GROWTH MONITORING AND THE PROMOTION OF HEALTHY YOUNG CHILD GROWTH:

Evidence of Effectiveness and Potential to Prevent Malnutrition

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INTRODUCTION

UNICEF currently estimates that approximately 146 million children under five worldwide—about one in four—are underweight (UNICEF 2006). Malnutrition is a direct cause of about half of the more than 10 million child deaths in the developing world each year. More of those deaths come from children who are mildly or moderately malnourished, due to their sheer numbers, as compared to those who are severely malnourished (Pelletier et al 1995).

Effective approaches to preventing malnutrition, especially mild and moderate malnutrition, are essential to achieving the Millennium Development Goals (MDGs). Addressing malnutrition plays a role in the attainment of six of the eight MDGs, from the first goal of eradicating extreme poverty and hunger to the sixth goal of combating HIV/AIDS, malaria and other diseases (World Bank 2006). Nutrition-related indicators include the prevalence of underweight children under five (Goal 1), and infant and child mortality rates (Goal 4). UNICEF is committed to achieving the MDGs and is responsible for 13 of the 48 indicators of progress toward the goals.

UNICEF has long been active in nutrition programming and has supported growth monitoring (GM) as a tool in that effort, primarily through provisioning programs with scales, growth charts, and training, since the medical community introduced the practice of measuring the growth of children in clinics in the developing world in the 1960s. In the 1970s the use of growth charts became standard practice. Publications emerged at this time that linked GM to nutrition education and counseling, and reported the use of GM outside of the clinic as part of community-based primary health care (PHC) activities. Adding to the momentum was the promotion of the growth chart for international use by the World Health Organization (WHO) in 1978 and the inclusion of under-five GM as one of the key components of UNICEF’s GOBI (growth monitoring, oral rehydration therapy, breastfeeding, immunization) approach in the “Child Survival Development Revolution” of the early 1980s.

Confusion around GM dates back to this time, when it was unclear whether GM alone produced results. Consequently, in the mid-1980s emerged the concept of Growth Monitoring and Promotion (GMP), which linked GM results to an action to be taken for the child (Pearson 1995). GMP aims to improve individual child nutritional outcomes. From this period to now, GMP has been an important element of UNICEF’s overall nutrition strategy.

Over the course of the past two decades, the debate has continued on the effectiveness and feasibility of GMP as an approach to preventing malnutrition, and more specifically, the added value of growth monitoring to growth promotion. Proponents of GMP point to large-scale programs (e.g. Indonesia: UPGK, Tanzania: Iringa, Thailand: Thailand National Nutrition Program, India: Tamil Nadu, Madagascar: SEECALINE, Honduras: AIN) that have effectively used GMP as a foundation for their success in reducing malnutrition and insist that monitoring growth is an essential component of those programs. Detractors point to the operational challenges that they say prohibit effective implementation and the lack of evidence that the effort and resources required for monitoring growth are necessary to achieving the impact on malnutrition. They suggest that promoting growth can be effective without the information obtained by monitoring growth, i.e., weighing.
The recent launching of the new WHO growth standards has refocused attention on child growth. UNICEF sees this as an opportune moment to reengage the international development community in a discussion and analysis of the value and effectiveness of GMP. The purpose of this paper is to provide updated information for this debate. The document is organized as follows:

- Definitions and conceptual framework for understanding the role of growth monitoring and promotion in preventing malnutrition.
- Rationale for monitoring growth: the scientific, historical, and programmatic basis.
- Evidence base for the effectiveness of GMP and growth promotion programs in achieving nutrition outcomes.
- Operational considerations for quality GMP and case studies of the use of GMP for effective Community-Based Growth Promotion (CBGP).
WHAT IS GROWTH MONITORING AND PROMOTION

The debate over growth monitoring and promotion (GMP) has been hindered by the lack of clear terminology as well as different understandings of what comprises a GMP program. There is not widespread knowledge of the conceptual underpinnings of GMP as an approach to preventing malnutrition. Recently, UNICEF hosted a technical consultation whose purpose was in part to come to consensus on the definition, objectives, and expected outcomes of GMP. This section draws heavily on the conclusions of that meeting (UNICEF forthcoming).

Definitions

Growth Monitoring (GM) is the process of following the growth rate of a child in comparison to a standard by periodic, frequent anthropometric measurements in order to assess growth adequacy and identify faltering early. GM is not the infrequent or one-time anthropometric measurement of a child to assess nutritional status without assessing growth velocity over time. (That is nutritional status surveillance or nutrition assessment.)

Growth Monitoring and Promotion (GMP) is a prevention activity comprised of GM linked with promotion (usually counseling) that increases awareness about child growth; improves caring practices; increases demand for other services, as needed; and serves as the core activity in an integrated child health and nutrition program, when appropriate. GMP is not the anthropometric measurement of a child to determine levels of malnutrition for a nutrition surveillance program; or for periodic nutrition assessment; or to screen a population to select or determine eligibility of children for food supplementation, therapeutic feeding, or other services. GMP also does not apply to a program that may have GM and an educational activity but the results of the GM do not inform the education. GMP is not a comprehensive intervention or program that will necessarily (although under some circumstances it can) lead to reductions in malnutrition or in child mortality on a public health scale. As an intervention it is designed to affect family-level decisions and individual child nutritional outcomes.

Community-Based Growth Promotion (CBGP) is a strategic approach that takes the concept of GMP further than the individual and family level. It takes the periodic (monthly) weighing of a child and classification of the child’s progress and uses it not only to make decisions regarding the child’s care at home or the need for medical attention, but also to stimulate activities in the community, district, or program to improve the child’s growth-enabling environment. CBGP is a broader program concept than either GM or GMP because it seeks to address the multiple causal factors impacting on a child’s growth and development. (Griffiths, Dickin, and Favin 1996)

Conceptual Framework

GM and GMP are both critical elements of a broader approach to preventing malnutrition in the community. Figure 1 below represents the GMP process, which is based upon actions at the family level. As the figure shows, the first step is proper GM. GM is the central starting point for GMP; the monitoring must occur regularly and be focused on growth status (the velocity of growth), not on anthropometric status. GMP links the information gathered over time from GM with an action. Monitoring child growth alone will not result in changes in growth; the action step and the...
intermediate outcomes associated with the action are needed before an impact on growth can be expected. With the knowledge of a child’s growth status, the expectation is that actions will be better tailored to the child and therefore more effective in helping the child to maintain growth or recover from faltering. Ultimately, if the actions are appropriate and growth impact is achieved, this should translate into improved nutritional status. It must be noted that if the individual family action (change in caring practices) and/or program actions (for example, availability of curative care) are not possible or are not adequate to address the underlying causes of poor growth, then the outcomes on growth from GMP may not be achieved.

**Figure 1: Growth Monitoring and Promotion Process**

![Growth Monitoring and Promotion Process Diagram](image)

The CBGP program framework reflected in Figure 2 shows the GMP process from Figure 1 as it fits within this more comprehensive approach. While GM remains the foundation upon which improved growth and improved nutrition status can be achieved, CBGP takes into account the child’s broader environment, which may also affect his or her growth. It recognizes the fact that to effectively achieve healthy growth, other influences on growth may need to be considered and addressed with appropriate actions. For example, children must have access to and use preventive services such as immunizations, and vitamin A supplementation in order to maintain healthy growth.

In addition, problems outside of the control of the family may need to be addressed. CBGP takes the individual child growth information and makes it available to the community. This enables the community to take ownership and address some of the issues related to poor growth in the area. This can be a community action or it can be related to a program issue. For example, the community can play a major role in motivating and assisting community workers as well as caregivers to ensure that all children are participating in regular growth monitoring. Community members, collectively,
can also improve the community environment for children by cleaning water sources or storing food for emergencies, for example.

**Figure 2: Community-Based Growth Promotion Conceptual Framework**

In the following sections of the paper the focus is on the GMP process although, in practice, few program experiences reflect “pure” GMP as defined in figure 1. Some or all elements of CGBP have been included in many of the programs. In other cases programs have monitored growth but then not used the results of the growth monitoring in the counseling process. These distinctions in program design and operation will be noted, when possible, to overcome weaknesses in other reviews of GMP that have not sufficiently defined the programs under review.
WHY MONITOR GROWTH

Prevention of Malnutrition

The most cost-effective way to address the pressing public health challenge of malnutrition is to prevent it. That means ensuring that all of the children who are normal weight at birth continue within the normal range, and those who are low weight at birth are brought swiftly into a healthy growth range. The rationale for monitoring the growth of a child—most commonly done in the developing world through monitoring weight but can include monitoring length/height—is based on the following assumptions:

- Growth is a good proxy for overall child well-being and its measurement serves as a robust indicator.
- Growth is a dynamic process that is made visible by monitoring changes in anthropometric indices and reflects current, not past, events.
- Adequate nutritional (anthropometric) status is dependent on meeting standards for growth velocity.

Growth is a proxy for well-being. If a child experiences deprivation in any area of his or her life, whether nutritional, biological, or social, his or her physical growth rhythm will suffer. Experts assert that it is somewhat of a misnomer to call measures of physical growth and achieved body size “nutritional status” because the cause of growth failure is not always nutritional (Beaton et al 1990). The cause of the poor growth may be any point on a long causal chain. Thus, the measure of growth is a measure of overall well-being and the detection of poor growth is an objective, albeit non-specific, indicator of a problem with the child and/or the environment in which the child is being raised.

Growth is dynamic; inadequate growth is reversible in the first two years. Many studies indicate that children whose anthropometry defines them with any degree of malnutrition are at greater risk for more severe morbidities and higher mortality (Pelletier et al 1995). Critical to the growth promotion concept is the understanding that malnutrition is a process, not a static state. Children do not become malnourished from one day to the next. Therefore, to reduce the proportion of children with inadequate anthropometric measurements, programs should identify children as they are becoming malnourished, not after they have already malnourished (Hendrata and Rohde 1988). This identification can be done by taking frequent measures that assess changes in growth routinely over time, thereby providing the opportunity to act to prevent the deterioration of anthropometric status before it becomes severe. The growth patterns across all regions in the developing world show that malnutrition occurs in children born near normal status, who then experience mild to severe growth retardation by 12 to 15 months of age (Shrimpton et al 2001). Studies also show that after the age of about 24 months much of the deprivation suffered by children is irreparable: underweight children become underweight adults and the cycle of malnutrition is perpetuated across generations. Therefore, helping children avoid or recover from any growth retardation or faltering in the dynamic first 12–18 months (the window of opportunity) is critical (World Bank 2006).
Velocity of growth is key to monitoring growth. The growth monitoring concept began with a tradition of tracking anthropometric status and evolved to monitoring growth velocity. The distinction between monitoring changes in nutritional status (body size) and monitoring growth velocity is often a difficult one even for developed country health professionals to grasp (Lucas 2007), but it is critical for the decisions that program personnel will make relative to assisting the child. This point is illustrated by comparing child A and child B on the graphs below. Child A is low on the chart, perhaps due to an illness in the past, but the child is currently growing at a velocity that mirrors the standard. Child B has grown well in the past, but currently is experiencing some insult and has failed to grow. Without the benefit of monitoring growth by assessing growth velocity, child A might be thought to have a problem while child B would not receive the attention s/he deserves because of their relative positions on the chart.

![Figure 3: Child Growth Patterns](image)

**Demand for Growth Monitoring and Parents’ Right to Know**

Caregivers want to know. Underlying the action of monitoring growth is the assumption that caregivers care about their child’s growth. Although they may confuse body size and growth, family members care about the physical development of their children, even if the characteristics they prize might vary (Griffiths 1992). Although undoubtedly linked to socioeconomic status, interest in child growth seems to increase as caregivers feel they have more control over their lives and it is heightened even more so when caregivers see that small actions they take can influence the growth of their children, giving them even more reason to feel in control (Griffiths 1990). To this end, growth monitoring is built on creating the expectation in every participant that his or her child can gain adequate weight. If programs are begun in the first month of a child’s life, this expectation can usually be fulfilled: growth problems can often be corrected through proper breastfeeding practices, which are within a mother’s control. This allows her to experience success. Later, when several actions may need to be taken together—such as early care-seeking to reduce the number of days of child illness, adequate micronutrient status and improved complementary feeding—the caretaker has more confidence and belief that these actions will make a difference.
Weighing is valued. Because caregivers care about the physical development of their children, weighing is a valued activity. Studies that have evaluated how well caregivers can interpret the growth chart often miss the point that the caregiver cares the most about the result—the weight of the child (Capone 1984). The growth chart is a tool that is important and helpful to the worker, but not essential for the mother. An integrated nutrition program in Honduras (AIN-C) showed that when caregivers were given the weight of their child and a “goal weight” for the next month, they remembered the weight and brought their child for weighing with great curiosity to see if they made the goal weight (Alvarado 2004). In the UPHOLD program in Uganda, the overwhelming reason that caregivers gave for participating in the program was to have their child weighed in order to know whether the child was growing well (Muyeti and Del Rosso 2007).

Rights of the child. Monitoring growth of children also relates closely to the rights of the child. The UN Convention of the Rights of the Child states that children should not be allowed to become malnourished. The World Summit for Children (1990) called on countries to institutionalize child growth monitoring and promotion programs as one of the actions to prevent malnutrition. The rationale for this derives from the fact that growth is a good proxy for child well-being, and the child who has healthy growth will not be malnourished. The child’s right is closely linked to that of the parents, who have a right to know if their child is growing well and be able to correct any deprivation causing poor growth. It is imperative for governments and technicians to develop approaches and technologies that permit families and communities to effectively promote the healthy growth of children.

Valuable Information for the Program, Individual and Community

Growth monitoring and Triple-A. The Triple-A approach (assessment, analysis, and action) has been widely used in UNICEF programming since its development in the late 1980s. GM provides a critical piece of information to apply UNICEF’s Triple-A approach at the individual household, and community and broader program levels in efforts to address health and nutrition. At the family level, Triple-A is focused on the individual child. The link is clear between information on the child’s growth that comes from the growth monitoring activity and the decision-making process and action taken for that child. At the community level, individual child growth information can be aggregated and serve as the foundation for Triple-A at the community level and beyond. Without the initial GM data, the capacity for the objective assessment and monitoring of progress at each of these levels—individual, community, district, and beyond—would be lost.

Targeted Messages. Nutrition education is a key component of GMP because improvements in child nutrition so often depend on changing feeding and caregiving practices in the home. Individual nutrition counseling is the cornerstone of effective and efficient GMP. The approach of regularly weighing and assessing the growth of a child provides the opportunity for individualized nutrition education (i.e. counseling) with targeted messages related to how well the child is growing, how healthy he or she is, what and how often the child eats, and the caregiver’s resources and motivation. GM is the focal point for stimulating a discussion on growth, health, and feeding for that child. Growth information also helps to target special assistance and gives an indication of the impact of new behaviors. Experience has shown that the key to success in nutrition education is precision: providing a specific message to the right person at the time that s/he is receptive, ready, and able to take action (Griffiths 1988). Individualized counseling based on growth status provides the information to tailor precise advice while offering a reason for concern and empathy. Without
GM there is much less scope for tailoring the messages and recommended actions to the individual situation (Griffiths et al 1996)

Health Follow-Up. Regular monitoring of child growth provides a framework for linking children and families with a wide range of services. The GMP session serves as the means to determine which services are needed for individual children and families. Just as advice for improved practices is tailored to children who falter in growth, the same is true for the package of other services that might be needed by children, particularly for children who may have an underlying, non-acute health problem. Failure to gain weight is often a signal and can be the threshold by which a child is first identified for care using Integrated Management of Child Illness (IMCI) protocols. Growth status is an objective indicator that can help to focus attention on the children who are most in need and guide referrals and follow-up of these children.

Detection of Community-Wide Problems. The aggregate growth information from the GM of all children in a community month after month provides community members and authorities at the district level and above with a consistent, non-specific measure of a community’s situation—one that sets the stage for a broad-based exploration of causes, fluctuations, and potential responses. Analyses of growth information compare locations, gender, age, proximity to health services, seasonality, etc., and at all levels the most meaningful actions to take are discussed and determined. Communities and district representatives become true partners as they see the effects of their actions and deepen their understanding of the influences on child development. Without a means to measure the growth of children, the community would lose an objective indicator that provides the structure both to analyze problems as well as to measure progress.

Keeping in mind the rationale for growth monitoring and promotion (prevention of malnutrition, satisfying demand and fulfilling children’s rights and providing critical information for timely local action) what follows is a review of the documented evaluations of GMP programs.
WHAT IS THE IMPACT OF PROGRAMS THAT MONITOR AND PROMOTE GROWTH

The evolution of growth monitoring and promotion over the past three decades is reflected in the design and implementation experience of programs aimed at addressing malnutrition over that period. Four early project experiences (Imesi in Nigeria, Narangwal and Jamkhed in India, and Hanover in Jamaica) set the stage for the programs that followed. These initial small scale projects are known for having transformed GM from a tool of the pediatrician in the clinic to an asset of the community health worker in the primary health care context.

These early project experiences from the 1970s demonstrated that GM was an important tool for improving the effectiveness of community health and nutrition programs. All of the documentation on these projects highlights the importance of the GM activity as a way for caregivers and families to follow the progress of their young children and to understand the role of health care and nutrition in achieving good nutritional status. All programs provided immunizations and prevention and treatment therapies for common diseases such as malaria and two programs provided food supplements as part of their primary health care approach. Selected villages provided high quality primary health care, which included monthly weighing to follow growth trends and nutritional status. Education focused on transferring knowledge about nutrition and health rather than on specific actions directed towards growth.

The evaluations of three of the projects—Imesi (Cunningham 1978), Hanover (Alderman 1978), and Jamkhed (Arole 1988)—and the research results from Narangwal (Kielmann 1983) showed that participating children were 300–600 gm heavier and 1–3 cm taller than non-participants. Furthermore, weight-for-age nutritional status of children under 5 years (under 3 years in Narangwal) improved, reducing rates of malnutrition by as much as 50% in villages covered by the high quality primary health care.

Three Decades of Program Evaluations and Experience

Over the more than three decades since these first projects were evaluated, GM has been used as a tool to promote the growth of children and GMP as an intervention has been linked with, or been the platform for, other actions or services in numerous programs to address malnutrition. The impact of many small and large-scale experiences across Asia, Africa, and Latin America has been reviewed and is documented in the following tables (See Tables 1-3). This documentation does not represent all projects and programs using GMP, but rather those for which evaluations are available and those programs that linked GM in some fashion to action, at least for the individual child. Because of the diversity of programs, several factors limit the ability to draw firm conclusions based on a review of the available literature:

Lack of comparable program designs. While the inclusion of programs in the review was not overly restrictive in order to learn from a large pool of programs implemented under a wide variety of circumstances, it is this diversity that makes comparisons difficult. While all of these programs or projects utilized GM with some regularity, the actions that were linked to GM varied across the projects. Most, but not all, provided services beyond the GMP process, including the provision of
vitamin A and curative health care services. Most were community-based, but with varying degrees of community involvement, and two were implemented through clinics in the community.

Variability in the operational effectiveness. The quality of the implementation of these projects and programs also varied. However, there is little objective, consistent information available to accurately rate and compare quality across these projects. There were differences in sources and consistency of funding, which are significant factors in program implementation. While all of the programs received some donor assistance, several were large-scale, primarily government-supported (at times inconsistently) programs, while others were smaller NGO-financed and operated projects. The degree to which a project was implemented according to its design and the quality of its operation are captured to some extent by measures associated with quality GM and GMP. These include the level of coverage and participation and the approach used in promotion. Information on other, important, generic operational considerations—such as the quality of training, the presence of support supervision, political commitment, or logistical factors—is not available across all of these projects. Annexes A and B present two case studies of programs with considerable information available on their implementation and impact. The Uganda case study is provided here as an illustration of GMP, and the Honduras example shows the use of GMP as a platform for a more comprehensive program addressing growth. For some projects, qualitative judgments on the quality of implementation and operation have been documented in the tables.

Different evaluation methodologies. The approaches to evaluating these projects and programs are also varied. Evaluation of program impact is particularly difficult in the un-controlled, natural conditions under which most of these projects operated. All of the program evaluations attempted to control for bias and to provide results based on scientifically sound methodologies. Some of the designs were end-of-project pre-post comparisons with control groups, some did not have control groups but compared participants over time and evaluated the dose-effect of participation, while other designs were based on a comparison of program data to national-level data over the same period. In addition to the end-of-project evaluations, the literature also includes several ex-post-facto analyses of readily available data from long-term GM or GMP programs, and one ecological analysis of GM data.
<table>
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<th>Country</th>
<th>Evaluation/ Analyses</th>
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<th>Age</th>
<th>Coverage/ Participation</th>
<th>Promotion Approach</th>
<th>Outcome Measures</th>
<th>Significant Effects</th>
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<th>Comments</th>
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<tr>
<td>Bangladesh</td>
<td>Comparison of participants to non-participants</td>
<td>BRAC Monthly GM of under 2s integrated with a primary health care program including ORT, immunization, Vitamin A, family planning, nutrition education, basic curative care</td>
<td>0-2 years</td>
<td>43% coverage under 2s 12% coverage under 6 months</td>
<td>Generic messages, Food demonstrations and general health and nutrition education</td>
<td>W/A &lt; 2 years</td>
<td>None, No significant difference in malnutrition between participants and non-participants</td>
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<td>Very low coverage</td>
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<td>(Karim et al 1994)</td>
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<tr>
<td>Bangladesh</td>
<td>Project participants compared to matched national-level data</td>
<td>BINP Community-based nutrition component focused on GM, nutrition counseling, and food supplementation for malnourished children. GM sessions held monthly at community nutrition centers</td>
<td>0-2 years</td>
<td>85% reported participation in GM 50% overall receive counseling 33% of malnourished receive counseling</td>
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<td>W/A, H/A, W/H &lt; 2 years</td>
<td>Malnutrition (Z-score &lt;-2) W/A: Project – 36.8%, Control – 39.3% H/A: Project – 27.6%, Control – 31.9% W/H: Project – 14.8%, Control – 16.6%</td>
<td></td>
<td>Overall acknowledged disappointing results. Project impact only for children who participated regularly. Poorest women were most likely to participate.</td>
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<td>(OECD 2005)</td>
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<tr>
<td>India</td>
<td>Numerous, small, pre-post comparisons</td>
<td>ICDS GM 2-4 times annually, medical checkups and referrals, ORT, immunization, nutrition education, food supplements for malnourished</td>
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<td>Low W/A (&lt;70%): 1976 – 42%, 1980—37%, 1982—17% 1984-88: Severe malnutrition down by 37% in drought-free versus 5% in drought-affected areas</td>
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<td>Generally acknowledged that quality of implementation limited its impact – low program coverage; poor training, supervision and support; weak link to health services</td>
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<td>(Subbarao: 1989)</td>
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<tr>
<td>India/Tamil Nadu</td>
<td>Pre-post comparison, staggered design</td>
<td>TINP GM monthly beginning at 6 months, MCH services, medical referrals, immunizations, ORT, nutrition education. Underweight children home visits and supplementary feeding. Focus on velocity of weight gain.</td>
<td>6 mos to 3 years</td>
<td>&gt; 90% participation</td>
<td>Detailed education but not counseling</td>
<td>W/A &lt; 5 years</td>
<td>W/A &lt; 70%, 1980: 19% (control 17%) 1984: 13% (control 17%) 1986: 10% (control 20%) Staggered implementation: Phase 1: 55% less severe malnutrition of 6-36 month over 72 months Phase 2: 24% less over 48 months Phase 3: 35% less over 38 months</td>
<td></td>
<td>Represents an integrated nutrition project—cannot separate out the impact of the GMP alone.</td>
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<td>Country</td>
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<td>Indonesia</td>
<td>Pre-post comparison</td>
<td>UPGK GM monthly under 5s with emphasis on under 2s, immunizations, Vit A, food coupons for malnourished, ORT, medical referrals, nutrition education</td>
<td>0-5 years</td>
<td>75-90% coverage</td>
<td>Counseling by age; generic messages</td>
<td>W/A &lt;5 years</td>
<td>National level malnutrition data &lt;5: 1978—14.1% 1986—12.8% &lt;75% malnutrition down from 25% to 14%</td>
<td>3</td>
<td>Higher dietary intake (calories and protein) in program versus comparison villages Higher intake of key foods (high quality weaning food in program versus comparison villages) Significant correlations among knowledge of message, practice of the recommendation and nutritional status</td>
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<tr>
<td>Indonesia</td>
<td>Pre-post cross-sectional and comparison</td>
<td>NCBC GM monthly combined with education focused on feeding practices for under 2s. An add-on to the UPGK project focused on behavior change through in-depth communications strategy</td>
<td>0-5 years</td>
<td>78% participation</td>
<td>Counseling by age and growth status. Innovative communications materials and mass media.</td>
<td>W/A, W/H, H/A &lt;2 years</td>
<td>50% less malnutrition (&lt;75%W/A) and fewer stunted (&lt;90%H/A) in program versus comparison villages Malnutrition (&lt;75%W/A) declined from 48% to 28% in program villages At 24 months of age there was a +.5 standard deviation difference in nutrition status of program children compared to control children</td>
<td>2</td>
<td>Higher weaning knowledge scores and contact with the project were highly correlated with higher percent adequacy of recommended calorie intake</td>
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<td>Indonesia</td>
<td>Pre-post cross-sectional and comparison</td>
<td>The Weaning Project GM monthly combined with nutrition education focused on weaning practices. An add-on to the UPGK project focused on enhanced communications</td>
<td>0-2 years focus</td>
<td>80% coverage</td>
<td>Counseling by age and growth status. Food demonstrations</td>
<td>W/A, W/H, H/A &lt;2 years</td>
<td>ANOVA controlling for age found a significant difference between the program and comparison groups in W/A (F=5.95, sign = .015) and H/A</td>
<td>2</td>
<td>Moderate and mild malnutrition: 1983—49% 1988—22% National level severe malnutrition &lt;5years: 1983—2% 1988—.04% Significant economic development over the same time period, so drops in malnutrition cannot be attributed entirely to the program.</td>
</tr>
<tr>
<td>Thailand</td>
<td>Pre-post comparison</td>
<td>NPHC Child care centers provide GM four times annually for under 5s, Vitamin A, ORT, medical referrals, immunization, parasite control, nutrition education. Malnourished children receive GM monthly and food supplementation.</td>
<td>0-5 years</td>
<td>98% program coverage and 85% under 3s participation in quarterly GM</td>
<td>Generic messages</td>
<td>W/A &lt;5 years</td>
<td></td>
<td>3</td>
<td>Significant economic development over the same time period, so drops in malnutrition cannot be attributed entirely to the program.</td>
</tr>
</tbody>
</table>

*Scale: 1= national or state-level program 2= coverage of multiple districts; 3= pilot project with no district-level implementation
### Table 2: Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Methodology/Analyses</th>
<th>Intervention/Program</th>
<th>Age Targeted</th>
<th>Coverage/Participation Rates</th>
<th>Promotion Approach</th>
<th>Outcome Measures</th>
<th>Significant Effects</th>
<th>Scale*</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Madagascar</td>
<td>Ex-post evaluation; two nationally representative samples, longitudinal at community level</td>
<td>SEE/CALINE Monthly GM and promotion through village level workers. Includes home visits. Focus on breastfeeding, introduction of complementary foods, and appropriate feeding during illness.</td>
<td>0-5 years</td>
<td>Not available</td>
<td>Individual and group counseling</td>
<td>W/A, H/A &lt; 5 years</td>
<td>Malnutrition (&lt;-2 Z-scores) declined by 5.2–7.5%</td>
<td>3</td>
<td>Improvements in nutritional outcomes were achieved through changes in key practices related to feeding, hygiene as well as maintaining a child health card.</td>
</tr>
<tr>
<td></td>
<td>(Glasso &amp; Umapathi 2007)</td>
<td></td>
<td></td>
<td></td>
<td>Hygiene demonstrations</td>
<td></td>
<td>Analysis showed that nutritional outcomes were protected from negative trend in stunting (H/A) in the absence of the program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senegal</td>
<td>Ex-post facto analysis of GM program data and national census data</td>
<td>PPNS Catholic nun-supported and run health centers provided center-based GM, nutrition education, advice on illness management and hygiene, some food supplementation and malaria treatment.</td>
<td>3 months to 2 years</td>
<td>90% coverage 71% average participation</td>
<td>Genetic Messages W/A Z-score &lt; 2 years</td>
<td>Increase in under-weight (&lt;-2Z-score W/A) from 1969-1989 despite GM: 1969-1974 – 28.6% 1975-1984—34.6% 1985-1992—35% Decrease in child mortality rates over same period: 1960-1964 – 201 1990-1994 – 68</td>
<td>2</td>
<td>Growth monitoring may have been helpful in improving health. Nurses considered nutrition status improved since 1969; may reflect a change in the severity of malnutrition—that is, fewer cases of severe clinical malnutrition—which may have contributed to reduced mortality.</td>
<td></td>
</tr>
<tr>
<td>Tanzania</td>
<td>Pre-post comparison</td>
<td>JNNSP/Tanga GM (monthly or quarterly) through village health days, child care/feeding centers, immunization, control of childhood illnesses, ORT, home visits to severely malnourished. Use of Triple-A cycle at the community level.</td>
<td>0-5 years</td>
<td>73.8% participation (range 63% to 89%)</td>
<td>Group education on improved practices W/A &lt;5 years</td>
<td>Moderate malnutrition (&lt;80%): 1984—56% 1988—38% Severe malnutrition (&lt;60%) 1984—6.3% 1988—1.8%</td>
<td>2</td>
<td>“Growth monitoring is the moving force of the Child Survival and Development program. Nutrition is an abstract concept unless it is linked to health status of specific children in real communities.” (UNICEF 1993, 25)</td>
<td></td>
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</tbody>
</table>

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<thead>
<tr>
<th>Country</th>
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<th>Promotion Approach</th>
<th>Outcome Measures</th>
<th>Significant Effects</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uganda</td>
<td>Longitudinal project and controls</td>
<td>NECDP Community-based GM and promotion with an emphasis on behavior change related to breastfeeding and young child feeding.</td>
<td>0-6 years</td>
<td>Not Available</td>
<td>General Messages</td>
<td>W/A&lt; 12 months</td>
<td>Regression analysis showed a significant improvement of .22 standard deviations in nutritional status (W/A Z-scores) among children 0-12 months in project compared to the control group.</td>
<td>3</td>
</tr>
<tr>
<td>Uganda</td>
<td>Pre-post cross-sectional comparison (no control group)</td>
<td>UPHOLD Community-based monthly GM for under 2s. GM provided by team of volunteers. No other explicit interventions provided other than GM and promotion/counseling and referral. Home visits supplemented community GM days.</td>
<td>0-2 years</td>
<td>72% average participation (district range from 59% to 89%)</td>
<td>Individual counseling Age and growth trend-specific messages</td>
<td>W/A &lt; 2 years</td>
<td>Malnutrition rates (&lt; -2 Z-score W/A): Baseline = 12.8% Endline = 7.9%</td>
<td>1</td>
</tr>
</tbody>
</table>

*Scale: 1= national or state-level program 2= coverage of multiple districts; 3= pilot project with no district-level implementation*
### Table 3: Latin America

<table>
<thead>
<tr>
<th>Country</th>
<th>Methodology/Analyses</th>
<th>Intervention/Program</th>
<th>Age Targeted</th>
<th>Coverage/Participation Rates</th>
<th>Promotion Approach</th>
<th>Outcome Measures</th>
<th>Significant Effects</th>
<th>Scale*</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>Ecological analysis; regression analysis of census and program weight gain data</td>
<td>PACS Community health worker program; monthly GM through home visits from health center staff. Health and nutrition education and referral services</td>
<td>0-2 years</td>
<td>42% to 100% by municipality</td>
<td>Not available</td>
<td>Prevalence of inadequate weight gain</td>
<td>Strongest health service predictor for adequate weight gain was GM; 10% increase in GM participation resulted in a 4.5% and 2.9% decrease in the prevalence of inadequate weight gain in infants and children respectively.</td>
<td>3</td>
<td>These analyses control for immunization, promotion of appropriate feeding practices, and home management of diarrheal disease.</td>
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<tr>
<td>(Souza 1999)</td>
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<tr>
<td>Dominican Republic</td>
<td>Pre-post comparison with controls</td>
<td>ANEP Community GM monthly for under twos and malnourished; every six months for 3-5 year olds. Education/individual counseling fully integrated with the GM.</td>
<td>0-5 years</td>
<td>85% for under twos; 70% under fives</td>
<td>Individual counseling targeted by age and growth status. Reinforced by group education.</td>
<td>W/A &lt; 5 years</td>
<td>Malnutrition (&lt;75% W/A): ANEP – 6.9%; Control – 11.1% Pre-Post Cohort Comparison Baseline: 14.6% Endline: 6.9%</td>
<td>1</td>
<td>Length of exposure to the program was positively related to program impact. Significant changes in some child feeding and care practices.</td>
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<td>(USAID 1988)</td>
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<tr>
<td>Honduras</td>
<td>Comparison of participants to non-participants; Regression analyses</td>
<td>AIN-C Community GM monthly for under twos. Focus on adequate weight gain. Community treatment of diarrheal disease, ARI, immunization, iron, Vitamin A, family planning</td>
<td>0-2 years</td>
<td>87% participation in GM</td>
<td>Individual counseling by age, growth status, illness. Mass media communications.</td>
<td>WA, H/A, W/H &lt; 2 years</td>
<td>Regression analysis among poorer households showed program participation associated with better nutrition status (weight-for-height); .122 increase in W/H Z-score. Greater intensity of participation positively associated with nutrition status; .004 W/A Z-score increase, .005 W/H Z-score increase for every 1% increase in participation.</td>
<td>2</td>
<td>GM introduced in the clinic and moved to the community for greater reach and effectiveness. Improvements in child care and feeding practices, timely care-seeking, and immunization, iron and Vitamin A status.</td>
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<td>(Schaetzel 2007)</td>
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Impact on Malnutrition and Intermediate Outcomes

With the aforementioned caveats in mind, the information from these program experiences provides some insight into the impact of programs that monitor and promote growth.

Overall Malnutrition. Of the 16 projects or experiences involving GM and GMP evaluated over the past three decades, the overwhelming majority—8 large-scale, 3 medium-scale and 2 small-scale—showed:

- Significant reduction in rates of malnutrition as measured by weight-for-age. The results often showed more than a 50% decline in all or mild and moderate malnutrition over a multiple year period. In a few instances the declines were less—on the magnitude of about 10%—particularly when the evaluations were done after a longer period of program implementation.
- Actual percentage point declines for malnutrition of about 10-20 points usually dependent on initial levels of malnutrition. Improvements in severe malnutrition contributed about one or two percentage points.
- Reduction in rates of stunting, malnutrition as measured by height-for-age in programs where heights were monitored.

Exceptions to this positive trend were projects in Bangladesh: the medium-scale BRAC project that showed no difference in rates of malnutrition between participants and non-participants, and the large-scale BINP project that was generally regarded as having performed poorly, although several analyses of data sets showed impact on children who participated regularly. A third exception to the positive trend was an analysis of data from a long-term, center-based GMP project in Senegal that cited good coverage and participation. The study showed that while mortality rates declined dramatically over the period 1960–1995, malnutrition rates among the same population rose slightly. The authors hypothesized that perhaps fewer children suffered from severe clinical malnutrition, but the limitations of the data set did not permit further analysis.

Malnutrition over time. Among the project evaluations, some assessed the relationship between the number of years of program operation and the impact on nutritional status, and other evaluations were based on five or more years of implementation. These evaluations provided some insight into impact over time and longer term threats to large-scale and community-based programs.

- ANEP in the Dominican Republic demonstrated that the greater the exposure to the program the greater the impact. Based on cross-sectional analyses, after three years malnutrition declined by 43.4% overall. The longer a community participated in the program the greater the decline in malnutrition—after one year there was a 3.3% decline; after 2 years 44%; and communities in the program for 3 years experienced a 60.5% reduction in underweight children (USAID 1988).
- The AIN (Honduras) and SEEcaline (Madagascar) programs were both implemented for more than five years during which time both countries experienced significant environmental trauma as well as some political turmoil. Both programs showed a positive effect on malnutrition over this same time period. In the case of AIN, some of the
program areas lost their extra budgetary funding midway, yet the positive effects persisted, if not at the highest levels (Schaetzel 2007). In Madagascar, there is evidence that program participation proved to be protective against the full impact of several “shocks” (Glasso 2007).

Intermediate outcomes. In addition to the overall positive impact on malnutrition demonstrated in the majority of these evaluations, some evaluations also documented enhanced intermediate outcomes toward improved nutritional status—e.g., fewer months with inadequate weight gain, improved feeding and care practices, use of preventive services, and more appropriate care-seeking. These intermediate results are important to examine because growth monitoring results were critical to tailoring the actions related to achieving these intermediate program outcomes.

- Participation in AIN, SEECALINE and UPHOLD significantly improved utilization, and therefore coverage of preventive health measures like immunization (even in places where immunization rates were high, as in Honduras) and micronutrient supplementation, particularly vitamin A and iron.
- SEECALINE, AIN, Uganda NECDP, ANEP and NCBC and TWP in Indonesia demonstrated improvements in young child feeding practices both breastfeeding and complementary feeding and key hygiene behaviors;
- AIN participants showed better health-seeking behavior on several measures including more rapid attention to acute respiratory infection (ARI).

Impact of GMP. As shown in the tables most of these programs provided services in addition to GMP. Two exceptions are the Uganda UPHOLD and the Dominican Republic ANEP projects. Both were small-scale efforts almost exclusively focused on providing a quality GMP intervention without the provision of additional services. Neither directly provided additional curative health services to program participants outside of making a referral, nor did they offer preventive health services or food supplementation. In Uganda, the GMP was used to promote preventive health care, primarily participation in “child days” that provided immunizations and vitamin A supplementation, but rarely at the same time as the GMP. In the ANEP program, income-generating activities were available to a limited number of program participants, and overall reached very few. These programs provide the strongest evidence for an impact on nutrition strictly from GMP. The ANEP program showed improvements of more than 50% from 14.6 percent to 6.9 percent in overall malnutrition and a “global recuperative impact…on malnourished children estimated at 63 percent” (USAID 1988 pg 38). In Uganda, malnutrition declined by 38 percent—from 12.8 percent to 7.9 percent—among children 0-24 months (Muyeti and Del Rosso 2007).
WHAT FACTORS CONTRIBUTE TO THE IMPACT OF PROGRAMS THAT PROMOTE GROWTH

Growth monitoring and promotion has been at the center of a wide range of prevention projects and programs that have lowered rates of malnutrition. The next step is to understand, to the extent possible from these evaluations, which design and operational factors in these programs contributed most significantly to their success. The conceptual framework for GMP presented earlier in this review shows the major operational elements in the growth monitoring and promotion process. These include:

- Contact with and measurement of children
- Assessment of adequacy of growth based on frequent measurement to determine growth trend.
- Use of the growth assessment to determine actions at the individual child level through counseling based on an understanding of the child’s growth and negotiating specific actions.

The review of program and research experience to date points to several conclusions regarding these operational elements of GMP as discussed below.

Isolating the Role of GM

During the past two decades, a few studies (not program- or project-based) were designed with the intention of disaggregating the contribution of monitoring growth from other activities important to achieving specific health and nutrition outcomes. Of these studies, two were recognized by Garner (2000) for the *Cochrane Review* as having strong enough research designs to be considered as evidence of the potential for GM to affect health outcomes. One of these studies (Ruel 1995) focused on caregivers’ understanding of the growth chart, which does not contribute to an understanding of the value of GM for effectively promoting growth and therefore it is not discussed in this review. The other study (George 1993) is discussed below.

Counseling with and without GM. George’s study in south India compared six villages with intensive nutrition counseling to six villages with GM plus counseling. The improvement in practices was significant in both the GM and the control (nutrition counseling alone) villages. There was no significant difference in nutritional outcomes between the two pairs of villages. While the author’s conclusion was that GM offered no advantage over nutrition counseling alone, the counseling was very intense (two times per month in the home), was done by trained nutritionists, and did not allow for any adjustment of the advice based on growth outcome. This study represents an ideal situation for counseling and does not utilize the monitoring information as it should be used. As such, it says little about the value of GM to counseling decision making or to what happens under field conditions where workers are well-trained, but not necessarily highly skilled.

PACA Program in Brazil. Among the program evaluations, at this time it is only the PACA program analysis that is of particular note for its attempt to separate out the impact of the
activity of GM from the impact of the other services provided through the program or clinic. The results show that an increase in participation in GM is associated with a decrease in the prevalence of inadequate weight gain. The methodology controls for other services provided as well as for the type of feeding practice, suggesting that GM is an important tool that directly contributes to prevention of malnutrition (Terra de Souza 1999).

Other Key Operational Considerations

Frequency of Participation. Paramount among the operational factors affecting impact are program coverage and participation. High coverage is essential to public health impact and the higher the frequency of participation, the better the outcome. While both of these factors may seem intuitive, where coverage is reported, high coverage is associated with improvements in malnutrition, and low coverage—as seen in the BRAC project area—is associated with poor outcomes. The relationship between better program participation and better outcomes for children can also be demonstrated. In SEECALINE, AIN, PACA, ANEP, BINP, and UPHOLD, the longer the child participated or the more frequently s/he was seen, the more improvement was noted. In BINP, improvement occurred only among those regular participants. The estimate from AIN is that for every extra month of participation there is a 1 percent increase in Z-score (Schaetzel et al 2007).

Focus on Adequate Weight Gain. The crucial step of ensuring that children optimize the number of months with healthy weight gain, and minimize the number of months they spend faltering in their growth is an important aspect of the GMP process. In the UPHOLD Uganda program, all GMP sessions were built around an individual child’s weight gain and not on the level of malnutrition. Tracking the children recuperating following an episode of growth faltering was an important program indicator. The program assessment found that for any given month, the recuperation rate was about 48 percent: about half of children who had faltered in growth the previous month recuperated in the subsequent month. Among the other half, 25 percent experienced growth faltering again, and the remaining 27 percent was not weighed the month after they had faltered. Recuperating from growth faltering was also associated with program participation: recuperation rates were 63 percent in communities with high participation compared to 36 percent in communities with poor participation (Muyeti and Del Rosso 2007).

Quality Counseling. The integrated nature of the majority of these programs makes it extremely difficult to separate out the effects of the various components on improved nutritional status. However, some of the projects and programs did not use the child’s growth results to guide counseling with the caregiver and the results of these programs were not strong; these include the programs in Bangladesh as well as SEECALINE in Madagascar. A comparison of the three program experiences in Indonesia shows the importance of using the child’s growth results for counseling. The evaluations of the two programs in Indonesia that focused on the counseling element (NCBC and TWP) compared program children with controls participating in the national program, UPGK. The two projects that emphasized counseling based on negotiation (NCBC and TWP) had robust behavior change results and very similar significant improvements in the nutritional status of program participants compared with controls (who were in villages served by the national program). Participants in these projects had weight-for-age Z-scores at 24 months of age on the order of one-half a standard deviation better than those in the national program (Zeitlin 1984 and Zeitlin 1989).
Three central questions that set the parameters of the debate about growth monitoring and promotion (GMP) have been the focus of this document. They are:

- What does the research and program experience tell us about the growth and nutrition outcomes that can be expected through GMP?
- Is the added value of GM essential to achieving GMP outcomes effectively?
- What design and operational factors contribute to the impact of GMP on growth and ultimately nutritional status?

This review of the available evaluations of programs that have used GMP sheds some light on the answers to those questions.

**Expected Outcomes from GMP.** There is ample evidence that the GMP “package” or process yields improvements in the nutritional status of children, by both reducing under-weight and stunting. While most effective as a prevention program there is evidence that young children who have experienced deprivation and who are malnourished entering a program can see improvement in their status, particularly prior to 24 months of age.

*Therefore, the use of the GMP “package” or process should not be abandoned as a key approach to addressing the prevention of malnutrition in young children, particularly for those under 24 months of age.*

**Added Value of GM.** Although difficult to separate the contribution of individual elements of an integrated program or process like GMP, the contribution of the measurement of growth to the outcomes achieved from the GMP process warrants closer examination. The two attempts to separate GM from other program elements cited in this review are inadequate to draw conclusions on the necessity of GM to achieving impact under a variety of conditions.

*Therefore, a more critical review of the role of GM in on-going GMP and CBGP programs, as well as research within new program efforts, is needed to better understand the contribution of having information on a child’s growth status to achieving improved nutritional outcomes.*

**Essential Program Design Factors.** The design of growth monitoring and promotion programs has evolved significantly since the first introduction of GMP as an intervention within the context of primary health care. There are new tools and techniques to make GMP better suited to implementation by community health workers. There has been a shift for focus on the individual child to the community of children. There has also been a move away from monitoring nutrition status to monitoring growth velocity. These and other program design and implementation factors have been shown to contribute significantly to the effectiveness of GMP (see box below).

*Therefore, these factors known to make the GMP process more effective should be put taken into account to improve on-going programs and inform the design of new ones.*
Quality Design Factors for GMP

- Achieve high coverage of all children in the catchment area for population-based impact. The exact percentage of children who must be covered is difficult to conclude, but the threshold might be drawn at 80+%.
- Focus program actions on children under 24 months of age. A few program evaluations indicate that impact declines for children over 24 months of age.
- Ensure consistent contact with children. There is a dose-effect—those children with higher participation rates do the best. The monthly schedule that most of the programs in the review tried to maintain is recommended as children will not attend/be seen every month.
- Reach and enroll children in the first months after birth. A few of the evaluations that showed the greatest impact came from among the group of children who were enrolled within months of their birth.
- Tailor advice for the child based on growth outcomes and discussions with the caregiver rather than providing generic information even if developed locally. Overall, the evaluations indicate that the programs with some of the poorest outcomes were those with poor linkages between GM and tailored actions for the child and with the poorest counseling.
- Expand the GMP process to encompass the community and municipal participation aspects of the CBGP program model. Evaluations of programs after five years of implementation show that this contributes to the sustainability of the program.


Green, J. 1995. Personal Communication.


Background. Honduras has made significant progress in improving health outcomes – infant mortality has dropped from 110 per 1,000 in 1970 to 39 per 1,000 in 1990. Malnutrition rates remained high for the region in the 1970s and declined from 24 percent to 18 percent from the 1980s to 2001. Despite this improvement, malnutrition persisted and was thought to be contributing to the stagnation in mortality rates. In the early 1990s health officials introduced changes in clinic-based protocols to address malnutrition, introducing the detection and treatment of growth faltering (not nutritional status monitoring) in children. This was then followed in 1995 by the development of the AIN-C approach that brought growth monitoring and promotion to the community and that became the national community health program in 2000 (Griffiths and McGuire, 2005).

Program Description. The goal of AIN-C is to prevent under-nutrition by maintaining newborn health or recuperating the infant with low birth weight by ensuring adequate monthly growth (weight gain) until 24 months and after that to see those children (until they are five years old) only when they are sick, to be sure that they receive timely and appropriate attention. All children in the community are eligible at birth, and parents are encouraged to participate in the monthly growth promotion session until their child reaches 24 months, which includes weighing and counseling based on growth performance. The counseling focuses on adequate nutrition, care, and health-seeking practices. When a child is seriously ill or has persistent or acute growth failure, the health worker refers the caregiver to the health clinic. The nurse auxiliary from the health post often attends growth promotion sessions where she updates immunizations, distributes micronutrient supplements, provides medicines to children, and discusses family planning with new mothers. Other activities flow from the monthly growth session: home visits for children who did not attend or who need special attention; reporting the child growth information to the community; and detection, assessment, and treatment of common childhood illnesses. The operational framework of AIN-C is shown below. In addition to what happens in the community, growth information is shared with municipality officials and they support community activities to foster healthy growth in children.

Coverage and Participation. In 2004 AIN was active in almost 2,000 communities—spread across about half the country’s forty-two health areas with high priority given to the poorest and most densely populated areas of the country. According to a 2002 evaluation (Schaetzel 2007), 92 percent of children in AIN communities are enrolled (been weighed at least one time). Of those at least 3 months old, 67 percent attended monthly in the past 3 months and 87 percent had attended two out of the three prior months. Almost 70 percent of those in the program were first weighed by 3 months of age. Ninety-three percent of participating caregivers were informed of the child’s weight and eighty-five percent were informed as to whether it was adequate.

Approach to Individual Counseling/Action. The adequacy of a child’s growth is the trigger for a dialogue with the caregiver. Advice is tailored based on the dialogue between the community health worker and the caregiver. A set of decision cards help the worker decide the basic content of the counseling session by guiding her through a decision tree differentiated by child age, adequacy or inadequacy of weight gain, illness status, and breastfeeding status. Based on the mix of these factors for an individual child the worker is guided to which counseling card(s) to select. The counseling
card(s) is used to aid the community health worker in this dialogue with the caregiver. The process involves discussing the variety of practices she should be following and encouraging her to determine what she might change in order to feed or care for her child more appropriately. If the caregiver is not able to identify a practice, then the worker will offer suggestions and will negotiate with the caregiver to determine what practice she might be able to alter to improve the child’s situation. If a child is seriously ill or has persistent or acute growth failure, the community health worker refers the caregiver to the health clinic using a referral form approved by the Ministry of Health and always following-up to ensure that the visit was made and helping to facilitate the visit when needed. When the nurse has seen the child, a counter-referral slip is sent back to the community health worker to tell her what follow-up is needed at the community level.

Operational Framework for Community-Based Growth Promotion

Source: Adapted from Manoff Group (2004)

Community Involvement. Community meetings are held about three times a year to permit the community at large to make decisions and work collectively on actions to address the needs of children in the community. At these meetings the growth (adequate weight gain) of children is displayed by month in a bar graph that allows the community members to easily see differences in the rates of participation over the months as well as the number of children who have grown adequately (or failed to grow adequately) each month. Together the meeting participants reflect on why attendance fluctuated or why children grew better or worse during the various months and what they can do to help those with poor growth. Collective community action included projects such as dealing with contaminated water sources and garbage disposal to reduce diarrheal disease, child care during times of harvest to improve child dietary intake, facilitating health center outreach to improve child immunizations rates and assisting with house ventilation to reduce exposure to indoor air pollution (smoke) and reduce ARI rates.
Operational Management. A five-day training for health area staff and nurses initiates the program in a health area to ensure that those who will be supervising the program were able to support it. Five days of training are also provided to the community volunteer and community level auxiliary health staff. Monthly meetings also serve as in-service training. Supervision is designed to be supportive and regular; for the first six months of implementation a supervisor attends the community weighing sessions. A key practice of the program is the use of a team of volunteers in the community rather than relying on one person. This aspect of program design ensured that the work was not too burdensome and added to the overall capacity by utilizing the different strengths of the various team members. A simple information system is an important management tool. At the end of each month, growth information from all of the children in a community are compiled into bar graphs that use five simple indicators: number of children under two in the community, number weighed that month, number gaining adequate weight, number with inadequate weight gain, and number gaining inadequate weight for two or more months. These indicators help volunteers to target home visits, focus supervision and mobilize the community. These data are also shared within the health system and sent to municipal authorities.

Results. Significant improvements in childcare and feeding practices were found except for children in 18-24 month category. Significant improvements in the timely seeking of care, for example, treatment for pneumonia were another significant finding from participation in AIN. The impact on nutrition status was associated with participation in the program: for every one month increase in participation there was a .085 increase in Z-score. Overall under-nutrition was reduced: 8.6% wt/ht; 7.5% ht/age; and 15% wt/age. The impact was strongest among the poorest households.

Costs. The annual recurrent cost was estimated at $76,000 compared to an annual cost of $113,552 in the start-up phase. (Fiedler:2003) This is a long-term annual recurrent cost per child for the program was $6.82 per child under two participating in the program. This estimate overstates the cost of the program since the program also targets and reaches 2-5 year old children. The long term annual recurrent cost of the program per child less than five was estimated at $2.73. The fixed costs, which include personnel and non-personnel supervision costs represent about 40 percent of the costs; the long-term, annual, incremental budget required was $4.00 per child under two, and under $2.00 for children under five. About 30% of the annual recurrent costs were in supplies and medicines and 70% for personnel and related personnel costs, per diem and transportation (Fiedler:2003). “The average direct cost per child of an AIN-C Program community-based weighing and counseling session is 10.9 lempiras (US$0.66), just 11 percent of the direct cost of a single MOH staff-provided, facility-based, child growth and development consultation (Fiedler:2003, pg 63).”
ANNEX B: UGANDA UPHOLD COMMUNITY-BASED GROWTH PROMOTION

Background. Despite all efforts to improve child survival, growth and development, Uganda still has high infant and under-5 mortality rates at 88 and 152 per 1,000 life births, respectively (UDHS 2001). Most child deaths could be prevented, as malaria, diarrhea, and pneumonia remain leading causes of morbidity and mortality and sixty percent of child death is, directly or indirectly, attributed to malnutrition. The Uganda Program for Human and Holistic Development (UPHOLD) funded by United States Agency for International Development (USAID) provided support for a Community-Based Growth Promotion (CBGP) program to help empower communities to prevent malnutrition among children under two years of age and to serve as a catalyst for solving problems of illness, poor feeding practices or other childcare concerns at the community and household level.

Program Description. The foundation of the UPHOLD CBGP program is weighing and promoting the growth of all children under the age of two on a monthly basis in the community. At monthly village weighing sessions, and through other means such as home visits, community growth promoters identify children with inadequate growth, counsel caretakers on the causes of poor growth, and agree on actions to be taken to restore children to adequate growth and health. Community growth promoters are trained in and equipped with a set of tools to use in conducting these monthly sessions and providing support to the community in meeting the health needs of children. The set of counseling cards includes guidance and feeding practices, antenatal care and birth preparedness, newborn and postnatal care, immunization, hygiene and sanitation, use of insecticide-treated nets (ITNs), danger signs and home care for sick children (fever, diarrhea and respiratory tract infections), child spacing, HIV counseling and testing, and conflict resolution. Community growth promoters generally work in teams of two or three within their village, ideally covering 30-40 children under two per team. In many parishes, growth promoters collaborate with their parish peers to conduct the monthly sessions. The growth promoters are supported by two trainers/supervisors from the sub-county who collaborate with district-level trainers.

Coverage and Participation. The UPHOLD CBGP program was introduced in six of Uganda’s 79 districts. As of April 2007, UPHOLD had supported the training of more than 1200 community growth promoters in more than 500 villages in these five districts, serving approximately 15,000 children on a monthly basis. Based on a program assessment done at the end of the project, rates of coverage were high, reaching 90 percent of all children under two years at the outset of the program in all districts. Participation in monthly growth monitoring sessions ranged from a high of 89 percent to a low of 59 percent, on average participation was 72 percent. High program participation rates were linked to improved growth trends. The average rate of adequate growth, in any given month, in communities with high participation was 73 percent compared to 57 percent in communities with poor levels of participation. The impact on children recuperating from growth faltering was even more significant. On average, high participation communities had a recuperation rate of 63 percent in any given month compared to 36 percent in communities with low participation.

Approach to Individual Counseling/Action. Growth promoters had access to and utilized tools, including a set of counseling cards, to provide advice to mothers on an individual basis on feeding, childcare and health. In the overwhelming majority of counseling sessions observed, mothers were given messages that were relevant to the age and health status of the child. The observations showed, and the exit interviews confirmed, that about half of the counseling sessions concluded in
an agreement between the mother and growth promoter. Growth promoters appear to give more attention to children who are faltering in growth compared to those who are growing well. The counseling sessions with children who were not growing well were more likely to be conducted using a counseling card, to provide relevant and specific guidance, and to reach a specific agreement. Mothers of these children also affirmed more often that they had learned something new in the session.

**Community Involvement.** Community participation and support for the growth monitoring and promotion activities was shown through the availability of the community volunteers. In addition, the information from the growth monitoring sessions was made available to the community at various community meetings. In some cases community actions resulted from these meetings including the organization and distribution of subsidized insecticide treated nets (ITNs) from a partner organization and the treatment of a water source and additional families boiling drinking water.

**Operational Management.** Community growth promotion worker selection, retention and training, availability and quality of support supervision and the application of a program monitoring system to guide program management and operation are important aspects of effective CBGP programs. In Uganda, community growth promotion workers are selected from the community and serve on a volunteer basis. Their initial training is a six-day, skill-oriented training. A cascade training approach is used. At the district level, national trainers train a team of district and sub-county personnel who then take responsibility to train growth promoters in selected sub-counties and villages. To supplement the support provided by the sub-county and district level supervisors, a parish coordinator is identified from within the group of community growth promoters and given one additional day of training in basic supervisory skills, data collection and reporting. These parish supervisors play a major role in collecting and compiling the monthly village summary reports, reviewing them for correctness and submitting them to the sub-county supervisor.

**Results.** A 2006 Review of the UPHOLD CBGP program found that the proportion of children who were malnourished (less than -2 Z-scores, WHO 2005 standard) declined from 12.8 to 7.9 percent. This reflects a 38 percent improvement in malnutrition over the eight-month period. The age composition of the sample at baseline and end line was significantly different as a result of the incomplete enrollment of newborn children over the study period. However, the positive impact on nutrition status was evident in both age groups: the decline in malnutrition was 11.3 to 7.3 percent in children 0-11 months and 14.8 to 8.4 percent in children 12-23 months.

**Costs.** The estimated cost to start up the CBGP program in three sub counties in one district was $40,251. This is approximately $268 per village and $5.37 per child with an estimated 50 children under two participating in CBGP per village per year. Including the supervision and support costs for the first year the total cost was estimated at $56,200 in the three sub counties, $375 per village and $7.50 per child under two. For subsequent years the recurrent costs to maintain the program in these villages was estimated at $14,226 or $95 per village and $1.90 per child under two.
Malnutrition generally refers to both undernutrition and overnutrition. For the purposes of this document, the term “malnutrition” will be used to describe the result of undernourishment, poor absorption or poor biological use of nutrients consumed.

The package of key components is known as GOBI-FFF: growth monitoring, oral rehydration, breastfeeding, immunization, family planning, food supplementation, and female literacy.

Overwhelmingly, the reported evidence shows that weighing is a valued activity in the eyes of caregivers. Occasionally, caregivers’ concern or anxiety related to weighing has been raised as an issue in the merits of weighing. This has been seen in two contexts. One is the concern that the child will not gain adequate weight and it will reflect poorly on the caregiver’s skills, and the second is related to general anxiety over the health or well-being of the child. The latter situation is raised in Garner’s paper that cites evidence from the Cochrane review. However, the paper presents no evidence to support the view that weighing creates anxiety on the part of the caregiver when it is not merited. Rather, this type of anxiety seems to be seen in developed countries (Garner 2007). The worry of a caregiver whose child does not gain weight adequately, especially over many months, is an important factor to consider in the design of programs, especially ones that are concerned with equity in participation, involving participants from different socio-economic groups. However, this issue is one to be tackled through program design and not a reason to avoid weighing children or focusing on growth.