most important respiratory pathogen among infants in Western Europe and North America, and accounts for considerable morbidity and death.²⁰⁻²² The prophylactic effect of breast-feeding against this infection is therefore especially pertinent.¹⁶

Breast-feeding's advantages are most evident during the first 6 months of life,^{13, 23-26} but are still evident through the second year.^{18, 19, 27} The advantages are seen in any setting but may be especially important where climate or living circumstances are unfavorable.^{26, 28} Protection is most evident against serious respiratory disease (wheezing, bronchitis, bronchiolitis, pneumonia) rather than uncomplicated upper respiratory tract infections.^{23-26, 28} Finally, the protection afforded by breast-feeding is greatest when bottle feeding is excluded, and the protection declines in proportion to the degree of supplementation with cow milk or formula.^{13, 17, 23, 24, 26, 27} These generalizations have accounted for other factors relevant to respiratory disease, such as smoking or the presence of young siblings. In fact, when such factors are taken into account, the relative risk of bottle feeding is even higher than the average figures quoted here.^{26, 29}

OTITIS MEDIA

The middle ear cleft is a branch of the respiratory tree, so it should be no surprise that breast-feeding protects it in the same way. The theory that bottle feeding causes middle ear disease because of positional effects and the regurgitation of fluid and secretions through the eustachian tube is probably an oversimplification, as suggested by the observation that human milk fed via bottle helps protect infants with cleft palate against otitis media with effusion.³⁰

Studies of infant feeding and otitis media have been done almost exclusively in the northern temperate zone of Europe and North America. Most are cohort studies that show that bottle feeding increases the risk of otitis media. Saarinen³¹ studied upper middle class Finnish children who were not in day care. When she compared children exclusively breast fed for 6 months or more with infants weaned before 2 months, she found a relative risk of 3.3 for two or more episodes of otitis media in infants weaned early (6% vs 19%) and a relative risk of 4.3 for four or more episodes for children 12 to 36 months of age (6% vs 26%). The duration of secretory otitis media is also reduced in breast-fed children,³² and in the harsh Labrador environment chronic granulomatous otitis media is seen only in Inuit children given bottle feedings before 6 months of age.³³

BACTEREMIA AND MENINGITIS

Four studies that have focused primarily on the epidemiology of *Haemophilus influenzae* infections have shown that breast-feeding prevents bacteremia and meningitis.

Table. Mortality risk of bottle feeding

Country, yr (reference)	Age group	Relative risk	Attributable risk	Comment
Egypt, 1981 (53)	~0-3 yr	2.0-5.0	130-290/1000	Cumulative mortality to next sibling
Rwanda, 1981 (19)	0-2 yr	2.0	135/1000	Hospital case fatality
England, 1981 (58)	0-3 mo	7.7		Sudden death
United States, 1982 (59)	0-6 mo	>7.0		Sudden death
England, 1983 (54)	1 wk to 1 yr		>0.8/1000	Unexpected death
England, 1986 (55)	1 mo to 1 yr		<5.1/1000	General prevention program
Brazil, 1987 (13)	1 wk to 1 yr	2.5-14.2		Death from infection
Latin America, 1988 (50)	0-1 yr	3.0-5.0		Program estimate
Malaysia, 1988 (52)	1 wk to 1 yr	2.5-5.2	28-153/1000	General mortality rate
United States, 1988 (57)	0-1 yr	3.7-5.0		Sudden death
Bangladesh, 1988 (51)	1½-3 yr	3.0		Death from diarrhea
United States, 1989 (56)	0-1 yr		+ /1000	Mathematical model

Cochi et al.,³⁴ Istre et al.,³⁵ and Lum et al.³⁶ have shown that bottle feeding imposes a 4- to 16-fold risk of *H. influenzae* bacteremia and meningitis in North American infants. In the United States the protection afforded by breast-feeding seems to be greatest during the first 6 months.³⁴ In Finland, where breast-feeding is more common and more prolonged, *H. influenzae* meningitis is much less frequent during the first year, and children breast fed longer than 6 months are only one third as likely to have invasive disease during the second year of life.³⁷ These findings have been corroborated in feeding-morbidity studies. Thus, in Syracuse, N.Y., and New Haven, Conn., bottle-fed infants have a tenfold risk of being hospitalized for any bacterial infection and a fourfold risk of bacteremia and meningitis.^{38, 39} In a study of Brazilian infants, Victora et al.¹³ found a threefold mortality risk of infections other than diarrhea and respiratory disease, including bacteremia and meningitis.

Narayanan et al.⁴⁰⁻⁴³ studied the effects of feeding expressed human milk to low birth weight infants in a New Delhi hospital nursery. They consistently showed at least a threefold risk of bacteremia in infants who received only formula feedings. Unheated human milk provided greater protection than pasteurized human milk, and the addition of formula substantially reduced the protection against diarrhea and bacteremia. On a smaller scale, there were similar findings among sick, very low birth weight infants in Syracuse, N.Y.⁴⁴ Formula-fed premature infants are more

likely to be withdrawn from studies of feeding and growth because of feeding intolerance and necrotizing enterocolitis,⁴⁵ and when necrotizing enterocolitis does develop in premature infants receiving human milk they are less likely to have septicemia or die.⁴⁶ The pathogenesis of necrotizing enterocolitis is complex, and human milk is not a panacea. Nevertheless, recent observations in British neonatal units⁴⁷ suggest that feeding human milk is the single most effective method of preventing this important cause of bacteremia in premature infants.

These observations explain the reductions in neonatal mortality rates seen elsewhere. Thus the changes in hospital nursery routines that increased breast-feeding also produced a fourfold reduction in mortality rates for diarrhea, pneumonia, bacteremia, and meningitis in rural Costa Rica.⁴⁸ In the city of Baguio, in Luzon, the Philippines, rooming-in, a shortened therapeutic starvation period, and an increase in breast-feeding from 48% to 92% of infants in the General Hospital nursery were accompanied by a decline in mortality rates for neonatal sepsis from 13.6 per 1000 to 0.6 per 1000.⁴⁹ Most of this improvement resulted from reduced mortality rates for low birth weight infants.

MORTALITY RATES

In a recent report the director of the Pan American Health Organization stated that in Latin America and the Caribbean the mortality risk for artificially fed infants is

three to five times higher than for breast-fed babies.⁵⁰ The Table shows that this is a figure with wide application. It becomes more tangible if we address individual factors and circumstances.

Globally, most of the deaths related to artificial feeding are due to diarrheal illnesses. In Latin America alone there are more than 500,000 deaths annually from intestinal infections with diarrhea in children less than 5 years of age.⁵⁰ Most of these deaths occur in infants for whom the mortality risk associated with artificial feeding is more than 14-fold.¹³ In rural Bangladesh, one third of all deaths in children from 18 to 36 months of age are attributable to failure to breast-feed.⁵¹ In Malaysia the attributable mortality rate for artificial feeding is between 28 and 153 per 1000 infants, depending, respectively, on the presence or absence of piped water and toilet facilities in the home.⁵² In Cairo, 150 children per 1000 die before the birth of the next sibling⁵³; most of these deaths are related to premature cessation of breast-feeding.

In industrialized nations the impact of breast-feeding on mortality rates is smaller because the hazards of bottle feeding in sanitized environments are reduced, and because of other factors that reduce infant mortality rates. Nevertheless, breast-feeding is associated with reduced mortality rates in technically developed societies. It has been estimated that breast-feeding (or the use of pooled human milk) could prevent 100 deaths from necrotizing enterocolitis annually in British neonatal units.⁴⁷ In Sheffield, England, breast-feeding was the single most important factor in a prevention program that reduced the postperinatal mortality rate from 5.2 to 1.9 per 1000; the emphasis on breast-feeding accounted for an estimated 24% of the reduction in the mortality rate.⁵⁴ In Nottingham, England, increased use of breast-feeding was one of several factors in the decline of the postneonatal mortality rate from 8.7 to 3.6 per 1000.⁵⁵ Preliminary data from the U.S. National Center for Health Statistics has shown a postperinatal mortality rate difference of 3.7 per 1000 when infants initially breast fed are compared with bottle-fed infants (Paul Placek: personal communication, 1986.) Finally, a risk-benefit analysis by the U.S. National Institute of Environmental Health Sciences estimates that the decision to breast-feed decreases the mortality rate during the first year by 4 per 1000.⁵⁶

In the United States and Western Europe, sudden death of unknown cause is the leading cause of postneonatal death.²² A recent study by the U.S. National Institute of Child Health and Human Development showed that the relative risk for predominantly breast-fed infants was only 0.2 for black infants and 0.27 for nonblack infants compared with that for babies who were bottle fed from birth.⁵⁷ These comparisons were adjusted for maternal age, socio-

economic status, and parity. The Nine Area Study in Finland found that in infants 3 months of age or younger who were from families with an excellent standard of home care, an infant's relative risk of sudden death when breast fed during the preceding 3 weeks was 0.13 compared with that for bottle-fed babies.⁵⁸ Sudden death from infant botulism occurs only in formula-fed infants.⁵⁹ Sudden death is also more likely to occur in bottle-fed infants as a result of respiratory infections, particularly those caused by respiratory syncytial virus.^{16, 20-22} Sudden death is a complex problem with several causes, only a few of which are known at present.^{60, 61} Current data, however, permit us to estimate conservatively that there is one sudden infant death per 1000 live births as a result of failure to breast-feed in western industrial nations.^{15, 57, 62}

LONG-TERM HEALTH

Until relatively recently, there were three prevailing opinions about the health benefits of breast-feeding: (1) Tangible benefits are evident only among infants in less technically developed countries. (2) Health benefits are limited to diarrhea prevention because contaminated nursing bottles are avoided. (3) The benefits are limited to the prevention of acute infectious disease during infancy, and there are no lasting benefits. As indicated by the foregoing, the first two opinions have been rejected. In the last decade the final belief has begun to fall.

One of the most interesting developments is the consistent association between bottle feeding and immune system disorders. In infancy, artificial feeding can cause lymphoid hypertrophy^{63, 64} and some of the immunologic phenomena associated with autoimmune diseases.⁶⁵ It accelerates the development of celiac disease⁶⁶ and is a risk factor for Crohn disease and ulcerative colitis in adulthood.^{67, 68} Insulin-dependent diabetes mellitus is believed to result from an immunologic attack on pancreatic beta cells; investigators have shown that bottle feeding is a risk factor that may account for 2% to 26% of cases of this type of diabetes.⁶⁹ Furthermore, breast-fed children in whom diabetes does develop are less likely to have antithyroid antibodies.⁷⁰ Lymphomas are malignant neoplasms that result, in part, from disordered immune system regulation, and a recent study by Davis et al.⁷¹ showed that the relative risk of bottle feeding, or of breast-feeding for less than 6 months, is nearly sixfold.

Although breast-feeding is not the panacea against allergic diseases that has been popularly supposed,⁷² food allergies appear to be less frequent in infants who are exclusively breast fed,⁷³ and breast-feeding delays the development of atopic dermatitis, particularly in allergic families.^{74, 75}

Finally, breast-feeding may have a role in preventing or modifying certain types of chronic liver disease. The r

anism may be as simple as the avoidance of copper toxicity from contaminated milk or water.⁷⁶ The mechanism may also be obscure and complex, as in children with α_1 -antitrypsin deficiency, who have been shown in some studies to be less likely to die of cirrhosis if they were breast fed.^{77, 78}

The foregoing observations are preliminary, but they have opened up an interesting and complex field for investigation.

PROBLEMS IN METHODOLOGY

Students of the epidemiology of illness and infant feeding should be aware of three methodologic problems. First, there is the problem of *definition*: What is breast-feeding? The definition may be restricted to babies who are breast fed exclusively, or it may include babies who receive only a single daily feeding of human milk. In general, the largest morbidity differences are found when exclusive breast-feeding is compared with exclusive bottle feeding; the differences narrow in proportion to the amount of supplementation permitted.¹³

Second, there is the problem of *assignment*. The most accurate morbidity comparisons are made when the illness in question is assigned to the feeding method used just before the onset of illness. Only sometimes is this achieved in feeding-morbidity studies.^{12, 13} Both case-control and cohort studies may be biased in favor of either bottle feeding or breast-feeding by failure to account for feeding changes before onset or after the onset of an illness.

Interesting epidemiologic and physiologic questions relate to these problems of definition and assignment. Is breast-feeding protective after it has been discontinued? Some studies of acute respiratory illness suggest this possibility,^{16, 31} and there are fascinating observations that the impact of feeding methods may be felt even years later.^{66-71, 77, 78} What are the mechanisms that account for the prevention of illness weeks, months, or years later?

Finally, there is the problem of confounders, or *associated variables*. This vexatious problem accounts for much of the skepticism about the benefits of breast-feeding for middle class populations. In well-to-do industrial nations, breast-fed infants are likely to come from the protected environment of small, nonsmoking families with high educational levels and an excellent standard of home care.^{12, 16, 25} Thus it is difficult to discern whether reduced morbidity is due to breast-feeding per se or the associated environmental factors. The problem has been overcome by meticulous studies that have accounted for these factors in suburban middle and upper class groups and mixed urban populations. These studies show, unequivocally, that breast-feeding prevents gastrointestinal and lower respiratory tract disease,^{17, 26} otitis media,^{31, 32} and bacteremia and meningitis^{34, 35, 37} in these settings.

Is the type of bottle feeding important? We assume that formula is safer than cow milk, but the data do not always support this assumption.^{13, 79} What happens when other foods are given? If contaminated, they may increase the risk of diarrheal illness, but there is some evidence that the addition of pureed foods may reduce mortality rates for respiratory disease, perhaps because of improved caloric intake.^{13, 14}

HOW DOES BREAST-FEEDING PROTECT BABIES?

The strictly honest answer to this question is that we do not know.³⁰ It seems clear that where sanitation is poor, the microbial burden from bottle feeding is substantial and that the resulting diarrheal illness is easiest to avoid when a baby is breast fed. However, serious diarrheal illnesses also occur with modern sanitation and are also prevented or treated with human milk.^{81, 32} The usual explanation is that human milk contains immunologic components and other host defense factors that counteract the enteric and nonenteric pathogens which remain even in a hygienic environment.^{83, 84} The activity of many such factors has been demonstrated in vitro, but in only three studies has the presence of such factors been correlated with prevention of illness in infants.⁸⁵⁻⁸⁷ Secretory antibody and other immunologic factors are important components of human milk's defensive repertoire, but laboratory studies suggest that the repertoire is extremely varied and engenders complex interactions among the mother, the suckling infant, and the external environment.

An enteromammary circulation has been described in which antibody-producing cells from the maternal intestine migrate to the breast.⁸⁸ By this means, secretory antibodies against enteric pathogens common to the maternal-infant environment are produced in the milk and provided to the nursing baby. There is evidence of a similar system for respiratory pathogens,⁸⁹ although how it protects the lower respiratory tract is obscure; coating of the pharyngeal entrance to the lower airway is one possibility.^{80, 84} Stimulation of the infant's respiratory defenses by soluble immunoregulatory factors in mother's milk is another.⁹⁰ There is also evidence of the circulation of protective milk factors such as lactoferrin, secretory IgA, and oligosaccharides to other mucosal surfaces such as the urinary tract,⁹¹⁻⁹³ and some casual observations suggest that breast-fed infants may have fewer urinary tract infections.^{94, 95}

The idea of a secretory antibody system and a mammary-mucosal axis appeals to common sense and teleologic principles, but there are undoubtedly other mechanisms of protection. Thus it is suggested that breast-fed infants have fewer symptoms of rotavirus infection because the virus interacts with the more benign bacterial flora in the nursing's

gut.⁹⁶ There is also the suggestion that antiinflammatory substances in human milk modify exuberant and damaging host responses to the microbial and food antigens to which the nursing is exposed.⁹⁷

The whole subject of host defense in the breast-fed infant is complex, and the foregoing examples can give only an inkling of the array of defenses in human milk. They say nothing of why babies who are breast fed may be protected years later from immunologic disease, and they neglect the fact that breast-feeding is more than just the ingestion of milk. Evidence that nursing mothers and their babies interact differently from those who bottle-feed is difficult to find, but lactation does have physiologic and behavioral consequences for the mother.^{98,99} At all levels—biochemical, immunologic, physiologic, behavioral, and epidemiologic—there is much to learn.

CONCLUSION

Breast-feeding has advantages for both babies and mothers, and the advantages are seen in rich and poor nations. They include the prevention of gastrointestinal and respiratory illness, and of infections as well as certain immunologic disorders. In addition to preventing illness early in life, breast-feeding appears to reduce the risk of certain chronic diseases as well. It has advantages for the premature as well as the term infant.

How long should babies be breast fed? In the technically developed countries of Europe and North America, there are cogent reasons for breast-feeding for 6 months or longer.^{16, 31, 37, 57, 71, 75} In Bangladesh, Rwanda, or Egypt, an infant's survival may require his mother's milk through the third year of life.^{19, 51, 53}

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WELLSTART

HAND EXPRESSION OF BREASTMILK

Milk expression may be performed for several reasons, including:

- To supply breastmilk for use while mother and baby are separated
- To increase milk supply
- To prevent or relieve engorgement

To a large degree your milk supply is a direct result of the stimulation to your breasts. Your milk supply will be appropriate for your baby if you either breastfeed or express milk at least every 3 hours. Some mothers find it difficult to express milk although their babies have no problem getting enough to satisfy their needs. Your overall milk production should not be judged by what you are able to express.

These guidelines may be useful in helping you with hand expression.

- Wash your hands well.
- If possible, express in a quiet, restful environment. Imagine you are in a pleasant place. Think nice thoughts about your baby. Your ability to relax will contribute to a better milk ejection reflex.
- Apply moist heat to your breasts for 3 - 5 minutes before expressing.
- Massage your breasts in a circular pattern, followed by light stroking of the breast from the outer edges toward the nipple.
- Gently stimulate your nipples, by drawing them out or rolling them between your fingers.
- Express and discard the first 2 - 3 squirts of milk obtained from each breast.
- Express into a clean container (hard plastic or glass).
- Place your thumb on the top of your breast at the areola edge and your four fingers underneath your breast at the areola edge.
- Press back toward your ribcage, then gently press your thumb and fingers together — just behind the areola.
- Repeat in a rhythmical pattern, rotating the position of your fingers around the breast to empty all areas.

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- Alternate breasts every 5 minutes or when the milk flow slows, remembering to repeat the massage, stroke, express cycle several times at each breast.
- The amount of milk obtained at each expression may vary. This is not unusual.
- When complete, apply a few drops of breastmilk onto each nipple and allow to air dry.
- The appearance of your milk will change while expressing. The first few teaspoons will appear clear, while after you have a milk ejection, your milk will be creamy white. Some medications, foods, and vitamins may also slightly alter the color of your breastmilk. The milk fat will rise to the top when the milk is stored.

If you plan to store the milk:

- Immediately after expressing, seal and label the container with the date, time, and amount
- See handout "Milk Storage"

Becoming skilled at hand expression takes practice. Be patient with yourself and don't become discouraged.

If you have questions, please call the Wellstart Helpline: 295-5192.



WELLSTART

MILK STORAGE

Breastmilk has no preservatives and therefore, care must be taken to handle it properly. Once you have chosen the method of collecting breastmilk, you should carefully follow the guidelines for storing, freezing and thawing your milk. Keep in mind that the appearance of the milk may change after milk has been stored, since the different components of the milk often separate. By properly collecting and storing your milk, you can be sure that you baby will receive the benefits of your milk even when nursings are not possible.

GENERAL GUIDELINES

- Wash your hands before handling breastmilk
- **Container Choices** Express directly into a clean/sterile container
 - **Term Infant:** Clean, heavy plastic or glass bottles (container should be washed well in a dishwasher with a sanitizing cycle or washed by hand in hot, soapy water and rinsed well with hot water)
 - **Preterm/Sick Infant:** Sterile, heavy plastic or glass bottle
- Immediately after expressing, seal the container and immerse in a bowl of ice water for 1 - 2 minutes. It is then ready to store in the coldest part of refrigerator or freezer. (Do not keep in the door area.)
- Always use the oldest milk first

STORAGE

General Guidelines Store in amounts equal to what your baby will take at one feeding. Label each contained with name, date and time, and amount. If freezing milk, leave room in container for expansion of milk.

SHELF-LIFE OF MILK

Method of Storage:	Term Infant:	Preterm/Sick Infant:
Room Temperature:	40 minutes	Not recommended
Refrigerator:	48 hours	24 hours
Freezer (1-door refrigerator):	Not recommended	Not recommended
Freezer (2-door refrigerator):	3 months	3 months
Deep Freezer (-20°):	1 year	1 year

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- **Adding Newly Expressed Milk to Previously Expressed, Refrigerated Milk**
 - **Term Infant:** Chill milk well before adding to previously expressed milk. May combine milk expressed during a 24 hour period.
 - **Preterm/Sick Infant:** It not recommended to combine milk. Use a separate container for each expression.
- **Adding Fresh Milk to Frozen Milk**
 - **Term Infant:** Chill milk well before adding to previously frozen milk (frozen milk cannot be thawed then refrozen).
 - **Preterm/Sick Infant:** It is not recommended to add fresh milk to frozen.
- **Re-freezing** It is not recommended to refreeze breastmilk that has thawed or partially thawed. Keep this in mind when transporting milk to the hospital or from work. For this reason, it is usually best to wait to freeze the milk once it has reached its final destination.
- **Re-use of Unfinished Portion (milk warmed in preparation for feeding)**
 - **Term Infant:** Permissible one time only, if chilled well between feedings. Do not re-use milk left over in bottle, as baby's saliva may contaminate the milk.
 - **Preterm/Sick Infant:** It is not recommended to reuse unfinished portion of warmed milk.

THAWING MILK

- Thaw frozen milk by "slow defrost" overnight in refrigerator
- Swirl the milk in a bowl of tepid water (Excessive heat modifies or destroys enzymes and proteins)
- Defrost the total amount, as butterfat separates during the freezing process
- Never use a microwave oven to defrost or warm milk
- Once thawed, breastmilk should be used within 24 hours

If you have any questions, please call the Wellstart Helpline: (619) 295-5193

Reference: The Institute for Medical Research, Mother's Milk Bank, San Jose, California.

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MECHANICAL MILK EXPRESSION

Milk expression may be performed for several reasons:

- To supply breastmilk for use while mother and baby are separated
- To increase milk supply
- To prevent or relieve engorgement

Milk production responds to demand. It is necessary to express or nurse at least 8 times in 24 hours to build and maintain a good milk supply. Some mothers find it difficult to express milk, although their babies have no problem getting enough to satisfy their needs. Your overall milk production should not be judged by what you are able to express.

These guidelines may be useful in helping you with mechanical milk expression.

- If possible, express in a quiet, restful environment. Imagine you are in a pleasant place. Think nice thoughts about your baby. Your ability to relax will contribute to a better milk ejection reflex.
- Wash your hands well.
- Apply moist heat to your breasts for 3 - 5 minutes before expressing.
- Massage your breasts in a circular pattern, followed by gentle stroking of the breast from the outer edges toward the nipple.
- Gently stimulate your nipples by drawing them out or gently rolling them between your fingers.
- Follow the general instructions that came with your breast pump.
- The flow of your milk will vary. During the first few minutes it may drip out slowly, and then squirt forcefully after you have a milk ejection. This pattern will repeat several times while expressing each breast.
- After expressing, apply a few drops of breastmilk to your nipples and allow to air dry.
- The amount of milk obtained at each expression may also vary. This is not unusual.
- The appearance of your milk will change while expressing. The first few teaspoons will appear clear, while after you have a milk ejection, your milk will be creamy white. Some medications, foods, and vitamins may also slightly alter the color of your breastmilk. The milk fat will rise to the top when the milk is stored.

If you plan to store the milk:

- Immediately after expressing, seal and label the container with the date, time, and amount.
- See handout "Milk Storage."

If you have any questions, please call the Wellstart Helpline: 295-5193.

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MOTHER TO INFANT BIOCHEMICAL AND IMMUNOLOGICAL TRANSFER THROUGH BREAST MILK

by

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Before birth, nutrients and bioactive components are transferred from mother to fetus through the placenta. After birth, the same function is carried out by breast milk. Newborn mammals, including humans, receive a balanced diet and generally thrive on their mother's milk. While the nutrient composition of human milk has been known for many years (especially as a result of the in-depth studies of Macy and Associates(1)), the bioactive components in milk have been investigated only recently. These studies have been discussed in several recently published books on "Human Lactation" (2-4). It is important to realize that most of the milk nutrients (the micronutrients, minerals and many trace elements) are not markedly affected by pasteurizing human milk (for feeding from donor to another mother's infant), whereas the "bioactive" components of milk, such as enzymes, cellular components, growth factors, certain hormones, immunoglobulins, are destroyed by the heating process. These bioactive components are the reason that human milk is superior to even the best infant formulas. Because of space limitations, we will present selected examples of specific milk components that have well characterized functions in the infant's growth and development. We will also mention briefly the differences in composition between the milk produced by mothers of full term infants and that of mothers of premature infants (5).

IMMUNOLOGIC AND ANTIINFECTIVE COMPONENTS OF HUMAN MILK

At birth, the infant does not have a well developed immune system. The latter continues to develop postnatally through much of infancy. Maternal milk provides many of the components not yet produced by the infant (6). The main immunoglobulin of human milk is IgA. During the first four months of life the breast-fed infant receives 500-600 mg IgA daily from milk. The maternal IgA transmitted through milk protects the infant against the pathogens in its environment, i.e. maternal intestinal microbial flora and pathogens of the respiratory tract (6). Human milk contains leukocytes, the type and amount changing with duration of lactation. Colostrum and early milk contain 10⁶ - 10⁷ cells/ml - 40-55% macrophages, 40-55% neutrophils and 5-10% lymphocytes - the cell number decreases rapidly during the first few months of lactation (7). Although it has been suggested that cell-mediated immunity may be transferred by human milk, it is at present unknown whether human milk leukocytes remain viable during transit through the gastrointestinal tract (6). Goldman, et al have recently suggested that human milk protects the infant not only by providing antiinfective agents, but also by minimizing inflammation (8). Table 1, p. 337 provides a list of selected antiinfective and antiinflammatory components of human milk. Recent studies indicate that feeding of human milk to premature infants not only provides the infants with immune factors (such as IgA, lactoferrin and lysozyme), but might in addition enhance the endogenous synthesis of these agents by the infant (9). The nutritional status of the mother during pregnancy and lactation can affect the level of immunologic and other antiinfective substances in colostrum and milk, malnutrition resulting in lower levels of IgA, IgG and component 4 of complement (10). The level of immunoglobulins and other protective factors varies in the course of lactation being highest in colostrum and during the weaning period.

Hormones and Growth Factors

Human milk and that of many other species contains a great number of hormones (ref. #4 pp. 183-196) and growth factors (ref. #2 pp. 191-219, and ref. #11 pp. 98-114). While it has been shown in animal studies, that these agents stimulate *in vivo* the growth of gastrointestinal tissues and *in vitro* the replication of cultured cells, the exact function of these components in the newborn infant is not yet known.

Some of the growth factors function in the mother by stimulating the functional maturation of the lactating mammary gland. Several recent studies (cited in refs. #2-4 and 11) suggest that some hormones and growth factors might resist passage through the gastrointestinal tract and thus retain biological activity in the infant. Table 2, p. 338 lists the hormones and growth factors reported to be present in human milk. The data presented should, however, be interpreted with caution, because analytical techniques vary greatly among laboratories. Thus, previous reports of high levels of prostaglandins in human milk (12) have recently been questioned when more sensitive methods of quantitation were used (13).

Enzymes

Milk contains a large number of enzymes. These differ in nature and degree of activity among species. Comparisons have been made between the activity level of some enzymes in human and cow milk (cited in ref. #2 pp. 251-266). More recently the enzymes of human milk have been reviewed with special emphasis to their functional role; a) in the lactating mammary gland for the synthesis of milk components; b) in the infant, to promote growth and development by providing compensatory digestive function during neonatal pancreatic insufficiency, by acting as metal carriers and as antiinfective agents (see Hamosh et al, ref. #2 pp. 251-266, ref. #11 pp. 66-97 for details, and Table 3, p. 339). Many of the milk enzymes are not inactivated during passage through the stomach because of a more hydrophobic tertiary structure than that of identical enzymes from other sources, and because milk is an excellent buffer, rising the gastric pH to 5.5-6.0.

Milk Components with Special Metabolic Function

Milk contains a number of components with special functions. While many of these components can be synthesized in the body, the newborn is either lacking the required amounts or is yet unable to synthesize these factors. Among these factors are long chain polyunsaturated fatty acids (necessary for brain development and membrane synthesis) (14), carnitine-the specific carrier for long-chain fatty acids that enables their final oxidation in mitochondria (14), taurine - facilitates fat absorption and may function in brain development, p-casomorphins (ref. #4 pp. 213-225) opioid agonists derived from the breakdown of the casein molecule that have a wide range of

effects, polysaccharides that inhibit bacterial binding to mucosal surfaces and might be unique to each individual (ref. #3 pp. 581-588, ref. #4 pp. 251-259, ref. #15). Table 4, p. 340 lists a few of these milk components.

COMPARTMENTATION OF MILK COMPONENTS

The specific compartmentation of nutrients and bioactive components in milk is important in their optimal delivery to the infant. For example, breakdown of milk fat by the endogenous lipases of human milk is efficiently preserved by packaging of the milk triglycerides within the milk fat globules that are inaccessible to the enzymes.

EFFECT OF LENGTH OF PREGNANCY ON MILK COMPOSITION

The milk produced by women who deliver prematurely differs from that produced after a full term pregnancy (5). In general, the composition of milk produced by women who deliver at 25 to 35 weeks of gestation remains close to the composition of colostrum for the first 4 to 6 weeks of lactation (Table 5, p. 341), providing higher levels of total nitrogen, protein, minerals and medium-chain and long-chain polyunsaturated fatty acids. Although sodium and chloride concentration is much higher (50-100%), that of the macro minerals calcium, phosphorus, and magnesium and the trace elements copper, zinc, and iron is similar in preterm and term milk. The different composition of preterm milk is probably the result of the immaturity of the mammary gland, which lacks the additional 2 to 3 months of functional maturation before term delivery. The higher concentration of IgA, of protein, and of some minerals in milk can be attributed to higher paracellular transport because of leaky junctions between apical membranes of mammary secretory epithelial cells.

The enzyme content of preterm milk is equal to or slightly higher than that of term milk (ref. #2 pp. 251-266, and ref. #11 pp. 66-97), suggesting that the preterm infant (who is even more dependent on compensatory digestive enzymes than the full-term newborn) is supplied by adequate amounts of lipase and amylase by his or her own mother's milk. Indeed, recent studies show much better growth of preterm infants who were fed preterm human milk than of those fed pooled mature milk from mothers of term infants (16).

ACKNOWLEDGMENTS

The authors' studies are supported by NIH grant HD 20833. We thank Mrs. Barbara Runner-Avery for expert secretarial help.

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TABLE 1:
ANTIINFECTIVE AND ANTIINFLAMMATORY COMPONENTS
IN HUMAN MILK+

<u>Milk Component</u>	<u>Function</u>
Secretory IgA	Prevents bacterial adherence. Limits antigen penetration.* Inhibits neutrophil chemotaxis.*
<u>Cells:</u> T Cells	Transfer of cell mediated immunity?
B cells	Role unclear
Macrophages and Neutrophils	Phagocytosis - microbial killing Poor response to chemoattractants*
<u>Non-immunologic antimicrobial agents</u>	
Lactoferrin	Inhibits complement* Inhibits bacterial growth by binding iron (Fe+3)
Lysozyme	Inhibits chemotaxis and production of toxic oxygen radicals*
Lipases	Produce free fatty acids and monoglycerides which disrupt virus envelopes and lyse protozoa
<u>Antiinflammatory agents</u>	
Catalase	Degrades hydrogen peroxide
Alpha-tocopherol, cysteine, ascorbic acid	Scavengers of oxygen radicals
Histaminase	Degrades histamine
Aryl sulfatase	Degrades leukotrienes.
Alpha-1-anti trypsin	Neutralize enzymes that act in inflammation
Alpha-1-antichymotrypsin	Inflammation
Prostaglandins (E2.F2)	Cytoprotective
Oligosaccharides	Inhibit microbial attachment

+ Adapted from reference #6 and 8

* Antiinflammatory action

TABLE 2:
HORMONES AND GROWTH FACTORS IN HUMAN MILK++

<u>Hormones</u>	<u>Growth Factors</u>
Adrenal steroids+	Epidermal Growth Factor (EGF)*+
Calcitonin*	Human milk growth factors I, II and III
Erythropoietin +	Mammary derived growth factor I
GRF*	Nerve growth factor (NGF)+
GnRH*	Transforming growth factor
Insulin*+	Colony stimulating factor
Neurotensin*	Bifido bacterium Bifidum growth factors
Oxytocin*	
Ovarian Steroids	
Prolactin	
Relaxin*	
Somatostatin*	
Triiodothyronine, Thyroxine	
TRH+	
TSH+	

++ Adapted from references 2,4 and 11.

* Concentration in breast milk higher than in blood (plasma or serum)

+ Evidence for absorption and/or activity in the newborn

TABLE 3 :
 ENZYMES IN HUMAN MILK THAT FUNCTION
 IN THE NEWBORN+

<u>Enzyme</u>	<u>Function</u>
Amylase	Digestion of polysaccharides
Lipase (bile salt dependent)	Digestion of fat (triglyceride)
Proteases	Proteolysis?
Xanthine Oxidase	Iron, Mollidemum carrier
Glutathione peroxidase	Selenium carrier (antioxidant activity)
Alkaline phosphatase	Zinc, Magnesium carrier
Antiproteases	Protection of bioactive components-enzymes, Immunoglobulins, growth hormone factors
Sulphydryloxidase	Maintenance of structure and function of milk proteins and GI mucus (?)
Lysozyme	Bactericidal
Peroxidase	
Lipases	Antifective (see Table 1)

+ Adapted from references #2 pp. 251-266 and #11 pp. 66-97.

TABLE 4:
 MILK COMPONENTS WITH SPECIFIC FUNCTIONS
 IN THE NEWBORN *

<u>Component</u>	<u>Function</u>
Long chain polyunsaturated Fatty acids	Brain development, Membrane structure and function
Carnitine	Essential for oxidation of fatty acids in mitochondria
Taurine	Fat absorption; needed for brain development
P-casomorphins	Opioid agonists
Polysaccharides	Inhibit bacterial binding to mucosal surfaces.

* This is a selective listing of only a few milk components.

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TABLE 5:
COMPOSITION OF PRETERM* HUMAN MILK

	<u>Comparison to mature term** human milk</u>
Protein	50-100% higher during first 4 - 7 weeks after delivery
Sodium	30-150% higher during first 4-6 weeks after delivery
Chloride	30-80% higher during first 3-4 weeks after delivery
Potassium	30-75% higher during first 3-4 weeks after delivery
IgA	Higher during first 2-3 months of lactation
Medium chain fatty acids	40-80% higher during first 3 months of lactation
Polyunsaturated fatty acids	40-70% higher in colostrum and transitional milk
Bile salt-stimulated lipase	Equal to mature human milk
Amylase	Equal to mature human milk
Epidermal growth factor	Equal to mature human milk

* Preterm milk - secreted by women who deliver after 26-36 weeks of pregnancy. ** Mature term milk - secreted by mothers of full term infants at 6 weeks post partum

The data are from references #5,15.

* Preterm infants (27-33 weeks gestation) regained birth weight in 11.4 +0.8 versus 18.8+1.7 days when fed preterm or term human milk, respectively (ref. #16).

GLOBAL
PROGRAMME
ON AIDS

CONSENSUS STATEMENT FROM
THE WHO/UNICEF CONSULTATION ON
HIV TRANSMISSION AND BREAST-FEEDING

GENEVA
30 APRIL – 1 MAY 1992



WORLD
HEALTH
ORGANIZATION

Consensus statement from the WHO/UNICEF consultation on HIV transmission and breast-feeding

In view of the importance of breast milk and breast-feeding for the health of infants and young children, the increasing prevalence of human immunodeficiency virus (HIV) infection around the world, and recent data concerning HIV transmission through breast milk, a Consultation on HIV Transmission and Breast-feeding was held by WHO and UNICEF from 30 April to 1 May 1992. Its purpose was to review currently available information on the risk of HIV transmission through breast milk and to make recommendations on breast-feeding.

Based on the various studies conducted to date, roughly one-third of the babies born worldwide to HIV-infected women become infected themselves, with this rate varying widely in different populations. Much of this mother-to-infant transmission occurs during pregnancy and delivery, and recent data confirm that some occurs through breast feeding. However, the large majority of babies breast-fed by HIV-infected mothers do not become infected through breast milk. Recent evidence suggests that the risk of HIV transmission through breast-feeding (a) is substantial among women who become infected during the breast-feeding period, and (b) is lower among women already infected at the time of delivery. However, further research is needed to quantify the risk of HIV transmission through breast-feeding and determine the associated risk factors in both of these circumstances.

Studies continue to show that breast-feeding saves lives. It provides impressive nutritional, immunological, psychosocial and child-spacing benefits. Breast-feeding helps protect children from dying of diarrhoeal diseases, pneumonia and other infections. For example, artificial or inappropriate feeding is a major contributing factor in the 1.5 million annual infant deaths from diarrhoeal diseases. Moreover, breast-feeding can prolong the interval between births and thus make a further contribution to child survival, as well as enhancing maternal health.

It is therefore important that the baby's risk of HIV infection through breast-feeding be weighed against its risk of dying of other causes if it is denied breast-feeding. In each country, specific guidelines should be developed to facilitate the assessment of the circumstances of the individual woman.

Recommendations

1. In all populations, irrespective of HIV infection rates, breast-feeding should continue to be protected, promoted and supported.
2. Where the primary causes of infant deaths are infectious diseases and malnutrition, infants who are not breast-fed run a particularly high risk of dying from these conditions. In these settings, breast-feeding should remain the standard advice to pregnant women, including those who are known to be HIV-infected, because their baby's risk of becoming infected through breast milk is likely to be lower than its risk of dying of other causes if deprived of breast-feeding. The higher a baby's risk of dying during infancy, the more protective breast-feeding is and the more important it is that the mother be advised to breast-feed. Women living in these settings whose particular circumstances would make alternative feeding an appropriate option might wish to know their HIV status to help guide their decision about breast-feeding. In such cases, voluntary and confidential HIV

testing accompanied in all cases by pre- and post-test counselling could be made available where feasible and affordable.

3. In settings where infectious diseases are not the primary causes of death during infancy, pregnant women known to be infected with HIV should be advised not to breast-feed but to use a safe feeding alternative for their babies. Women whose infection status is unknown should be advised to breast-feed. In these settings, where feasible and affordable, voluntary and confidential HIV testing should be made available to women along with pre- and post-test counselling, and they should be advised to seek such testing before delivery.
4. When a baby is to be artificially fed, the choice of substitute feeding method and product should not be influenced by commercial pressures. Companies are called on to respect this principle in keeping with the International Code of Marketing of Breast-milk Substitutes and all relevant World Health Assembly resolutions. It is essential that all countries give effect to the principles and aim of the International Code. If donor milk is to be used, it must first be pasteurized and, where possible, donors should be tested for HIV. When wet-nursing is the chosen alternative, care should be taken to select a wet-nurse who is at low risk of HIV infection and, where possible, known to be HIV-negative.
5. HIV-infected women and men have broad concerns, including maintaining their own health and well-being, managing their economic affairs, and making future provision for their children, and therefore require counselling and guidance on a number of important issues. Specific issues to be covered by counselling include infant feeding practices, the risk of HIV transmission to the offspring if the woman becomes pregnant, and the transmission risk from or to others through sexual intercourse or blood. All HIV-infected adults who wish to avoid childbearing should have ready access to family planning information and services.
6. In all countries, the first and overriding priority in preventing HIV transmission from mother to infant is to prevent women of childbearing age from becoming infected with HIV in the first place. Priority activities are (a) educating both women and men about how to avoid HIV infection for their own sake and that of their future children; (b) ensuring their ready access to condoms; (c) providing prevention and appropriate care for sexually transmitted diseases, which increase the risk of HIV transmission; and (d) otherwise supporting women in their efforts to remain uninfected.

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PSYCHOSOCIAL AND CULTURAL ASPECTS OF BREAST-FEEDING

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Presented at the Latinamerican Congress on Breastfeeding
Oaxaca, Mexico, March, 1992

ABSTRACT

Recent research advances in infant development have shed important light on the basic components of early human development. It is now clear that the neonate has complex behavioral competencies that allow him to be an active participant in his own early social experience. This is of critical importance and it's in this context the child develops a concept of self and others, of the rules of interaction and of the communicative intent of his behavior and that of others. These are the foundations of development which explain the predictive value of social interaction on child development. Breast-feeding supports psychological growth by providing the optimal interactive environment for the child and enhancing parental sense of competence. Cultural goals and values shape this interaction. Infant malnutrition has psychosocial and developmental consequences through direct detriment on the central nervous system (CNS), but also through perpetuating a cycle of failed interaction with the social and object world. Breast-feeding must be valued for its wide-ranging effects on the infant and society at large. It must be seen as reflecting and shaping cultural values and expectations.

"Mothers have as powerful an influence over the welfare of all future generations as all other earthly causes combined." (1814 On the Education of Children)

The perspectives on roles of mothers and more broadly the social context of the infant in determining the course of his development have changed rapidly over the last several years in spite of this early observation. In order to understand the full impact of breast-feeding, one must have a clear appreciation of the psychosocial factors of breast-feeding in the context of infant development with these new insights in mind.

COMPETENCIES OF THE INFANT

Within the last several years there have been dramatic increases in our appreciation of the enhanced capacities of the human newborn¹. He begins life with the equipment available to interact in a complex pattern with the world around him^{2,3}. The infant is born with incredible visual competencies that rapidly increase in the first weeks and months of life⁴. The infant's vision is quite mature at birth and allows him to have a fixed focal distance with good resolution of imaging in the 8- to 10-inch range. This allows him to focus on primary caretakers during the course of routine care and feeding. This gaze is directed selectively toward those objects in the environment that are most salient to his integration into the social world, specifically his parents' faces and smiles and those visual stimuli that have high contrast and information to give him. This gaze progression proceeds rapidly in the first months of life so that by the time a child is 3 to 4 months of age he can track the social interaction around him through complex coordination of motor movement and visual tracking. Additionally, the infant, even in the newborn period, can quiet extraneous motor movement in order that his gaze is directed at an object or person of interest. He immediately begins to coordinate seemingly random motor movement with objects that attract his attention, with rounded movements of the extremities occurring with attention to people and more jagged and abrupt activities directed toward objects in his environment³.

Auditory competencies are also geared toward social interaction in the newborn period. The child selectively attends and will orient to the human voice, particularly if the voice has high modulation of intensity and pitch. He may quiet his distress and focus his visual attention through auditory tracking^{2,4}. Additionally, he demonstrates "interactional synchrony" whereby his seemingly random body movements are coordinated with

the rhythms of the human voice around him⁵. In our own laboratory, we have noted that infants can, within 10 seconds of hearing a music stimulus while crying coordinate their crying to that musical sound and eventually quiet to the soothing tunes. It is no accident that lullabies around the world have the same musical characteristics that allow the infant to organize his distress and quiet himself when hearing them⁶.

The infant's attention is selectively enhanced when vestibular mechanisms allow him to open his eyes in an upright position and scan the environment. The infant's tactile sensitivity has only more recently been appreciated⁷. Gentle but firm stroking of the trunk and extremities creates significant neurophysiologic organization in both normal infants and those with neurologic and medical risk factors. Pressure on the ventral surface of the body enhances neurobehavioral organization⁸.

These powerful sensory capacities are readily coordinated in the newborn period, integrated in behavioral packages and directed towards social interaction within the environment¹⁰. Within the first six months, the infant achieves the status of being truly human, in that he learns to initiate, participate and modulate important interactions with those around him, as described by Stern⁹. The infant quickly learns patterns of interaction with those around him and begins to elicit behaviors from sensitive caretakers, even in the first weeks of life¹¹⁻¹³. The remarkable achievement of these goals for the infant that occur within the first month of life is perhaps the most significant hurdle in all of human development⁹. The infant begins to understand his own capacities to interact with the world around him and within that context, develop a solid sense of self, of others, of communicative intent of behavior³ and the pattern of interaction he can anticipate from his environment¹⁴.

PARENT BEHAVIOR

Parents' behavior has also been observed in recent studies to be substantially reorganized in the perinatal period to be available to the infant in coordinating this important social interaction. Through the psychological turmoil that is part of every pregnancy in every family in every culture comes a new organization of the adult body and psyche^{15,16}. We now understand that this pregnancy adjustment has a predictable developmental course for the parent going through a pregnancy, delivery and postpartum period. These form the bases of the later bonding and attachment that will only be fully realized when the infant interplays with these important psychological variables in the adult. Adults are preprogrammed to attend to those particular "babyness" qualities that offer an appeal for the infant⁹ and allow the parents to become focused on and eventually attached to their particular infant¹⁷.

When the infant is present, adult behavior is significantly changed by the infant. Researchers have observed that the facial expressions, change in voice and other behaviors seen in adults interfacing with children around the world are rather unique to that social interaction^{9,11}. We violate all our regular social rules to some degree in interfacing with the infant as the infant draws us in and out of ourselves to interact in a strange and appealing way. In an important study by Ferguson¹⁸ entitled, "Baby Talk in Six Languages," we find the particular speech patterns that adults world the world use with infants are particularly geared to the infant's auditory capacities and attention and are unique to that kind of interaction. What strange things these infants make us do!

THE INTERACTION

Putting a uniquely prepared neonate with an adult primary care provider who is also attuned to the infant's characteristics and is dramatically affected in their behavior and their feelings by the presence of the infant, we then have the raw ingredients for social interaction. Why are researchers so interested in the central role of social interaction in early human development? Why so much attention on what might be seen as the "fluff" of child rearing? However, this is really touted by researchers these days as being the foundation for development. To quote Stern⁹, "This choreography of interaction of maternal behaviors is the raw material from the outside world with which the infant begins to construct his knowledge and experience of all things human." It is the beginning of everything else that follows. Multiple research studies coming from various theoretical perspectives and using both naturalistic and laboratory models, have clearly highlighted that, barring severe inherited or acquired disease, the social interaction experienced by the infant with his primary

caregiver in fact may be the major determinant of his long-term development^{3,9,10,12,14,19,20}. The primary factor influencing the majority of the infant's development is the nature of his relationship between himself and his primary care provider. If this is positive, then it supports development; poor interactions can undermine it.

The nature of this interaction is an advancing spiral of development in which the infant initially achieves physiologic stability after the circumstances of birth and the biopsychologic requirements of newborn transition²¹. Then he begins to achieve stability in state organization, moving from sleep to alertness to crying with regularity, smoothness and internal control. Then the child begins to appreciate the complex patterns of interaction of his caretakers around him and through these begins to develop a concept of self and others. He begins to learn "the dances"⁹ that are the essential element of social interchange and it is only from this reciprocal interaction between caretakers and others that the child is then available to move to the next level. That level involves the use of object play and expanding social world with even more complex "dances.". In other words, the infant's early developmental course occurs within the context of interaction with primary caretakers.

There is increasing evidence that autonomic stability and regulation is facilitated through close, direct, immediate, consistent interaction with one's primary caretakers²². The work of Evelyn Thomen indicates that early tactile contact with a primary caretaker helps the infant achieve regularity in breathing control, heart rate regulation and temperature maintenance¹⁰. Indeed, recent popular review of the data on breathing regulation in infancy suggests that irregularities in these areas may be the basis for some cases of SIDS. Certainly temperature maintenance control provided through direct skin-to-skin contact has been an important mechanism over the millennia through which the child can survive and grow in harsh environments, at high altitudes and the extremes of heat and cold, with the mother's body in these cases forming, literally, a thermal regulatory resource for her young infant^{23,24}. With increasing maturation and time, the stability of this system is achieved and the infant moves on to the next stage.

State regulation refers to the child's ability to develop regular wake and sleep cycles and it has its own developmental course. Demonstrated in 1970 with Dr. Sander²⁵, and followed by many other reports, those infants who are cared for by a single care provider rather than multiple care providers, even if they are kept in institutions, achieve this state organization much earlier. Or to quote Kagan¹⁴, "Mother has an important influence on her infant's capacity for state regulation during their early interactions." Providing continuous, direct care and contact with adult care providers means the infant can learn when to wake and when to sleep. Separated from those same providers, he is left with diurnal confusion and expends unnecessary calories in calming himself and achieving state regulation based on a schedule rather than on interaction with a care provider. In an important study from Greece, Maratos et al²⁶, demonstrated that children who are not separated from their primary care providers in fact achieve much better behavioral organization within the first week of life than those children with comparable medical conditions who are separated. The unseparated children achieve early orientation, better wake/sleep cycles and better weight gain, alertness and decreased irritability. These behavioral measures were unrelated to specific feeding patterns. These and related studies document the neurophysiologic behavioral organization that was achieved through the undivided attention and contact with a single care provider in the early days of life²⁷.

The other side of interaction is, of course, the parents. There is no question that one does not become attached to an infant instantly at birth. The process of seeing one's child as one's own, the process we call bonding and attachment, is neither automatic nor predictable from case to case²⁸. An early study by Budin²⁹ shows that there was marked inability to provide early care in mothers who received no initial contact with their infant's overall care. Robson and Kumar³⁰ were able to show that indifference to an infant is really rather normal in the immediate postpartum period, but the feelings of attachment to an infant grow over the first weeks and months of life, again within the context of immediate and direct interaction³¹. Our current concept of bonding supports this fluid, maturational model³². The child's own behavior and responsiveness to a parent's caretaking efforts fuels the parent's energy to attend to and respond to that infant^{10,33,34}. Successful caretaking and, particularly, enhanced sense of self confidence and self esteem in the maternal role lead, perhaps, through biopsychologic mechanisms to increased attachment and responsiveness to the infant³⁵. However, one cannot expect the infant to do any magic on parents if they are not together long enough for that interaction to take place. Contact with the infant is vital. It is unreasonable to expect that every infant

and every family can surmount the barriers that regular or prolonged separation might pose. The system of attachment is provided with spontaneous combustion, provided we don't squirt a fire extinguisher over all of that through inadvertent medical care^{36,37} practices, misguided information and our own need to control. Perinatal care practitioners must bear this in mind in designing systems of care.

SOCIAL INTERACTION AS THE CENTRAL FACTOR

The central role of the achievement of positive social interaction with one's primary care provider is now accepted as a good predictor, if not the best, for long-term development in all spheres of concern—cognitive and emotional as well as physical. How can we explain this important relationship? What is it within the context of social interaction that allows it to be such a foundation for later development in all these other areas? Why doesn't neurophysiologic maturation explain it all?

Part of the answer lies in the fact that within positive social interactions in infancy the three basic components that are necessary to cognitive and emotional growth are clearly laid out. The work of Jean Piaget³⁸ and many others^{3,14} have highlighted the important special dimensions of learning and behavior in infancy. Infants are not just less smart, but are qualitatively different in their approach to learning of the world about them as well as themselves and others. They learn through direct experience, through their senses and through motor behavior. Their learning is not of the type of a school-age child learning from modeling or imitation, although this occurs to a lesser degree in later infancy. Rather, the child learns from his own experiences of interaction with the world around him, and the world around him is essentially social in early infancy. The primary ingredients that are basic and important to this cognitive development, are consistency, contingency and reciprocity. These large "Piagetian" words should not be intimidating as they really make sense not only in infancy, but throughout the life span. Consistency: the child only learns in an environment that provides him with some consistency in experience. This allows him to make early associations between one event and another. "I feel hunger, I cry and someone picks me up and feeds me." "When I hear my mother's voice, I know food is nearby." "When I see my dad's face, I know that fun is around the corner." "When I smell my grandmother's wonderful fragrance, I know that the time for cuddling and rocking is near." The infant begins to link events in his environment through the consistent response pattern of the important people around him. Within the context of consistent social interaction then, the infant experiences that kind of consistency that is the foundation for all intellectual growth as well as emotional growth that comes thereafter.

The second word, contingency, means that the child begins to see events occur in response to his own behavior. He begins to see himself effectively interacting in the world around him. If one has the basic sense that the world is unresponsive to you or any of your behaviors, you will also lose your ground both cognitively and emotionally and so does the infant. He must be an active scientist who can reliably repeat his experiments by reaching out to the world around him and expecting the world to respond to his activities.

Finally, reciprocity. This implies that the world regularly interacts with us in a balanced and systematic way. A child only learns about objects in his world when there is an interaction with them and himself. Children cannot learn language from a television set and they can't learn love from the movies. They only learn these basics of human existence within the context of a reciprocal relationship. What appears to be lacking in the environment of institutionalized children with severe developmental compromise and a 25% mortality, as described by Rene Spitz² back in the 1940s, is an environment that lacks particularly this element of responsiveness or reciprocity. The institutional environment also lacks consistency and contingency. A child will not develop emotionally or psychologically without all of these elements in place. As developed by Ericson, the concept of "establishment of a sense of basic trust in the interpersonal world as well as the object world around you is the basic work of infancy." People have to be relied upon to understand one's needs and to consistently meet them. If one misses that work of infancy, the foundation for the rest of development is weak. If one continues to negotiate a sense of basic trust throughout the life span, there is no energy left for other developmental work appropriate for later stages.

RELATIONSHIP OF SOCIAL INTERACTION TO BREAST-FEEDING

What has this to do with breast-feeding? I would propose that in the breast-feeding situation we have the earliest, most extensive and closest model for social interaction between the child and the world around him. Certainly, many have cited the other important aspects of breast-feeding. Now I would have you focus on the psychological aspects of the earliest social interaction. This interactive setting forms the prototype for other types of interaction as the child and family matures. Successful negotiation of this interaction provides not only nutritional support, but psychological beginnings for the child and the family together³⁹. Breast-feeding supports psychological growth as well as physical growth by providing opportunities for immediate and satisfying answers to the infant's needs⁴⁰. As we previously developed, a child needs to sense that the world is acting contingently upon his own needs. There is a reciprocity between his requirements and the response of the world around him. This response obviously is readily there at just the right temperature, just the right consistency and with no delays at all. Delays in gratification cannot be understood or appreciated by the young infant. The bottle-feeding situation of necessity infuses some delays and, therefore, does not support an ongoing sense of contingency in the environment. In addition, inconsistencies in the bottle feeding, either the who, the what or the where, do not provide this kind of satisfying answer to the infant's needs.

Secondly, within the breast-feeding situation, the infant is allowed to control and determine the interaction with his mother. Milk is not just poured into him, but its delivery requires an integrated system of behavior on his part in conjunction with learned behavior on the part of his mother. The two of them learn to work together and this is the prototype for other interactions that follow. The degree to which the infant is an active participant in the interaction is determined in part by his own behavior. This is a prototype for opportunities for learning that follow in other interactive settings. Thirdly, the breast-feeding situation offers opportunities for making available a consistent, predictable interaction with the primary caregiver. Mother and baby are locked together in a nutritional "dance" that is the prototype for other interactions that will be the foundation for other development in the child's life. This kind of consistent and predictable response forms a backdrop for good emotional and physical growth. Within the breast-feeding context, there is increased opportunity for undivided attention by the caretaker, direct bodily contact and stroking. These could be achieved with bottle feeding, but research indicates that these are not consistently present in that situation as with breast-feeding⁴¹. Clearly, these factors support psycho-physiologic organization as well as higher levels of behavioral organization⁴².

The close tactile and vestibular stimulation that bodily contact and undivided attention by the mother provides in a breast-feeding situation is clearly important for other areas of development²². Breast-feeding is more often observed in western cultures to be done in private situations. This provides increased opportunities for the mother to be alone with her infant. The breast-feeding situation provides a direct learning experience based upon interaction. Although the infant is equipped with a set of reflexes that allow him to root, suck and mold his body in approach manner, clearly the whole sequence must be put together in a learning process that is relatively complex and must be achieved in a short time frame. Lastly, it has to do with offering in a temporal manner a coordinated, integrated schedule of the meeting of physiological needs alternating with social interaction that may proceed or follow that. This kind of rhythm of integration between the child's needs for social interaction and food is a child-determined interaction. It is centered on the consistent organization with a single caregiver. As has been pointed out, neurophysiologic organization is achieved through this kind of direct, consistent, integrated interaction with a primary care provider. Temperature regulation, heart and respiratory rate regulation as well as physical growth and development are facilitated through this behavior²⁷. No time, effort or calories are wasted on excessive crying, trying to calm oneself, or trying to meet the schedule of a bottle feeding rather than having one's needs met immediately.

Finally, a successful negotiation of the breast-feeding interaction offers a wedge of opportunity for intervention. Most families don't need formal intervention to achieve this successful interaction with their infant. They just need the breaking down of barriers to achieving this kind of satisfactory regulation. But, in any case, for any population, an opportunity to establish on firm grounds the basis for further interaction is made available in negotiating a successful breast-feeding interaction. This success is vitalizing for infant and mother alike.

Maternal self esteem, competence and confidence in the maternal role and an enhanced sense of personal worth have all been major psychological developments that have been demonstrated to be enhanced in mothers who successfully breast-feed their infants^{39,42,43}. This kind of fueling of maternal psychological factors is then infused back into the infant's growth, with enhanced sensitivity to the infant's needs and enhanced responsiveness to the infant's social and other cues. Infant development is fueled by both internal processes of neuromaturational development and this external input. Piager³⁶ tells us that it is this sense of achievement and equilibrium that fuels development. One cannot underestimate the energizing role of a successful negotiation of the breast-feeding situation for infant and mother alike⁴⁴.

CONSEQUENCES OF A POSITIVE BREAST-FEEDING SITUATION

Does breast-feeding make a difference over the long term? Every researcher of human development thinks it does, though scientific data are difficult to obtain. When one enhances the interaction between a mother and her infant through successful breast-feeding, literally every other factor in the environment is also changed^{39,44}. So it is difficult in the complex human situation to clearly point to breast-feeding as the single factor that has changed the long-term development for the child. Clearly, animal studies show that rodents have increased motor skills, improved memory tasks, increased cognitive capacities as well as enhanced physical growth when they are breast-fed, as opposed to adequately but artificially fed control animals. Several other animal models have noted these gains. In human babies the experimental paradigm is much more complicated. Certainly consistent, enhanced cognitive and social development has been implicated in populations of breast-fed babies in western cultures⁴⁵. However, these outcomes are "confounded" by the many factors, including which mothers initially choose to breast-feed, what else happens when successful or unsuccessful breast-feeding occurs, and other factors that may follow from breast-feeding or are antecedent or only casually correlated. It's clearly been shown that breast-fed babies do walk earlier in certain comparative studies⁴⁰. There is enhanced verbal interaction in the second year with more active infant participation present in breast-fed groups⁹. Because human beings are not white rats, we cannot definitely answer this question at this time. Rather, large data sets of comparable data collection need to be collected and submitted to a meta analysis in order to tease out the impact of breast-feeding as a single factor. Even with these complex statistics, however, because breast-feeding changes so much of the interactive setting, as well as nutritional competency, these answers may be difficult to obtain. In that sense, maybe the answer is already there.

Several studies have implicated breast-feeding as an important component to the bonding of mother to infants. Certainly, Klaus and Kennell³¹ demonstrated the importance of postpartum contact with its long-term consequences, as well as short-term changes in the interaction between the mother and child. Much of their work has come under scientific scrutiny and criticism, and the concept of a "sensitive period" for bonding has particularly been assaulted. Clearly, we all owe them a debt of gratitude for increased attention to the perinatal period and the humanizing of the birth process. Reports from the Swedish literature^{43,44} indicated that early postpartum contact, which included support for breast-feeding in its immediately postpartum period, enhanced parenting skills on a wide variety of measures, and infant development was also enhanced in those settings⁴⁵. Again, this is "confounded" by many variables that are changed when we provide this early postpartum support. Of note, are the findings by another group of researchers from Sweden whose conclusions about enhanced infant or parent behavior using early postpartum contact with breastfeeding were significantly "marred" by behavioral differences in the infants. Breast-fed infants were calmer, quieter and cried less. I find this a central observation rather than a flaw. Control infants who were not allowed to breast-feed immediately postpartum or required close contact with their mothers cried more. The researchers said this had a more profound effect on the maternal behavior than the breast-feeding or the contact itself. What is the medium of change here? Do we have more satisfied babies and, therefore, more satisfied mothers? This does not seem like an extraneous finding but a critical one, in my estimate^{10,33,36}. Early breast-feeding experience enhances maternal-child interaction through a greater assurance of success with a much better "dance" partner, a responsive, happy infant.

Clearly, all research points to the direction that breast-feeding enhances development in children and certainly enhances parenting behavior responsiveness⁴⁶. This in turn is important and in fact, central, as we previously

described, to the infant's long-term development. Definitely proving that breast-feeding alone achieves this higher level of organization may be difficult, but it never clinically stands alone.

INTERACTIONAL FAILURES

Through an examination of what occurs when breast-feeding fails and infant malnutrition occurs, I would like to broaden your perspective on infant development that has worldwide significance. It has clearly been demonstrated that even mild-to-moderate malnutrition in infants and young children substantially changes not only children's physical and central nervous system growth, but changes the whole caretaking environment⁴⁷. The cyclic failure of the caretaking network in the situation confounded by infant malnutrition can be clearly laid out. Children who are malnourished are much less responsive, much less eliciting, have increased apathy and irritability. These behavioral dimensions have a negative impact on the caretaking environment. The child's decreased behavioral responsiveness feeds the cycle in terms of less positive parenting as the infant is perceived as more demanding, requiring more resources and decreases the parent's self esteem. Als and co-workers⁴⁸ demonstrated that even in greater than six pounds, but long lean SGA babies, this kind of irritable, unresponsive behavior in the newborn period had adverse consequences in mothers attempting to breast-feed these children. Even in the perinatal period then, we see the effects of intrauterine malnutrition as it affects in a cyclic manner the responsiveness of parents as well as children's behavior. The work of Ernesto Pollitt⁴⁷ and others in Latin America, where malnutrition is regular and severe, shows the infant's own behavioral changes may, in fact, be more important in determining solicitous parenting than other factors in the environment. The kind of fueling of successful parenting that a well-nourished child provides is not available to the parents of a child who is undernourished. Looking at changes in behavior one is, of course, familiar with the fact that malnutrition directly affects a child's cognitive and emotional growth as well as his physical growth. A child who is progressing less well may be seen as a blight on a parent's reproductive competency, the kinship group, or may bode badly for the future. All of these changes in the infant's developmental course have a negative impact on the environment. In our own work in sub-Saharan Africa⁴⁹, we were able to demonstrate in a community where mid-to-moderate malnutrition was regular but severe malnutrition extremely rare. Those children who were severely malnourished had a significant bonding failure with their parents. That is to say, these were the irritable, difficult, unresponsive, unpredictable children who offered nothing back to parents attempting to cope with their difficulties. In some cases, these severely malnourished children carried this negative burden from the perinatal period in which they were seen as ill or unresponsive or did not meet the expectations for vigorous, fat or chunky infant. They reflected negatively on parents and on the kinship group at large. Although all of these responses to the infant were unconscious, they appeared to play a role in determining which children were severely malnourished in a population that was otherwise compromised in a marginal way nutritionally. The nutritional superiority of breast-feeding clearly has implications for development, not only because of its direct support for central nervous system growth, but also for enhancing the whole cycle of caretaking that surrounds the child and supports development.

CULTURAL DIFFERENCES

Does all this have significant cultural variations? A resounding yes⁵⁰!. Within the last 15 years, major research efforts to look at the behavior of children around the world to find those characteristics that are universal as well as cultural-specific has provided us with an explosion of observations. From a variety of sources it is now very clear that infants reflect their own culture beginning from the day of birth. Children vary substantially in their central behavioral characteristics. Each cultural group has its own distinct baby "profile" that already reflects as well as shapes the culture in which they are born^{10,51}. Infants move more readily to the language they have been exposed to in utero, have movement patterns that are consistent with the culture's pattern of motor development and behavior, and the qualities of auditory and/or visual attentiveness are also evidenced as differentially present in various cultural groups. Are Navajo babies, an American Indian group in the United States, born or made? The answer is probably both, but it's clear they are also born, or at least arrive with an intrauterine history that substantially influences their behavioral pattern.

A brief "world tour" is warranted: African infants are motorically strong and visually alert from the day they are born. Australian aboriginal infants are irritable and difficult to console on the first day of life. Chinese

and Japanese infants share certain behavioral characteristics in common with their anthropologically related cultural groups, the Navajo and Hopi in the United States. These infants are pensive, quiet, have fewer state changes, seem unperturbable and have competence in self quieting. This clearly fits in with our concepts about the adult cultures in which these children are born, in which these personality characteristics are also evident.

Beginning with these varying behavioral profiles, infants then begin to interact with a culture that provides an interface that is also culture specific. The way we perceive the world, the people around us and ourselves is established during early infancy through interactions with primary caregivers. This perception varies from culture to culture and is the beginning of each child's cultural education⁵². The way we interact with people, with vigor or with restraint, the tempo and timing of interactions, how we use pauses, and the proximal space we require vary significantly from culture to culture and allows the infant to develop patterns of interaction that are clearly culture specific. Cultural values and goals determine the nature of the interaction between the infant and the caretaker, or at least impact significantly upon it. This includes, of course, the interaction around breast-feeding.

The values we must examine when considering the components of the interaction that are culture specific, are what the culture, first of all, sees as a concept of the infant. In America, we see an infant as hopelessly dependent, with the job of parenting to be one of bringing the child to a more independent state. Japanese mothers view their infants with exactly opposite terms. They see their infants as being born independent, with the expectation for their own parenting to make the child dependent upon the culture and the caretaking milieu in a complex bind of kinship and family relationships that extend across time. Whether one views the extension of oneself into the infant as an extension of one's cultural heritage or ancestry or other concepts of the infant will clearly determine how one interacts and behaves with that infant. Brazelton was able to demonstrate that Zambian mothers' perceptions of their infants as vigorous and strong, and neurobehaviorally competent³, (in spite of the fact that they had recently seen a decrease in infant birth weight and growth) determined that interaction. In spite of the undernourished status of these infants, the infants and the mothers behaved with an expectancy that was grounded through the millennia of vigorous healthy infants. Indeed, the infants responded to that behavioral organization with a relatively short and steep recovery curve. In contrast, Tronick and others observed infants in the highlands of Peru, who were very physiologically immature and fragile. Parents perceived them as such and their caretaking was designed to decrease caloric expenditure and achieve substantial autonomic stabilization through direct, quiet and nonintrusive interaction with the adult caretakers. In comparison with the ideal American infant interaction, this type of care would be perceived as stifling, stilted and nonstimulating for the infant.

Expectations for parenting by parents and others are important determinants of the interaction around feeding. For our Mexican-American families, the role of the mother is clearly one of the feeder of the family, and health and vigor is defined as how chunky or "robust" one is. For these mothers, not having enough milk in the first day postpartum is amazingly agonizing, as they see their role of feeding and nurturing so central to their own identity. It's almost impossible for us to sustain some of these women through their "no leche" syndrome.

The social role of adults and how they are seen also has important implications for what adults bring to the feeding interaction. The changing role and demands on women clearly will have contemporary influence on parent-child interaction. The role of women in any society clearly has implications for the whole kinship group. For example, in India the grandmother takes substantial care of the infant and determines all social interactions around the young child. The mother's role is clearly defined to feeding the child and maintaining the household, with the grandmother taking more preeminence in social interactions. This system seems to work in that culture, but may be maladaptive in others.

A sense of time is also important. In America, our sense of time is clearly focused on the future, so that for a mother to fail with breast-feeding in the first days of an infant's life looms ominous in front of her as she senses failure for her growing child, juvenile delinquency in adolescence, and social and economic failure as an adult, all laid out before her in one terrible scene. Her sense of focus on the future then clearly clouds or shapes her expectancy for success with the breast-feeding situation.

A culture's sense of relationship between man and nature also clearly determines how the interaction will go. American Indian groups in the southwestern United States see fluid relationships between man and the natural world around him. Children are viewed as rather autonomous in that situation and things that happen in infants are determined by forces outside the family unit. This may be interpreted by outside groups as neglect or unresponsiveness, but within this cultural context, it's part of a broader perspective of the relationship with the child in the context of the larger natural world.

Finally, direct perceptions of eating, feeding and nurturing, in general, are important determinants that any society brings to the feeding situation. Infant feeding practices have evolved specifically from certain ecological factors. These include the temperature, how much clothing individuals wear and, therefore, how close the infant is to the mother physically, how mobile the culture needs to be and, therefore, how that baby is cached to carried. It includes the availability of weaning foods. In harsh climates such as experienced by hunter-gatherer groups, weaning foods are difficult to digest for young infants, and a prolonged breast-feeding pattern is adaptive in that context^{23,53}. In agricultural groups, more bland and easily digested weaning foods may lead to a shorter lactation period. Household size and density have been shown in multiple cross-cultural comparisons to have important influence on infant rearing and feeding, in particular. A large, dense family unit means the infant must be fed or responded to quickly, and his needs for socialization and interaction are met by a variety of individuals. Less densely populated households require that each individual, including the mother, have multiple jobs, and the baby's nurturing may have to take second place, at least briefly, and require less attention from the mother. Sleeping with the infant is the regular pattern of behavior throughout the world; in American and western Europe, the tradition is that the infant sleeps separately from the caretakers, and this requires some adjustment to accommodate breast-feeding. Because it's part of a broader pattern of encouraging independence and autonomy, the sleeping arrangements that are most regular are unlikely to be changed in this context. These practices must be taken into account, however, when one counsels families and develops programs within a specific cultural context.

SUMMARY

Breast-feeding contains and determines important cultural goals and expectations. It offers us a window into culture as well as into individual interaction. Supporting breast-feeding programs within a specific cultural milieu must have a clear perspective on the cultural variations in the infants, in the parents and the values of society at large. To run at odds with these is counterproductive and likely to be a waste of time. To run in concert with these goals and expectations means that energy will be added to the system of support and care.

This discussion was offered to broaden your perspective on breast-feeding. One must see breast-feeding as not only milk in the baby's tummy, but as an important opportunity to set in place the supports for interaction with the child in the world around him. We are nurturing the future through facilitating interactions between the child and the caretaker. We are laying the foundations of individual, family and cultural identity through enhancing this interactive setting. Through improving the supports for psychological growth through supporting lactation, one can see the far reaching implications that go beyond simply nutritional considerations. We will prevent, in many ways, the psychosocial morbidity associated with malnutrition that necessarily always confound it.

In the words of Charles Super and Sara Harkness, cross-cultural investigators working in early infancy, "Human development does not proceed through an isolated mechanism. Its emergence and shaping of social interactions involves a complex system for the infant's and parent's behavior, guided in part by culturally-defined values and expectations. It is within the interactions between parent and child that the history and evaluation of culture reside."

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Current Knowledge About Skin-to-Skin (Kangaroo) Care for Preterm Infants

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Skin-to-skin ("kangaroo") care for preterm infants is becoming widespread in Western Europe. During this care the mother holds her diaper-clad premature infant against her skin beneath her clothing and allows self-regulatory access to breast-feeding. Fathers hold their infants skin-to-skin also. Research projects in Western Europe and the United States provide data that support the safety and effectiveness of this method. Infants held skin-to-skin are warm enough and have regular heart rate and respirations, more deep sleep and alert inactivity, less crying, no increase in infections, greater weight gain, and earlier discharge. Lactation is more productive and of greater duration. Parents become attached to their infants and feel confident about caring for them. This research is summarized and annotated in a table, along with descriptive reports and videotapes. These data can be used by health care professionals to make informed decisions about offering kangaroo care opportunities to selected parents and their preterm infants. (*J Perinatol* 1991; XI:216-226)

By now many health care professionals in fields related to perinatology have heard about skin-to-skin care for preterm infants, otherwise known as "kangaroo care." With this method, the mother holds her diaper-clad infant beneath her clothing, skin-to-skin, and lying upright between her breasts or on one breast. In complete kangaroo care, she allows self-regulatory access to breast-feeding. Fathers also hold their infants skin-to-skin.

Kangaroo care originated in Bogotá, Colombia, where it was followed by reports of dramatic improvement in infant outcome and parental attachment.¹ These reports were later discounted, however, when it became clear that the methodology was questionable: the control group included all infants born at the hospital, whereas the treatment group included only those infants healthy enough to enter the kangaroo program.^{2,3} Nevertheless, the reports stimulated interest, visits to Bogotá, and research in developed countries.

The decision to begin kangaroo care varies along continua of gestation, birthweight, postnatal age, and severity of illness. To facilitate description, four categories have been developed. The first category is *late kangaroo care*, which begins after the infants have completed the intensive care phase, have stable respirations, and are breathing room air. This usually occurs many days or weeks post-birth.

Intermediate kangaroo care begins after the infants have completed early intensive care, usually about 7 days postbirth. These infants usually still require oxygen and may have apnea and bradycardia. Infants stabilized on ventilators are also included in this group.

Early kangaroo care is done with infants who are easily stabilized and begins as soon as they are stable postbirth. This can occur during the first day, even the first few hours. In Bogotá, stabiliza-

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tion is accomplished as follows: following birth, preterm infants with Apgar scores of 7 to 10 are placed prone in a warm incubator; preterm infants with Apgar scores of 4 to 6 are placed prone in a warm incubator and given oxygen and intravenous therapy as needed.

Very early kangaroo care begins by returning infants to their mothers during the first minute postbirth. Mothers who give birth in the supported semisquatting position simply sit down cross-legged, pick their infants up, and hold them. If the mother has given birth lying down, the infant is placed prone near her breasts. The infants are allowed to stay with their mothers thereafter in the same bed or an adjacent incubator and have self-regulatory breast-feeding opportunities.

Until recently, the only controlled scientific investigations of kangaroo care were being carried out in Europe. The first two randomized clinical trials were conducted in Dusseldorf, Germany,⁴ and London, England.⁵ In addition, excellent models of implementation exist. Two outstanding examples are at the Academic Medical Center in Amsterdam, The Netherlands, introduced by neonatologist Richard de Leeuw,⁶ and at Helsingborg Hospital in Helsingborg, Sweden, introduced by Berlith Persson, nursing director.⁷ Funded by UNICEF, the author visited these four sites and six others in May and June of 1988.

In June 1990 a second visit was made to Helsingborg, this time to learn more about ways to facilitate breast-feeding during kangaroo care. At that visit it was also learned that Berlith Persson and Per Henriksson, MD, had begun to give very early kangaroo care to any preterm infant who was healthy following an uncomplicated vaginal birth. The three smallest infants were 27 to 28 weeks' gestation. The behavior of these infants was similar to full-term infants, the postnatal course was uneventful, the infants were discharged home fully breast-fed, and their development was normal. Similarly, Dr Nils Christensen, Soenderborg, Denmark, gives very early kangaroo care to infants who are healthy at birth and weigh 2000 g or more. The forerunner of this method was carried out very successfully with 100 infants weighing 1600 to 2490 g by Dr Michel Odent in Pithiviers, France.⁸

Some knowledge gained on the first investigative tour to Europe has been reported.⁹ A second article, in preparation, will emphasize breast-feeding aspects of kangaroo care and ethical considerations that may arise when parents in the United States request kangaroo care. The first international research conference on kangaroo care was held in Bogotá in November 1990, sponsored by the Maternal and Child Institute of Bogotá, Fundación VIVIR, UNICEF Regional Office for Latin America and the Caribbean, and the Pediatric Department of the Colombian National University. Tentative future plans include an international conference for clinicians, a consensus conference at the National Institutes of Health,

and the establishment of an institute (currently the Fund for Natural Care Postbirth, University of Florida Foundation) to study and promote kangaroo care and related approaches.

Table 1 contains an overview of all known research data and descriptive reports in the English language that are about kangaroo care and its implementation. The reports have been arranged in order of decreasing scientific rigor, as can be seen by the side headings. One can quickly see that research ranging from randomized clinical trials to descriptive exploratory endeavors have yielded rather consistent findings that support the safety and value of kangaroo care.

Infants given kangaroo care were warm enough; had adequate oxygenation; had fewer episodes of periodic breathing, apnea, and bradycardia; and had no increase in infection. Almost no crying occurred during kangaroo care. The infants had twice as much regular sleep (sleep with deep regular respirations), longer bouts of regular sleep, and a fourfold increase in alert inactivity. The infants came out of incubators sooner, went home sooner, and cried less at 6 months.

During kangaroo care the mothers showed thermal synchrony with their infants, that is, their own body temperatures increased or decreased as needed to maintain their infants in a thermoneutral range. The mothers were more inclined to breast-feed, produced more milk, and breast-fed longer. Mothers felt close to their infants; felt confident about monitoring their infant's health, even in the neonatal intensive care unit; and were eager to take their infants home. Often fathers wished to give kangaroo care, and their infants responded similarly to them.

The information in Table 1 is current as of June 1991, but the table undergoes frequent revisions. Additional information for a future publication of the table, and requests to be placed on a mailing list for information regarding kangaroo care, can be sent to the author. Numerous videotapes are also available (see annotated listing in the Appendix).

Currently, kangaroo care is becoming widespread in Western Europe, especially in Scandinavia, and is being used with infants who are weaker or of earlier gestation or both. It is also started sooner after birth, and breast-feeding is encouraged and supported in numerous ways. Apparently no further research is in progress in Europe at this time. Instead, the focus appears to be on implementation. Representatives from virtually every major hospital in Sweden have visited Helsingborg to observe the Persson model. In Finland, implementation of kangaroo care has begun in all 5 university hospitals and 13 of 15 central hospitals.³⁰

In the United States, research has begun on the West Coast,^{13,16-19} including a pretest-posttest randomized clinical trial with incubator infants now in progress in Richland, Washington, by Ludington, Hadeed, and the

Table 1

AN OVERVIEW OF RESEARCH DATA AND DESCRIPTIVE REPORTS IN THE ENGLISH LANGUAGE ON KANGAROO CARE, 1983-1991

Type of Study	Reference/Study Site	Sample on Day of Entry*	Kangaroo	Control	Results (Kangaroo vs Control)	Comments
Randomized Clinical Trials	Schmidt, Wittreich (1986). ⁸ University of Dusseldorf, Dusseldorf, Germany	n = 12; 11† AGA and SGA BW = 1000-1500 g	Late KC‡ ̄ BW = 1312 g ̄ wt DOE = 1350 g	Incubator care, holding, feeding by mothers ̄ BW = 1158 g ̄ wt DOE = 1238 g	Breast fed 50% vs 0% Daily milk production. 640 ml vs 400 ml Feedings per day: 12 vs 9 KC infants' growth is slightly better Letters re KC infants were seven times as long, with deep emotion expressed KC infants had no increase in infections	Assignment by alternate sequential series Some control mothers expressed milk KC infants in N = 23 may have been healthier on DOE Follow up at 3 and 6 months
	Tuomikoski Kotrinen (1988). ¹⁰ University Central Hospital of Turku, Turku, Finland	n = 8; 8†	Intermediate and late KC ̄ = 1610 g (1330-1900 g) ̄ = 28 days (7-94) 20-60 min per visit	̄ = 1600 g (1500-1770 g) ̄ = 19 days (8-44)	Ongoing lactation 100% vs 75% All KC parents liked KC	Assignment by alternate sequential series
	Ludington, Hadeed, Anderson (1991). ¹¹ Kadlec Medical Center, Richland, Wash	n = 11, 13† AGA and SGA Infants in open cribs KC once for 2-3 hours	Intermediate and late KC Open air crib between feedings 1 and 2 KC between feedings 2 and 3 Open air crib between feedings 3 and 4	Open air crib between feedings 1 and 2, 2 and 3, and 3 and 4	HR, RR, SaO ₂ , and SF stayed within normal limits for both groups in all periods During KC increases occurred in HR (01), ST (03), and percent of RQS (03) Frequency of periodic breathing decreased (03)	Protocol spanned 3 interfeeding intervals between feedings 1 and 4 Measurements were only done between feedings All measurements were recorded each minute
Repeated Measures‡	Whitelaw, Heisterkamp, Sleath, et al (1988). ³ Hammersmith Hospital, University of London, London, England	n = 35, 36† AGA and SGA <1500 g	Intermediate and late KC ad lib ̄ = 16 days (1-61 days) Clothed in diaper, no hat	Incubator care, holding, feeding by mothers ̄ = 16 days (1-66 days)	Lactation longer than 6 weeks. 55% vs 28% KC infants maintained stable temperature Complications and visiting were equal Hospitalization 30 days vs 37 Deaths: 2 (NEC; septicemia) Duration of lactation 9 weeks vs 5 weeks Crying/day at 6 months: 25 min vs 38 min KC infants did not cry more to be held and were not carried more	After randomization, KC mothers were asked to do KC, 5 did not, but were included in analyses Hat is advisable for the smallest infants Breast feeding was not done during skin-to-skin time KC dyads averaged 36 min/d of skin to skin
	Acolet, Sleath, Whitelaw (1989). ¹² Hammersmith Hospital, University of London, London, England	N = 14 AGA and SGA ̄ = 1550 g (1000-2200 g) ̄ = 35 days postbirth (6-134)	Late KC and intermediate Held at 60° angle 10 min	Incubator, prone, horizontal 10 min	During KC: Nine infants with normal lungs. HR increased 6-5 beats/min Five infants with chronic lung disease (two still on O ₂): TcPO ₂ rose 1.0 kPa No serious apnea, bradycardia, or hypoxia Skin temperatures for 3 smallest infants (1000, 1100, 1250 g) were stable, rising slightly	Order of condition was randomly assigned Ten minutes of stabilization between conditions Room temperature = 26-29°C Measured TcPO ₂ , TcSaO ₂ , HR, and temperature
	Bosque, Brady, Alfonso, Wahlberg (1988). ¹³ University of California, San Francisco, Calif	N = 6 ̄ = 1370 g (1250-1460 g) <1500 g <32 weeks	Late KC Held 4 h/d, 6 d/wk, for 3 weeks Breast feeding ad lib	Incubator	Heart rate, respiratory rate, apnea and TcSaO ₂ similar Percentage of sleep time lower (14 vs 68) Skin temperature lower (36.5°C vs 36.8)	Condition was monitored once each week, 4 hours in KC, 4 hours in incubator KC is safe, feasible, and beneficial for selected mothers in a tertiary level nursery Room temperature lower than at Hammersmith

Table 1 (Continued)

Type of Study	Reference/Study Site	Sample on Day of Entry*	Kangaroo	Control	Results (Kangaroo vs Control)	Comments		
Repeated Measures§ (cont)					Less bradycardia during breast feeding than gavage or bottle in both conditions All mothers felt confident, fulfilled 67% were breast feeding at discharge			
	de Leeuw, Colin, Dunnevier, Mirmiran (1991) ¹⁴ Academic Medical Center, University of Amsterdam, The Netherlands	N = 8 GA = 28 wk (27-29) AGA, SGA not specified BW = 1104 g (770-1465 g) PNA = 18-1 days (6-33) Eight infants studied 16 times (one once, two twice, one three times)	Intermediate 1 hour KC.	Incubator 1 hour pre-KC 1 hour post-KC.	No significant difference in mean respiratory rate, percent time in regular respiration, number of apneic attacks, heart rate, TcPO ₂ , behavioral state, or rectal temperature No crying occurred at any time Respiratory rate and apnea increased in some, decreased in others Bradycardia went from 0 to 8 and 0 to 13 in two infants during KC Rectal temperature decreased in two infants by 0.3°C (to 36.5°C) and 0.9°C (to 36.2°C) during KC	Regularity of breathing patterns was studied by spectral analysis Conclusion: KC is a safe method, even for very small nonstabilized infants KC in more stable infants, as practiced in their unit, provokes no clinical problems No clinical deterioration occurred, no KC needed to be stopped A trained nurse should screen and monitor nonstabilized infants		
	de Leeuw (1988) ¹⁵ Academic Medical Center, University of Amsterdam, The Netherlands	Study 1 N = 15 AGA and SGA GA = 28-7 wk (26-33) BW = 1100 g (620-1560 g) PNA = 21 days (6-45)	Early KC Intermediate KC x̄ = 44 min (25-70)	Incubator	Pretest Skin temp 35.9°C Rectal temp 36.5°C	During KC — —	Posttest 36.9°C 37.0°C	Skin temperatures continuously recorded and apparently averaged just before and just after KC Rectal temperature measured once just before KC and once just after
	de Leeuw (1988) ¹⁵ Academic Medical Center, University of Amsterdam, The Netherlands	Study 2 N = 20 AGA and SGA GA = 29-4 wk (26-33) BW = 1184 g (690-1670 g) PNA = 13-7 days (6-32)	Early KC Intermediate KC 1 hour KC.	Incubator 1 hour pre-KC 1 hour post-KC.	Pretest Periodic breathing (n = 14) 30% (0-89)	During KC 9% (0-31)	Posttest 26% (0-82)	Breathing pattern recorded continuously Six infants had no periodic breathing or apnea at any time
	Ludington-Hoe (1990) ¹⁶ Hollywood Presbyterian Hospital, University of California, Los Angeles, Calif	N = 8 AGA x̄ = 2167 g (1865-2560 g) PNA = 9-5 days (2-28)	Intermediate and late KC Between feedings 2 and 3 Infants were diapered and under a velour blouse	Open air crib Between feedings 1 and 2; and feedings 3 and 4 Infants were fully clothed with hat, wrapped in one blanket and under another	Pretest 148 MA 3.2 RQS (%) 13 IS (%) 32 AS (%) 16 VAS (%) 14 Twice as much RQS in KC as in pre- or post-KC (P = 0.002) Periodic breathing was common and IIR often approached bradycardia and tachycardia in pre- and post-KC, but not in KC ¶	During KC 157 1.1 27 33 9 7	Posttest 149 4.0 12 36 17 11	Protocol spanned 3 interfeeding intervals (IFI) between feedings 1 and 4 Measurements were only done between feedings All measurements were recorded each minute, except rectal temperature (at end of each IFI) Continuous video Conclusion: Viewed from an energy balance framework, energy conservation probably occurred during KC.

Table 1 (Continued)

Type of Study	Reference/Study Site	Sample on Day of Entry*	Kangaroo	Control	Results (Kangaroo vs Control)	Comments
Repeated Measures§ (cont)	Ludington Hoe, Hadeed, Anderson (1991) ¹⁷ Hollywood Presbyterian Hospital, University of California, Los Angeles, Calif (n = 8) and Kadlec Medical Center, Richland, Wash (n = 4)	N = 12 AGA \bar{x} = 2149 g (1780-2560 g) PNA = 9.9 days (2-28)	Intermediate and late KC Between feedings 2 and 3 Infants were diapered and under a velour blouse	Open air crib Between feedings 1 and 2; and feedings 3 and 4 Infants were fully clothed with hat, wrapped in one blanket, and under another	Pretest During KC Posttest HR 145 155 149 RR 41 41 42 SaO ₂ 95.8 95.2 95.7 SI 36.1 36.9 36.5 RI 36.6 37.2 36.7 PB† 4 0 5	Protocol spanned 3 interfeeding intervals (II) between feedings 1 and 4 Measurements were only done between feedings All measurements were recorded each minute, except rectal temperature (at end of each II) Continuous video Conclusion: KC was safe for the infants in this sample and had a beneficial warming effect
	Ludington Hoe, Anderson, Hadeed (1990) ¹⁸ Hollywood Presbyterian Hospital, University of California, Los Angeles, Calif	N = 8 AGA \bar{x} = 2167 g (1865-2560 g) PNA = 9.5 days (2-28)	Intermediate and late KC Between feedings 2 and 3 Infants were diapered and under a velour blouse	Open air crib Between feedings 1 and 2; and feedings 3 and 4 Infants were fully clothed with hat, wrapped in one blanket and under another	Twice as much sleep in KC (27%) as in pre-KC (13%) or post-KC (12%) (P = .0002) No change in irregular sleep Duration of consecutive observations of regular quiet sleep were 2½ times longer in KC than pre-KC (P = .0002) or post-KC (P = .0002) Alert inactivity increased nearly fourfold in KC with a doubling of that increase in post-KC (NS)	Protocol spanned 3 interfeeding intervals (II) between feedings 1 and 4 Measurements were only done between feedings All measurements were recorded each minute, except rectal temperature (at end of each II) Continuous video Conclusion: Improved regulation of behavioral state occurred during KC
	Ludington Hoe, Anderson, Hadeed (1990) ¹⁹ Hollywood Presbyterian Hospital, University of California, Los Angeles, Calif	N = 8 AGA \bar{x} 2167 g (1865-2560 g) PNA = 9.5 days (2-28)	Intermediate and late KC Between feedings 2 and 3 Infants were diapered and under a velour blouse	Open air crib Between feedings 1 and 2, and feedings 3 and 4 Infants were fully clothed with hat, wrapped in one blanket, and under another	Mother infant skin temperature. 0-10 min: strong positive correlation (6 of 8 pairs) 11-80 min: negative correlation Change of 0.2°C ST in infant was followed by 1.5°C-2.5°C change in maternal ST in opposite direction (7 of 8 pairs) Infants stabilized by 60 min (7 of 8 infants) Maternal ST was 2° < infant ST Each mother's ST met the neutral thermal environmental zone requirements of her own infant	Protocol spanned 3 interfeeding intervals (II) between feedings 1 and 4 Measurements were only done between feedings All measurements were recorded each minute, except rectal temperature (at end of each II) Continuous video Conclusion: KC was associated with thermal stabilization, maternal temperatures may regulate infant temperatures in specific patterns
Historical Control	Afonso, Wahlberg, Persson (1989) ⁷ Helsingborg Hospital, Helsingborg, Sweden	n = 33,331 AGA and SGA	Early KC Intermediate KC Late KC GA = 31.1 wk (26-38) BW = 1482 g (745-2450 g)	Standard GA = 31.3 wk (26-37) BW = 1497 g (805-2300 g)	Discharge 41.6 vs 49.4 days Warm toward infants vs "Why?", "How long?" re technical care Confidence in breast feeding, comfortable in nursery, eager for discharge vs frequently abandoned breast feeding, anxious in nursery and re discharge Self monitoring of infant vs dependence on monitors	KC began 1-30 days postbirth Control mothers were interviewed by phone approximately 1 to 1½ years after infant's birth, KC mothers in person during and after KC on unit

Table 1 (Continued)

Type of Study	Reference/Study Site	Sample on Day of Entry*	Kangaroo	Control	Results (Kangaroo vs Control)	Comments
Historical Control (cont)	Rey, Martinez (1984) ¹ Hospital Materna Infantil, Bogotá, Colombia	AGA and SGA	Late KC Intermediate KC Early KC	Completely separated, shared incubators	Infant deaths: 30% vs 70% Infant abandonment: decreased 75% during KC period	These results are in question: the control group was not only nonequivalent because historical controls were used, but because of very different selection criteria KC began 1-1 days postbirth
	Wahlberg, Persson, Alfons (1990) ²⁰ Helsingborg Hospital, Helsingborg, Sweden	n = 33,33† AGA and SGA	Early KC Intermediate KC Late KC GA = 31-1 wk (26-38) BW = 1182 g (745-2450 g)	Standard GA = 31-3 wk (26-37) BW = 1197 g (805-2300 g)	No problems with KC care KC infants out of incubator 1 week earlier Breast feeding at discharge, 77% vs 42% KC infants had greater weight gain; home 8 days sooner	Some dusky skin noted in small infants soon after birth, if they were clothed but not in skin-to-skin
Retrospective	de Leeuw (1988) ¹³ Academic Medical Center, University of Amsterdam, The Netherlands	Study 3 All surviving newborn infants admitted to the NICU and <2000 g	Early KC Intermediate KC First 6 months of 1986 (n = 112)	First 6 months of 1985 (n = 121)	4 blood culture, 4 vs 7 infants 1 culture liquor (SL: 1 vs 6 Skin infections: 8 vs 1 Conjunctivitis: 8 vs 16	Conclusion: no difference, especially no increase in infection in KC infants
Descriptive (Primary)	Colonna, Uxa, da Graça, de Vonderweld (1990), ²¹ Central Hospital of Maputo, Mozambique	N = 100 GA = 32-5 wk BW = 1329 g 28% AGA, 72% SGA, no LGA PNA = 11.6 days \bar{x} = 1239 g	Early KC and intermediate KC Transferred to kangaroo mother's ward when stable and showed sucking reflex	—	Discharged at \bar{x} = 28 days (9-64) \bar{x} = 1418 g \bar{x} weight gain 12.8 g/d Five infants died: 3 from diarrhea with septicemia, 2 unexpectedly, during mother's night sleep	Consecutively studied Breast fed freely and at least every 2 hours No gavage feeding and rare formula supplementation on KC ward Almost all were exclusively breast fed at discharge
	Odent (1984) ⁸ Pithiviers, France**	N = 100 \bar{x} = 2298 g (1600-2490 g) AGA and SGA	Very early KC Infant in incubator at bedside thereafter Mothers held and breast fed ad lib	—	All infants survived except one (2300 g) Discharged home at \bar{x} = 7.8 days (2-16) First 48 were followed for one year and had no rehospitalization	Consecutively studied Mothers began holding their infants immediately postbirth, the infants were covered with a blanket Gestational age data will be gathered from medical records
	Eudington, Anderson, Simpson, Hollingsrad (1991) ²² Hospital Universitario Universidad del Valle, Cali, Colombia, in collaboration with Dr Humberto Rey Vargas, neonatologist, and Luz Angela Argete, RN, nursing professor	N = 6 GA = 31-36 wk AGA = all but one 36 wk infant (9th percentile)	Began 19-43 min postbirth (\bar{x} = 26) as soon as monitor electrodes were attached Continued next 6 hours HR and RR. Corometric 515A Pneumogram Corometric 535 Temperature: Cole Palmer 100 thermistors (infant abdomen and toe; maternal chest) SaO ₂ and HR: Nellcor 200 KC room temperature \bar{x} = 30.3°C (86.6°F) Range = 28.8°C to 32.7°C	—	In general, vital signs stabilized rapidly within normal limits Two infants (31 and 36 wk) had loud grunting respirations which disappeared in 2-7 min with warmed humidified O ₂ given during KC. All infants went to postpartum with mother at 6 to 8 hours, were fully breast feeding by 24 hours, and were discharged by 24-48 hours	Exception in one infant was 9 min of low SaO ₂ (80-87, \bar{x} = 81.3) when abdominal temperature persisted at 38.0°C despite cooling efforts No air conditioning in this hospital
	Slath, Whitelaw (1987) ²³ Hammersmith Hospital, London, England	N = 5 \bar{x} = 1100 g \bar{x} = 15 days GA = 26-31 wk	Intermediate and late KC, ad lib	—	Maintained body temperature TcPO ₂ 56-70 mm Hg Quiet and content Searched for nipple, 2 found it and began to breast feed	

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Table 1 (Continued)

Type of Study	Reference/Study Site	Sample on Day of Entry*	Kangaroo	Control	Results (Kangaroo vs Control)	Comments
Descriptive (Primary) (cont)	Whitelaw (1986) ²⁴ Hammermith Hospital, London, England	N = 20 AGA and SGA <1500 g	Late KC Up to 3 h/d	—	Even in infants as small as 700 g, body temperature was well maintained and no apnea occurred. Some stronger infants began 3 days postbirth.	Infants were tube fed. Mothers reported they produced more milk after giving KC. Five fathers held their infants skin to skin and enjoyed it.
	Armstrong (1987) ²¹ Nairobi, Kenya	AGA and SGA <2000 g	Late KC. All mothers stay in the hospital dormitory, hand express milk every 3 hours day and night, often hold their babies on their lap at this time, and give KC at other times. Infants have their own mother's milk. Gavage, then cup, then breast, no bottles.	—	Most infants are discharged fully breast-feeding between 1850-2000 g. Mother-to-mother bonding also occurs. Extended families and employers support this method.	Infants >2000 g stay with mothers from birth. Valuable guidelines are given for this method. See videotape by Armstrong and Kamau. Author concludes that "milk insufficiency among preterm mothers may have some iatrogenic element".
	de Iecuw (1986) ⁶ Academic Medical Center, University of Amsterdam, The Netherlands	AGA and SGA	Late KC Intermediate KC Early KC	—	More regular breathing. Temperatures remained good provided they were good at the start.	Excellent description of how to do KC.
	Moeller-Jensen, Hjort-Gregersen, Matthiessen, et al (1987) ²⁶ Hospital of Soenderborg, Soenderborg, Denmark	At first <1500 g Soon as small as 1000	Early KC Intermediate KC	—	Positive impact on child's temperature, pulse, respiration. Need less clothing than expected or became too warm. Infants were more awake, seeking, and eager to suck. After KC were more dissatisfied in incubators.	In a ward with 16 incubators or cradles and 8 beds for mothers, same staff nursed mother and infant. Used telemetry (a small wireless transmitter) connected to child's electrodes and a receiver connected to cardiograph, this permitted mothers to move about the ward.
Descriptive (Secondary)††	Anderson (1989) ⁹ Hospitals throughout Europe	AGA and SGA	All levels	—	All data from European research support safety and value of KC.	KC becoming widespread in Europe. Even infants on ventilators are given KC.
	Anderson, Marks, Wahlberg (1986) ² Hospital Materno Infantil, Bogotá, Colombia	AGA and SGA	Late KC Intermediate KC Early KC	—	See videotape by Anderson, Marks, and Wahlberg.	Background and description of status quo in Bogotá in June 1985. Both SGA and AGA infants benefit. No infants began KC at birth.
	Slcath (1985) ²⁷ Hospital Materno Infantil, Bogotá, Colombia	AGA and SGA	Late KC Intermediate KC Early KC	—		An English nurse reports on her observations of KC in Bogotá.
	Virgin (1988) ²⁸ Hospital Materno Infantil, Bogotá, Colombia	AGA and SGA	Late KC Intermediate KC Early KC	—		A Danish physical therapist reports on her observations of KC in Bogotá.

Table 1 (Continued)

Type of Study	Reference/Study Site	Sample on Day of Entry*	Kangaroo	Control	Results (Kangaroo vs Control)	Comments
Descriptive (Secondary) (cont)	Whitelaw, Sleash (1985) ³ Hospital Materno Infantil, Bogotá, Colombia	AGA and SGA	Late KC Intermediate KC Early KC	—	The control group in the Rey and Martinez research ¹ included all infants born at the hospital, the experimental group included only infants well enough to enter the KC program However, the authors were very impressed clinically by the KC they saw being given, and they have been doing KC research ever since	Background and description of KC in Bogotá An investigative tour, funded by UNICEF, to determine the accuracy of the reports from Bogotá
Review	Sims (1988) ²⁹ Grapeview, Wash	—	—	—	—	The status quo, as of March 1988, as known in the United States
	Luomikoski Kotiranta (1990) ³⁰ University Central Hospital of Turku, Turku, Finland	—	—	—	—	Overview of KC, especially in Finland. KC began there in 1986 and is now being applied in all 5 university hospitals and 13 of 15 central hospitals. "Kangaroo Care is here to stay."
	Wahlberg (1987) ¹¹ Nordic School of Public Health, Göteborg, Sweden	—	—	—	—	Presents summary of data from several studies not yet published Raises ethical questions such as "Do we have the right to deny parents with preterm infants in stable condition this alternative?"
	Whitelaw (1990) ³² Ullevål Hospital, Oslo, Norway	—	—	—	—	Provides an overview of KC to date <i>Conclusions:</i> KC may be lifesaving in developing countries. KC is not an alternative to intensive care in developed countries, but is valuable for the parents.
Brochure	Neonatal Intensive Care Team (1990) ³³ St Paul Childrens Hospital, St Paul, Minn	—	—	—	—	Given to all parents with NICU infants Describes safety and probable value of KC Offers to help parents interested in KC.

* Sample size and mean and range of weight and postnatal age on day of entry; † Number of infants in KC, number in control group; ‡ KC categories (late, intermediate, early, and very early); § Each infant was studied in both conditions; ¶ These infants were able to have early KC, but apparently the research was done at a later postnatal age; ¶ Anecdotal from one pneumogram, typical of all 12, during 9 minutes at 1 hour postfeeding in pre-KC, KC, and post-KC; # Authors gave KC to their patients; ** All data are personal correspondence, July 27, 1988, †† Authors observed KC being given.

Definitions: KC—kangaroo care; AGA—appropriate for gestational age; SGA—small for gestational age, BW—birthweight; x—mean, DOE—day of entry; HR—heart rate, RR—respiratory rate, SaO₂—transcutaneous arterial oxygen saturation; ST—skin temperature, RQS—regular quiet sleep; NEC—necrotizing enterocolitis; SIDS—sudden infant death syndrome; TcPO₂—transcutaneous oxygen, kPa—kilo pascals (1 = 7.5 mm Hg); TcSaO₂—transcutaneous arterial oxygen saturation; PNA—postnatal age; MA—motor activity; IS—irregular sleep; AS—active sleep, VAS—very active sleep; RT—rectal temperature, PB—periodic breathing; CSF—cerebrospinal fluid, IGA—large for gestational age; NICU—neonatal intensive care unit.

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author.¹¹ At Children's Hospital, Oakland, California, kangaroo care is being given to infants with bronchopulmonary dysplasia and infants who were cocaine-exposed in utero and whose mothers are being rehabilitated. To date, numerous anecdotal outcomes are promising. This federally funded work is being directed by Richard Umansky, MD. National Institutes of Health funds were awarded recently to Dr Susan Ludington, University of California, Los Angeles, for a randomized clinical trial with multiple sessions of kangaroo care given to bassinette infants approaching discharge.

Suggestions for future research include randomized clinical trials conducted longitudinally to determine long-term outcomes. Lower risk preterm infants, who might benefit the most from kangaroo care, need to be studied in this way as well, ideally beginning at birth. The first step toward this goal was taken in June 1991 in Cali, Colombia, where in a descriptive research project physiologic and behavioral variables were monitored every minute during kangaroo care beginning in the delivery room and continuing for 6 hours.²²

The value of breast-feeding as a component of kangaroo care and the effect of kangaroo care on lactation and milk maturation need evaluation also. The father's effect on his infant during kangaroo care merits study as well. From another perspective, ways need to be developed to provide social support, defined broadly, to mothers so they can be more available to their infants for kangaroo care.

Provision of kangaroo care in the United States began in 1986. Isolated successful cases of kangaroo care have occurred in Seattle, Washington, at Northwest Hospital with Louis Pollack, MD, and Judi Withers Hollies, MSN; at the University of Florida in Gainesville, at Shands Hospital with Marylou Behnke, MD, and the author; and in St Paul, Minnesota, at St Paul Childrens Hospital with Stephen Boros, MD, Mark Mammel, MD, and Cindy Sagmeister, MSN.

The last isolated case quickly became a frequent event. Within one year, a brochure on kangaroo care³³ was developed that is now given to all parents at St Paul Childrens Hospital when they have an infant admitted to the NICU. The staff then offers to help the parents if they would like to try. The staff has also helped one of their auxiliary hospitals to implement kangaroo care.

In conclusion, the potential that kangaroo care has for health promotion, parental involvement, and cost containment is clear, and successful prototypes are already established. Thus, it seems only a question of time before kangaroo care becomes more broadly requested and available in the United States. Fortunately the choice to request, and to offer, this more natural approach will be an increasingly informed choice because of the research database being compiled.

Acknowledgments

The author extends her sincere appreciation to UNICEF, the sponsor of her investigative tour; her colleagues in Europe who welcomed her; the investigators and implementers of kangaroo care who shared their knowledge, and the parents who shared their experiences so generously; and Dr Vivian Wahlberg, professor, Nordic School of Public Health, Gothenburg, Sweden, who arranged a major portion of the tour. Myrtle Holton deserves special thanks for typing many revisions and updates of the manuscript, especially the table.

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APPENDIX

VIDEOTAPES (ANNOTATED)

Anderson, G. C., Marks, E. A., Wahlberg, V. (1986). *Early Breastfeeding and Discharge Home for Premature Infants in Bogota, Colombia: Kangaroo Method*. Available in English from Learning Resources and Communications, Television and Film, Box J-6, University of Florida, Gainesville, FL 32610. Background regarding the method is presented; a description is given of an 1850 g, 32-week-gestation infant who is appropriate in weight for gestation. He experienced a difficult breech vaginal delivery with both hands down; Apgar at 1 minute was 6. The infant's gestational age assessment is shown. He is also shown breast-feeding at 8

hours postbirth, being discharged home at 36 hours, returning to the clinic with his mother 2 days later, and returning to their one-room home. (8 minutes; \$25.00)

- Armstrong, H., Kamau, M. (1986). *Feeding Low Birth-weight Babies*. Co-produced by IBFAN and UNICEF, East and Southern Africa Regional Office (ESARO). Available in English, French, Portuguese, or Spanish from the UNICEF Office or National Committee in your country, or UNICEF TV and Video Unit, H9F, 3 UN Plaza, New York, NY 10017, USA. In Kenya, mothers are housed free of charge nearby to their low-birthweight babies; they handle their babies frequently every day, which promotes good bonding; mother-to-mother support occurs naturally; mothers provide fresh hand-expressed colostrum and breast milk every 3 hours around the clock; bottles are outmoded; only cups are used; breast-feeding supplemented by cup feeds of expressed breast milk begins at 1600 to 1850 g; health education can be given quarterly, day by day; babies are discharged weighing approximately 2000 g, exclusively breast-fed; continued breast-feeding for 4 months without supplemental feeds is usual; following discharge, babies attend special follow-up clinics. (29 minutes; contact UNICEF regarding price)
- Colonna, F., Uxa, F., Graca, A., Ferreira, M. H., Bertolaso, G. (1988). *"Kangaroo-mothers": A Method of Care for Babies in Developing Countries*. Videotape presented at the 11th European Congress of Perinatal Medicine, Rome, Italy, April 10-13, 1988. Available in English and Italian from Dr U. de Vonderweid, Dept of Neonatology, Istituto per l'Infanzia "Burlo Garefolo," Trieste, Italy. (18 minutes; as yet unavailable in VHS)
- Gloppestad, K. (1987). *From Separation to Closeness: Parents' Experiences with Closeness*. Available in English or Norwegian from Kari Gloppestad, Department of Pediatrics, National Hospital, University of Oslo, Pilestredet 32, 0027 Oslo 1, Norway, or in case of immediate need, from the Fund for Natural Care Postbirth (Gene Cranston Anderson, founder and director; use author's address). In 1981, based on needs expressed by parents during interviews, Kari Gloppestad started taking small prematurely born infants in steady condition out of incubators and placing them skin-to-skin under the parents' clothes. This was done even though some of the infants' required supplemental oxygen and assisted ventilation. The video also shows how to encourage the infants to open their eyes in the presence of their parents at an earlier stage than usual. (25 minutes; \$140.00)
- UNICEF Regional Office for Latin America and the Caribbean (1988). *Mother Kangaroo—A Light of Hope*. Bogotá, Colombia, South America. Available in English or Spanish from UNICEF TV and Video Unit,

H95, 5 UN Plaza, New York, NY 10017. This excellent update on the kangaroo method answers many questions raised by students of the method and viewers of earlier films and videotapes. (14 minutes; Contact UNICEF regarding price)

Van Rees, S., de Leeuw, R. (1987). *Born Too Soon: The Kangaroo Method*. Available in English from the Mediatheek Lichaamstaal, Ans Aarts, Pr. Marijkestraat 32, 6039 BZ Stramproy, The Netherlands. In the autumn of 1985 Richard deLeeuw introduced the kangaroo method at the Academic Medical Centre at Amsterdam. The parents take care of their prematurely born babies themselves and carry them against their bare skin. Even babies born 3 months prematurely react intensively to this. It is beneficial not only to

their physical condition but also to their psychological development. (35 minutes; \$60)

Virgin, C., Lange, U. (1988). *The Environment of Childhood Is the Landscape of Our Soul*. Produced for Danish television and available in Danish (being translated into English) from Cecelia Virgin, Åbrinke 267, DK283 Virum, Denmark. This video shows the most progressive kangaroo care in Europe and includes comments by nursing director B. Persson, Helsingborg, Sweden, and neonatologists B. Friis-Hansen, Rigshospitalet, Copenhagen, Denmark; N. Svenningsen, Lund, Sweden; and N. C. Christensen, Soenderborg, Denmark. (30 minutes; not in production, but will be loaned on request for \$10 postage)

**NO HANDOUTS
FOR THIS SESSION**

BABY FRIENDLY HOSPITAL INITIATIVE

Part I

EUROPEAN ACTION PLAN



WHO and UNICEF
January 1993

2 January 1993

European Action Plan for the Baby-Friendly Hospital Initiative

Introduction

The Baby-Friendly Hospital Initiative (BFHI) was launched by WHO and UNICEF in 1991 at the International Paediatric Association Conference in Ankara, with the following goals:

- to enable mothers to make an informed choice about how to feed their newborns;
- to support early initiation of breastfeeding;
- to promote exclusive breastfeeding for the first 4-6 months;
- to ensure the cessation of free and low cost infant formula supply to hospitals;
- to include, possibly at a later stage and where needed, other mother and infant health care issues.

An invitation to hospitals to join the Initiative

BFHI has chosen maternity services and hospitals as the entry point for breastfeeding promotion and support for several reasons. Initiation of breastfeeding most often takes place there and the attitude and advice of health workers towards breastfeeding are important for the mothers' choice of how to feed their babies. Further, hospitals provide new health workers with practical training and hospital practices may thus influence other public health facilities as well as private practitioners. When in the following we refer to *hospitals* this is meant to include *hospitals and maternity services in general*.

The required changes in hospital practice are relatively easy to carry out, involve no extra costs and usually no legal provisions. In fact, it has been shown that the BFHI routines save staff time and money. Mothers who choose to breastfeed need active support from the maternity services which is outlined by WHO and UNICEF in their *Ten steps to successful breastfeeding* in the Joint WHO/UNICEF Statement entitled *Protecting, Promoting and Supporting Breastfeeding; the Special Role of Maternity Services*.

All hospitals with maternity wards are invited to participate. They can indicate their interest by contacting their national Breastfeeding Committee, if one exists, (see below

ENCL: *Ten Steps to Successful Breastfeeding*

for details about this Committee) or the European Joint WHO/UNICEF BFHI Action Task Force (for contact addresses, see below). They will then receive further information including the **Global Criteria for BFHI**¹, and a **Hospital self-appraisal tool**², which will help them assess their own degree of *baby-friendliness*. These tools will also indicate improvements that have to be undertaken by a hospital to become truly baby-friendly. The completed questionnaire may be returned to the National Breastfeeding Committee and to the European Joint WHO/UNICEF BFHI Task Force.

When the hospital finds that it complies with all the requirements listed in the above tools, including not receiving any free or low-cost infant formula supply and the necessary documents are prepared as described in the Global Criteria, it may request an external assessment of its practices. In most cases this assessment is organized by a National Designation Authority (see below) and carried out by a team of professional assessors according to a standard procedure; it usually takes about three days to carry out.

If the National Designation Authority, based on the report of the assessors, finds that the criteria are satisfied, the hospital will be designated and awarded a plaque.

If the National Designation Authority finds that the hospital does not yet meet the criteria, but intends to take the necessary steps to meet them by a certain date, the hospital may get a Certificate of Commitment.

A National Baby-Friendly Hospital Initiative

To reach the goals outlined above, in each European country, a national Baby-Friendly Hospital Initiative should be launched if it does not already exist. The present proposal for how this could be done has been formulated and endorsed by the Task Forces both in WHO Europe and UNICEF Europe. It is not prescriptive, but should be seen as a proposal for a framework for national action.

The National Breastfeeding Committee³

As stated in the Innocenti Declaration, all countries should establish a multisectoral national breastfeeding committee. Ideally, it should be composed of representatives

1 **The Global Criteria for the WHO/UNICEF Baby Friendly Hospital Initiative.** In: *Baby Friendly Hospital Initiative, Part II: Hospital Level Implementation.* WHO/UNICEF Guidelines, March 1992

2 **Hospital self-appraisal tool for the WHO/UNICEF Baby Friendly Hospital Initiative.** In: *Baby Friendly Hospital Initiative, Part II: Hospital Level Implementation.* WHO/UNICEF Guidelines, March 1992

3 The choice of title of the **National Breastfeeding Committee** will of course remain at the discretion of the national authorities or initiative-takers. Here we have chosen the above name to distinguish it from for example the National UNICEF Committee or other existing Committees. Some countries do not like to use the term *committee* and prefer *team* or an equivalent; this too will be up to each country to decide.

from relevant government departments, health professional associations, relevant non-governmental organizations such as mother-to-mother support groups and preferably also a representative from the National Committee for UNICEF. Needless to say, the baby food industry should not be part of the Committee.

Governmental participation in the national initiative is desirable. If not represented on the Committee, the government could be responsible for getting the Committee established and for formulating its mandate to work for the BFHI. If any help or advice is needed in this process, the European Joint WHO/UNICEF BFHI Task Force is willing to assist.

If not involved directly in the establishment and work of the National Breastfeeding Committee, the National Committees of UNICEF and Representatives or Liaison Officers of WHO should be kept informed about the national initiative. In countries where the National Committee for UNICEF cannot assist in the establishment of the National Breastfeeding Committee, another partner should be the national focal point who could carry out the role of facilitator for the establishment process.

The National Breastfeeding Committee mandate might include the following:

- (a) Election of a Breastfeeding Coordinator with the necessary secretarial assistance.
- (b) Drawing up a preliminary national BFHI Action Plan, which defines the roles of the different organizations and of the various other actors.
- (c) Providing a national level assessment of how breastfeeding is promoted and supported in maternity wards in the country.
- (d) Surveillance of the rates of breastfeeding upon discharge from hospital, at 16 weeks, 26 weeks and one year of age of the baby according to WHO/UNICEF criteria. It is frequently found that a national institution or non-governmental organization is already doing this, or has experience in doing such surveys.
- (e) Establishment, on the basis of the situation analysis, of general and specific goals/objectives for the National Action Plan, selection of indicators for monitoring progress of the BFHI.
- (f) Clear definition, in the final National BFHI Action Plan, of the mandates of the various actors and assignment of responsibilities for carrying out its various components. Drawing up a budget, the size of which will depend on to what degree new structures need to be set up, or existing structures may be able to absorb the work.
- (g) Selection of members of the National Designation Authority (for details, see below), obtaining formal approval by government for the establishment and mandate of this body, which will be formally responsible for the assessment and designation of Baby-Friendly Hospitals at national level.

Other elements to include in the National Action Plan might be organizing the translation of the basic BFHI documents and ensuring that essential information material on breastfeeding initiation and support is available. The Committee might wish to establish working groups on for example breastfeeding promotion, identification of training needs, public information and dealing with the problems of cessation of supplies of breast milk substitutes to hospitals.

The National Committee might wish to consider for inclusion in the National BFHI Action Plan, other elements of importance for the success of breastfeeding, such as improved maternity protection legislation and implementation of the International Code of Marketing of Breast-Milk Substitutes.

The European Joint WHO/UNICEF BFHI Task Force would appreciate being informed about progress of the implementation of the BFHI at regular intervals and its members are always at the disposal of the National Breastfeeding Committee if assistance and guidance is needed.

The *Ten steps for successful breastfeeding* (copy enclosed for ease of reference), are the basis and minimum requirement for hospitals that wish to be designated as Baby-friendly. National variations in the implementation tools and global documents will have to be approved by the European Joint WHO/UNICEF BFHI Task Force.

The assessment procedure

The external assessor team would be composed of one or two trained assessors and three or four national assessors who would be trained by taking part in assessments and thus possibly be eligible to do assessments in the future. Initially, when relatively few have the experience of assessing hospitals, the trained assessor(s) will be chosen from a roster of assessors approved by the European Joint WHO/UNICEF BFHI Task Force in consultation with the World Alliance for Breastfeeding Action (WABA) in Europe. National Breastfeeding Committees are invited to select, from among those in their countries who have the necessary experience and commitment, persons who could be trained as assessors and then join the external assessment team roster.

Hospitals inviting an external assessment team are encouraged to provide food and accommodation for the team members who need it during the assessment period.

The National Designation Authority

The National Designation Authority should be established by the National Breastfeeding Committee, be approved by government and operate independently of both. It should be composed of 5-6 experts in breastfeeding from different disciplines.

The function of the Authority is to organize the external assessments when a hospital's completed self-appraisal questionnaire indicates that the hospital is willing and ready to be assessed.

On the basis of the results of the external assessment, the National Designation Authority will decide, in reference to an existing international scoring scale, whether the hospital is

truly Babyfriendly and can be designated as such and thus be awarded the plaque. The Designation Authority arranges for the awarding ceremony in cooperation with the hospital.

For hospitals that are not yet found to be fully complying with the standard, a **Certificate of Commitment** can be issued, which means that the hospital is committed, within a specific period of time, to draw up a plan of action and make the required changes so as to become truly Baby-Friendly.

The role of government

The BFHI is intended as a support to governments in implementing their commitment towards the Innocenti Declaration, the World Summit for Children and the resolutions of the World Health Assembly and the UNICEF Executive Board relating to infant and young child nutrition.

The government may be responsible for nominating the National Breastfeeding Committee and formulating its mandate and will ideally also be represented on the Committee. Further, government should nominate the National Designation Authority.

Governments may find that existing national initiatives in support of breastfeeding may suitably be included into the National Action Plan. Further new initiatives may be inspired by the existence of the Committee, such as the improvement of relevant maternity protection legislation, changes in the norms for infant feeding where such norms exist, and implementation of the International Code of Marketing of Breast-Milk Substitutes.

Awarding plaques

Plaques are produced by the UNICEF Greeting Card Operation in New York and can be made available upon request. At the present time the plaques are available with texts in English, French and Spanish. Other languages may have to be produced locally. The UNICEF Geneva office will assist national partners in obtaining these plaques.

The role of National Committees for UNICEF in the BFHI

In most European countries, there is a National Committee for UNICEF. These Committees can facilitate the establishment of a National Breastfeeding Committee and encourage the involvement of government and of health workers' organizations. The National Committee for UNICEF can support the appointment of a breastfeeding coordinator and assist in setting up a secretariat for the National Breastfeeding Committee.

The National Committees for UNICEF can also, where possible, act as advocates for and initiators of other activities related to breastfeeding and the BFHI. The main national responsibility will of course remain with the National Breastfeeding Committee.

It is strongly recommended that the National Committee for UNICEF is represented on

the National Breastfeeding Committee and that it acts as a link between the latter and the UNICEF Geneva Office. The same is true for WHO representatives or WHO Liaison Officers where they exist. WHO and the National Committee for UNICEF representatives may for example convey requests for technical assistance to the regional offices.

It is on the other hand **not** recommended that the National UNICEF Committee or the local WHO representative be part of the National Designation Authority. If the representatives happen also to be breastfeeding experts they may be chosen to take part in the National Designation Authority in their individual capacity.

The role of non-governmental organizations (NGOs)

There are several NGOs with skills of particular importance to the BFHI, especially in the area of advocacy:

- Organizations of **health professionals** who are directly involved with mothers and infants, such as paediatricians, obstetricians, gynaecologists, nurses, midwives, lactation counsellors, hospital administrators etc.. They may convey information about the BFHI to their members; request and formulate hospital breastfeeding policies and disseminate information about lactation management to their members through curriculum formulation and post-graduate training.
- **Mother-to-mother support groups** give mothers themselves a forum to meet and to formulate their problems, to influence policy-makers and spread information about breastfeeding to the general population. They provide newly-delivered mothers with a real choice as to whether or not to breastfeed. They may also provide training in lactation management for health professionals and are usually in a very good position to select and translate relevant material on breastfeeding for mothers and health workers.
- NGOs working specifically for the implementation of the **International Code of Marketing of Breast-Milk Substitutes** may be able to do surveys and research work such as monitoring of breastfeeding rates, maternity ward practices and of the marketing practices of the infant formula manufacturers. They may be very good at raising public awareness of the importance of breastfeeding through local media. They work mainly towards government action to adopt the International Code of Marketing of Breast-Milk Substitutes into national legislation.
- **Other NGOs** such as womens' organizations, youth organizations and labour organizations could help encourage public demand for better protection and promotion of breastfeeding and help create a more breast-feeding-friendly environment in the community in general. A new breastfeeding culture should include the whole society, including kindergarten, schools etc.

The European Joint WHO/UNICEF BFHI Task Force

The BFHI is a joint WHO/UNICEF initiative. The Regional Offices of the two UN bodies are playing an active role in its implementation. UNICEF has its European office in Geneva and has established a BFHI Task Force with one full-time coordinator who carries out much of the day-to-day workload of the initiative. WHO has its Regional Office for Europe in Copenhagen and a Task Force with the most relevant Programme Managers has been established, the Nutrition Programme being the coordinator.

The Headquarters of the two Organizations are also very supportive of the Regional Efforts and as WHO has its Headquarters in Geneva, there is close collaboration between UNICEF/Geneva and WHO Headquarters.

In addition, the two organizations coordinate their efforts with the World Alliance for Breastfeeding Action (WABA) European Coordinator whenever necessary. This entire team is at the disposal of institutions or persons wishing to realize the BFHI in their own country.

Below are some of the addresses that might be useful as contacts for those who wish to start action.

Contact addresses

Information, material, services, meeting attendance and answers to questions are provided on a full-time basis by:

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UNICEF

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Switzerland

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Telefax: 41 - 22 791 0822

Responsible at the WHO Regional Office for Europe:

Regional Adviser for Nutrition

Dr Elisabet Helsing

WHO Regional Office for Europe

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Denmark

Telephone: 45 - 39 17 12 26 or 17 13 62

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Responsible at WHO Headquarters in Geneva:

Technical Officer, Nutrition Unit

Ms Randa Saadeh

WHO Headquarters

Avenue Appia

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Switzerland

Telephone: 41 - 22 791 3315 and 791 3325

Telefax: 41 - 22 791 0746

World Alliance for Breastfeeding Action

European Coordinator:

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IHCAR

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S-104 01 Stockholm

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Telefax: 46 - 8 755 2340

The joint WHO/UNICEF statement on breast-feeding and maternity services has become the centerpiece for the "baby-friendly" hospital initiative. Maternity wards and hospitals applying the principles described in the joint statement are being designated baby-friendly to call public attention to their support for sound infant-feeding practices.

In promoting this designation, WHO and UNICEF are hoping to stimulate demand among women themselves who, as a result, will be inclined to seek out maternity services that measure up to this standard. A convenient yard-stick – referred to as the "Ten steps to successful breast-feeding" – is provided in the joint statement to help determine whether a maternity service is in fact baby-friendly.

Ten steps to successful breast-feeding

Every facility providing maternity services and care for newborn infants should:

1. Have a written breast-feeding policy that is routinely communicated to all health care staff.
2. Train all health care staff in skills necessary to implement this policy.
3. Inform all pregnant women about the benefits and management of breast-feeding.
4. Help mothers initiate breast-feeding within a half-hour of birth.
5. Show mothers how to breast-feed, and how to maintain lactation even if they should be separated from their infants.
6. Give newborn infants no food or drink other than breast milk, unless medically indicated.
7. Practise rooming-in – allow mothers and infants to remain together – 24 hours a day.
8. Encourage breast-feeding on demand.
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breast-feeding infants.
10. Foster the establishment of breast-feeding support groups and refer mothers to them on discharge from the hospital or clinic.

BABY FRIENDLY HOSPITAL INITIATIVE

PART II HOSPITAL LEVEL IMPLEMENTATION



WHO UNICEF
August 1992

The criteria for a Baby Friendly Hospital are applicable in all countries.

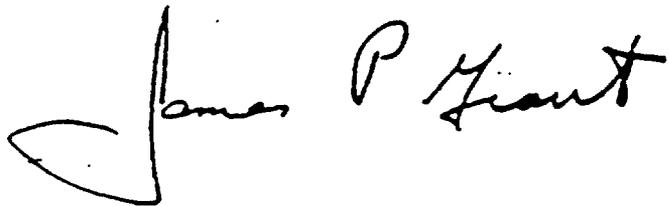
This basic principle is expressed in the Foreword to the Joint WHO/UNICEF Statement, which was signed by the Director-General of the World Health Organization (WHO) and the Executive Director of the United Nations Children's Fund (UNICEF).

In our world of diversity and contrast, we believe that this statement on the role of maternity services in promoting breast-feeding is striking for its universal relevance. The principles affirmed here apply *anywhere* maternity services are offered, irrespective of such labels as "developed" and "developing", "North" and "South", "modern" and "traditional". And the health professionals and other workers responsible for these services are well placed to apply them by providing the leadership needed to sustain, or if necessary re-establish, a "breast-feeding culture".

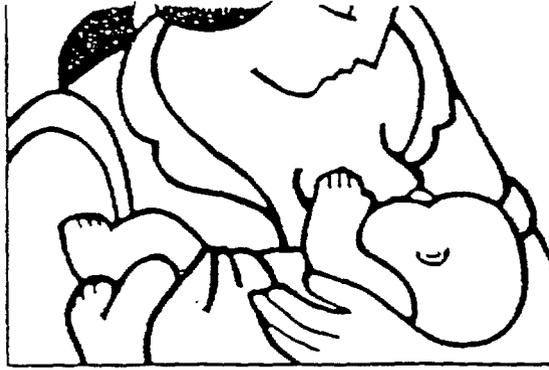
While discoveries are still being made about the many benefits of breast milk and breast-feeding, few today would openly contest the maxim "breast is best". Yet slogans, however accurate, are no substitute for action. That is why we invite all those concerned with providing maternity services to study this statement to see how they are helping or hindering breast-feeding. Are they encouraging and supporting mothers in every possible way? We urge them, wherever they might be, to ensure that their services are fully mobilized to this end and thereby to bear witness to the unequalled excellence of breast-feeding for infants and mothers alike.



Hiroshi Nakajima, M.D., Ph.D.
Director-General
World Health Organization



James P. Grant
Executive Director
United Nations Children's Fund



Ten steps to successful breast-feeding

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From: Protecting, Promoting and Supporting Breast-feeding: The Special Role of Maternity Services
A Joint WHO/UNICEF Statement

Published by the World Health Organization, 1211 Geneva 27, Switzerland

TOWARDS A BABY FRIENDLY HOSPITAL AWARD

Introduction

The Baby Friendly Hospital Initiative (BFHI) has been launched by WHO and UNICEF to encourage hospitals, health care facilities, particularly maternity wards to adopt practices that fully protect, promote and support exclusive breastfeeding from birth.

For more information on the initiative as a whole, please read the UNICEF brochure *Take The Baby Friendly Hospital Initiative (February 1992)*.

For information on how the initiative can be initiated/organized at the country or state level, please read *Programme Guidelines Part I: Country Level Implementation*. Numerous countries have already taken steps to start national Baby Friendly campaigns, including vigorous steps toward improved support to breastfeeding in hospitals, actions to protect breastfeeding by national policy implementation, and public promotion campaigns. The recommendations here given are to reinforce, not replace such national initiatives. They indicate how the achievements of strong national programmes may be confirmed and recognized internationally by using the BFHI global process.

The Ten Steps to Successful Breastfeeding, a summary of the guidelines for maternity care facilities presented in the Joint WHO/UNICEF Statement *Protecting, Promoting and Supporting Breastfeeding: The Special Role of Maternity Services, (WHO, 1989)* have been accepted as the minimum global criteria for attaining the status of a Baby Friendly Hospital.

Becoming a baby friendly hospital is a process that starts with self-appraisal by the hospital. This initial self-assessment will lead to analysis of the practices that encourage or hinder breastfeeding, and then to action to make the necessary changes. It thus follows the triple-A sequence (Assessment, Analysis, Action) which characterises other UNICEF Programme development.

After a facility is satisfied that it meets a high standard, this achievement is confirmed objectively by using internationally agreed standards for maternity care which protects, promotes and supports breastfeeding.

The process therefore concludes with an external evaluation of whether the facility has attained a level which can be awarded the Global Baby Friendly Hospital designation and plaque. Alternately, the facility may have made changes in practice which are substantial but not yet complete, and qualify for the Global Certificate of commitment to becoming Baby Friendly.

WHO and UNICEF, with the technical assistance of Wellstart and policy guidance of the BFHI Advisory Board, have developed four basic tools for use in this process at the hospital or health care facility level.

1. *The Global Criteria for the WHO/UNICEF BFHI*

This elaboration of the Ten Steps to Successful Breastfeeding defines the minimum global criteria to become baby-friendly. Distribution of this six page document will help to clarify the international standards of the BFHI.

2. *Hospital Self-Appraisal Tool for the WHO/UNICEF BFHI*

Hospitals or other facilities may use this tool to measure how their current practices compare to the Ten Steps. Its questions are derived from the Global Criteria and from the recommendations of the Joint Statement, and are in a simple yes/no format. The results provide baseline for further action.

3. *Global Hospital Assessment (Questionnaire) for the WHO/UNICEF BFHI*

This questionnaire is to be used by a team of assessors external to the institution to evaluate if the facility has attained the level of the global criteria. This outside assessment is invited by the facility when its staff consider themselves ready for a Baby Friendly designation.

4. Guide for Scoring the Global Hospital Assessment for the WHO/UNICEF BFHI

Ten summary sheets are to be completed by the external assessment team and submitted to the National BFHI Committee. This report serves as the basis on which they decide whether or not the assessed facility should receive a Certificate of Commitment or a Global BFH award and plaque.

Every facility that receives the BFH plaque will be regularly reassessed to ensure that its practices continue to represent high global standards.

Breastfeeding Rates

The Baby Friendly Hospital Initiative seeks improved breastfeeding both early in life when it should be exclusive, and throughout the first two years. However, for purposes of assessing a maternity facility, the number of women breastfeeding exclusively from birth to discharge may serve as an approximate indicator of whether protection, promotion and support to breastfeeding is adequate in that facility. If fewer than 75% of women who deliver in a facility are breastfeeding exclusively, the staff may wish to use the Self-Appraisal Tool, consider the Global Criteria carefully and for assessment, analysis, and action to increase breastfeeding rates - to at least 75% or to exceed the national average, whichever is larger.

The BFHI cannot guarantee that women who start out breastfeeding exclusively will continue to do so for the recommended 4-6 months. However, research studies have shown that women whose babies received very supplemental feeding in hospital are extremely unlikely to rely upon exclusive breastfeeding after that. By establishing a pattern of exclusive breastfeeding, during the maternity stay, hospitals are taking an essential step toward longer durations of exclusive breastfeeding after discharge. If a hospital staff believes that antenatal care provided elsewhere contributes to rates of less than 75% breastfeeding after the birth, they may consider how to work with the antenatal caregivers toward more adequate antenatal education on breastfeeding.

Supplies of Breastmilk Substitutes

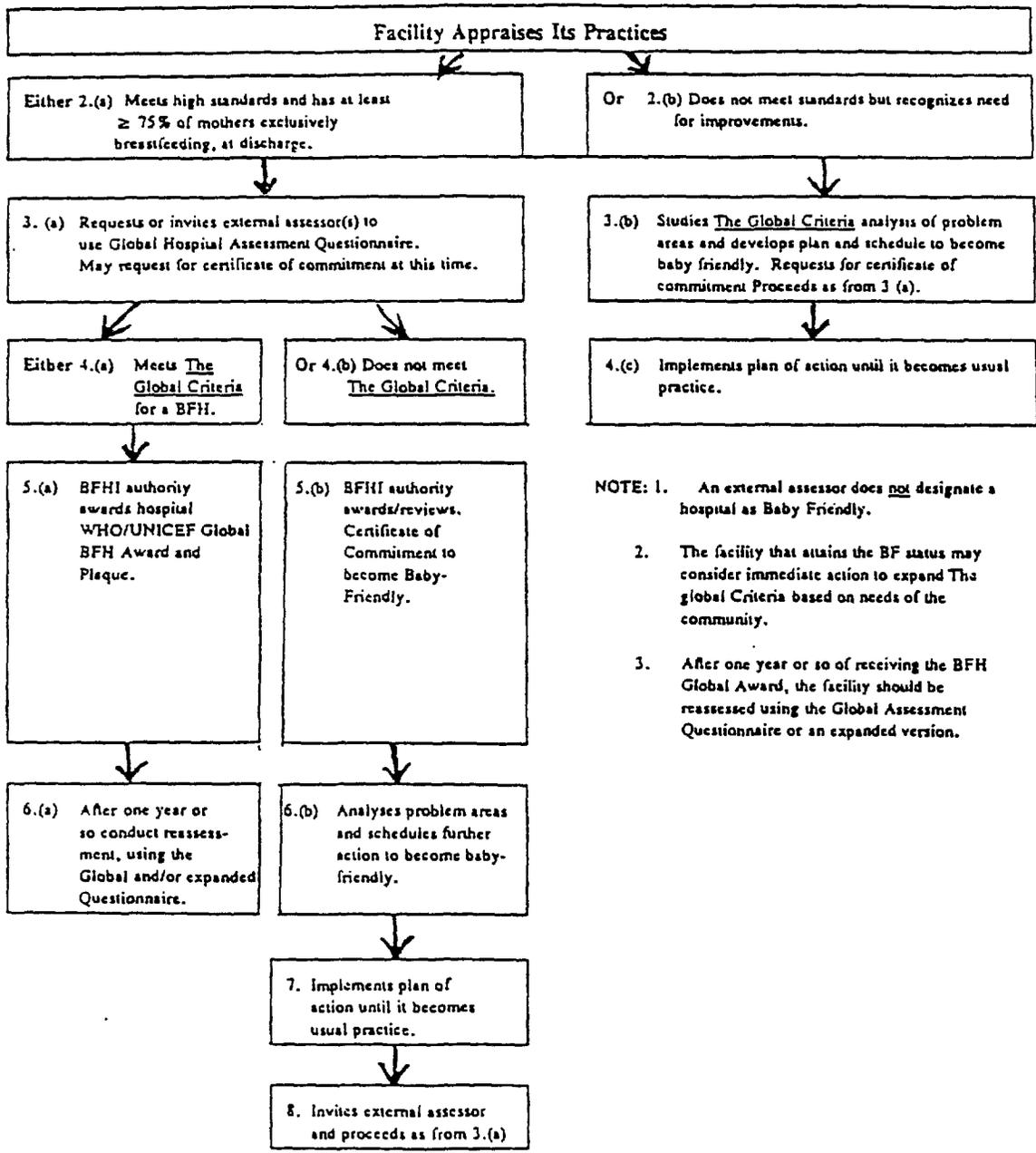
The 1991 UNICEF Executive Board called for the ending of free and low cost supplies of formula to all hospitals and maternity wards by the end of 1992. UNICEF and WHO have embarked on a strategy to facilitate this process. It is part of the BFHI, and includes dialogue with major manufacturers of breastmilk substitutes through the International Association of Infant Food manufacturers, a voluntary association with twenty-nine members.

Questions that are strictly not covered by the Ten Steps have therefore been added to the appraisal and assessment tools, to monitor any distribution of free and low cost supplies of breastmilk substitutes. At the same time, certain questions determine if mothers are subjected to double messages by being exposed to promotion of breastmilk substitutes, bottles or teats through any written materials distributed or displayed in health care facilities.

This information will help the facility, the national BFHI authority, and the government to determine the extent of need for these substitutes, and how best help facility toward eliminating the need so that it may become Baby Friendly within a given period.

THE Baby Friendly Hospital DESIGNATION PROCESS

- The BFHI is initiated at national level, with government UNICEF, WHO breastfeeding group and others interested as catalysts. The Global Criteria and Hospital Self-Appraisal Tool will be available to those interested from the BFHI authority or UNICEF office. For details on country level implementation, please read the BFHI UNICEF Guidelines. Part I - Country-level Implementation (March 1992).
- The facility should:
 - Obtain The Global Criteria and Hospital Self-Appraisal Tool and follow through the steps. Possible sources are BFHI authority, UNICEF, WHO breastfeeding promotion group(s), other facilities.
 - Appraises (assess) its practices using Hospital Self-Appraisal Tool



1. THE GLOBAL CRITERIA
FOR
THE WHO/UNICEF
BABY FRIENDLY HOSPITAL INITIATIVE



WHO UNICEF
August 1992

I. THE GLOBAL CRITERIA

SUMMARY - STEP ONE

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.

The health facility should have a written breastfeeding policy that addresses all 10 steps and protects breastfeeding. The senior nursing officer for the institution and/or the senior nursing officer on maternity duty should be able to locate a copy of the policy and describe how the other staff are made aware of it.

The policy should be available so that all staff who take care of mothers and babies can refer to it. The policy should be visibly posted in all areas of the health care facility which serve mothers, infants, and/or children, particularly in the maternity ward, all infant care areas, including the well baby nursery (if there is one), the infant special care unit, and the antenatal care services. The policy should be displayed in the language(s) most commonly understood by patients and staff.

SUMMARY - STEP TWO

2. Train all health care staff in skills necessary to implement this policy.

The senior responsible nursing officer should report that all health care staff who have any contact with mothers, infants, and/or children have received instruction on the implementation of the breastfeeding policy and be able to describe how this instruction is given.

A copy of the curricula or course outlines for training in breastfeeding and lactation management for various types of staff should be available for review and a training schedule for new employees should exist. The training should be at least 18 hours in total, including a minimum of three hours of supervised clinical experience, and cover at least 8 steps.

The senior nursing officer should report that all staff caring for women and infants have participated in breastfeeding and lactation management training or, if new, have been oriented on arrival and scheduled for training within six months. Out of 10 randomly selected maternity staff members, at least 80% should confirm that they have received the described training or, if they have been on the maternity ward less than 6 months, have at least been oriented. 80% should be able to answer 4 out of 5 questions on breastfeeding management correctly.

SUMMARY - STEP THREE

3. Inform all pregnant women about the benefits and management of breastfeeding.

If the hospital has an affiliated antenatal clinic or antenatal ward, the senior nursing officer in charge should report that breastfeeding counseling is given to most pregnant women using those services. A written description of the minimum content of the antenatal education should be available, or appropriate senior staff asked to prepare it. The antenatal discussion should cover the importance of exclusive breastfeeding for the first 4-6 months, the benefits of breastfeeding, and basic breastfeeding management.

Out of 10 randomly selected pregnant women of 32 weeks or more gestation who are using the hospital antenatal service, at least 80% should confirm that the benefits of breastfeeding have been discussed with them and are able to list at least two of the following benefits:

- Nutritional
- Protective, including the role of colostrum
- Bonding
- Health benefits to the mother

Additionally, at least 80% of these women should confirm that they have received no group education on the use of infant formula. They should be able to describe at least two of the following breastfeeding management topics:

- Importance of rooming-in
- Importance of feeding on demand
- How to assure enough milk
- Positioning and attachment

SUMMARY - STEP FOUR

4. Help mothers initiate breastfeeding within a half-hour of birth.

Out of 10 randomly selected mothers in the maternity ward who have had normal vaginal deliveries, 80% should confirm that within a half-hour of birth they were given their babies to hold with skin contact, for at least 30 minutes, and offered help by a staff member to initiate breastfeeding.

When possible, observations in the delivery room of up to ten normal vaginal deliveries confirm this practice.

Out of five randomly selected mothers who have had caesarean deliveries, at least 50% should confirm that within a half-hour of being able to respond, they were given their babies to hold with skin contact, for at least 30 minutes, and offered help by a staff member to initiate breastfeeding.

SUMMARY - STEP FIVE

5. Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants.

Out of 15 randomly selected postpartum mothers (including caesarean), at least 80% report that nursing staff offered further assistance with breastfeeding within six hours of delivery and that they were shown how to express their milk or given written information on expression and/or advised where they could get help, should they need it. Out of the same group of mothers, at least 80% of those who are breastfeeding are able to demonstrate correct positioning/attachment with their own babies.

Out of five randomly selected mothers with babies in special care, at least 80% report that they have been helped to initiate and maintain lactation by frequent expression of breastmilk.

Out of 10 randomly selected health care staff on duty in maternity wards, 80% report that they teach mothers positioning/attachment and techniques for manual expression of breastmilk. 80% of these same staff demonstrate correct teaching of positioning/attachment with one mother on the ward. In addition, 80% can describe an acceptable technique for expressing milk manually that they teach to mothers.

SUMMARY - STEP SIX

6. Give newborn infants no food or drink other than breastmilk, unless *medically* indicated

Observe mothers and infants in the maternity wards for at least two hours. If any babies are being fed food or drink other than breastmilk, ask the mothers if they are breastfeeding at all. For any breastfeeding babies being given food or drink other than breastmilk, ask the staff to indicate why. In at least 80% of the cases there should be acceptable medical reasons.

No promotion for infant foods or drinks other than breastmilk should be displayed or distributed to mothers, staff, or the facility.

Observe staff and infants in the well-baby nurseries (if there are any) for at least one hour. If any normal babies are being fed food or drink other than breastmilk, ask the staff to indicate why. In at least 80% of the cases there should be acceptable medical reasons unless the mothers specifically refuse to breastfeed for reasons outside the control of the hospital.

Ask 15 randomly selected mothers in the maternity wards (including 5 caesarean) if their babies have received food or drink other than breastmilk in the hospital. The senior nurse or another staff member should be able to give acceptable medical reasons for these cases where breastfeeding babies receive other food or drink (see Annex).

SUMMARY - STEP SEVEN

7. Practice rooming-in — allow mothers and infants to remain together — 24 hours a day.

Out of 15 randomly selected mothers with normal babies (including 5 caesareans), at least 80% report that since they came to their room after delivery (or since they were able to respond to their babies in the case of caesareans) their infants have stayed with them in the same room day and night, except for periods of up to an hour for hospital procedures.

Out of 10 mothers with normal vaginal deliveries, at least 80% report that their babies were separated from them for no longer than one hour before starting rooming-in.

All normal postpartum mothers in the maternity ward should be observed to have their babies with them or in cots by their bedside, unless their babies are away for a short time for a hospital procedure or unless separation is indicated.

SUMMARY - STEP EIGHT

8. Encourage breastfeeding on demand.

Out of 15 randomly selected mothers of normal babies (including 5 caesarean), at least 80% of those who are breastfeeding report that no restrictions have been placed on the frequency or length of their babies' breastfeeds. In addition, out of the 15 mothers, at least 80% report that they have been advised to breastfeed their babies whenever they are hungry or as often as the baby wants and that they should wake their babies for breastfeeding if the babies sleep too long or the mother's breasts are overfull.

The nursing officer in charge of the maternity ward confirms that no restrictions are placed on the frequency or length of breastfeeds.

SUMMARY - STEP NINE.

9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.

Out of 15 randomly selected postpartum mothers (including 5 caesarean), at least 80% of those who are breastfeeding report that, to the best of their knowledge, their infants have not been fed using bottles with artificial teats (nipples) nor allowed to suck on pacifiers.

The nursing officer in charge of the maternity ward reports that breastfeeding infants are not given bottles with artificial teats (nipples) or pacifiers. No more than two breastfeeding infants are observed using them during two hours observation in the maternity ward. None are observed using them during one hour in the well-baby nursery (if there is one).

SUMMARY - STEP TEN

10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Out of 15 randomly selected mothers (including 5 caesarean) 80% of those breastfeeding should confirm that their plans for infant feeding after discharge were explored. They should also be able to describe one thing that has been recommended to ensure that they will be linked to a breastfeeding support group (if adequate support is not available in their own families) or report that the hospital will provide follow-up support on breastfeeding if needed.

The nursing officer in charge of the maternity ward should be aware of any breastfeeding support groups in the local area and, if there are any, describe at least one way mothers are referred to them (e.g., through written material or counseling). Alternatively, she or he should be able to describe a system of follow-up support for all breastfeeding mothers after they are discharged (early postnatal or lactation clinic checkup, home visit, telephone call).

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ANNEX
to
THE GLOBAL CRITERIA

Acceptable medical reasons for supplementation

A few medical indications in a maternity facility may require that individual infants be given fluids or food in addition to, or in place of, breastmilk.

It is assumed that severely ill babies, babies in need of surgery, and very low birth weight infants (less than 1,000 grams) will be in a special care unit. Their feeding will be individually decided, given their particular nutritional requirements and functional capabilities, though breastmilk is recommended whenever possible. These infants in special care are likely to include

- infants with very low birth weight or who are born preterm, at less than 1000g or 32 weeks gestational age
- infants with severe dysmaturity with potentially severe hypoglycaemia, or who require therapy for hypoglycaemia, and who do not improve through increased breastfeeding or by being given breastmilk

For babies who are well enough to be with their mothers on the maternity ward, there are very few indications for supplements. In order to assess whether a facility is inappropriately using fluids or breastmilk substitutes, any infants receiving additional supplements must have been diagnosed as:

- infants whose mothers have severe maternal illness (e.g. psychosis, eclampsia, or shock)
- infants with inborn errors of metabolism (e.g. galactosaemia, phenylketonuria, maple syrup urine disease).
- infants with acute water loss, for example during phototherapy for jaundice, whenever increased breastfeeding cannot provide adequate hydration.
- infants whose mothers are taking medication which is contraindicated when breastfeeding (e.g. cytotoxic drugs, radioactive drugs, and anti-thyroid drugs other than propylthiouracil).

When breastfeeding has to be temporarily delayed or interrupted, mothers should be helped to establish or maintain lactation, for example through manual or hand-pump expression of milk, in preparation for the moment when breastfeeding may be begun or resumed.

For a full discussion of this and related issues see: Chapter 3, Health factors which may interfere with breast-feeding. In: Infant feeding: The Physiological Basis. Bulletin of the World Health Organization, 67, supplement (1989).

2. HOSPITAL SELF-APPRAISAL TOOL
FOR
THE WHO/UNICEF
BABY FRIENDLY HOSPITAL INITIATIVE



WHO UNICEF
August 1992

Using the Hospital Self Appraisal Tool to Assess Policies and Practices

Any hospital or health facility that is interested in becoming Baby Friendly should - as a first step - appraise its current practices vis-a-vis the Ten Steps to Successful Breastfeeding. This Self-Appraisal Tool has been developed for use by hospitals, maternity facilities, and other health facilities to evaluate how their current practices measure up to the Ten Steps, and how they practice some other recommendations of the 1989 WHO/UNICEF Joint Statement titled Protecting, Promoting and Supporting Breastfeeding: The Special Role of Maternity Services.

The checklist that follows will permit a hospital or other health facility giving maternity care to make a quick initial appraisal or review of its practices in support of breastfeeding. Completion of this initial self-assessment form is the first stage of the process, but *does not in itself qualify the hospital for designation as Baby Friendly*. The Global Criteria which qualify a hospital a Baby Friendly should also be reviewed by staff in reflecting upon the effectiveness of their breastfeeding programme.

Nationally-determined criteria and local experience may encourage addition of other relevant queries to this global tool. Whatever practices are seen by a facility to discourage breastfeeding may be reconsidered during the process of self-appraisal.

Analysing the Self-Appraisal Results

Under ideal circumstances, most of the questions in this tool will be answered "yes." Numerous negative answers will suggest divergence from the recommendations of the WHO/UNICEF Joint Statement and its Ten Steps to Successful Breastfeeding.

If a hospital finds that many of its answers to this self assessment are "yes," they will wish to study The Global Criteria to learn more details of the international standards. They may then wish to consider taking further steps toward being designated as a Baby Friendly Hospital and receiving the Global Award plaque. This involves use of the Global Hospital Assessment Criteria (Questionnaire), by an assessor external to the facility. Hospitals with an exclusive breastfeeding rate from birth to discharge which exceeds the national average or is at least 75% (whichever is larger) could consider taking such steps. An external assessor should be arranged in consultation with the BFHI authority, where this exists.

A hospital with many "no" answers on the Self-Appraisal Tool or where exclusive breastfeeding from birth is not yet given to 75% of babies may want to develop an action plan. The aim can be to eliminate practices that hinder initiation of exclusive breastfeeding and to expand those that enhance it. Such hospitals may wish to ask for assistance with training or hospital policy development, from their national BFHI authority.

Action

Results of the self appraisal should be shared with the National Authority and/or UNICEF and WHO. Training may be arranged in the country or could be facilitated by senior professionals who have attended an international training-of-trainers course in lactation management. In many settings, it has been found valuable to develop various cadres of specialists who can give help with breastfeeding, both in health care facilities and at the community level. Through village health workers and mother support groups, mothers can be reached with education and aid in their home settings, a vital service wherever exclusive and sustained breastfeeding have become uncommon.

Hospitals are encouraged to establish a written breastfeeding policy covering all Ten Steps to Successful Breastfeeding before seeking assessment and designation as Baby Friendly. They also will need to have, in advance of assessment, a written curriculum for any training in lactation management given to hospital staff caring for mothers and babies. A third written document is an outline of the content to be covered in antenatal health education about breastfeeding. Existence of such written documents provides evidence of on-going institutional commitment to breastfeeding and ensures against variations in practice with changes in staffing.

Consultation with the relevant local authority and the UNICEF country office can provide more information on policies and training which will contribute to increasing the Baby Friendliness of health facilities.

Hospital Data Sheet

Date _____, 19____

If no nursery for normal well newborns exists, write "none" in space provided.

Hospital Name: _____

Address: _____

City, District, or Region: _____ Country: _____

Name of Chief Hospital Administrator: _____ Telephone: _____

Names of Senior Nursing Officers (or other personnel in charge):

For the Facility: _____ Telephone: _____

For the Maternity Ward: _____ Telephone: _____

For the Antenatal Service: _____ Telephone: _____

Type of Hospital: Government Public/Private (Mixed) Private
 Mission Teaching Other: _____

Hospital census data:

Total bed capacity: _____

_____ in labour and delivery area
_____ in the maternity wards
_____ in the normal nursery
_____ in the special care nursery
_____ in other areas for mothers and children

Total deliveries in year 199__ : _____

_____ were by Caesarean Caesarean rate _____ %
_____ were low birth weight babies (<2500g) Low birth weight rate _____ %
_____ were in special care Special care rate _____ %

Infant feeding data for deliveries from records or staff reports:

_____ mother/infant pairs discharged in the past month
_____ mother/infant pairs breastfeeding at discharge in the past month _____ %
_____ mother/infant pairs breastfeeding exclusively from birth to discharge in the past month _____ %
_____ infants discharged in the past month who have received at least one bottlefeed since birth _____ %

How was the infant feeding data obtained?

From records Percentages are an estimate, provided by: _____

STEP 1. Have a written breastfeeding policy that is routinely communicated to all health care staff.

- 1.1 Does the health facility have an explicit written policy for protecting, promoting and supporting breastfeeding that addresses all 10 steps to successful breastfeeding in maternity services? Yes No
- 1.2 Does the policy protect breastfeeding by prohibiting all promotion of and group instruction for using breastmilk substitutes, feeding bottles and teats? Yes No
- 1.3 Is the breastfeeding policy available so all staff who take care of mothers and babies can refer to it? Yes No
- 1.4 Is the breastfeeding policy posted or displayed in all areas of the health facility which serve mothers, infants, and/or children? Yes No
- 1.5 Is there a mechanism for evaluating the effectiveness of the policy? Yes No

STEP 2. Train all health care staff in skills necessary to implement this policy.

- 2.1 Are all staff aware of the advantages of breastfeeding and acquainted with the facility's policy and services to protect, promote and support breastfeeding? Yes No
- 2.2 Are all staff caring for women and infants oriented to the breastfeeding policy of the hospital on their arrival? Yes No
- 2.3 Is training on breastfeeding and lactation management given to all staff caring for women and infants within six months of their arrival? Yes No
- 2.4 Does the training cover at least eight of the Ten Steps to Successful Breastfeeding*? and the protection of breastfeeding? Yes No
- 2.5 Is the training on breastfeeding and lactation management at least 18 hours in total, including a minimum of 3 hours of supervised clinical experience? Yes No
- 2.6 Has the healthcare facility arranged for specialized training in lactation management of specific staff members? Yes No

STEP 3. Inform all pregnant women about the benefits and management of breastfeeding.

- 3.1 Does the hospital include an antenatal care clinic? Or an antenatal inpatient ward? Yes No
- 3.2 If yes, are most pregnant women attending these antenatal services informed about the benefits and management of breastfeeding? Yes No

- 3.3 Do antenatal records indicate whether breastfeeding has been discussed with the pregnant woman? Yes No
- 3.4 Is a mother's antenatal record available at the time of delivery? Yes No
- 3.5 Are pregnant women protected from oral or written promotion of and group instruction for artificial feeding? Yes No
- 3.6 Does the healthcare facility take into account a woman's intention to breastfeed when deciding on the use of a sedative, an analgesic, or an anaesthetic, (if any) during labour and delivery? Yes No
- 3.7 Are staff familiar with the effects of such medicaments on breastfeeding? Yes No
- 3.8 Does a woman who has never breastfed or who has previously encountered problems with breastfeeding receive special attention and support from the staff of the healthcare facility? Yes No

STEP 4. Help mothers initiate breastfeeding within a half-hour of birth.

- 4.1 Are mothers whose deliveries are normal given their babies to hold, with skin contact, within a half hour of completion of the second stage of labour and allowed to remain with them for at least the first hour? Yes No
- 4.2 Are the mothers offered help by a staff member to initiate breastfeeding during this first hour? Yes No
- 4.3 Are mothers who have had caesarean deliveries given their babies to hold, with skin contact within a half hour after they are able to respond to their babies? Yes No
- 4.4 Do the babies born by caesarean stay with their mothers with skin contact at this time, for at least 30 minutes? Yes No

STEP 5. Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants.

- 5.1 Does nursing staff offer all mothers further assistance with breastfeeding within six hours of delivery? Yes No
- 5.2 Are most breastfeeding mothers able to demonstrate how to correctly position and attach their babies for breastfeeding? Yes No
- 5.3 Are breastfeeding mothers shown how to express their milk or given information on expression and/or advised of where they can get help, should they need it? Yes No

- 5.4 Are staff members or counsellors who have specialized training in breastfeeding and lactation management available full-time to advise mothers during their stay in healthcare facilities and in preparation for discharge? Yes No
- 5.5 Does a woman who has never breastfed or who has previously encountered problems with breastfeeding receive special attention and support from the staff of the healthcare facility? Yes No
- 5.6 Are mothers of babies in special care helped to establish and maintain lactation by frequent expression of milk? Yes No

STEP 6. Give newborn infants no food or drink other than breastmilk, unless medically indicated.

- 6.1 Do staff have a clear understanding of what the few acceptable reasons are for prescribing food or drink other than breastmilk for breastfeeding babies? Yes No
(See acceptable medical conditions, Annex 1: The Global Criteria).
- 6.2 Do breastfeeding babies receive no other food or drink (than breastmilk) unless medically indicated? Yes No
Breastmilk only Yes
Some other food/drink No
- 6.3 Are any breastmilk substitutes including special formulas which are used in the facility purchased in the same way as any other foods or medicines? Yes No
- 6.4 Do the health facility and all health care workers refuse free or low-cost* supplies of breastmilk substitutes, paying close to retail market price for any? Yes No
- 6.5 Is all promotion for infant foods or drinks other than breastmilk absent from the facility? Yes No

STEP 7. Practice rooming-in – allow mothers and infants to remain together – 24 hours a day.

- 7.1 Do mothers and infants remain together (rooming-in or bedding-in) 24 hours a day, except for periods of up to an hour for hospital procedures or if separation is medically indicated? Yes No
- 7.2 Does rooming-in start within an hour of a normal birth? Yes No
- 7.3 Does rooming-in start within an hour of when a caesarean mother can respond to her baby? Yes No

STEP 8. Encourage breastfeeding on demand.

Low-cost: below 80% open-market retail cost. Breastmilk substitutes intended for experimental use or evaluation should also be purchased at 80% or more of retail prices.

*professional

8.1 By placing no restrictions on the frequency or length of breastfeeds, do staff show they are aware of the importance of breastfeeding on demand? Yes No

8.2 Are mothers advised to breastfeed their babies whenever their babies are hungry and as often as their babies want to breastfeed? Yes No

STEP 9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants.

9.1 Are babies who have started to breastfeed cared for without any bottlefeeds? Yes No

9.2 Are babies who have started to breastfeed cared for without using pacifiers? Yes No

9.3 Do breastfeeding mothers learn that they should not give any bottles or pacifiers to their babies? Yes No

9.4 By accepting no free or low-cost feeding bottles, teats, or pacifiers, do the facility and the health workers demonstrate that these should be avoided? Yes No

STEP 10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

10.1 Does the hospital give education to key family members so that they can support the breastfeeding mother at home? Yes No

10.2 Are breastfeeding mothers referred to breastfeeding support groups, if any are available? Yes No

10.3 Does the hospital have a system of follow-up support for breastfeeding mothers after they are discharged, such as early postnatal or lactation clinic check-ups, home visits, telephone calls? Yes No

10.4 Does the facility encourage and facilitate the formation of mother-to-mother or healthcare worker-to-mother support groups? Yes No

10.5 Does the facility allow breastfeeding counselling by trained mother-support group counsellors in its maternity services? Yes No

Summary:

Does your hospital follow all 10 STEPS for promoting and protecting successful breastfeeding? Yes No

If no, what improvements are needed?

If improvements are needed, would you like some help? Yes No If yes, please describe:

This form is provided to facilitate a process of hospital self-appraisal. If a hospital or health facility wishes to invite assessment in order to be designated Baby Friendly by global criteria, the completed form may be submitted in support of the application to the relevant national health authority and the WHO and UNICEF country programme.

If this form indicates a need for substantial improvements in practice, hospitals are encouraged to spend several months in readjusting routines, retraining staff, and establishing new patterns of care. The self-appraisal process may then be repeated. Experience shows that major changes can be made in three to four months with adequate training. In-facility or in-country training is easier to arrange than external training, reaches more people and is therefore encouraged.



Model Hospital Breastfeeding Policies for Full-Term Normal Newborn Infants

Definition and Purpose:

To promote a philosophy of maternal and infant care which advocates breastfeeding and supports the normal physiologic functions involved in this maternal-infant process. The goal is to assure that all families who elect to breastfeed their infants will have a successful and satisfying experience.

1. Hospital administrative, medical, nursing and nutrition staff should establish a strategy which promotes and supports breastfeeding through the formation of an interdisciplinary team responsible for the implementation of hospital policies and provision of ongoing educational activities.^{1,2,3,4,5}
2. All pregnant women should receive information regarding the benefits and management of breastfeeding prior to delivery.^{1,3,4,6,7,8,9,10}
3. Every mother should be allowed to have a close companion stay with her continuously throughout labor.^{11,12,13,14}
4. Infants are to be put to breast as soon after birth as feasible for both mother and infant. This is to be initiated in either the delivery room or recovery room, and every mother is to be instructed in proper breastfeeding technique and re-evaluated before discharge.^{8,15,16,17,18,19,20,21}
5. Breastfeeding mother-infant couples are to room-in together on a 24 hour basis.^{7,15,22,23,24,25,26}
6. The infant is to be encouraged to nurse at least 8-12 times or more in 24 hours, for a minimum of 8 feedings per 24 hours.^{8,18,23,27,28,29,30,31}
7. Specific timing at the breast is not necessary. Infants usually fall asleep or release the nipple spontaneously when satiated.^{27,28,32,33,34,35,36,37}
8. Infants should spontaneously finish the first breast, and then be encouraged to try the second breast at each feed.^{36,37,38}
9. If a feeding at the breast is incomplete or ineffective, the mother should be instructed to begin regular expression of her breasts in conjunction with continued assistance by an experienced staff member. The colostrum or milk obtained by expression should be given to the baby.^{39,40,41,42,43,44,45}
10. No supplementary water or milk is to be given unless specifically ordered by a physician or nurse practitioner.^{6,8,41,42,46,47,48}
11. Pacifiers are not to be given to any breastfeeding infant unless specifically ordered by a physician or nurse practitioner. The use of bottle nipples and nipple shields should be discouraged.^{17,49,50,51}
12. Breastfeeding mothers are to have breasts examined for evidence of lactation or breastfeeding problems at least once every nursing staff shift.^{43,52,53}
13. Discharge gift packs offered to breastfeeding mothers should contain only noncommercial materials which provide educational information and promote breastfeeding.^{6,24,54,55,56}



14. All breastfeeding mothers are to be advised to arrange for an appointment for their baby's first checkup within one week after discharge.^{42,57}
15. At discharge, each mother is to be given a phone number to call for breastfeeding assistance.^{42,57}
16. Policies 1, 2 and 4 and 10 through 15 apply when mothers and babies are separated. Mothers who are separated from their babies are to be instructed on how to maintain lactation.^{3,40,42,44,45,58,59}

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Because breastfeeding is an issue that can be addressed at multiple entry points of the health care system, the United States federal Department of Health and Human Services has developed guidelines to support the practice of breastfeeding in the context of the U S health care system. Though parts are not applicable within the Russian system with extended post-partum in hospital care, it does help to present many of the elements of care we may utilize to maximize our teaching opportunities in offering breastfeeding support.

**Key Elements for Promotion of Breastfeeding
In the Continuum of Maternal and Infant Health Care**

1. Primary-care settings for women of childbearing age should have
 - a supportive milieu for lactation
 - educational opportunities (including availability of literature personal counseling, and information about community resources) for learning about lactation and its advantages
 - ready response to requests for further information
 - continuity allowing for the exposure to and development over time of a positive attitude regarding lactation on the part of the recipient of care.
2. Prenatal-care settings should have:
 - a specific assessment at the first prenatal visit of the physical capability and emotional predisposition to lactation. This assessment should include the potential role of the father of the child as well as other significant family members. An educational program about the advantages of and ways of preparing for lactation should continue throughout the pregnancy
 - resource personnel- such as nutritionists/dietitians, social workers, public health nurses, La Leche League members, childbirth education groups-for assistance in preparing for lactation
 - availability and utilization of culturally suitable patient-education materials.
 - Availability and utilization of culturally suitable patient-education materials.
 - An established mechanism for a predelivery visit to the newborn care provider to ensure initiation and maintenance of lactation
 - A means of communicating to the in-hospital team the infant feeding plans developed during the prenatal course.
3. In-hospital settings should have:
 - A policy to determine the patient's infant-feeding plan on admission or during labor
 - A family- centered orientation to childbirth including the minimum use of intra-partum medications and anesthesia.
 - A medical and nursing staff informed about and supportive of ways to facilitate the initiation and continuation of breastfeeding (including early mother-infant contact and ready access by the mother to her baby throughout the hospital stay)
 - The availability of individualized counseling and education by a specially trained breastfeeding coordinator to facilitate lactation for those planning to breastfeed and to counsel those who have not yet decided about their method of infant feeding.
 - Ongoing in service education about lactation and ways to support it. This program should be conducted by the breastfeeding coordinator for all relevant hospital staff.
 - Proper space and equipment for breastfeeding in the postpartum and neonatal units. Attention should be given to the particular needs of women breastfeeding babies with special problems.
 - The elimination of hospital practices/policies which have the effect of inhibiting the lactation process, e.g. rules separating mother and baby
 - The elimination of standing orders that inhibit lactation, e.g. lactation suppressants, fixed feeding schedules, maternal medications.
 - Discharge planning which includes referral to community agencies to aid in the continuing

**Key Elements for Promotion of Breast-feeding
in the Continuum of Maternal and Infant Health Care (continued)**

The development of policies to support lactation throughout the hospital units (e.g. medicine, surgery, pediatrics, emergency room, etc.)

The provision of continued lactation support for those infants who must remain in the hospital after the mother's discharge.

4 Post-partum ambulatory setting should have:

A capacity for telephone assistance to mothers experiencing problems with breast-feeding

A policy for telephone follow-up 1-3 days after discharge

a plan for an early follow-up visit (within first week after discharge)

The availability of lactation counseling as a means of preventing or solving lactation problems

Access to lay support resources for the mother.

The presence of a supportive attitude by all staff.

A policy to encourage bringing the infant to postpartum appointments.

the availability of public/community health nurse referral for those having problems with lactation.

A mechanism for the smooth transition to pediatric care of the infant, including good communication between obstetric and pediatric care providers.

From Report to the Surgeon General's Workshop on Breast-feeding and Lactation. Presented by US Department of Health and Human Services, June 11 and 12, 1984, DHHS pub. No HRS-D-MC, 84-2.

Таблица 1 Влияние социальной поддержки на перипатальный период беременности. сравнительная оценка пяти произвольных клинических случаев.

автор, год, место издания	общее количество	выборочный критерии	главный резульативный показатель	Сравнение экспериментальной группы с контрольной.
Соса и др (1980), Гватемал	всего - 127 эксперим - 32 контроль - 95	женщины от 13 до 34 лет первородящие, 1 доношенная беременность, неосложненная беременность, 1-2 см открытие шейки матки при поступлении	Продолжительность родов стимуляция окситоцином, Кесарево сечение, наклады ванне щипцов, наличие мекония, использование анестезии, реакция на новорожденного	Снижение проблем в перипатальном периоде, снижение продолжительности родов, улучшение реакции на новорожденного
Клаус, 1986, Гватемал	всего - 417 экс - 168 контр - 249	Женщины от 13 до 34 первородящие, 1 доношенная беременность, неосложненная беременность, 3-4 см открытие шейки матки при поступлении	Продолжительность родов стимуляция окситоцином, Кесарево сечение, наложение щипцов, наличие мекония использование анестезии	Снижение случаев использования Кесарева сечения, снижение продол- жительности родов, снижение случаев стимуляции окситоцином, снижение перипатальных проблем
Ходнет, Осборн, 1986, Гватемал	всего - 103 экс - 49 контр - 54	Возрастная группа не указана, неосложненная беременность, жен- щины, посещающие классы по подготовке к родом вместе с партнером	Продолжительность родов стимуляция окситоцином, Кесарево сечение, наложение щипцов, использование анестезии, наличие мекония	Увеличение использования стимуляции окситоцином, снижение использования эпидуральной анестезии
Кеннелл 1991, США	всего - 416 экспер - 212 контроль - 204	Женщины от 16 до 36, первородящие, 1 доношенная беременность, неосложненная беременность, раскрытие шейки матки 3-4 см при поступлении	Продолжительность родов стимуляция окситоцином, Кесарево сечение, наложение щипцов, использо-вание анестезии, использования эпидуральной анестезии, средняя продолжительность пребывания в госпитале, повыше-ние температуры у роженицы	Снижение случаев Кесарева сечения, снижение потребности в эпидуральной анестезии, снижение стимуляции окситоцином, снижение случаев наложения щипцов, меньше случаев подъема температуры у роженицы, снижение продолжительности родов
Хофмейер 1991 Ю Африка	всего - 189 экспер - 92 контроль - 97	Возрастная группа не указана, первородящие, 1 доношенная беременность, неосложненная беременность, рас-крытие шейки матки менее 6 см при поступлении	Продолжительность родов, стимуляция окситоцином, Кесарево сечение, наложение щипцов, использование анестезии, наличие мекония	Улучшение переносимости родов, увеличение случаев грудного вскармливания, снижение болевой чувствительности, снижение беспокойства, страха и депрессии после 6 недель

From Klaus M, Kennell J, Berkowitz G, and Klaus P (1992) Maternal assistance and support in labor. Father, nurse, midwife, or Doula? *Clinical Consultations in Obstetrics and Gynecology* 4(4)

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Maternal Assistance and Support in Labor: Father, Nurse, Midwife, or Doula?

MARSHALL KLAUS, MD, JOHN KENNEL, MD, GALE BERKOWITZ, PHD, PHYLLIS KLAUS, MEd

CASE REPORT

Two months before the birth of their first child, a couple considered having a doula present for the labor. Initially, the father, an electronics engineer, felt that a doula might take away from the intimate experience of having the baby. However, his wife disagreed. The father's decision changed during a childbirth class when they both viewed the last 10 minutes of the birth of six infants. They chose an experienced doula in her early fifties who has a 19-year-old son and works as a private certified public accountant.

The doula visited the couple three times before the delivery, going over their plans, relaxation techniques, and birth positions. On one visit, the mother had many questions and found it especially helpful to talk with an experienced woman about her concerns. In the last visit, they toured the hospital together.

The active labor began within a few days of term with rupture of the membranes. The doula met the mother and father when they arrived at the hospital, where the mother's cervix was effaced and dilated 3 cm. Early in the labor the nurse suggested on several occasions that the mother have an epidural because she thought her labor would be long; however, the mother felt she didn't need it. The mother spent the first hours walking, taking a shower, and receiving strong support from the doula and her husband. Approximately 3.5 hours after admission the doula noted the mother was flushed and her legs were shaking. She suggested to the nurse that she might be farther along in transition. The nurse didn't fully agree but felt she was making progress. She again suggested an epidural for an easier birth. The mother again refused. But 15 minutes later, an examination by the same nurse found the mother was dilated 9 cm. One hour later, the mother delivered an 8.5 lb. healthy girl with the help of her obstetrician without an episiotomy.

The mother felt the doula was most valuable. The father noted, "It was especially helpful to have an experienced doula since I was able to be more relaxed since the pressure was off me. We also needed her physically to help my wife and emotionally because the nurse was good but pessimistic." The next day the doula reviewed the course of the labor with the couple, explaining how strong the mother appeared and how the labor evolved.

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INTRODUCTION

In this case, the continuous emotional support was provided by a caring, experienced woman we have called a childbirth doula. In looking for a word to stress the value of a woman companion who is continually supportive and comforting, we chose the Greek word "doula," which means a woman caregiver of another woman. Dana Raphael¹ first used the word to describe experienced women who after birth help mothers with breast-feeding. All childbirth doulas have a short (2 to 3 weeks) but intensive training period to be able to give the laboring woman and her partner both emotional and physical support throughout labor, as well as information about the delivery.

When birth locations shifted from home to hospital (60 to 70 years ago), many childbirth practices that had evolved over the centuries were lost or altered, including birth position, obstetric medication, and companionship during labor. In the past, it was common for a woman in labor to be supported by other women.²

The present birth environment can be lonely and has many elements that can increase the stress of labor. These include the routine use of intravenous lines, limitation of food intake, regular vaginal examinations, restriction of movement, fetal monitoring, the use of oxytocin, and possibly more importantly, the strange location and unfamiliar personnel.

What is the evidence that continuous emotional support of the mother during labor has a significant effect on reducing the stress of this experience and improving maternal and neonatal morbidity? To date, five separate randomized trials have evaluated the effectiveness of a doula in reducing the stress of the "modern" birth environment.³⁻⁷ Table 1 lists the details of these five studies.

In all five studies, the mothers were healthy and primiparous women at term who had a normal pregnancy. The "intervention" was the introduction of a doula, or trained lay person who would provide emotional support consisting of praise, reassurance, measures to improve the

Table 1. Effect of Social Support on Perinatal Outcomes: Meta-Evaluation of Five Randomized Clinical Trials

Author, Year, and Location	Sample Size	Selection Criteria	Primary Outcome Indicators	Findings Exp. vs. Control (significant results only)
Sosa et al ³ (1980) Guatemala	n = 127 Exp = 32 Control = 95	Women aged 13-34; nulliparous women; single gestation term; uncomplicated pregnancy; 1-2 cm cervical dilatation at entry	Duration of labor; oxytocin augmentation; cesarean section; forceps; meconium staining; use of analgesia; responsiveness to infant	Decreased perinatal problems; decreased length of labor; increased responsiveness to infant
Klaus et al ⁴ (1986) Guatemala	n = 417 Exp = 168 Control = 249	Women ages 13-34; nulliparous women; single gestation term; uncomplicated pregnancy; 3-4 cm cervical dilatation at entry	Duration of labor; oxytocin augmentation; cesarean section; forceps; meconium staining; use of analgesia	Decreased cesarean section rate; decreased length of labor; decreased oxytocin; decreased perinatal problems
Hodnett and Osborn ⁵ (1989) Canada/urban	n = 103 Exp = 49 Control = 54	No age specified; uncomplicated pregnancy; Women enrolled in childbirth classes with partner	Duration of labor; oxytocin augmentation; cesarean section; forceps; use of analgesia; meconium staining; perceived control; trait anxiety	Increased oxytocin use; decreased need for epidural
Kennell et al ⁶ (1991) USA/urban	n = 416 Exp = 212 Control = 204	Women ages 16-36; nulliparous women; single gestation term; uncomplicated pregnancy; 3-4 cm cervical dilatation at entry	Duration of labor; oxytocin augmentation; cesarean section; forceps; use of analgesia; epidural use; average length of hospital stay; maternal fever	Decreased cesarean section rate; decreased need for epidural; decreased oxytocin; decreased use of forceps; less maternal fever; decreased length of labor
Hofmeyr et al ⁷ (1991) South Africa	n = 189 Exp = 92 Control = 97	No age specified; nulliparous women; single gestation term; uncomplicated pregnancy; less than 6 cm cervical dilatation at entry;	Duration of labor; oxytocin augmentation; cesarean section; forceps; use of analgesia; meconium staining	Increased coping during labor; increased breastfeeding; lower perceptions of pain; decreased state anxiety and depression after 6 weeks

Abbreviation: Exp, experiment.

comfort of the mother, physical contact (eg, rubbing the mother's back and holding her), an explanation of what was happening during the labor, as well as the continuous presence of the friendly doula.

Since the design of these studies was nearly identical and the role and responsibilities of the supportive companion similar, we have summed their results using a meta-analysis, a statistical technique for summarizing the results of several independent research studies.⁸ The meta-analysis is a way to determine the overall effect, size, and significance level of different studies. This technique yields an odds ratio, or the odds of having some outcome (eg, a cesarean section), given exposure to an intervention (eg, a doula) compared to women not "exposed" to a doula.⁹ An odds ratio equal to 1 would signify that the doula had no effect on a given obstetrical outcome. An odds ratio of less than 1 would describe a protective effect. The range noted in Figs 1 and 2 denotes the 95% confidence interval for the odds ratio. That is, the actual odds of needing a certain intervention is somewhere within that range for 95% of the population. For example, in Fig 1, when the four studies reporting cesarean sections are combined, 95 of 100 women who have a doula would have a reduction in their cesarean section rate ranging from 34% to 67%. If the upper limit of the odds ratio is <1, then the P value for the odds ratio is <.05. It can be surmised that the doula would significantly alter this aspect of care for the better, thereby decreasing the odds of needing a given obstetrical intervention. The meta-analyses were performed using True Epistat software on a personal computer using data available from published manuscripts.¹⁰

Figures 1 and 2 summarize the effect of the doula on the need for a cesarean section, analgesia, oxytocin, and forceps. When all of these studies are combined, the results of the meta-

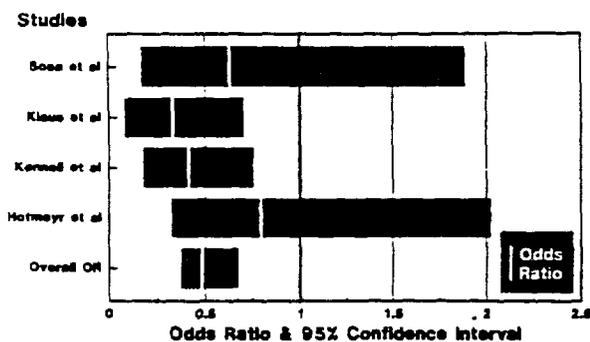


Figure 1. Effect of social support on cesarean section rate.

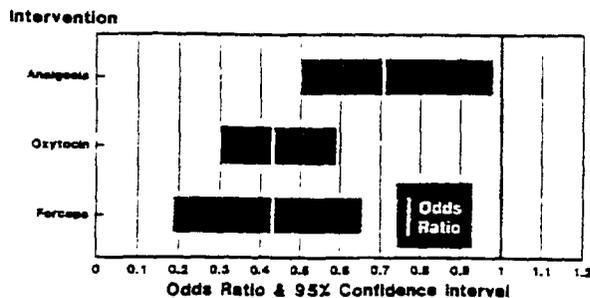


Figure 2. Overall odds ratio and 95% confidence intervals for interventions in labor and delivery.

analysis of these trials are similar and compelling. The analysis of the overall effect on duration of labor found that the presence of the doula significantly reduced the length of labor by 25% ($P < .00001$). The presence of an emotionally supportive companion during labor resulted overall in a remarkable and significant decrease in all of these outcomes. The odds of having a cesarean section for those having a doula were significantly reduced by 34% to 67% (Fig 1). The presence of a doula reduced the odds of needing analgesia by 1% to 47%, for oxytocin by 43% to 68%, and forceps by 35% to 82%. In one of the hospitals that reported the use of epidurals, 11% of mothers with a doula requested an epidural compared with 64% of the control group.

THE EFFECTS OF THE DOULA ON THE POSTPARTUM HEALTH OF THE MOTHER

In the South African study, the results revealed favorable effects of constant support on the subsequent psychological health of the women and infants in the doula group. At 24 hours, the mothers in the doula group had significantly less anxiety compared with the no-doula group, and fewer doula-supported mothers considered the labor and delivery to have been difficult. At 6 weeks' postpartum, there was a significantly greater proportion of women breast-feeding in the doula group (51% compared with 29%), and those demand feeding (81% compared with 47%), and feeding problems were significantly less in the doula group (16% vs 63% in the no-doula group). Mothers in the doula group said that during the first 6 weeks after delivery they spent 1.7 hours a week away from their baby in contrast to those in the no-doula group, who spent 6.6 hours away.

The doula mothers noted that it took an average of 2.9 days for them to develop a relationship with their baby compared with 9.8 days for the

no-doula mothers. These results suggest that support during labor expedited the doula group mothers' readiness to bond with their babies and require less time away from them. In other studies, mothers in the doula group were again significantly less anxious, had scores on the depression scale that were significantly lower than the control group, and had higher levels of self-esteem at 6 weeks postpartum. They also felt significantly more satisfied with their partner 6 weeks postterm (71% compared with 30%) and felt their baby was better than the standard baby, more beautiful, clever, and easier to manage than the control mothers, who perceived that their baby was slightly less attractive than a standard infant.

THE ROLE OF THE FATHER

Unfortunately, similar randomized trials in which fathers were the main supportive companion compared with women who had no support or a doula, are not available. It was not until the 1970s that the majority of hospitals began to permit fathers to be present during the mothers' labor and delivery. In 1973, only 27% of fathers were present at delivery, compared to 79% by 1983. Unfortunately, the only studies available on the effect of fathers on the birth process are limited in that they compared samples of couples that had chosen to attend childbirth classes with those who had not.¹¹ Though these studies have shown that the presence of the father significantly reduces the need for analgesia, no randomized trial has reported a significant decrease in the length of labor, the incidence of forceps use, the rate of cesarean sections, epidural anesthesia, or the use of oxytocin. Given that in most United States maternity units fathers are expected to provide for their partner during labor, randomized trials are imperative.

A number of experienced observers have questioned the effectiveness of the father during labor and delivery. O'Driscoll and Meagher¹² have noted, "Women, in general, have more to gain from the presence of a female companion," while Odent¹³ writes, "Men sometimes find it hard to observe, accept, and understand a woman's instinctive behavior during childbirth." It is our experience that many male partners are limited in their ability to meet both his and the mother's needs at this intense time, because of his close emotional ties to the mother. Dr. Martin Greenberg¹⁴ noted, "I didn't realize until later how frightened and angry I felt at the staff for

being left alone with my wife when having our first baby." He wisely noted, "The mother has a biologically based task which is driven by a time clock, while the father feels like he's floating in air without a connection, uncertain about his tasks."

The presence of a doula frees the father from being the sole support for his wife with the associated anxiety of that responsibility. The woman's partner or close friend can provide encouragement and the loving, emotional support that every woman needs during labor; however, they, in general, do not have the training or experience to help the mother evaluate, understand, and manage her labor in the way a doula can. Often the couple may worry that the outside support person will take over and control the experience, as initially noted in this case. What is different about a doula from other support people is that she does not take over or attempt to control the birth. The doula is there to help parents have the type of birthing experience they want. As noted in this case, the doula moved in concert with the mother's and father's wishes. In asking fathers to be the main support, our society created very difficult expectations for fathers to fill. There is sometimes the mistaken impression from childbirth classes that by seeing a few exercises the husband can be the main source of support and knowledge for the entire labor when the nurse is unavailable. While this may be true for some fathers, many may lack the skill to be an effective source of support during labor and delivery.

We suggest a different but equally important role for the father. A support person during labor can reach out to the mother and her male partner, decreasing the father's anxiety, giving him support and encouragement, and teaching him specific tasks, allowing him to interact with his wife in a more caring and nurturing fashion.

In line with this role of the father is the observation that almost all women find the presence of their husbands supportive. The doula allows the fathers to experience the birth, support his wife to his capacity, but not be the sole support to meet his wife's many needs. The presence of the doula during the labor separates the medical care from the supportive function and would be appropriate where the nurse or midwife cares for more than one patient at a time. If, however, the delivery unit is reorganized, and the midwife or nurse is assigned only one patient, they could care for both the medical and supportive needs of the mother. A unit using this procedure and providing a nurse or midwife to remain contin-

uously with the mother has been in existence for the past 25 years at the National Maternity Hospital in Dublin, Ireland.

THE MIDWIFE AS THE SUPPORTIVE COMPANION

The Active Management of Labor, created by Kierin O'Driscoll and Declan Meagher,¹² was initially developed to prevent prolonged labor and its complications. A key part of the approach was the accurate diagnosis of labor. They developed definite criteria for whether a mother was in labor or not. In this unit labor is rarely induced. If a mother arrives with contractions every 8 minutes and 1 cm dilation with slight effacement of the cervix, she is sent to the ward and discharged in the morning if there is not adequate progression.

The Active Management of Labor is a comprehensive way of thinking about and facilitating the entire labor and delivery experience. It involves understanding the progression of labor, the woman and her family, and then organizing the mother's experiences in the hospital. Education of the mother is also important so that she understands what is happening in labor and how it can be managed. The emphasis is on transmitting to the mother that her labor should not last longer than 12 hours, that she will never be left alone in labor, and that everything is geared to that goal.

When the diagnosis of labor is made, each woman is assigned her personal nurse-midwife (usually a nurse in training to become a midwife), who will remain with her throughout her labor, providing one to one care. Since the continuous care by the midwife appears to be one of the critical elements of this method and has often been left out of the procedure when it is transferred to another obstetrical unit, we quote O'Driscoll and Meagher. "Mere physical presence is not enough. The nurse-midwife must appreciate that her primary duty to the mother is to provide the emotional support so badly needed at this critical time and not simply to record vital signs in a detached manner. A guarantee is given to every expectant woman who attends this hospital that she will have a personal nurse through the labor from the time of her admission to after her birth without regard to the hour of the day or night the baby is born."

The nurse-midwife is trained to touch the mother, to have eye-to-eye contact, hand contact, and to use "en face" position. To permit one-to-

one care, the organization of the unit had to be changed. Each shift, night and day, has the same number of midwives. Because there is a remarkable shortening of labor, every midwife now delivers 225 babies per year (whereas before The Active Management of Labor [AML], they delivered 95 babies per year).

Another aspect of AML includes rupturing the membranes when the head is engaged if they do not rupture spontaneously. If the cervix is not dilating at a rate of one centimeter per hour, primiparous mothers will be given oxytocin. Still, only 30% of women require augmentation of labor.

OUTCOME

The results of AML in primiparous mothers at the National Maternity Hospital Dublin are of special interest as shown in Table 2.

After visiting the unit for one week and observing 40 deliveries, several comments are appropriate. We have never before observed a whole system geared for supporting the mother and father through their baby's birth without anxiety, with such gentle care and warmth. It was clear that great respect was afforded the laboring woman, and the absence of angry or impatient tones by staff was apparent.

Because rupturing the membranes appears to shorten labor by only 20 to 30 minutes and only about 30% of mothers received oxytocin, it is fair to conclude that the one to one midwifery support appears to account for a major part of the good results.

MECHANISM OF ACTION OF SUPPORT OF WOMAN

As stress and anxiety are known to increase catecholamine secretion, which makes uterine contractions less effective and labor longer, continuous support by reducing anxiety would shorten labor, thus reducing the time for a complication to occur and therefore the need for a cesarean section.^{15,16} In animal studies, emo-

Table 2. Obstetrical Outcome at the National Maternity Hospital in Dublin

Cesarean section rate 1980-1990	5-6.5%
Length of labor (mean)	5.9 hours
50% deliver in <5 hours	
90% deliver in <8 hours	
2% deliver around 12 hours	
Neonatal mortality and morbidity are appropriately low	

tional stress to the mother monkey has been shown in many cases to effect fetal heart rate by decreasing placental blood flow.^{17,18} It is possible that emotional support to the mother might also reduce fetal heart rate abnormalities, however, no human data as yet supports this hypothesis.

DOULA TRAINING

Doula courses have been designed to specify minimum support standards to encourage personalized care and to provide the trainee with a wide variety of care procedures. Basic information about pregnancy, labor and delivery is also included in most 24 to 30 hour courses. In addition, it is especially important for the doula trainee to work with an experienced doula for seven to eight deliveries before working on her own. Fortunately, there are now many cities where doulas are available. A book by three of the authors illustrates and further describes the role of the doula, her training, care at the National Maternity Hospital in Ireland, how to find a doula, as well as details of the randomized trials is in press.¹⁴

DISCUSSION

Once an obstetrical unit decides to provide continuous support to women in labor, it must decide if this is to be accomplished with one to one nursing or midwifery care or with a doula. In one to one care, both the emotional support and the medical care procedures for the mother are managed by the same person. Though there are obvious medical benefits for the family to spur a change in our present practices, there are also additional financial savings. Given these preliminary findings from the meta-analysis, a doula is likely to be a highly cost-effective strategy. The presence of a doula is likely to decrease length of labor, use of oxytocin and analgesia, forceps, and cesarean section rates. They have also been associated with positive social outcomes such as decreased maternal anxiety and depression, increased breast-feeding and increased satisfaction with interpersonal relations with partners.

Using the data from the Houston study⁶ as a specific example where cesarean sections were reduced by 10% and epidurals by 75%, assuming that the average cost of a doula is \$200, maternity health care costs would be reduced by more than \$2 billion if every woman in the United States had a supportive woman with her continuously

throughout labor. Interestingly, continuous social support by women has been a birth practice in most cultures but has not been routinely provided in the West. In 126 of 127 representative non-industrialized societies from which data are available, it is an established practice that a woman is present with the mother during the entire labor.¹⁹

SUMMARY POINTS

1. It would appear that continuous support during labor is an essential ingredient of the labor that has unfortunately been left out when maternity care moved from home to hospital in the early 1930s.
2. Randomized trials of continuous emotional and physical support during labor have resulted in multiple benefits, which include a shorter labor, significantly less medication and fewer medical interventions, including cesarean section, forceps, and epidural anesthesia.
3. The results of these studies strongly suggest that we must reevaluate present-day obstetrical practices.

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Lactational Amenorrhea Method

LAM is more than 98% effective until:

- **menses returns, or**
- **breastfeeding is reduced, or**
- **the baby reaches 6 months of age**

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Contraceptive Technology
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Lactational Amenorrhea Method LAM

Topics to be covered:

- **What is LAM?**
- **Mechanism of action**
- **Scientific basis**
- **Advantages and disadvantages**
- **Provider/client issues**

What is LAM?

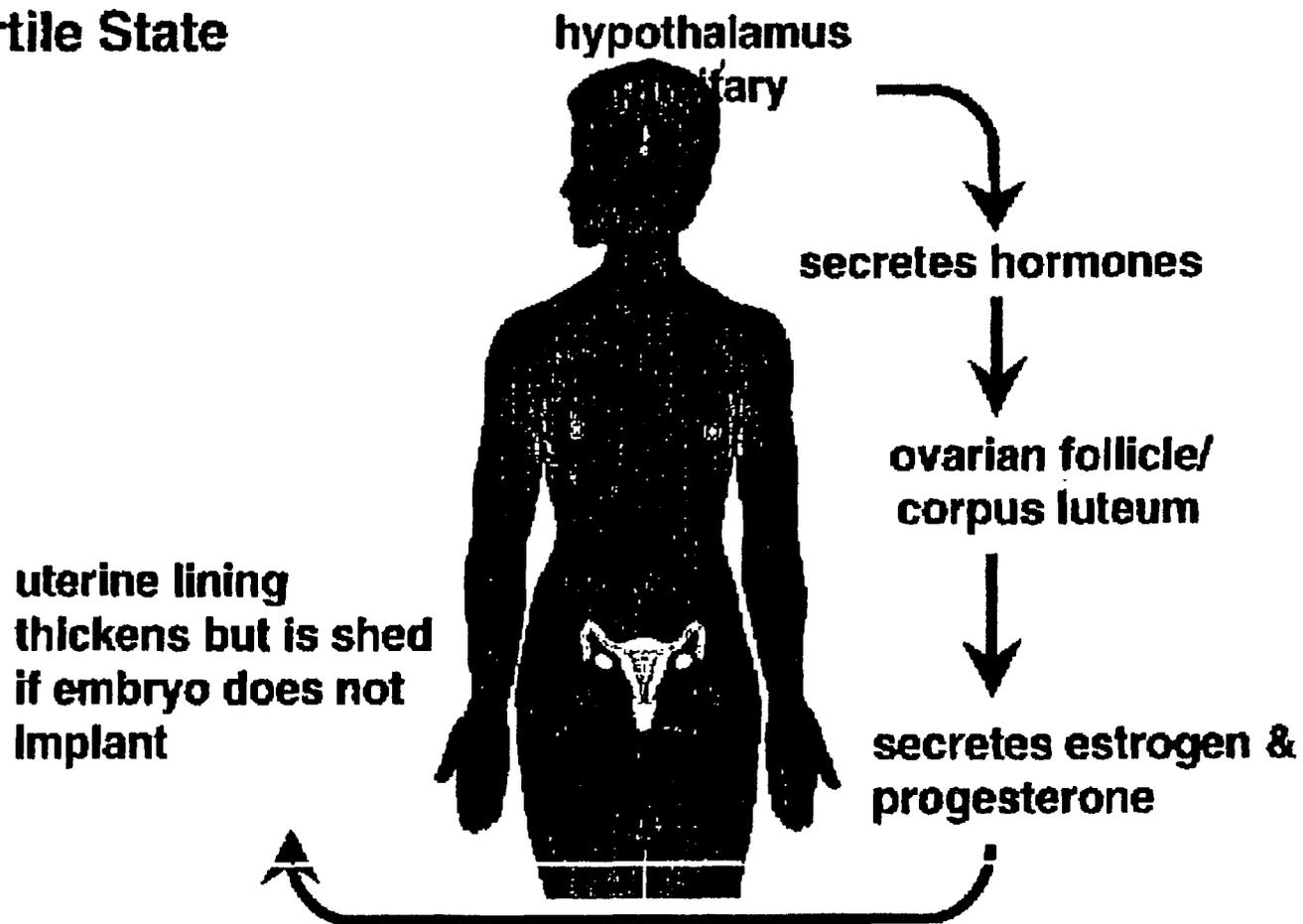
Criteria

- 1- menses must not have returned
(lactational amenorrhea)**
- 2- woman must fully or nearly fully breastfeed**
- 3- infant must be less than six months**

If any criteria change, start another method.

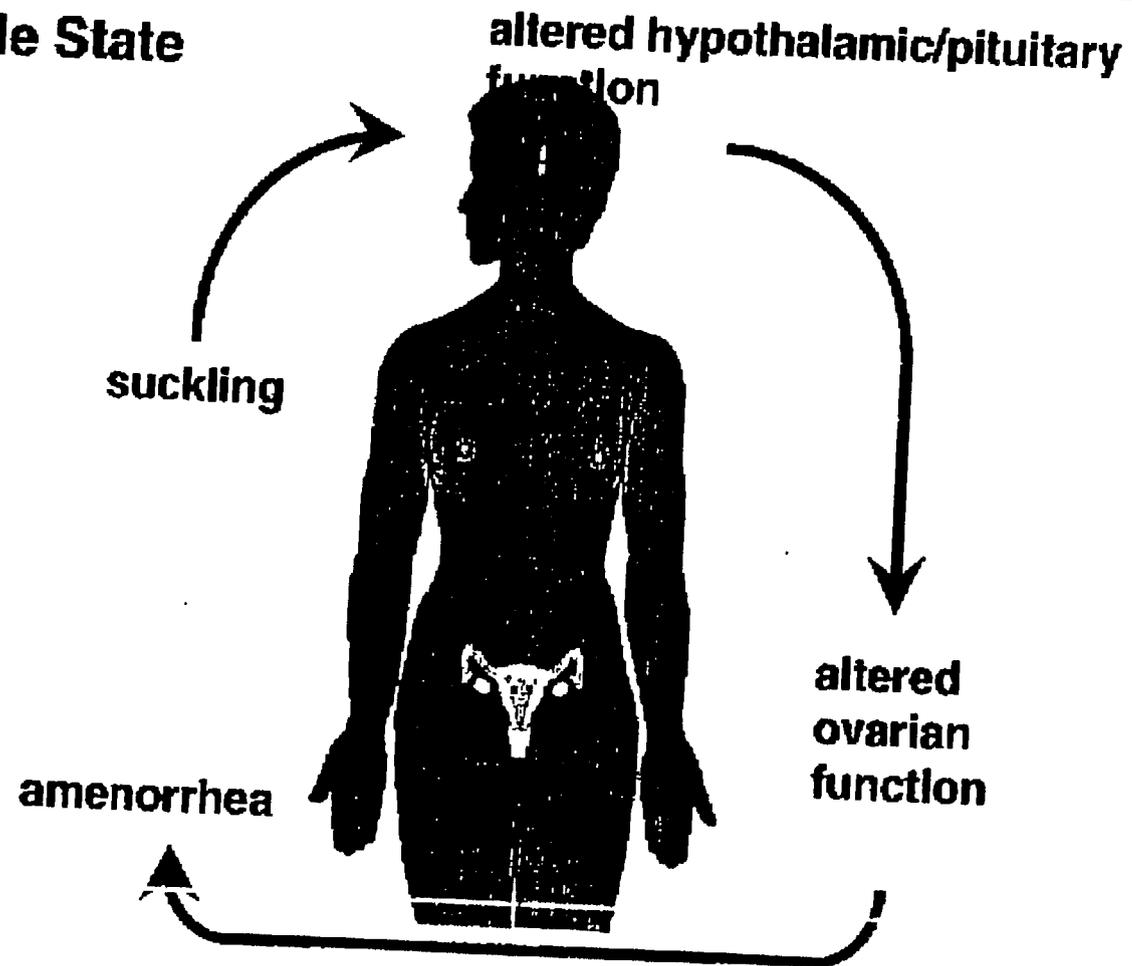
Normal Menstrual Cycle

Fertile State



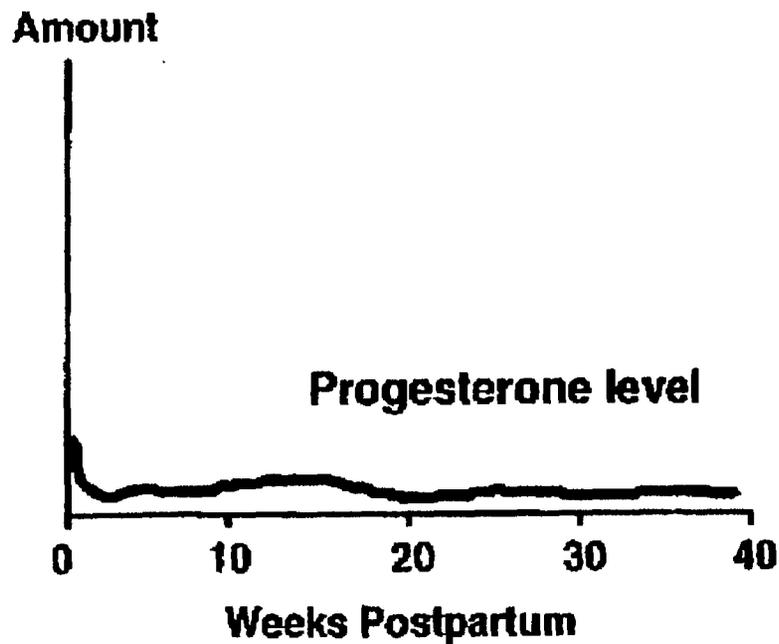
Physiology of Lactational Amenorrhea

Nonfertile State



Effects of Breastfeeding

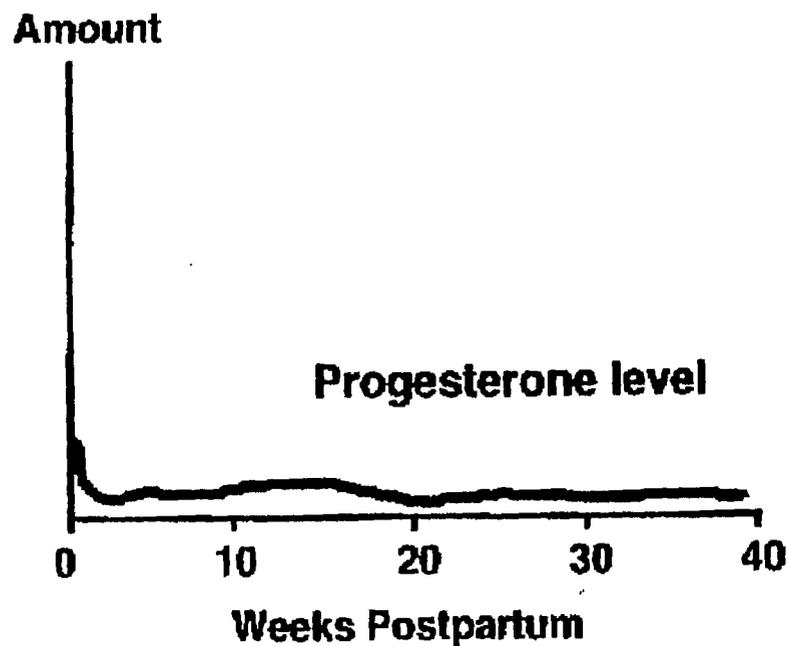
Effective Protection Intensive Breastfeeding



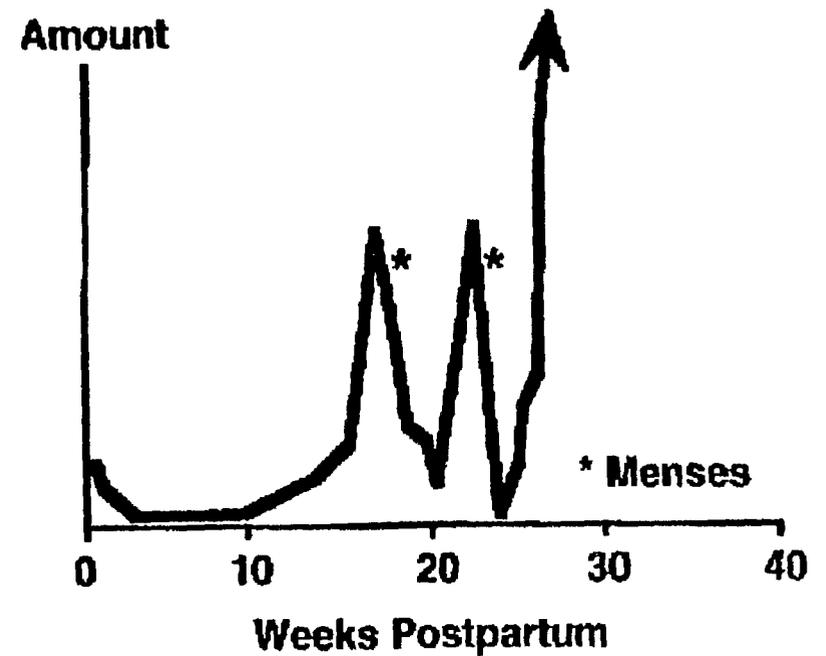
Source: Rivera, et al, 1985.

Effects of Breastfeeding

Effective Protection Intensive Breastfeeding

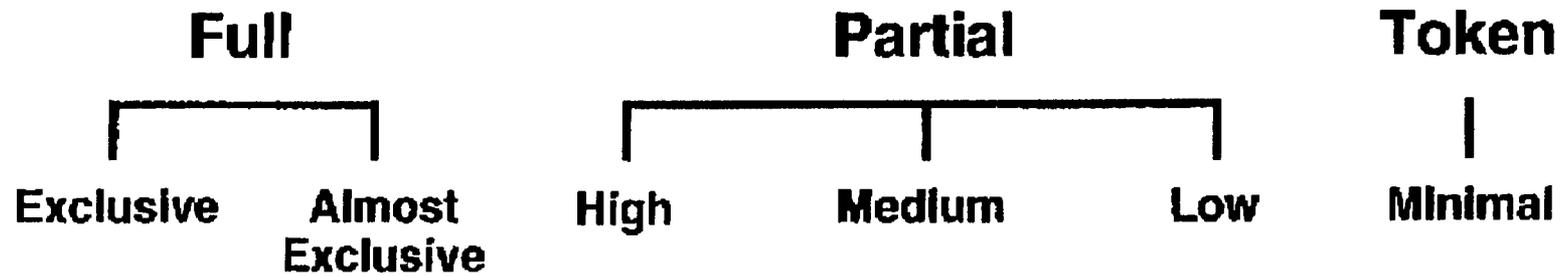


Ineffective Protection Infrequent Breastfeeding



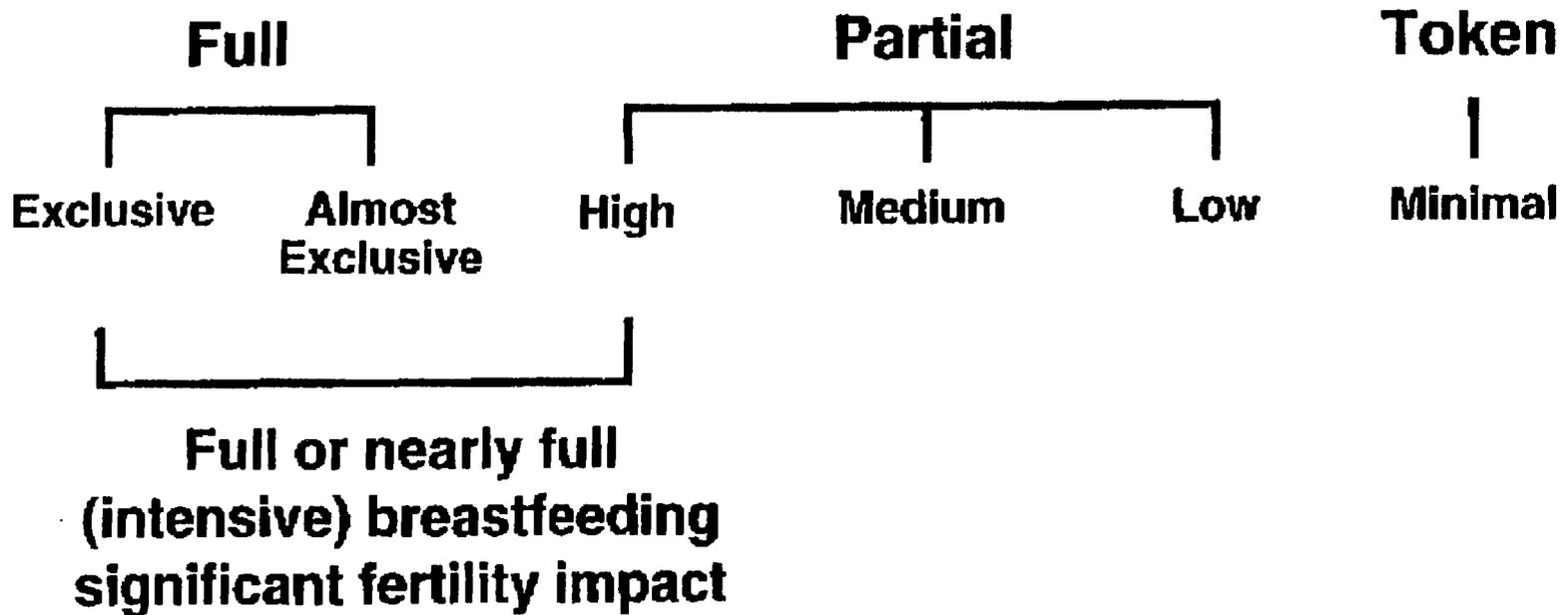
Source: Rivera, et al, 1985.

Breastfeeding Categories



Source: Labbok and Krasovec, 1990.

Breastfeeding Categories



Source: Labbok and Krasovec, 1990.

Early Postpartum - Full or Nearly Fully Breastfeeding Women

- **Likelihood of menses and ovulation is low**
- **Ovulation may occur prior to menses**
- **Luteal phase is frequently defective**

Less than 2% have an adequate luteal phase that results in pregnancy

Later Postpartum - Breastfeeding Women

- **Likelihood of full or nearly full breastfeeding is less**
- **Likelihood of menses and ovulation increases**
- **Probability of ovulation preceding menses is higher**
- **Probability of an adequate luteal phase is higher**

Women who intensively breastfeed and remain amenorrheic have high degree of pregnancy protection

History of LAM – Worldwide Studies



Bellagio Consensus

A postpartum woman has at least 98% protection from pregnancy for 6 months when she remains amenorrheic and fully or nearly fully breastfeeds.

Georgetown Conference

- **Established LAM**
- **Based on Bellagio Consensus and other published research**
- **Algorithm designed**
- **Emphasized timely introduction of another method**

LAM Efficacy Studies

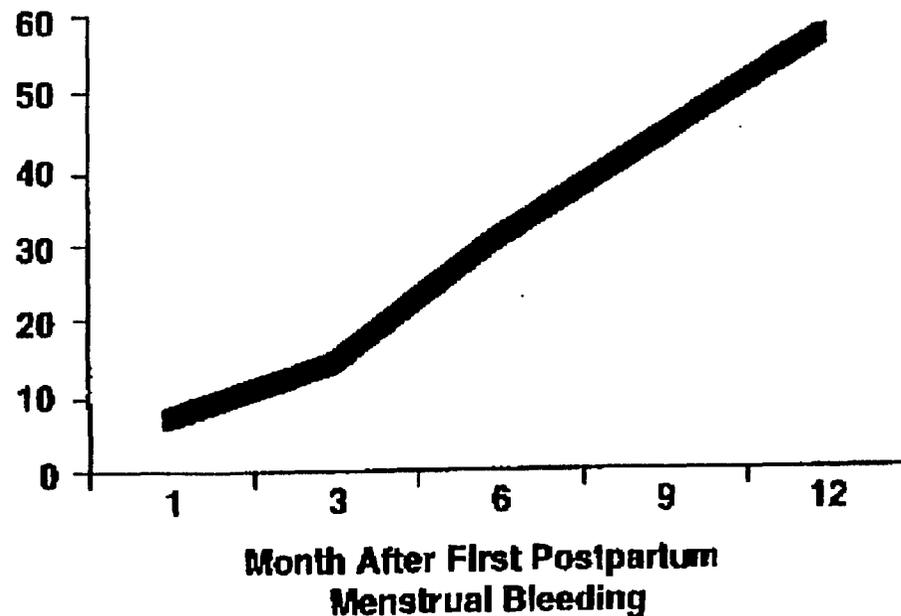
	Chile	Ecuador	Pakistan	Philippines
Number of women	422	330	391	485
Pregnancies among LAM users	1	2	1	2
Effectiveness	99.55%	99.85%	99.42%	99.04%

Source: Pérez, et al, 1992; Sevilla et al, 1994; FHI, 1994a; FHI, 1994b.

Scientific Basis of LAM Criteria

What does the return of menses mean?

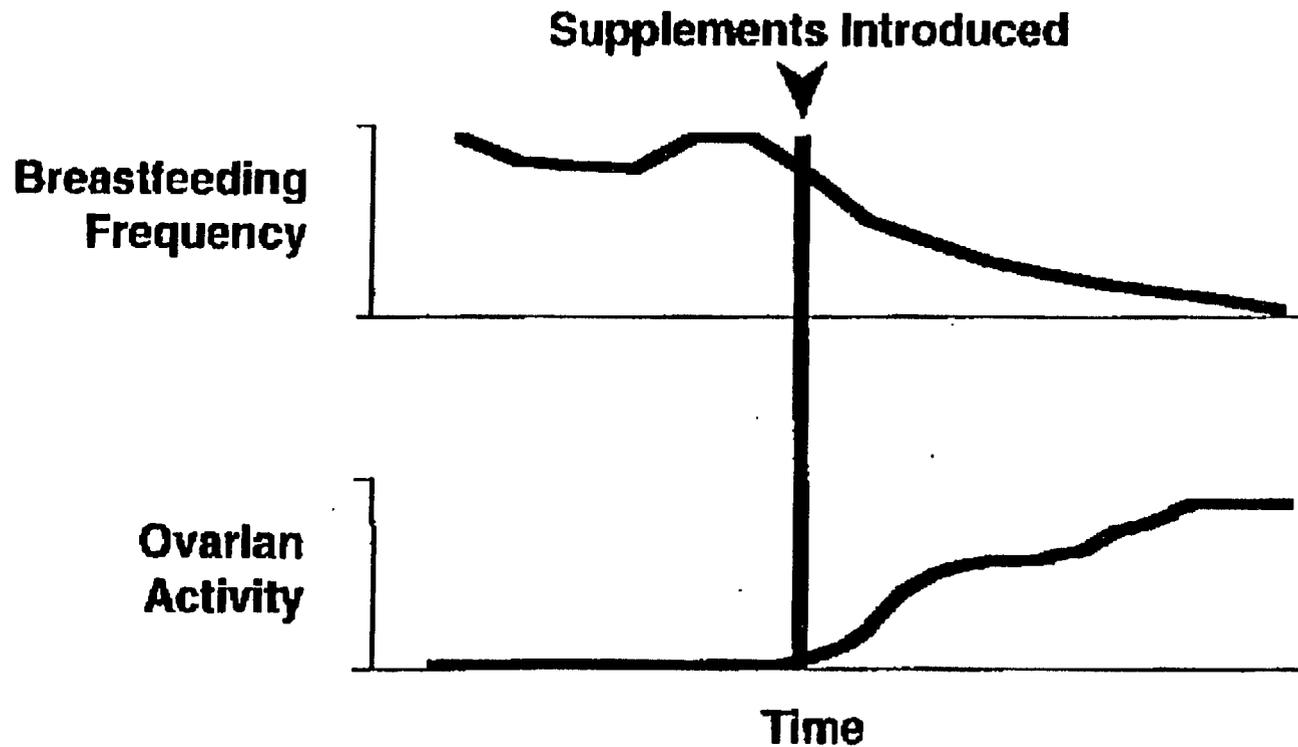
**Cumulative Probability of Pregnancy In Breastfeeding Women
After Return of Menses**



Source: Díaz, et al, 1991.

Scientific Basis of LAM Criteria

What if breastfeeding is reduced?



Source: Howle, et al. 1981.

Scientific Basis of LAM Criteria

What happens after six months?

- **supplements typically begin and breastfeeding often decreases**
- **luteal phase defect less likely**
- **most women will need to begin another contraceptive method or observe special extended LAM guidelines**

LAM Advantages

- **Universally available**
- **98% effective (or more)**
- **Begins immediately postpartum**
- **Health benefits for mother and infant**
- **No commodities/supplies required**
- **Bridge to other contraceptives**
- **Builds on established cultural and religious practices**
- **Improves breastfeeding and weaning patterns**
- **Postpones use of steroids until infant is more mature**

LAM Disadvantages

- **Breastfeeding pattern may be difficult to maintain**
- **No STD or HIV protection**
- **Duration of method limited**
- **Only useful for breastfeeding women**

Recommended Breastfeeding Behaviors

A mother should breastfeed:

- **soon after delivery**
- **without supplementation up to 6 months**
- **before any supplemental feedings**
- **frequently, upon request, not on a schedule**



Recommended Breastfeeding Behaviors *continued*

A mother should breastfeed:

- **without bottles or pacifiers**
- **without long intervals between feeds both day and night**
- **while maintaining a good diet for herself**
- **even when mother/baby are ill (special recommendations for HIV-positive women)**



Who Can Use LAM?

Any postpartum woman is eligible

- **if successful breastfeeding established and plans to continue breastfeeding**

Nearly fully breastfeeding women

- **exclusive breastfeeding is not required**
- **minimal supplementation is allowed**

Who Can Use LAM? *continued*

Malnourished women

- **supplement the mother's diet**
- **continue breastfeeding**

Working women

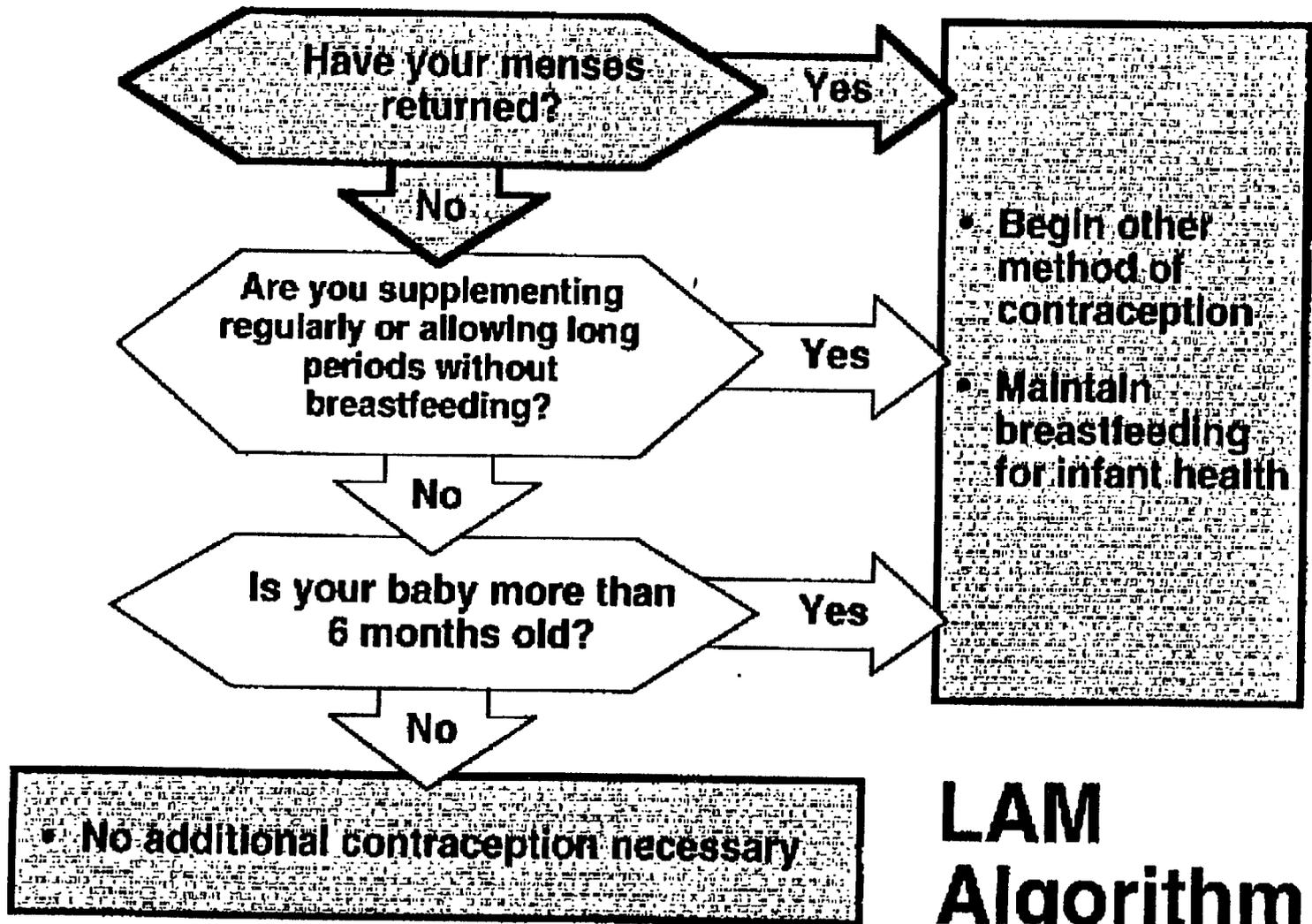
- **long intervals between feeds may shorten duration of LAM**
- **option to express milk manually (expression should not replace suckling more than 10% of feeds)**

Programmatic Considerations

- **ongoing research to examine most effective strategies**
- **early and continued support for breastfeeding and LAM offered**
- **prenatal counseling/information provided**
- **providers trained**
- **client access to other methods prior to LAM expiration ensured**

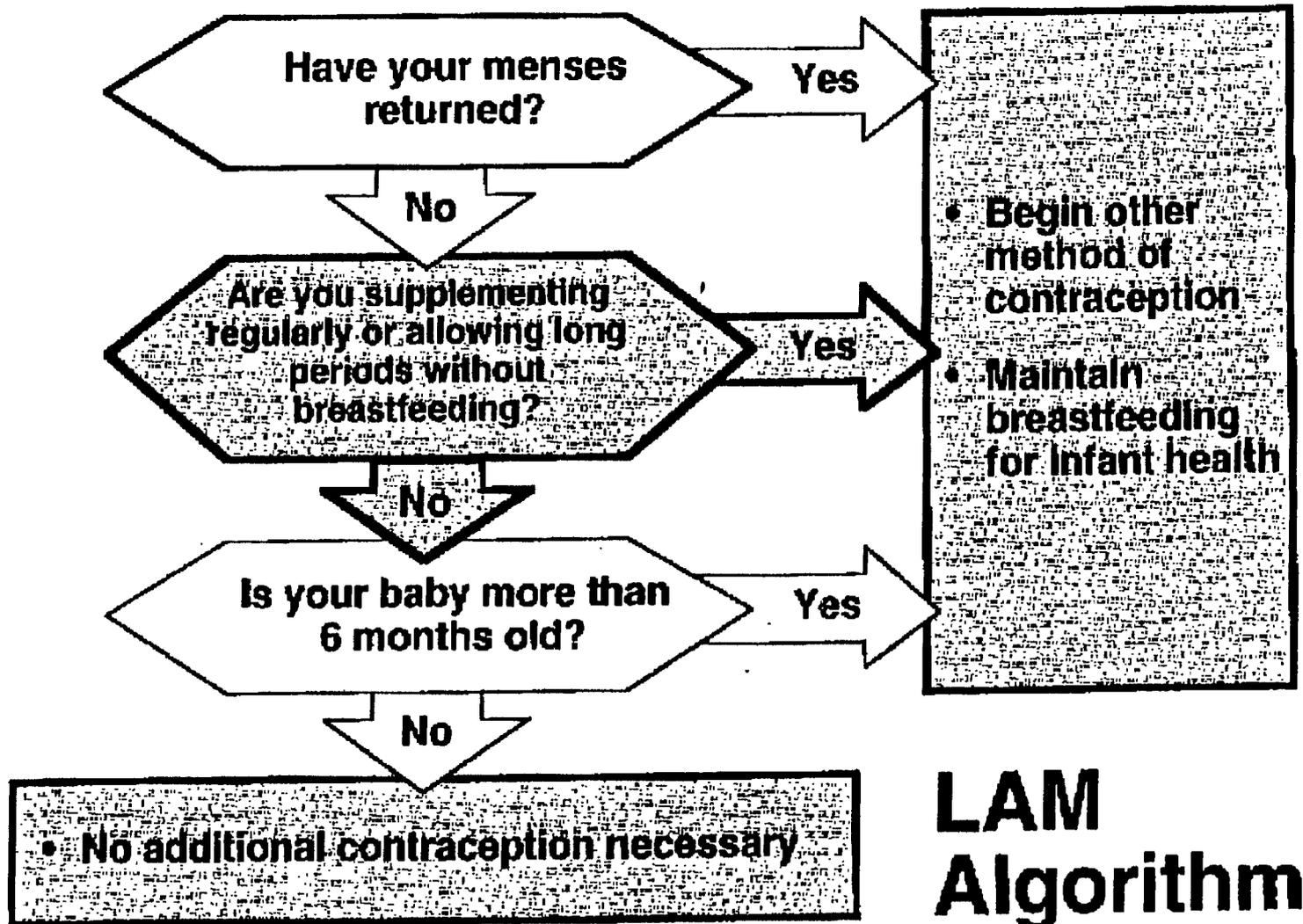
LAM Counseling Guidelines





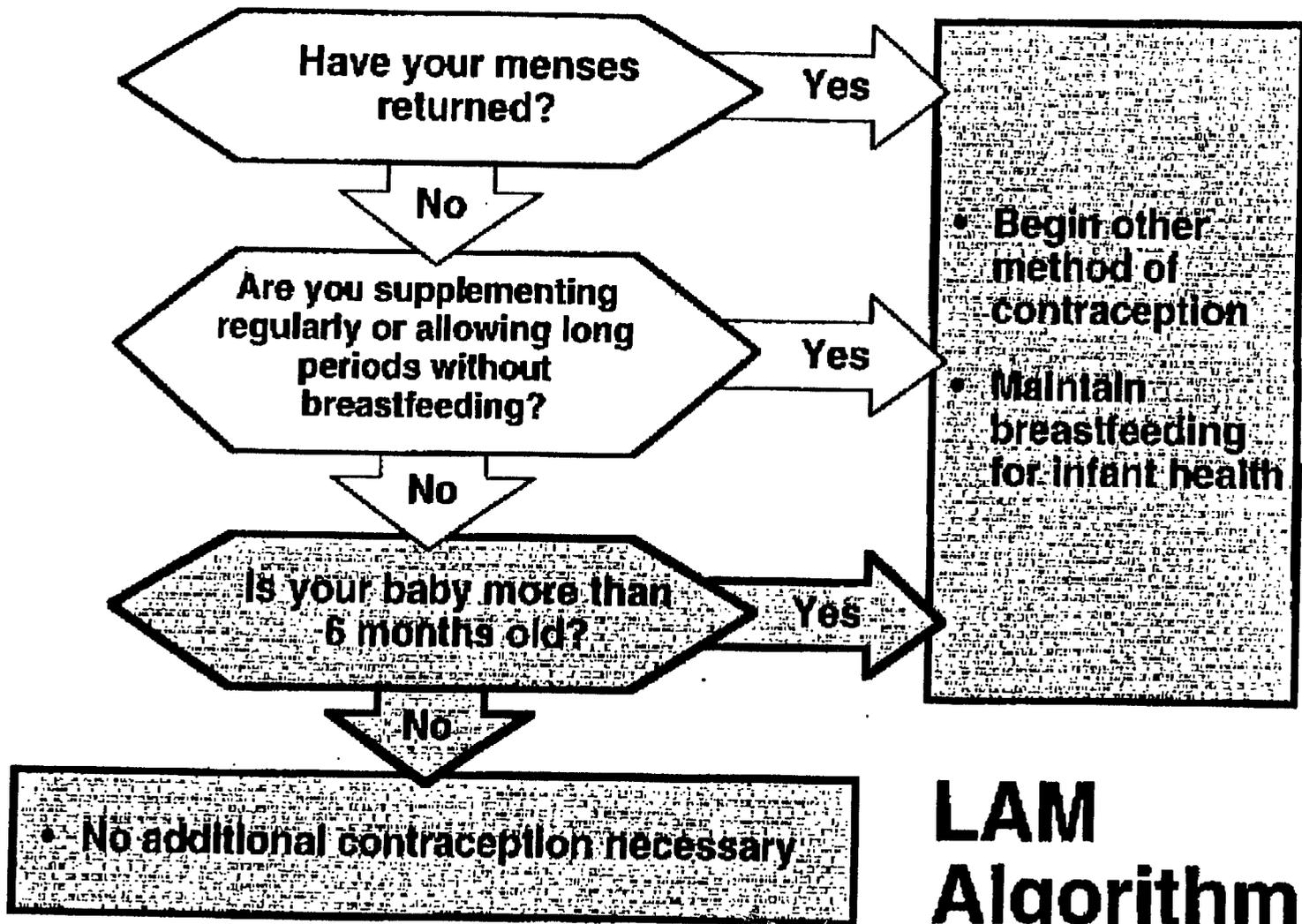
LAM Algorithm

Source: Institute for Reproductive Health, 1994.



LAM Algorithm

Source: Institute for Reproductive Health, 1994.

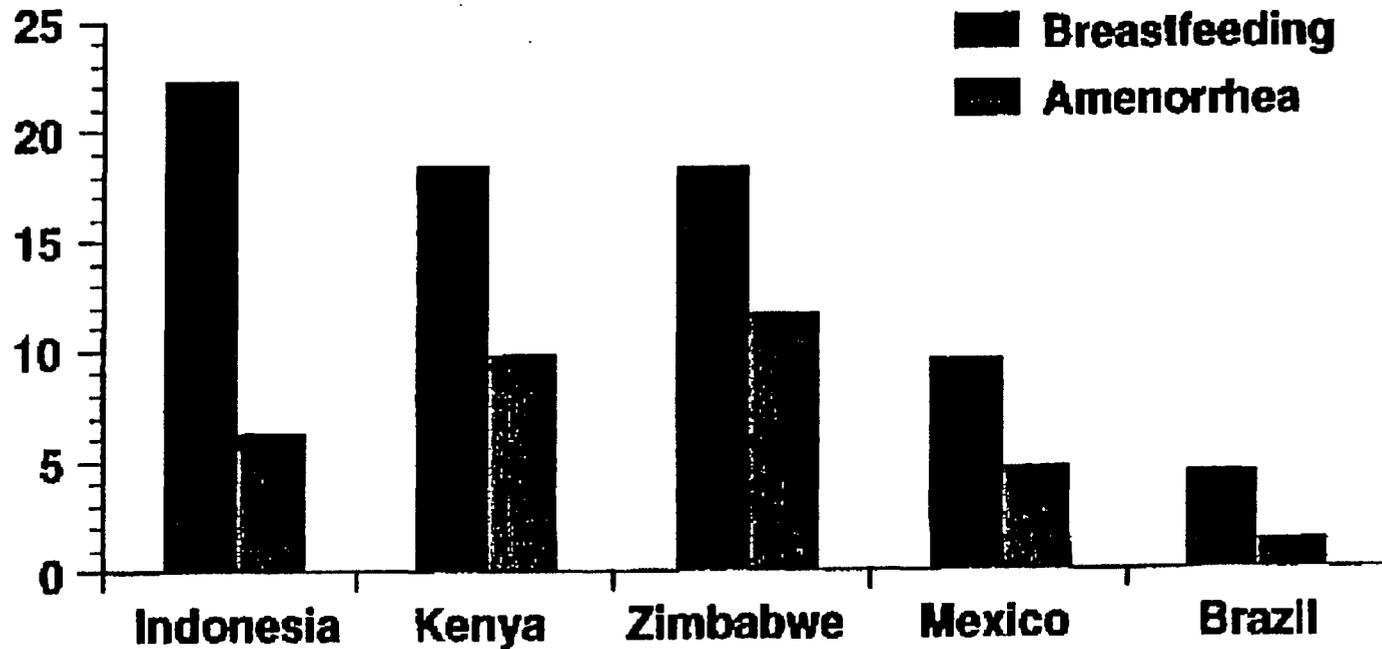


Source: Institute for Reproductive Health, 1994.

Adaptations of LAM

Median Duration of Breastfeeding and Amenorrhea

Months



Source: Demographic and Health Surveys, 1988-91.

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Relying on Extended LAM

- **Modify time limit based on local conditions and practices**
- **Breastfeed prior to each supplementation**
- **Begin weaning foods at six months postpartum**

Beginning Another Method



Other Contraceptive Options for Breastfeeding Women

First Choice Non-hormonal Methods



Diaphragm



IUDs

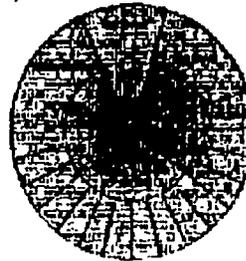


Male and
Female Condoms

Male and Female
Sterilization



Spermicides



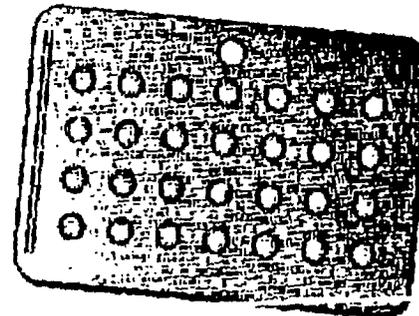
Natural
Family Planning



Other Contraceptive Options for Breastfeeding Women

Second Choice Progestin-only Methods

- Progestin-only pills (POPs)
- Injectables (DMPA, NET-EN)
- Subdermal implants (NORPLANT)

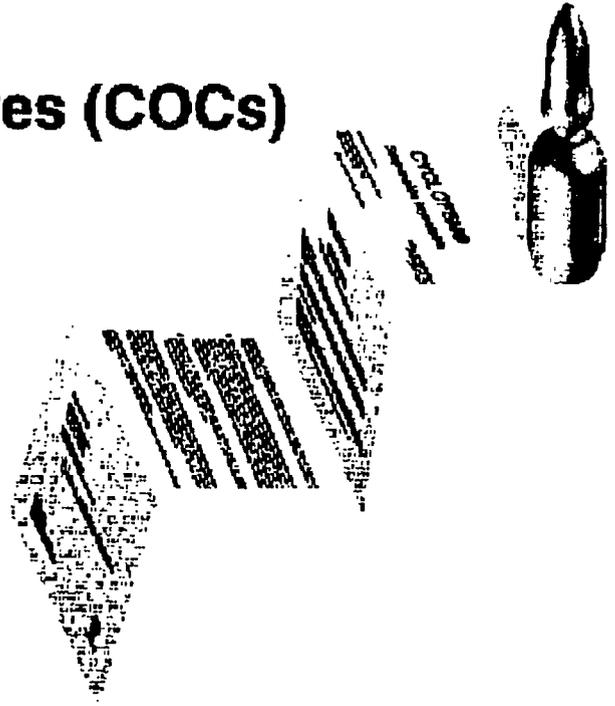
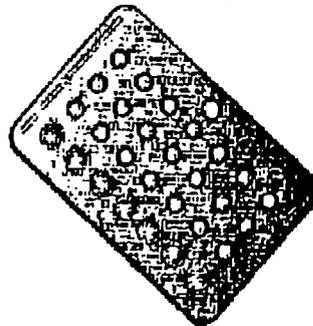


Other Contraceptive Options for Breastfeeding Women

Third Choice

Methods Containing Estrogen

- **Combined oral contraceptives (COCs)**
- **Monthly injectables (Mesigyna, Cyclofem)**



Other Considerations

- **Re-education necessary for policy-makers and care providers**
- **Overcomes restrictive policies and practices**

Summary of LAM

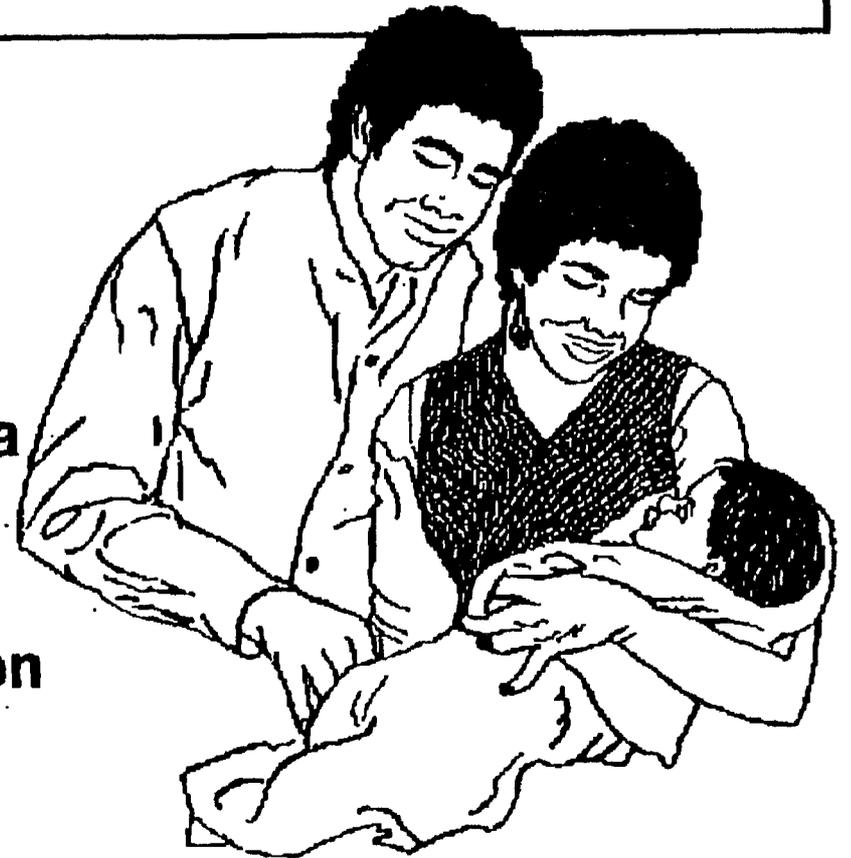
Intensive Breastfeeding



Lactational Amenorrhea



Pregnancy Protection



Conclusion

Lactational Amenorrhea Method:

- **Safe and effective**
- **Scientifically validated**
- **Universally available**
- **Many advantages/few disadvantages**
- **Requires counseling**
- **Viable contraceptive option**

The Lactational Amenorrhea Method (LAM): A postpartum introductory family planning method with policy and program implications

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Abstract

It is well accepted that breastfeeding contributes significantly to child survival and child nutrition. Healthful child spacing is associated with improved birth outcomes and maternal recovery. On a population basis, breastfeeding may contribute more to birth spacing than all family planning use combined in many countries. However, while breastfeeding does provide a period of infertility, until recently, there was no reliable way for an individual woman to capitalize on this lactational infertility for her own efficacious child spacing. The Lactational Amenorrhea Method (LAM) is a new introductory family planning method that simultaneously promotes child spacing and breastfeeding, with its optimal nutrition and disease preventive benefits for the infant. LAM, as it is called, is based on the utilization of lactational infertility for protection from pregnancy and indicates the time for the introduction of a complementary family planning method. LAM is recommended for up to six months postpartum for women who are fully or nearly fully breastfeeding and amenorrheic, and relies on the maintenance of appropriate breastfeeding practices to prolong lactational infertility, with the concomitant delay in menses return. A recent clinical trial confirmed the theoretical 98% or higher effectiveness of the method and field trials are demonstrating its acceptability. Nonetheless, some demographers and family planning organizations continue to debate its value. The development, efficacy, and sequelae of the method are presented using data from several studies by the authors.

Introduction

The Lactational Amenorrhea Method [1] as presented in Figure 1 was developed following a consensus meeting held at Georgetown University. It was based primarily on previously published approaches [2-6], incorporating the results of the Bellagio Consensus meeting held in 1988 [7,8], and was designed to serve as a guide from which a program could develop a project-appropriate protocol. Today, LAM programs are ongoing or planned in at least 15 countries, each program modifying the guidance to achieve culturally appropriate presentation and understanding of the parameters.

The parameters of LAM have been available in the literature for many years [2-4]. However, support by family planning policy-makers and program planners is not yet universal. Policy on this issue is in flux; a few international organizations have openly endorsed LAM or the Bellagio guidelines, while others have yet to consider either positively. The trend has been toward the better understanding of the scientific basis, which should lead, in turn, to acceptance over time.

The Lactational Amenorrhea Method

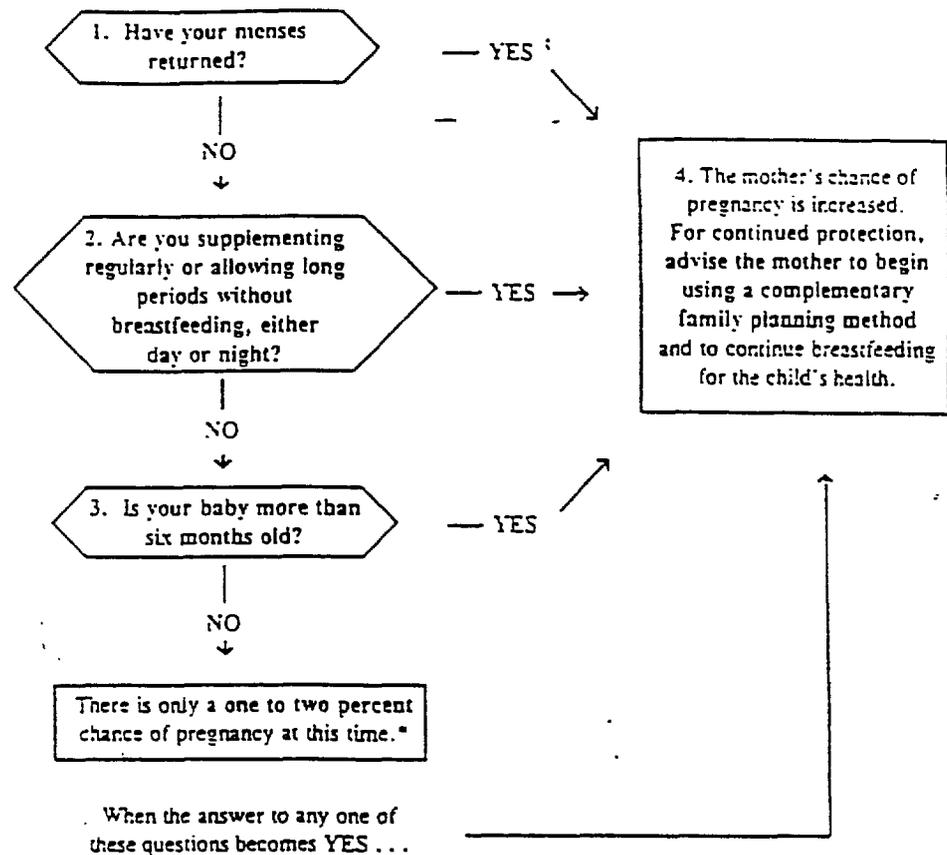
LAM is a new, introductory hormonal method for family planning which strengthens existing programs and may support acceptance of family planning in new populations with no experience with family planning. Consistent scientific evidence demonstrates that a breastfeeding woman who is less than six months postpartum and amenorrheic is at low risk of unplanned pregnancy [8-10]. Additionally, if she is fully or nearly fully breastfeeding [11]* she significantly increases both the delay in menses return and the risk of conception during amenorrhea [12,13]. Hence, full or nearly full breastfeeding increases her chance of being able to rely on LAM for six months. The method dictates that the mother is asked about three criteria: (1) if she is amenorrheic; (2) if she is fully or nearly fully breastfeeding; and (3) if her baby is less than six months old. If she meets these three criteria, or as long as she can answer 'no' to each of the three questions as presented in Figure 1, she is counseled that her risk of pregnancy is less than 2% and she does not need a complementary method yet, but if any of these change, the fourth parameter applies - she should use a form of family planning complementary to breastfeeding in order to continue to achieve this same high efficacy [1].

*Fully or nearly fully' breastfeeding covers a range of behaviors, from exclusive breastfeeding to irregular supplementation, from 100% of all feeding episodes being breastfeeds to about 85-90%. This includes behaviors from exclusive to high partial according to accepted definitions. In all cases, it is recommended, but not demanded, that feeding be day and night, on demand, with no intervals of greater than about six hours between breastfeeds (see Figure 2 and Ref 1,11).

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LAM: Lactational Amenorrhea Method

Ask the mother, or advise her to ask herself these three questions:



*However, the mother may choose to use a complementary method at any time.

Figure 1. The Lactational Amenorrhea Method

Physiology

The physiological basis of LAM is drawn from the work cited above. Review articles are available [14-16] which outline the relationship between the intensity and duration of suckling and the hypothalamic-pituitary-ovarian feedback system. The central nervous system is the limiting controller of reproductive function with the central signal initiator (the hypothalamus) reacting to the suckling stimulus by changing the neuroendocrine cascade mediated by the level and rhythm of release of

gonadotropin releasing hormone (GnRH). This in turn, changes the pulsatile secretion of prolactin (PRL) and the gonadotropic hormones, follicle stimulating hormone (FSH) and luteinizing hormone (LH). The result is decreased and disorganized follicular development. While suckling continues, there is also a paradoxical negative feedback loop; if estrogen rises, there is increased suppression of LH and FSH, rather than peaks, or more frequent pulsing, seen in response to estrogen rise during the menstrual cycle of non-lactating women. The result is that intensively lactating women are more likely to have both a delay in menses return and an anovulatory first bleeding episode [12].

Breastfeeding patterns are highly variable. The following diagram defines the different patterns and indicates their fertility impact.

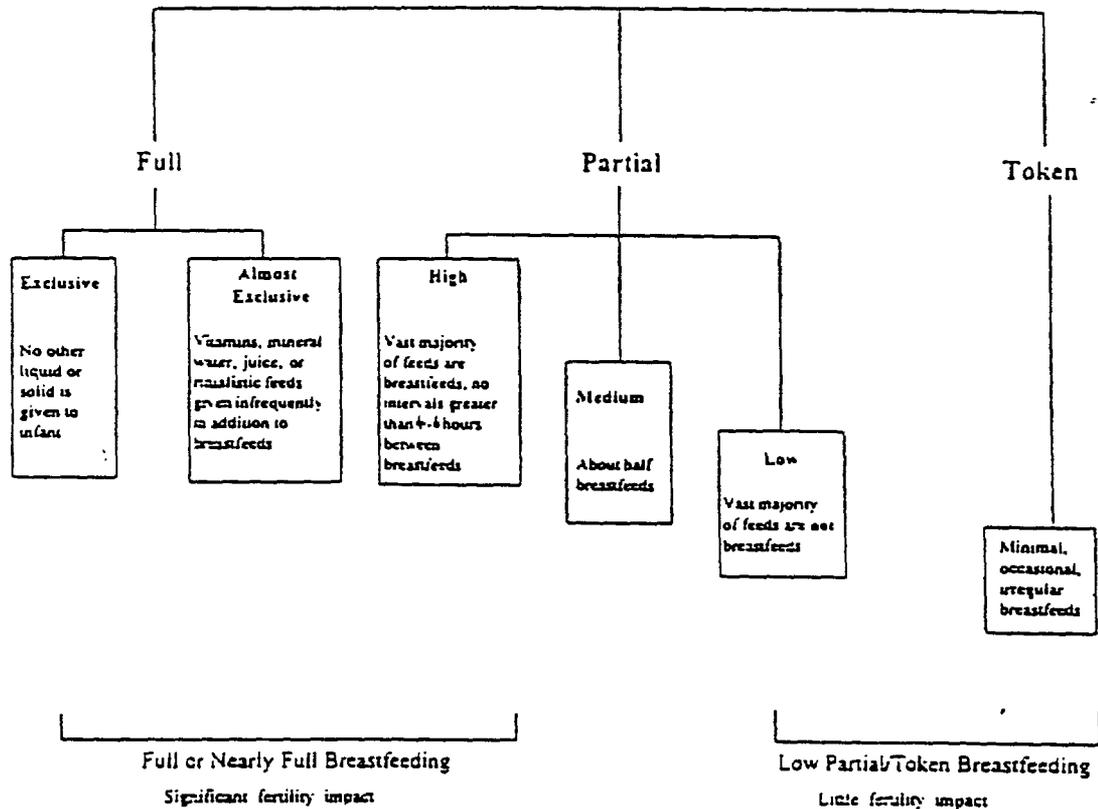


Figure 2. Schema for breastfeeding definition

Each LAM criterion has a basis in physiological research. Menses return has long been shown in demographic studies to herald increased fertility, a finding that has been sustained in clinical research [4,6,9,12-14]. Although fertility remains significantly suppressed after bleeding resumes if frequency of feeds remains high and breastfeeding remains nearly exclusive, menses remains the most significant proxy for fertility return [9].

The importance of intensive breastfeeding has been well defended in research for more than 20 years. However, it remains necessary to reiterate that less than full breastfeeding is associated with a gradual increase in the occurrence of ovulation prior to menses and with a decreased duration of amenorrhea [9,12]. Gray et al. show graphically that, when controlling for the duration of each feed, there is more than a doubling of the risk of ovulating prior to menses when frequency is reduced from 15 to 10, or from 10 to 5 times daily. This study also shows that the risk of ovulating doubles when the percentage of all feeds that are breastfeeds is reduced from 100% to 75%, or from 75% to 50%. Clinically, this creates a small and gradual, but distinct, increase in pregnancy. Clients should be informed that the closer to 100% exclusive breastfeeding with daily frequencies of greater than 10, the higher the potential efficacy of LAM. However, the method does allow for the reality of infant feeding patterns while still assuring high efficacy by defining the applicability of 'nearly fully' breastfeeding (about 85-100% of breastfeeds), and recommending 'day and night' to keep frequency high.

A six-month time frame is the one of the three criteria with the least direct fertility impact. This is because there is a gradual increase in the risk of ovulating prior to menses over the postpartum months; there is no sudden shift exactly at six months. This point in time was selected for LAM based on the increasing risk of ovulation over time, and specifically because weaning should commence at this time, so there will tend to be longer intervals between feeds and more supplementation.

Clinical trials

The Lactational Amenorrhea Method has undergone clinical trial in Santiago, Chile [17-20]. A case-control intervention study was established in which the control cohort was ascertained prior to the development of an organized breastfeeding support program at the Pontificia Universidad Católica de Chile. The intervention included prenatal education, immediate postpartum breastfeeding, rooming-in, decreased in-hospital use of formula, the establishment of a follow-up clinic, and the offer of LAM as an introductory family planning method. In this study, 'full or nearly full' breastfeeding was defined as no more than 1 x 2 ounce supplement of any liquid or solid per week. All variables are comparable between the control and intervention groups with the exception of parity. Major variables were later controlled for parity to assure that the results were not affected by this disparity. The difference in maternal weight is of no clinical significance (Table 1).

LAM proved highly efficacious. More than 56% were able to continue LAM use through six months, with less than 0.5% pregnancy rate by six-month life-table (Table 2). Figure 3 clearly shows the impact of the intervention, more than doubling the percentage of women who achieved six months meeting LAM criteria. The percentage of women using no family planning method at six months was reduced from 22% to 9%.

Table 1. Description of Santiago, Chile study population

	<i>Control group</i>	<i>Intervention group</i>
<i>n</i>	313	422
Age (mean)	26.8	27.1
% 'higher' education	45.5	43.8
% Para 1	46.0	33.6
Maternal weight (kg) (mean)	61.0	62.3
Birth weight (g) (mean)	3424	3428

Table 2. Life-table analysis of LAM efficacy

<i>Month</i>	<i>No of pregnancies</i>	<i>Women in month</i>	<i>Pregnancy rate</i>
1	0	384	0.0000
2	0	327	0.0000
3	0	272	0.0000
4	0	243	0.0000
5	0	224	0.0000
6	1	221	0.0045

The LAM acceptors had received guidance to begin another method of family planning in a timely manner, so the impact of this method should last well beyond the six months of its use. Although LAM continuation was only 71% by three months and 58% by six months, the percentage pregnant remains lower among the group of initial LAM acceptors, albeit not significantly. At 6 months, only one percent of the intervention group have become pregnant, while 1.7% of the control group have become pregnant; this difference continues to 12 months (8.9% vs 10.3%). As 18 months approaches, several of the pregnancies that occurred were planned by parents who wished to have about a two-year interval between births. Apparently, increased emphasis on the importance of longer child spacing for the health of the mother and the child is appropriate.

As a 'side-effect' of this method and the increased breastfeeding support, patterns of breastfeeding were significantly improved (Table 3). Again, this impact lasted well beyond the six months of intervention. Figure 3 shows an increase in the duration of full breastfeeding and amenorrhea in the intervention group. Breastfeeding patterns, both among exclusive and partial breastfeeders, became more intensive after the intervention. The result was that twice as many mothers achieved the pattern of optimal breastfeeding recommended by WHO: exclusive breastfeeding for six months, followed by supplemental breastfeeding thereafter. Not only was breastfeeding prolonged by these optimal patterns, but the duration of amenorrhea also was extended.

Table 3. Percentage of women still breastfeeding by month postpartum

Month	Control	Intervention
6	76	89
12	23	36
18	5	13

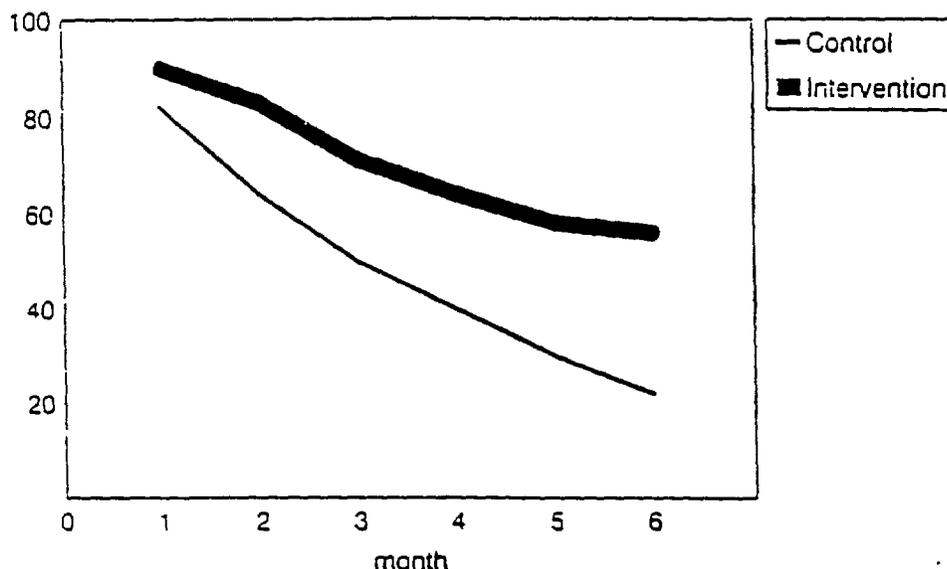


Figure 3. Percentage fully lactating and amenorrheic by month postpartum

Family Health International is now completing two studies of the Bellagio Guidelines/LAM in the Philippines and in Pakistan. Preliminary analyses are reported to be yielding similar findings [21].

Field trials

LAM was introduced as a family planning method option in four Centro Medico de Orientacion y Planificacion Familiar (CEMOPLAF) free-standing family planning delivery sites in Ecuador [22]. Each acceptance was credited 0.25 couple-years protection (CYP) in the management information system of the organization [23]. Results confirm the acceptability and efficacy of this method. Furthermore, the introduction of IUDs during breastfeeding began earlier, based on LAM criteria. This was primarily because the service providers trusted LAM and were willing to do an IUD insertion using LAM criteria, rather than demanding a costly pregnancy test, or

asking the mother to return later when her menses resumed, which might prove to be too late.

The result was an increase in total family planning acceptors, an increase in clinic attendance in areas where modern methods were not highly acceptable, an increase in the timely use of complementary family planning among breastfeeding women, and the recruitment into family planning of persons who might have been reticent in the past (Figure 4). Since these clinics now provide LAM, with the concomitant support of optimal breastfeeding, they are now providing a maternal and child health intervention that has been shown to save millions of lives every year worldwide. The CEMOPLAF staff were encouraged by this project, reporting that the introduction of LAM has made their policies, programs and norms for pregnant and postpartum clients more concrete and has helped improve the quality of care. In light of LAM's benefits to their clients and to their overall services, they subsequently have expanded services to all 20 clinics and into their outreach strategy.

Figure 4. The results of a process analysis of LAM use in Ecuador

LAM:

- is acceptable (82% of all new clients, 31% of less than 6 months postpartum)
- attracts first time family planning users (73%)
- is used correctly (77%), with two visits (90%)
- creates satisfied clients (75%)
- allows for IUD insertion prior to menses return
- serves as a tie to other health programs

Other field trials have been carried out through mother-to-mother breastfeeding groups in Guatemala and Honduras. These studies have shown us the importance of the involvement of the family planning program in LAM to assist in the timely introduction of the complementary methods. They have further illustrated the importance of maintaining the three criteria and the fourth parameter, the timely introduction of a complementary form of family planning, in a single message unit, such as the algorithm. When the message is presented as three separate messages in general counseling, it is apparently harder to remember and retain all elements.

Planned LAM research

Current research is concentrating on three areas:

- Assessing the importance and flexibility of each of the three criteria

- Developing an extended LAM approach (LAM II)
- Addressing program issues, including further definition of program initiation procedures, continuing assessment of acceptance and efficacy, and examining the timely introduction of complementary contraceptives during breastfeeding.

The importance and flexibility of each of the three criteria

Based on the physiological research presented above, we are aware that the LAM guidelines are very conservative; each of the three criteria has significant flexibility and may be loosely interpreted and still provide significant protection. Six months was chosen since this is the point in time when women are asked to begin supplementation. However, we know that continuing high breastfeeding frequency by breastfeeding prior to each supplemental feed can extend both amenorrhea and infertility. Exclusive breastfeeding is not necessary, although the closer to exclusive breastfeeding, with high frequency and short intervals between feeds, the more likely fertility will be delayed and that menses will be predictive of fertility return. A recently published article states that the intensity of breastfeeding may be the least important of the three criteria [10]. However, it is clear from this work and that of many others [6,9,12-14] that more intensive breastfeeding is associated with longer durations of infertility and fewer pre-bleeding pregnancies. Even menses, as an indication of fertility return, has some flexibility; the first ovulation is often associated with inadequacies in the luteal phase and other hormonal parameters [9,24]. Therefore, much work remains to fully explore the possibilities of expanding or extending each criterion.

Extended LAM

Due to worldwide practices relying on lactational amenorrhea beyond six months, we are now exploring an extended method. Some centers have already begun, independently, to experiment with LAM-9, a nine-month variant, and women who have self-selected to extend LAM are being studied in several settings. A recent review of data from Rwanda, where women rely on LAM-9 (using LAM for six months and then continuing to rely on amenorrhea while breastfeeding first before each supplement is given, for up to nine months) found no pregnancies among 419 acceptors. Even if a percentage of those lost-to-follow-up ($n=26$) were presumed to have become pregnant, the efficacy remains high [25].

It may be possible to create an even more extended LAM, LAM-12, in some settings where intensive breastfeeding and sustained amenorrhea are the norm into the second year postpartum. The issue becomes whether the program or the woman can accept the potential for increasing pregnancy rates, although the rates may remain very small. Such a method would demand that breastfeeding frequency remains high and that breastfeeding precedes supplemental feeds. Hence, a risk-benefit situation

would arise, with informed choice education of the mother becoming even more important as the pregnancy risk might increase from the less than 1% risk (for LAM) to a projected 3-6% for the potential additional six-month extension [9,10]. This level of pregnancy risk might well be justified and acceptable among women who both live in underserved areas, unable to access a steady supply of family planning supplies, and practice sustained breastfeeding with sustained amenorrhea.

Programmatic questions

Previous theory has been reconfirmed through analysis and evaluation of field trials in several countries: there is a need to use consistent messages in teaching LAM and retention of all criteria can be enhanced by presentation as an algorithm. Where the algorithm was dropped in favor of discussion, retention of all three criteria was less. Practical program issues, including efficacy, acceptability, and timely acceptance of a complementary family planning method, will be assessed in two ways: (1) a multicenter trial, primarily at academic institutions, and (2) expanded field program studies. The first approach is a 10-12 site worldwide Multicenter Trial which has been initiated by the Institute for Reproductive Health and which will be co-funded by the World Health Organization Special Programme for Human Reproduction, and the Rockefeller 'South-to-South' program. Data will be collected to assess acceptability, efficacy and patient guidance.

A series of field operational research projects are and will be addressing these and other specific questions. The CEMOPLAF study, now nearing an end, is also assessing method continuation, method use in indigenous populations, and method acceptability in community based distribution. Studies planned in Africa and Asia will address the use of a management information system, and will assess method introduction in more intensively breastfeeding, but less intensively contraceptive, populations.

Issue and responses

This section addresses the three most often raised concerns about the initiation of LAM and breastfeeding for its fertility impact, and explores reasons why some professional groups may be hesitant to accept the science of breastfeeding, fertility and LAM.

Three concerns are often voiced when policy and program decision makers are first considering LAM:

1. *'Our women cannot use LAM; they are malnourished'*

This statement often is made out of real concern for the health and well-being of the women in the area served. It is necessary to consider the implications of any

new intervention on all who may be touched by it. In order to address this concern, studies were instituted and/or identified and researchers were asked to participate in an 'Expert Panel' presentation and discussion. The proceedings document the outcome of the debate: If intervention is possible and affordable, that intervention should be to support continued breastfeeding and to feed the mother [26]. One researcher points out that there really is no choice if child survival is weighed into the decision while another shows that the maternal supplement has a negligible impact on fertility return. If the concern is the maternal nutritional status, intervention should begin well before the girl-child reaches her reproductive years.

2. *'Our women cannot use LAM; they don't exclusively breastfeed'*

Worldwide, more than 90% of women breastfeed, but few exclusively breastfeed for the optimal six months. Three issues are relevant here: (i) LAM does not demand exclusive breastfeeding; (ii) with sufficient support, women can exclusively breastfeed; and (iii) women who rely on breastfeeding for their contraception are more likely to change to exclusive breastfeeding [27,28]. LAM allows for some supplementation, but more importantly, when women are informed of the importance of close to full breastfeeding for contraceptive efficacy, they do improve their breastfeeding patterns.

Although it is not often raised as a deterrent to LAM use, prolonged exclusive breastfeeding, well past six months, also has negative health effects. The extended LAM guidance encourages timely commencement of weaning. The evaluation of the project in Rwanda, presented above, showed that LAM-9 resulted in improved weaning practices. In sum, the LAM method supports changes in infant feeding practice that benefit both mother and child.

3. *'Our women cannot use LAM; they return to work'*

In truth, all women are working women. Whether it is in the household, in agriculture, or in the organized labor sector, the realities of life will separate women from their infants for varying periods of time. How can they use LAM? First, it must be recognized that not all LAM users will use it for the full six months; the return to organized work sector may be the moment of 'long intervals between breastfeeds' that indicates that LAM can no longer be relied upon. However, with proper instruction, women may continue to exclusively breastfeed by expressing their milk frequently, eliciting hormonal response similar to that of the infant at the breast. This can certainly allow the continuation of LAM use when intervals of separation are brief. However, the efficacy of LAM will probably decline if milk expression begins to replace the infant at the breast (see Footnote and Figure 2, on definitions).

Why have some policy makers, demographers, medical professionals, and even reproductive health and family planning professionals, found it difficult to accept LAM? At a recent international meeting, a round-table was held to discuss this issue [29]. Several reasons were suggested by that group: People cling to their current practices and vested interests; messages have been inconsistent; and skepticism is widespread concerning women's ability to change breastfeeding behaviors and consequent fertility impact. The reported studies have made it virtually impossible for scientific analysts to deny the impact of the method. However, much work remains to fully educate policy and program leaders as well as those who doubt women's ability to change.

Demographers tend to address breastfeeding and its effect on fertility as a constant. In creating mathematical models, assumptions of an individual's ability to control or change cultural norms are rare. Rather, there is an assumption that previously measured biological determinants are constant. With simulation models, however, the demographer may explore different scenarios that they design. A 1992 article [30] used simulation models and data collected from women who were not users of LAM and concluded that LAM carries high risk. The article argues that women will delay adoption of a complementary method, resulting in unplanned pregnancies. In such simulations, assumptions may dictate outcomes. The actual return of fertility is gradual (see physiology section). Operational research allows actual assessment of women's behavior [31]; to date, research has shown that, in practice, women who choose LAM as their introductory method do adopt a complementary method, and do so at the same if not higher rates than others.

Changing the beliefs and practices of medical professionals is also a complex issue. As an approach that has implications for several disciplines (i.e. obstetrics/gynecology, pediatrics, nursing, nutrition, etc.), LAM should be integrated into all. However, well educated service providers may have difficulty accepting LAM because it was not part of their training. It is also a user-controlled method, and as such, it is not typical of curative medical responses. As with other preventive techniques, it has been difficult for practitioners to receive reimbursement for their time and counsel in support of breastfeeding under the current fee for service/fee for commodity model of curative care reimbursement.

There may be, also, an expressed concern for the woman, that the method may be too difficult for her, or that it takes too much time to teach her, or that she may misunderstand and use it incorrectly. The results of the studies cited illustrate that women can learn the method and practice it correctly, returning for other methods in a timely manner. With growing international interest concerning gender issues, this aspect of provider-client trust and respect may become central in the discussion of the provision of all family planning methods and services.

Programmatically, such an intervention can result in cost savings. Financial savings are becoming an important programmatic consideration, as donor agencies increasingly stress sustainability and self-reliance in family planning and related programming. The savings can accrue from the breastfeeding support activities and from reduced need for double coverage contraceptive use. Table 4 illustrates the financial savings in personnel alone when a maternity facility converts to

breastfeeding-supportive rooming-in [17,32]. When all other costs of the change (retraining, reorganization, room conversions, etc.) are capitalized over ten years, there remains an annual cost savings of 10–15%. There are also cost savings from the reduced contraceptive commodity needs. LAM, on average, provides more than three months of contraceptive protection. This results in a direct cost saving since the alternative method need not be purchased for those three months. It also offers an indirect saving, in that the woman now has time to seek out the best service site and the best method for herself. It may be argued that immediate postpartum methods, such as IUDs, are most likely to result in adequate child spacing. This is a valid argument in many settings; however, there is no program in the world where immediate postpartum insertion is 100% accepted. LAM is a perfect adjunct method in such programs for those who may not be prepared to accept an IUD or another new family planning commodity in the confusing day after childbirth, and who may need time to consider all options.

Table 4. Cost savings accrued with rooming-in

	<i>Control</i>	<i>Intervention</i>
Daily patient census	23	23
Nurse FTEs	4.5	3
Aide FTEs	9	6
Nurse cost/patient	\$1.97	\$1.28
Aide cost/patient	\$1.60	\$1.07
Cost/patient day	\$3.57	\$2.35
34% Saving in personnel costs		

Within the renewed international interest in reproductive health, postpartum contraception remains an issue. The new postpartum approach has emphasized the need to consider every postpartum woman as a breastfeeding mother [33]. This is logical, since about 95% of babies worldwide are breastfed and massive campaigns are underway to increase this percentage [34]. This challenges the assumption that women need immediate postpartum protection. Another assumption is that women will not return for family planning services if they are not provided in the maternity. LAM naturally addresses both issues, fitting well into postpartum programs that offer comprehensive care and providing guidance for the woman to know when another method is needed. This becomes particularly important in patient populations where women have been relying solely on lactational amenorrhea for child spacing in the past.

As part of an effort to address the concerns of reproductive health and family planning care providers, a listing of 20 reasons to consider LAM use in family planning programs has been compiled (Figure 5). The reference list for this article includes research to substantiate each of the 20 listings. This list and other print and audiovisual materials designed to promote breastfeeding as a proximate determinant

of fertility, and to educate concerning LAM and the appropriate introduction of complementary family planning during breastfeeding, are being widely distributed.

Lactational Amenorrhea Method

20 Reasons to Make it Part of Your Program

- ✓ LAM is highly effective as a family planning method (99.5 percent by six-month life table in clinical study).
- ✓ LAM is based on comprehensive scientific investigation.
- ✓ LAM was developed by family planning service program representatives and has been used in child survival and breastfeeding programs as well.
- ✓ LAM serves as a link to other reproductive and preventative health services.
- ✓ LAM allows for a great deal of user "error" without a significant increase in pregnancy rates.
- ✓ LAM can be offered and used successfully as a family planning method in a variety of settings.
- ✓ LAM demands no logistic system after it is taught.
- ✓ LAM provides an average CYP (Couple Year Protection) of 0.25.
- ✓ LAM attracts new family planning users.
- ✓ LAM directly contributes to family planning prevalence through increased acceptance rates.
- ✓ LAM promotes timely introduction of complementary family planning among breastfeeding women, which indirectly contributes to increased family planning prevalence.
- ✓ LAM is acceptable to most religious groups.
- ✓ LAM gives women time to choose which complementary method they prefer.
- ✓ LAM gives postpartum women in many settings the time they need to prepare for a permanent method of family planning by getting their households in order, finding child care, saving money, having all necessary releases signed.
- ✓ LAM empowers women by putting them personally in control, and individualizes postpartum counseling.
- ✓ LAM is inexpensive and, in fact, saves money for the family.
- ✓ Women worldwide believe that breastfeeding can be used for child spacing. LAM builds on these existing beliefs by providing parameters for the efficacious use of breastfeeding as a contraceptive.
- ✓ LAM has positive effects on the environment by reducing the need for plastics and dairy farming, thus decreasing industrial waste.
- ✓ LAM encourages timely weaning, and
- ✓ By encouraging optimal breastfeeding practices, LAM has the extraordinary side effects of improved infant nutrition, increased child survival, and maternal health benefits.

Figure 5. Reasons to include LAM in a family planning program

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Conclusions

Breastfeeding has long been recognized as a major proximate determinant of fertility. In fact, if breastfeeding were to decline, it would be necessary to increase contraceptive prevalence several-fold in many countries just to replace the lost fertility protection [35]. LAM is an additional efficacious postpartum method that, by design, encourages both improved breastfeeding practices as well as timely introduction of complementary family planning during breastfeeding. Since it builds on the widespread existing belief that breastfeeding does provide fertility suppression, it attracts new users to consider family planning for the first time. It is appropriate in all family planning settings and in most health services, and expands family planning options. The side-effects of LAM are unique: improved breastfeeding practices resulting in improved infant and maternal health, and satisfied family planning workers who are able to contribute more fully to the reproductive health care of the mother and her community.

Acknowledgements

This paper was presented, in part, at the 40th Anniversary Meeting of the International Planned Parenthood Federation, New Delhi, India, October 1992, at the Meeting of the Society for the Advancement of Contraception, Barcelona, Spain, October 1992, and at the Annual Meeting of the American Public Health Association, Washington, November 1992.

Support for this publication was provided by the Institute for Reproductive Health, Georgetown University, under cooperative agreement with the Agency for International Development (A.I.D.) (DPE-3040-A-00-5064-01). The views expressed by the authors do not necessarily reflect the views or policies of A.I.D., Georgetown University or the other institutions represented.

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MS received 15 Oct. 93.

Accepted for publication 11 Apr. 94.

Resumé

C'est un fait reconnu que l'allaitement naturel par la mère contribue de façon significative à la survie du nourrisson et à sa nutrition. L'espacement des naissances est associé à des accouchements et des retours de couches plus satisfaisants. Au niveau de la population, l'allaitement au sein contribue sans doute davantage à l'espacement des naissances que toutes les autres méthodes de planning familial réunies. Il n'en reste pas moins que, si l'allaitement occasionne une période de stérilité, la femme n'avait jusqu'ici aucun moyen fiable de tourner à son avantage cette stérilité du temps de lactation pour espacer efficacement les naissances. La méthode de l'aménorrhée de la lactation (MAL) est une méthode de planning familial nouvellement introduite qui favorise simultanément l'espacement des naissances et l'allaitement au sein, tout en assurant des conditions optimales de nutrition et la prévention de maladies pour l'enfant. Cette méthode fait appel à la stérilité de la lactation comme protection contre une nouvelle grossesse et permet de déceler le moment où il devient nécessaire de passer à une méthode supplémentaire de contraception. Il est recommandé aux femmes d'avoir recours à la MAL jusqu'à six mois après l'accouchement, tant qu'elles allaitent entièrement, ou presque, et que les règles n'ont pas reparu. Cette méthode table sur la poursuite de l'allaitement pour prolonger la stérilité de la lactation et retarder le retour des menstruations. Une récente étude clinique a confirmé l'efficacité théorique à 98%, voire plus, de cette méthode et les essais dans la population en démontrent l'acceptabilité. Néanmoins, certains démographes et certaines organisations de planning familial continuent d'en débattre la valeur. Le développement, l'utilité et les séquelles de cette méthode sont présentés en s'appuyant sur les résultats de plusieurs études effectuées par les auteurs.

Resumen

Se acepta en general que el amamantamiento contribuye significativamente a la supervivencia y nutrición de los niños. El espaciamento sano de los niños se asocia con mejores resultados de los nacimientos y la recuperación materna. Tomando una base demográfica, es posible que el amamantamiento contribuya más al espaciamento de los nacimientos que todo el uso combinado de la planificación familiar. Sin embargo, si bien el amamantamiento proporciona un período de infecundidad, hasta hace poco no había una forma segura que permitiera a las mujeres aprovechar esta infecundidad por amamantamiento para realizar su propio espaciamento eficaz de los nacimientos. El Método de Amenorrea por Lactancia (LAM) es un nuevo método introductorio de la planificación familiar que promueve simultáneamente el espaciamento de los nacimientos y el amamantamiento, con sus beneficios óptimos de nutrición y prevención de enfermedades para el niño. El LAM se basa en la utilización de la infecundidad por lactancia como prevención del embarazo e indica el momento de introducción de un método complementario de planificación familiar. El LAM se recomienda durante un período máximo de seis meses con posterioridad al parto para las mujeres que amamantan plenamente o casi plenamente y están en amenorrea, y depende del mantenimiento de prácticas apropiadas de amamantamiento para prolongar la infecundidad por lactancia, con la demora concomitante en el retorno de la menstruación. Un ensayo clínico reciente confirmó la eficacia teórica del 98% o superior del método y los ensayos de campo están demostrando su aceptabilidad. Sin embargo, algunos demógrafos y organizaciones de planificación familiar continúan debatiendo su valor. Se presenta el desarrollo, la eficacia y las secuelas del método utilizando datos de diversos estudios de los autores.

securing haemostasis in animal models, and adrenaline and polidocanol have been shown to cause significant tissue damage in these models.¹¹ However, the relevance of these acute models to man is unclear, and data from all the controlled studies of injection sclerotherapy in human beings refute these findings. There have been reports of perforation associated with the injection of large volumes of sclerosant^{12,13} and of a substantial increase in ulcer size in some patients treated with adrenaline and polidocanol.⁴ Therefore, it seems prudent to inject no more than 2 ml of sclerosants such as polidocanol or ethanolamine at any one site. This study indicates that injection treatment of bleeding peptic ulcers is best done by those experienced in the technique.

The results of two large meta-analyses^{9,10} show that laser treatment, thermal methods, and injection treatment are equally effective in the treatment of bleeding peptic ulcers. These data and the results of this trial indicate that injection treatment is an appropriate method for most district general hospitals. Therapeutic endoscopy should be available for all patients with upper gastrointestinal bleeding.¹⁰

We thank Sister Sue Hawkes, Sister Senga Middleton, and the nurses and other staff of the endoscopy unit, Oldchurch Hospital, for their help. We also thank Mr S. J. Day for statistical advice and medical and surgical colleagues for permission to study patients under their care.

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Clinical study of the lactational amenorrhoea method for family planning

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trans lacteal

The effect of breastfeeding on fertility is well known; however, its use as a method of family planning was, until recently, untested. In 1988, the Bellagio Consensus Conference proposed guidelines that became the basis for a method of family planning called the lactational amenorrhoea method (LAM). The principle of LAM is that a woman who continues to fully or nearly fully breastfeed her infant and who remains amenorrhoeic during the first 6 months postpartum is protected from pregnancy during that time. We have assessed this method in the context of a breastfeeding support intervention study of 422 middle-class women in urban Santiago, Chile. The cumulative 6-month life-table pregnancy rate was 0.45% among women who relied on LAM as their only family planning method (1 woman pregnant in month 6). The findings indicate that LAM, with its high acceptance and efficacy, is a viable method of family planning and can safely serve as an introductory method for breastfeeding women.

Lancet 1992; 339: 968-70.

Introduction

The influence of breastfeeding on the reestablishment of ovulation and fertility after childbirth¹⁻⁵ and on the birth

interval⁶⁻⁹ are well known. At the Bellagio Consensus Conference, Italy, in August, 1988, it was agreed that a mother who is fully or nearly fully breastfeeding her infant and who remains amenorrhoeic has a less than 2% chance of pregnancy during the first 6 months after childbirth.¹⁰ The agreement and the subsequent assessments of its validity were based on clinical data and hormonal profiles obtained prospectively.^{11,12} The guidance was then developed into the lactational amenorrhoea method (LAM).^{13,14} Whereas several groups have applied the guidance to pre-existing data to estimate efficacy or have followed cohorts to assess physiological changes,^{1,11,12} to our knowledge, there has been no clinical efficacy study of LAM, per se, presented as a family planning method option. We here report the findings of a clinical study in which LAM was offered as a family planning method in the context of a breastfeeding support programme.

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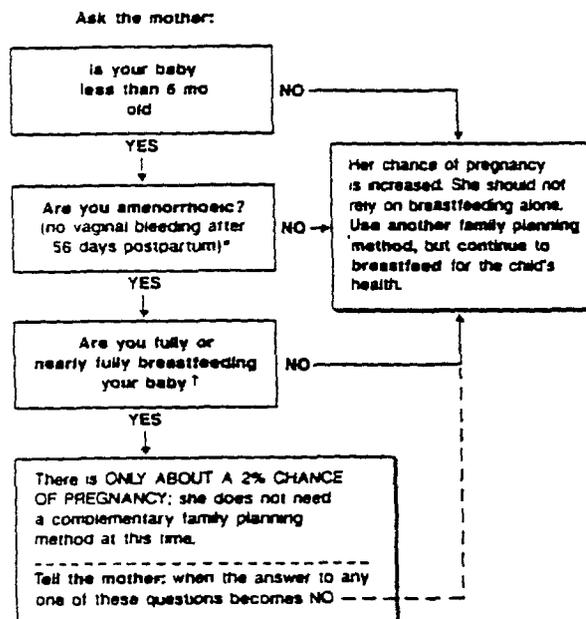
Subjects and methods

Subjects

Between Aug 1, 1988, and Sept 30, 1989, 422 mother/child pairs were entered into the study. The selection criteria for admission of the mother into the study were: age between 18 and 39 years, parity under 5, normal nutritional status, good health without previous history of infertility, normal breast examination, stable union, work situation compatible with 6 months of exclusive breastfeeding, term vaginal delivery, singleton birth with birthweight over 2500 g, and written consent of the couple. Pregnancy, delivery, and postpartum care were provided at the Hospital of the Pontificia Universidad Catolica de Chile. The women were generally middle class and lived in Santiago, Chile. All women were invited to take part as volunteers in a hospital-based programme for the promotion of breastfeeding for its child health and child spacing effects. Preliminary findings and details of the breastfeeding promotion programme designed for this study have been published elsewhere.^{15,16} The programme included training of the health team, breastfeeding education, and promotion in the prenatal outpatient clinic, early breastfeeding of newborn babies, support and supervision of breastfeeding techniques, rooming-in, and a free lactation clinic to address any difficulties related to breastfeeding.

Methods

Each woman was first interviewed between 7 and 10 days postpartum. During this visit, socioeconomic and health data were recorded, as well as data about pregnancy and delivery. Breastfeeding practices associated with the best outcomes for mother and child health were reinforced and the mother was told about contraceptive methods available locally (contraceptive pill, intrauterine device [IUD], barrier [condom, cap], natural family planning [NFP], and others [sterilisation, injectable contraceptives, coitus interruptus]). The women were also told about LAM as a temporary family planning option. LAM was defined as follows: if a woman continued to fully breastfeed and remained amenorrhoeic during the first 6 months postpartum, she would be protected against pregnancy for that time, without need for another contraceptive method (figure).^{10,14} The woman was also informed



Use of LAM for child spacing during first 6 months postpartum.

*Spotting that occurs during the first 56 days not regarded as menses.
 †"Full" breastfeeding includes exclusive or almost exclusive breastfeeding (allows occasional tastes of foods or water), day and night.
 "Nearly full" breastfeeding means that non-breast feeds are given. This study included only full breastfeeders.

TABLE 1—CHARACTERISTICS OF WOMEN STUDIED

	No	%
Age (yr)		
15-20	39	9.2
21-25	125	29.2
26-30	155	36.7
31-35	84	19.9
36-40	19	4.5
Parity		
1	142	33.6
2	161	38.1
≥3	119	28.3
Education		
Elementary	111	26.3
Secondary school	167	39.5
Technical	121	28.7
University	23	5.4
Total	422	100

that the risk of a new pregnancy was similar to that offered by other contraceptive methods. Each woman who decided to use LAM was also regularly reminded that when breastfeeding was supplemented with food or when menses restarted she would need a complementary family planning method to avoid pregnancy. Exclusive breastfeeding was encouraged as defined by international consensus.¹⁷ However, almost exclusive breastfeeders (allowing up to one supplemental feeding of not more than 60 ml per week) were regarded as full breastfeeders and within the LAM definition. Mothers were encouraged to maintain night feedings.

Follow-up visits were on days 30, 60, 90, 120, 150, and 180 postpartum in the outpatient clinic specially set up for this programme. Mother and child were seen together and the following indices were recorded: mother's weight, occurrence of vaginal bleeding or spotting, frequency of intercourse, use of other family planning methods, pregnancy, characteristics of breastfeeding (full, partial, discontinued), and number of breastfeeds over the past 24 hours; a breast or gynaecological examination was done if indicated. Data obtained for the infant included its weight, length, cranial circumference, and complete physical examination. Any vaccinations and medicines received since the previous visit were recorded, as was type of feeding, with special emphasis on any food supplements given. During each visit the mother was again counselled about whether other contraceptive methods should be used or whether she should continue to use LAM if she were still fully breastfeeding and amenorrhoeic. When a mother missed an appointment at the clinic, a nurse-midwife visited her at home, asked her why she had not attended, and tried to convince her to continue in the study. Of the 422 mother/child pairs, 409 (97%) completed the sixth month of the study. In addition, all women who were still amenorrhoeic at 180 days postpartum were given a pregnancy test.

Data were recorded on pre-coded forms to facilitate computer entry and analysis. Data entry and statistical analyses were completed by computer with SAS software.

Results

Table 1 shows the characteristics of the women. Mean age (SEM, range) was 27.1 years (5.0, 18-39). Mean parity (SEM, range) was 2.0 (1.0, 1-5). 23.6% of the women had primary education, and only 5.4% had completed university studies.

TABLE 2—LIFE-TABLE ANALYSIS OF LAM EFFICACY

Month	No of pregnancies	WM	WMAC	R × 100	P × 100
1	0	384	384	0.00	0.00
2	0	327	711	0.00	0.00
3	0	272	983	0.00	0.00
4	0	243	1226	0.00	0.00
5	0	224	1450	0.00	0.00
6	1	221	1671	0.45	0.45

WM = no of women using LAM; WMAC = cumulative women-months of use; R × 100 = monthly risk of conception; P × 100 = cumulative risk of conception.

422

TABLE III—FAMILY PLANNING METHOD DURING EACH OF THE 6 FIRST POSTPARTUM MONTHS

No of women*	Month postpartum	No (%) of women using contraceptive method							
		IUD	Progestagen only pill	Combined pill	Barrier	NFP	LAM [†]	Others	None
419	1	4 (1)	—	—	1 (0.2)	—	384 (91.6)	—	30 (7.2)
397	2	23 (6)	8 (2)	—	3 (1)	—	327 (82.4)	—	36 (9.1)
395	3	38 (10)	20 (5)	3 (1)	10 (2.5)	7 (1.8)	272 (68.9)	—	45 (11.4)
387	4	49 (13)	25 (6)	3 (1)	14 (3.6)	6 (1.6)	243 (62.8)	7 (1.8)	40 (10.3)
382	5	53 (14)	30 (8)	8 (2)	18 (4.7)	6 (1.6)	224 (58.6)	4 (1.0)	39 (10.2)
408	6	65 (16)	40 (10)	13 (3)	23 (5.6)	10 (2.4)	221 (54.2)	7 (1.7)	29 (7.1)

*No of women using the method during that month.

Table II shows the life-table cumulative protection rate in the women who used LAM as their only method of family planning. During LAM use, only 1 pregnancy occurred and the pregnancy rate per 100 women was 0.0045 (0.45%).

Four pregnancies were registered among both LAM users and those who had stopped using LAM or had changed to another method. The conditions under which these pregnancies occurred were as follows:

Woman	Month postpartum	Vaginal bleeding	Full breastfeeding	Family planning method
A	6	No	No	None
B	5	Yes	No	NFP
C	6	No	Yes	LAM
D	6	Yes	No	None

Table III shows the different family planning methods used during the first 6 months postpartum: at the end of the 6th month, 221 (54.2%) women were using LAM, 65 (15.9%) IUDs, 53 (13%) contraceptive pills, 23 (5.6%) barrier methods, and 10 (2.4%) NFP.

Table IV is the life-table for return of menses among full breastfeeders. 280 women (66.8%) completed 180 days postpartum in exclusive breastfeeding, without having introduced liquid or solid food supplements to the infant's diet. 237 women (56.2%) were fully breastfeeding and were amenorrhoeic with no other family planning use besides LAM at 180 days.

Discussion

Several other studies have assessed fertility and fecundity in breastfeeding women and have confirmed the physiological association of intensive breastfeeding and amenorrhoea with reduced fertility. Our prospective study shows that LAM is a successful family planning method with high acceptance and an efficacy of 99.5%.

A previous study in a similar population^{4,5} had shown that women who elected to use exclusive breastfeeding and amenorrhoea to postpone pregnancy were well protected; however, in that group, 30% of the exclusively breastfeeding women had return of menses by the end of 3 months postpartum and 53% by 180 days. In our study, only 9% of exclusive breastfeeders restarted menses by 3 months and 19% by 180 days. We believe that the increased intensity of breastfeeding support (prenatal in hospital and

postnatal) as well as the women's motivation to use LAM for family planning have contributed to this increased suppression of fertility.

The women in this study are representative of a middle-class environment similar to that seen in urban settings world wide. This clinical study has confirmed that LAM is an effective introductory method of family planning for breastfeeding women.

Support for this work was provided by the Institute of Reproductive Health, Georgetown University, under Cooperative Agreement with the Agency for International Development (AID) DPE-306-1-00-1029-00. We also thank the department of statistics of the faculty of mathematics, Pontificia Universidad Católica de Chile for analyses and the Graduate Program in Public Health at the University of Pittsburgh for their help with planning and early analysis of this study.

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TABLE IV—LIFE-TABLE OF REESTABLISHMENT OF MENSES AMONG EXCLUSIVELY BREASTFEEDING WOMEN USING LAM

Month	Bleeding	WM	WMAC	R × 100	P × 100
1	0	384	384	0.00	0.00
2	8	327	711	2.45	2.42
3	18	272	983	6.62	8.67
4	11	243	1226	4.55	12.72
5	10	224	1450	4.46	16.53
6	6	221	1671	2.73	18.78

R × 100 = monthly bleeding risk; P × 100 = cumulative risk of bleeding.

TRAINING COURSE IN WOMEN'S HEALTH

2nd Edition

■ Breastfeeding and the Lactational Amenorrhea Method of Family Planning



INSTITUTE FOR DEVELOPMENT TRAINING

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Objectives**Main Learning Objective**

To enable the learner to understand the importance of **breastfeeding** and the **Lactational Amenorrhea Method** to mother, child and family health.

Sub-Objectives

1. State how breastfeeding promotes infant health.
2. State how breastfeeding promotes maternal health.
3. Define the Lactational Amenorrhea Method (LAM) of family planning.
4. Describe the role of the hospital health worker in protecting, promoting and supporting breastfeeding and in providing LAM.
5. Describe the role of the maternal child health worker in protecting, promoting and supporting breastfeeding and in providing LAM.
6. Describe the role of the family planning worker in protecting, promoting and supporting breastfeeding and in providing LAM.
7. Describe the role of the community health worker in protecting, promoting and supporting breastfeeding and in providing LAM.
8. State what breastfeeding information and skills a prenatal client needs to learn.
9. Identify what information on LAM and other family planning methods a prenatal client needs to know.

25. Identify what information on LAM and other family planning methods a woman needs to know when her infant is over six months old.
26. Describe the information on maternal health a woman needs to know when her infant is over six months old.
27. Describe the information on infant health a woman needs to know when her infant is over six months old.

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Pre-test A

The following questions are multiple choice. Circle one answer or note it on a separate piece of paper.

1. After delivery, health workers should help mothers to initiate breastfeeding within the first _____ .
 - a. 1/2 hour
 - b. 4 - 5 hours
 - c. day
 - d. week

 2. Breastfeeding saves approximately _____ lives each year.
 - a. 1,000,000
 - b. 6,000,000
 - c. 25,000,000
 - d. 50,000,000

 3. Health workers should begin to counsel women about the lactational amenorrhea method and other family planning methods:
 - a. during prenatal visits
 - b. immediately after delivery
 - c. only if they express interest
 - d. during the first postpartum visit

 4. To use the Lactational Amenorrhea Method, a woman should be:
 - a. fully, or nearly fully, breastfeeding
 - b. not menstruating
 - c. less than 6 months post partum
 - d. all of the above
 - e. none of the above
-

10. A baby should breastfeed on each breast for _____ minutes.
- 3 - 5 minutes
 - 5 - 10 minutes
 - 10 - 20 minutes
 - none of the above, a baby should feed at a mother's breast till the breast is empty or the baby's hunger is satisfied.

The following questions are true (T) or false (F). Place a T or F in the blank provided.

11. _____ In warm climates, breastfed infants need to regularly receive water as a supplement to breastmilk.
12. _____ Mothers should breastfeed infants with diarrhea and/or fever more frequently.
13. _____ Women who are HIV positive or have AIDS should never breastfeed.
14. _____ It is important for infants to receive their mother's first milk (colostrum) because it helps protect them from diseases.
15. _____ Mothers who are ill should continue to breastfeed.
16. _____ Women who have breast infections should not breastfeed.
17. _____ All breastfed babies should begin receiving supplemental feedings by 4 - 6 months of age.
18. _____ Most temporary and all permanent family planning methods can be used by women who are breastfeeding.
19. _____ To promote optimal birthspacing and child survival health workers should encourage women to breastfeed for at least two years.
20. _____ Babies who are weaning should eat 3 - 4 times a day.
21. _____ If a baby is correctly positioned on the breast his/her mouth is centered on the mother's nipple.

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Pre-test B

To the Learner: Before starting this module, try taking the following test. This test will give you an idea of what you already know and what you will learn in this module. You will take the same test again after you have completed the module. A comparison of your two sets of answers will give you an idea of how much you have learned from this module.

Record your answers on a separate sheet of paper. You will find the correct answers to the Pre-test at the end of this module.

1. What are some of the benefits of breastfeeding to mothers and children?
2. What is the Lactational Amenorrhea Method (LAM) and how does a woman use it?
3. Why should health workers assist women to breastfeed?
4. How do breastfeeding and LAM save health workers and mothers time and money?
5. What are the dangers of formula, cow's milk and bottle feeding?
6. How does a hospital health worker assist clients to breastfeed?
7. How does a maternal/child health worker assist clients to breastfeed?
8. How does a family planning worker assist clients to breastfeed?
9. How does a community health worker assist a woman to breastfeed?
10. What is the role of the father and family in breastfeeding?
11. What questions regarding breastfeeding should a health worker ask mothers?
12. Why should health workers talk to prenatal clients about family planning needs?

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1. Why and How Should I Protect, Promote and Support Breastfeeding and the Lactational Amenorrhea Method (LAM) in My Work?

Learning Objectives

At the end of this lesson, you will be able to:

- ☛ State how breastfeeding promotes infant health.
- ☛ State how breastfeeding promotes maternal health.
- ☛ Define the Lactational Amenorrhea Method (LAM) of family planning.
- ☛ Describe the role of the hospital health worker in protecting, promoting and supporting breastfeeding and in providing LAM.
- ☛ Describe the role of the maternal child health worker in protecting, promoting and supporting breastfeeding and in providing LAM.
- ☛ Describe the role of the family planning worker in protecting, promoting and supporting breastfeeding and in providing LAM.
- ☛ Describe the role of the community health worker in protecting, promoting and supporting breastfeeding and in providing LAM.

Breastfeeding is one of the most important resources for promoting mother and child health and well-being. Recent studies show that breastfeeding has more health benefits than previously known -- nutritionally, immunologically, psychologically and in family planning. How a mother breastfeeds, when and for how many months determines how beneficial breastfeeding will be for her and her infant. Health workers need to learn accurate, up-to-date information about breastfeeding so that they can help to protect, promote and support the practice of breastfeeding.

What is the Lactational Amenorrhea Method (LAM)?

For many centuries people have understood that breastfeeding women were less likely to get pregnant. However, it was not understood how effective breastfeeding was as a contraceptive or when it stopped being effective. New studies on breastfeeding have determined more exact information about the effect that lactation (breastfeeding) has on a woman's monthly cycle and that breastfeeding women can know how to be protected from pregnancy by breastfeeding. This knowledge has been developed as a temporary method of family planning called the Lactational Amenorrhea Method (LAM).

The Lactational Amenorrhea Method is a postpartum family planning method.

If a woman is:

- * fully, or nearly fully, breastfeeding day and night (not giving the infant any other regular supplement of liquid or food)
- * not menstruating (bleeding before 56 days is not considered menstrual bleeding)
- * less than six months postpartum

she is 98 percent or more protected from pregnancy.

To use LAM effectively, it is important for health workers to explain to women the importance of **fully or nearly fully breastfeeding**. *Full breastfeeding* includes: exclusive breastfeeding, which means no other liquid or solid is given to the infant; almost exclusive breastfeeding, which permits vitamins, mineral water, juice or other ritualistic feeds given infrequently in addition to breastfeeds. *Nearly full breastfeeding* means that the vast majority of feeds are breastfeeds, with no intervals greater than six hours between breastfeeds.

When a woman begins to regularly supplement her infant's diet, or when her menses returns, or at six months postpartum, whichever comes first, she must begin a complementary family planning method to continue highly effective child spacing.

When health workers provide communities with the information that breastfeeding women are protected by the Lactational Amenorrhea Method, mothers will have an easily available, inexpensive method of family planning that they can rely on for up to six months after delivery.

Women who want to space their children's births at least two years apart will need to switch to a complementary family planning method when:

- * their menses return,
- * or their infants reach six months,
- * or they start supplementing their infants' diets regularly.

Health workers should include this new information about LAM into their breastfeeding and family planning counseling. LAM as a method of child spacing can make an important contribution to maternal health and child survival.

Why Should I Assist Clients to Breastfeed?



REASONS TO PROTECT, PROMOTE AND SUPPORT BREASTFEEDING

Breastfeeding saves infants' lives

Breastfeeding promotes the child's growth and development

Breastfeeding fosters a bond between mother and child

Breastfeeding is good for women's health and welfare

Breastfeeding complements family planning

Breastfeeding promotes birth spacing

Breastfeeding saves money

Breastfeeding promotion and support programs work.

Labbok, M. and Koniz-Booher, P. (eds). *Breastfeeding: A Natural Resource*. Institute for Reproductive Health, Georgetown University, Washington, DC.

What Complementary Family Planning Methods can a Breastfeeding Woman Use?

Spacing children's births apart by at least two years is important so that breastfeeding can be sustained. Most temporary and all permanent family planning methods can be used safely by women who are breastfeeding (see table on following pages). Women who are only partially breastfeeding, and those who can no longer rely on LAM, who wish to space their births or who want no more children should use a family planning method. (For more information refer to the module in this series on Family Planning Methods.)

SECOND CHOICE: PROGESTIN ONLY METHODS

METHOD	ADVANTAGES	DISADVANTAGES	COMMENTS
PROGESTIN ONLY METHODS (mini-pill, injectable, and implants*)	Can be very effective. May increase milk volume. Effectiveness during breastfeeding approaches that of combined pill.	Some hormones may pass into breastmilk.	There is no evidence of adverse effects on the infants from the very small amount of hormone which passes into the milk.

THIRD CHOICE: METHODS CONTAINING ESTROGEN

These methods should only be used when other methods are unavailable, and should be avoided until lactation has been well established.

COMBINED ORAL CONTRACEPTIVE (Estrogen and Progestin*)	Very effective.	Estrogens may reduce milk supply. Some hormone may pass into breastmilk.	There is no evidence of a direct negative effect on infants. However in some women, suppression of milk supply appears to lead to early cessation of breastfeeding. If these methods cannot be avoided breastfeeding can and should be continued, as it continues to offer important health and nutritional benefits for the infants or toddler.
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* Some injectable and implants may have estrogenic components. These should be considered "Third Choice" methods.

From "Guidelines For Breastfeeding in Family Planning and Child Survival Programs". Georgetown University, Institute for Reproductive Health, pages 6-8.

Using unclean water to dilute formula and cow's milk and using unclean bottles can give infants infections. Water used to mix with formula must be boiled for 20 minutes before being used. Baby bottles also have to be sterilized between each use, otherwise germs that cause infections can grow.

How Does a Hospital Health Worker Assist Clients to Breastfeed?

An important part of your responsibilities as a hospital health worker is to provide education and support to your clients in addition to the medical services you perform. Women who deliver in your hospital need accurate, up-to-date information on breastfeeding. Many women incorrectly think that bottled milk and formulas are better than breastmilk. They also need your help and encouragement in showing them how to breastfeed. It may take several attempts for the mother and baby before they can successfully breastfeed. All mothers may need your help with breastfeeding, not just first-time mothers. Some women who have already had children may not have breastfed their other infants or may have had difficulties in breastfeeding. Women who are admitted to the hospital for health problems may incorrectly think that they cannot continue breastfeeding.

As a hospital health worker, you can help mothers to breastfeed by:

- * talking with your clients, their husbands and families about the benefits of breastfeeding and child spacing
- * helping clients to breastfeed as soon as possible after delivery
- * helping women to continue to breastfeed if they are admitted to the hospital
- * answering your clients' questions about breastfeeding
- * praising and encouraging mothers as they learn to breastfeed
- * referring them to **breastfeeding support groups** in their communities
- * offering them the choice of LAM and other postpartum family planning methods that support child spacing and sustained breastfeeding.

Mothers who do not begin breastfeeding in the few hours after delivery are going to have a more difficult time being able to breastfeed successfully. Hospital health workers are important promoters of breastfeeding at a very critical time. Health workers should encourage their hospitals to implement the "Ten Steps to Promote Successful Breastfeeding" listed on the following page.

How Does a Maternal/Child Health Worker Assist Clients to Breastfeed?

One study in Brazil shows that an exclusively breastfed infant is:

- * 14 times less likely to die from diarrhea
- * 4 times less likely to die from respiratory disease
- * 3 times less likely to die from other infection

than non-breastfed infants.

Source: Victora, C. et al, *Infant Feeding and Deaths due to Diarrhea: A Case-Control Study*. American Journal of Epidemiology, 129(5), 1989.

Maternal/child health workers, because of their clinic work and their outreach into the community, have an important role in promoting, encouraging and supporting breastfeeding. Through your provision of maternal and child health services you have many contacts with women as they come in for prenatal care, treatment of their or their children's health problems, childhood immunizations and postpartum care. Each of these visits provides an opportunity to talk with women about their plans to breastfeed, and the successes and problems they are having in breastfeeding and family planning.





To promote optimal child survival and child spacing instruct mothers to:

- * Begin breastfeeding as soon as possible after the child is born, preferably immediately after delivery.
- * Breastfeed exclusively for the first six months.
- * Continue to breastfeed for at least two years.
- * Breastfeed frequently, whenever the infant is hungry, both day and night.
- * After the first six months, when **supplemental foods** are introduced, breastfeeding should precede supplemental or semi-solid foods.
- * Continue to breastfeed, even if you or your baby are ill.
- * Avoid using bottles, pacifiers (dummies) or other artificial nipples.
- * Eat and drink sufficient quantities to satisfy your thirst and hunger.

Adapted from "Guidelines for Breastfeeding in Family Planning and Child Survival Programs"
Georgetown University - Institute for Reproductive Health.

How Does a Community Health Worker Assist a Woman to Breastfeed?

Through their presentations, home visits and daily contact with the children, women and men, including leaders and healers in their community, community health workers can play an important role in promoting, encouraging and supporting breastfeeding and LAM. As you can see in the table below, it is important for community health workers to promote breastfeeding just as they promote oral rehydration therapy (ORT).

UNICEF estimates that ORT currently saves 2.5 million lives of <u>children</u> (ages 0 to 5 years).	Breastfeeding currently saves at least 6 million lives of <u>infants</u> (ages 0 to 12 months).
UNICEF estimates that ORT has the potential to save an additional 1 million infant lives each year.	Breastfeeding has the potential to save an additional 2 million infant lives each year.

Adapted from: *Breastfeeding Saves Lives: The impact of Breastfeeding on Infant Survival*, Center to Prevent Childhood Malnutrition Policy Series Vol 2(1): 1 - 12. July 1991.

Community Health Workers can promote, encourage and support breastfeeding in their communities by:

- * Discussing with pregnant women the importance of breastfeeding for their health and the health of their babies.
- * Encouraging women to breastfeed exclusively in the first six months.
- * Promoting continued breastfeeding through the second year of life.
- * Visiting the homes of new babies and answering mothers', fathers' and grandmothers' questions about breastfeeding and the mothers' and babies' health.
- * Encouraging new mothers to rest and care for their new infants, and helping them get support from their husbands, families and neighbors.
- * Talking about the important contribution that breastfeeding makes to child spacing, child survival and maternal health in community presentations.
- * Finding out what traditional practices promote or interfere with breastfeeding and helping to correct myths and spread correct information about breastfeeding.
- * Helping to establish breastfeeding support groups for women in the community.
- * Knowing to whom or where to refer women for advice on breastfeeding.

What is the Role of the Father and Family in Breastfeeding?

Most maternal and child health programs target their health education programs to women because they are most often the primary care givers in the family. However, husbands or older women are often the ones that make health care decisions such as whether to breastfeed or not and when a sick infant can see a health worker for treatment. Older children, aunts and cousins often are important infant care givers when the mother is resting or away from the house. Because many family members are involved in infant care, health workers should share information about supporting the breastfeeding mother with all family members.

When a family understands the importance of breastfeeding for mother and child health, they are more likely to be supportive of breastfeeding. Health workers should instruct fathers and families to help mothers to breastfeed by:

- allowing a mother to rest for several weeks after delivery
- making sure the mother eats and drinks enough to satisfy her hunger and thirst, since she is eating and drinking for two
- helping the breastfeeding mother with her chores so that she will have time to rest and breastfeed her baby as often as the baby needs, every one to three hours in the early weeks with longer time between feedings later
- not feeding infants under six months of age any food or drink (including water) if the mother is gone for a couple of hours. The mother should leave expressed milk to be used in her absence.



Practice Questions



1. What are some of the benefits of breastfeeding for mothers and children?
2. What is the Lactational Amenorrhea Method (LAM) and how does a woman use it?
3. Why should health workers assist women to breastfeed?
4. How does breastfeeding and LAM save health workers and mothers time and money?
5. What are the dangers of formula, cow's milk and bottle feeding?
6. How does a hospital health worker assist clients to breastfeed?
7. How does a maternal/child health worker assist clients to breastfeed?
8. How does a family planning worker assist clients to breastfeed?
9. How does a community health worker assist a woman to breastfeed?
10. What is the role of the father and family in breastfeeding?

To the Learner:
Turn the page to check your answers.

7. Maternal/child health workers can help women to breastfeed by:
 - * talking with mothers during prenatal visits about the importance of breastfeeding for mother and child health
 - * sharing information with prenatal clients, their husbands and families on how to breastfeed
 - * teaching prenatal mothers about LAM
 - * listening to the concerns and questions of prenatal clients and mothers about breastfeeding
 - * supporting new mothers as they learn to breastfeed
 - * promoting breastfeeding in the community through discussions with men's groups, fathers, traditional birth attendants and women
 - * finding out about traditional practices in the community that promote or interfere with breastfeeding. Promote the positive practices and tactfully correct those practices which interfere with breastfeeding.

8. Family planning workers should:
 - * encourage women to breastfeed fully, or nearly fully, and inform them that LAM is 98% effective as a family planning method as long as they continue to breastfeed fully, until their infant reaches six months of age or until their menstrual cycle returns
 - * help women who are partially breastfeeding or who can no longer use LAM to choose non-hormonal methods (condoms, spermicides, cervical caps, diaphragms, IUDs, periodic abstinence, vasectomy and tubal ligation) or progestin-only methods (Norplant® implant, injectables and mini-pills) which will not interfere with breastfeeding
 - * encourage breastfeeding and promote LAM by including information about them in community presentations and clinic information sessions about family planning methods.

9. Community health workers can promote, encourage and support breastfeeding by:
 - * discussing with pregnant women the importance of breastfeeding for their health and their babies'
 - * encouraging women to breastfeed exclusively in the first six months

Learning Activities

- * Talk with your colleagues about breastfeeding and LAM. Discuss ways that you can support your clients to breastfeed.
- * When was the last time you and your colleagues received training on breastfeeding or LAM? Request or arrange for a training session if there has not been one in the past year so that everyone will receive updated information.
- * Review the literature, posters, training information and procedures your facility has on breastfeeding. Are they up-to-date and accurate? Do they include information on LAM?
- * Find out about breastfeeding practices in your community by asking people the following questions:
 - Are babies put to the mother's breast within one hour after delivery?
 - Do babies drink the mother's first milk (colostrum)?
 - How old are babies usually when they are given liquid or food other than breastmilk?
 - For how many months or years is a baby usually breastfed?
 - Why do some mothers not breastfeed?
 - What are the most common reasons that mothers stop breastfeeding?
- * How can you help to educate fathers and families about breastfeeding and LAM? Do you talk to them about breastfeeding and what their role is in supporting breastfeeding mothers when they come to your clinic or hospital? Do you reach out to them in community presentations?



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2. What Information and Support About Breastfeeding Does a Prenatal Client Need?

Learning Objectives

At the end of this lesson, you will be able to:

- ☛ State what breastfeeding information and skills a prenatal client needs to learn.
- ☛ Identify what information on LAM and other family planning methods the prenatal client needs to know.
- ☛ Describe the information on maternal health a prenatal client needs to know about breastfeeding.
- ☛ Describe the information on infant health a prenatal client needs to know about breastfeeding.

Women who want to space their children at least two years apart to protect their health and their children's health will need to begin using a method of family planning soon after delivery. Women who plan to breastfeed exclusively for the first six months will receive the 98% protection against pregnancy offered by LAM. LAM and family planning also allow breastfeeding of the child to be continued for two years.

It is important for health workers to tell women about LAM, as they might not know of the contraceptive protection offered by full breastfeeding and amenorrhea. Other women may incorrectly think if they breastfeed their infant two to three times a day that breastfeeding will protect them against pregnancy.

.....
Tell women who are planning to use LAM that they should start using another family planning method when:

- their monthly period (menses) returns
 - OR
 - they start supplementing breastfeeding regularly
 - OR
 - their infant reaches six months of age.
-

Women who are not planning to fully breastfeed and who want to space births need information on other family planning methods.

During prenatal visits, health workers should inform clients about each of these methods, discuss their advantages and disadvantages, and counsel each woman so that she can decide which method is best for her. (Refer to the table on breastfeeding and family planning in the first section of this module.) Although it is recommended that women not have vaginal intercourse until six weeks after delivery, some women choose to have intercourse sooner, others are forced to have intercourse. Some women will not be able to come back for a six week postpartum check up. Therefore, planning during a prenatal visit what a woman will do for family planning after delivery is important. (For more information, refer to the module in this series on Family Planning Methods.)

Methods of second choice for women who are planning to breastfeed are those that contain only a progestin hormone and no **estrogen**. Progestin-only methods are:

Implants (Norplant®) - Norplant® implant is the only type of implant currently available. For the fully breastfeeding woman, Norplant® implant insertion should be delayed until 12 weeks after delivery, if possible. If Norplant® implant is available only at the hospital or clinic where she delivers or has her six week check up and she cannot return there, it may be better to have it inserted at the time of delivery or the six week check up.

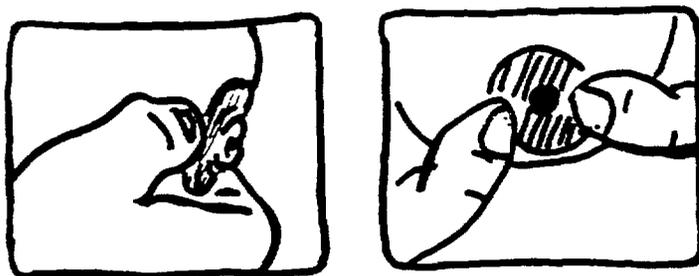
Injectables and Mini-pills - Injectable progestin only contraceptives (Depo-provera and Net-en) can also be provided immediately after delivery, but it is recommended that they not be started before the six-week visit.

Methods of third choice are those which contain the hormone estrogen, like the **combined oral contraceptive pills** and some injectables. Like progestin, the estrogen hormone is found in the breastmilk of nursing mothers who use these contraceptives. Unlike progestin, estrogens decrease the quantity of breastmilk and interfere with breastfeeding. Therefore, they are not recommended for use by women who plan to breastfeed, even partially. However, if a baby is no longer relying on breastmilk as her or his major food source, or if no other method is available, the combined pill is an option.

If a woman does not want to have any more children, you can counsel her and her partner about **permanent methods of family planning**, the vasectomy or tubal ligation. If a woman will be delivering her baby in the hospital or clinic she can have the tubal ligation performed at the same time. However, she may not be able to have the tubal ligation done unless she has been counseled before entering the hospital for delivery.

How Can I Help a Woman With Flat or Inverted Nipples to Breastfeed?

When providing prenatal care to women, notice if their nipples protrude, or are flat or inverted. If a woman's nipples are flat or inverted, push on the areola about one inch below the nipple. Often this pressure alone will make the nipple stand out and indicates that nipple position will not cause any difficulty in breastfeeding. If, however, the nipple remains in the same position or further inverts, you will need to provide the client with some instructions on the **Hoffman Technique** (see the following figure), an exercise which will help the nipple to protrude.



Adapted from: *The Breastfeeding Answer Book*, Mohrbacher, N. and Stock, J. La Leche International. Franklin Park, IL, USA, 1991.

Instruct the pregnant woman to place a thumb on each side of the base of the nipple. She should then press gently in towards her chest, while at the same time pushing her thumbs away from each other. This should make the nipple move up and outward. Instruct a woman to do this at least five times a day.

Also, for a woman who has inverted nipples and who wears a bra, you can instruct her to cut a hole in her bra over the nipple area. If she wears the bra with a cut-out nipple during pregnancy, it will stimulate the nipples to protrude.

Practice Questions



1. What questions regarding breastfeeding should a health worker ask a prenatal client?
2. Why should health workers talk to prenatal clients about family planning needs?
3. When should women who are using LAM start using another family planning method?
4. What are complementary family planning methods of first choice for women who are breastfeeding?
5. What techniques can a health worker teach a woman who has flat or inverted nipples?
6. Should a woman who is HIV positive or has AIDS breastfeed?

To the Learner:
Turn the page to check your answers.

6. Yes, women who are HIV positive or have AIDS can breastfeed their infants. Although the virus can be transmitted through breastmilk, breastmilk is more nutritious than substitutes and breastfed infants are protected from infectious diseases (for example, measles, pneumonia, etc.) that can be fatal to infants. However, you should talk with local medical authorities to find out advice specific to your area. The United States Centers for Disease Control and Prevention (CDCP) recommend that in the United States and other developed countries women who are HIV positive should not breastfeed.

To the Learner:

If you missed any of the answers to the questions, go back to the lesson and study it again. When all of your answers are correct, go on to the next page.

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3. What Information and Support About Breastfeeding Does a Mother Need Immediately After Delivery?

Learning Objectives

At the end of this lesson, you will be able to:

- ☛ State what breastfeeding information and skills a woman needs to learn after delivery.
- ☛ Identify what information on LAM and other family planning methods a woman needs to learn after delivery.
- ☛ Describe the information on maternal health a woman needs to learn after delivery about breastfeeding.
- ☛ Describe the information on infant health a woman needs to learn after delivery about breastfeeding.

What Help Does a Mother Need at the First Breastfeedings?

If the baby and mother have not begun breastfeeding on their own, it is very important for health workers to assist the mother to begin breastfeeding within an hour after birth. When the baby is delivered (after the cord has been cut and bound), place her or him on the mother's chest while waiting for the placenta to deliver. Breastfeeding soon after delivery causes uterine contractions which can decrease postpartum bleeding. The first breastmilk is called colostrum and is yellowish, not white, in color. Colostrum is the baby's first immunization (protection against childhood illnesses). It contains special immunization factors for infants and a laxative which helps them to pass their first bowel movement, called "meconium."

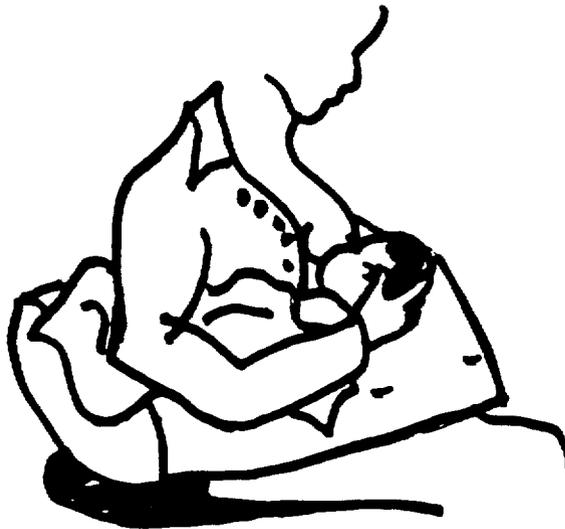
Assure mothers that the first breastfeeding is a trial run which may not go perfectly. The first few breastfeedings are a time for the mother and baby to learn something new. The mother will need to find the most comfortable positions for breastfeeding and the proper way to offer and support the breast for her newborn. The newborn needs to learn how to identify

Cradle Hold



The mother should lay the baby across her lap so that her or his face, chest, stomach and knees face her (see figure above). The baby's head rests in the bend of her elbow and her arm supports her or his back and buttocks. A pillow or blanket roll can be placed on the mother's lap to raise the baby up nearer to her breast.

Side Hold

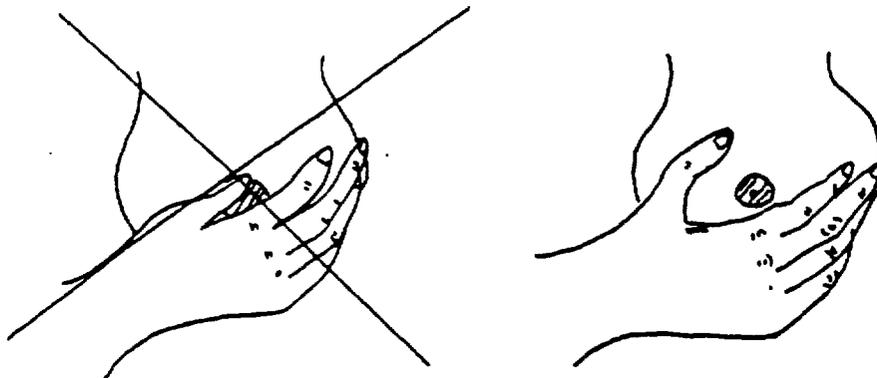


The mother is sitting up with her baby's head facing the breast and her or his body tucked under her arm at her side. The position gives the mother more control of the baby's head and she can see better as she latches the baby on to the breast. The baby's head is cradled in her hand while her forearm supports the baby's back.

Steps in Breastfeeding

Health workers should share the following information with mothers about breastfeeding:

- * Place the baby in one of the positions described above or another if it is comfortable. You'll know that the baby is positioned correctly if you look down and see that the baby's ear, shoulder and hips are in line.
- * If necessary, you can support your breast with your hand by placing your hand outside of the areola with four fingers cupping underneath your breast, while the thumb rests on top (see following figure).



Make sure your hand is not touching the areola. The baby will need to grasp both the nipple and areola. If she or he grasps the nipple alone it can cause nipple soreness. ♀

How Can I Help Mothers Who Have Had Cesarean Births Breastfeed?

Mothers who have had cesarean sections can breastfeed just as well as women who have vaginal deliveries. Because of the cesarean procedure and the anesthesia used, mothers may feel tired and have difficulty moving because of weakened stomach muscles. The hospital health worker should share the following information with women who have delivered by cesarean section:

- * Remain in bed and use the side lying position for nursing.
- * Use pillows behind your back and between your knees to support your incision site.
- * Burp your baby by rolling, not lifting, your baby onto your chest and rubbing her or his back.
- * It is all right for you to take medication that health workers recommend for pain. Although some of the medication will pass to your baby, it is not harmful. It may, however, make the baby sleepier than normal. The less strong the medication the better for the baby.
- * Keep the baby in the same room with you. Have your partner or a relative or friend stay with you to carry the baby to you when it is time to nurse and to help care for the infant.

What Assistance in Breastfeeding Does a Mother of a Premature or Ill Baby Need?

Premature or ill babies have a special need for the nutrition and immunizing agents provided by mother's milk and for the physical closeness provided by breastfeeding. The milk produced by the mother is special and different from that produced by a mother who carries a baby to term. If the baby has to be separated from the mother and/or is unable to suck milk from the breast, the mother should be taught how to hand express milk. The milk that she expresses can then be given to the infant by a cup or spoon. Premature babies should be fed frequently, at least every one to two hours.

infants. Breastmilk collected by the bicycle pump can easily become contaminated, since the pump cannot be easily cleaned, and cause illness if given to an infant. The bicycle pump could be used to relieve breast engorgement, but the milk should be thrown away.



For expressing milk by hand, share the following information with the mother:

EXPRESSING MILK BY HAND

- * Prepare a glass, cup or jar with a wide mouth to collect the milk. Wash the container with soap and water and then let it dry in the sun. This can be done the day before, if the cup is covered while stored. If possible, just before expressing milk, fill the container with boiling water and let it sit for five to ten minutes. Pour the water out of the cup when you are ready to express milk.
- * Wash your hands before expressing milk, so that dirt and germs that could make your baby sick do not accidentally get in the milk.
- * For the milk to let down you will find it easier if you relax, hold your baby or think about your baby. Warming your breast with a hot compress or massaging your breast forward toward the nipple can help. It also helps you to relax if your husband or a family member or friend can massage your back and shoulders.
- * Massage the breasts, moving the hands in a circular motion. (See figure A following.)
- * Stimulate the nipples with your fingers and hand.
- * Get into a comfortable sitting or standing position.
- * Place or hold the container near your breast.

How Often Should a Woman Express Milk?

Mothers who have a baby who was premature, or is sick, or who are away from the baby, should express milk as often as the baby normally feeds. Premature infants should be fed every one to two hours, and one- to six-month-olds every two to four hours.

If you are expressing milk because your breasts are engorged and/or leaking you need to express milk as often as necessary to keep your breasts comfortable. You only need to express them long enough for them to be comfortable.

What Can I Do To Help a Mother with Sore Nipples?

The first few times a mother breastfeeds it is common for there to be some discomfort when the baby first latches on. This discomfort or pain should be similar to that caused by wearing a new pair of shoes or getting a sunburn or other minor burn. It should go away or lessen after the first 20 to 30 seconds of the feed and should not last over a week to ten days.

Women who complain that their nipples are sore during nursing may not have the baby positioned on the breast correctly. Watch the mother and baby as they nurse. Check to make sure the baby is latching onto the areola and not the nipple. If the baby is only holding on to the nipple this can cause pain. Also, check to see that the baby's mouth is more or less centered on the nipple and areola and is not off to one side.

If the baby's position is wrong, instruct the mother to remove the baby from her breast. She should break the suction first, before removing the infant from her breast, by inserting a finger between the baby's mouth and her breast. Then she should reposition the infant so that she or he is centered on the breast and both the nipple and areola are in the baby's mouth.

Sore nipples that occur after a mother has been nursing successfully for a while may indicate a thrush (yeast) infection; both mother and infant should be checked for signs of thrush and treated.

HOW TO AVOID BREAST ENGORGEMENT

- * Begin breastfeeding as soon after birth as possible.
 - * Breastfeed whenever your baby wants to nurse. This may be as often as every one to two hours in the early days and as the baby gets bigger at least every two to four hours.
 - * Offer both breasts at each feeding. Feed as long as the baby wants on the first side, burp the baby, and then offer the other breast. If the baby only nurses on one side during a feed, always begin the next feed with the other breast.
 - * Start each feed on the alternate breast.
 - * If you must miss a breastfeeding or your baby is not nursing well, express your milk to assure the breast is emptied and to stimulate milk production.
-

What Should I Tell Mothers About the Lactational Amenorrhea Method (LAM)?



Sometimes delivery is one of the few times that a woman comes in contact with a health worker or visits a hospital or clinic. Because having children less than two years apart can harm the health of the woman, her newborn and a future child, it is important to inform clients about the benefits of birth spacing and the use of family planning methods. Child spacing also makes it easier to continue breastfeeding a child for two years or more. ♀

Tell mothers if they plan to breastfeed fully, day and night, that as long as they are not having a menses and their baby is less than six months old LAM is 98% effective as a method of contraception.

Condoms and Spermicides - Health workers should inform women who plan to use either of these methods that they must be used every time she has vaginal intercourse to be effective. Condoms and spermicides used together for each act of intercourse are approximately 99% effective. Condoms have the added advantage of protecting against HIV and STD transmission. Spermicides also offer some protection against HIV and STDs. Health workers should provide women with an initial supply of condoms and/or spermicides if the client is unlikely to return to the clinic after delivery. Spermicides have the advantage of providing extra lubrication which can be helpful since a woman's vagina is drier during breastfeeding.

Cervical Caps and Diaphragms - Health workers should inform women who choose these methods that they can be fitted for them at the six week postpartum visit. Provide these women with an initial supply of condoms and/or spermicides.

Intrauterine Devices (IUDs) - Women who are breastfeeding can use non-hormonal IUDs (Copper T 380 A, Lippes Loop, Copper 7, Multiload). IUDs which contain progestin (for example, the Progestasert) are not a method of first choice. Since IUDs can be inserted at delivery, it is important for a woman to decide before she goes into labor if she wants an IUD inserted. IUDs can also be inserted at the six week postpartum visit. Women who are having an IUD inserted at their six week check up should receive an initial supply of condoms and/or spermicides to use until their six week visit.

Natural Family Planning (Fertility Awareness Methods) - Women who are breastfeeding can use a fertility awareness method of family planning. Because of the effect breastfeeding has on the hormones that control the menstrual cycle and the mucus signs of fertility, natural family planning techniques used during breastfeeding are different from those used by a non-breastfeeding woman. Breastfeeding women who choose this method will need instructions by a trained individual.

Health workers should share the following information with women who plan to breastfeed and who plan to use one of the second choice methods because first choice methods are unavailable or unacceptable.

Methods of second choice for women who are planning to breastfeed are those that contain only a progestin hormone and no estrogen. Progestin-only methods are:

Implants (Norplant®) - Norplant® implant is the only type of implant currently available. For the breastfeeding woman, Norplant® implant insertion should be delayed until 12 weeks after delivery, if possible. If Norplant® implant is available only at the hospital or clinic where she delivers or has her six week check up and she cannot return there, it may be better to have it inserted at the time of delivery or at

Practice Questions



1. What is colostrum and why is it important?
2. What can a health worker do to help a woman begin breastfeeding right after delivery?
3. How can a hospital health worker help a mother with a cesarean section breastfeed?
4. What should a health worker do to assist the mother of a premature infant to breastfeed?
5. Which mothers should learn to express milk?
6. What can a health worker tell a mother to do to prevent sore nipples?
7. What can a health worker tell a mother to help her avoid breast engorgement?
8. What information about using LAM should a health worker share with a woman?

To the Learner:
Turn the page to check your answers.

- * After a feeding, rub some of your milk on the nipple and areola. This is the best "lotion" for your breast.
- * Let your breast dry in the air or sunlight after a feeding.
- * Do not use soap on your nipple or areola.

7. Share the following information with mothers on preventing breast engorgement:

- * Begin breastfeeding as soon after birth as possible.
- * Breastfeed on demand. This may be as often as every one to two hours in the early days and as the baby gets bigger, at least every two to four hours.
- * Offer both breasts at each feeding. Feed as long as the baby wants on the first side, burp the baby, and then offer the other breast.
- * If you must miss a breastfeeding or your baby is not nursing well, express your milk to assure the breast is emptied and to stimulate milk production.

8. Explain the following information to women using LAM:

- * Do not feed your baby any supplemental foods or liquid. The only exception to this is medicine or **oral rehydration solutions**.
- * Do not offer your baby pacifiers or dummies.
- * Nurse on demand (whenever the baby wants to feed), at least every two to three hours.
- * Feed your baby at night, without any long periods of time (more than six hours) between feeds.
- * Remind mothers that they will need to see a health worker to use a complementary family planning method when:
 - they stop fully or nearly fully breastfeeding, OR
 - their menses returns, OR
 - their baby reaches six months.

To the Learner:

If you missed any of the answers to the questions, go back to the lesson and study it again. When all of your answers are correct, go on to the next page.

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4. What Information and Support About Breastfeeding Does a Mother of a One to Two Week Old Infant Need?

Learning Objectives

At the end of this lesson, you will be able to:

- ☛ State what breastfeeding information and skills a woman needs to know when her infant is one to two weeks old.
- ☛ Identify what information on LAM and other family planning methods a woman needs to know when her infant is one to two weeks old.
- ☛ Describe the information on maternal health a woman needs to know when her infant is one to two weeks old.
- ☛ Describe the information on infant health a woman needs to know when her infant is one to two weeks old.

The first two weeks with a new baby can be a difficult time, especially for first time mothers. Mothers who have not breastfed before may be having some difficulties. Well meaning, but incorrectly informed friends and relatives may be encouraging her to give her infant water, teas, animal milk, cereal or formula. If possible a home visit by a health worker during this two week period can be an important part of preventive health care.



- * Is the baby contented and sleeping well?
- * Watch the mother breastfeed -- Is the baby positioned comfortably and effectively? Does the baby suckle at each breast until it is emptied?
- * Is the mother drinking enough to satisfy her thirst? About six to eight cups of water or clear fluid each day?
- * Is the mother eating enough to satisfy her hunger? What is she eating?

Encourage the mother to continue to breastfeed and to have her baby weighed once a week to determine if the baby is gaining or losing weight. Explain to the mother that if the baby is sleeping well and if she or he is urinating six to eight times in 24 hours that it is very likely the baby is getting sufficient breastmilk.

What If the Mother is Sick?

Mothers who are sick should continue to breastfeed. A mother's breastmilk does not go "bad" because she is sick. The baby's feeding schedule should not be interrupted, if possible. The mother will need help caring for her baby if she is sick. She should be encouraged to ask her family for help. If she has a fever she will need to drink extra fluid.

When an ill breastfeeding mother goes to a health worker for treatment, she should tell the health worker she is breastfeeding so that the health worker does not give her a medication that would interfere with breastfeeding or harm her infant.

What are the Family Planning Needs of a Breastfeeding Mother of a One to Two Week Old Infant?

Tell mothers about the contraceptive effect of breastfeeding and LAM. Encourage mothers who are using LAM for their family planning method to continue to breastfeed fully, for six months, to protect them against a pregnancy too soon after a birth. Review with them how to use LAM and ask if they have any questions.

All women should be reminded of their six week follow up visit. Remind women who are partially breastfeeding, or who do not wish to rely on LAM, that the six week check up is a good time to start most family planning methods. Ask a client whether she has started having intercourse again. Women who have started having vaginal intercourse again should be instructed in the use of condoms and spermicides. Health workers should provide the sexually active mother with condoms and/or spermicides or refer the woman to a place where she can obtain these supplies.

Practice Questions



1. What questions should a health worker ask about breastfeeding when interviewing a client with a one to two week old infant?
2. What questions should a health worker ask a mother who thinks she has insufficient breastmilk?
3. What family planning information should a health worker discuss with the breastfeeding mother of a one to two week old infant?

To the Learner:
Turn the page to check your answers.

3. Encourage mothers who are using LAM for their family planning method to continue to breastfeed fully, for six months, to protect them and their children against a pregnancy too soon after a birth. Review with them how to use LAM and ask if they have any questions.

Remind women who are partially breastfeeding, or who do not wish to rely on LAM, that the six week check up is a good time to start most family planning methods. Women who have started having vaginal intercourse again should be instructed in the use of condoms and spermicides. Health workers should provide the sexually active mother with condoms and/or spermicides or refer the woman to a place where she can obtain these supplies.

To the Learner:

If you missed any of the answers to the questions, go back to the lesson and study it again. When all of your answers are correct, go on to the next page.

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5. What Information and Support About Breastfeeding Does a Mother of a Two Week to Six Month Old Infant Need?

Learning Objectives

At the end of this lesson, you will be able to:

- ☛ State what breastfeeding information and skills a woman needs to know when her infant is two weeks to six months old.
- ☛ Identify what information on LAM and other family planning methods a woman needs to know when her infant is two weeks to six months old.
- ☛ Describe the information on maternal health a woman needs to know when her infant is two weeks to six months old.
- ☛ Describe the information on infant health a woman needs to know when her infant is two weeks to six months old.



What If the Baby is Not Gaining Weight?

If at a baby's checkup you find she or he is not gaining weight at a normal rate, you should ask the mother the following questions:

- * What is the pattern of feeding during the day and night?
(Babies need to breastfeed every two to three hours, at night the time between feedings may be longer. If a mother needs to miss a feeding, she should express milk ahead of time so that a care giver can feed the baby.)
- * Does your baby empty your breast? How long does it take?
- * Do you stop breastfeeding before your baby is ready to stop?
(Some babies drink slower or faster than others.)
- * Does the baby make swallowing sounds during the feeding?
- * Are you using a pacifier or a dummy? How often? How long?
- * Are you giving the baby anything other than breastmilk? What? How often?
- * Are your nipples sore?
- * Has your baby been sick? Had diarrhea or vomiting?
- * Are you taking good care of yourself?
(Breastfeeding mothers need to eat the most nutritious, high-calorie diet that is available, drink enough water to satisfy thirst, rest, decrease a heavy workload, and take time to relax and nurse.)
- * Have you introduced other liquids, semi-solid or solid foods?

Babies grow at different rates and have growth spurts. No weight gain at any one visit does not necessarily mean a problem. If a baby has been sick and not eating well, no weight gain should be expected. The mother should offer her breast frequently while the baby is sick and after the baby is feeling well. Ask the mother to return to the clinic or have the baby weighed in one week. Encourage the mother to breastfeed frequently and to let the baby empty breasts at each feed.

Many studies have shown that breastfed babies grow rapidly the first three months and more slowly but steadily in months three to six. This pattern of slower growth does not indicate a problem. Infants should be breastfed exclusively for the first six months even with slow weight gain (temporary weight loss may occur if the baby is ill). Supplementation is usually not indicated prior to six months.

Discuss with the mother the different causes of blocked milk ducts and how to prevent the problem, which can lead to a breast infection (**mastitis**) if untreated. Share the following prevention information with her:

HOW TO PREVENT BLOCKED BREAST DUCTS

- * Nurse on demand at least every two to three hours.
 - * Do not miss a feeding. If you are away from your baby express milk to avoid engorgement and to stimulate milk supply.
 - * Use both breasts at each feeding, when possible, to avoid engorgement.
 - * Change the positions your baby nurses in, to ensure that all the milk ducts are emptied.
 - * Avoid wearing any clothing that compresses the breasts, or a too tight brassiere.
 - * Wean slowly, only skipping one feeding every few days, to avoid engorgement.
-

How Do I Treat a Mother with a Breast Infection (Mastitis)?



Mothers with breast infections can continue to breastfeed their babies. The breastmilk is not infected. ♀

Some women will develop breast infections. Their usual causes are blocked milk ducts or cracked nipples. Signs and symptoms of breast infection are:

- hot, painful breasts (If both breasts are affected consider other infections such as tuberculosis.)
- reddened skin over infected site
- a lump may be present
- fever
- flu-like symptoms (chills, achiness, tiredness).

Because of the hormonal changes caused by breastfeeding, women may notice that their vagina is drier. Vaginal dryness can cause discomfort during sexual intercourse. Breastfeeding women may need more foreplay for their vagina to become lubricated or they may need to use a lubricant or a spermicide (jelly, cream or foam).

Some women are concerned about having their breasts stimulated during sexual relations when breastfeeding. There is no reason that a breastfeeding woman's breast should not be touched during lovemaking. Sexual arousal can stimulate a breastfeeding woman's let-down reflex. If she or her partner is bothered by this she should breastfeed or express milk before having sexual relations.

Can a Mother Who Works Outside the Home Breastmilk-feed Fully?

Yes, women who work outside the home can continue to fully breastmilk feed with assistance and encouragement from their family and work place. Health workers may need to help mothers figure out how to continue to fully breastmilk feed when separated from their infants for several hours.

Share the following tips with mothers:

- * Express milk while separated from your baby to help maintain your milk production and to have milk for care givers to feed your baby.
- * Expressed milk should be refrigerated if possible or put on ice. However, breastmilk is good for 8 to 10 hours at room temperature, if kept out of the sun. New studies are showing that 12 to 24 hours' storage at room temperature is possible.
- * Some mothers arrange with their employers breastfeeding breaks where either they go home to breastfeed or the care giver brings the baby to the mother. If the baby goes to work with the mother, she needs a place and time to breastfeed.
- * Mothers should show their babies' care givers how to prepare and feed their babies breastmilk in their absence. Only clean cups and spoons should be used.

What Information Should Fully Breastmilk Feeding Mothers Give to Care Givers in Their Absence?

Fully breastmilk-feeding mothers who will be leaving their infants with care givers should give care givers clear instructions that the baby should be given no food and fluids besides breastmilk. Care givers frustrated by a crying baby may offer the baby food, water, juice or a pacifier (dummy). The infant's hunger or urges to suckle are decreased by these substitutes and the infant may not breastfeed sufficiently later to meet her or his nutritional requirements. Mothers should express milk before leaving home so that care givers will have breastmilk to offer a hungry or thirsty infant.

Practice Questions



1. When should women who are using LAM start using another family planning method?
2. What questions should a health worker ask a mother if the baby is not gaining weight?
3. Do breastfeeding babies need oral rehydration solution when they have diarrhea?
4. What information does a mother need to manage a blocked milk duct?
5. Can mothers with breast infections continue to breastfeed?
6. What are signs and symptoms of breast infection?
7. What might you recommend to a woman who reports discomfort with sexual intercourse while breastfeeding?
8. How can a health worker help a woman to breastfeed fully when she works outside the home?
9. What information should mothers give care givers in their absence?

To the Learner:
Turn the page to check your answers.

4. Give the following instructions to a mother with a blocked milk duct:
 - * Place a warm wet compress over the affected area, before feedings.
 - * Massage the breast, especially the area behind the plugged duct, before and during feedings. Massage from behind the lump towards the nipple.
 - * Nurse often.
 - * Begin nursing with the affected breast, so that the infant will suck hardest on that breast.
 - * Position the baby so that her or his chin points toward the lump because the sucking will help massage that area.
 - * Increase the amount of time you rest.
 - * Drink to quench your thirst and more liquids if possible.
5. Yes, mothers with breast infections can continue to breastfeed. The breastmilk is not infected. If there is pus express that milk and pus and discard it, then resume breastfeeding.
6. Signs and symptoms of breast infection are:
 - hot, painful breasts (If both breasts are tender consider another infection like tuberculosis.)
 - reddened skin over infected site
 - a lump may be present
 - fever
 - flu-like symptoms (chills, achiness, tiredness).
7. Because of the hormonal changes caused by breastfeeding, women may notice that their vagina is drier. Vaginal dryness can cause discomfort during sexual intercourse. Breastfeeding women may need more foreplay for their vagina to become lubricated or they may need to use a lubricant or spermicide.

Learning Activities

- * If many women in your community work out of the home, visit their work sites and talk to their employers about practices that can promote breastfeeding.
- * Develop a presentation to educate older children on the importance of breastfeeding and how they can help their mothers to breastfeed fully.



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6. What Support and Information About Breastfeeding Does a Mother of an Over Six Month Old Infant Need?

Learning Objectives

At the end of this lesson, you will be able to:

- ☛ State what breastfeeding information and skills a woman needs to know when her infant is over six months old.
- ☛ Identify what information on LAM and other family planning methods a woman needs to know when her infant is over six months old.
- ☛ Describe the information on maternal health a woman needs to know when her infant is over six months old.
- ☛ Describe the information on infant health a woman needs to know when her infant is over six months old.

What Questions Should a Health Worker Ask the Mother of an Over Six Month Old?

When health workers see a client, in the clinic or in the field, they should ask the mother questions about breastfeeding, sexual practices and family planning. (Refer back to the section in this module on interviewing mothers of one to two week old infants and review the suggested questions.)

What Supplemental Foods Can a Mother Feed her Baby When She or He Starts Eating?

If babies start to eat before having any teeth, they should start eating soft foods that do not require chewing. Cereals and porridges are good to start with. Add mashed bananas or other fruits, cooked vegetables, and foods high in fat, protein, iron and vitamin A. (Citrus fruits and juices, like oranges, lemons and limes, should be avoided until an infant is one year old.)

Instruct mothers to introduce foods one at a time and only add new foods when you are sure that your baby can tolerate them well. Next, teach mothers to add at least one teaspoonful of one of the following foods which are high in fat to her baby's portion of the porridge:

- oil
- margarine
- cooking fat
- nuts (ground-up).

They should also add one of the following foods which are high in protein, minerals (for example, iron) and vitamins:

- breastmilk
- beans
- nuts (ground-up)
- cooked eggs
- non-citrus fruits
- vegetables.



How and When is it Best for a Woman to Start Weaning?

Health workers should encourage mothers to breastfeed through their child's second year of life. Breastfeeding is an important nutritional and immunological supplement throughout the second year of life. Breastfeeding also provides time for intimacy between the mother and child which is important for their relationship and the child's emotional development. However, some children will stop breastfeeding after a year or two, others may want to continue until they are three or four.

Share the following information with women on how to wean:

HOW TO WEAN

After several months of slow weaning:

- * Increase the number of non-breastmilk meals your infant eats each day.
 - * Increase the length of time between breastfeeds.
 - * Feed the infant first before breastfeeding.
 - * Drop one breastfeeding a day for a week, then drop another breastfeeding each week until the infant is weaned.
 - * Start by dropping the breastfeeding your infant is least interested in.
-

What Information On Family Planning Should Health Workers Share With Women Who are Only Partially Breastfeeding?

Women who are only partially breastfeeding and wish to plan their families should start a family planning method. Some women may wish to rely on the continued partial contraceptive protection provided by extended LAM. Advise women who wish to continue to use LAM that they will no longer receive the 98% contraceptive efficacy offered by LAM when their baby was less than six months old. They should continue to breastfeed frequently and offer their breast to their baby before she or he eats or drinks.

Practice Questions



1. When should a mother begin offering her infant food supplements?
2. Should a mother continue to breastfeed after her infant starts eating food?
3. What supplemental foods should a health worker recommend for infants when they first start eating?

To the Learner:

Turn the page to check your answers.

Learning Activities

- * Find out what weaning practices are used in the community you serve. Which ones are appropriate? Which ones are potentially harmful? Determine what the best supplementary and weaning foods are that are readily available to your clients. Make specific recommendations to your clients and the community about weaning foods.
- * Work with women's or mothers' groups to form a breastfeeding support group. Educate the women in the group about accurate information on breastfeeding. Talk with them about their concerns and questions.
- * How available are complementary family planning methods in your community? Does your health center offer family planning methods? If so, which ones? If not, why not? Where are family planning methods available? How much do they cost? How can family planning methods be made available in your health center or community?



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Answers to Pre-test A

- 1. a
- 2. b
- 3. a
- 4. d
- 5. d
- 6. c
- 7. b
- 8. d
- 9. b
- 10. d
- 11. F
- 12. T
- 13. F
- 14. T
- 15. T
- 16. F
- 17. F
- 18. T
- 19. T
- 20. F
- 21. F

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Post-test B Questions

1. What are some of the benefits of breastfeeding to mothers and children?
2. What is the Lactational Amenorrhea Method (LAM) and how does a woman use it?
3. Why should health workers assist women to breastfeed?
4. How do breastfeeding and LAM save health workers and mothers time and money?
5. What are the dangers of formula, cow's milk and bottle feeding?
6. How does a hospital health worker assist clients to breastfeed?
7. How does a maternal/child health worker assist clients to breastfeed?
8. How does a family planning worker assist clients to breastfeed?
9. How does a community health worker assist a woman to breastfeed?
10. What is the role of the father and family in breastfeeding?
11. What questions regarding breastfeeding should a health worker ask mothers?
12. Why should health workers talk to prenatal clients about family planning needs?
13. When should women who are using LAM start using another family planning method?
14. What can a health worker tell a mother to help her avoid breast engorgement?

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Answers to Post-test B

1. Breastfed infants are less likely to be malnourished and sick and women who breastfeed are less likely to become pregnant or develop breast or ovarian cancer. Breastfeeding saves families and hospitals time and money.
2. The Lactational Amenorrhea Method (LAM) is a postpartum family planning method. If a woman is **fully, or nearly fully, breastfeeding, day and night** (not giving the infant any other liquid or food), is **amenorrheic** (no menses), and is **less than six months postpartum**, she is **98 percent or more protected from pregnancy**.
3. Women need instruction and support in order to breastfeed correctly. Health workers should provide accurate information, and correct inaccurate information and myths.
4. Health workers save time by promoting and supporting breastfeeding by avoiding time they would later spend caring for a sick or malnourished infant. This also saves money that would have to be spent on medicine. Mothers save time that would be spent in sterilizing and preparing bottles and caring for a sick infant. They avoid the extra expense of bottles and the fuel needed to sterilize them.
5. Formula, cow's milk and bottle feeding can cause infants to become sick more often, become malnourished, and develop allergies, some cancers and diabetes.
6. Hospital health workers can help women to breastfeed by:
 - talking with clients, their husbands and families about the benefits of breastfeeding and child spacing
 - helping clients to breastfeed as soon as possible after delivery
 - helping women to continue to breastfeed if they are admitted to the hospital
 - answering clients' questions about breastfeeding
 - praising and encouraging mothers as they learn to breastfeed
 - referring them to breastfeeding support groups in their communities
 - offering them the choice of LAM and other postpartum family planning methods that support child spacing and sustained breastfeeding.

- * finding out what traditional practices promote or interfere with breastfeeding and helping to correct myths and spread correct information about breastfeeding.
 - * helping to establish breastfeeding support groups for women in the community.
10. Health workers should instruct fathers and families to help mothers to breastfeed by:
- * allowing a mother to rest for several weeks after delivery
 - * making sure the mother eats and drinks enough to satisfy her hunger and thirst, since she is eating and drinking for two
 - * helping the breastfeeding mother with her chores so that she will have time to rest and breastfeed her baby as often as the baby needs, every one to three hours in the early weeks with a longer time between feedings later
 - * not feeding infants under six months of age any food or drink (including water) if the mother is gone for a couple of hours. The mother should leave expressed milk to be used in her absence.
11. Ask mothers the following questions about breastfeeding:
- Are you breastfeeding? (If she isn't ask why she stopped.)
 - How is it going?
 - When do you breastfeed? Day? Night?
 - Describe to me how you breastfeed. What starts it?
 - Is latching on comfortable?
 - Does the baby empty a breast?
 - How long does it take for the baby to empty a breast?
 - Have you missed any feedings?
 - Have you given the baby any foods or fluids besides breastmilk? If Yes, What? How much? How often?
 - How often does your baby urinate? Pass stools?
 - Are you eating and drinking to satisfy your hunger and thirst?
 - How much are you eating and drinking?
 - How much are you resting?
 - Is your husband and family helping you to breastfeed? How?
 - Are you having any difficulties breastfeeding?
 - Are you and your baby having any other problems?
 - Have you started having vaginal intercourse again?
 - Are you using a method of family planning?
12. Child spacing is important to maternal and child health, new mothers, who are not breastfeeding fully, can conceive soon after delivery. A prenatal visit may be a health worker's only opportunity to talk with a client about family planning.

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Glossary

AIDS (acquired immunodeficiency syndrome): a disease thought to be caused by the human immunodeficiency virus (HIV). The body's immune (defense) system is impaired and cannot fight off diseases.

allergy: a condition in which the body reacts to a particular substance. Allergic reactions can include skin rashes, itchiness and even impaired breathing, which can lead to death.

areola: pink or dark colored area of skin around the nipple.

breast ducts/milk ducts: the tubes that carry mother's milk out through the nipples of the breast.

breast pump: a device used to draw (express) milk from a nursing woman's breast. It may be hand, electric or battery operated.

breastfeeding support group: a gathering of women who are breastfeeding to provide encouragement, information and assistance.

breastfeeding: a method of feeding an infant from the milk of a woman's breast. It is most often the mother, although sometimes another woman called a 'wet nurse' is used.

exclusive breastfeeding: the practice of feeding an infant only breastmilk, no other liquid or solid is given.

fully breastfeeding: includes the practices of both exclusive and nearly exclusive breastfeeding.

almost exclusive breastfeeding: the infant is only given small quantities (no more than once or twice a day and no more than one or two swallows) of liquids or solids other than breastmilk.

engorged breast: congested; excessive accumulation of milk in the breast duct can cause tenderness and lead to infection if not treated.

estrogen: the hormone which contributes to ovulation and to the growth and maintenance of the uterus, Fallopian tubes, vagina, and ducts of the mammary gland.

expressing milk: a method by which a lactating woman withdraws milk from the breast. It can be done by hand or pump.

family planning: determining how many children a family wants to have and when to have them.

fever: a body temperature above the normal of about 98.6°F or 37°C. It may be an indication of disease or infection.

foremilk: the first type of milk coming out of the mother's milk which is thirst quenching.

formula/infant formula: a liquid preparation which tries to duplicate mother's milk.

health workers: people who are trained to provide information, education and health assistance to their communities.

hindmilk: follows foremilk and is thicker and higher in fat content and calories.

HIV (human immunodeficiency virus): the virus that is believed to cause AIDS (acquired immunodeficiency syndrome). It is transmitted through contact with bodily fluids like blood, vaginal secretions and seminal fluid.

HIV positive: someone who through blood testing has been shown to have human immunodeficiency virus.

Hoffman Technique: a method of preparing inverted nipples for breastfeeding.

hormone: a substance produced in an organ or gland. It is transported by the blood from one body part to another.

immunizations: injections of very small amounts of an infectious disease triggering the body to produce antibodies which then protect them from future infections.

implants/Norplant® implant: a family planning method. Six small tubes containing progesterin are placed in a woman's upper arm, they protect from pregnancy for up to five years.

periodic abstinence: (a type of natural family planning); the traditional practice of avoiding vaginal intercourse for a period of time (varies from culture to culture).

permanent methods of family planning: surgical methods of family planning for couples who are certain they do not want any more children. The procedure for women is called tubal ligation and for men vasectomy.

porridges/cereals: grains which have been cooked with a large amount of liquid until they are very soft.

postpartum bleeding: discharge of blood from the uterus after a woman has given birth.

postpartum care: the care and treatment a woman who has recently given birth receives from a health care provider.

prenatal visits/antenatal care: the care and treatment a woman who is pregnant receives until the time of delivery.

progestin: a man-made hormone that is like progesterone used in family planning methods.

rooming-in: after delivery, the newborn and mother sleep together in the same bed or room.

spermicide: a substance which kills sperm.

STD/sexually transmitted disease: an infection acquired through sexual contact with another person.

sterilize: a process used to destroy microorganisms.

supplemental foods: semi-solid or solid foods fed to an infant in addition to breast milk or infant formula.

traditional practices: customs carried down in the culture for many, many generations.

tubal ligation: the Fallopian tubes are permanently closed, preventing fertilization, thereby preventing conception.

vaginal intercourse: sexual relations between a man and a woman in which the man's penis enters the woman's vagina.

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International Addresses for Breastfeeding and LAM Information

Institute for Reproductive Health
Georgetown University Medical Center
Department of OB/GYN
2115 Wisconsin Ave, NW
6th Floor
Washington, DC 20007
tel. 001-202-687-1392
fax. 202-687-6846

The following addresses are for La Leche League International (LLLI). LLLI Centers will have information about breastfeeding and some may have information about LAM.

La Leche League International (LLLI)
9616 Minneapolis Avenue
PO Box 1209
Franklin Park, Illinois
60131-8209 USA
Tel: 001-708-455-7730

Carmen Vandebabeele (LLLI), Around the World Director
8 Chemin de Launay
78990 Elancourt France
Tel: 33-1-30-50-26-71
Fax: 33-1-30-62-03-60

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Carolina Villa (LLLI)
Regional Administrators of Leaders for Latin America
Apartado Aereo 80278
Envigado, Antiqua Colombia
Tel: 57-270-4345
Fax: c/o FES
57-4-268-4376 (write "para Carolina de Villa" and include her phone no.)

Training Course in Women's Health

Module 7

**Breastfeeding and the
Lactational Amenorrhea Method
of Family Planning**



Institute for Development Training

History of Module 7

This module was added to The Training Course in Women's Health in 1993. It was funded by the Institute for Reproductive Health, Georgetown University, under the Cooperative agreement with the United States Agency for International Development (A.I.D.) (DPE-3061-A-00-1029-00). Zoe Kopp wrote the module, with input from staff of the Institute for Reproductive Health and other reviewers listed below.

The Institute for Development Training would like to thank Mr. Clifford E. Sanders Lopez, Senior Associate for Field Programs at Georgetown's Institute for Reproductive Health for his administrative and collegial support for this project.

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TRAINING COURSE IN WOMEN'S HEALTH

International Prototype

The *Training Course in Women's Health* consists of a series of self-instructional modules which teach the skills necessary for health clinicians to deliver a variety of women's health services. **THESE MODULES ARE ONLY ONE PART OF A TYPICAL TRAINING COURSE. THE OTHER PARTS WOULD CONSIST OF CLASSROOM TEACHER LECTURES AND DEMONSTRATIONS AS WELL AS PRACTICE AND DIRECT EXPERIENCE WITH CLIENTS. ALL HANDS-ON PROCEDURES WITH CLIENTS WHICH ARE NEW TO YOU MUST BE PRACTICED UNDER THE SUPERVISION OF A CLINICIAN WHO HAS HAD THE PROPER AMOUNT OF EXPERIENCE WITH THE PROCEDURE.** No written explanation alone can give you enough instruction.

The modules in the series are:

- Module 1 *The Female Reproductive and Sexual System*
- Module 2 *Communication and Counseling Skills*
- Module 3 *Infection Control*
- Module 4 *Gynecological Examinations and Managing Common Gynecological Problems*
- Module 5 *The Female Urinary System and Managing Common Urinary System Problems*
- Module 6 *Family Planning*
- Module 7 *Breastfeeding and Lactational Amenorrhea Method of Family Planning*
- Module 8 *Female Voluntary Surgical Sterilization*
- Module 9 *Reproductive Tract Infections*
- Module 10 *Female Genital Mutilation*
- Module 11 *Treatment of Spontaneous or Incomplete Abortion*

The modules in the *Training Course in Women's Health* are intended to be only a prototype. For the series of self-instructional modules to be used most effectively, a specific adaptation needs to be made for each country which focuses on the needs of the type of trainees who will use the modules.



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September, 1993

Dear Reader:

On behalf of the board of directors and staff of the Institute for Development Training, this prototype revised edition of the **Training Course in Women's Health** is dedicated to the many health workers everywhere who work tirelessly and ceaselessly in health clinics, in hospitals, and in promoting public health throughout their communities. We hope that you find this course useful to your professional development.

Remember that these modules are prototypes and are meant to be adapted on a country-by-country basis. Please contact us if you would like to find out if IDT has already done an adaptation in your country. If we have not, we would be glad to discuss the possibility with you of doing an adaptation workshop with a health association in your country.

We hope to hear from you as you use this course. Please write us with your suggestions, comments, criticisms and ideas.

Charles R. Ausherman, Ph.D.
Executive Director

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Instructions For the Learner

This module is self-instructional. Self-instruction is a method by which you, the learner, learn by yourself from carefully sequenced materials. The module is divided into short sections of information; each of these lessons is followed by a series of questions which give you a chance to practice using the information you have learned. Answers to these questions are given so that you can check your understanding of the information.

The self-instructional method allows you to learn at your own speed and enables you to check your progress as you learn the information.

Follow the steps below in order to proceed through this self-instructional module in the most effective way:

1. Read the objectives for the module. They will outline for you what you will learn and what you will be able to do after completing the module.
2. Take the Pre-test to get an idea of what you already know and what you need to learn.
3. Read and study the information in Lesson 1.
4. Answer the practice questions following the lesson without looking back at the information. Use a separate sheet of paper.
5. Check your answers using the answer sheet on the page following the questions.
6. If any of your answers are incorrect, re-read the information in the lesson and try to answer the questions again.
7. When all your answers are correct, go on to the next lesson.
8. At the end of the module there are a glossary and a resources and bibliography list to help you in your learning.
9. Proceed through the rest of the lessons in the same way: Read the lesson; answer the questions; check your answers; re-read the lesson if necessary.
10. Some lessons in the module contain suggested learning activities. Arrange to do these activities while studying the module.
11. Take the Post-test after you have completed the entire module.
12. Check your answers to the Post-test using the answer sheet at the end of the module.

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**NO HANDOUTS
FOR THIS SESSION**

FACTS ABOUT INFANT FEEDING

Issue No. 2

NOVEMBER 1992

BREASTFEEDING AND CHILD-SPACING

1. Evidence for the contraceptive benefits of breastfeeding

It has been known for centuries that after the birth of a child it takes longer for women who breastfeed their children to become pregnant than it does for those who do not breastfeed (1). In fact, the desire to have another child quickly has been traditionally considered a reason for women *not* to breastfeed (2). It is only relatively recently, however, that this popular wisdom has begun to receive the attention of the scientific community.

Although breastfeeding is acknowledged to play an important role in reducing the general fertility level of a population, it has usually been regarded as an unreliable method of contraception for women individually. As a result, it is often thought prudent to provide women with access to contraceptives soon after birth, whether or not they are breastfeeding. Although non-hormonal methods can be introduced at any time postpartum, estrogen-containing hormonal contraceptives present significant disadvantages in terms of breastfeeding itself, e.g. they affect the quality and quantity of breastmilk (3).

In 1988 an international interdisciplinary group of researchers gathered in Bellagio, Italy, to review the scientific evidence and reach consensus about the conditions under which breastfeeding can serve as a safe and effective family planning method. The results of this meeting - referred to as the "Bellagio Guidelines" (4) - are based on the results of thirteen prospective studies made in eight countries (Australia, Canada, Chile, Egypt, Mexico, the Philippines, Thailand, and the United Kingdom).

The essential message of the Bellagio Guidelines may be summarized as follows. **The maximum birth-spacing effect of breastfeeding is achieved when a mother fully breastfeeds and thus remains amenorrhoeic, i.e., she does not menstruate.** "Full breastfeeding" entails providing an infant with no other food or liquid than breastmilk (allowing small amounts of water or water-based drinks only). **When these two conditions are met, breastfeeding provides more than 98% protection from pregnancy during the first six months postpartum.** The following figure provides a practical tool for using these guidelines in a family planning clinic.

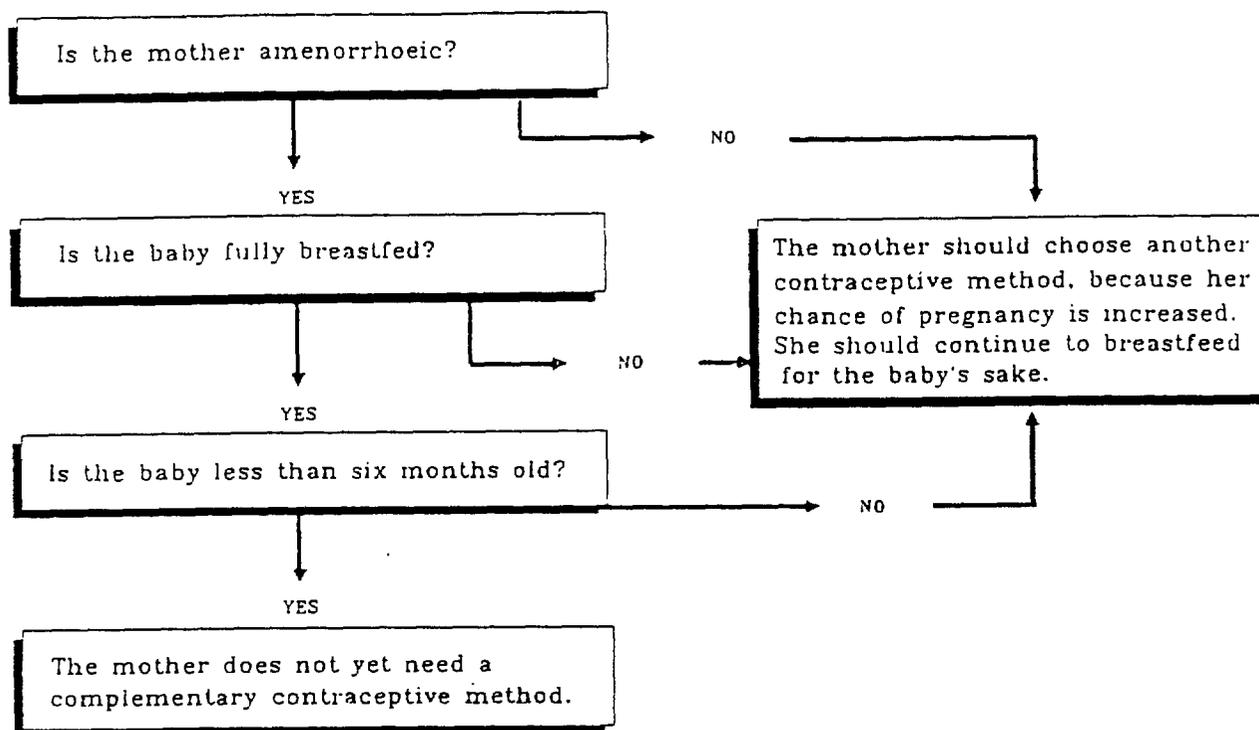
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THE FOOD AND NUTRITION PROGRAMME
AND THE CENTRE FOR POPULATION AND REPRODUCTIVE TRAINING IN HUMAN REPRODUCTION



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Figure: Decision-making chart for women wanting to use breastfeeding for birth-spacing purposes



Several recent studies, and some still under way, are attempting to refine the Bellagio Guidelines. For example, one analysis of previous studies (5) looked at the effectiveness of lactational amenorrhoea - the absence of menstruation due to breastfeeding - irrespective of whether food supplements had been introduced into a child's diet, and beyond six months postpartum. Results showed that if a breastfeeding woman remained amenorrhoeic, the probability of her becoming pregnant during the first 12 months postpartum was similar to that of users of artificial contraceptive methods. Even when ovulation occurred, luteal-phase length and progesterone production were not always sufficient to support pregnancy.

A WHO study involving some 4,000 mother and child pairs is under way in seven countries (Australia, Chile, China, Guatemala, India, Nigeria and Sweden). The study, the largest of its kind ever undertaken, closely follows breastfeeding practices in relation to the return of fertility in different populations. It attempts to establish, where breastfeeding patterns are similar, whether there are any significant differences in the duration of amenorrhoea. This study is also gathering information on factors that may contribute to observed differences (6). It will be completed in 1994.

2. Mechanisms of action

The mechanisms by which breastfeeding decreases fertility are poorly understood. It has been thought that the hormone prolactin plays a role since the mother's level of prolactin rises during pregnancy and remains high while she breastfeeds. However, according to current knowledge, other factors such as the decrease in luteinizing hormone (LH) and the altered gonadotrophin-releasing hormone (GnRH) pulsatile secretion are the most important mechanisms in maintaining ovarian suppression (7,8).

Breastfeeding not only delays ovulation but also reduces the likelihood of conception. Studies from several countries have shown that, even after the return of menses, breastfeeding reduces the chances of pregnancy. This may be the result of a higher proportion of anovulatory cycles, or inadequate luteal phases, or a lower probability that a fertilized egg will be implanted in the womb (9).

Several factors seem to affect the influence of breastfeeding on fertility. The inhibitory effect of suckling upon gonadotrophin secretion is reduced when the frequency of suckling decreases, as, for example, when supplementation is given. A mother's nutritional status seems to be inversely related to the return of her menses, so that undernourished women seem to experience longer lactational amenorrhoea than well nourished women, although it is not clear why this is so. **As a child-spacing method, breastfeeding is most effective during the early postpartum months, provided that the two conditions mentioned earlier are met; however, its effect diminishes over time.** Night-time breastfeeding seems to make a particularly important contribution to delaying the return of fertility (10).

3. Policy implications

There is a direct relationship between child-spacing and child survival. As the interval between successive pregnancies decreases, the infant mortality rate tends to increase. Thus, in the absence of other contraceptive methods, **breastfeeding has an important role to play in reducing mortality during the first year of life.** In addition, the greater the interval between births, the longer the previous child will be able to enjoy breastfeeding's multiple health and psychosocial benefits (11); also, the mother has more time to recover her nutritional stores and to see to her own needs and those of other family members.

Considerable concern has been expressed about the implications of a general decline in breastfeeding in the absence of a simultaneous increase in contraceptive practice. This combination would result in significantly higher birth rates in many countries. A decline in breastfeeding would not only increase fertility, but would also increase infant and young child mortality. Nevertheless, the impact of higher fertility would still be greater than that of higher mortality, with the result that population growth rates would rise (12).

As implied in the Bellagio Guidelines, **breastfeeding's potential as a family planning method should be carefully considered** by maternal and child health programmes in all countries. Postpartum women should be encouraged to breastfeed and use lactational amenorrhoea as a family planning method. When properly instructed in the use of the lactational amenorrhoea

method, women can control their fertility without dependence on health care providers. Thus breastfeeding has the additional benefit of empowering women. Among the important considerations to be taken into account when developing relevant guidelines for specific population groups are their infant-feeding patterns and practices, the average duration of amenorrhoea and the prevalence of contraceptive use (13).

If a woman wishes to delay her next pregnancy, she should immediately begin to use another family planning method once she has had her first postpartum menstrual period, even if she is fully breastfeeding, and regardless of the time since the birth of her last child. Preference should be given to contraceptive methods that do not interfere with breastfeeding. Non-hormonal methods should be the first choice. If hormonal methods are used, the lowest available dose of progestogen-only contraceptives should be chosen.

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Facts about infant feeding, which is produced in English, French and Spanish, is a new medium through which the WHO Working Group on Infant Feeding will convey the results of its collaborative activities to both the international health community and the general public. The Working Group was established by the Director-General under the Task Force for Nutrition to ensure coordination among the various WHO programmes that play a key role in promoting adequate nutrition among young children. Your comments and queries in connection with any issue will be welcome. Write to: Editor, "*Facts about infant feeding*", CDR Division, WHO, 1211 Geneva 27, Switzerland.

Expressing Breastmilk

Hand expression • Hand pumping
Electric pumping • Breastmilk storage

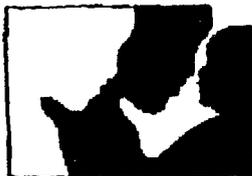
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About the author

Sarah Coulter Danner is a Certified Pediatric Nurse Practitioner in practice with Edward R. Cerutti, M.D., and also a Certified Nurse-Midwife in a faculty practice in Cleveland, Ohio. Sarah is a member of the International Board of Certified Lactation Consultant Examiners and is a consultant to the International Childbirth Education Association.

This pamphlet is part of a series of illustrated pamphlets of practical information on breastfeeding. Other titles include:

- Nursing Your Baby for the First Time
 - Nursing Your Baby Beyond the First Days
 - Nursing Your Baby with Down Syndrome
 - Nursing Your Baby with a Cleft Palate or Cleft Lip
 - Nursing Your Premature Baby
 - Nursing Your Neurologically Impaired Baby
- Single copy and bulk purchase terms are available upon request.



**CHILD BIRTH
GRAPHICS™**

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Photography by Edward Cerutti, Jamie Bolane, and Sarah Danner
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Sarah Coulter Danner, C.P.N.P., C.N.M.
IBCLC International Board Certified Lactation Consultant

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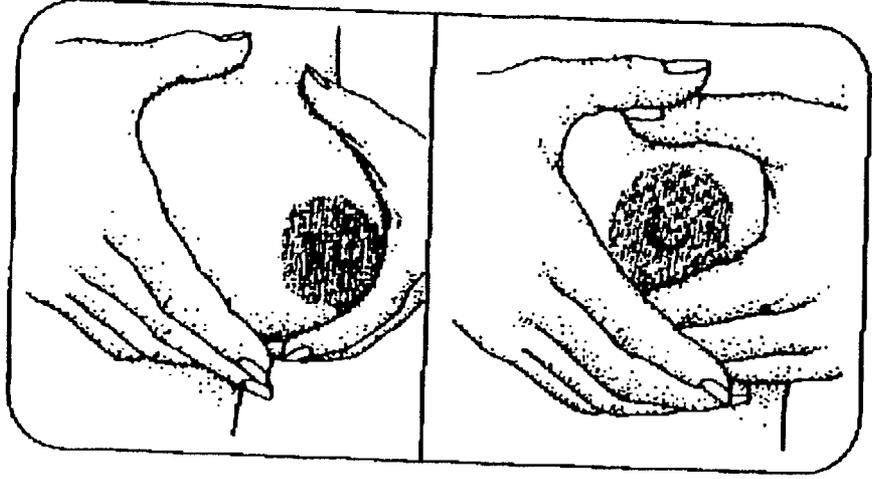
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three methods of breast massage:

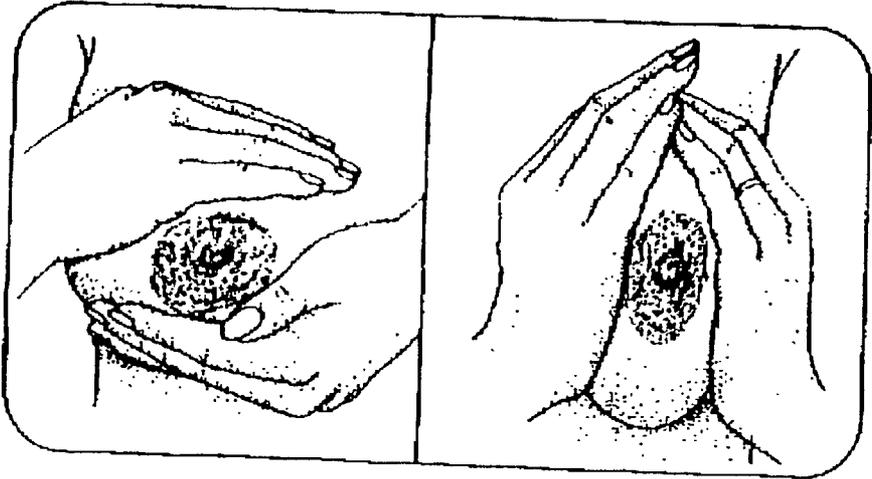
1 *Diamond position.* Support your breast with both hands, thumbs on top and fingers tucked underneath as shown in the illustration. Squeeze your breast gently as you slide your hands forward from your chest toward your nipple. The pressure comes from your palms and fingers and should reach all parts of your breast.

Diamond hand position



2 *Parallel position.* Place one hand above and one hand beneath your breast as shown in the illustration. Cup your breast with your fingers and palms and slide them forward from your chest toward your nipple. Rotate your hands to reach all parts of each breast.

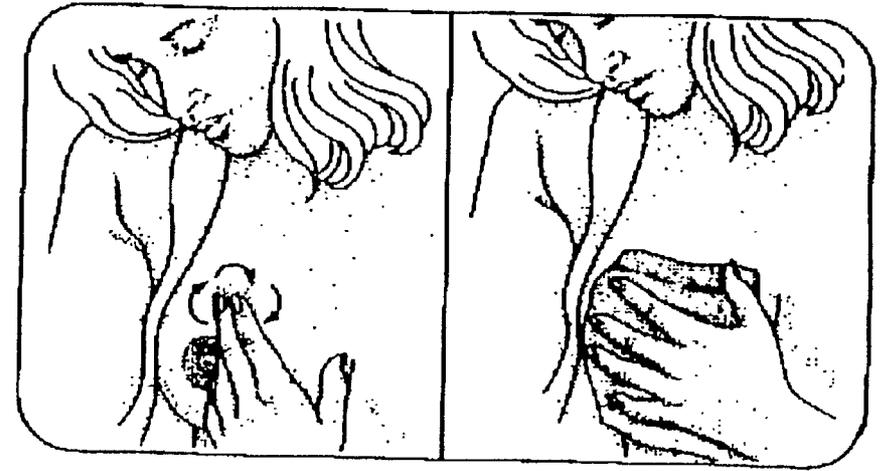
Parallel hand position



3 *Finger tip massage.* This method can be alternated with the diamond or parallel massage. Using two fingers of your right hand for your left breast, press lightly into your breast making small, circular motions. Start near your chest wall and move out toward your areola. Massage all around your breast with your fingertips. Making your fingers vibrate gently may feel good and make this massage technique even more effective.

Finger tip massage

Warm washcloth

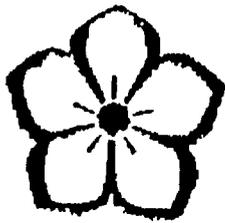


Hand expression



Hand expression is an excellent way to obtain milk for any feeding when you are separated from your baby—either planned or unplanned. If your baby does not suck vigorously at your breast, you can use hand expression after a feeding to stimulate your breasts to produce more milk. Manual or electric pumps are very useful but hand expression of breast milk is just as effective once you've learned the technique.

Before starting to express milk wash your hands thoroughly. Use a warm hot washcloth on your breasts for a few minutes. Get yourself a drink of juice or water to sip while you express your milk. To express breast milk effectively, the final squeeze must be just behind the outer edge of your areola and not on your areola and nipple. This final compression will cause the milk that is stored in the milk reservoirs (sinuses) to flow out of your nipple. The pressure must be firm to get the first drops of milk.



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Hand pumping



You can hand pump to provide milk for your baby while you are away for a feeding, or to stimulate your milk production if your baby does not nurse long enough to signal your body to produce an adequate milk supply. The Medela Manual Breast Pump is one

of the best pumps along with the Marshall/Kanerson (also known as the Comfort Plus) The Happy Family Breast Pump, the Ameda Hand Operated Breast Pump, and the Evonflo are additional types of hand pumps on the market today. The "bicycle horn" type of pumps are inefficient, can cause nipple trauma, and are difficult to clean.

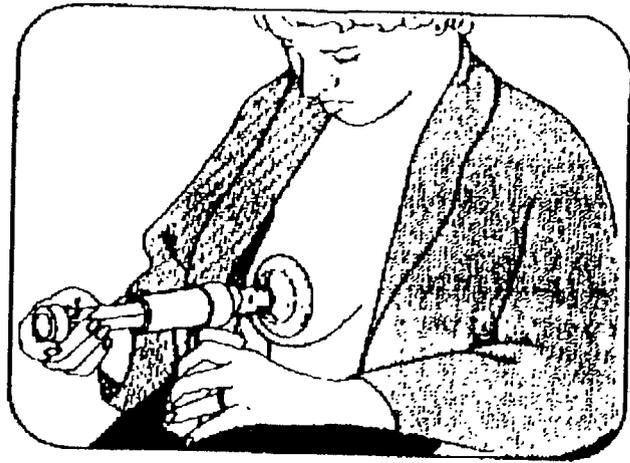
Start by reading the instructions for your pump. Wash your hands before you begin. Make sure all parts are clean or sterile. A clean, nonsterilized pump is fine for a well baby who is one month or older. Sterilize the pump for a baby who is ill or less than one month old.

Get yourself something to drink and find a comfortable sitting position. Rest the pump and your hand on a pillow or table. Be sure that you have the privacy that you would like and/or that your situation allows.

Choose the nipple adapter (flange) that surrounds your nipple most closely yet allows your nipple to slip into it. Center your nipple in the opening. Lean over and move your nipple and areola into the flange so that you get as much in as possible. You may have to do this once or twice to find the most comfortable position for your breast.

If possible, pump right after a feeding ^{because} the first two or three times you pump. Your baby's sucking will have already started your milk flow. Practice holding the pump and feeling how much pull you need to get a stream of milk. You may not get much milk, but you will get a feel for the pump and how it works. If you are not able to pump right after a feeding, use breast massage and a warm washcloth on your breast before you begin.

To get the first let-down or release of milk, pull and push on the plunger slowly several times until you see a few drops of milk on your nipple or in the flange. At this point, pull on the plunger just hard enough to maintain steady suction and a stream of milk. When the stream slows or stops, release the suction and take the pump off your breast. Take a drink and massage your breast a few times. Then reposition the flange on your nipple with the plunger just above the milk in the cylinder. Push and pull the pump once again, repeating the sequence above.



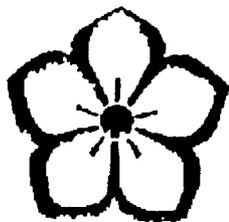
Pump 5 minutes at each breast
Pump again at first breast 3 to 5 min
Pump again at second breast 3 to 5 min

The Medela pump is designed to release suction at the end of each pull without removing the pump. Simply push the plunger to the innermost position then pull all the way out. You do not need to remove the Medela pump from your breast until you are ready to pump on your other breast.

The number of times you need to remove the pump and massage your breasts depends upon the flow that is started and maintained. Each woman will respond to pumping a little differently. Some women can simply pull out on the plunger when the flow of milk slows or stops and get another good stream of milk, others will need to repeat the massage, pump, rest, massage, and so on.

Manual pumping—rest your arm on a pillow





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How often should you pump?



When you have to be away from your baby especially if your baby is less than four months old, try to express or pump at the same time intervals established at home. When you are pumping for your baby who is too ill to breastfeed, pumping a minimum of five times a day for twenty minutes each time has been shown to adequately stimulate your milk supply. Try to pump at least five times a day and space these pumping episodes through the day as much as possible according to your schedule.

How long should you pump?



Pump 5 to 8 minutes on one breast then repeat the same procedure on your other breast. Return to the first breast and then to the second again for a total of 25 to 30 minutes of pumping. This switching takes advantage of the milk let down on one breast stimulating the let down on the other.

Helpful hints:

- Warmth helps relaxation. Sitting with a sweater around your shoulders, sitting near a heat source, or using a warm washcloth on your breast may help you release your milk.
- Look at a picture of your baby. Listening to music, reading something enjoyable, drinking juice or water, snacking, and using slow easy breathing may help you to relax and obtain the greatest amount of milk. If you are at work, a call to the baby's care provider for an update on your baby's day may help your peace of mind and set the stage for pumping.
- Use imagination. Think of the heaviness of your baby lying against your arm and the warmth of your baby's body as she snuggles close to you. Think of the softness of her skin and the sounds she makes before and during feedings. Visualize her face and hands.

If you get sore nipples from pumping take extra care to center your breast and nipple in the pump flange. Start pumping on the least sore breast first and pump for a shorter time on the sore breast. Express some of your breastmilk on the sore nipple and then use a blow dryer on a low setting for about 15 to 20 seconds to dry your nipple. Your breastmilk and exposure to air are the best cures for sore nipples.

Bilateral pumping



Pumping both breasts at once is not only less time consuming but stimulates higher prolactin levels and therefore a larger milk supply. This is particularly important if you are separated from your baby on a regular basis or you are pumping around the clock when your baby is too ill to feed from you directly. Bilateral pumping kits and instructions are available for electric pumps as well as some battery-operated pumps. Pumping both breasts for 15 minutes a session is a desirable amount of time.

Pumping for a premature baby



If your baby is premature or ill or has a weak suck and you are instructed to pump after feeding in order to stimulate your breasts to make more milk, follow the above instructions. Note, however, that 5 to 6 minutes of stimulation at each breast may be enough. Any milk you obtain should be given to your baby by dropper, or syringe. Avoid using bottle nipples. They may confuse your baby, making it more difficult for her to latch on to your breast and nurse effectively.



Cleaning your breast pump



Rinse the pump parts with warm water right after pumping. Then wash them thoroughly with soap and water as soon as possible and let them air dry. Putting your pump parts in the dishwasher is just as good as boiling in order to sterilize the pump. Beware of boiling the rubber gaskets or putting them in the dishwasher since the rubber may shrink as it hardens and ruin the seal that is necessary to create the suction.

You may boil them for 10 minutes.

FACILITY BASED - SERVICE OUTPUT INDICATORS

One Year Assessment

. Breastmilk Substitutes Rates **

Definition: Percentage of mothers who receive breast-milk substitutes, infants feedings bottles at any time prior to hospital discharge.

Benchmark: 80% of the mother will receive no breast-milk substitutes prior to discharge in 5 years; 20 % in 1 year.

Source: Mother's Postpartum Record, Hospital

. Rooming-in Rate **

Definition: Percentage of infants rooming-in 24 hours a day, (for every day in hospital) beginning within 1 hour of birth, not separated from the mother for more than 1 hour at any time.

Benchmark: 90 % of the mothers and babies will room-in in 5 years; 30% in 1 year.

Source: Newborn Record, Hospital

. Exclusively Breastfeeding Rate **

Definition: Percentage of infants exclusively breastfed from birth to discharge.

Benchmark: 80% of the infants are exclusively breastfed in 5 years; 20 % in 1 year.

Source: Newborn Record, Hospital

. Number of Women who respond that LAM was one of the Family Planning methods offered as an immediate postpartum contraceptive option.

Benchmark: 100% of the women responding that LAM was offered an immediate contraceptive method.

Source: Women's Record, Women's Consultation Center

. Number of Women who select LAM or other breastfeeding compatible method (barrier method, progestin-only pills) among women who are exclusively breastfeeding at time of discharge from hospital.

Benchmark: 10% of Women who are exclusively breastfeeding select a contraceptive method immediately postpartum which is compatible with breastfeeding.

Source: Women's Record (postpartum) at Women's Consultation Center and/or Mother's Postpartum Record, Hospital

** WHO Global Data Bank on Breastfeeding

РАБОЧИЕ ПОКАЗАТЕЛИ ДЛЯ УХОДА В УСЛОВИЯХ СТАЦИОНАРА

Оценка в течение одного года

Доля использования заменителей грудного молока **

Определение: Процентная доля матерей, которые получают заменители грудного молока, бутылочки для кормления младенцев в любое время, предшествующее выписке из больницы.

Сравнительный показатель: за период в 5 лет 80% матерей не получают никаких заменителей грудного молока до выписки; за период в 1 год - 20%.

Источник информации: Послеродовая история болезни матери, больница

Доля новорожденных, постоянно находящихся в одной палате с матерью **

Определение: Процентная доля новорожденных, находящихся в одной палате с матерью 24 часа в сутки (в расчете на каждый день в больнице), начиная отсчет с 1 часа после родов, в любое время они не должны отделяться от своих матерей на срок более, чем 1 час.

Сравнительный показатель: за период в 5 лет 90 % матерей и младенцев постоянно содержатся в одной палате; за период в 1 год - 30%.

Источник информации: История болезни новорожденного, больница

Доля исключительно грудного вскармливания **

Определение: Процентная доля новорожденных, которых вскармливают исключительно грудью, от самого рождения до выписки.

Сравнительный показатель: за период в 5 лет 80% новорожденных вскармливают исключительно грудью; за период в 1 год - 20 %.

Источник информации: История болезни новорожденного, больница

Число женщин, которые ответили, что МЛА был одним из методов планирования семьи, предложенным в качестве возможного варианта контрацепции сразу же после родов.

Сравнительный показатель: 100% женщин, отвечающих, что МЛА был предложен в качестве метода контрацепции сразу же после родов.

Источник информации: История болезни женщин, Женский Консультационный Центр

Число женщин, которые выбирают МЛА или другой метод, совместимый с грудным вскармливанием (защитный метод, таблетки, содержащие только прогестин), из того количества женщин, которые кормят исключительно грудью на момент выписки из больницы.

Сравнительный показатель: 10% женщин, которые кормят исключительно грудью, сразу после родов выбирают метод контрацепции, который совместим с грудным вскармливанием.

Источник информации: История болезни женщин (послеродовая) в Женском Консультационном Центре и/или Послеродовая история болезни матери, больница

** Глобальный Банк Данных По Грудному Вскармливанию Всемирной Организации Здравоохранения

Totals to be tallied monthly from post-partum newborn records and/or hospital post-partum registries.

		Totals %
Mothers receiving breastmilk substitutes prior to discharge		
1. Yes	2. No	
Mothers-Infants rooming-in		
1. Yes	2. No	
Mothers-Infants exclusively breastfeeding		
1. Yes	2. No	
Mothers who select either LAM, BARRIER Method, progestin-only as contraceptive among exclusively breastfeeding women		
1. Yes	2. No	

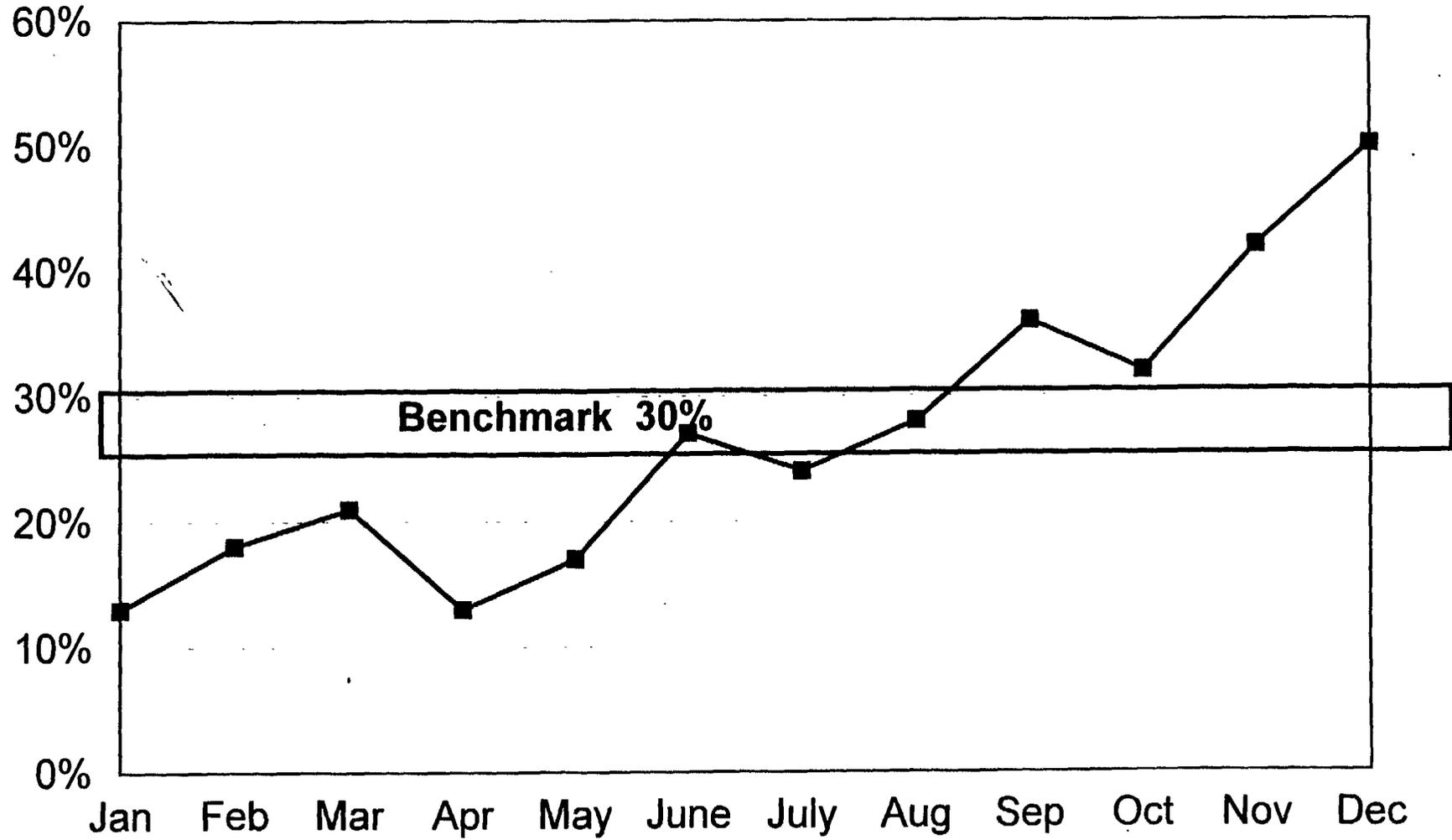
_____ Лист ежемесячного учета больницы

Месяц/год _____

Итоги должны подводиться ежемесячного с помощью регистрационных карточек новорожденных и/или карточек послеродового учета больницы.

		Всего %
Матери, получающие заменители грудного молока до выписки из больницы		
1. Да	2. Нет	
Матери и новорожденные в одной палате		
1. Да	2. Нет	
Матери используют исключительно грудное вскармливание для кормления ребенка		
1. Да	2. Нет	
Матери, выбравшие или МЛА; или Метод БАЯИЕЯА, или только прогестин в качестве противозачаточного средства; среди женщин, использующих исключительно грудное вскармливание.		
1. Да	2. Нет	

ROOMING IN



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ПОСТОЯННОЕ СОДЕРЖАНИЕ МЛАДЕНЦА ВМЕСТЕ С МАТЕРЬЮ

