

Working Group on:

BREASTFEEDING:
SCIENCE AND SOCIETY

11-13 May 1995

Organized in collaboration with
THE ROYAL SOCIETY

SUMMARY REPORT



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AIM

«... attention should be given to the positive benefits of breastfeeding for nourishment and disease prevention in infants, as well as for maternal bonding and birth-spacing».

(JOHN PAUL II, *Address to Dr. Nafis Sadik, Secretary General of the 1994 International Conference on Population and Development*, 18 March 1994, n. 8)

There is general recognition that breastfeeding is a benefit to infants in terms of nourishment and prevention of disease, and it also benefits mothers in terms of maternal bonding and the spacing of births.

In recent years there has been much research in different areas and among people of various cultures. Scientists now have information on how breastfeeding positively influences child development and protects the child from infectious disease. There is also scientific data on the qualities of milk, and on the factors that encourage women to initiate and maintain breastfeeding.

The Pontifical Academy of Sciences and The Royal Society will co-sponsor a scientific meeting that will bring together many of the scientists engaged in research on breastfeeding. The purpose of this meeting is to create a forum for the presentation of the research and conduct a high-level scientific discussion on the present data. This information can be shared with the scientific community and can also be given wider circulation so as to encourage breastfeeding and give assurance to mothers who breastfeed their infants.

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SOLEMN PAPAL AUDIENCE

On the morning of 12 May 1995, His Holiness John Paul II granted a Solemn Audience in the Apostolic Palace of the Vatican to the participants in the Working Group "Breastfeeding: Science and Society".

The group, introduced by His Excellency Msgr. James T. McHugh, Bishop of Camden, N.J. (U.S.A.), was paternally received by the Holy Father, who at the end of the Audience greeted all the participants.

The Holy Father pronounced the following discourse:

*Your Eminences,
Your Excellencies,
Ladies and Gentlemen,*

1. *As always, it is a great pleasure to meet the distinguished participants in the study sessions organized by the Pontifical Academy of Sciences, and I thank Bishop James McHugh for his kind words of introduction. Today I am especially happy to extend my appreciation to the The Royal Society, which has cosponsored this significant meeting.*

True to its purpose and statutes, the Pontifical Academy of Sciences addresses itself to a wide range of scientific, social and ethical issues which have a bearing on the Church's service to the human family, a service which springs from the fundamental Gospel commandment of love. The Academy plays a resourceful role in helping the Church, in particular the Holy See, to fulfill this task of service with the benefit of the most expert scientific knowledge and insights. Your studies and enquiries contribute to

the Church's supreme effort to journey hand in hand with humanity on its path through temporal realities towards man's great and inexorable transcendent destiny.

2. *On this occasion you have been invited to share your expertise on the specific subject of: "Breast-feeding: science and society", as a part of the overall study which the Academy is pursuing since 1990 on Population and Resources. As scientists you direct your enquiry towards a better understanding of the advantages of breast-feeding for the infant and for the mother. As your Working Group can confirm, in normal circumstances these include two major benefits to the child: protection against disease and proper nourishment. Moreover, in addition to these immunological and nutritional effects, this natural way of feeding can create a bond of love and security between mother and child, and enable the child to assert its presence as a person through interaction with the mother.*

All of this is obviously a matter of immediate concern to countless women and children, and something which clearly has general importance for every society, rich or poor. One hopes that your studies will serve to heighten public awareness of how much this natural activity benefits the child and helps to create the closeness and maternal bonding so necessary for healthy child development. So human and natural is this bond that the Psalms use the image of the infant at its mother's breast as a picture of God's care for man (cf. Ps 22:9). So vital is this interaction between mother and child that my predecessor Pope Pius XII urged Catholic mothers, if at all possible, to nourish their children themselves (cf. Allocution to Mothers, 26 October 1941). From various perspectives therefore the theme is of interest to the Church called as she is to concern herself with the sanctity of life and of the family.

3. *Worldwide surveys indicate that two thirds of mothers still breast-feed, at least to some extent. But statistics also show that there has been a fall in the number of women who nourish their infants in this way, not only in developed countries where the practice almost has to be reinstated, but also increasingly in developing countries. This decline is traced to a combination of social factors such as urbanization and the increasing demands placed on women, to healthcare policies and practices, and to marketing strategies for alternate forms of nourishment.*

Yet the overwhelming body of research is in favour of natural feeding rather than its substitutes. Responsible international agencies are calling on governments to ensure that women are enabled to breast-feed their children for four to six months from birth and to continue this practice, supplemented by other appropriate foods, up to the second year of life or beyond (cf. UNICEF, Children and Development in the 1990s, on the occasion of the World Summit for Children, New York, 29-30 September 1990). Your meeting therefore intends to illustrate the scientific bases for encouraging social policies and employment conditions which allow mothers to do this.

In practical terms, what we are saying is that mothers need time, information and support. So much is expected of women in many societies that time to devote to breast-feeding and early care is not always available. Unlike other modes of feeding, no one can substitute for the mother in this natural activity. Likewise, women have a right to be informed truthfully about the advantages of this practice, as also about the difficulties involved in some cases. Healthcare professionals too should be encouraged and properly trained to help women in these matters.

4. *In the recent Encyclical Evangelium vitae I wrote that: "A family policy must be the basis and driving force of all social policies ... It is also necessary to rethink labour, urban, residential*

and social service policies so as to harmonize working schedules with time available for the family, so that it becomes effectively possible to take care of children and the elderly” (n. 90).

Is this a vague utopia, or is it the obligatory path to the genuine well-being of society? Even this brief reflection on the very individual and private act of a mother feeding her infant can lead us to a deep and far-ranging critical rethinking of certain social and economic presuppositions, the negative human and moral consequences of which are becoming more and more difficult to ignore. Certainly, a radical re-examination of many aspects of prevailing socio-economic patterns of work, economic competitiveness and lack of attention to the needs of the family is urgently necessary.

5. *I am therefore very grateful to all of you for offering your time and co-operation to this meeting cosponsored by the Pontifical Academy of Sciences and The Royal Society. I look forward to the synthesis and report of your findings so that this information may be widely circulated to our Church agencies and interested institutions throughout the world. I pray for the success of your research and for your own personal well-being. May God’s blessings of strength, joy and peace be with each one of you and the members of your families.*

ADDRESS TO THE HOLY FATHER

At the Solemn Audience granted to the Working Group participants on 12 May 1995, His Excellency Msgr. James T. McHugh, Bishop of Camden, N.J. (U.S.A.), delivered the following address:

Most Holy Father,

I am pleased to present to you the participants in the Working Group on Breast-feeding: Science and Society. The meeting of this Working Group is cosponsored by the Pontifical Academy of Sciences and The Royal Society of London. The persons taking part in this meeting are physicians and scientists who are engaged in scientific research and who have accumulated much important data on the advantages of breast-feeding for both mother and child.

There is considerable evidence that breast-feeding provides proper nutrition for children and also protects the child against life-threatening infections in the earliest years of life. The mother also benefits by knowing that she is providing good nourishment and research shows that breast-feeding is associated with a reduction in the risk of breast cancer. The return of ovulation is inhibited in the fully breast-feeding woman, at least during the first six months after birth, thereby providing important health benefits to the family because of improved birth spacing.

We are now coming to a better understanding of the nutritional components of human milk and of the receptivity and response on the part of the child. The efforts of our participants are directed toward enabling women to initiate and sustain breast-feeding and enabling infants to benefit fully. The research papers and the discussions within our Working Group are a valuable contribution.

Unfortunately there are many factors that discourage or inhibit women from this important practice. In developed countries the rapid pace of life and time demands on women are obstacles. Absence of stable family life and familial support affect many women. Employment patterns, the work environment and the absence of sufficient maternal leave time create difficulties.

In developing countries where breast-feeding has been a more common practice, urbanization, work outside the home and other aspects of modernization tend to diminish the practice of breast-feeding. It is important to protect and strengthen the cultural support for breast-feeding practices within the family.

Our Working Group has also recognized that while breast-feeding primarily involves mother and child, there is also an important role for fathers. Every element of child care is a mutual responsibility and commitment of both parents. The father should be particularly sensitive to the physical demands placed on the mother and assist her in obtaining proper nutrition and rest. The father should give approval and encouragement to help the mother sustain the practice. Every woman should be supported in every aspect of her motherhood, by her family and by society.

Our Working Group is pleased with this opportunity to present and review the important research data. We are grateful to be able to meet with you, Holy Father, and we ask your blessing and your prayers.

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PRENTICE A.: *The constituents of human milk.*

WOOLRIDGE M.W.: *Problems of establishing lactation.*

VILLALPANDO S.: *Social and biological determinants.*

II.

IMPACT ON FERTILITY

MCNEILLY A.S.: *Breast-feeding and the suppression of fertility.*

PEREZ A.: *The effect of breast-feeding on fertility.*

MENKEN J.A.: *The demographic effects on breast-feeding.*

RASMUSSEN K.M.: *Effect of breast-feeding on maternal health and well-being.*

III.

INFECTION AND DISEASE

HOWIE P.W.: *Protective effect of breast milk against infection.*

HANSON L.Å.: *The effect of breast-feeding on the baby and its immune system.*

VICTORA C.G.: *Infection and disease: the impact of early weaning.*

POLLITT E.: *Breast-feeding and child development.*

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SOMMERFELT E.: *World-wide patterns of breast-feeding.*

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GARZA C.: *Implication for policy and program development.*

SUMMARISERS AND FINAL DISCUSSION

BREASTFEEDING: SCIENCE AND SOCIETY

SUMMARY REPORTS

Scientific experts in fields concerned with the health and well-being of children and their mothers recognize breastfeeding as the best way to nourish infants and to promote the postpartum, and possibly longer term, health of women. This consensus led the world community over twenty years ago to recommend that infants be breast-fed exclusively for four to six months with continued breastfeeding for two years or longer.

BENEFITS TO THE INFANT

The benefits to the infant fall into three broad categories: nutritional, immunologic, and behavioral. Reviews of the world's scientific literature by the Working Group reaffirmed the strength of the conclusions regarding the nutritional and immunological benefits and led to an acknowledgment of the potential for significant behavioral advantages.

Nutritional Benefits

It is clear that nutritional benefits to infants extend through the periods of exclusive and partial breast-feeding and possibly beyond the latter period. The high nutritional value of human milk conferred by the high bioavailability of its nutrients, balance of specific nutrients, and other characteristics is of significant advantage to all infants. It is of most value, however, to infants of families with low economic resources. Human milk substitutes accessible to those infants generally are unsafe because of their inferior nutritional quality and frequent contamination with potentially fatal infectious agents.

The bacteriologic safety and high nutritional value of human milk argue strongly for maximizing the intake of human milk, especially among infants

of the poor. This is particularly important when foods that are added to the infant's diet displace human milk, are of inferior quality, and are bacteriologically contaminated, thereby raising the risk of infection and malnutrition. Although there are recent data that support the extension of exclusive breast-feeding beyond six months among some infants, published data remain too limited to conclude that the period of exclusive breast-feeding should be extended universally beyond the current recommended period of four to six months. There is no controversy, however, regarding the important role of human milk in supplying essential nutrients and immune protection to the child during the period of mixed feeding.

The major possible exceptions to the full adequacy of exclusive breast-feeding relate to vitamins K, D, and B₁₂. Although there is some disagreement, most medical scientists continue to recommend vitamin K supplementation at birth for all infants, regardless of feeding mode, to prevent hemorrhagic problems in the newborn. Infants with limited exposure to sunlight and/or of mothers with low vitamin D stores because of low vitamin D intakes and limited sun exposure should receive vitamin D supplements. Infants of strict non-lacto-ovo vegetarians also run the risk of vitamin B₁₂ deficiency and therefore should be provided an exogenous source of this essential nutrient.

Maternal malnutrition also may result in abnormally low levels of some nutrients in human milk. Generally, however, even women living under very harsh conditions will provide sufficient milk of adequate quality to exclusively breastfeed infants for four to six months. More importantly, circumstances that lead to maternal malnutrition almost uniformly result in malnutrition and serious infectious morbidity among nonbreastfed infants. Mortality rates of nonbreastfed infants in these circumstances are estimated to be 12 times greater than those of their breast-fed counterparts.

The contamination of human milk may present safety concerns in some circumstances. Situations in which environmental pollutants such as heavy metals and organohalides may contaminate human milk should be evaluated carefully; however, attention must be given always to the benefits and risks presented by the exclusion of human milk and by its substitutes. In these circumstances, exposure of the infant obviously begins *in utero*, thus increasing the imperativeness of attending to the contamination of the environment.

Another major concern is the human immunodeficiency virus (HIV) which is responsible for the acquired immune deficiency syndrome (AIDS). Although it is clear that human milk may carry HIV, controversy remains as to the conditions that determine the infectivity of HIV in human milk. There is no controversy, however, that the benefits of human milk are much

greater than the risks presented by HIV in areas characterized by high rates of infant mortality and malnutrition.

Immunologic Benefits

In addition to serving as the most reliable, safe, and nutritious food for infants, human milk also provides unique immunological benefits that result in decreased infections and other desirable outcomes. In the recent past, scientific evidence was limited to the likelihood that human milk provided passive protection, i.e. protection against infectious disease which occurs because of the direct interaction between specific milk components and potential pathogens that threaten the infant. Little evidence, however, was available to support the hypothesis that human milk alters the development of the infant's immune system, thereby also providing active in addition to passive protection. Data reviewed by the working group support the idea that both active and passive mechanisms likely account for the decreased infectious morbidity observed in infants in both economically developing and fully industrialized nations. Of particular interest were data from the United Kingdom demonstrating the persistent protective effects of breastfeeding, i.e. following weaning, against gastrointestinal infectious disease, and to a lesser degree against respiratory diseases, in infants breast-fed for at least 13 weeks or more.

Recent studies have demonstrated that breastfeeding enhances responses by the infant to infectious challenges. Enhanced responses were noted following the administration of parenteral vaccinations with diphtheria and tetanus toxoids and Hib (*Haemophilus influenzae* type b)-protein conjugate, oral polio virus, and "natural" infections with respiratory syncytial virus. The mechanisms responsible for these responses are the object of intensive investigations. It is likely that both the high nutritional quality of human milk and its complex immune components (e.g. anti idiotypes, various growth factors, cytokines, and various anti-inflammatory factors) are responsible for the improved immune function of breast-fed infants.

The combined nutritional and immunological benefits of human milk result in a reduced incidence and severity of diarrheal disease. As a consequence, breastfeeding protects strongly against diarrheal mortality and the greatest protection is to young infants. Although partial breastfeeding is protective, maximal protection is achieved with exclusive breastfeeding. A reduction in the incidence of respiratory disease is less clearly established, but breastfeeding does appear to reduce the severity of respiratory illness as reflected by hospitalization rates and mortality due to respiratory illness. There also is fairly consistent evidence that breastfeeding protects against

otitis media, but the effect is less than that seen for diarrheal diseases. Evidence for protection against other infectious diseases is less clear, but nonetheless suggestive. Theoretical mathematical projections based on data obtained from the World Health Organization indicate that a 40% reduction in the prevalence of nonbreastfeeding would result in a 50% reduction in respiratory deaths and 66% reduction in diarrheal deaths worldwide in children 18 months or younger.

Longer birth spacing due to breastfeeding is discussed in greater detail later. It is raised here because its effects are important to the infant. Longer interbirth spacing decreases infant mortality and morbidity through its beneficial impact on the child's nutrient and immune status. The latter is a result of both improved nutrition because of longer breastfeeding and fewer family members competing for food and a reduced number of siblings, which may decrease infectious contacts within the household.

Evidence also was reviewed which suggests that the immunologic benefits may be longer term. Investigators have reported that breast-fed infants run a significantly lower risk compared with bottle-fed infants of developing type I diabetes, Crohn's disease, and lymphomas in childhood, years after breastfeeding has ceased.

Behavioral Benefits

Behavioral benefits are more difficult to document. Although the plausibility is strong that specific constituents of human milk enhance the infant's neural development and that suckling at the breast augments desirable emotional ties between mother and infant, objective experimental evidence in support of the hypothesis that breastfeeding directly enhances the infant's behavioral development is limited. The usefulness of most published investigations is restricted by inadequate study designs, inappropriate evaluation tools available to and/or selected by the researchers, and an overly narrow focus on developmental outcomes (e.g. IQ's and psychomotor indices). The narrowness of the focus excludes consideration of interactions between feeding mode and other potentially important modulators of behavioral development (e.g. reductions in morbidity) and disregards *processes* that underlie development. Furthermore very little attention has been given to the alternative possibility, i.e. that breastfeeding may limit mental development through, for example, the transfer of toxic substances in milk to the child. This alternative is complicated by the confounding likelihood that the infant's exposure to toxicants is initiated during gestation, the period of maximal vulnerability.

Acknowledging these caveats, previously breast-fed children appear to

have an advantage compared to bottle-fed children in developmental scales, IQ tests, and assessments of other specific cognitive outcomes. Among the most provocative observations are the positive relationship on IQ of human milk feeding in premature infants. Although the workshop participants acknowledged controversial aspects of those observations, the need to replicate such studies was recognized widely. The consistency of the evidence argues strongly for evaluations with more robust designs and evaluation tools. Such investigations should permit inferences regarding the nature, degree, and persistence of effects of breastfeeding or human milk feedings on behavioral development and the assessment of the modulation of putative effects by social, economic, and other environmental factors.

BENEFITS TO THE MOTHER

Maternal benefits also fall into three broad categories: health benefits of a non-behavioral nature, positive behavioral outcomes, and reductions in fertility. The first and third categories were examined by the working group in greater detail than was the second category.

A principal limitation of most studies of the effects of lactation on women is that lactation seldom is evaluated in the context of a complete reproductive cycle, i.e. a cycle inclusive of pregnancy, lactation, and the non-lactating, non-pregnant state that precedes a subsequent pregnancy. The significance of this omission stems from the likelihood that biological strategies for maintaining maternal well-being through the life cycle rely on a healthy physiologic preparation for reproduction and adequate pregnancy intervals for maternal repletion. Interactions among the contiguous stages within reproductive cycles and the biologic effects of distinct socio-economic, demographic and environmental conditions in industrializing, newly industrialized, and post industrialized settings are expected to modulate maternal responses to lactation.

Health Consequences

Generally lactation is expected to help women maintain a healthy body weight when sufficient quantities of adequate food are readily accessible and to enhance the physiologic efficiency of nutrient utilization under nearly all conditions. Insufficient data were, however, available to the working group for an assessment of the effects of lactation on the prevention of maternal obesity and nutrient depletion of the mother. Although obesity is of most concern in fully industrialized and newly industrialized nations, it is

ironically a growing problem among some developing countries with large numbers of undernourished women of reproductive age. Similarly the paucity of data made it difficult to assess the global impact of lactation on nutrient depletion of the mother and its potential consequences on maternal and infant health.

Issues related to longer-term health outcomes, i.e. osteoporosis and breast cancer, were addressed more confidently. Concerns that lactating women may be at greater risk of osteoporosis because of calcium losses in milk have not been supported by recent studies conducted largely in affluent countries. As for breast cancer, current evidence supports a beneficial effect of breastfeeding in preventing premenopausal breast cancer, but no association has been uncovered between breastfeeding and postmenopausal disease.

Behavioral Benefits

Hormonal changes that accompany lactation are expected to influence maternal behavior in ways that support breastfeeding and promote mothering behaviors. Investigators also have suggested that successful breastfeeding is important to maternal self-efficacy and possibly social empowerment. These expectations likely are most relevant when maternal nutritional and social needs are met. Further research on these possible effects clearly is essential.

Fertility

Data reviewed by the working group reaffirmed the suppression of fertility by breastfeeding. The duration of a mother's infertility is dependent directly on her infant's suckling activity. Breastfeeding is most effective in decreasing fertility (and thereby facilitating, longer, more desirable inter-pregnancy intervals) when infants are breastfed on demand and are provided no other sources of food or water. There also are data suggesting that the use of pacifiers may lessen breastfeeding's effects on fertility by decreasing the infant's suckling activity.

The mean anovulatory period for nonbreastfeeding women appears to be approximately 40 days. In breastfeeding women, anovulation may persist well into the second year postpartum. Infertility appears to be maintained by a suckling-induced disruption of the normal pattern of pulsatile luteinizing hormone (LH) release (essential for ovulation) and facilitated by an increased hypothalamic sensitivity to the negative feedback effects of estradiol. The mechanisms responsible for these maternal responses to

lactation have not been identified but are sufficiently reliable to have led a group of investigators to conclude that when women fully or nearly fully breastfeed and remain amenorrheic, breastfeeding provides more than 98% protection from pregnancy in the first six months postpartum. The programmatic implementation of this conclusion is known as the Lactational Amenorrhea Method (LAM) of natural family planning.

Any biologic or social factor that either promotes or interferes with the infant's suckling activity (e.g. a delay in the introduction of complementary foods or the inappropriate or premature introduction of supplementary or complementary infant foods) will, respectively, prolong or shorten the duration of infertility. Discussions on the control of milk synthesis were particularly relevant to these considerations. It is clear that milk synthesis is under autocrine (or local) control. The frequency and degree to which the breast is emptied are principal determinants of the quantity of milk that is produced. Most interferences with the suckling activity of infants will be reinforced by subsequent decreases in milk production. Under such conditions feedback mechanisms will lead to progressive decreases in suckling, which, in turn, will disable mechanisms that disrupt LH pulsatile release and eventually result in an earlier return of ovulation. Therefore, the social factors that determine breastfeeding patterns are especially important for the maintenance of lactational infertility.

DEMOGRAPHIC EFFECTS OF BREASTFEEDING

The Working Group examined the demographic effects of breastfeeding's impact on fertility and infant mortality. It reviewed the impact of breastfeeding on one of the two principal proximate determinates of fertility, the rate of births. The other proximate determinate, the length of the reproductive span (the interval between a woman's first ovulation and the time she either dies or becomes infertile), was not considered because it is not thought to be related to breastfeeding.

The effects of breastfeeding on the dynamics of birth intervals may be examined by dividing the birth interval into three component parts, i.e., (i) the postpartum period (the time between delivery and the resumption of both sexual intercourse and ovulation), (ii) the time between the end of the postpartum period and the next birth, and (iii) the length of the subsequent pregnancy associated with a live birth. The endocrine responses that make lactation possible prolong postpartum anovulation and amenorrhea through mechanisms that have been reviewed briefly in the preceding section and regulate other reproductive functions (e.g. luteal function) through

mechanisms that are understood less comprehensively. A semi-quantitative assessment of the impact of these effects on fertility suggests that a woman's lifetime fertility may be reduced by as much as 50% by prolonged breast-feeding.

The demographic impact, however, also will be influenced by the effect of infant feeding practices on child survival. Unlike the semi-quantitative assessments of the effects of the proximate determinants of fertility on population growth, the impact of the proximate determinants of child mortality on population growth have been more difficult to estimate. Six types of factors have been identified among the principal determinants of child mortality: (1) maternal characteristics, (2) environmental contamination, (3) nutrient deficiency, (4) injury (5) personal illness control, and (6) the gestational age and development of the newborn. The first three are influenced greatly by breastfeeding.

Relationships among breastfeeding, fertility, and child mortality are confounded by the socioeconomic changes which often accompany changes in breastfeeding patterns. The socioeconomic conditions that traditionally have led to decreases in the incidence and duration of breastfeeding tend, over the long term, to improve the six factors identified above and to diversify and increase the use of contraceptive strategies for birth control. Nonetheless, if socioeconomic changes are ignored and the positive impacts of breastfeeding on fertility and child mortality on population growth are assessed, it appears that long-term breastfeeding (i.e. breastfeeding into the second year of the child's life or beyond) has a major effect on population growth in addition to the positive health effects for both mother and infant due to increased birth spacing and the nutritional and immunological benefits discussed previously. Breastfeeding is a major factor determining fertility in the non-contracepting world. In fact, it can reduce fertility to half what it would be if no women breastfed. But it alone cannot reduce fertility to the very low levels that are consonant with slow or even moderate population growth (e.g. under two percent per year).

CURRENT WORLDWIDE BREASTFEEDING TRENDS

The Working Group also reviewed data from demographic and health surveys conducted from 1990 to 1993. It is alarming that under-five mortality remains excessive by any measure in much of the world. For example, in Africa mortality of one- to four-year-old children in 13 countries for which data were available ranges from a high of 318 per 1000 live births in Niger to a low of 83 in Namibia. As in all regions, infant mortality in

those 13 countries generally accounts for an increasing proportion of under-five mortality as the under-five mortality drops.

It is likely that improved breastfeeding practices will impact child mortality significantly in nearly all economically developing countries. The term *breastfeeding practices* merits emphasis because among children born in the last five years, the surveys found between 95 and 97 percent were ever breastfed in the same 13 African countries for which mortality data were reviewed. Rates of children ever breastfed were similarly high (i.e. > 90%) in Asian, South Pacific, and Latin American countries for which data were available.

1. In most of these developing countries substantially more than 50% of all infants were breast-fed for 12 to 15 months and more than 25% were breast-fed for 20 to 23 months. The median duration of breastfeeding among children born in the last three years ranged from 17 to 28 months in the 13 African countries. No economically developing country in the regions surveyed had a mean duration of breastfeeding below six months and most mean durations were substantially above that level. Yet, consistently across all countries surveyed, the mean duration of breastfeeding was longer in rural than in urban areas. Relative differences in mean duration between rural and urban areas within countries ranged from close to 100% to as little as 5%. A minority of infants in most countries, however, received human milk exclusively through 4 months of age, although rates varied widely among those countries surveyed. For example 90% of Rwandan infants are reported to receive only human milk through 4 months of age; but rates in Tanzania, Kenya, Madagascar and Namibia range from 17 to 47% and in Burkina Faso, Ghana, Malawi, Niger, Senegal, Nigeria, Zambia, and Cameroon from 1 to 13%. Rates were similarly divergent in other regions of the world. The percentage of infants whose diets were restricted to only human milk and water were similarly divergent among countries, but substantially higher than those receiving only human milk.

SOCIO-CULTURAL FACTORS AFFECTING BREASTFEEDING

Breastfeeding is not an instinctive behavior. It is learned, and desirable breastfeeding practices must be actively promoted and supported. Successful breastfeeding, therefore, is dependent upon social and cultural factors. Major shifts in breastfeeding practices in fully industrialized countries over the last 30 to 40 years and rural-urban differences in most

economically developing countries provide the best evidence of the great influence of socio-cultural factors on breastfeeding. The best predictors of breastfeeding practices in fully industrialized countries are socio-cultural rather than biologic in character. This also is increasingly true in the industrializing countries, especially in those that are urbanizing quickly. However, recognizing the importance of socio-cultural factors in determining infant feeding practices does not lessen the difficulty of understanding how specific socio-cultural factors operate or may be measured adequately to explain variations within and between different infant feeding patterns.

Socio-cultural factors that have been examined most often are those that can be integrated easily into biomedical and epidemiological models, e.g. religion, marital status, education, and kinship pattern. These often are included in assessments of knowledge, attitudes, and beliefs. Yet, because infant feeding and breastfeeding in particular represent a wide range of highly emotional issues, it is often difficult to obtain reliable and valid data from informants in most studies.

Other factors are less commonly studied because they are more difficult to assess. For example, factors reflective of values, attachment, nurturance, and sexuality require interpretation from social science paradigms and are not as amenable to reductionist models. Nonetheless each likely contributes significantly to the links among what people say they know, what they know, and what they practice.

As long term, detailed ethnographic analyses have become increasingly available, a conceptual model has emerged which describes culture as an interaction between *style* and *structure*. Style refers to the manner of expression characteristic of an individual, a time, and a place. The application of this model is expected to help the understanding of the influence of socio-cultural factors on breastfeeding. Infant feeding styles communicate fundamental values, attitudes and beliefs reflected in the interaction between mother and infant during feeding, in how breastfeeding is accomplished, etc. These *styles* of feeding are part of dynamic trends and fashions.

Styles in turn are in a dynamic interaction with defined organizational and institutional *structures*, such as those related to health care, the economy, and governments each with its own potential influence on infant feeding choices. An improved understanding of relevant *styles* and *structures* should enhance our ability to predict how infant feeding choices will be affected by changes in socio-cultural factors.

Despite these limitations a comparison of the effects of biological and socio-cultural factors on measures of breastfeeding success (e.g. prevalence and duration) strongly suggests that breastfeeding is biologically robust, but

highly susceptible to positive and negative socio-cultural influences. The principal basis for this conclusion is that breastfeeding is sustainable under the wide range of biological conditions characteristic of affluent women in economically developed countries and poor women in harsh environments in less economically developed areas. This is not true when breastfeeding is considered under an analogously wide range of socio-cultural conditions relevant to breastfeeding. Although it would be a mistake not to recognize the cost that this characteristic presents to poor women (i.e. to their biological well being), it is equally fallacious to conclude that adequate breastfeeding can be accomplished when only biological needs are met.

RESOURCES NEEDED TO PROTECT, SUPPORT, AND PROMOTE BREASTFEEDING

The information reviewed by the Working Group did not allow a prioritization of resources needed to protect, support, and promote breastfeeding; it did allow the group, however, to identify resources which would enhance the likelihood of successful lactation in nearly all settings. The paucity of quantitative information available to assess the relative importance of resources needed in specific settings represents a major research gap. The resources identified by the group fell in three broad categories: time, space, and socio-cultural/economic support.

The physiological and socio-cultural information reviewed by the group documented clearly that breastfeeding requires time of the mother. The two principal sources/requirements of time are the family and, when the mother also is employed outside the home, her employer. Because milk production is sustained by physiological processes dependent upon the regular removal of milk, time constraints that result in decreased or inefficient suckling will impact negatively on milk production and eventually the sustainability of adequate milk production. Time constraints imposed by employers have marked negative impacts on breastfeeding success because of adverse effects on suckling. Employment policies that recognize the importance of maternal leaves, temporary part-time employment options that do not adversely affect longer-term full-time employment opportunities, and opportunities for breastfeeding in the workplace represent complementary strategies to help establish and sustain adequate lactation.

Space is required to breastfeed. Differing perceptions of physical modesty, hygiene, and other concepts dependent upon cultural norms and relevant to infant feeding and maternal well-being will make diverse demands on the characteristics of spaces best suited for the protection, support, and promotion of breastfeeding. These demands apply to family

residences, places of employment, and various sites where communities congregate (e.g. places of worship, businesses, and entertainment).

Socio-cultural/economic support fell in two subcategories, tangible and intangible support. Examples of the types of tangible support needed to obtain full benefits of breastfeeding are safe and adequate food for the mother and complementary infant foods for the period of mixed feeding, i.e., when foods other than human milk are introduced to the infant diet; fair labor compensation that recognizes the needs of families, and adequate housing and related services that protect, support, and promote the hygienic well-being of the family.

Examples of intangible support tended to center around five social sectors: government, business, community, health professions, and educational and research institutions. Those that center around government represent a wide range of issues. They extend from laws and policies that govern parental leaves to those that lead to differing urbanization trends. Parental leave policies are of obvious relevance; urbanization trends influence family support structures and employment patterns which affect the protection, support, and promotion of breastfeeding.

Although the Working Group recognized the significant influence that the commercial sector plays in determining parental and family leave policies of specific countries, the negative impact of overt and subtle inappropriate marketing practices by producers and vendors of infant foods received more attention. Strategies that are used to reduce breastfeeding appear designed to decrease suckling at the breast by the infant, thereby causing decreased milk production and an increasing dependence on human milk substitutes and/or undermining maternal confidence in the ability to breastfeed, and the general social support of breastfeeding. These strategies are implemented by such diverse activities as direct advertisement to the public and the discredited distribution of human milk substitutes either at no or reduced cost in health settings or directly to family residences. Other issues relevant to the commercial sector's employment policies and the impact these policies have on the time mothers have to breastfeed have been discussed previously.

The issue common to communities-at-large, health professions, and educational and research institutions is recognition of breastfeeding as the *expected* mode to feed all infants and, its corollary, the use of human milk substitutes only when specifically indicated. Although all agencies, institutions, etc., with interests in infant health recommend exclusive breastfeeding for at least the first four to six months, these recommendations are not commonly reflected in the practices of communities, the health professions, and educational and research institutions. Examples of the

consequences of failing to conform practices with recommendations are 1) the inappropriate management of lactation by health professionals who have received inadequate training, 2) the poor knowledge and attitudes of many young families relative to breastfeeding because of inattention to lactation in primary and secondary education, and 3) a poor knowledge base for the improvement of lactation practices because of inadequate research support.

CONCLUSIONS AND RECOMMENDATIONS

The data reviewed by the Working Group reaffirmed present recommendations. Infants should be breastfed exclusively for four to six months with continued breastfeeding for two years or longer. The benefits of breastfeeding in all countries and the benefits that are projected if international recommendations are implemented more broadly are significant to individuals and organizations responsible for the implementation of scientific knowledge that is highly pertinent to the wellbeing of all families.

Accumulated knowledge leads to the conclusion that almost all women are able to breastfeed fully for four to six months, and perhaps longer, if given adequate sociocultural support. The robust physiologic characteristic of lactation is particularly valuable because of the nutritional, immunological, and possibly behavioral benefits of breastfeeding to the infant. Similarly, benefits to the mother are important. And, some such as the effects on fertility, are of value to both mother and infant.

The Working Group urges the active protection, support, and promotion of breastfeeding by governments, communities, the commercial sector, education and research institutions, voluntary organizations responsible for the promotion of maternal and infant health, and, in particular, health professions and facilities. Of special concern to the Working Group are efforts by some manufacturers and vendors of human milk substitutes to reduce the rate and duration of breastfeeding. Such efforts should be actively prohibited because of their harmful effects, particularly in developing countries. Especially relevant to this recommendation is the resilience of lactation in the face of harsh biological conditions and the fragility of breastfeeding in the face of inadequate socio-cultural/economic support. These characteristics impose a special responsibility on all societies to safeguard the well-being of women by assuring their access to a safe and adequate food supply throughout their life cycle and to the provision of adequate time, space, and socio-cultural/economic support to women and their families to maximize health of all children from infancy and of women throughout the reproductive cycle.