

BASICS II

A Better Future for Children: Progress Toward World Summit Goals for Health and Nutrition

A Series of Briefing Papers Prepared for the
UN Special Session on Children

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Abstract

In 1990 world leaders assembled at the World Summit for Children made a commitment to “give every child a better future” and established 27 goals for improving children’s health and well being by the year 2000. Progress toward those benchmarks will be the focus of the first special session of the United Nations General Assembly devoted to children, to be held 19-21 September 2001. In preparation for this meeting, the U.S. Coalition for Child Survival asked a number of experts to write briefing papers assessing efforts to achieve the goals of the 1990 summit. This document contains papers drafted by BASICS II staff summarizing what has been learned and accomplished during the past decade in eight important areas of child survival and makes recommendations for the future. The topics covered are: 1) maintaining a high level of immunization, 2) preventing neonatal tetanus, 3) reducing deaths from diarrhea, 4) reducing deaths from acute respiratory infections, 5) reducing deaths from measles, 6) reducing malnutrition, 7) promoting children’s growth, and 8) improving newborn health.

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BASICS II

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Introduction

In 1990, the largest gathering of world leaders in history assembled at the World Summit for Children at the United Nations in New York. Making a commitment “to give every child a better future,” they established 27 goals for improving child health and survival. The aim was to achieve these 27 goals by the year 2000.

In the Year 2001, How Do We Rate?

Progress toward achieving those goals—and a plan for advancing the health, development, and the well being of children worldwide—will be the focus of a historic special session of the United Nations General Assembly 19-21 September 2001. This first-ever UN Special Session on Children will bring together heads of state, senior government officials, and child health advocates to renew their commitments to children and agree on specific goals for the next decade.

The complete list of goals established in 1990 is included in the annex to this document.

A Review of Eight Goals

In preparation for the special session, the US Coalition for Child Survival asked a number of child survival experts to write briefing papers summarizing progress to date in achieving the goals of the 1990 summit. Eight papers drafted by members of the BASICS II Project describe the status of these efforts, the challenges ahead, and the way forward in the following critical areas of child survival:

- Maintaining a High Level of Immunization
- Eliminating Neonatal Tetanus

- Reducing Measles Deaths
- Reducing Deaths Due to Diarrhea
- Reducing Deaths Due to Acute Respiratory Infections
- Reducing Severe and Moderate Malnutrition in Children
- Promoting the Growth of Children and the Education of Families and Communities
- Improving Newborn Health

At the time of the 1990 World Summit, a special focus on newborn health was not on the agenda. However, this document includes a briefing paper on the topic, reflecting increasing recognition that infant and child mortality cannot be reduced substantially without addressing high rates of death in the first weeks of life.

The authors of the following briefing papers solicited input from expert reviewers and submitted the papers, on behalf of the United States Agency for International Development, to the US Coalition for Child Survival. These papers do not necessarily represent the views of USAID.

BASICS II welcomes further discussion on these issues.

Maintaining a High Level of Immunization

In 1990 the World Summit for Children set a goal for the year 2000 of maintaining a high level of immunization coverage against diphtheria, pertussis, tetanus, measles, poliomyelitis, and tuberculosis among children and against tetanus among women of childbearing age. For children, the target was to maintain immunization rates of at least 90 percent of those under one year of age.

What Has Been Accomplished and Learned in the Past Ten Years?

After the achievement in 1990 of universal childhood immunization rates of 80 percent, coverage declined throughout the 1990s for the “traditional” childhood vaccines of measles, polio, whooping cough, tetanus, diphtheria, and tuberculosis (Table 1). Coverage of women of childbearing age with two or more doses of tetanus toxoid (TT) has increased slightly, and coverage of infants with such underutilized vaccines as hepatitis B and yellow fever has risen more markedly, but the levels are still quite low.

Reported global coverage figures indicate that nearly 80 percent of the world’s children are vaccinated with the “traditional” vaccines, but not in the areas of highest risk such as Africa, where 50 percent were not immunized against measles last year. In some countries, half the children who begin their immunization series drop out before completion due to problems in supply, demand, satisfaction, and quality of services. A complex infrastructure has been established to deliver vaccines, but one-third of African infants still do not receive even the first vaccination in the immunization schedule.

Despite stagnating progress over the decade, immunization prevents more than three million child deaths each year. That is a total of 30 million lives saved during the 1990s—an achievement that can make us all

proud. However, the international health community cannot take the continued performance of immunization programs for granted. Nearly two million children continue to die each year from the six vaccine-preventable diseases traditionally included in the Expanded Program on Immunization (EPI). Another 1.3 million deaths could be averted with relatively newer vaccines against hepatitis B and *Haemophilus influenzae* (Hib).

Immunization is an enormously effective intervention. In high-mortality environments where 150 to 200 out of every 1,000 children die before reaching their fifth birthday (as in much of Africa and Asia), immunization of 1,000 infants with the “traditional” EPI vaccines prevents, by five years of age, about 30 measles deaths, 10 deaths from

Table 1. Global Immunization Coverage Rates in Infants, 1990, 1995, and 1999

	1990	1995	1999
BCG	87	86	81
DTP3	83	82	76
OPV3	84	82	78
Measles	81	80	74
Hepatitis B	1	10	20
Yellow fever (endemic countries)	4	6	15

Source: WHO Vaccine Preventable Diseases Monitoring System: 2000 Global Summary (WHO/V&B/00.32)

Note: rates for 2000 not yet available.

whooping cough, and five cases of lifelong disability from polio. Immunization of 1,000 women prevents five deaths from neonatal tetanus. (By comparison, for each person who died from Ebola virus in the former Zaire during the large epidemic in 1995, an estimated 182 Zairian children died nationwide from measles.)

The World Bank's landmark 1993 World Development Report, *Investing in Health*, concluded that immunization is the most cost-effective health intervention (especially when combined with other population-based health interventions) and that it should have an extraordinary claim on resources. Calling immunization an unfinished agenda, the report also noted that immunization programs would need assistance for the foreseeable future. Because of its role in promoting social justice and equity, immunization is widely recognized as a key element of comprehensive approaches to poverty reduction.

Immunization is now attracting considerable attention and resources with the race toward poliomyelitis eradication, the development of important new coalitions such as the Global Alliance for Vaccines and Immunization (GAVI), and the creation of new funding mechanisms such as the Global Fund for Children's Vaccines (with the support of Bill and Melinda Gates and others), to support introduction of new vaccines. To fully realize the benefit of all vaccines—traditional vaccines, existing underutilized vaccines, and the new vaccines of tomorrow—we need to continue to strengthen the platform from which they are delivered: a functioning health infrastructure and a routine immunization system. However, despite their relative maturity, immunization programs in many countries are showing signs of decay.

Vaccines clearly are essential to immunization programs, but many more inputs are needed to deliver them effectively and safely. The cost of fully immunizing a child is about US\$20, of which only about US\$2 (depending on the vaccines used) covers the cost of the "traditional" vaccines

and syringes, with about US\$17 going toward delivering the vaccines. Financing of EPI requires investments in cold chain equipment, spare parts, repair and maintenance, and fuel for refrigerators, as well as trained, paid staff, and functional health facilities.

Immunization performance is frequently described by vaccination coverage rates, but these figures do not describe the quality of services. With high levels of transmission of HIV and hepatitis B and C in developing countries, concern has increased about the safety of injections provided by the health system in general and of immunization in particular because most vaccines are administered by injection. WHO estimates that of the 12 billion injections given each year in the developing world, more than half are unsafe and may contribute to disease transmission. While immunization injections account for only about ten percent of all injections, EPI has taken the lead in pushing for safer injection and disposal practices. Progress has been made in developing safer technologies, but the managerial, financial, and behavioral dimensions of the issue are only starting to receive the attention required to improve the situation.

The effect of health sector reform (HSR) on the organization and delivery of immunization services has been the subject of several studies. Findings indicate that certain functions—such as setting policies, norms, and standards, procuring vaccines and equipment, and designing forms for disease surveillance—should not be decentralized. Because immunization entails the control of vaccine-preventable diseases that do not respect district borders, it is especially important that technical staff at the national level continue to play a role in the analysis and application of surveillance (and burden of disease) data. Technical staff also must be actively engaged in the design and implementation of health sector reform to ensure that the unique features essential to immunization quality and effectiveness are encompassed in the reforms.

What Are the Challenges?

The job of immunizing a nation's children is never finished

Immunization coverage is stagnating in different countries for many reasons. Among these are a perception that the job of immunizing the population has been completed, a false sense of security and complacency that the diseases have been controlled, and donor fatigue. Other reasons are inadequate investment in the fundamentals (such as training, logistics, and communications), reductions in outreach, rigid models of health reform, disengagement of potential partners and insufficient national ownership, inadequate donor coordination, preoccupation with vertical eradication initiatives, and lack of accurate routine data to identify problems and target contextually appropriate solutions. The advent of GAVI has focused new resources and attention on the importance of continually strengthening routine immunization services, even in the face of important competing needs. The message needs reinforcing that immunization is an essential component not just of child survival programs, but also of programs of primary health care, maternal and child health, infectious disease control, emergency humanitarian assistance, social transition, and health reform.

A systems approach is needed

An immunization program means more than just a supply of vaccines and syringes. A program requires staff training, development of supply lines, systems of management and monitoring, communication and behavior change, engagement of communities, and the means to finance these services. Solving the complex problems facing such programs requires consideration of the many interconnected pieces of the jigsaw puzzle that constitute a complete, coherent, and sustainable immunization system. Solving just one problem in isolation—say, vaccine supply—is not sufficient and may introduce distortions. And, as in any system, constant

attention, maintenance, and repair are needed to avoid decay.

Controversies and opportunities

The immunization program is caught squarely in a “development dilemma.” Traditionally under-funded, bottom-up, long-term developmental efforts in immunization must compete with well-funded, top-down, short-term initiatives. While short-term goals seem to be needed to keep stakeholders focused and to attract resources from donors who expect a rapid return on investments, the problems that must be overcome are not amenable to short-term solutions. The result is a succession of highly visible objectives that may not always meet the needs of countries but are a means of attracting resources. This introduces distortions in the agenda and leads to the adoption of inappropriate strategies at the neglect of other approaches. Political leaders are rightly concerned about declines in short-term program performance, but the proffered solutions often leave the more difficult problems unremedied. One challenge is to achieve disease control objectives in a manner that promotes sustainability and strengthens the health system.

Coordination is critical

No one partner can single-handedly address immunization. The job is too big and multi-faceted. Agencies must contribute according to their strengths and encourage national ownership. The current prospect of new vaccine introduction should continue to be used to stimulate investments in improving the broader immunization system. New alliances such as GAVI have systematically focused attention on the need and mechanisms for coordination.

What Must Be Done?

The changing landscape of country health systems, donor policies, and vaccine technology presents new challenges and opportunities. Immunization programs must

learn to function in the integrated, decentralized environment of health reform. Global partners and developing country governments must “stay the course” by committing sufficient resources to ensure that each year’s cohort of infants is protected from all vaccine-preventable diseases.

Some of the continuing challenges that require direct investment in the routine immunization system include:

- Raising immunization coverage in each district.
- Introducing new and underutilized vaccines.
- Reaching the unreached, particularly the high-risk urban poor.
- Making injection and disposal practices safe.
- Actively monitoring selected indicators at each level to improve staff motivation, management, performance, and data quality.
- Developing indicators to monitor the effects of health reform, eradication efforts, and new vaccine introduction on immunization services and health systems.
- Developing innovative financing mechanisms, such as World Bank efforts to tie debt relief to national investment in health.
- Introducing integrated disease surveillance and control measures.
- Developing capacity to implement communication to change behaviors.
- Designing sustainable, contextually relevant training approaches.
- Replacing aging cold chain equipment.

We need to formulate a more coordinated approach to developing and delivering an integrated package of well-child and sick-child health services in health facilities and communities. We must learn how to use

immunization contacts and services as a vehicle for other population-based interventions.

Health sector reform challenges the notion of traditionally “vertical” immunization programs. Yet, as an essential cost-effective public good that attracts limited private support at the country level, immunization requires deliberate public investment at levels sufficient to deliver services to all segments of the population.

Despite the challenges, the future holds great promise. There has never been a time when the need and our ability to act effectively have been greater. Immunization services are extremely popular and effective, and they demonstrate that “good health is good politics.”

—Robert Steinglass

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Eliminating Neonatal Tetanus

A goal of eliminating neonatal tetanus (NNT) by 1995 was declared by the World Health Assembly in 1989 and further endorsed at the World Summit for Children in 1990. Tetanus is responsible for 14 percent of all neonatal deaths globally and is a leading cause of neonatal mortality in the poorest parts of the world.

What Has Been Accomplished and Learned in the Past Ten Years?

Each case of neonatal tetanus represents multiple failures of health services to provide routine immunization, antenatal care, and clean delivery and cord care services. NNT is completely preventable by immunizing females before or during pregnancy or by ensuring clean delivery, clean cutting of the umbilical cord, and proper care of the cord in the days following birth. A series of highly effective, safe, and inexpensive tetanus toxoid immunizations can be given during a wide window of opportunity, lasting from infancy through adulthood.

The bacteria that cause tetanus are found everywhere in the environment, and everyone is susceptible to the disease. NNT occurs most commonly when tetanus spores contaminate the umbilical cord as it is being cut or dressed after delivery. In the developing world the disease rapidly progresses to difficult breathing, exhaustion, starvation, and, in most cases, death. Maternal tetanus is the result of contamination from tetanus spores, usually linked to unsafe abortion practices or unhygienic deliveries.

The World Health Organization (WHO) estimates that on average, only five percent of NNT cases are actually reported to health services. Because the disease does not occur in epidemics, it often goes unnoticed. An infant with NNT usually dies at home without being seen by a health worker. In most

developing countries, neither the birth nor early death is registered in any vital events reporting system. For these reasons, neonatal tetanus is called the “silent killer.”

Elimination of NNT by 1995 was redefined as less than one case per 1000 live births in every district in every country. Major progress toward that goal has been achieved. In 1995 alone, an estimated 700,000 potential deaths due to NNT were prevented. By 1999, 104 out of 161 developing countries had achieved elimination.

However, an estimated 289,000 cases of NNT continue to occur annually, with the case fatality rate averaging 70 percent. WHO estimates that 215,000 infants died from tetanus in 1998. In addition, some 30,000 women die each year from maternal tetanus. Reported immunization coverage of women of childbearing age with two or more doses of tetanus toxoid (TT) has remained stagnant in developing countries (at slightly less than 50 percent) since the mid-1990s, although evidence from several countries indicates that the proportion of protected women is higher than reported immunization coverage.

The goal of maternal and neonatal tetanus (MNT) elimination by 2005 was recently declared by UNICEF, WHO, and UNFPA. Substantial resources have been raised, resulting in renewed momentum to eliminate MNT in the 57 countries that have not yet done so. Approximately 100 million women are considered at highest risk and in need of immunization.

What Are the Challenges?

In addition to difficulties in reaching the poorest and least educated populations who lack regular access to health services, tetanus control poses special challenges.

Accurate measurement and interpretation of immunization coverage is difficult because women of childbearing age need multiple doses over a thirty-year span—with varying intervals between doses—and unprotected women enter childbearing age each year.

Detection of NNT is made difficult by reluctance in some cultures to acknowledge cases of the disease, poor health facility coverage, and undeveloped disease surveillance in underserved areas. In addition, areas of high risk are difficult to identify precisely in the least developed countries. In countries with the weakest infrastructure and highest mortality, NNT may not cluster in focal areas, but may be more widespread, appearing in “silent” areas where disease surveillance has limited reach. As a non-communicable disease, NNT does not exhibit the familiar epidemiological patterns of other vaccine-preventable infectious diseases, such as measles, poliomyelitis, and smallpox.

Yet it is not necessary to locate every case to know that tetanus is a problem. Wherever neonatal mortality is high, tetanus is usually a major contributor. The factors contributing to its high incidence are widespread and well recognized in the least developed countries:

- poor access to or use of general health services, including child immunization,
- low access to or use of antenatal care services, including maternal immunization,
- high incidence of home deliveries, often unassisted or assisted by unskilled attendants,
- a predominantly rural population engaged in agriculture,
- proximity to farm animals,
- low literacy levels and income.

Since antenatal care services are not well developed in many areas where tetanus remains a problem, population-based strategies to control the disease have been developed. The World Health Organization pioneered a strategy of continuous immunization with a total of five doses of tetanus toxoid for women of childbearing age, including pregnant women.

This strategy does not protect individual newborns as rapidly as does immunizing women who are already pregnant, but eventually it protects the susceptible population. However, because women must be screened and immunized or referred during any health facility visit, it has been difficult to implement this strategy without strong commitment by health services, additional resources, and durable, patient-held immunization records.

Many of the immunization strategies aimed at different target groups can be used to control tetanus. There is no single global blueprint for all situations. Different strategies need to be used and combined, over time, to control the disease at affordable cost. The immunization strategies and the most appropriate target groups must be defined in each country, based on local data and operational and financial circumstances.

Another challenge is the need for sustained effort. As an environmental hazard, tetanus can never be eradicated. Its elimination as a public health problem will need to be maintained year after year through continuous political commitment and application of resources.

What Must Be Done?

Just 27 countries account for 90 percent of the global burden of MNT cases:

Afghanistan, Angola, Bangladesh, Burkina Faso, Cambodia, Cameroon, Chad, China, Côte d’Ivoire, the Democratic Republic of Congo, Ethiopia, Ghana, Guinea Bissau, India, Indonesia, Liberia, Mali, Mauritania, Mozambique, Nepal, Niger, Nigeria, Pakistan, Senegal, Somalia, Sudan, and Yemen.

As part of broader national immunization plans, many of these countries are articulating the strategies, activities, and resources needed to achieve and maintain MNT elimination. Nearly 60 percent of the \$100 million in external support needed for national efforts to achieve the MNT elimination goal by 2005 has been raised.

For countries to achieve MNT elimination, WHO, UNICEF, and UNFPA advocate the “high-risk approach.” This strategy involves identifying districts at highest risk within countries and focusing interventions in those areas. The primary elements of the program include supplemental tetanus immunization of at least 80 percent of all women of childbearing age with three properly spaced doses of tetanus toxoid to quickly clear the backlog of unprotected women, thereby providing immunity lasting more than five years. The strategy then calls for maintaining elimination in formerly high-risk districts by routinely vaccinating pregnant women, increasing routine DTP coverage for children, and increasing women’s access to and use of clean delivery services.

To maintain the decline of tetanus, some countries may need to repeat supplementary tetanus immunization periodically in inaccessible, underserved areas as new cohorts of under-immunized women enter their childbearing years and as immunity wanes among previously vaccinated women. Disease surveillance in “silent” areas will need to be improved and a constant effort made to detect new high-risk areas. The frequency of follow-up supplemental immunization to maintain high levels of protective immunity in a population may need to be determined through periodic serologic studies until routine disease surveillance can be improved. In addition to strengthening surveillance, there is a need to improve current systems that routinely monitor coverage with tetanus toxoid and clean delivery.

Longer-term strategies are also required to protect adolescent females entering the period of risk. Their need for timely protection

cannot be met solely by infrequent follow-up campaigns. To maintain the momentum and political interest associated with the supplemental immunization of childbearing-age women in high-risk areas and to take advantage of gains being made in infant immunization, school-based immunization can be introduced in areas where a high proportion of girls (e.g., more than half) are enrolled in the early grades of primary school. School-based tetanus immunization, whether as priming or booster doses, increases the duration and level of protection of girls before they enter childbearing age and sharply reduces the number of doses required later for complete protection. This is an important operational consideration because these females will be more difficult to reach routinely after they become adults. All girls and boys in the early grades can be immunized during a single annual visit to each primary school.

During the past decade, female enrollment rates in primary school increased dramatically in many developing countries. Tetanus toxoid immunization is especially cost effective when added to an integrated, comprehensive package of school health services. Where appropriate, such school-based approaches can sustain the gains achieved during supplementary “high-risk” immunization activities by channeling political interest into longer-term follow-up action.

Other new approaches and technological developments are needed. Simple and robust population-based serological methods, which use filter paper to detect anti-tetanus antibody levels among women of childbearing age, are under development. In areas with poor disease surveillance, field assays that use minimally invasive methods of sample collection (e.g., finger-prick or saliva) in combination with appropriate sampling methods will assist in confirming areas suspected of being at high risk, targeting scarce resources to areas of highest susceptibility, and monitoring progress. The introduction, testing, adaptation, and

marketing of inexpensive clean birth kits in partnership with the private sector shows promise for reducing harmful practices during home deliveries. A slow-release micro-encapsulated tetanus toxoid vaccine is currently being tested in clinical trials. Another need is for the design and introduction of long-lasting immunization records that women and girls can keep at home.

Auto-disable, single-dose injection devices have emerged as an important tool for increasing tetanus immunization coverage while strengthening safe injection practices among underserved populations. One easy-to-use injection device is pre-filled with a single dose of tetanus toxoid and cannot be reused. These injection devices may enable programs to try innovative approaches to expanding immunization coverage, such as administration by trained birth attendants or other lay providers and use in areas of limited health facility infrastructure and staff shortages. They may also provide cold chain flexibility during storage and transport, and may overcome acceptability concerns, such as fear of unsafe injections.

Recommended strategies to eliminate maternal and neonatal tetanus have already proven effective, feasible, safe, and

affordable in many of the least developed countries. Financial and human resources and strong political support will be required to achieve and maintain elimination. With that support, elimination of maternal and neonatal tetanus as a public health problem in every country is indeed possible by 2005.

—*Robert Steinglass*

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Reducing Measles Deaths

Measles is a major childhood killer in developing countries. Worldwide, about 31 million measles cases occur annually, resulting in an estimated 900,000 deaths. The leading cause of vaccine-preventable deaths in children, measles accounts for 40 percent of the estimated two million deaths that could be averted every year through expanded immunization.

What Has Been Accomplished and Learned in the Past Ten Years?

In 1989 the World Health Assembly resolved to reduce measles morbidity by 90 percent and measles mortality by 95 percent from their levels in the pre-vaccine era. The target date for achieving these reductions was 1995. In 1990 the World Summit for Children adopted the goal of vaccinating 90 percent of children against measles by 2000. During the next decade the Region of the Americas, the Eastern Mediterranean Region, and the European Region of the World Health Organization all set target dates for the elimination of measles.

The estimated number of measles cases has declined by 63 percent and measles-related deaths have dropped by 83 percent, compared with pre-vaccine era estimates. Despite significant progress toward measles control, the 1990 World Summit goal was not met. Global measles coverage was 79 percent in 1997 and 72 percent in 1998, with 16 countries reporting that less than half of infants had received one or more doses of measles vaccine. Failure to deliver at least one dose of measles vaccine to all infants and inadequate case management leading to complications remain the principal reasons for continued high measles morbidity and mortality.

There are wide geographic differences in measles morbidity and mortality (Table 1). The World Health Organization's Western

Hemisphere Region now reports the lowest rates of measles, and transmission has been interrupted in most countries of the Americas. Most of these countries benefit from strong health infrastructures and comprehensive and focused surveillance activities.

Measles remains a major cause of childhood death in western and central Africa. It is estimated that the African continent now has 59 percent of all global measles cases. The fundamental problem is falling or stagnant routine coverage in the context of inadequately funded and poorly used health systems.

Several countries have embarked on measles immunization campaigns targeting children up to five or 15 years to decrease morbidity and mortality from measles. These efforts have had mixed success. When

Table 1. Estimated Number of Measles Deaths, 1999

<i>WHO region</i>	<i>Measles deaths</i>
Africa	514,000
Americas	1,000
Eastern Mediterranean	97,000
Europe	4,000
SEAR	241,000
WPR	17,000
Global total	874,000

Source: WHO, World Health Report 2000

measles campaigns have been grafted onto programs with high routine coverage (greater than 70 percent), the results have been dramatic—with rapid decreases in reported cases and a public health impact that appears to last four to five years. Conversely, when measles campaigns have been conducted in countries with low coverage (less than 50 percent), the results have been disappointing. Findings from epidemiologic modeling of these results suggest that mounting measles campaigns in the absence of major efforts to increase routine measles immunization is neither a sustainable nor a cost-effective strategy for reducing measles-related morbidity and mortality.

Lack of access to case management at health facilities and the often-poor quality of such services also contribute to continued high measles morbidity and mortality. Deteriorating health systems in many countries do not provide opportunities for effective management of measles cases. Many cases are never seen at health facilities. Others are seen by health workers who are ill equipped to manage cases effectively due to inadequate training and supervision and shortages of drugs and supplies.

What Must Be Done?

- Reinvigorate routine immunization programs to ensure that comprehensive measles vaccination is sustainable and linked to control of pertussis and other disease prevention activities.

- Improve case management at health facilities and strengthen links with home management of measles and referral care.
- Encourage intensified measles control and elimination activities, particularly in countries that have achieved high measles coverage in their routine programs. Such efforts will require a two-dose measles vaccine strategy.
- Conduct research to develop alternative methods of administering measles vaccine.
- Support intensified surveillance activities and efforts to improve case management, particularly with vitamin A supplementation to prevent measles complications.

— *F. Marc LaForce and Remi Sogunro*

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Reducing Deaths Due to Diarrhea

In 1980 diarrhea was the leading cause of child mortality, accounting for 4.6 million deaths a year. Oral rehydration therapy (ORT), defined as the oral administration of sodium, a carbohydrate, and water, was introduced in 1979 and rapidly became the cornerstone for the reduction of mortality due to diarrheal diseases. ORT has been proposed as the “most significant medical advance of the 20th century.”¹

What Has Been Accomplished and Learned in the Past Ten Years?

At the World Summit for Children in 1990, more than 150 countries undertook to attain 80 percent ORT coverage by 1995, with the goal of achieving a 50 percent reduction in diarrheal mortality by 2000. The good news is that this goal has been met. The annual number of deaths attributed to diarrhea worldwide declined from 3.3 million in 1990 to 1.5 million in 1999.²

How this public health goal was achieved bears study. First and foremost, sound research studies unequivocally established the clinical principle that rehydration could be done orally with the use of sugar/electrolyte solutions.³ Then field studies showed that the oral use of electrolyte solutions was effective in a variety of conditions. These results helped initiate the early treatment protocols that emphasized the

use of a solution of prepackaged oral rehydration salts (ORS). However, access to ORS packets was erratic, and the packets were unavailable in many communities.

Further operations research studies conclusively showed that about 70 percent of diarrheal episodes did not result in dehydration and did not require ORS. Case management strategies then shifted to the prevention of dehydration with home fluids, including homemade electrolyte solutions that were tailored to country needs. Salted rice water and cereal-based solutions were found to be effective in preventing dehydration.

In the late 1980s ORT was further broadened to include “increased fluids,” and in the early 1990s “continued feeding” was added. These changes in the definition of ORT have made it more difficult to determine coverage rates of ORT in field studies. When broader definitions of ORT were used as the

Table 1: Changes in Definitions of Indicators of Diarrhea Management and Diarrhea Mortality

<i>Year</i>	<i>Main indicator: % of under-five diarrhea cases who were:</i>	<i>Coverage rates</i>	<i>Diarrhea deaths (millions)</i>
1981	Treated by ORS (oral rehydration salts)	23%	4.6 (1980)
1988	Treated by ORT: ORS and/or recommended home fluids	57%	
1991	Treated by ORT plus increased fluid intake	32%	3.3 (1990)
1992	Treated by ORT plus increased fluid intake and continued feeding	21%	1.5 (1999)

Source: Modified from reference 2.

Table 2: Estimates of ORT (ORS and/or recommended home fluids) for 1993 and 2000

Region	Estimates of oral rehydration therapy use (%)	
	1993	2000
Sub-Saharan Africa	43	64
Middle East and North Africa	51	60
South Asia	19	69
East Asia and Pacific	49	81
Latin America and Caribbean	58	58
Developing Countries	40	69

Source: *The State of the World's Children*, UNICEF, 2001.

“gold standard,” coverage rates fell, as shown in Table 1. Nonetheless, the public health benefit, measured by decreased mortality from diarrhea, has continued (Table 1). These impressive results offer a convincing argument for the effectiveness of the refinements in ORT that have occurred over the last two decades.

Reductions in diarrheal disease mortality were achieved by implementing carefully developed strategies. Diarrheal disease control programs were operational in 80 countries by 1990. The number of ORS packets sold worldwide increased from 51 million in 1980 to 800 million in 1992. Countless health care workers were trained, and culturally sensitive educational materials were created, tested, modified, and used to educate the public about ORT.

Estimates for the use of ORS and/or recommended home fluids for the years 1993 and 2000 are shown by region in Table 2. Every region reported significant increases except Latin America and the Caribbean, where rates stayed at 58 percent. Dramatic increases were documented in South Asia, East Asia, and the Pacific. Lessons learned from this work include the key point that sound treatment strategies can become institutionalized not only in health facilities, but also in the home.

What Are the Challenges?

Despite the unqualified success of diarrheal

disease control efforts, challenges remain. The current mortality burden of 1.5 million deaths annually is still too high. How can populations not yet covered by ORT be reached? How can the lessons learned in diarrheal disease control programs influence a broader array of health initiatives in health facilities, communities, and homes? And how can the benefits of ORT be provided more equitably? For example, in 1985 an infant from northeastern Brazil had a risk of dying from diarrhea 5.2 times higher than that of an infant from southern Brazil; by 1995, this ratio had increased to 8.5.²

Although sales of ORS have increased dramatically over the past decade, economic, cultural, and geographic barriers still limit their widespread use. The shift from ORS to ORT (recommended home fluids and increased foods and fluids during diarrheal illness) to prevent dehydration is an effort to eliminate some of these barriers and to make the best use of existing household resources and feeding practices.

Caretakers are often unaware of the link between diarrhea and dehydration and of the role dehydration plays in causing childhood death. Because oral rehydration salts do not curtail diarrhea, but rather prevent dehydration, they have lost some credibility among caretakers who have turned to anti-diarrheals instead. Anti-diarrheals do not have any documented benefits. In fact, some actually prolong diarrhea, and others have

been shown to produce severe and sometimes fatal side effects in children.

These challenges are being addressed in a new context. In the mid-1990s the World Health Organization (WHO) and UNICEF launched the Integrated Management of Childhood Illness (IMCI) strategy, which integrates management of diarrheal disease with that of ARI, fever, measles, and malnutrition—the five most prevalent childhood illnesses. Because children often have more than one of these illnesses at a time, IMCI is designed to address the full health needs of a child rather than just one disease or condition. Originally a curative approach based in health facilities, the IMCI strategy has now been extended into communities and households to promote improved health behaviors, both preventive and curative, to address the major causes of childhood illness and death.

WHO and UNICEF have developed a set of 16 key family and community practices to be promoted under the rubric of Community IMCI. Six of these practices assist in the prevention and treatment of diarrheal disease and resulting dehydration:

- exclusive breastfeeding for at least four and if possible up to six months of age,
- safe disposal of feces and appropriate handwashing,
- continued and increased feeding during illness,
- appropriate home treatment for illness (to include ORT),
- timely care seeking for grave illness,
- compliance with health worker treatment recommendations and referral.

Many ministries of health in Africa, Asia, and Latin America have adopted IMCI as their approach for significantly reducing childhood mortality and morbidity. In contrast to the previous vertical control programs that emphasized supplying information and salts, Community IMCI, in particular, focuses on promoting individual behavior change to

increase the demand for prevention and treatment options.

The reductions in diarrheal disease mortality in the 1980s and early 1990s resulted from the concentrated efforts of vertical control programs. IMCI combines several vertical control programs into an integrated strategy. With a declining diarrheal disease mortality rate and competing health priorities, new generations of health workers and caretakers may not be as focused on diarrheal disease as in previous years. It is not yet clear whether IMCI can sustain and continue the advances made under the vertical disease control programs.

What Must Be Done?

Eight out of ten children who die do so at home, after having little or no contact with health facility staff. Therefore, implementing Community IMCI is a priority for controlling diarrhea and other major causes of childhood death. Community IMCI lays the foundation for improved communication with community members about key practices that promote child health and survival. It also provides a framework for closer ties between health facilities and the community-based organizations and other nongovernmental organizations that have established relationships with communities.

Health facility staff members need a better understanding of the communities they serve so they can respond appropriately to people's health and development needs. In some countries, health center management committees bring community perspectives into the planning and management of facilities.

Further research should inform efforts to promote the key household practices for diarrhea prevention and control. Additional qualitative research is needed to understand the barriers to ORT use and to identify locally appropriate and readily available fluids and foods that could be given to children with diarrheal disease by all but the most impoverished families. Communication and

behavior change strategies must address the many constraints to providing ORT, counseling of families on feeding practices during and after bouts of diarrhea, and misperceptions about the benefits of anti-diarrheals.

Recognition of the importance of first-level health providers by government authorities is another critical step toward further reductions in the child mortality attributable to diarrhea. Governments should ensure that systems are in place for training, supervision, refresher training, and referral care to ensure that health facility staff can provide appropriate treatment and counseling and educate families on home management of diarrhea.

USAID is funding research to evaluate the impact of the overall IMCI strategy on the most prevalent childhood diseases. This research will provide data on how effective an integrated approach can be in managing specific causes of mortality and morbidity.

Correct management of diarrhea could

save the lives of up to 90 percent of children who currently die from the effects of the disease. In many countries where health services are underutilized, greater investment in the community and improved partnerships between health facilities and communities may offer the best return for continued decreased mortality due to diarrheal disease.

— *F. Marc LaForce, Kim Cervantes,
Remi Sogunro, and Paul Ickx*

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Reducing Deaths Due to Acute Respiratory Infections

Acute respiratory infection (ARI), mostly in the form of pneumonia, is the leading cause of death in children under five, killing more than two million children annually. Up to 40 percent of children seen in health clinics are suffering from ARI, and many deaths attributed to other causes are, in fact, “hidden” ARI cases.

What Has Been Accomplished and Learned in the Past Ten Years?

There are no reliable surveillance data that can be used to determine incidence or mortality from ARI in a country. The most complete data on ARI come from the Demographic and Health Surveys (DHS). These surveys consistently show that about one out of four children from 0 to 59 months old had a respiratory tract infection in the two weeks before the survey. About one-third of these were ill enough to have been brought to a practitioner (physician, indigenous healer, or pharmacist) for treatment.

Most cases of pneumonia can be treated effectively with low-cost oral antibiotics. The main clinical problem is the speed of the infection. Urgent treatment is often necessary, but many parents do not understand how quickly severe respiratory distress can become fatal¹ and do not know that antibiotics are the only effective treatment. As a result, cases of pneumonia that become fatal are usually first seen late in the course of illness.

Integrated Management of Childhood Illness (IMCI)—an approach developed by the World Health Organization and UNICEF—is the principal strategy for reducing ARI mortality. It does so by promoting:

- prevention through reduced indoor air pollution, improved nutrition—including breastfeeding—and immunization,

- early recognition of disease by caretakers and improved home management,
- prompt recognition of symptoms and signs of pneumonia by health workers,
- rapid treatment with antibiotics in accordance with national treatment policy,
- rapid referral of the most serious cases.

Health workers following the IMCI approach learn the importance of classifying the severity of respiratory infections by observing a child for the key signs of pneumonia: chest indrawing and fast breathing. They are also aware that children suffering from other conditions, such as malnutrition or measles, are particularly susceptible to pneumonia, and thus are looking for the early signs of the disease to ensure rapid treatment.

Excellent WHO/UNICEF course materials such as the “Management of Childhood Illness” modules help prepare health workers to effectively manage ARI and other major diseases in children between the ages of one week and five years. Over the last decade these generic treatment guidelines have been adapted to meet conditions in a variety of countries. However, turnover of trained personnel, insufficient post-training supervision, and failure of trained staff to follow ARI protocols have blunted the potential public health impact of ARI training.

By far the best strategy for reducing mortality is to promote immediate recognition of danger signs by caretakers and provide access to appropriate treatment. The community component of IMCI helps caretakers and community health workers recognize when a child is sick enough to require care outside the home. Community IMCI also promotes a set of 16 key household practices in care seeking, disease prevention, growth promotion and development, and home care.

Documenting the public health impact of such efforts has been difficult because of insufficient information. In addition to the lack of surveillance data, few population-based data are available on IMCI treatment of ARI. Most published WHO data deal with numbers of training courses given and health workers trained.

Nevertheless, it is clear that the 1990 World Summit on Children goal of reducing ARI deaths by one-third has not been met. A careful analysis of factors associated with a decrease in under-five mortality was unable to substantiate a correlation with “bringing an infant ill with ARI to a medical facility for treatment.”²

Bacterial resistance is becoming an increasingly important problem. Current ARI treatment protocols are based on cheap oral antibiotics such as trimethoprim/sulfamethoxazole (TMZ) and ampicillin/amoxicillin, and pneumococcal resistance to these drugs continues to grow. More expensive antibiotics will be needed, which will further complicate treatment.

Primary prevention through immunization could become a more important global strategy for controlling ARI in the future. Population-based field studies in the Gambia have shown that rates of pneumonia can be decreased by about 25 percent with comprehensive immunization programs that include the *H. influenzae* b (Hib) vaccine, and these results have been confirmed in retrospective studies from Chile. Polyvalent

pneumococcal vaccines have shown great promise in studies in the United States. Vaccines against the most common cause of serious respiratory infections in the very young—respiratory syncytial virus (RSV)—will be field tested within the next ten years, and better influenza and parainfluenza vaccines are also likely to be introduced over the next decade.

What Must Be Done?

- Recognition of the need to seek early treatment for severe respiratory infection must improve so that children are seen early enough to make a difference. Health programs need to improve communication with parents and strengthen services to remove barriers to appropriate care seeking.
- Control of ARI deaths is difficult because of the need for a health system that ensures effective treatment. Community- or home-based treatment must be expanded to generate sufficient public health impact. Access to effective antibiotics in remote villages would save many lives.
- A preventive approach that emphasizes training is successful only when it is combined with supervision and a referral network.
- Bacterial resistance patterns, particularly for *S. pneumoniae*, should be regularly monitored to ensure that recommended treatment protocols are appropriate.
- Comprehensive HiB immunization plus the maintenance of high DPT3 and measles coverage are cost-effective ways to prevent ARI deaths in children.
- New vaccines offer promise for primary prevention of severe ARI.

— F. Marc LaForce and Remi Sogunro

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Reducing Severe and Moderate Malnutrition in Children

Reducing severe and moderate malnutrition* by one-half the 1990 level—from 32 percent of children under five to 16 percent—was one of the goals of the 1990 World Summit for Children. Progress towards this goal has been slow, and 27 percent of children worldwide remain malnourished.

What Has Been Accomplished and Learned in the Past Ten Years?

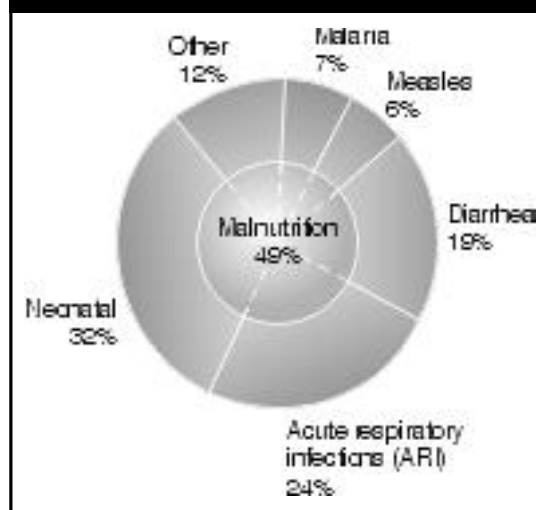
Some advances were made in the last decade. The goal of reducing malnutrition by half was achieved in Latin America. However, other regions lagged behind. Globally, our understanding of the problem improved, new approaches were developed, and stronger partnerships were established. The first part of this paper summarizes the progress made since 1990, and the second part identifies areas for action.

What we learned

- Half of all childhood deaths in developing countries could be averted by eliminating malnutrition (Figure 1). Even mild malnutrition raises the risk of childhood deaths substantially. Moderately and severely malnourished children are five times and eight times more likely to die, respectively, than are adequately nourished children (Table 1).
- In addition to increasing the risk of deaths, malnutrition in children does serious and lasting damage to physical and mental development. This damage continues through adulthood and in the next generation.

- Malnutrition imposes a particularly heavy burden on poor families and communities in terms of death, disease, disability, lost income, and lost opportunity. It is most prevalent among the poor and also exacerbates other problems common among low-income families. Malnutrition reduces immunity against childhood illnesses, delays recovery from illness, and is linked with low productivity, dropping

Figure 1. Distribution of Causes of 11.6 Million Deaths Among Under-5-year-olds in all Developing Countries, 1995



Source: WHO 1998.

* Children who receive inadequate nutrition grow less rapidly than well-nourished children and have heights or weights that are less than two standard deviations below the heights and weights of well-nourished children of the same age. These children are considered "severely or moderately malnourished."

Table 1. Risk of Mortality Increases with Severity of Malnutrition

<i>Category of malnutrition (wt/age as % of median)</i>	<i>Relative risk of death from any cause</i>
Below 60%	8.4
60–69%	4.6
70–79%	2.5
> 80%	1.0

Source: Pelletier et al. 1995.

out of school, and poor educational achievement. Income and economic growth are now recognized as outcomes of improved nutrition. Thus, nutrition interventions must form an important part of poverty alleviation strategies.

- Raising income is insufficient, by itself, to bring about reductions in malnutrition. Multiple causes of malnutrition were recognized and represented in a framework developed by UNICEF. This led to a clearer view of the interventions required in multiple sectors to improve nutrition.
- Maternal nutrition plays a significant role in causing childhood malnutrition. It became clear that the effects of childhood malnutrition carry over from one generation to the next. It is essential to link maternal health with child health and nutrition strategies. Improving women's education and social status emerged as a central theme for reducing malnutrition.
- Micronutrients, such as vitamin A, iron, folic acid, zinc, and iodine, play an important role in achieving adequate nutrition in children. Their importance—apart from the previously well-known role of dietary energy and protein in child nutrition—was highlighted.
- A number of interventions are effective and affordable in reducing moderate and severe childhood malnutrition. These proven interventions include actions that health providers can take as part of routine health services, as well as

approaches in community development, agriculture, food technology, trade, and marketing. The importance of community-led action, public education, and household behavior change and communication was recognized.

- Nutrition interventions, in comparison with other health investments, are highly cost-effective and affordable ways to reduce the global burden of disease.

Actions taken

- A number of countries recognized the importance of nutritional status improvement for national health and economic development. They drafted national plans of action that cut across sectors. Support provided to governments by FAO, UNICEF, and WHO was key to these efforts.
- Policies and programs put into practice by some countries resulted in accelerated reductions in moderate and severe malnutrition.
- The important roles of nongovernmental agencies, the private sector, and academic institutions were recognized. Nongovernmental organizations played a pivotal role in raising awareness among international organizations and donors and urging governments to take action.
- The strong influence of the commercial sector was recognized. Positive partnerships were realized for food fortification activities, and commercial marketing increased awareness of nutrition in the general public. However, the need for caution regarding commercial marketing and encouragement of breastmilk substitutes was reinforced, and violations of the international code of marketing were documented. Special guidance was developed to prevent unintended reductions in breastfeeding practices among non-infected populations due to counseling on breastmilk alternatives for HIV-positive mothers.
- Data on nutritional status, in some cases

from more than one representative national survey, became available for a number of countries, making it possible to monitor progress and focus attention on countries and regions with high prevalence or declining trends.

Approaches and tools developed to address malnutrition

- Community empowerment and motivational approaches were developed and applied for improving nutritional practices, such as: the use of growth monitoring and promotion (GMP); discovery of good community practices through 'positive deviance' inquiries; and participatory approaches to setting priorities that involve community members (e.g., participatory learning and action, or PLA).
- Communication and behavior change tools and techniques were increasingly applied to improve child feeding and maternal/child care.
- Agricultural research, in particular plant breeding and development of new varieties of high-nutrient corn and rice, opened up new opportunities.
- In the health sector, combined health and nutrition packages were defined and related tools developed, such as: Integrated Management of Childhood Illnesses (IMCI); a "Nutrition Minimum Package" for preventive actions in maternal-child services; and distribution of vitamin A with immunizations and other

maternal-child health (MCH) services.

- The importance of small-scale income-generation and agriculture programs—particularly for women—and access to credit by low-income groups was recognized, and these approaches were documented (e.g., the Grameen Bank in Bangladesh).
- The need for continued advocacy, strong leadership, and management skills to enable programs and policies to improve nutrition on a large scale and with adequate resources was recognized and documented.

What Must Be Done?

- *Focus on the poor and on regions and countries with high malnutrition and declining health trends, using a proven set of essential nutrition actions.*

Overall progress in reducing malnutrition has been very slow despite the availability of a "minimum package" of nutrition interventions. Moreover, improvements have varied by region and country.

The World Summit goal was to decrease the proportion of children under five who are malnourished to 16 percent (87 million children). Currently an estimated 150 million children, or 27 percent, are underweight for their ages (Table 2).

Latin America is the only region to achieve the World Summit goal of halving 1990 levels of malnutrition. In Africa, the number of malnourished children increased

Table 2. Trends and Regional Pattern of Childhood Malnutrition

Region	1990		1995		2000	
	%	Million	%	Million	%	Million
Africa	27	30	28	34	28	38
Asia	36	141	33	121	29	108
Latin America	10	6	8	4	6	3
Developing Countries	32	177	29	160	27	150

Source: WHO Global Database on Child Growth and Malnutrition, 2000.

from 30 to 38 million. Asia remained the largest contributor to global malnutrition, with the highest prevalence and numbers of moderate and severely malnourished children. Clearly, lessons learned in Latin America and some Asian countries where malnutrition declined (e.g., Thailand) need to be documented and transferred.

Within countries, increasing commitment to benefiting the poor and other marginalized segments of the population is important. Recognizing and sharing best practices within and across countries can be useful for reducing disparities. Poverty alleviation should not be limited to agricultural or non-farm sector inputs, but should also address access to markets—including facilitating processing and selling of agricultural and non-farm outputs.

The growing population of urban poor calls for a tailored strategy to deal with the specific constraints of urban poverty and malnutrition and to take advantage of opportunities in urban areas that may not be available in rural settings.

- *Improve coverage, quality, and demand for services.*

Even simple, proven nutrition interventions have not been systematically integrated throughout maternal and child health services. About half the population of developing countries is estimated to come in contact with health services at critical times for nutrition interventions, but fewer than one out of five are estimated to receive the counseling and care needed. More emphasis on strengthening an essential package of proven nutrition interventions within MCH services is a high priority. Useful tools and techniques from the private sector, such as quality control, setting standards, and regulatory mechanisms, have not been fully adapted to the delivery of nutrition interventions.

- *Encourage community action.*

Communities often have the resources to protect the nutrition of mothers and children. Support for community-based actions has

received insufficient attention. Social, religious, and education infrastructures/networks that already exist in communities have only sporadically been mobilized for community nutrition support. Particularly important is universal coverage with the minimum or essential nutrition package: ensuring adequate diets for pregnant and lactating women and adolescent girls; support for breastfeeding mothers; child growth promotion; ensuring appropriate complementary feeding; and access to key micronutrients.

- *Emphasize maternal malnutrition, low birthweight, and a lifecycle approach.*

Childhood malnutrition begins in utero and is made worse by poor infant feeding and child health practices. Child malnutrition affects fetal nutrition in subsequent generations. It is cyclical, with influences at one stage in the life cycle affecting outcomes at another. The main precursor of malnutrition is fetal deprivation, commonly known as intrauterine growth retardation, or IUGR. In developing countries an estimated 30 million newborns (24 percent of 126 million births per year) are affected. Maternal malnutrition is the major determinant of IUGR in developing countries. This is particularly true among populations with low gestational weight gain, low pre-pregnancy body mass, and short maternal stature. Malnourished mothers are likely to have suffered from fetal malnutrition themselves. Maternal anemia, infections, malaria, and cigarette smoking are also important etiological factors for IUGR.

- *Protect nutrition among refugees and displaced persons.*

Malnutrition is highly prevalent among refugees and displaced persons, who numbered 21.5 million in 1999. Disruption in food production and distribution as a result of natural and man-made disasters, crop failure, high prices, inadequate assistance, and disease outbreaks are the main causes of malnutrition in these groups. Continued

support for early warning, surveillance, and rapid/appropriate response will remain priorities in the near future.

- *Provide special care for children living with HIV/AIDS.*

HIV-positive children are more susceptible to malnutrition and need special care. Since the beginning of the AIDS pandemic, an estimated three million children worldwide have been infected with HIV. Because the virus is present in breastmilk and can infect an estimated 15 percent of breastfed infants of HIV-positive mothers, special care needs to be taken to counsel those mothers who test positive for HIV about infant feeding options.

- *Address insufficient human capacity: management, technical, leadership, and advocacy.*

Institutions and agencies have an uneven record of maintaining or strengthening their nutrition expertise or of building capacity among government and nongovernment personnel to carry out important tasks. Donors and governments have reduced support for key partners (such as universities, technical and research centers, and public laboratories) whose skills and knowledge are critical. Greater emphasis on short-term results and the high demand for emergency programs may have reduced such investments. This problem deserves further examination and appropriate action. Networking and mobilizing public partners should remain a priority, particularly for institutions with a track record of delivering results.

The knowledge and tools exist to achieve the goals set at the World Summit for reducing childhood malnutrition. Stronger commitment, partnerships, and focus on proven interventions can accelerate the achievement of these goals in the near future.

—Tina Sanghvi

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Promoting the Growth of Children and the Education of Families and Communities

The Plan of Action of the 1990 World Summit for Children recognized the preventive power of promoting growth for keeping children healthy and free of malnutrition. The plan called for institutionalizing growth promotion and regular growth monitoring in all countries by the year 2000. Although several large country programs had demonstrated the importance of growth promotion by 1990 and had continued its implementation, the operational details of how to realize this goal had not yet been fully developed.

What Has Been Accomplished and Learned in the Past Ten Years?

The last ten years have seen expansion and institutionalization of growth promotion and monitoring in a few countries, such as Thailand, Indonesia, and Honduras, and its implementation in other key programs in another handful of countries. But for the most part, the past decade has been a time of defining and refining a mix of effective, efficient actions that can be institutionalized on a large scale, yet still reflect local realities.

The lessons from the past ten years that will define growth promotion for the next decade point to the need for significant changes in the way services are provided to everyone, not just the sick. These changes will involve:

- *A shift from a curative to a preventive focus.*

The majority of the world's children are born healthy, and maintenance of adequate child growth is an excellent proxy for good health. Mothers and program workers who strive for adequate child growth each month protect the health children were born with and prevent malnutrition and illness. Few well-nourished

children die from communicable diseases. As children slip into even mild or moderate degrees of malnutrition, however, their risk of death from illness climbs. Therefore, preventing even mild and moderate malnutrition—which account for the vast majority of all malnutrition—will lead to large reductions in child mortality.

- *Moving from a vertical to an integrated approach to caring for children.*

Most programs focus on a discrete area of child health, such as breastfeeding or the major childhood illnesses. Growth promotion encourages a more comprehensive approach to improving children's health and survival. By detecting a problem as it begins to unfold, community workers can address the cause of the problem—whether it is illness, improper feeding practices, or a family social situation. This approach detects a problem as soon as growth falters, diagnoses the problem, allows for decision making with the family, and outlines whatever actions are necessary rather than the solutions prescribed by a particular vertical program.

- *Taking growth promotion and monitoring from the clinic to the community.*

Children under two years of age grow rapidly.

In the first months of life, children should gain as much as a half-kilogram every month. Because children's health and nutritional status can change so quickly, growth promotion and monitoring can function as a preventive tool only if children are weighed monthly. Distances and the cost of travel to clinics, as well as the typical clinic environment, are not conducive to monthly follow-up or to detailed counseling and negotiation of care. Community members are close and can provide follow-up. They can be trained to weigh children, detect adequate or inadequate weight gain, diagnose any problems, and make decisions about what action should be taken. They can also counsel mothers and help them improve their children's growth. Health maintenance must be brought to the community level.

- *Targeting children for help when help can do the most good.*

Traditionally, programs place highest priority on severely malnourished children and on all children younger than five. However, many of these children are either too sick to respond to

local solutions or are beyond the point where they will ever be able to recuperate losses in weight. Targeting *all* children under five for monthly follow-up overloads health workers and community volunteers and dilutes efforts to prevent malnutrition during the critical first two years of life. Figure 1 shows the typical pattern of growth for a malnourished child in those first two years, with a rapid deterioration of nutritional status during the first 12 to 18 months, after which the growth trend levels off but the child is left stunted.

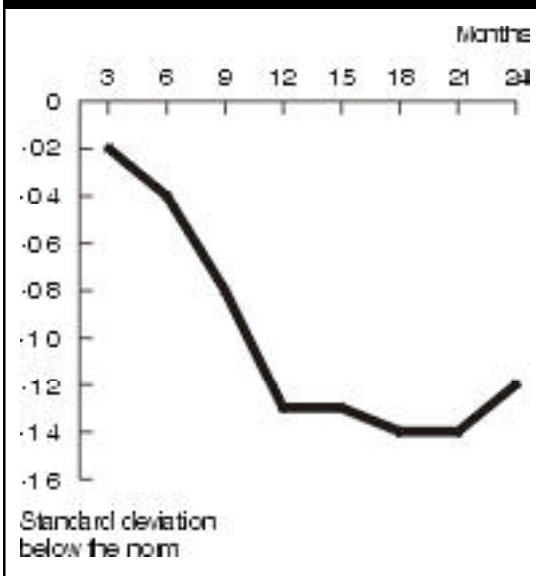
When the youngest children are given priority and action is taken at the first signs of faltering growth—before anorexia or extreme illness set in—most children will recover the weight they had lost and resume their growth path. Early intervention could prevent much of the stunting so common in developing countries today. Involving all families in the program, regardless of the nutritional status of their children, exposes everyone to education on child care and brings equity to health service provision.

- *Seeking solutions to faltering growth first with the family and within the community.*

Providing food has been the conventional treatment for malnutrition. Countries spend millions of dollars on food aid, with little impact on nutrition or health. There is a place for food aid, particularly in emergencies. However, the accumulating body of evidence suggests that with the proper guidance, the majority of families can meet the nutritional needs of their young children with their own resources.

The kind of guidance that makes the difference in whether or not a child gains adequate weight from one month to the next may be, for example, a recommendation about the number of times he or she is breastfed during the day and night. It might mean teaching a mother that she must give her child two more spoonfuls of rice at each meal or half a tortilla twice a day. The changes needed at this age are small (about 300 kilocalories per day) and within the reach of the majority of families.

Figure 1. Typical Pattern of Declining Nutritional Status (weight-for-age) of Children 0-24 Months



Source: AIN Honduras baseline survey data, BASICS I, 1998.

Of course individuals or families cannot manage some problems alone. In such cases, the involvement of the broader community usually results in local solutions. Again, the problem may not be lack of food or absolute economic constraint, but the need for child care while a mother goes to work. As a solution, the community might offer organized child care. The growth promotion and monitoring programs of the next decade should place ownership of children's growth with the family and the community.

What Are the Challenges?

There are three key challenges to advancing the global expansion and institutionalization of growth promotion. The following challenges can all be met with the proper resources and dedication.

- *Revamping programs that are monitoring children's growth but are not promoting growth and providing education.*

Since the 1960s, governments and private organizations have been monitoring the growth of children, often as part of well-baby programs at clinics or in conjunction with feeding programs. Although it has been demonstrated that monitoring does not affect health outcome if it is not linked to action, many groups continue merely to collect growth data. Convincing these programs that they should alter their activities, especially when it may mean less reliance on food handouts, has proved difficult, though not impossible.

- *Orienting and training enough people to facilitate program development and implementation among and within countries.*

Convincing policy makers to alter the focus of programs has not been as great a challenge as finding enough professionals to develop and run them. This new model for growth promotion for the next decade turns many of the notions about nutrition and health

programming for children upside down. Even professionals trained within the past decade have not been exposed to the idea of monitoring growth rather than nutritional status (the measure of past, accumulated growth performance), of giving priority to only the very young and those who are not yet ill, and of looking at improved practices, rather than food, as the key to nutritional improvement. A new cadre of health and nutrition professionals is needed who can design and manage large-scale community-based programs based on this model.

- *Resolving resistance to community-based programming and the devolution of authority to the community level.*

In countries that have had a tradition of community-based work and volunteerism, growth promotion and education programs have been embraced as an effective way to focus community health activities. However, where community action has not been a national priority and where there are few nongovernmental organizations, establishing a network of community workers is seen as expensive and management-intensive, even when the majority of workers may be volunteers. Advocacy work is needed to educate governments about the multiple benefits that can be expected when community health infrastructures and programs are in place. Establishing these infrastructures more than returns costs, in terms of coverage rates, improved equity in coverage, better outcomes in health and other social sectors, and even more rapid responses to emergencies. There are many ways to build such capacity at the community level and effective management systems that can be adapted if governments are convinced that community-run services are important.

What Must Be Done?

- Advocate, separately or as part of health reform efforts, to encourage support for community health networks and programs and to promote the importance of a

- prevention paradigm focusing on child growth.
- Build a constituency for growth promotion as an essential complement to the World Health Organization's Integrated Management of Child Illness (IMCI) initiative: the preventive component of integrated child care.
 - Forge regional teams of facilitators for growth promotion and education. These teams would provide the advocacy and technical assistance needed to help governments and nongovernmental organizations adapt proven program models and tools to local conditions.
 - Establish a network to share experiences across countries and to fine-tune implementation.
 - Hold forums for donors and governments to ensure that sufficient resources are available for the start-up costs of growth promotion and education activities. Experience to date indicates that governments are able to sustain the recurrent costs of these programs.

—*Marcia Griffiths*

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Improving Newborn Health

Over the last two decades child survival programs have made significant progress in reducing infant mortality in many developing countries. However, the impact of these efforts has been primarily on deaths during the post-neonatal period, or after the first four weeks of life. In many countries newborn mortality has remained static. Where infant mortality has decreased, neonatal mortality now accounts for a higher proportion of infant deaths and is responsible for 50 percent to 70 percent of all infant deaths.

What Has Been Learned in the Past Ten Years?

Neonatal and perinatal deaths impose a heavy burden on the people of developing countries, where 90 percent of all births take place. Although there are great disparities in infant mortality rates among different countries, neonatal mortality tends to remain high from one country to the next (Figure 1). In the developing world, 34 out of every 1,000 live births end in death in the newborn period. Perinatal mortality, which includes stillbirths and early neonatal deaths (deaths during the first week of life), is even higher, at 56 deaths per 1000 live births.

Tetanus, pneumonia, and other major infections are the leading cause of death among newborns, accounting for 32 percent of neonatal mortality, followed by birth asphyxia (Figure 2). Low birthweight is an underlying predisposing factor in a large number of these cases. An estimated 16 percent of infants born in developing countries have a low birthweight, with national rates ranging from 6 percent to 30 percent. In these countries a large proportion of low-birthweight babies have suffered intrauterine growth retardation, and fewer infants are born prematurely than they are in industrialized countries.

The newborn period—and especially the critical first week of life—has long been

neglected by both maternal health and child survival programs, although it actually constitutes an important part of both efforts. None of the goals of the 1990 World Summit on Children specifically addressed newborn health, although related goals on prenatal care, maternal health, breastfeeding, and reducing infant mortality were set.

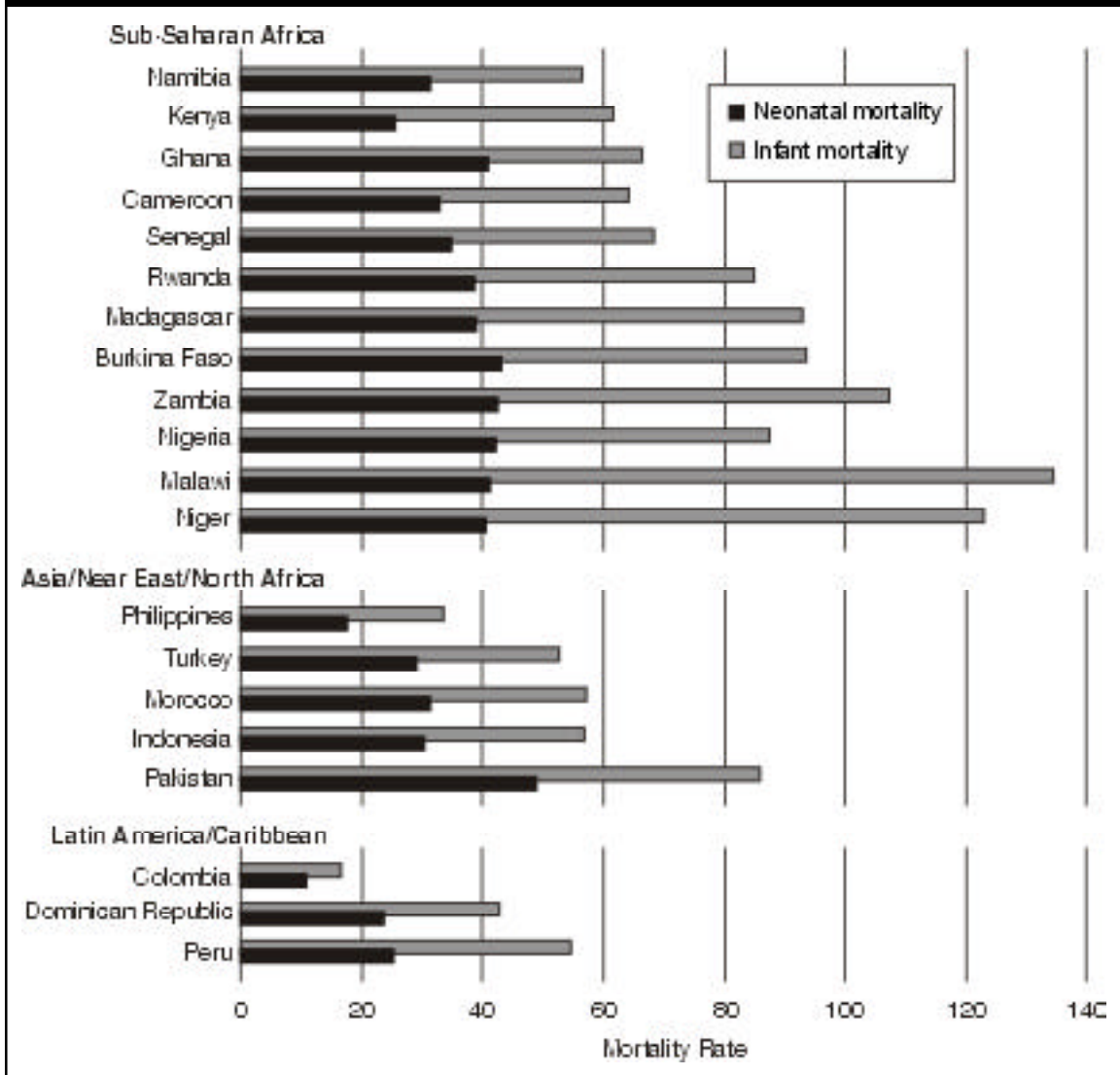
It has become increasingly evident that any further impact on infant mortality will require concerted efforts to prevent neonatal deaths. Now that the international health community is awakening to the needs of newborns and beginning to recognize the opportunities for effective intervention, newborn health should be high on the agenda at the 2001 UN Special Session for Children.

Constraints

Preventing low birthweight would dramatically reduce neonatal mortality. But much of low birthweight is tied to maternal malnutrition and other problems for which feasible, cost-effective strategies have yet to be developed. Evaluations of a number of interventions to prevent low birthweight have not shown them to be consistently effective, and further studies are needed.

For some time newborn care was equated with the high-tech, specialized care provided in hospital intensive care units and was not

Figure 1. Childhood Mortality Rates for Selected Countries



Source: Demographic and Health Surveys, 1990–1994.

covered to any significant extent in the pre-service education of medical, nursing, and paramedical staff in developing countries. However, recognition is growing that the vast majority of newborn babies require only basic primary care, known as “essential newborn care,” that is in fact feasible and affordable. Currently such care is practically nonexistent in many district hospitals and peripheral centers.

To complicate matters, childbirth and newborn care are often steeped in traditional practices and rituals that do not permit

mothers to leave their homes during a specified period after delivery—commonly 40 days. Many mothers give birth at home with no assistance or with the help of traditional birth attendants, relations, or friends—particularly in rural and tribal areas. Their infants are kept at home and are rarely seen by health workers. Thus, training of health staff alone—and even providing resources to strengthen the care provided at health facilities—may not be effective in reducing newborn deaths without complementary

efforts to improve newborn care and care seeking at the community level.

Essential Newborn Care

All newborn infants require basic, essential care that consists of:

- skilled attendance at birth,
- temperature maintenance,
- early and exclusive breastfeeding,
- basic hygiene, including cord and eye care,
- immunization.

Early identification and referral of newborns with health problems is also important. Implementation of this essential newborn care package should be linked with maternal and reproductive health programs, as well as child survival programs. Basic antenatal care, immunization of pregnant women against tetanus toxoid, and care at birth are critical to newborn survival.

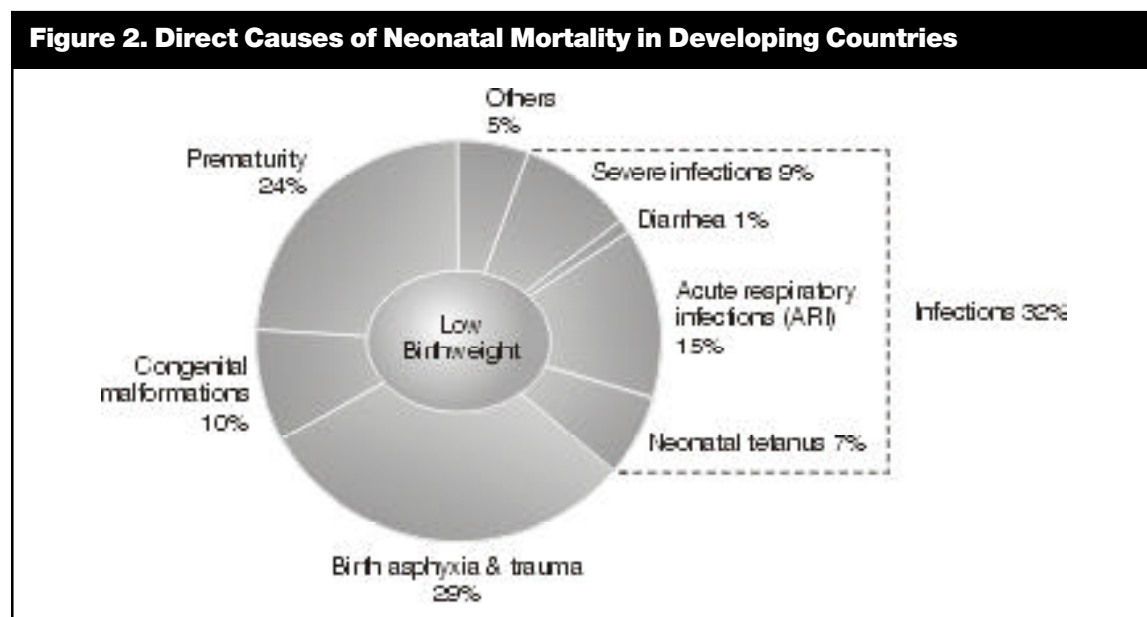
A recent innovative study by Bang et al. in rural India showed that a program combining essential newborn care and treatment of babies for sepsis in their homes

reduced neonatal mortality by 62 percent. However, this program involved frequent postnatal visits and use of injections at home by community health workers. Replications and adaptations of the program may need to be further evaluated before such interventions can be applied on a larger scale.

The possibilities demonstrated by the Bang study underscore the need to identify effective and affordable ways of improving newborn health at the community level. We know that the evidenced-based interventions that make up the essential newborn care package can save lives. Now we must invest in operations research to determine *how* to implement those interventions to reach millions of women and their babies.

What Must Be Done?

- **Advocacy** is required at national, state, and district levels to raise awareness of the need for newborn health interventions and the activities appropriate for a given area. Working groups should be formed at the national and state levels to guide the planning, implementation, and evaluation of programs and to ensure sustainability



Source: Zupan J. 2001.

and a technically sound approach to expanding the scale of programs.

■ **Community-based Interventions.**

Community mobilization is particularly important because of the unique traditional/cultural practices associated with maternal and newborn health. It is essential from the beginning to mobilize and involve community leaders and representatives of local government agencies, women's groups, and local nongovernmental organizations. We must understand the needs and perceptions of community members, motivate them to adopt behaviors that promote newborn health, and actively involve them in programs to promote ownership to ensure that interventions are relevant and services used appropriately.

Communication strategies are needed to mobilize communities and also to promote effective practices and change harmful ones. At the community level, promotion of the essential newborn care package is the highest priority. This will involve educating and encouraging families and training birth attendants and community health workers. Enabling caretakers to identify health problems in newborns and to seek early and appropriate care is another priority. Treating infections at home (as in the Bang model) may be applicable in some areas. We also need to explore possibilities of establishing community outreach clinics, where infants can be referred for such treatment.

- **Systems Strengthening and Performance Improvement.** Given the inadequacy of current pre-service education in newborn care, it is crucial to provide practical training in essential newborn care and care of common problems in newborns at the facility level.

However, mere training is not enough. Ensuring that training results in improved performance requires regular and supportive supervision, quality assurance, and provision of the basic resources needed to use the skills acquired. Training should address improved communication with family members and promotion of services to families. Links between facilities and the community are needed to ensure proper use of services and improved care-seeking practices.

- **Evaluation.** Careful monitoring and evaluation of programs in this new area of international health will help us identify effective and cost-effective interventions to bring to scale.

— Indira Narayanan

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Goals of the 1990 World Summit for Children

I. Major Goals for Child Survival, Development, and Protection

- (a) Between 1990 and the year 2000, reduction of infant and under-5 child mortality rate by one third or to 50 and 70 per 1,000 live births respectively, whichever is less;
- (b) Between 1990 and the year 2000, reduction of maternal mortality rate by half;
- (c) *Between 1990 and the year 2000, reduction of severe and moderate malnutrition among under-5 children by half;*
- (d) Universal access to safe drinking water and to sanitary means of excreta disposal;
- (e) By the year 2000, universal access to basic education and completion of primary education by at least 80 per cent of primary school-age children;
- (f) Reduction of the adult illiteracy rate (the appropriate age group to be determined in each country) to at least half its 1990 level with emphasis on female literacy;
- (g) Improved protection of children in especially difficult circumstances.
- (iii) Access by all pregnant women to pre-natal care, trained attendants during childbirth and referral facilities for high-risk pregnancies and obstetric emergencies;
- (iv) Universal access to primary education with special emphasis for girls and accelerated literacy programmes for women.

B. Nutrition

- (i) *Reduction in severe, as well as moderate malnutrition among under-5 children by half of 1990 levels;*
- (ii) Reduction of the rate of low birthweight (2.5 kg or less) to less than 10 per cent;
- (iii) Reduction of iron deficiency anaemia in women by one third of the 1990 levels;
- (iv) Virtual elimination of iodine deficiency disorders;
- (v) Virtual elimination of vitamin A deficiency and its consequences, including blindness;
- (vi) Empowerment of all women to breast-feed their children exclusively for four to six months and to continue breast-feeding, with complementary food, well into the second year;
- (vii) *Growth promotion and its regular monitoring to be institutionalized in all countries by the end of the 1990s;*
- (viii) Dissemination of knowledge and supporting services to increase food production to ensure household food security.

II. Supporting/Sectoral Goals

A. Women's health and education

- (i) Special attention to the health and nutrition of the female child and to pregnant and lactating women;
- (ii) Access by all couples to information and services to prevent pregnancies that are too early, too closely spaced, too late or too many;

Goals in italic/bold denote those addressed in this paper.

C. Child health

- (i) Global eradication of poliomyelitis by the year 2000;
- (ii) *Elimination of neonatal tetanus by 1995;*
- (iii) *Reduction by 95 per cent in measles deaths and reduction by 90 per cent of measles cases compared to pre-immunization levels by 1995, as a major step to the global eradication of measles in the longer run;*
- (iv) *Maintenance of a high level of immunization coverage (at least 90 per cent of children under one year of age by the year 2000) against diphtheria, pertussis, tetanus, measles, poliomyelitis, tuberculosis and against tetanus for women of child-bearing age;*
- (v) *Reduction by 50 per cent in the deaths due to diarrhoea in children under the age of five years and 25 per cent reduction in the diarrhoea incidence rate;*
- (vi) *Reduction by one third in the deaths due to acute respiratory infections in children under five years.*

D. Water and sanitation

- (i) Universal access to safe drinking water;
- (ii) Universal access to sanitary means of excreta disposal;
- (iii) Elimination of guinea-worm disease (dracunculiasis) by the year 2000.

E. Basic education

- (i) Expansion of early childhood development activities, including appropriate low-cost family- and community-based interventions;
- (ii) Universal access to basic education, and achievement of primary education by at least 80 per cent of primary school-age children through formal schooling or non-formal education of comparable learning standard, with emphasis on reducing the current disparities between boys and girls;
- (iii) Reduction of the adult illiteracy rate (the appropriate age group to be determined in each country) to at least half its 1990 level, with emphasis on female literacy;
- (iv) Increased acquisition by individuals and families of the knowledge, skills and values required for better living, made available through all educational channels, including the mass media, other forms of modern and traditional communication and social action, with effectiveness measured in terms of behavioural change.

F. Children in difficult circumstances

Provide improved protection of children in especially difficult circumstances and tackle the root causes leading to such situations.