

# 7 Nutrition



|   |     |
|---|-----|
| Advocating for Nutrition . . . . .  | 131 |
| Integrating Nutrition in Child Health and<br>Community-Based Programs . . . . . | 131 |
| Exclusive Breastfeeding Through Six Months .                                    | 133 |
| Complementary Feeding and Continued<br>Breastfeeding, 6-24 Months . . . . .     | 138 |
| Vitamin A . . . . .   | 146 |
| Other Micronutrients . . . . .  | 150 |
| Food Fortification . . . . .  | 152 |
| Severe Malnutrition . . . . .   | 152 |
| Nutrition, Health, and Poverty . . . . .  | 154 |
| Summary . . . . .   | 155 |

**A**lthough nutrition appears last in this document among six child survival interventions, it easily deserves to be first. Nutritional deficiencies contribute to a large percentage of deaths associated with the other interventions discussed here. The World Summit child survival goals for 2000 focused on moderate and severe malnutrition. However, the public health community has recently turned its attention to the importance of *under-nutrition*—a far more pervasive problem but at the same time one that is harder to detect. In many countries, under-nutrition is the norm and “looks” normal to mothers and providers alike. Approximately

80 percent of nutrition-related mortality is associated with this mild form.<sup>1</sup> The overall contribution of nutritional deficiencies to child health problems is shown in the box on page 130.

Poor nutrition is most harmful early in life, particularly between about 4 to 12 months. Damage during this period cannot be fully repaired in later years. This realization has led to a narrowing of focus in many nutrition activities (for example in Title II supplementary feeding programs). During their first two years children are most vulnerable to diarrheal disease and ARI—and to the cycle of infection, poor nutrition, and re-infection. For a mother, this is a

---

<sup>1</sup> WHO, BASICS, UNICEF 1999.

period of continuous challenges: beginning with initiation of breastfeeding, exclusive breastfeeding through six months, then timely introduction of complementary foods, and gradual transition to adult foods.

A key aspect of nutrition is recuperation from disease episodes. As we have seen elsewhere in this document, feeding during and after illness is integral to home management of infections and is a counseling priority. Nevertheless it is often virtually overlooked by health systems, and the impact of communication in this area is rarely examined.

## CHILD DEATHS ATTRIBUTABLE TO UNDERWEIGHT

| Disease               | Attributable % |
|-----------------------|----------------|
| Diarrheal Disease     | 61 percent     |
| Pneumonia             | 52 percent     |
| Malaria               | 57 percent     |
| Measles               | 45 percent     |
| All under five deaths | 53 percent     |

More than 80 percent of malnutrition-related deaths occur in children who are mildly or moderately underweight.

Source: Black 2003.

Our understanding of the technical, social, and behavioral aspects of nutrition is always evolving. Research regarding zinc, for example, has only recently changed recommended treatment practices for diarrhea (see Chapter 4). Recent evidence-based guidance on feeding options in the context of reducing mother-to-

child transmission of HIV helped clarify how to approach many highly personal decisions and practices regarding feeding during the first six months of life. Complementary feeding—one of the most complex family behaviors in all of child survival—is finally becoming navigable in terms of “key practices.” A Guidance by PAHO/WHO in 2003 covers eight different aspects of feeding for four age ranges from birth to two years. One of the most important themes of the guidance is that nutrition is not simply (or even primarily) about food but about *care*. Nutrition is a poverty issue. But the constraints go beyond those of food security and cash flow. Consensus on indicators for this constellation of behaviors is just emerging.

Child nutrition has been approached through a vast array of interventions. Often these have been tackled by programs launched in parallel to child survival efforts, and even in parallel to each other. One reason for this fragmentation is the sheer breadth of the science involved. Another is the varied partnerships required. Behavioral challenges are the most diverse of any health area—ranging from the straightforward promotion of twice-yearly vitamin A capsule supplementation, to strategies encouraging changes in daily food preparation and consumption, to combined nutrition/infection control activities targeting deficiencies (e.g., anemia), to public-private collaborations to fortify staple foods.

This document cannot do justice to these issues. One clear imperative of child survival programs is to *integrate* an emphasis on priority nutrition behaviors within both health system and community approaches to child health. We offer here only a brief overview of the need to advocate for nutrition; the challenge of incorporating nutrition in clinic- and community-based programs; and an outline of behavioral and communication issues related to several major intervention areas mostly likely to be incorporated into child survival programs.

## ADVOCATING FOR NUTRITION

Ironically, nutrition is often a low priority in the Ministry of Health. The national nutrition policy may be out of date or may exist only on paper or not at all. Advocacy is generally a necessary first step for any nutrition intervention. Decision makers must be convinced of the epidemiological need, the feasibility, and the cost effectiveness of new directions. Several approaches have been effective:

- Ministries of health, agriculture, education, women's affairs, planning, and finance all have a stake in nutrition. Improvements in nutrition can be linked to quantifiable changes meaningful to those sectors—including educational outcomes, economic productivity, as well as mortality. International data can provide powerful arguments for new and scaled-up efforts, but projections with a country's own statistics are crucial. The PROFILES advocacy process, which uses computer modeling incorporating a country's own data, can bring together partners to focus on the potential benefits of investing in specific interventions.
- Regional networks (such as the West Africa Nutrition Focal Points) can also focus attention on priority areas when governments are slow to make commitments.
- NGOs often support community nutrition initiatives long before these are integrated into the health system; coalitions of these partners can catalyze government concern.
- The science of nutrition is always advancing. Protocols and pre-service training must be constantly reviewed and revised. While the

complexity of nutrition can be a burden for programs, it can also be used as a helpful “hook” for gaining the attention of medical decision-makers. The science of breastfeeding; the science of vitamin A and zinc; the science of infant feeding options in the context of HIV/AIDS will continue to require state-of-the-art updates—these opportunities should be capitalized on to raise interest among potential partners and the public.

Nutrition is a lifecycle intervention. The girl child whose growth falters during the first two years of her life is additionally compromised during adolescence, often becomes pregnant too young and too often, and brings low birth weight babies into the world. Although the health system may have any number of chances to intervene, many or all of these are likely to be missed. One of the challenges is to bring together the diverse stakeholders in this process and articulate a coherent overall strategy. Nutrition seems to belong everywhere and yet nowhere. A related challenge is to know the most effective *entry points* for nutrition interventions/messages and consider whether nutrition itself can serve as a platform for other child survival practices. The next section describes three different frameworks for nutrition approaches.

## INTEGRATING NUTRITION IN CHILD HEALTH AND COMMUNITY-BASED PROGRAMS<sup>2</sup>

### Minimum Program Elements

The Essential Nutrition Actions framework, or ENA, focuses on the behaviors of pregnant and lactating women and children under two years.<sup>3</sup> The framework overlaps with safe motherhood, newborn care, and child survival. For policymakers and for providers,

---

<sup>2</sup> HEARTH is another community-based approach, discussed under malnutrition. The strategic use of mass media can also be considered an “approach” to promoting changes in nutrition behaviors.

<sup>3</sup> WHO, BASICS, UNICEF 1999.

ENA can be a tool or checklist to assure priority interventions are included in health delivery systems and counseling messages. It highlights *six priority interventions* as part of a lifecycle approach. These are:

- Exclusive breastfeeding for six months
- Appropriate complementary feeding and continued breastfeeding for two years
- Adequate nutritional care during illness and for severe malnutrition
- Adequate vitamin A intake
- Adequate iron intake
- Adequate iodine intake

The ENA framework also proposes *six specific contacts with the health system* for incorporating appropriate nutrition emphases. The contacts are:

- Prenatal care
- Delivery care
- Postpartum care for mothers and infants
- Immunization contacts
- Counseling on infant feeding during well-baby visits
- Sick-child care

The framework does not specify how the behavioral clusters will be promoted through the various contacts; this will vary by country. For example, vitamin A supplementation might be incorporated into immunization programs (such as polio NIDS) or well-baby visits (child health weeks or growth promotion). Counseling on infant feeding is also assumed to take place beyond well-baby visits.

The Nutrition Minimum Package (or MinPak, which is closely related to ENA) focuses on these same six practice-clusters and indicates three levels of intervention: improving facility-based services

(counseling as well as supplies); improving household behaviors (through participatory planning, peer counseling, and women's groups); and improving community supports (access to fortified foods and micronutrient supplements).<sup>4</sup> Communication activities potentially cut across all three strata.

## Community Growth Promotion

Nutrition is a home behavior and for the most part a social behavior rather than a medical one. Growth monitoring has been used as a starting point for promoting practices at the home and community level. Regular weighing can serve as a tool for both *advocacy* and *counseling*. One advantage of growth monitoring is that it “makes visible” what otherwise may go unnoticed. A child whose growth *falters due to illness* can be quickly identified and the mother counseled on appropriate feeding practices. A child who does not gain adequate weight *over time* suffers from a *pattern* of deficiencies. This requires analysis and negotiation with the family, and often help from the community.

A carefully explained community growth chart makes the nutritional status of the whole community visible to its members. Over time it can reveal seasonal problems such as outbreaks of diarrhea and shortages of food or financial resources. It can be a useful tool for collective reflection and problem solving, not only about nutrition but also about health, environmental, and social problems.

Growth promotion is time consuming and challenging. It requires well-trained community workers; scales and charts; a good understanding of local foods and feeding practices; and effective counseling. It also requires strong outreach because those children who do not regularly attend weighing sessions are likely to be at highest risk. Growth promotion activities have been effective in reducing

---

<sup>4</sup> Sanghvi & Murray 1997.

underweight and child mortality in a number of countries.<sup>5</sup> Food supplementation programs have also used regular weighing as a tool for targeting the most needy beneficiaries. However, programs that conduct weighing and charting without providing good counseling and fostering community awareness and problem-solving are a waste of effort and money.<sup>6</sup>

In some countries monthly growth monitoring provides a platform for other child health interventions (such as detecting cases of ARI or malaria). Good ongoing evaluation is important to assess whether the community worker is effective in handling multiple interventions. These programs require intensive training and supervision, which are also challenging to establish at scale.

The *concept* of growth serves as a link between good feeding practices and good health. This link can also be promoted without actually weighing children. In Pakistan, formative research identified three cues related to nutritional status that were recognized and appreciated by parents—the child’s level of energy, the child’s appearance, and recent illness. A program in The Gambia identified the qualities of power and strength as valued benefits that could be linked to good nutrition (see box on page 67). Communication programs must identify *concrete benefits* to motivate changes in practice that may be deeply ingrained in daily habits and cultural tradition. “Good nutrition” is not a tangible outcome for families. Visible benefits are usually the most powerful. Fewer and shorter episodes of diarrhea, better resistance to severe illness, and greater capacity to learn are tangible and real.

## Cross-Sector Community Programming

Malnutrition is strongly associated with poor socioeconomic status and low status *within* the family. UNICEF emphasizes three underlying causes of malnutrition: inadequate access to *food*; inadequate maternal and child *care*; and poor water/sanitation and health *services*. These in turn are related to more fundamental issues: inadequate education, social status, and economic security.<sup>7</sup> Successful nutrition programs are therefore often cross-sectoral and address *underlying causes* (see box page 134). Micro enterprise and credit with education programs, women’s literacy programs, and early childhood education (including day care for infants of women who work) have all been linked to improved child nutrition, especially when combined with a specific focus on improved nutrition practices.<sup>8</sup>

## EXCLUSIVE BREASTFEEDING THROUGH SIX MONTHS

Exclusive breastfeeding until the child is around six months of age is one of the most effective of all child health interventions and is estimated to save about five to six million infant lives each year.<sup>9</sup> Broader adoption of optimal breastfeeding practices could save an additional one to two million lives each year in developing countries. Eight key practices help mothers establish and maintain breastfeeding and also contribute to child spacing:

<sup>5</sup> Griffiths et al. 1996.

<sup>6</sup> Ruel 1995. (The number of ineffective GM programs has also caused some to question how feasible this approach is in typical developing country contexts.)

<sup>7</sup> UN Standing Committee on Nutrition 2004.

<sup>8</sup> Allen & Gillespie 2001.

<sup>9</sup> Key practices are for the woman who is HIV negative or of unknown status. Feeding options for the HIV-positive mother begin on page 144.

## COMBINING CREDIT WITH NUTRITION EDUCATION

In Ghana in the late 1990s, about 9,000 women participated in a collective credit program that aimed to improve both household food security and nutritional status. The *Credit with Education* program (designed by Freedom From Hunger) combined small-scale loans with training in small business skills as well as education in health, nutrition, and family planning.

### Benefiting from small investments

Women borrowed money to invest in running tabletop stores, buying and selling fruits, fish, and other products, and preparing and selling food items and small housewares. The average loan was about US \$78 for a four-month period.

**Nutrition and health education** The rationale behind the education portion of the program was to promote beneficial spending as well as adoption of better health/nutrition practices. Participatory learning included skits, stories and demonstrations, problem analysis, and trying out new practices at home. The nutrition lessons emphasized exclusive breastfeeding; enriched complementary foods; increased feeding frequency, variety, and hygienic practices; and feeding during and after illness.

**Results** In a randomized controlled study in Ghana, the program demonstrated large effects on feeding practices. Children aged 12 to 24 months also showed significant improvement in weight and height (about .4 to .5 Z scores) in comparison with changes in the control communities.

*Source: McNell & Dunford 1998.*

### Key Practices<sup>10</sup>

- Initiate breastfeeding within one hour of birth
- Position and attach infant correctly at the breast
- Breastfeed frequently during the day
- Breastfeed during the night
- Offer second breast after infant releases the first
- Give only breastmilk
- Continue breastfeeding when mother is sick
- Increase breastfeeding frequency during and after infant's illness

These practices fall into two clusters: early *initiation* and *duration* of breastfeeding up to six months.

### Initiate Within One Hour of Birth

The decision to initiate breastfeeding immediately requires *support* from those present at the birth and those who influence what happens at this time. Initiation also requires *skills* or assistance to assure proper positioning and attachment. The primary barriers are usually *beliefs* and traditions that lead to delay, discarding of colostrum, and/or giving prelacteals and postlacteals (such as water or honey or other traditional foods).

Behavior change and communication strategies have focused successfully on mothers, influential family members, and skilled and unskilled attendants. The benefits of early breastfeeding are powerful motivators. Benefits *to the infant* have probably been promoted more energetically than those to the mother, partly because of the need to reposition colostrum as a valuable first food (that serves as a “first vaccination,” for example). Harm reduction (rather than confrontation) has worked best in tackling ritual prelacteals. Programs have typically tried to reduce the

<sup>10</sup> LINKAGES 2001(a).

ritual food to a symbolic “taste” and have used local metaphors to raise the status of colostrum (for example, equating it with a gift to the child from God). The specificity of messages is very important. Programs have often found that the message to “give nothing but breastmilk” is interpreted as “give nothing but breastmilk *and* water, tea, juices,” or whatever is in fact commonly given.

As mentioned in Chapter 2, the very dramatic benefits of early initiation *to the mother* should be promoted during birth preparation and also at the time of delivery: the baby’s suckling helps expel the placenta, helps stop bleeding, and shrinks the womb. Many programs have not emphasized these to enough advantage. Early and exclusive breastfeeding also acts as a natural family planning method. Birth preparation, as well as the postpartum visit, are critical opportunities to counsel mothers on the Lactational Ammenorhea Method (LAM) of birth spacing.<sup>11</sup>

Within a given country, place of birth is strongly associated with different initiation practices. Aggressive *advocacy* and *policy changes* have been necessary to change institutional norms. Training of *providers* and good counseling aids are key. In many countries advocacy is still necessary to promote the ten steps of the Baby Friendly Hospital Initiative. WHO and

## THE IMPORTANCE OF INSTITUTIONS

In Jordan, a two-year nation wide communication program focused on several breastfeeding behaviors under the umbrella theme, the “ten golden rules of breastfeeding.” One goal was to improve rates of early initiation. Before the intervention, more than 60 percent of women waited seven hours or more before breastfeeding. Research showed that both mothers and medical personnel held beliefs that undermined early initiation.

**Raising the “status” of breastfeeding** The program (managed by USAID’s HEALTHCOM Project with the Noor Al Hussein Foundation) first organized a national seminar to draw attention to breastfeeding (considered by most of the medical community to be a simple practice not worthy of scientific attention) and to position it as an important technology also supported by the Koran. Medical professionals as well as religious leaders attended the seminar, given by high-profile experts and covered by the press.

**Promoting specific behaviors** The program otherwise focused on families and reached them exclusively through the mass media. A series of television spots were broadcast every evening and longer instructive radio programs were broadcast for two months in 1989 and an additional month almost a year later. Television emphasized the supportive role of family members (husbands, mothers-in-law, and older children), the importance of early initiation, and the Koran’s teaching on breastfeeding. The radio programs featured advice from a fictional woman physician, Dr. Huda, whom women began spontaneously to write with questions.

**Results** Among all mothers surveyed, knowledge about correct initiation increased significantly (from 41 to 74 percent). However, changes in behavior were directly related to place of birth. Initiation within six hours (the program target) rose significantly from 43 to 69 percent among mothers who delivered in public hospitals and from 42 to 67 percent among those who delivered at home. In private institutions, early initiation rose from 17.2 to 24.5 percent, indicating particularly strong barriers in these settings, as well as the need in general to target those *present at the birth*.

*Sources: McDivitt et al. 1993.*

<sup>11</sup> LINKAGES 2001(c).

UNICEF's institutional self-assessment tool helps maternity wards carry out rapid monitoring to improve the coverage and quality of breastfeeding counseling and policies.<sup>12</sup>

### *Breastfeed Exclusively for the First Six Months*

Optimal breastfeeding is a cluster of behaviors a mother must carry out both day and night and despite any illnesses (her own or the infant's). She needs skills, knowledge, confidence, support, and often persistence in the face of both cultural and social constraints.

WHO estimates that around 35 percent of infants 0-4 months old are exclusively breastfed; the number may be as high as 70 percent in some countries and as low as 2 percent in some African countries.<sup>13</sup> Improvements are more difficult to achieve than for initiation, which has the obvious advantage of being a one-time cluster of behaviors.

The primary barriers vary. However, very common ones include:

- Belief that the baby needs water, especially in hot weather
- Belief that the mother has “insufficient milk” (lack of understanding that increased suckling produces more milk)
- Belief that breastmilk is not enough nourishment after one or two months
- Rushed feeds due to other work and time constraints
- Separation (due to work outside the home) leading to mixed feeding or early cessation

Other common problems include difficulties with attachment and “topping off” a breastfeed with diluted

animal milk or formula. If use of bottles (or pacifiers) is common, these should be strongly discouraged; they can be highly contaminated and also confuse babies.

Interviews, observations, and focus groups will reveal pervasive problems and the reasons mothers do what they do. Trials of Improved Practices<sup>14</sup> can then help zero in on one or two key problems and find out what changes are easiest for mothers to make. As always, the central focus should be a few simple “doable” actions that will make a difference, rather than the entire litany of positive breastfeeding practices.

Mothers are influenced by their mothers-in law, their peers, their husbands, health providers, and others. In many countries doctors as well as health providers believe water is necessary in the summer. Several studies have shown that messages targeting water must be very specific and highlight “even in summer” or any other sticking point. “Insufficient milk” is another problem that must be tackled with several audiences at once. Few health providers understand the demand/supply mechanism of breastmilk production, how to counsel mothers, and how to reassure them.

Breastfeeding has been largely neglected in pre- and in-service training of most health workers. Both WHO and UNICEF are now emphasizing standardized breastfeeding courses. An 18-hour and a ten-hour course are available for adaptation.

Most changes in breastfeeding behaviors require *skills* as well as *social support*. Peer counseling and mother support groups have both been effective in helping mothers with the techniques of breastfeeding. A study in Mexico found that home visits by trained

---

<sup>12</sup> WHO, UNICEF, Wellstart 1999.

<sup>13</sup> Hill et al. 2001.

<sup>14</sup> Dicken et al. 1997.

peers had a significant impact on practices. At three months postpartum, 50 percent of mothers who had been visited were exclusively breastfeeding: the rate was 67 percent among mothers who had received six home visits and only 12 percent in the control.<sup>15</sup> The study showed the most dramatic impact from visits in the first two weeks. Mother support groups have also had measurable impact on exclusive breastfeeding. A program in Honduras extended *duration* of exclusive breastfeeding, which is a very difficult indicator to affect. Mother support groups tend to work best among those who are already inclined to breastfeed, however, and the approach is also challenging to organize at scale.<sup>16</sup>

The complexity of breastfeeding, combined with the difficulty of reaching large populations with skilled face-to-face support, has pressured communication managers to create mass media programs that both *teach skills and build confidence*, as well as raise awareness. Several programs have demonstrated that radio, for example, can be used effectively to explain and model these behaviors. In some cases the media can do a better job than face-to-face channels. A program in Bolivia, for example, found that radio was more effective in influencing behaviors than trained volunteers

<sup>15</sup> Rodriguez-Garcia et al. 1990.

<sup>16</sup> Green 1999.

## IMPROVING EXCLUSIVE BREASTFEEDING

A behavior change strategy focusing on community groups and message saturation through several channels helped raise exclusive breastfeeding rates in Madagascar. The initial phase (1997-99) included policy activities with the Ministry of Health and establishing an intersectoral nutrition action group.

Communication activities were launched in 2000 and eventually covered six million people. (The program was a partnership between LINKAGES and Jereo Salama Isika, both funded by USAID.)

**Multiple interpersonal strategies** The program put primary emphasis on the community and on building interpersonal skills among volunteer group leaders as well as health workers. Working through field agents located in each of the districts, the program introduced nutrition education into existing grassroots groups and trained health promoters in counseling and negotiation techniques, using counseling cards and other job aids. Training extended to members of women's groups and to local leaders.

**Mass media support** Radio broadcasts, television spots, and appearances by a pop singer (a new mother who became Madagascar's "breastfeeding ambassador") heightened awareness of messages and extended their reach.

**Institutional focus** At the institutional level, the project focused on revitalizing the Baby-Friendly Hospital Initiative and developed self-instructional training modules for maternities. The project also worked with the MOH to integrate a nutrition emphasis in the pre-service curricula of medical, nursing, and midwifery schools.

**Results** In 2000, after 22 months of communication activities, rapid assessments in ten districts showed exclusive breastfeeding had risen to 83 percent from a baseline of 46 percent. In the following year (after suspension of project activities due to political unrest) rates fell to 75 percent. Almost the entire drop-off was among 4-5 month olds, reflecting the particular challenge of *duration* of exclusive breastfeeding.

Sources: Guyon & Rambeloson 2002.

(partly because of the challenges of training large numbers of semi-literate workers and partly due to problems of reach).<sup>17</sup>

### ***Breastfeeding Duration and Mother's Work***

Time is a major constraint to breastfeeding for many mothers. Separation is a common reason for stopping breastfeeding. Generally the decisive impact of *mother's work* on breastfeeding has not been adequately addressed, even when surveys point right toward the problem. This is a major gap for programs to deal with if the problem of *duration* is to be taken seriously.

Many mothers who work but are not away from their infants long and can provide enough breastmilk by feeding intensively when back together (at night for example). This practice can be encouraged. A few programs have encouraged working mothers to express and store milk, but this is not culturally acceptable everywhere. Some mothers believe their milk spoils if they are out in the sun, so don't consider bringing their infants to the fields with them. This belief can be targeted.

Even more important are the *policy* and *collective support* actions needed to bridge the gap between breastfeeding and work. Legislation supporting maternity leave and breastfeeding on the job can aid mothers working in the formal sector. Changes in policies will benefit families but also employers, in terms of reduced absences taken to care for sick children. Breastfeeding *advocacy* has a long and venerable history—from the Innocenti Declaration on the Protection, Promotion, and Support of Breastfeeding in 1990 and the Code of Marketing of Breastmilk Substitutes, to the Baby Friendly Hospital Initiative. The time may be right for a workplace friendly breastfeeding initiative. *Collective action* by women to help each other is also crucial, particularly in

the informal sector. Crèches and simple but secure hanging cradles that can be watched alternately by women in the fields benefit all families. Development programs should lead the way by assuring that their own training programs provide crèches for breastfeeding women.

### **COMPLEMENTARY FEEDING AND CONTINUED BREASTFEEDING, 6-24 MONTHS**

The major indicator for complementary feeding is “timely complementary feeding” (giving solid or semi-solid foods) from six months to nine months of age. This is a critical time for growth faltering. Peak vulnerability extends to around 18 months. Foods are usually introduced too early rather than too late. The exception is South Asia.<sup>18</sup> Feeding practices from birth through around two years consist of a series of transitions marked by the child's changing needs as well as capacities. The mother and family help the child navigate these transitions. The process is highly individual to the child, steeped in local customs, and affected by many conditions within the family. Programs used to call this the “weaning” period, a concept that also captured the idea that the child's foods were special and underwent transitions as well. At around one year the child should be eating regular food from the family pot. Because breastfeeding should continue until two years and beyond, however, the word “weaning” has been deemed misleading.

### **Combining Nutrition and Behavioral Perspectives**

Despite its critical importance, nutrition for children 6-24 months old has not received the attention it

---

<sup>17</sup> LINKAGES 2002(b).

<sup>18</sup> Brown & Bentley 1998.

## KEY PRACTICES — COMPLEMENTARY FEEDING

### 1. Duration of exclusive breastfeeding and age of introduction of complementary foods

Practice exclusive breastfeeding from birth to 6 months of age, and introduce complementary foods at 6 months of age while continuing to breastfeed.

### 2. Maintenance of breastfeeding

Continue frequent, on-demand breastfeeding until 2 years of age or beyond.

### 3. Responsive feeding

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

### 4. Safe preparation and storage of complementary foods

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

### 5. Amount of complementary food needed

Start at 6 months of age with small amounts of food and increase the quantity as the child gets older, while maintaining frequent breastfeeding. The energy needs from complementary foods for infants with “average” breast milk intake in developing countries are approximately 200 kcal per day at 6-8 months of age, 300 kcal at 9-11 months of age, and 550 kcal per day at 12-23 months of age. In industrialized countries these estimates differ somewhat (130, 310, and 580 kcal/d at 6-8, 9-11 and 12-23 months, respectively) because of the differences in average breastmilk intake.

*(continued in box page 139)*

deserves. One obvious reason is its complexity. A single measure of what a child ate within the last 24 hours provides little insight into what is working and what is not. Nutritionists are constantly expanding our understanding of what children need to thrive at different ages in terms of energy and nutrient

requirements, frequency of feeding, and the process of introducing new foods. PAHO/WHO recently published a new Global Strategy for Infant and Young Child Feeding including detailed guidelines on practices in ten different categories (see box pages 139, 140).<sup>19</sup> New indicators are also under discussion.

<sup>19</sup> The nutrition module of the child survival KPC survey questionnaire has recently been revised (Arimond & Ruel 2003).

(continued from box page 138)

## KEY PRACTICES — COMPLEMENTARY FEEDING

### 6. Food consistency

Gradually increase food consistency and variety as the infant gets older, adapting to the infant's requirements and abilities. Infants can eat pureed, mashed, and semi-solid foods beginning at six months. By 8 months most infants can also eat "finger foods" (snacks that can be eaten by children alone). By 12 months, most can eat the same types of foods as consumed by the rest of the family (keeping in mind the need for nutrient-dense foods, as explained in #8). Avoid foods that may cause choking (i.e., items that have a shape and/or consistency that may cause them to become lodged in the trachea, such as nuts, grapes, raw carrots).

### 7. Meal frequency and energy density

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

### 8. Nutrient content of complementary foods

Feed a variety of foods to ensure that nutrient needs are met. Meat, poultry, fish or eggs should be eaten daily, or as often as possible. Vegetarian diets cannot meet nutrient needs at this age unless nutrient supplements or fortified products are used (see #9). Vitamin A-rich fruits and vegetables should be eaten daily. Provide diets with adequate fat content. Avoid giving drinks with low nutrient value, such as tea, coffee and sugary drinks such as soda. Limit the amount of juice offered so as to avoid displacing more nutrient-rich foods.

### 9. Use of vitamin-mineral supplements or fortified products for infant and mother

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

### 10. Feeding during and after illness

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

Source: PAHO 2003.

Consensus will help not only with program design, but with much needed advocacy for what we used to call “the weanling.”

This is probably the longest *list* of key practices in all of child survival. It shows why complementary feeding has always been difficult to translate into “a few key behaviors” or simple messages. While the science has advanced, nutrition counseling in the field has often remained stuck on the basic food groups. Communication programs must work with nutritionists to understand how a small number of changes in what most families are doing might make a difference. Extensive food recalls and analyses, observations of food preparation and feeding styles, group discussions, and market surveys can reveal *what* children are given and *how* at different ages, and what specific improvements might be feasible and affordable. Trials of Improved Practices with individual mothers are especially valuable for testing different options. Recipe trials with groups of women also help determine what alternatives are acceptable.

Introduction of IMCI at the facility level should include some of these basic steps. The district adaptation process includes revision of the IMCI “Food Box.” The box identifies local foods, ways to fortify them if necessary, and specifies what to give and how many meals at different ages. These recommendations should be incorporated in the child health card as well as health worker counseling. In reality, adaptations may be necessary for several areas or populations.

In order to counsel mothers or create media products however, communication programs must go further and help mothers *bridge the gap* between the recommendations and what they typically do. This requires knowing their constraints and what might motivate change. Those who counsel mothers must

*anticipate* local problems, *ask specific questions* about how an individual mother feeds her child, and *negotiate* improvements she might make.

Negotiation is particularly important concerning feeding behaviors because a problem might be resolved by several alternative practices. (Allowing a mother to choose what is easiest and most comfortable for her increases the chances she can maintain the practice.) One regional program in West Africa trained community nutrition volunteers in a five-step counseling process that also included reflection on whether an identified problem should be discussed in mothers groups or by the larger community.<sup>20</sup> Job aids such as counseling cards that emphasize good local practices by age and by problem (feeding during illness for example) are invaluable for providing more generic advice.

### **A Balance of Factors—a Moving Target**

Good nutrition is a variable formula. Fiddling with one factor affects the others. A nutritionist must help with the science. But nutrition at this age is primarily about *care*, and solutions may lie in unexpected directions.

### **Quality**

Poor quality of foods is a common “major offender.” Across cultures, children are often given thin gruels or soups. Simple messages can focus on giving the child “the thicker part of the soup” or giving the regular family food after it has been mashed or pureed. Quality and *diversity* of food including adequate amounts of protein, energy, and micronutrients is a challenge (see page 146 for more on vitamin A). A number of programs have worked with mothers to develop new

---

<sup>20</sup> Nutrition Communication Project 1995.

recipes that enrich a common porridge (often grain-based in sub-Saharan Africa and rice-based in Asia) with simple ingredients that provide added protein and micronutrients (oil, ground peanuts, and cow pea flour in Africa, for example, and fish flakes and vegetables in Southeast Asia). Acceptable changes must be affordable and require little preparation time.

Traditional household technologies (such as fermentation, roasting, and malting) can also improve the *quality* or the *safety* of foods. One program in Tanzania that promoted a fermented gruel achieved a 40 percent reduction in children's diarrhea.<sup>21</sup>

### *Frequency*

Recommended frequency of feeding depends on the age of the child and the calories offered. Frequency is another common "offender." It may actually be a marker for a constellation of problems arising from *time constraints* in the family. When a mother is employed or in the fields during certain seasons the child may be left with others. Someone may give the child a low quality snack or leftovers that have not been reheated. *Who* is feeding the child is an important question for message design. Very often the child at greatest risk is largely in the care of an older sibling. Communication programs to date have not looked closely enough at *why* children may not be fed frequently enough and *who* can feed that child what and when.

### *Quantity*

Our understanding of *how much* young children need to eat is continuously being revised downward.

Estimated energy requirements are 5-18 percent lower than those published as recently as 1998.<sup>22</sup> Quantity may be a more serious problem for an older child if the custom is to eat from a common pot. This is also a *care* issue, however. Some programs recommend giving a young child his or her own bowl as a way of drawing attention to how much the child actually eats.

### *Hygienic Preparation and Feeding*

Half of childhood diarrhea may be the result of contaminated food.<sup>23</sup> Polluted water, dirty pots, cooking utensils, unwashed hands, and unhygienic surroundings all contribute. The box on page 139-40 lists key practices. In a particular community however, one important change might be to keep chickens out of the kitchen or to keep a dog away from the child's plate. Even observational research is difficult because people tend to change these particular behaviors in the presence of guests. Few programs have conducted research to analyze this category of problems.

### *Responsive/active Feeding*

Some parents are attentive to their children's hunger cues, coax them to eat, and are responsive to their efforts to communicate about food. Eating is a developmental process and a socialization process. In a few cultures a child may be "force fed," which is not healthy. In many, however, a child of 12 months or older may be set on the ground with a bowl and left alone while others go about their work. Feeding a child who is under-nourished, in particular, takes patience and persistence.<sup>24</sup>

---

<sup>21</sup> Hill et al. 2001.

<sup>22</sup> Dewey & Brown 2003.

<sup>23</sup> Hill et al. 2001.

<sup>24</sup> Engel 1999.

### *Processed Complementary Foods*

Especially in urban areas, many children are already eating pre-cooked commercial foods. In some areas women's groups prepare and sell nutritious snacks specifically for young children. Most products produced in the private sector are not affordable to those at highest risk. However, increased urbanization and employment of women has made this an important potential product niche.

Experience has shown that improvements in one child's feeding behavior may have unexpected consequences on others. For example, children in this age range still need the anti-infective qualities of breastmilk and messages about food quantity have sometimes led to displacement of calories from breastmilk.<sup>25</sup> A program in Ghana found that a successful effort to promote exclusive breastfeeding seemed to have a negative effect on timeliness of introducing semi-solid foods. This points up the necessity of testing all nutrition messages carefully. It also seems best to promote a whole continuum of behaviors rather than practices for isolated ages.<sup>26</sup>

### **Feeding During and After Illness**

Children lose their appetites when they are ill and are less able to absorb what they do eat. In some communities mothers withhold food during diarrhea or administer harmful remedies such as purges. Feeding during and after diarrhea is particularly critical (see Chapter 4). A child with ARI may have reduced appetite and also have trouble eating, or especially breastfeeding, because of a blocked nose. Mothers are less apt to withhold

---

<sup>25</sup> Brown and Bentley 1989.

<sup>26</sup> Ibid.

## **DIETARY MANAGEMENT OF DIARRHEA**

### **Diarrhea as a “Moment of Opportunity”**

A nutrition program in Peru in 1994 aimed to address the problem of widespread stunting and the effects of frequent diarrheal episodes. Research showed mothers were introducing complementary foods at around five months, but fed children thin soups until around the age of one. They took their children to the field but could not bring soup with them, so only fed them twice a day.

Families had no concept of malnutrition but were concerned about frequent diarrhea and the effects on children's appetites and growth. The program decided illness could be a “moment of opportunity” to ask mothers to try something new.

**Creating a New Product** The project (known as the Dietary Management of Diarrheal Disease project, funded by USAID) conducted extensive formative research, including market surveys of local foods, and worked with a nutritionist to find a traditional recipe that could be improved at low cost with the addition of pea flour, carrots, and oil. Recipe trials with mothers' clubs helped refine the recipe. It could be prepared in eight minutes and was easy to handle and could be taken to the fields.

The new product was named “Sanquito” to position it as a food with medicinal connotations. The program demonstrated how to make Sanquito in women's groups, at local markets, and promoted it over the radio. Sanquito was also promoted to health workers, and prescription pads with the Sanquito recipe were sent to physicians.

**Results** After a 90-day trial, 82 percent of mothers surveyed had heard of Sanquito; 16 percent had tried it; and 12 percent said they planned to give it to their children again. The program could not be sustained because of security reasons and the long-term fate of Sanquito is not known.

*Source: Brown & Bentley 1994*

food during ARI. However, counseling about feeding during any illness is critical and is often overlooked by providers or is poorly done. Special foods and feeding practices are needed during rehabilitation for severe malnutrition (see page 152).

Feeding *during illness* and *during recuperation* are different behaviors and require different beliefs and skills. Mothers tend to be very sensitive to their children's loss of appetite while ill. They may offer special foods. While recovering, the child needs additional food and generally has an increased appetite. But few mothers are aware of this need.<sup>27</sup>

The key practice during illness is *many small feeds*. The key requirements are time and patience. Mothers should be encouraged to give children whatever they are willing to eat. There is no reason to reduce food quality during diarrhea, as WHO recommended in earlier years. In most cultures, mothers do continue to breastfeed and children usually continue to accept breastmilk even if they lose their appetite for animal milk, for example.<sup>28</sup> Breastfeeding also helps comfort an ill child. "Continue breastfeeding" is therefore a simple, feasible, and rewarding message for mothers. It is a critical message for any mother who might be inclined to withhold breastmilk.

A child should receive an extra meal every day for at least two weeks while recuperating. However, during this time the child is probably not getting the same attention from his or her mother and feeding responsibilities may also have reverted to others. The message "give additional food following illness" is therefore a challenging one. It must be directed at the mother but also at the entire family. Again, the major requirements are time and patience. At this age the additional meal is not costly.

Heightened concern about nutrition *during illness* makes this a good time for new feeding suggestions. Chapter 4 described special foods more easily absorbed during diarrhea that also can reduce stool volume. A "prescription" for a special food is a useful communication tool. Some programs have used this moment to introduce new complementary (or "weaning") foods, positioning them as products that have special qualities (see box page 143).

Most importantly, this is probably the single most crucial *moment* for counseling of any kind about child feeding. The provider may also be more inclined to discuss feeding practices with the mother than during a well child visit. This is an opportunity for the provider to link good feeding practices with *resistance to disease*.

## **Infant Feeding in the Context of HIV**

A number of facts are now known about the transmission of the HIV virus through breastfeeding. An HIV-positive mother should be counseled on how to make decisions appropriate to her own circumstances and how to carry out steps to protect her own and the child's health in the context of that choice.<sup>29</sup> Counseling about feeding options is a critical part of any program to prevent mother-to-child transmission (PMTCT) of HIV.

### ***Relative Risks to the Child***

About 15 percent of infants breastfed for 18 to 24 months will become infected through that route if their mothers are HIV positive; one-half to two-thirds of this transmission takes place *after* six months. These transmission risks must be weighed against the dangers to the child of not being breastfed during

---

<sup>27</sup> Bentley et al. 1991.

<sup>28</sup> Huffman et al. 1991.

<sup>29</sup> See LINKAGES 2004 for a more detailed discussion of this topic.

corresponding months. An infant not breastfed in the first two months of life has a six-fold risk of dying from an infectious disease. At six months the risk is about two-and-a-half fold. This means that for most children in the developing world, the risks of not being breastfed are greater than the alternative until around six months of age.

These are only the statistics, however. Every mother's situation is different. Whatever her decision, optimal child feeding practices will be challenging and require support.

### *Practices for the Mother Who Chooses to Breastfeed*

Exclusive breastfeeding is even more important than usual for the HIV-positive mother. Mixed feeding has been shown to increase the chance of infection (over either breastfeeding *only* or replacement feeding *only*).<sup>30</sup>

The mother must also protect her own health. Breast conditions (cracked nipples, mastitis, and breast abscess) increase the chance of transmitting the virus. She needs good counseling on proper positioning and attachment and how to avoid breast problems as well as what to do if they occur. She should also be counseled on practicing safe sex in order to guard against re-infection. The risk of transmission is higher if she is newly infected while breastfeeding.

At around six months or sooner if the mother chooses, she should transition to replacement feeding. This transition should be *rapid*—over the course of a few days or a couple of weeks—in order to avoid the dangers of mixed feeding. It requires many new behaviors: cup feeding, expressing/heating breastmilk, feeding the child at night, and not comforting the child with the breast. The mother has to resist the temptation to reinitiate breastfeeding. Counseling and support are very important during this period.

<sup>30</sup> Ibid.

## **AFASS: CRITERIA FOR REPLACEMENT FEEDING**

**A counselor should help an HIV-positive mother consider whether she meets the “AFASS” criteria for selecting replacement feeding:**

**Acceptable** The mother perceives no barrier to choosing replacement feeding for cultural or social reasons, or for fear of stigma and discrimination.

**Feasible** the mother (or family) has adequate time, knowledge, skills, resources, and support to correctly prepare breastmilk substitutes and feed the infant 8-12 times in 24 hours.

**Affordable** The mother and family, with available community and/or health system support, can pay for the costs associated with the purchase/production, preparation, storage, and use of replacement feeds without compromising the health and nutrition of the family. Costs include ingredients/commodities, fuel, clean water, and medical expenses that may result from unsafe preparation and feeding practices.

**Sustainable** A continuous, uninterrupted supply and a dependable system for distribution of all ingredients and products needed to safely practice replacement feeding are available for as long as needed.

**Safe** Replacement foods are correctly and hygienically stored and prepared and fed with clean hands using clean cups and utensils—not bottles or teats.

*Source: LINKAGES 2004, adapted from WHO 2003.*

### *Practices for the Mother Who Chooses Not to Breastfeed*

The mother who chooses not to breastfeed can feed her child commercial infant formula or home-modified animal milk. She should be counseled that replacement feeding should be “acceptable, feasible, affordable, sustainable, and safe” (AFASS). The cost of replacement feeding is only one consideration. If these other criteria cannot be met, the child is still at greater risk (see box page 145).

### *Integrating Quality Care*

Care of the mother and the child in the context of HIV must be mainstreamed into maternal and child health programs. This requires new norms and training. It also raises the stakes considerably for a number of already difficult behaviors. Among the most difficult are *maternal nutrition* and *complementary feeding*. Asymptomatic HIV infection increases energy needs by 10 percent and symptomatic infections increase needs by up to 30 percent.<sup>31</sup> The breastfeeding mother who is HIV-positive requires ongoing nutrition counseling. The child who is totally weaned at an early age—even at six months—needs the maximum benefits of hygienic and responsive feeding, as well as high quality food. Communication programs will be profoundly tested by these challenges.

### *Policy and advocacy issues*

Strong advocacy is needed to encourage countries to revise national infant and young child feeding policies to include options in the context of HIV. This is also a

time for vigilant monitoring of compliance with the International Code of Marketing of Breast Milk Substitutes. Response to these new challenges should not facilitate non-compliant donations or inappropriate promotion of breastmilk substitutes.

## VITAMIN A

### **Supplementation Strategies**

Vitamin A deficiency undermines the immune system and makes children more susceptible to mortality from common infections. In the 1980s, studies confirmed that twice yearly supplementation of high-dose vitamin A (for children 6-59 months) can reduce under-five mortality from all causes by around 23 percent.<sup>32</sup> Supplementation has protective effects against deaths from diarrhea and measles, reducing mortality by 33 percent and 50 percent respectively.<sup>33</sup> The protocol for treating measles now includes two or three doses of vitamin A.

Governments usually coordinate preventive supplementation through some kind of mass distribution strategy. National Immunization Days (NIDS) were a convenient way to “piggyback” one yearly dose along with polio eradication efforts in the 1990s. As polio campaigns wound down, countries looked for other mechanisms. A study of seven programs that achieved at least 70 percent national coverage pointed to three successful strategies:<sup>34</sup>

- Vitamin A days—(National Micronutrient Days) twice yearly
- Child Health Weeks (vitamin A and a package of child health services) twice yearly

<sup>31</sup> Ibid.

<sup>32</sup> Hill et al. 2001.

<sup>33</sup> WHO also recommends a single high dose (200,000 IU) of vitamin A to postpartum women (for breastfeeding women, within 8 weeks, and for non-breastfeeding women, within 6 weeks). A nursing infant will also benefit from the mother's taking this supplement (IVACG 1998).

<sup>34</sup> Harvey et al. (no date).

- Inclusion in an existing monthly outreach strategy (two selected months per year)

All of these are campaign-like approaches and many of the behavioral and communication issues are similar to those of immunization campaigns.

### *Families*

A vitamin A capsule is a relatively simple and desirable product. It is also appreciated by families as one of the few preventive services offered to *older* children as well as younger ones.

Vitamin A can serve as a draw for other services (growth promotion, deworming, ITNs, vaccinations, other micronutrients). As a program matures, the major promotional challenge is simply to get the word out about *what, when, where, and for whom*. Part of the goal is to create a new norm—“vitamin A is available twice a year during month (x) and month (y).”<sup>35</sup>

In the early years of a program, communication efforts must (re)position the product. Vitamin A may be known for protecting the eyes—but children only go blind from severe deficiency and communities may not identify with this problem. Programs have often associated vitamin A with its “survival” value (helps the child recover from serious illness, saves lives) and with local concepts of “vitality” (helps children grow strong and energetic).<sup>36</sup>

<sup>35</sup> MOST (Accessed May 13, 2004).

<sup>36</sup> Ibid.

## **INTRAHOUSEHOLD STRATEGIES**

In 1991 the Ministry of Health in Niger joined with the Ministries of Agriculture and Education and several international NGOs to reduce vitamin A deficiency in a population of around 250,000. The three-year pilot (in collaboration with USAID’s Nutrition Communication Project and Helen Keller International) focused on nutrition communication strategies to improve household consumption of vitamin A-rich foods. At baseline, around 75 percent of pregnant women and 66 percent of nursing women were at risk of vitamin A deficiency; 50 percent of children aged 13-36 months and 62 percent of children aged 37-72 months were at high risk.

### **Changes in consumption as well as sharing of foods**

The food-based strategy promoted culturally acceptable and feasible alternatives (in light of seasonal availability of foods as well as variations in income). Messages focused on consumption of foods and also intrahousehold food allocation—in particular, the purchasing practices of men.

Research showed that grilled liver was a prized snack available in the market. Even small amounts (25 grams every two weeks) can meet 75 percent of a young child’s needs. One program goal was to increase the frequency with which fathers buy liver as snacks for their families. Other goals included encouraging mothers to buy liver or to share the liver of animals provided at feasts with children. Messages also focused on increasing consumption of squash and mangoes, as well as green leafy vegetables.

The media strategy combined the strengths of interpersonal communication and radio. Amateur village dramas laid the basis for group discussions and counseling by government workers, teachers, and agricultural extension agents. An FM station also broadcast the dramas, raising the prestige of individual villages as well as reinforcing the messages.

**Results** After the year-long campaign, 73 percent of women reported eating liver in the past week compared to 43 percent at baseline; 49 percent of women indicated their children had eaten liver in the past week compared to 37 percent at baseline. The percent of men who said they brought home liver doubled; and the percent of women who indicated they themselves purchased liver and brought it home increased from under 1 percent to 12 percent.

*Source: Seidel 1996.*

Safety is an important concept as well. Fears have focused on toxicity—either that the product is dangerous or the provider does not know how to give it properly. Rumors and adverse events have been a problem for vitamin A as for practically all campaign-style interventions. *Safety* has been the key issue to date for vitamin A.

### *Providers*

Distribution strategies have depended heavily on semi-literate volunteers. Training is crucial—in techniques (to assure safety) and in communicating with parents. In Nepal, volunteers have used the national days to promote food sources of vitamin A as well. During most distributions volunteers only have time to convey basic messages, however. Communication programs can give them basic *job aids*—how to measure and deliver doses, key messages for parents, and answers to common questions. Providers also need clear information on how to follow up with any missed children.

Twice yearly distributions can sap the regular health system and burn out volunteers. As always, non-monetary *incentives and rewards* are essential, as are *signs of appreciation* from the community and the government. *Information on coverage* is a necessary part of this feedback so that problems can be discussed and solved as a group. Successful programs have empowered volunteers and given them “ownership” of program results.

## **DESIRABLE PRODUCT, RESPECTED COMMUNITY WORKER**

The story of vitamin A in Nepal is inextricably linked with that of Female Community Health Volunteers (FCHVs). This cadre was launched in 1988 by a female Minister of Health committed to women’s empowerment. In 1993 the FCHVs (mostly non-literate women over 25) were authorized to distribute vitamin A in bi-annual campaigns.

### **A desirable product, a respected worker**

Participatory training and regular capsule supply were key to the program’s success. Vitamin A is a desirable product; an efficient distribution system has assured capsules are available even in remote areas, raising the *prestige* of the FCHVs. *Training* is geared to give them confidence and to motivate commitment to their communities. Each worker receives materials identifying her with the program as well as registers and educational aids. Local leaders are trained in how to support distribution. Only the FCHV is allowed to dispense the capsules, assuring her status in the program. The distribution day itself is a festival with parades and dramas. The national program encourages visits by high-level observers as an advocacy strategy for both communities and policymakers.

**Results** By 2002 the program\* reached national scale and achieved over 80 percent coverage. The program also brought about a shift in community attitudes toward the FCHV and improved job satisfaction. In contrast to many countries, the average FCHV stays on the job nine years with no financial compensation. Communities in 15 districts have set up endowment funds for the program, providing various supports to service delivery.

The new visibility of the FCHVs as well as their improved outreach skills has also led the way for more complex interventions. Nepal’s ARI program (described in Chapter 6) for example, relies upon FCHVs to visit homes, and on families to trust their skills. The vitamin A program may have been a necessary first step in strengthening the FCHV-family relationship.

(\*National program supported by USAID, JSI, and the Nepali Technical Assistance Group)

*Sources: Coates 1999; BASICS 2004.*

## Communities

Mobilization of families often rests on communities and local NGOs. In Indonesia, Muslim women's groups played a critical role in reaching families in poor urban areas. In Ghana, the school system promoted outreach through a child-to-family effort. In Nepal, local leaders honor the volunteers and communities help with transportation and tea. Although mass media can support demand creation and get out the tactical messages, the massive outreach needed requires that the health system work *with* communities to arrange distribution sites and get the word out.

## Policymakers and the Press

Vitamin A is a new intervention in many countries and decision makers may be unsure about its benefits or about the right delivery system. A “vertical” campaign approach may conflict with decentralization goals, for example. Successful programs have been led by national task forces that have begun by reviewing country mortality data. The press are also useful partners in educating the public about vitamin A—explaining government strategies and promoting upcoming launches. They are important allies in the face of adverse events. District and lower levels must also be prepared to respond quickly to rumors and to any safety issues and must develop good relations with the local press as well.

Coverage data are important for *advocacy purposes* and planning at all levels. This is a challenge for a new intervention that is not yet part of the health information system. Incorporating vitamin A supplementation into routine monitoring systems is the first step towards program sustainability.

## Household Strategies

Household and community approaches can provide long-term answers to vitamin A deficiency. These begin with food-based approaches such as fortification (discussed on page 151) and increased dietary diversity. Well-designed behavior change and social marketing strategies can also address allocation and consumption of foods *within* the family, increase *women's control* over resources to purchase foods, and encourage actual *production* as well as processing of foods. Household strategies are usually complex, multi-faceted, and difficult to evaluate. There is a wealth of experience and some good results however.

Food-based programs often promote consumption of vitamin A-rich foods, such as eggs, liver, and milk products, as well as precursors including orange and yellow fruits, red palm oil, and dark green leafy vegetables. They may also promote new preservation techniques, such as solar drying, that allow families to consume products beyond their usual seasons. Strategies to improve the family diet have recently proven even more challenging, however. The cheapest sources of vitamin A—green leafy vegetables—cannot be eaten in large enough quantities to improve status.<sup>37</sup> The best sources—animal products—are the most expensive and are also usually reserved for males.

Promoting any changes in the family diet requires specialized research and close collaboration with nutritionists. A seasonal calendar of what is available and affordable, methods of storing and preserving foods, local recipes, taste preferences, and intra-family consumption patterns as well as food purchasing behaviors must all be examined. New recipes or preservation methods also require “product testing” techniques familiar in the commercial world. After all of this, suggested changes must be *simple* and should build on what people are already “doing right” and

---

<sup>37</sup> West & Eilander 2000.

what they find *familiar and easy*. Options must be tried and tested by those in the community—including children. Mothers often say they are willing to adopt something “if their children like it.”

Dietary diversity is a *food security issue* and also an *intra-family issue*. Vitamin A programs often include a food production component, targeting specific products for kitchen gardens or encouraging families to consume a portion of the produce from animal husbandry efforts. Nutrition programs have a long history of collaboration with agricultural extension programs, as well as community and school garden and education activities.

Strategies that require changes in intra-household food allocation are challenging. Such changes can be the key however, and successful projects have not shied away from them (see box page 147). The most efficient vitamin A consumption changes can be small ones—such as occasional snacks of liver that the family can afford but are usually reserved for males.

## OTHER MICRONUTRIENTS

### Iron and Anemia

Prevention and treatment of anemia require an integrated strategy looking at the roles of both *nutrition* and *infection*. The epidemiology varies by country and region, and iron supplementation by itself may do little for children. It is important to assess the causes of anemia in a given population. Anemia can be caused by low dietary iron intake, poor absorption of dietary iron, malaria, helminth infections (such as hookworm

or schistosomiasis), and sickle cell disease. Repeated infections (such as chronic diarrhea) are also linked with anemia, as are deficiencies of vitamin A and other vitamins and minerals.<sup>38</sup> Pregnant women, children 6 to 24 months, and low birth weight babies are especially susceptible. In developing countries, over half of preschool children suffer from anemia.<sup>39</sup>

In areas where hookworm (helminth) infection is greater than 20 percent among children, WHO recommends twice yearly deworming for *children over two*. In many countries deworming is included in Child Health Weeks. It may rapidly improve child growth and parents appreciate the service. In areas with high prevalence of helminths, deworming should be actively promoted as one of the benefits of Child Health Weeks or other preventive activities.

In malaria endemic countries, deaths due to severe malarial anemia are at least double those for severe iron deficiency severe anemia.<sup>40</sup> Insecticide-treated nets are an important intervention to prevent anemia among children under five. One study of infants 1 to 11 months old in a high malaria transmission area in Kenya showed that ITNs reduced anemia by 60 percent.<sup>41, 42</sup>

Nutrition strategies for children focus on *fortification, supplementation, and food-based* approaches (see page 151). Exclusive breastfeeding and optimal complementary feeding practices, including consumption of iron-fortified foods from 6 to 24 months, are important to prevent nutritional anemia. Children may be deficient when they don't eat enough heme iron-rich food (such as meat, poultry, and fish),

---

<sup>38</sup> Brabin et al. 2001.

<sup>39</sup> Hill et al. 2001.

<sup>40</sup> Brabin et al. 2001.

<sup>41</sup> Phillips-Howard et al. 2003.

<sup>42</sup> A study in Tanzania found that intermittent treatment for malaria at the time of routine vaccinations reduced malaria by 59 percent and severe anemia by 50 percent. Intermittent treatment of children is not a standard approach at this time, however (Schellenberg et al. 2001).

and when their diets are high in grains or starchy roots. Phytates in whole grains will reduce absorption, as will the tannin in tea. Nutrition education messages can focus on eating small amounts of meat and citrus fruits (even small amounts of vitamin C will promote absorption) and not drinking tea with meals. Various technologies also increase the bioavailability or absorption of plant-based iron: germination, fermentation, and amylase treatment of food, and cooking in iron pots can also help improve iron status.

Animal products are the most important sources of iron. Agricultural projects promoting small animal husbandry and fishponds can improve children's iron as well as vitamin A status.

*Supplementation* with iron is recommended for *low birthweight* babies, who are born with low stores of iron. They should receive daily iron supplements *from 2 to 23 months of age*.<sup>43</sup> WHO also recommends iron supplementation for children *6 to 24 months of age* in areas where the prevalence of anemia in young children is 40 percent or more.<sup>44</sup>

## Zinc

Zinc deficiency is prevalent among young children and is linked with more frequent, more serious, and longer illness, and with growth retardation.<sup>45</sup> In therapeutic trials zinc has been helpful in both preventing and treating childhood diseases. Supplementation has reduced the incidence of malaria, has reduced the severity and duration of diarrhea episodes, and reduced rates of both diarrhea and pneumonia.<sup>46</sup> Recent trials

have generated great interest in the public health community.<sup>47</sup> In 2002, WHO and UNICEF issued new recommendations for diarrhea management: children who are ill should receive zinc supplements (tablets or syrup) for 10-14 days to treat the diarrhea and reduce recurrence (see Chapter 4.)

Any *preventive strategies* involving zinc would be more complex. Unlike vitamin A (and like iron) zinc must be taken regularly in small doses according to a child's age.

## Multivitamins and New Products

Some public health experts are very interested in promoting multivitamins (for example, an iron-zinc combination) as a standard preventive measure. However, to reach vulnerable populations the product would require age-specific doses, instructions, and a dependable distribution system. It would present both compliance and monitoring issues.

Commercial partners are also interested in a product called "sprinkles" which can be packed in single doses and mixed with a child's regular complementary food without changing taste or texture. In trials it has been acceptable to parents and children. One spoonful a day would meet the micronutrient needs (iron, vitamin C, zinc, vitamin A, iodine) of infants. Sprinkles are in a trial stage and would also present issues of compliance, cost, and distribution.<sup>48</sup>

---

<sup>43</sup> Stoltzfus & Dreyfuss 1998.

<sup>44</sup> Ibid.

<sup>45</sup> Walker & Black 2004.

<sup>46</sup> Ibid.

<sup>47</sup> USAID 2004.

<sup>48</sup> Tondeur et al. 2004.

## FOOD FORTIFICATION

Food fortification is a cost-effective and sustainable approach for reducing micronutrient deficiencies.<sup>49</sup> The process usually costs less than two percent of the product's retail price. In order to reach vulnerable groups, the food vehicle must be a staple, consumed in sufficient but safe amounts by those under five, and produced by just a few central plants so that supply can be controlled. Fortification must also be a mandatory process in order to benefit the poor—raising both import and export considerations.

Even when fortification is mandatory, the new product requires careful consumer research and social marketing. *Packaging, labels, and positioning* are crucial. Common food vehicles for different micronutrients include sugar, wheat flour, corn flour, salt and MSG, fats and oils including margarine, and milk. Each one of these products means something to people and concerns about altering them will vary tremendously by country as well as audience group. Universal Salt Iodization (USI) has been successful in much of the world. In Pakistan, however, the original marketing materials made people suspect a connection with the family planning program. Bread fortification is particularly challenging because of many associated intangibles. In Morocco, higher socioeconomic groups were afraid of genetic engineering; poorer groups feared deterioration in quality and higher costs; both feared commercial manipulation of some kind.<sup>50</sup>

Food fortification involves many partners and requires good collaboration between the private sector and the government. Usually a multisectoral task force

coordinates the process, helping to propose policies and draft legislation. Often an experienced third party catalyst assists. The marriage can sometimes begin on a rocky basis and must be sustained over time. In Zambia, the country's major sugar manufacturer welcomed mandatory fortification because it helped assure greater vigilance against foreign and black market competition.<sup>51</sup> In Guatemala, however, neither the government nor industry were very keen on passing or enforcing legislation, and public health advocates and the general public had to put pressure on both for around a decade to assure a fortification program launched in the mid-1970s remained in effect.<sup>52</sup> The “catalyst organization” in such a process must take a behavioral perspective on the barriers and benefits to both sides, and also find supportive advocates to apply the right amount of pressure and supply the right awards.<sup>53</sup>

## SEVERE MALNUTRITION

### Practices and Products for Rehabilitation in the Home

Health workers are trained to recognize severely malnourished children according to a number of signs including severe wasting, edema of both feet, and—for severe anemia—very pale palms (palmor pallor). Current recommendations are for such children to be rehabilitated in a hospital or a therapeutic feeding center. However this is not always feasible, either for the health system or for the family member who may have to stay with the child up to 30 days.

---

<sup>49</sup> WHO 2001.

<sup>50</sup> Centers for Disease Control and Prevention 2001.

<sup>51</sup> Serlemitos & Fusco 2001.

<sup>52</sup> Mora et al. 2000.

<sup>53</sup> Centers for Disease Control and Prevention 2001.

Programs in both Bangladesh and Ethiopia found that home management can be effective and cheap.<sup>54</sup> In Bangladesh, children treated at home following a week of in-patient care did better than those who remained in the centers, and their mothers preferred this as well. In Ethiopia, an emergency feeding program trained some mothers to treat their children at home with just one visit a week to the center. They were first treated for infections and then given supplies of therapeutic foods, including a ready-to-use food (RUTF)<sup>55</sup> in the form of a paste, which children can eat from the packet.

The mortality and recovery rates were significantly better than international minimum standards for therapeutic feeding centers. Recovery was slower than expected, and the program believed this was probably because the therapeutic food was shared with others in the family. Program staff anticipated that rations would be shared with other family members and provided extra take-home rations. However, it concluded that the message “not to share” needs to be particularly strong.

## Rehabilitation in the Community —Hearth

The Hearth/Positive Deviance approach looks for solutions to childhood malnutrition *within* the community, and also focuses on the community as the means of rehabilitation. It includes two phases. Formative research consists of nutrition and health assessments as well as a participatory process that helps the community identify children who are thriving

despite impoverished circumstances, and it analyzes what these families are doing that is different. These are the “positive deviants.” The second phase consists of cooking demonstrations and on-site as well as at-home feeding of children, using the same foods and care giving practices as those of families whose children are doing well. Rehabilitation therefore takes place right at the family hearth.

The positive deviance inquiry includes home visits by researchers to observe behaviors. These include *nutrition* behaviors, *caring* behaviors, and *health-promoting* behaviors. In Vietnam, research found that mothers collected the tiny shrimps and crabs from the irrigation ditches and added these along with sweet potatoes and greens to their children’s diet.

When caretakers participate in the hearth demonstration and on-site feeding they are asked to bring “positive deviant” food with them as the “price of admission.” The program also includes regular growth monitoring and usually deworming. In Vietnam, two years after the start of the program, severe malnutrition was eliminated (from a baseline of three percent) and mild and moderate nutrition were both reduced by 80 percent. Fifty-nine percent of participants were rehabilitated to normal and remained so 14-23 months after participation. A follow up study several years later found that the largest nutrition benefits were actually among younger siblings who had not been directly involved in the program but benefited from the new family practices.<sup>56</sup>

In Vietnam the model was scaled up from 14 to 160 communes (1,500,000 population) through a

---

<sup>54</sup> Collins & Sadler 2002.

<sup>55</sup> Ibid. (RUTF is a fat-based food with high energy and nutrient density equivalent to the Formula 100 used in therapeutic feeding centers. It was developed by Institute de Recherche pour le Developpement and is also produced in Malawi by a local company. The product is also promising as a replacement feeding for children whose mothers stop breastfeeding early due to HIV/AIDS. RUTF is a humanitarian effort and is not sold commercially. The French company Nutriset produces a version called Plumpynut<sup>®</sup> and the Danish company Compact produces a bar called BP100.

<sup>56</sup> Mackintosh et al. 2002.

“living university” approach. Representatives of government and other organizations attended a two-week training program at a participating commune that served as a campus for learning about the process.

## NUTRITION, HEALTH, AND POVERTY

Nutrition, probably more than any of the other child survival interventions, requires behavior and communication programs to stay focused on the underlying causes of poor health. Inadequate access to food is an economic issue. But this is only the most obvious reflection of poverty. Poor hygiene and sanitation, inequities within the family, separation from young infants, and lack of maternal decision-making power must all be addressed directly in nutrition communication programming. And although messages may start out aimed at various individuals—health providers, husbands, volunteers, mothers, older siblings—collective problem-solving may be the most powerful recourse when problems are most severe, and the most vulnerable need help.

## Summary

# Nutrition

**N**utritional deficiencies contribute to a large percentage of deaths associated with the other child survival interventions. In addition to focusing on the problems of moderate and severe malnutrition and micronutrient deficiencies, the public health community has recently turned its attention to the importance of undernutrition, which causes about 80 percent of nutrition-related mortality. Poor nutrition causes most harm in early life, particularly between 4 to 12 months of age.

Behavioral challenges are the most diverse of any health area. Interventions are often launched parallel to child survival efforts and parallel to each other. This document provides only a brief overview of the need to advocate for nutrition; the challenge of integrating nutrition in clinic- and community-based programs; and an outline of behavioral issues related to several major intervention areas.

## ADVOCACY FOR NUTRITION

Nutrition is often a low priority in the Ministry of Health. The national nutrition policy may also be out of date or may exist only on paper—or not at all. Selected approaches to raise awareness and promote policies include:

- Organize scientific updates (conferences, etc.) to galvanize attention and clarify policies
- Focus multiple stakeholders on country nutrition data and cost of interventions—e.g., via PROFILES advocacy process
- Launch/join a regional network that can instigate government commitment
- Support NGO leadership, especially when joined in a strong network with focused strategies

## ATTEMPTS TO INTEGRATE NUTRITION AT THE CLINIC AND COMMUNITY LEVEL

Nutrition is a lifecycle intervention that belongs everywhere and is owned by no one. Advocates have struggled to find the most effective entry points for nutrition interventions and to decide whether nutrition itself can serve as a platform for other child survival practices. Selected approaches<sup>1</sup> include:

### *Essential Nutrition Actions Framework (ENA)*

ENA highlights six priority interventions and six specific corresponding contacts with the health system. ENA can serve as a conceptual checklist to assure that priority interventions are included in health delivery

---

<sup>1</sup> HEARTH (see page 159) another community-based approach, and is discussed under malnutrition. The strategic use of mass media can also be considered an “approach” to promoting changes in nutrition behavior.

systems and counseling messages. ENA builds on a very similar earlier framework, the Nutrition Minimum Package (MinPak).

### **Community Growth Promotion**

Regular weighing and charting of changes can help diagnose nutrition problems, make them “visible” to parents, and create an opportunity for counseling. Growth promotion (GP) has also been combined with other services. There have been some successful programs, but the number of ineffective GP programs has caused some to question how feasible this labor intensive approach is in developing countries.

### **Cross-sectoral Community Approaches**

Malnutrition is strongly associated with poverty. Some programs link nutrition with other sectoral activities. The Credit with Education approach combines small-scale loans with training in small business skills as well as health and nutrition education. Women’s literacy programs, early childhood education (including day care for infants of women who work) have also been linked to improved child nutrition when combined with a focus on specific nutrition practices.

## **KEY INTERVENTIONS**

### **Exclusive Breastfeeding through Six Months**

Practices fall into two clusters: *early initiation* and *duration* of breastfeeding up to six months. For early initiation, programs have chiefly emphasized benefits *to the child* of colostrum. Breastfeeding’s dramatic benefits *to the mother* should also be promoted during birth preparation and at delivery. Initiation is strongly associated with place of birth. Institutional policies, training of providers, and good counseling aids are key. For home births, the family (especially the mother-in-law) is highly influential.

Common barriers to exclusive breastfeeding include:

- Belief that a baby needs water, especially in summer
- Belief that a mother can have “insufficient milk”
- Separation due to work outside the home

Few providers can provide good counseling. Training and job aides are needed. Home visits by peer counselors have been effective, and mother support groups have had some success. The conflict between work and breastfeeding is a major barrier and has not received adequate attention.

### **Complementary Feeding and Continued Breastfeeding**

PAHO/WHO recently issued detailed guidelines on ten categories of feeding practices. Indicators are also being revised. The guidelines will allow for better advocacy and program development. Nutrition counseling in the field has often remained stuck on the basic food groups.

Formative research with help from nutritionists can identify a small number of feasible changes in feeding practices. Trials of Improved Practices (TIPS) help determine what is acceptable to mothers. Recommended foods should be incorporated in the IMCI “food box.” Common major offenders include:

- Foods are usually introduced *too early* (South Asia is the exception)
- Foods are poor *quality*, e.g., thin gruels
- *Frequency* of feeding is not adequate
- Little attention given to feeding during *recovery from illness*, which is a critical period

Nutrition is about care as much as about food. Children at greatest risk are often in the care of older siblings. *Who* feeds the child is often at the root of

*what* and *how often* the child is fed. Few interventions have focused on this crucial issue. In many cultures children are not adequately coaxed to eat; feeding an undernourished child takes special persistence. Feeding during *illness* and during *recuperation* require different beliefs and skills. Children may receive special foods during illness but parents are rarely aware of the need for additional meals during recovery. Illness is a key *moment of opportunity* for counseling, but providers rarely discuss feeding practices at that point (see box at right).

### Infant Feeding in the Context of HIV

Counseling about feeding options is a critical part of any program to prevent mother-to-child transmission (PMTCT) of HIV. For most children in the developing world whose mothers are HIV positive, the risks of not being breastfed are greater than those of being infected through their mothers' milk *for about the first six months of life*. The mother who considers not breastfeeding should be counseled to choose replacement feeding (formula or home-modified animal milk) only if it is Acceptable, Feasible, Affordable, Sustainable, and Safe (AFASS).

The danger associated with *mixed* feeding (breastfeeding that is not exclusive) is higher than that of either breastfeeding alone or giving no breastmilk. Therefore, for those women who breastfeed,

- *Exclusive* breastfeeding behaviors are extremely important
- The infant must be *weaned rapidly* at about six months

No matter what a woman's choice, feeding practices are very challenging and require excellent ongoing counseling.

## Is There a “Moment of Opportunity” for Child Nutrition?

**Mothers are usually concerned about *what* and *how* to feed a child during illness. This is a valuable window for change that is usually completely overlooked.**

During illness children tend to lose their appetites as well as their strength, causing mothers to be concerned about feeding. In many cultures families encourage a sick child to eat and offer special foods.

Although “key practices” for all the major childhood illnesses include advising a mother about how to feed her child during and after illness, few providers take the time—or even know what to advise. But this is the moment when mothers are most receptive to making changes. It is also the moment when changes can be most crucial. Children need additional food and patient attention during recovery. Families rarely understand this need.

Targeting children who are frequently ill is also a natural way of capturing those at highest risk. The first step is to ask questions about how a child is usually fed. The next is to negotiate specific small changes that will make a difference. *Care* is often the biggest challenge; it requires help from family members or others.

## Vitamin A—Supplementation Strategies

Children 6 to 59 months should receive high dose vitamin A capsules twice a year. Successful distribution strategies have included vitamin A days (National Micronutrient Days) twice yearly; Child Health Weeks (vitamin A and a package of child health services) twice yearly; and generalized monthly health outreach (two selected months per year). All are campaign-like approaches and many of the behavioral issues are similar to those of immunization campaigns.

Vitamin A is a simple and generally a desirable product with few barriers.

- Young programs may have to reposition the product (which is known for protecting the eyes) to emphasize its broader “survival” value to children.
- Mature programs can focus on establishing the logistical norms: when, where, and for whom.
- Fears have centered on toxicity; rumors along this line have derailed at least one program.

Distribution strategies often depend heavily on semi-literate volunteers. Training to assure safety and job aids with key messages and answers to common questions are important. Successful programs have focused heavily on motivating and providing recognition for workers.

## Vitamin A—Household Strategies

Household approaches include promoting consumption of vitamin A-rich foods and preservation techniques. Successful programs often collaborate with agricultural extension activities, especially kitchen garden or animal husbandry efforts (see fortification on page 159).

Efforts to improve the micronutrient value of the family diet require specialized nutrition research,

seasonal calendars, recipe trials, and product testing. Recommended dietary changes should be as simple and specific as possible. The best sources of vitamin A—animal products—are the most expensive and are usually reserved for males. Successful strategies have often included emphasis on *intra-household food allocation* and increasing women’s *control over resources* to purchase foods.

## Iron and Anemia

Anemia can be caused by low dietary iron intake, malaria, helminth infections (such as hookworm or schistosomiasis), and sickle cell disease. Repeated infections are also linked with anemia. Prevention and treatment of anemia require an integrated strategy based on the local epidemiology. Low birthweight babies require iron supplements from *2 to 23 months of age*. WHO also recommends supplementation for children 6 to 24 months old where the prevalence of anemia is 40 percent or higher.

In areas where hookworm (helminth) infection is greater than 20 percent among children, WHO recommends twice yearly deworming for *children over two*. Deworming is often included in Child Health Weeks; it is appreciated by parents and can be promoted as a draw in connection with other services.

Animal products are the most important sources of iron. Agricultural projects promoting small animal husbandry and fishponds can improve children’s iron as well as vitamin A status. Consumption of whole grains reduces absorption, as does drinking tea with meals; however, even small amounts of vitamin C promote absorption. Various technologies also increase the bioavailability or absorption of plant-based iron. Any efforts to improve the family diet must consider these factors.

## Zinc

In therapeutic trials zinc has been helpful in both preventing and treating childhood diseases. WHO and UNICEF now recommend that children with diarrhea should receive zinc supplements for 10 to 14 days to treat the illness and reduce recurrence. Any preventive strategies involving zinc would be more complex. To improve general stores, zinc must be taken regularly in small doses according to a child's age.

## Food Fortification

Food fortification is a cost-effective and sustainable approach for reducing micronutrient deficiencies, making this an important approach to promote at the policy level. Food fortification requires understanding the benefits and barriers of both manufacturers and distributors, and good public private collaboration. Universal salt iodization has depended upon legislation and vigilant enforcement.

Whether or not fortification is mandatory, a new product requires careful consumer research and social marketing. Packaging, labels, logos, and positioning are crucial. Common food vehicles for different micronutrients include sugar, wheat and corn flour, salt, fats and oils, and milk. All of these staples may be associated with intangible qualities that the public may

fear altering. Suspicions of a hidden family planning agenda are also common in some regions.

## Severe Malnutrition

### *Rehabilitation in the Home*

Traditionally, severely malnourished children are rehabilitated in a hospital or therapeutic feeding center (TFC). Facility-based care is often not feasible even when accessible, because a family member needs to stay with the child for many days. Several trial programs of a home-based therapeutic care approach have shown that mortality and recovery rates can exceed those of facility-based interventions. A ready-to-use therapeutic food product (RUTF) is central to this approach. Rations are often shared with other family members and may be increased to allow for this.

### *Rehabilitation in the Community*

The HEARTH/Positive Deviance approach looks for cost effective solutions to childhood malnutrition within the community by analyzing how poor but healthy children are fed. It promotes these “positive deviant” behaviors to parents of malnourished children through cooking demonstrations, guided group practice, and home visits.

