CHILD SURVIVAL: A REPORT TO CONGRESS ON THE AID PROGRAM

Child Survival
ACTION PROGRAM
AGENCY FOR INTERNATIONAL DEVELOPMENT

FOREWORD

The Agency for International Development (AID) is proud of its record of leadership in developing and delivering the technologies known to save significant numbers of young lives. Particularly noteworthy has been our long effort to develop and promote oral rehydration therapy (ORT) and to support vaccine research and immunization delivery.

The Agency is commited to maintaining its strong leadership role in child survival. To that end we launched the Child Survival Action Program last February. This program consolidates AID's contribution to the worldwide effort to reduce illness and death among children in developing countries.

AID's child survival strategy is to focus on a limited, manageable mix of proven technologies that promise substantial and direct health benefits for infants and children. The most important of these are ORT, immunization, birth spacing and improved nutrition practices including the promotion of breastfeeding and appropriate weaning, growth monitoring and the prevention of Vitamin A deficiency. Other programs which AID funds also support our child survival goals, notably those in malaria, acute respiratory infection, and water and sanitation.

If these technologies are to fulfill their promise, however, child survival activities must be part of ongoing programs. There will always be new infants to be vaccinated, new groups of mothers to be trained. AID, therefore, encourages cooperating countries to commit themselves to the principles of child survival, to better resource allocation and management within the health sector, to private sector participation, and to community-based support for basic health services.

In Fiscal Year 1985, the Agency's child survival programming efforts were effectively doubled with an additional $85 million appropriated by Congress for this purpose. This report describes the Fiscal Year 1985 Child Survival Action Program which builds on the Agency's decade-long experience with delivering basic health services. The program pools the skills and resources of U.S. and international private voluntary organizations, U.S. universities and the private sector, international organizations, and a range of governmental agencies. It is an investment in the future, a partnership of hope.

In presenting this report, I would like to acknowledge the contribution of the Agency's Child Survival Task Force. It has been responsible for overseeing the development of this program and will continue to guide the Agency's efforts to improve the prospects for survival for the children of the developing world.

Administrator
Agency for International Development

December 1985

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Chapter I — Introduction

"Insuring that children are protected from the scourge of disease is an important part of our commitment to the future. . ."

President Ronald Reagan
Letter to the Secretary General of the United Nations
October 1985

It has long been AID's policy to focus its health programs on the most vulnerable members of the developing world's population—that is, on infants and children under five, along with pregnant and lactating women. Children under five account for more than half of all deaths in developing countries. Millions of others suffer the ravages of disease and malnutrition.

The causes of death and disease among Third World children are not mysterious. By and large, they are the same ones that affected generations of poor in Europe and North America less than a hundred years ago. Measles and whooping cough, especially when accompanied by malnutrition and intestinal parasites, head the list. Tetanus resulting from unhygienic birth practices kills both newborns and their mothers. Respiratory infections spread rapidly when people live crowded together in rural and urban slums. Diarrheas of all sorts are spread where water and sanitation facilities are inadequate; they can be life-threatening when their victims are already debilitated by disease and undernutrition.

In industrial countries, these afflictions declined with rising incomes and better community facilities, and similar

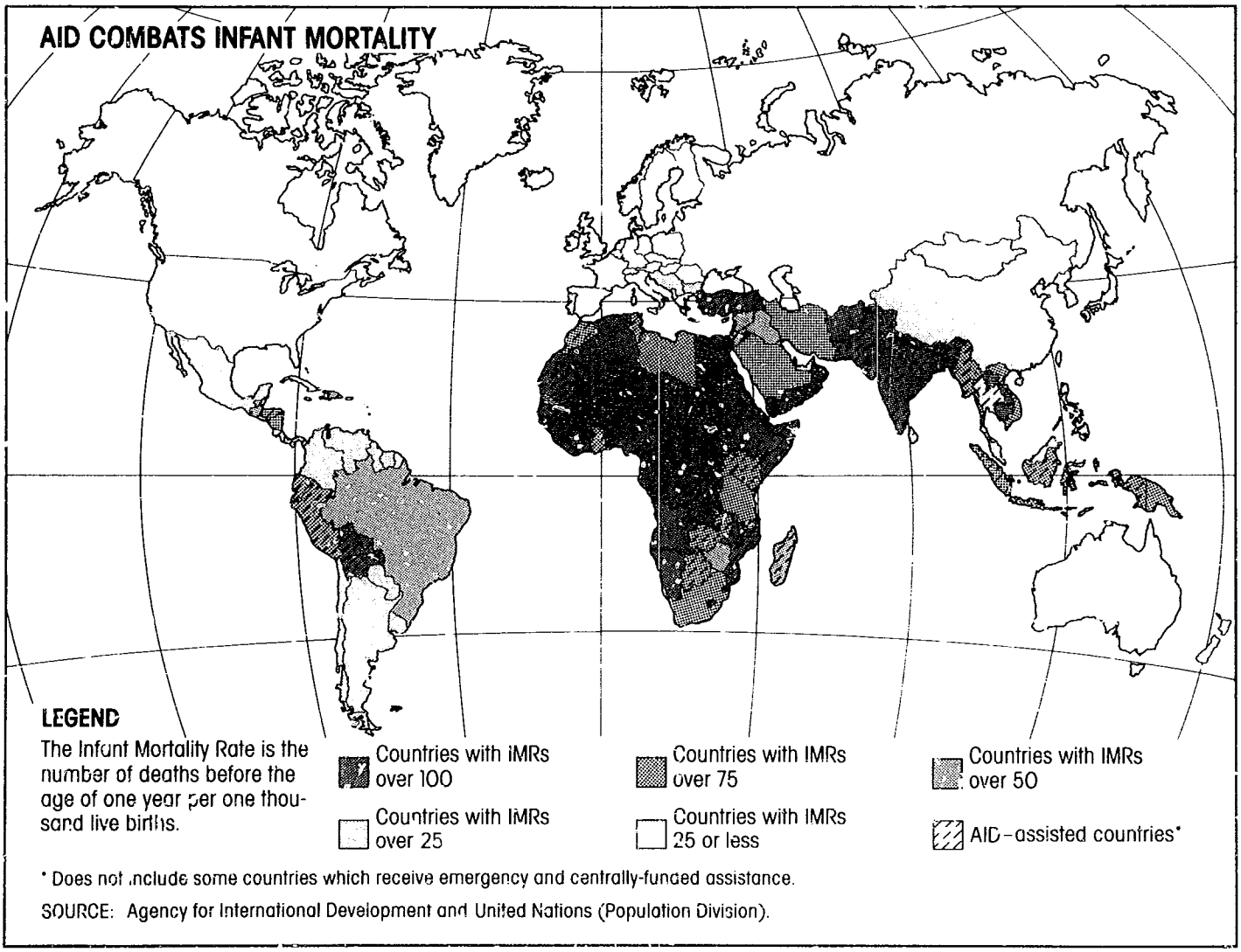
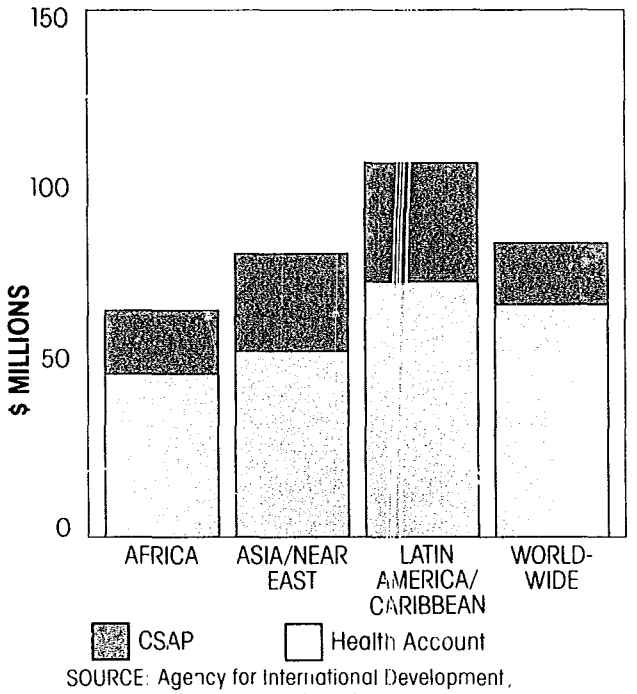


Figure I-1

FISCAL YEAR 1985
HEALTH ACCOUNT BY REGION
AND ADDITIONAL CSAP FUNDS



SOURCE: Agency for International Development, Health Projects Data Base, 1985

patterns are beginning to emerge in many parts of the Third World, not only because of investments in public health but also because of general economic and social development. Thus, life expectancy in developing countries has risen from an average of 42 years to 51 since 1960. Child mortality has dropped from 31 to 19 per thousand live births, and infant mortality from 163 to 114.

But these rates are still unacceptable. They mean that roughly 10 million children die each year—over 27,000 a day—in AID-assisted countries alone (and another 4 million a year in other parts of the developing world), with close to half these deaths occurring in infants under the age of one. In parts of the poorest developing countries, as many as 250 of every thousand children never see their fifth birthday.

AID's goal—in concert with cooperating governments, other aid donors, and private voluntary organizations—is to reduce infant mortality in AID-assisted countries from the present average of 114 to 75 per thousand live births (still a long way from the United States' 11 per thousand), and child mortality from an average of 19 to 10 per thousand before the end of the century. These goals are ambitious but they should be attainable, since *many of the techniques and services for saving children's lives are already available and more are being developed through innovative research.*

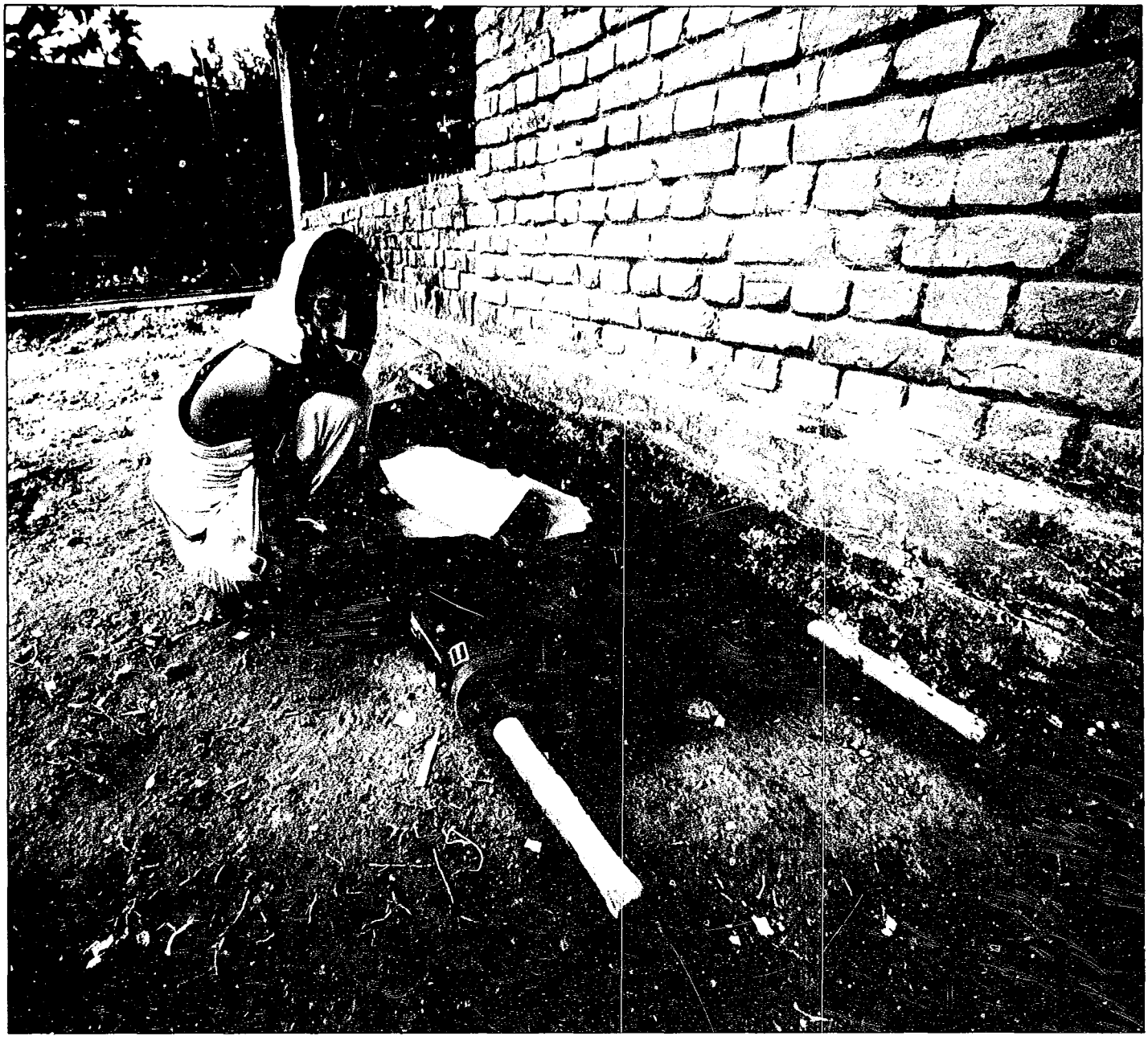
This report tells the story of the Agency's contributions to child survival. While AID finances only about 10 percent of international aid in the health field—and far less a proportion of total health expenditures by Third World governments—it has health activities in more than 65 countries and it can lay claim to a solid record of leadership in developing and delivering health technologies. This is particularly true as regards to AID's long effort to develop and promote oral rehydration therapy (ORT) and to support immunization research and service delivery. In both health and family planning, AID has made a major contribution by developing innovative programs for delivering education and technology through social marketing outside the existing public health sector and by devising new ways to make use of the talents and capabilities of the private sector.

Projects related to child survival are financed under a variety of accounts, primarily health but also including the nutrition and population Development Assistance programs as well as some activities financed with Economic Support Funds and under Public Law 480. Child survival activities accelerated in Fiscal Year 1985 as a result of an additional $85 million, appropriated by Congress to carry out Sections 103 ($10 million) and 104c ($50 million) of the Foreign Assistance Act and the provisions of a special Child Survival Fund ($25 million).[1] In February 1985, AID Administrator M. Peter McPherson announced that these moneys would be used in a Child Survival Action Program that would build on and enhance existing programs and enable AID to give all of its health activities a sharper focus and fresh impetus.

In real life, most infant deaths in developing countries result from multiple, interacting causes and many contributing factors. The deaths attributed to diarrhea, for example, may have been precipitated by a recent bout of measles, which in turn may have been more serious because the child was undernourished from birth and unable to make good use of its food due to intestinal worms transmitted in contaminated water. In another child, lowered resistance from nutritional deficiency and/or disease may increase susceptibility to pneumonia, which may then be cited as the official cause of the child's death. The synergy between malnutrition and infectious disease is particularly important, creating poorer health status than might have been expected from either one individually.

Deciding where to intervene in this vicious circle can be difficult. On the one hand, some have seen the linkage among health factors as an argument for providing across-the-board integrated care. But experience has shown that

[1] A complete listing of Child Survival activities funded from the additional $85 million appropriated by Congress in FY 1985 can be found in the Appendix.



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when health services try to do too much, they tend to do none of it well enough. On the other hand, one-shot "vertical" campaigns are easily overwhelmed by the myriad other factors affecting children's health, and the short-term impact of these campaigns is difficult to sustain. In its Child Survival program, AID tries to walk a middle line between these two extremes, focusing on a few technologies which have high potential for saving lives, which are technically and logistically deliverable at reasonable cost, and for which support and enthusiasm can be generated.

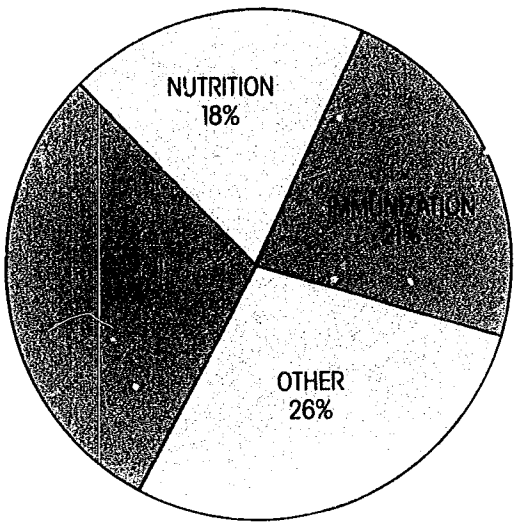
By emphasizing a limited, manageable mix of interventions, AID and cooperating governments are able to make more efficient use of their health funds, and, it is hoped, to have a more direct and visible impact on children's health. They are also able to take advantage of elements in the private sector—mass media, commercial firms, private doctors, pharmacists, traditional healers, and voluntary organizations—to reach the millions of mothers, who are the first line of defense in protecting the health of their children.

The new moneys appropriated in FY 1985 and used for the Child Survival Action Program enabled AID effectively to double its programming in basic health services for children. In order to increase impact, the Agency selected a relatively few target countries for special government-to-government efforts under this initiative. In addition, assistance to U.S. private voluntary organizations for health programs in developing countries was more than doubled, and substantial contributions were made to UNICEF and the United Nations Development Program (UNDP) for child survival activities, especially in Africa.

The following chapters outline the most important technologies affecting child survival and illustrate how AID is helping to promote them in developing countries. Since so many programs build on AID's prior efforts, projects funded from both the Child Survival Action Program and the AID health and nutrition accounts are described, along with a few projects financed with Economic Support Funds and under PL 480. As will be seen, AID is focusing heavily on ORT, intensified immunization efforts, and such nutrition-related activities as promotion of breastfeeding and Vitamin A therapy. Chapters II-IV take up each of these interventions in turn. Related program elements such as child spacing, research on acute respiratory infections, vector control, and improved water and sanitation are covered in Chapter V, while Chapter VI considers some of the institutional and financial factors that affect the long-term sustainability of these programs. The projects described in this report do not by any means exhaust the list of those supported by AID in the area of child survival. Rather, they have been chosen to illustrate various aspects of AID's work.

Figure I-2

CHILD SURVIVAL ACTION PROGRAM BY MAJOR INTERVENTIONS



SOURCE Agency for International Development, Health Projects Data Base, 1985

Chapter II — Oral Rehydration Therapy

"The discovery that sodium transport and glucose transport are coupled in the small intestine, so that glucose accelerates absorption of solute and water, was potentially the most important medical advance this century." (Lancet, 1978.)

Children in developing countries have been getting diarrhea from one infection or another for as long as there have been children. For the most part, time and parental treatment take care of the immediate problem, though the attack may well set back the child's growth and weaken its defenses against other diseases. But perhaps 60 to 70 percent of diarrheal attacks are acute, and in these cases loss of fluids and essential chemicals can be severe enough to cause dehydration. This is when diarrhea can kill. If the fluids and chemicals are not replaced, death can come in a matter of hours, especially in children who are already underweight or malnourished.

These more severe cases of diarrhea add up to a public health problem of enormous magnitude. The World Health Organization (WHO) has estimated that up to a billion episodes of diarrhea occur every year in children less than five years of age, with approximately five to six million resulting in death. In many developing countries, diarrhea accounts for a third to a half of admissions to pediatric wards and represents a serious drain on very limited health resources. Cholera, the most severe of the diarrheal diseases, kills up to 50 percent of its victims through dehydration if left untreated. In addition, diarrheal diseases are the major cause of malnutrition in the developing world.

As recently as the late 1960s, drugs and intravenous (IV) fluids constituted the accepted treatments for diarrhea. Children whose parents were too far from a hospital or too poor to get to one—and they are the great majority—were out of luck if their diarrhea proved serious. Even those who made it to a hospital often arrived too late to benefit from treatment. Folk wisdom could be unhelpful or downright harmful. In some countries, it taught that food and liquids, including breastmilk, should be withheld until the diarrhea stopped; in others, actual purges were recommended.

It is now known that a simple combination of sugar, salts, and water in specific ratios (along with bicarbonate or trisodium citrate)[1], given by mouth in frequent small doses, will reverse dehydration in all but about 5 percent of cases, usually within three to seven hours. Just sugar, salt and water, in the right proportions, will usually prevent dehydration if given soon enough. This oral rehydration therapy (ORT) is not only far cheaper than the IVs and drugs it replaces; it is also better for the child and can be used in the home and outpatient clinic as well as in the hospital.

The breakthrough in knowledge came when scientists at the Cholera Research Laboratory (in what is now Bangladesh) realized that glucose accelerates the absorption of salt and water through the wall of the intestine, thus permitting quick replacement of essential fluids. Dramatic proof that this helps in diarrheal cases came when young scientists working in Dhaka and Calcutta during the Indo-Pakistan War of the 1970's were able to lower the diarrheal death rate in refugee camps from 25 percent to 3.6 percent using oral rehydration. Subsequent research has documented the importance of continued feeding, especially breastfeeding, during diarrheal attacks; this will shorten the attack and conserve nutrition.

AID has been associated with the development of ORT from the beginning (see Appendix). It has provided core support for the Cholera Research Laboratory (now called the International Centre for Diarrheal Disease Research, Bangladesh, or ICDDR,B) since its inception in 1960 and over the years has contributed $36 million to its activities. AID continues to support ICDDR,B's research on variations of the original formula[2] and such related subjects as vaccines against common causes of diarrhea. In addition, a new project called Applied Diarrheal Disease Research has been developed to support research on topics including the important matter of continued feeding during and after diarrheal attacks.

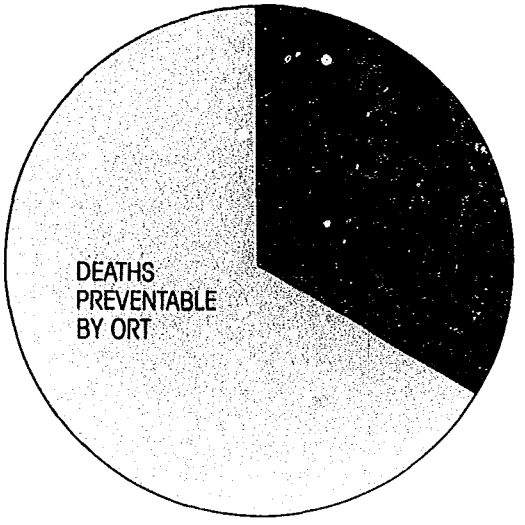
In June 1983, AID (in cooperation with WHO, UNICEF, and ICDDR,B) sponsored the first major international conference on ORT, which drew to Washington more than 600 participants from over 80 countries. AID has since held regional workshops for health professionals in Asia and Africa. Another world conference (ICORT II)

[1] The official WHO formula for Oral Rehydration Salts (ORS) is as follows:
Sodium Chloride: 3.5 grams; Trisodium citrate: 2.9 grams (or Sodium Bicarbonate: 2.5 grams); Potassium Chloride: 1.5 grams; Glucose: 20.0 grams; Water: 1 liter.

[2] Several promising variations involve the substitution of starch (rice powder, etc.) for sugar or combining glucose with amino acids and dipeptides; this "super ORS" reduces stool losses by half and the duration of attacks by a third or more, and thus offers nutritional benefits. AID-supported researchers are experimenting with the new formula in several places.

Figure II-1

WORLDWIDE DEATHS FROM DEHYDRATION (1985)



TOTAL ESTIMATED NUMBER
OF DEATHS—5.5 MILLION

SOURCE: World Health Organization Estimates (excluding China), 1985

has been called for December, 1985, to identify lessons learned and examine various issues of implementation, evaluation and cost of ORT programs. AID has once again been joined by the sponsors of ICORT I, as well as the World Bank and UNDP, in convening the meeting. AID also sponsors a widely circulated international newsletter, videotapes, and other means of publicizing the new therapy.

More important, AID has begun a major push to emphasize ORT activities in as many as possible of the health programs the Agency sponsors directly and indirectly around the world. There are now AID-supported ORT activities in more than 25 developing countries through direct government-to-government agreements and many more are being mounted by private voluntary organizations and international agencies with AID's financial help. Through a $19 million project called The Technology for Primary Health Care Project (PRITECH), AID finances technical assistance in planning and implementation of ORT programs worldwide. PRITECH teams sent by the Boston-based consulting firm, Management Sciences for Health, have already visited 27 countries to help develop national programs. A PRITECH adviser is stationed in the Sahel helping to promote use of ORT in seven drought-affected countries of Africa. AID-supported relief agencies are using ORT in refugee camps in Ethiopia and the Sudan to combat outbreaks of cholera and other diarrheal diseases, with the result that death rates have been kept to 2-3 percent.

Such worldwide and regional projects as Combatting Childhood Communicable Diseases (CCCD), Water and Sanitation for Health (WASH), and Primary Health Care Operations Research (PRICOR) also include support for diarrheal-disease control among their activities. In addition, AID has signed agreements with the Peace Corps to strengthen its ORT activities, including development of a manual and other training materials for Peace Corps Volunteers and their local counterparts. Over a dozen field training workshops have already been held, more are scheduled, and Peace Corps Volunteers are actively promoting ORT in the villages where they work.

ORT In Egypt

The National Control of Diarrheal Diseases Project in Egypt is one of the most comprehensive of those supported by AID, in this case through Economic Support Funds. It grew out of a pilot study begun in 1980 which showed a 50 percent reduction in deaths from diarrhea in several districts where ORT had been introduced and promoted.

With lessons learned from the pilot study, a five-year campaign was mounted, beginning in 1983, to spread knowledge and use of ORT over the entire country and, hopefully, to reduce mortality in children under the age of three by 25 percent. To this end, a multifaceted program was developed under the general coordination of a temporary secretariat in the Egyptian Ministry of Health. Mothers were the target of carefully prepared and tested radio and TV messages on how and when to use ORT at home, how to continue feeding, and how to recognize signs of trouble. Those who brought sick children to health centers were taught how to administer oral rehydration on the spot. Nearly 13,000 doctors and nurses received hands-on training and ORT was added to pediatric curricula in medical schools. Thirty university research and training centers were devoted exclusively to diarrheal diseases. Doctors and nurses, in turn, trained many hundreds of community health workers.

By December 1985, close to 90 percent of all health facilities around the country were able to provide on-site rehydration services. Pharmacists were supplied with Egyptian-made rehydration packets and plastic measuring cups to sell for home use. In remote areas, "depot mothers," who earn money from giving ORT treatment, were trained and supplied. The project logo has become the most commonly recognized graphic advertisement in Egypt. One investigator reports, "Everywhere I went, I found evidence that ORT people had been there. Posters were up. Salts were available. The system was working." AID's contribution to this massive effort is $26 million, including

NATIONAL CONTROL OF DIARRHEAL DISEASES PROJECT, EGYPT

9:00 AM

9:15 AM

10:00 AM

1:15 PM

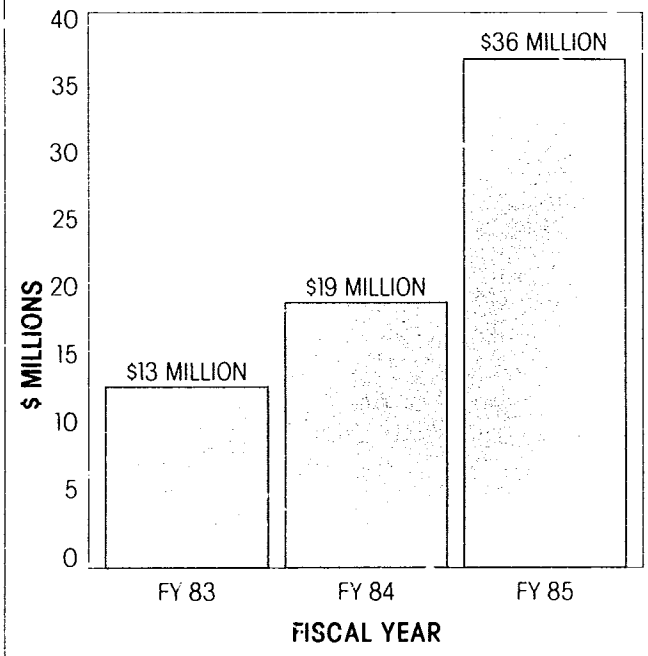
A dehydrated Egyptian infant is seen sunken fontanel at 9:00 a.m. is rehydrated with ORT

financing for the services of advisers from John Snow, Inc., a Boston-based health consulting firm; contributions by the Government of Egypt and private Egyptian expenditures for rehydration salts and services are comparably large.

Results are beginning to show. The number of mothers who knew about ORT rose from 1.5 percent in early 1983 to 94 percent in 1984, and over half of them had used it. A high proportion said they had learned about ORT through television, which reaches nine out of ten Egyptians. Ninety-eight percent of pharmacies had rehydration salts available, and private-sector sales had tripled. The government-owned pharmaceutical company that makes the salts was running at a profit. Seventy-five percent of doctors reported that they were using ORT to some extent, and some decrease in the use of antidiarrheal drugs was registered. Best of all, approximations based on sample surveys showed that diarrhea-caused deaths in under-two-year-olds had been cut by two-thirds since 1980, and infant deaths (0-1 year) by nearly half from about 130,000 deaths annually nationwide to 40,000. Although there is still a ways to go to institutionalize and sustain the national coverage that is the goal of this project, these results are an indication of what can be achieved.

Figure II-2

ESTIMATED AID EXPENDITURES FOR ORT ACTIVITIES WORLDWIDE



SOURCE Agency for International Development, Health Projects Data Base, 1985

COUNTRIES WITH AID-SUPPORTED ORT ACTIVITIES

AFRICA

Botswana
* Burundi
* Central African Republic
Chad
* Congo
Djibouti
* Guinea
* Ivory Coast
Kenya
* Lesotho
* Liberia
Malawi
Mali
Mauritania
Niger
Nigeria
Rwanda
* Senegal
Sierra Leone
* Somalia
Sudan
Swaziland
Togo
* Uganda
* Zaire
Zambia
Zimbabwe

ASIA/NEAR EAST

* Bangladesh
Burma
* Egypt
India
* Indonesia
Jordan
Morocco
* Nepal
Oman
* Pakistan
* Philippines
* Thailand
Tunisia
Yemen

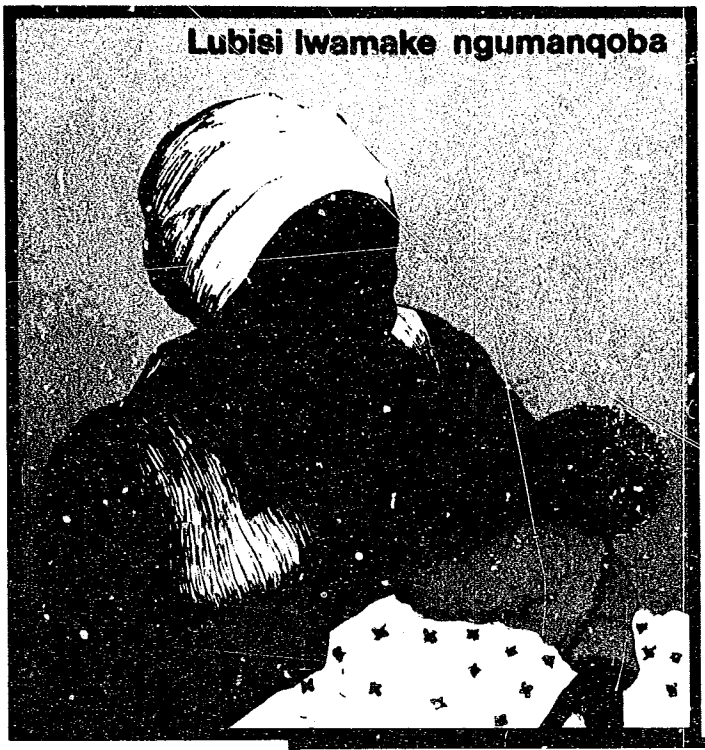
LATIN AMERICA and THE CARIBBEAN

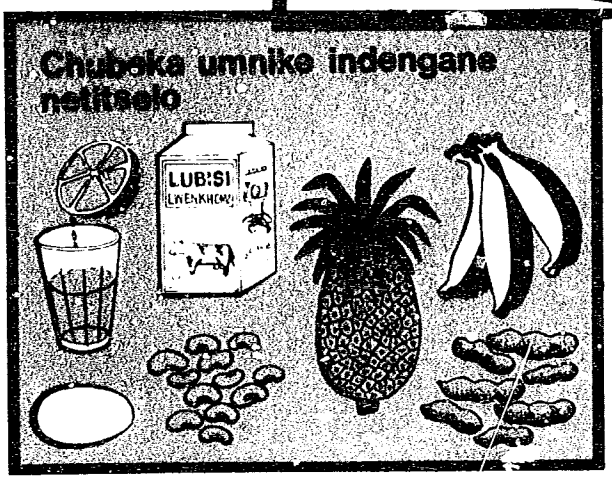
Belize
* Bolivia
Brazil
Costa Rica
Dominican Republic
* Ecuador
* El Salvador
Grenada
Guatemala
* Haiti
* Honduras
Panama
* Peru

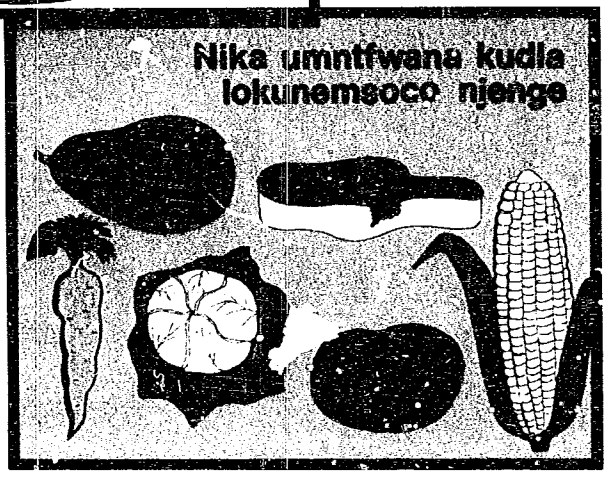
* Major programs

A poster from Swaziland (opposite page) shows mothers how to mix salt, sugar and water to protect their children from dehydration and—just as important—to continue feeding

kudla lokunikwa lophetfwe ngumsheko







AYIHLOME MASWATI

MINISTRY OF HEALTH, SWAZILAND

AGENCY FOR INTERNATIONAL DEVELOPMENT PHOTO ROBERT CLAY

ORT Around the World

Other AID-supported projects include some or all of the elements found in Egypt, although not all developing countries have so extensive an infrastructure of roads, communications, public facilities, and trained personnel to build on.

- The program in **Honduras** has made especially good use of social marketing to get the message of ORT out across the country. After 16 months of radio spots promoting Litrosol (the local brand of ORS packets), the campaign was approaching its target of 30-50 percent acceptance (which is believed to be the percentage of diffusion required for eventual acceptance by an entire population). Almost half the mothers surveyed had used Litrosol at least once and diarrhea-related mortality in children under two had dropped by 40 percent in the survey area.

- A social marketing program in **The Gambia**, where a "happy baby lottery" promoted over Radio Gambia drew some 11,000 women to village ORS-

making contests, proved that even illiterate and semiliterate women could learn to mix and use rehydration salts; feeding practices also showed measurable improvement. The Gambian Government is hoping to maintain these gains even though AID's part of the project has been completed.

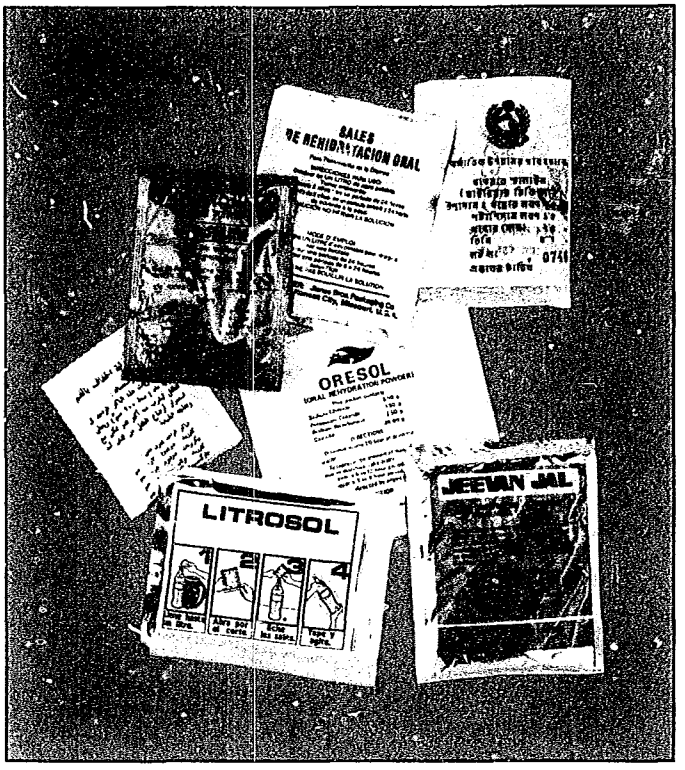
- After a seven-month campaign in **Swaziland**, survey data showed an increase from 17 percent to 43 percent of mothers who said they used ORT; 61 percent (up from 35 percent) understood that their traditional purges were not appropriate treatment for diarrhea.

- At the University Hospital in **Haiti**, a program for management of infant diarrhea using ORT reduced infant mortality to 14 percent the first year, 1.9 percent the second, and less than 1 percent thereafter.

- Admissions to the pediatric ward of San Lazaro Hospital in the **Philippines** fell by almost half the first year an ORT unit was introduced, and costs per patient fell from $1.90 to $1.48.

The Child Survival Action Program has enabled AID to greatly speed up programming in this area. From a base of $12.7 million for ORT programs in FY 1983, Agency expenditures for new and ongoing projects rose to an estimated $36 million in FY 1985. A Child Survival grant of $4 million will enable the Philippines to strengthen its national program. **Nepal**, **Ecuador** and **Haiti** will also expand their programs with grants of $1 million or more. UNICEF will use its Child Survival grant in part to support ORT promotion through the Pediatrics Association of **Nigeria** and the National Association of Nigerian Nurses and Midwives, both of which are well positioned to influence their colleagues and to help mobilize community support within its Child Survival grant. UNDP will help **Sierra Leone** to set up its first in-service training clinics for ORT and **Somalia** to establish an ORS production facility. In **Bangladesh**, existing government and private voluntary efforts will be augmented by a $5 million national social marketing project to support private-sector production and distribution of rehydration salts, along with heavy advertising and promotion of ORT in general.

There is no question that ORT is effective and could save many lives. But programmers have learned that getting large numbers of people to understand and use ORT is no simple task. It cannot be done using conventional public health systems alone. Demand must be created. Services and supplies must be available to meet demand. And the different program elements must work to reinforce one another.



More than 40 developing countries now produce oral rehydration salts. Product name, logo and size are decided locally.

Except in some areas, the supply problem is not acute at the moment, but this is because ORT is used in much less than 10 percent of diarrheal attacks. If each child under five was provided with six packets a year—enough to cover about three episodes of diarrhea—2.4 billion would be needed. UNICEF, the major international supplier, is currently producing 75 million packets a year, at a cost of about four cents apiece. At last count, some 40 developing countries were manufacturing more than 100 million packets. Under the Child Survival initiative, nearly $2 million has been used to launch Project Support through the Seattle-based Program for Appropriate Technology in Health. The project will provide technical assistance and low-interest loans to private Third World pharmaceutical companies in order to increase local manufacture of the salts. In addition, AID responded to requests for over seven million U.S.-made ORS packets in FY 1985 alone.

Nonetheless, prepackaged rehydration salts are unlikely to fill all ORT needs in the near future. A major part of the need worldwide will have to be filled by mixtures made at home and tailored to fit the pocketbooks of the rural poor. Fortunately, the ORS formula can tolerate variations of up to 25 percent without loss of effectiveness. Many AID-supported programs, therefore, include intensive instruction for mothers in how to mix a "pinch" of salt and a "handful" of sugar with water in an appropriate-sized container, often a popular soft-drink bottle.

Stimulating Demand

Families, especially mothers, must be the center of any effective ORT program. It is they who need to treat diarrhea when it first appears and know what feeding is appropriate during the attack. It is they who must recognize when diarrhea is becoming watery and be ready to administer rehydration salts—no easy task, since the solution must be mixed daily in specific proportions and up to a liter a day must be given, teaspoonful by teaspoonful, to an initially listless child. And it is they who must take their child to a health center if the illness gets worse. Any strategy for reaching these women must respond to their existing knowledge, beliefs, and practices, which can only be discovered through careful field research involving the skills of social scientists and communications specialists as well as health professionals.

AID has taken the lead in exploring innovative approaches to mothers. Through its Communication for Child Survival project[3], the Agency has pioneered in promoting the use of radio and TV as well as print, posters, handbills, even T-shirts to get the ORT message across. The project is already active in seven countries and expects to expand to ten more in the near future. While the final message—essentially, "use fluids for diarrhea and continue feeding"—may seem simple, its development is not. In **Honduras**, for example, specialists from the U.S.-based Academy for Educational Development took seven months to survey and analyze how rural women viewed diarrhea and what they wanted a remedy to do. Since oral rehydration will not do what women want—i.e., stop the diarrhea or firm up watery stools—radio and other messages had to present Litrosol as something else; a special remedy for dehydration, whose signs the women were taught to recognize. "In essence, we had to create a new disease," says one of the program designers. Equally detailed attention was paid to the rest of the message, the packaging, the labeling, and other supporting material. Social marketing methodology is now being adapted to health-education campaigns for immunization and nutrition by the Division of Education in the Honduran Ministry of Health, which has greatly improved its capabilities as a result of long-term technical assistance provided by AID.

[3] Formerly called the Mass Media and Health Practices project.

In a technique borrowed from marketing, focus groups of mothers selected the logo for the Egyptian (above) and Gambian (top right) programs.

Many AID-supported programs also make use of the informal channels most families use for getting health care and advice. Several, for example, have "flag (or depot) mothers" — local women who have been trained and supplied with rehydration salts and whose homes are marked with brightly colored flags signifying ability to provide neighborly advice and service; in places like **Haiti**, **Bolivia**, and **Swaziland**, as well as Egypt, such service is a welcome source of independent income for the depot women as well as a channel of health education for local mothers. Under a PRICOR project, investigators from Cuttington College in **Liberia** and Tuskegee University in the United States are testing the use of teenagers as health promoters in their homes and communities. An anthropologist from the University of Virginia is training traditional healers in northeast **Brazil** to deliver oral rehydration along with their usual treatment in special "curing rooms"; the healers have proved meticulous and dedicated promoters of the new technology. In a rare example of cross-sector cooperation, **Ecuador's** Ministry of Health staff have trained Quechua-speaking literacy educators from the Ministry of Education to promote basic rehydration therapy. Programs in

ACADEMY FOR EDUCATIONAL DEVELOPMENT

Mothers in the Gambia learned about ORT at health centers, reinforced by brochures and radio broadcasts.

Egypt, Bangladesh, and elsewhere use pharmacists and other private-sector outlets for promotion as well as sales. Traditional midwives, when given oral rehydration training, are also proving useful. And all programs depend heavily on a growing number of village-level health workers and other paraprofessionals.

Although their projects tend to reach a relatively small proportion of any country's population, local or foreign private voluntary organizations are sometimes the only providers of health services in rural areas. AID is thus intensifying its longstanding support to such groups. In all, more than $30 million of Child Survival money is going to support their programs, most of which feature ORT training and education. Seventeen organizations have been awarded grants, including:

- Save the Children Federation, which already has an extensive program in the Third World, is being helped to expand projects promoting ORT and other "child protective" behaviors in **Bolivia**, **Bangladesh** and elsewhere; the project in **Ecuador** is one of the few to be located in an urban slum, in this case in Quito.

- Salvation Army clinics in **Pakistan** and World Vision projects in **Zimbabwe** will add ORT to their services.

- In **Bolivia**, 1,800 community-based mothers' clubs organized by Caritas Bolivia and assisted by Catholic Relief Services and PRITECH are adding ORT training and packet distribution to their existing PL 480 food-distribution programs (see Chapter IV, Food Supplementation). Caritas sees this as an important step in transforming the local mothers' clubs, which serve at least 240,000 children, from passive food recipients to authentic community develop-

forced by broadcasts in Aymara and Quechua, the languages of Bolivian Indians, among the poorest of the country's citizens.

The Role of Government and the Community

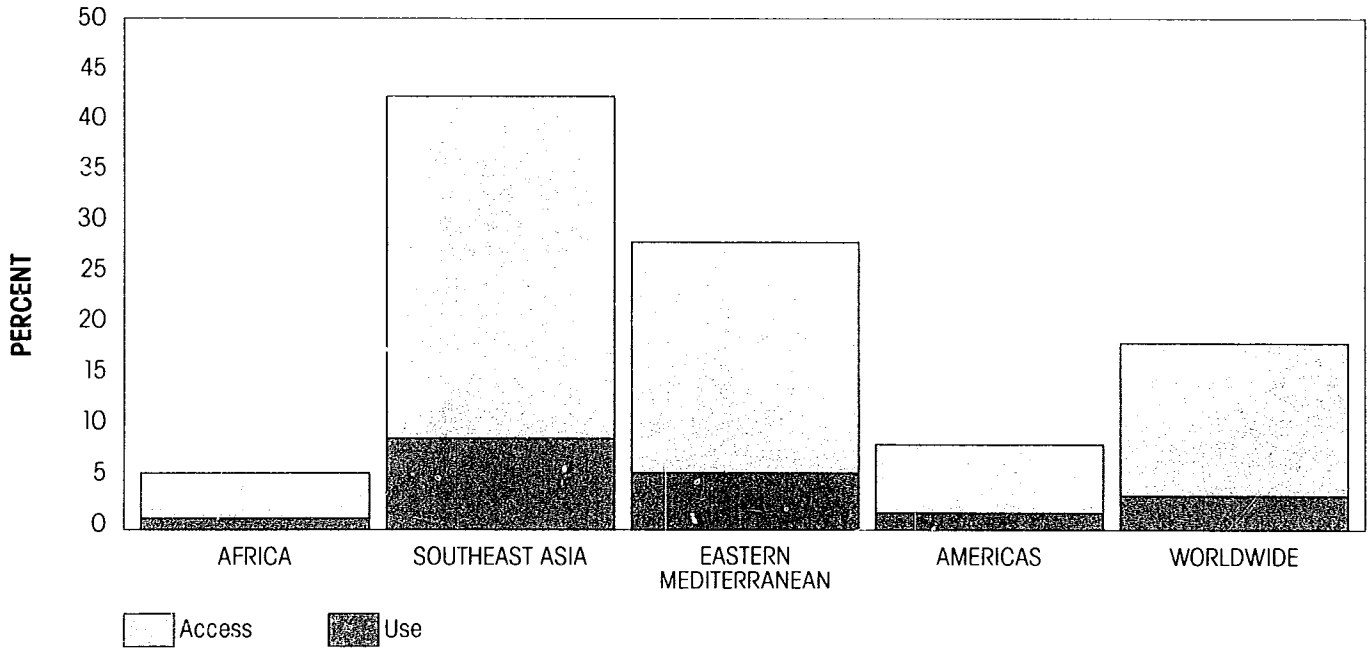
In the end, however, there is no substitute for sustained support and direction from the health establishment. Without doctors' support, ORT is simply not credible to health workers or to mothers. Without overall direction and coordination, a national program cannot live up to its promise. And without complementary health programs, even a successful ORT program can merely postpone the day that children succumb to other illnesses.

Many doctors who received their medical education in the days of antidiarrheal drugs and IV therapy still need to be persuaded that ORT is effective. Attitudes are beginning to change in Egypt, thanks both to training and to the demonstration effect of existing programs. But in the Philippines, among other places, surveys have shown that many doctors are still not convinced. The new ORT component of the Primary Health Care Financing Project in the **Philippines** thus provides for establishing a national rehydration training center at San Lazaro Hospital, where ORT is already being used successfully. This center will train at least 75 provincial pediatricians and ward nurses, who will in turn help train their counterparts in the provinces. The center will sponsor demonstrations in district and private hospitals and publish a physician's manual. An ORT newsletter, a national diarrhea library, scientific conferences, and inclusion of ORT modules in pediatric curricula are other ways by which Filipino doctors will be brought the most up-to-date information on treatment.

Much ORT-related AID support goes into strengthening the management capabilities of ministries of health, promoting multi-faceted health planning, and training health manpower. Even if it is not labeled specifically for ORT, such aid is critical to the success of ORT programs. Significantly, the much-praised Communication for Child Survival project in **Honduras** is but one part of a comprehensive, 20-component Health Sector Project covering everything from continuing education for Ministry of Health personnel to supervision of village health workers to logistic support. **Egypt** is planning a major Child Survival Project to complement its ORT program. This project will focus on expanding and improving the underutilized national immunization system; expanding the child nutrition program, with special emphasis on private-sector production of weaning foods and iron fortification of wheat flour; and improving early diagnosis and treatment of acute respiratory infections, after diarrhea, the second highest cause of death among children in Egypt. These and other interventions, in Egypt and elsewhere, are the subjects of subsequent sections of this report, but they are mentioned here because an effective program will include many of them, depending on the health situation in any given country.

Figure II-3

ORAL REHYDRATION SALTS: ACCESS AND USE, 1983



SOURCE: World Health Organization estimates of minimum rates of access and use (based on country reports), 1985

Chapter III – Immunization

"Immunization is not an end but a beginning—the beginning of sustainable health care systems available to even the poor and the isolated rural families of developing countries."

M. Peter McPherson, 1985

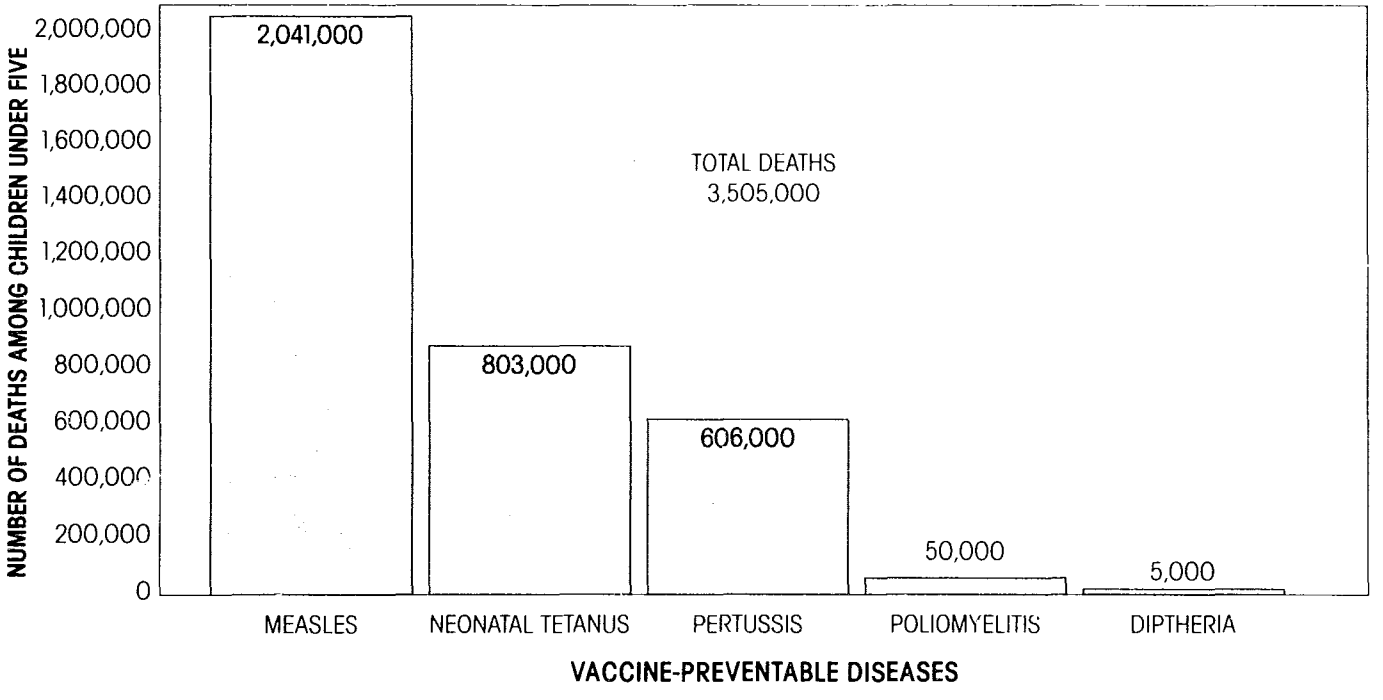
Given the number of diseases peculiar to Third World climates and environments, it hardly seems fair that children in developing countries should also be subject to a full array of illnesses once common in industrialized countries but now largely controlled. In fact, however, measles is a far greater killer in developing countries than trypanosomiasis (sleeping sickness). Whooping cough poses a greater health hazard worldwide than onchocerciasis (river blindness).

During the first days of life, tetanus is a threat, especially if the newborn was delivered at home by untrained attendants, who often cut the umbilical cord with unsterilized instruments and sometimes compound the error by putting contaminated dirt, dung, or herbal preparations on the stump. Pertussis (whooping cough) and diphtheria start to attack children at months one through five, especially if they were premature and underweight to begin with. Measles is a major problem beginning at about six months and contributes significantly to deaths by the end of the child's first year. Polio generally strikes in the first three years, though older children can succumb during epidemics if they are unprotected. Tuberculosis can be contracted at any time, although it may not appear until later in life. In all, some 3.5 million infants and children die each year of these diseases. Two million die of measles alone.

Furthermore, survivors often suffer debilitating aftereffects. Measles, for example, seriously complicates diarrheal disease; it can precipitate nutritional blindness and other illnesses. Pertussis, with its prolonged cough, loss of appetite, and vomiting, is a major cause of serious undernutrition. Polio paralyzes as many as one in every 100 who catch it.

Figure III-1

CHILD DEATHS DUE TO VACCINE-PREVENTABLE DISEASES



SOURCE: World Health Organization estimates, 1985

Vaccines to prevent these scourges have been available for at least 20 years. With the possible exception of BCG (for tuberculosis), their effectiveness ranges from 80 percent for pertussis to 95 percent for measles and tetanus. Eighty percent coverage of children is generally considered sufficient to protect the population from epidemic outbreaks. Furthermore, the vaccines are inexpensive—about 50 cents for enough to fully immunize a child, with perhaps another $5 to $15 for delivery costs, though the latter vary considerably among countries. (In rural areas without roads and other infrastructure or the means to keep vaccines cold enough to retain their potency, delivery costs have been estimated as high as $45 per child.) Public health systems might save many times the cost of vaccinating all children by avoiding the cost of treating children when they fall ill. Before this can happen, however, vaccines must be delivered into millions of small mouths, arms, and thighs. At present, fewer than one Third World child in five is fully protected.

Expanded Immunization Activities in Africa

Because immunization is so important and cost-effective an intervention, AID is lending major support to WHO's Expanded Programme of Immunization (EPI) through its bilateral programs as well as through direct support of WHO and other international agencies. AID gives some support to immunization programs in more than 50 countries.

The $45 million Combatting Childhood Communicable Diseases (CCCD) Project, for example, is working along with PRITECH in 12 African countries to support national EPI programs. The CCCD Project operates on the premise that much better use can be made of existing facilities. Hard-pressed African governments can ill afford to hire many new people and make new capital investments that will saddle them with large recurring costs after AID dollars stop. Thus, CCCD is concentrating on retraining existing health workers and epidemiologists, on improving the supply chain to existing health facilities, on promoting health education, and on strengthening the management capabilities of national ministries of health. Technical backstopping for the project is the responsibility of the Centers for Disease Control, in Atlanta, which also spearheaded AID's earlier contribution to WHO's successful drive to eradicate smallpox.

The CCCD project is scheduled to run through 1989, with activity in any one country limited to four or five years. Although the country programs are new and it is difficult to separate the impact of CCCD from all the other immunization activity going on at the same time, it is clear that much is being accomplished. So far, 8.3 million children have been protected. Two million pregnant women have been immunized against tetanus. In **Zaire**, the number of immunizations has been growing at an average annual rate of about 30 percent. **Lesotho** and **Swaziland** are closing in on the 80 percent coverage of children under two that is the goal of the project; so far, more than 60 percent of their children have been immunized.

It is clear, however, that immunization projects need to pay much more attention to the demand side of the equation. Existing services are underutilized and could probably handle double or triple the vaccinations they are now giving if they were upgraded (for example, with more reliable means of keeping vaccines cold) and became more aggressive about recruiting clients.

Aggressive Outreach

Families fail to use immunization services for a variety of reasons. Clinics are often far away and open fitfully or at inconvenient times; clinic workers rarely go out to the surrounding communities, often for lack of transport or per diem costs. Some programs depend on limited numbers of specialized immunization workers rather than on the nurses or nurses' aides who see families regularly. Some are short of supplies. If the refrigerator has broken down or the power supply has been irregular, vaccines may have

COUNTRIES WITH AID-SUPPORTED IMMUNIZATION ACTIVITIES

AFRICA
- Botswana
- * Burundi
- * Central African Republic
- Cameroon
- * Chad
- * Congo
- Djibouti
- Gambia
- * Guinea
- * Ivory Coast
- Kenya
- * Lesotho
- * Liberia
- * Malawi
- Mali
- * Mauritania
- Niger
- Nigeria
- * Rwanda
- * Senegal
- Somalia
- Sudan
- * Swaziland
- * Togo
- Uganda
- * Zaire
- Zimbabwe

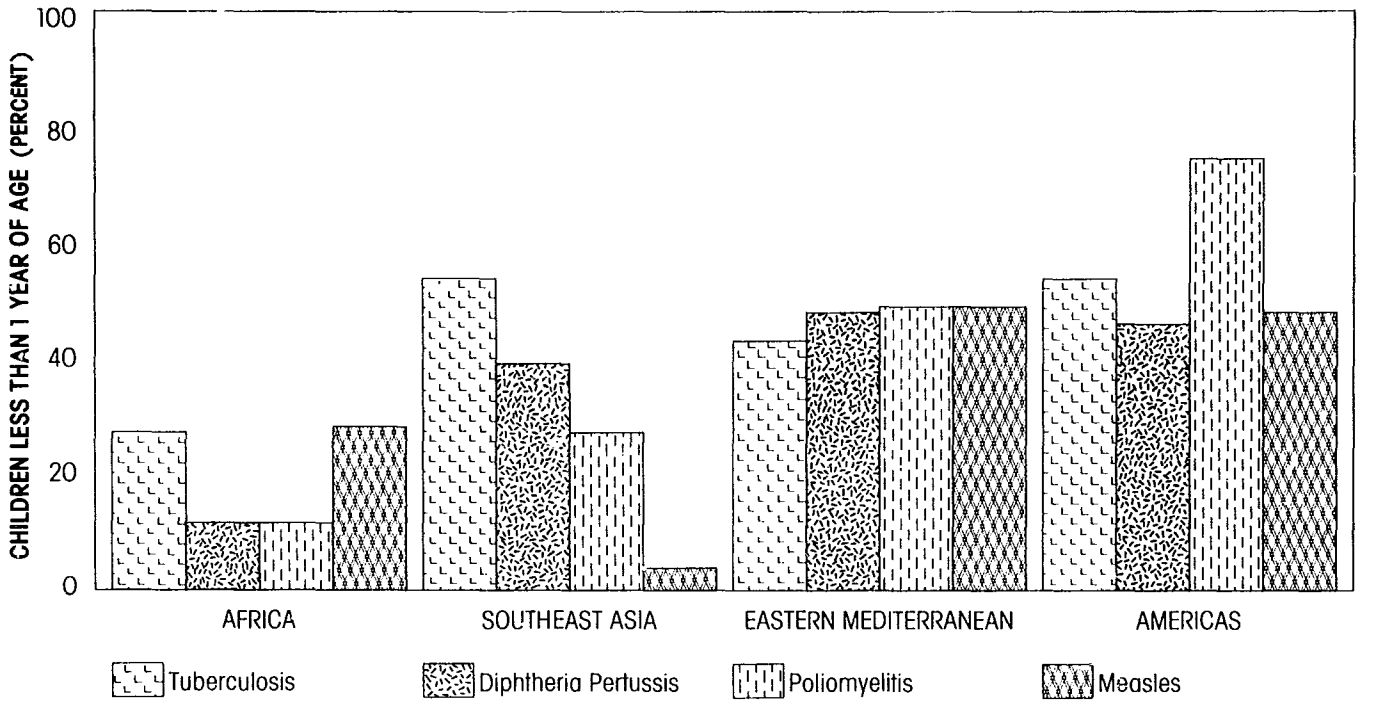
ASIA/ NEAR EAST
- Bangladesh
- Burma
- * Egypt
- * India
- * Indonesia
- Jordan
- Morocco
- * Nepal
- Oman
- * Pakistan
- Philippines
- South Pacific Region
- Sri Lanka
- Thailand
- * Turkey
- Yemen

LATIN AMERICA and THE CARIBBEAN
- Bolivia
- Brazil
- Costa Rica
- Dominican Republic
- * Ecuador
- * El Salvador
- * Guatemala
- * Haiti
- * Honduras
- * Peru

* Major programs

Figure III-2

ESTIMATED IMMUNIZATION COVERAGE AGAINST VACCINE-PREVENTABLE DISEASES IN CHILDREN UNDER 1



SOURCE: World Health Organization Estimates, 1985

lost their potency. Some health workers, mistakenly, do not vaccinate children who are at the clinic with minor illnesses. Furthermore, a full series of vaccinations requires at least six contacts with the health system—two for the mother for tetanus vaccine; three for the baby, at 6, 10, and 14 weeks for DPT (diphtheria, pertussis, tetanus), polio and BCG; and still another at nine months for measles. A new baby may be brought in for the first dose, but if the baby runs a fever and becomes generally irritable—and many do—the mother may not come back for the rest of the series, particularly if she was not told what to expect or if she has to come a long way, take care of other children at home, or attend to other work.

As a result, completion rates are low. Measles, the last of the series, is the major cause of death preventable by immunization, but has the lowest current coverage. Low completion rates in Indonesia's ambitious EPI program, which has been supported by AID since 1979, are typical of those that face many programs. The Ministry of Health expected to immunize 3.6 million children with DPT during 1982-83. In fact, careful recordkeeping revealed that a little more than two million children got the first shot. But only 1.3 million got the second, and 121,264 the third. Only 78,552 children were vaccinated against measles out of a target of 324,000.

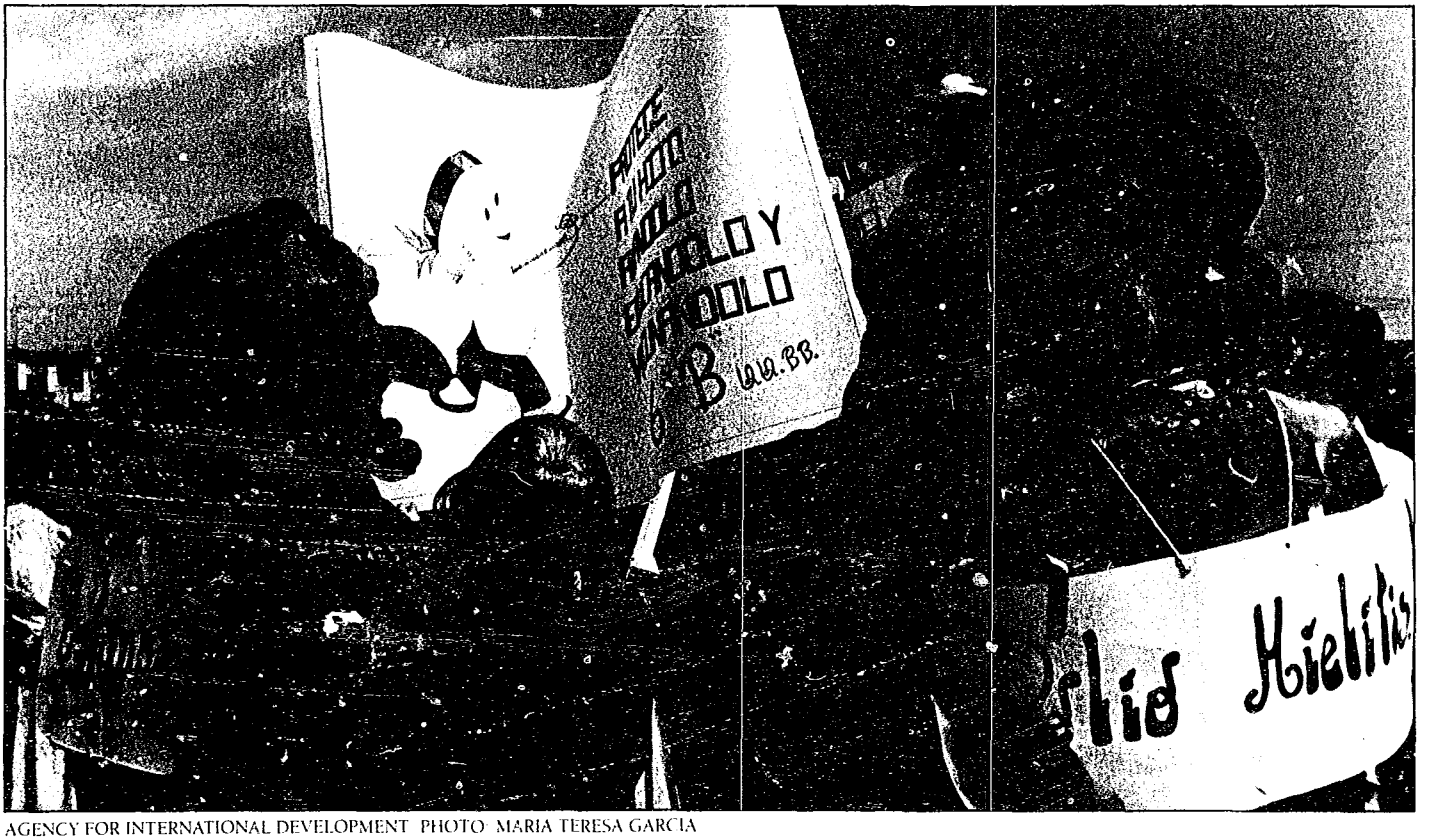
Considerations like these have led AID to put greater emphasis on community-level promotion. In **Indonesia**, for example, the immunization program will become better integrated with other health and family planning services, with the highly successful family-planning network assuming an active role in promoting immunization. Nurses and midwives will give vaccinations along with other services, and health-center doctors will take over responsibility for immunization in their service areas.

Nearly a quarter of Child Survival Action Program moneys are going toward expanded immunization.The Child Survival program has provided new resources for **Nepal**, **Guatemala**, **Ecuador**, and elsewhere. UNDP will use part of its Child Survival grant for strengthening the all-important "cold chain" in **Chad** through supply of emergency generators, refrigerators, insulated cold chests, and the like. A number of private voluntary organizations will also use Child Survival grants to expand immunization coverage. International Child Care, for example, is a U.S. voluntary organization which promoted a successful anti-tuberculosis campaign in **Haiti** in the 1970s. ICC/Haiti will now expand its network of community-based TB education and treatment centers to include DPT, measles, and polio vaccines along with other health education. ICC hopes to duplicate its earlier feat of making vaccination available within one hour's walk of every mother.

The National Mobilization Campaign in **Ecuador** is

AGENCY FOR INTERNATIONAL DEVELOPMENT. PHOTO: MARIA TERESA GARCIA

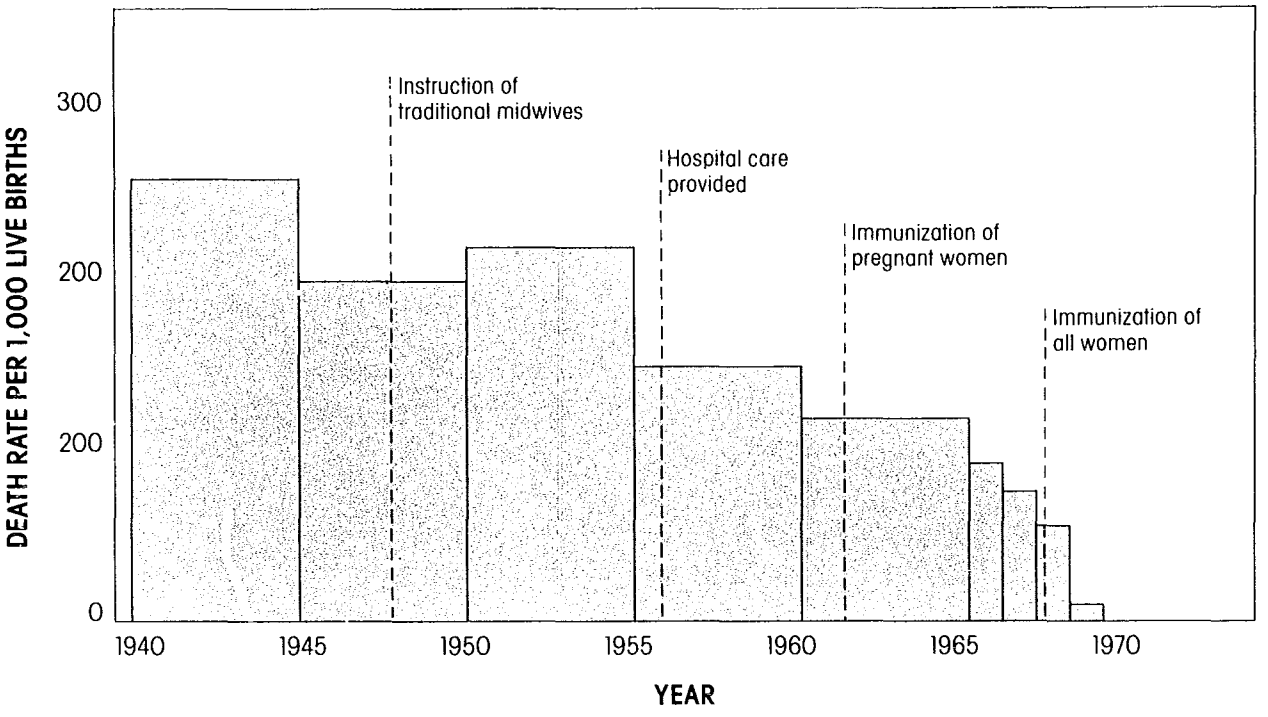
The First Lady of Ecuador kicks off a nationwide immunization campaign on October 26 (top), supported by school children (below) parading masked as tetanus and polio.



AGENCY FOR INTERNATIONAL DEVELOPMENT. PHOTO: MARIA TERESA GARCIA

Figure III-3

TETANUS CONTROL IN HAITI



SOURCE: From Berggren W., A Tetanus Control Program in Haiti. American Journal of Tropical Medicine, 1974

particularly promising because it has high-level political support. The campaign, which aims for a dramatic increase in immunization (and ORT) coverage throughout the country, was kicked off with the first "National Day of Child Health" on October 26, 1985. The program is being led by a national committee of dignitaries headed by Sra. Eugenia Cordovez Ponton de Febres-Cordero, Ecuador's First Lady, who has personally coordinated the design of the component parts. The committee has mobilized the support of a wide variety of institutions and volunteers—the Catholic Church, the armed forces, the Red Cross, the Ministries of Health, Education, and Social Welfare, the Institute for Protection of the Child and Family, international agencies, dozens of private voluntary and commercial organizations, and thousands of fifth and sixth graders who distributed printed invitations to mothers from the First Lady to bring their children in for immunization.

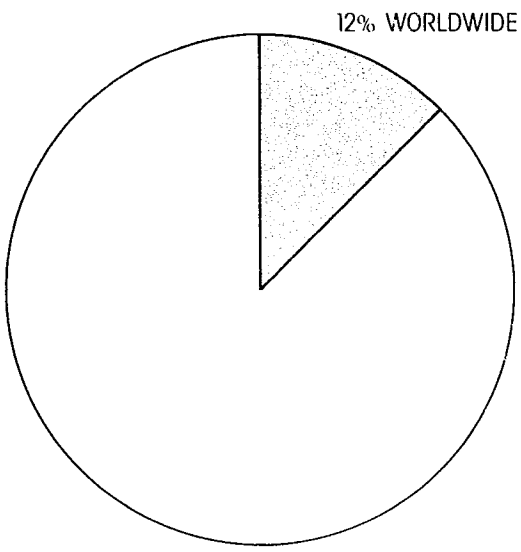
There will be three immunization campaigns this year, during which all available health personnel will man temporary vaccination posts and mobile brigades. The U.S. advisers who were so successful in promoting ORT in Honduras are helping to develop a multi-faceted mass media campaign as part of a larger Child Survival project which will work to institutionalize the gains made in these campaigns. In addition, health workers are being retrained and motivated, innovative approaches to field mobilization are being explored, and a "Health Bag" for mothers is being developed containing a packet of rehydration salts, a bag to mix them in, and educational material. The display of enthusiasm and determination at all levels is remarkable. Initial results suggest that some 400,000 children were vaccinated, at least six times the number in previous campaigns.

The difference that planning, organization, and enthusiasm can make is dramatically illustrated by the experience of two AID-funded pilot measles-vaccination projects in **India.**[1] In the first demonstration, in Maharashtra, newly trained workers fanned out ahead of time to the five target villages to talk to community leaders, distribute handbills, and register all children under the age of three, even if that required repeated home visits. The night before the campaign was to begin, the workers prepared enough syringes and needles for each child, while others marched through the villages beating drums and reminding mothers to come to the clinics the next day. Most important, the clinics opened by 7 or 7:30 in the morning, the best time to reach village families, and

[1] Previous government programs offered only DPT, BCG, and polio vaccines for children, in part because public health authorities underestimated the impact of measles on child mortality.

Figure III-4

PERCENT PREGNANT WOMEN IMMUNIZED AGAINST TETANUS



SOURCE: World Health Organization, 1985

all during the day workers kept going back to the houses of children who had not yet come in. Result: 95 percent of the children were inoculated over a five-day period.

In the two demonstration villages in Gujarat, by contrast, inexperienced staff, already shorthanded because of a strike, made only one attempt to contact target families. They waited until morning to prepare syringes, etc., and did not open for business until 11 o'clock. Despite a puppet show and other advance publicity, only 30 percent of the children were inoculated. These lessons will be put to use in the projected extension of the measles vaccine program, which is being assisted by technical experts funded under the Child Survival initiative. The experience points up the importance of careful pilot projects to test every step of new programs and explains in part why some programs seem to be slow in getting off the ground.

Each country must choose for itself the best way to reach its people. **Guatemala**, for example, has tried immunization campaigns, but they became more and more routine, with less mobilization and assistance from other institutions. They produced relatively low coverage, especially among impoverished Indian children. Now the government is trying a system it calls "channeling," to promote immunization in communities as a basic component of preventive health care. Vaccinations will be given at every opportunity at all health facilities. In addition, auxiliary nurses and/or rural health technicians will go from house to house three times a year registering children and vaccinating them at temporary posts nearby; this has the added advantage of getting health personnel out into the villages to see directly the other health needs of their client population. In epidemic-ridden Esquintla, where a pilot project was sponsored by the Pan American Health Organization, immunization coverage shot up from 10 percent to 73 percent, demonstrating that channeling can be a promising intervention in the Guatemalan context if adequate support for training, supervision, cold chain and promotion is available. As part of the Child Survival initiative, AID is helping to underwrite a major expansion of this system, with the aim of covering the entire country within three years.

At the other extreme is **Turkey**, which has opted for an all-out campaign to immunize at least 80 percent (from a base of 22 percent) of its children. UNICEF has contributed about $1 million of its Child Survival grant from AID and $3 million of other funds to the campaign. During the first round, which took place in September 1985, the combined efforts of government and private institutions more than achieved their target reaching over 85 percent of Turkish children under five. What is most impressive, however, is that the momentum did not slacken during the second round in October. The Prime Minister in his monthly TV broadcast, provincial government officials, imams in the country's 54,000 mosques, radio, TV, and newspapers all joined in promoting the effort. The Chamber of Commerce donated prizes for a lottery open only to mothers who completed the vaccination series. The government's Meat and Fish Establishment donated its cold storage rooms and refrigerated trucks for vaccines. And provincial doctors and nurses manned 45,000 vaccination stations, often in areas thought to be beyond the reach of any health intervention. If the program is sustained after this "catch up" phase, Turkey will be among the first large developing countries to achieve broad success in mass immunization.

Immunization programs generally emphasize vaccinations for children. But one of the most effective ways to bring down infant mortality rates—and protect mothers, too—is to see that women receive two doses of tetanus toxoid at least a month before giving birth. (Women who were given a full series of DPT in childhood need only a single booster, which is good for ten years.) Neonatal tetanus, which accounts for half of all newborn deaths in many poor countries, has been called a "silent killer" because it is consistently under-reported. Doctors tend to be skeptical of data showing high rates of neonatal tetanus because they see so few cases in hospitals, but this is because most deaths occur at home, away from the formal health system. They

may not even be reported. But when mothers are interviewed, they often describe the symptoms of neonatal tetanus—loss of sucking, spasms, early death—as present in their children when they died. An AID-financed survey in one area of Indonesia turned up mortality rates as high as 35.8 per thousand live births, much higher than local health officials had expected. In some parts of Pakistan and India, rates exceed 60 per thousand.

Most tetanus vaccine programs have focused on women who are already pregnant, but they rarely reach their targets. In **Indonesia**, for example, only 800,000 women out of a target population of more than 4 million were vaccinated in 1982-83. Clinics often fail to vaccinate even the women who come to them for prenatal care, and women in many cultures resist injections during pregnancy in any event.

As a result, and following a recent recommendation from WHO, AID-supported programs like that in **Indonesia** are now beginning to emphasize immunization for all women of reproductive age, not just pregnant ones, with priority given to areas of highest neonatal tetanus incidence. With Child Survival Program funds, for example, **Nepal** will hire and train temporary vaccinators to provide two cycles of tetanus toxoid to all women of childbearing age (15-44) in three districts comprising over 800,000 people. The hope is to clear up the substantial backlog of unimmunized mothers which makes any systematic approach to full coverage a daunting task. Thereafter, the regular health staff could concentrate only on the much more manageable task of providing boosters and reaching the 1 percent or less of all women who enter childbearing age each year. Figure III-3, based on an early pilot project which was later replicated by the Division of Family Hygiene, **Haiti**, with help from AID, graphically illustrates the dramatic reductions in mortality that can be achieved through such a strategy.

Much of the discussion so far has concerned increasing demand for immunization. This is not to say that there are not major problems from the supply side. Much AID financing under both ongoing programs and the Child Survival initiative has gone to improve the cold chain of refrigeration needed to retain the potency of vaccines. AID is supporting the building of central cold storage facilities, and the procurement of refrigerators, ice chests, and cold packs, along with fuel to transport vaccines to outlying service centers in many countries. UNICEF and UNDP projects being undertaken with Child Survival money include funds for these purposes as well. AID also finances procurement of vaccines where necessary, especially those for measles and polio, which must usually be imported. In **India** and **Burma**, the possibility of AID support for local manufacture of these vaccines is being investigated.

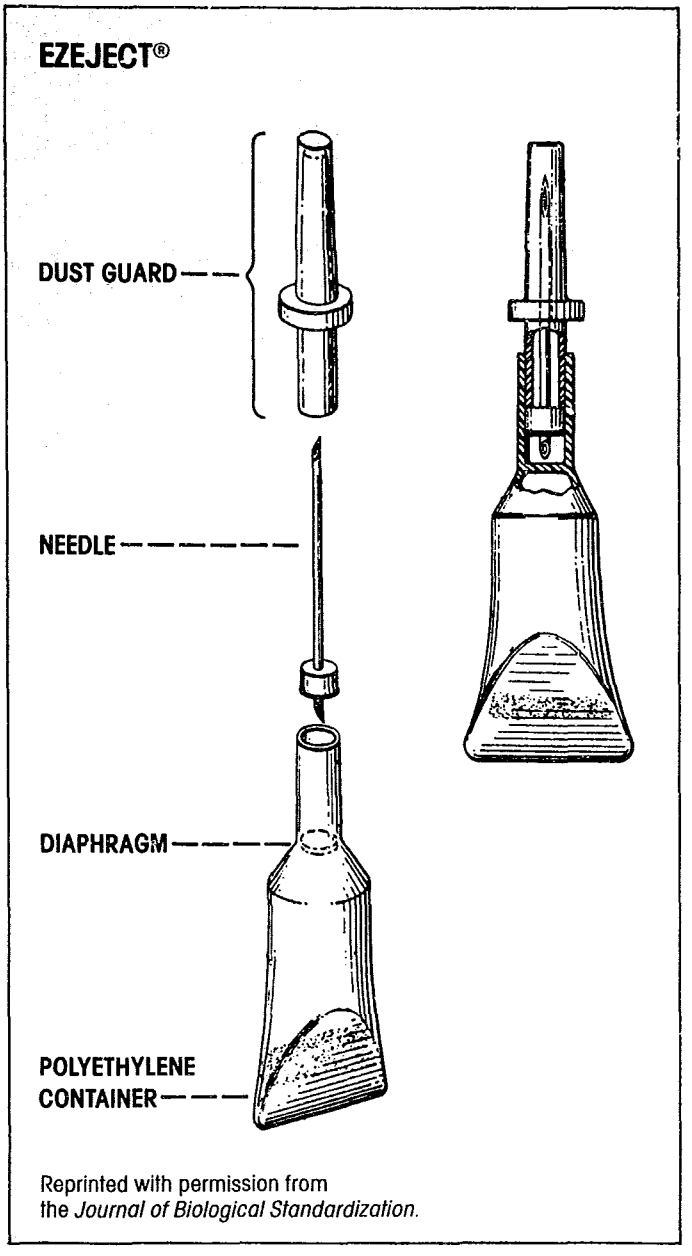
In addition, the new $19 million Resources for Child Health (REACH) project, which includes $2 million of Child Survival funds, will attempt to do for immunization what PRITECH is doing for ORT. Another component of the project is to develop new and more effective ways to finance basic health programs and otherwise improve the management of health services.

Progress in Research

Over and above the Child Survival Action Program, AID has made a major commitment to biomedical research related to child survival. Improving the heat stability of vaccines, demonstrating the feasibility of combining two or more into one administration, developing new vaccines for diseases not yet covered by EPI programs, and developing vaccines that overcome existing biological limitations are important elements in improving the effectiveness of immunization programs. Other research is under way to improve the technology for vaccine delivery.

AID is justifiably proud of its role in research on malaria vaccine. Nearly 20 years ago, when few scientists were interested in parasitology and many thought a malaria vaccine unattainable, AID began a research program, first to confirm the feasibility of a human vaccine and then to go about developing one (or more). Even though the first part of the effort, demonstrating feasibility, took nearly 10 years, AID persisted. Following the procedures that a commercial drug company would use, the Agency set up a network of university and other research institutions, put out contracts for specific research objectives, and coordinated the entire complicated effort.

Chances of failure were high. Developing a vaccine against malaria is far more complex than making one against smallpox and other viruses or bacteria because the malaria parasite is much larger and has a particularly complex life cycle. But the stakes also were high, since the standard means of combating malaria — through spraying the habitats of disease-carrying mosquitos with insecticides and treating malaria victims with chloroquine — are less and less effective (see Chapter V, vector-borne diseases). Today, after an investment of $45 million, and thanks to the new methods of molecular biology, AID's commitment to the possibility of a malaria vaccine is paying off. "Every day something new is happening," says AID's coordinator. Researchers at New York University have isolated a protective antigen that stimulates the body's immune defenses against one stage of the life cycle of one malaria parasite, *P. falciparum* (the deadliest form in human beings). Techniques of genetic engineering are now being used for synthesizing a vaccine. Other researchers are working on a vaccine that would attack the parasite in the more susceptible, red-blood-cell stage. Still others are doing similar research on *P. vivax*, another species of malaria. Two prototype vaccines for *P. falciparum* and, most recently, one



Reprinted with permission from the *Journal of Biological Standardization.*

for *P. vivax* are now awaiting Food and Drug Administration approval, after which safety trials (using human volunteers in the U.S.) will be started. In the future lie field trials supervised by collaborating scientists in the Third World. There is genuine optimism that one or more malaria vaccines may be available within five to ten years.

In addition AID is supporting research and development of:

- a *measles* vaccine that can be given to infants as young as six months, when it could be administered simultaneously with the third DPT shot; the present vaccine will not "take" until nine months, by which time the child may already be infected;
- heat-stable vaccines, e.g. for *polio*, to reduce dependence on the cold chain;
- a single-dose vaccine for *whooping cough* that does not have the negative side effects that often discourage mothers from completing the DPT series;
- a genetically engineered oral vaccine, as well as a new injectable, for *typhoid*, a disease which has become resistant to antibiotics in several parts of the Third World; typhoid is responsible for a considerable number of deaths worldwide, with its greatest severity in adolescents;
- an oral vaccine for *cholera*, the most severe of the diarrheal diseases; it affects an estimated 20-24 million adults and children worldwide every year;
- a vaccine for *rotavirus*, the most common cause of diarrhea in the U.S. as well as the Third World;
- a *leprosy* vaccine that can be used not only as a preventive but also to reduce the severity of the disease in those who are already infected.

Many of these have progressed to the point of field trials. Thus, AID is collaborating with ICDDR,B to test the cholera vaccine in **Bangladesh**; with the Centers for Disease Control for measles and pertussis vaccines; with the National Institutes of Health for tests of pertussis vaccine in Sweden and rotavirus vaccine in the United States, **Sweden** and **Venezuela**; and with WHO for trials of a second rotavirus vaccine.

Finally, AID-supported research is also under way on technological improvements that could make vaccines easier to deliver in Third World settings. Perhaps the most exciting of these is Ezeject, a single-dose, non-refillable injection developed (and donated) by Merck, Sharp, and Dohme to replace the traditional needle and syringe. Vaccine prepared in the Ezeject has the great advantage of remaining potent for three weeks without refrigeration, thus eliminating the last and most expensive step in the cold chain. Furthermore, when mass-produced the Ezeject should cost only 3-4 cents, one third the price of a disposable syringe, and be usable by all levels of health personnel. About 3,000 of these devices are presently being tested by nurses and community health workers in **Guatemala**'s measles vaccination program, but the technology is adaptable for other vaccines as well. Indeed, because it could be used by midwives and community workers, an Ezeject filled with tetanus toxoid could be useful for protecting large numbers of women who are not reached by current immunization campaigns.

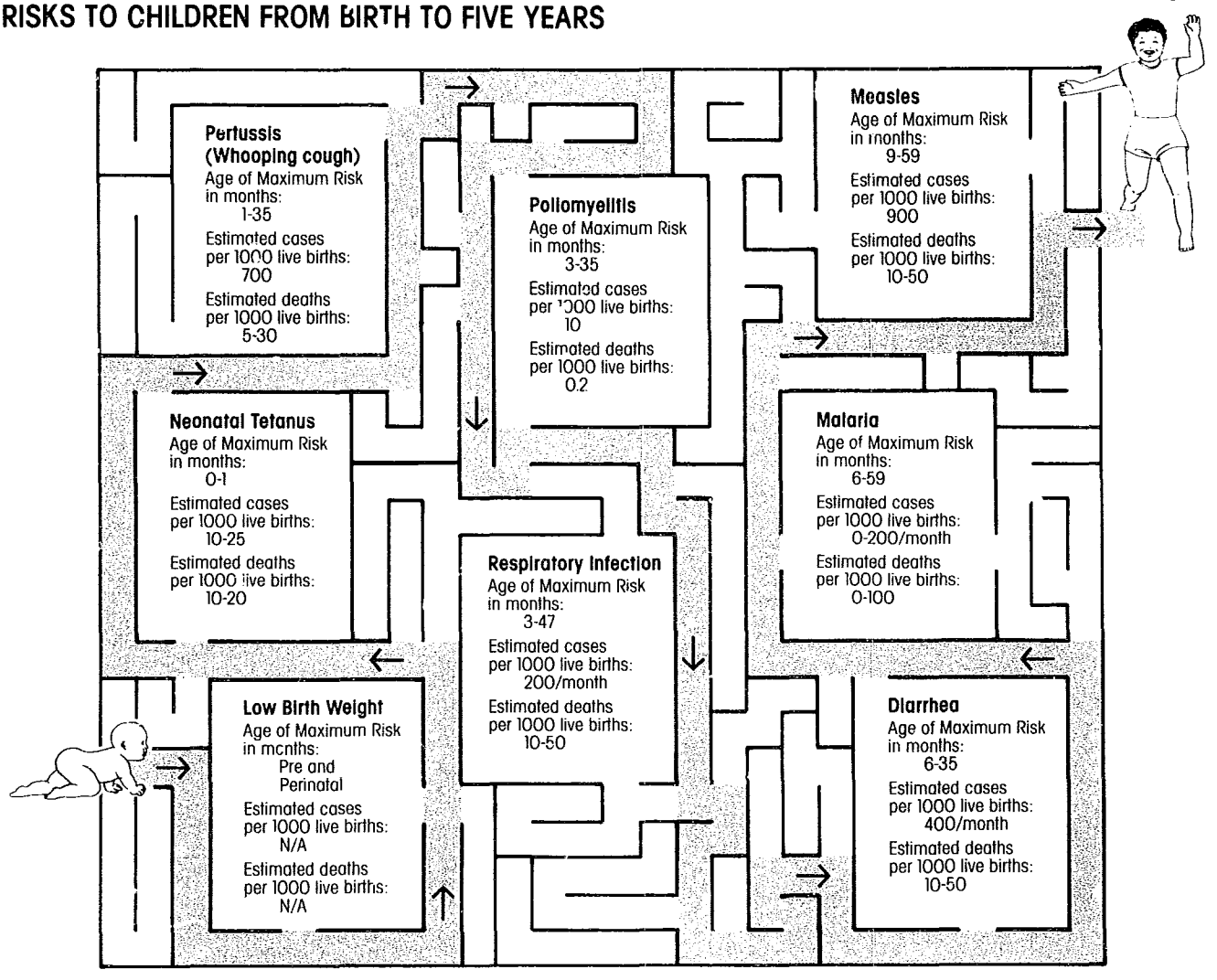
Chapter IV — Nutrition

". . . malnutrition touches the lives of approximately one quarter of the developing world's young children. . . steals away their energy; it gently restrains their growth; it gradually lowers their resistance. . . it is inextricably interlocked with the illnesses and infections which both sharpen, and are sharpened by malnutrition itself." UNICEF 1983

At any given time, up to seven out of a hundred small children in the poorest developing countries weigh little more than half of what they should. Significant, if less dramatic, undernutrition affects as many as 50 percent. These shocking rates of malnourishment take a terrible toll—in potentially fatal nutritional diseases like marasmus (which comes from lack of protein and carbohydrates), kwashiorkor (from lack of protein), nutritional blindness (lack of Vitamin A), and anemia (lack of iron); and even more in the general debility that makes children vulnerable to infections and diarrhea. Pregnant and nursing women form another nutritionally vulnerable group. Without the right kinds of foods or enough of them, they are likely to respond poorly to the stresses of pregnancy and childbirth;

Figure IV.1

RISKS TO CHILDREN FROM BIRTH TO FIVE YEARS



SOURCE:
Agency for International Development (Based on estimates of incidence of major infectious diseases in Africa, CCCD, Annual Report, 1984)

their children are likely to be of lower birthweight and at greater risk of complications after birth. Although malnutrition is rarely listed as the official cause of death, many studies have shown that it probably contributes to more than half of all child deaths in developing countries. Data from Cité Simone, in **Haiti**, for example, suggest that up to 60 percent of infant deaths from diarrhea are accounted for by the 3 percent of children suffering from severe malnutrition. In Narangwal, **India**, the equivalent figures were 43 and 4 percent.

Even when malnourished children survive the rigors of infancy, their physical and intellectual development can be stunted. This is because the brain grows fastest in the first two years of life. If it is deprived of the food it needs at this time, the result can be impaired reasoning powers, language, and motor skills, thereby denying the child's right to realize its full potential as an adult. Breaking the circle of malnutrition-disease-malnutrition thus has enormous implications for the general welfare of mankind.

AID supports many approaches to improved nutrition, usually in combination and usually in connection with other child-survival interventions. The newest and possibly most exciting of AID's efforts have to do with the role of Vitamin A in preserving children's health.

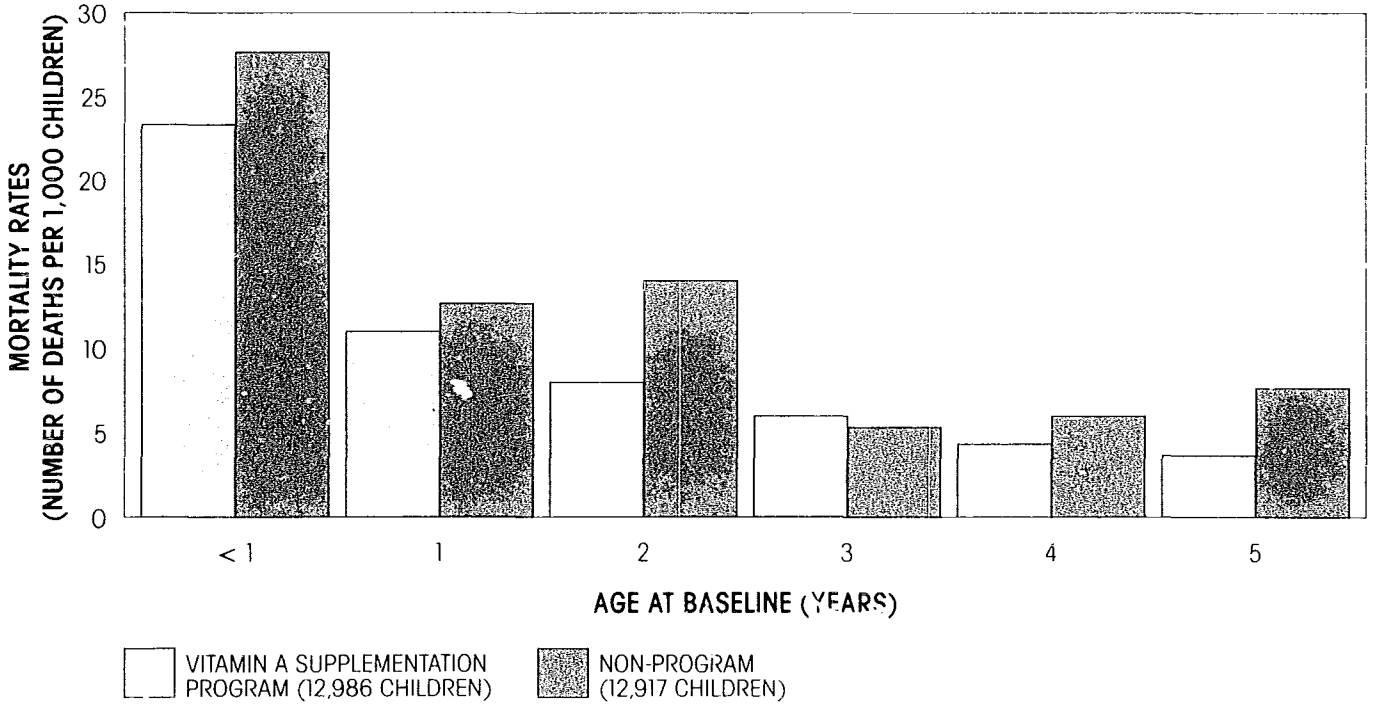
New Vitamin A Findings

It has long been known that lack of Vitamin A causes loss of vision in small children. Xerophthalmia, the formal name for this condition, begins with an inability to see in low light (in parts of Asia, the common name for xerophthalmia is "chicken eye," because its victims, like chickens, tend to walk erratically when evening falls), progresses through corneal scarring, and culminates, if not corrected, in irreversible blindness. Children who get enough breastmilk, green leafy vegetables, and dark yellow fruits, along with dietary fat to help metabolism, normally do not have vision problems. But many children do not get enough of these foods. Even when available, custom often suggests that they are unsuitable for children. As a result, Vitamin A deficiency is a public health problem in an estimated 73 countries and territories around the world; it affects some 5 million children under the age of five in Asia alone, and blinds about 250,000 of them each year. Now it appears that Vitamin A may also have a key role in preventing deaths from diarrhea and acute respiratory infection. Indeed, the eyes may be the last organ affected, not the first.

Since 1974, AID has spent $4.5 million to help developing countries to recognize, treat, and prevent

Figure IV-2

VITAMIN A AND MORTALITY—ACEH PROVINCE, INDONESIA

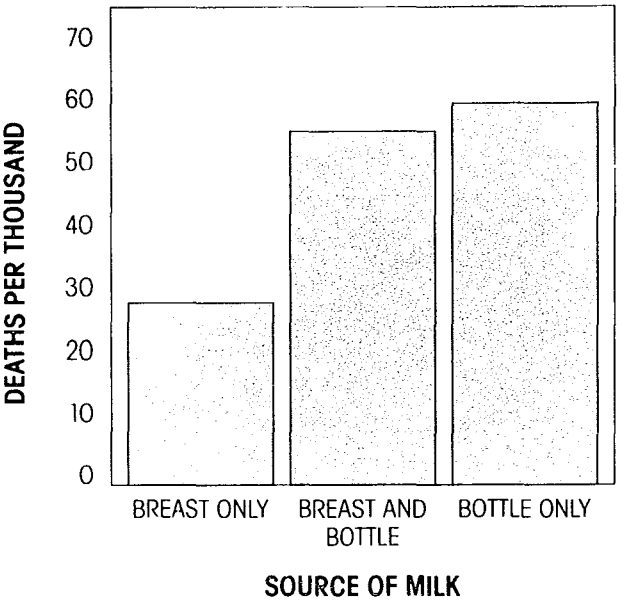


SOURCE: International Center for Epidemiologic and Preventive Ophthalmology, 1985

Researcher examines eyes of Indonesian child in study of Vitamin A deficiency.

Figure IV.3

BREASTFEEDING AND CHILD SURVIVAL
MORTALITY BETWEEN 1 MONTH AND 1 YEAR



SOURCE: World Health Organization
(based on data from rural Chile, 1973)

Starting at birth—with supportive health professionals—is the key to successful breastfeeding and healthier infants.

UNITED NATIONS INTERNATIONAL CHILDREN'S FUND

Vitamin A deficiency. It has also funded an International Consultative Group to coordinate efforts of the affected countries, donor agencies, and private organizations. In addition, the Agency helped create and fund the International Center for Epidemiologic and Preventive Ophthalmology (ICEPO) at Johns Hopkins University, which assists collaborating countries in planning and managing their Vitamin A programs and carries out related research.

It was ICEPO that first noticed the connection between Vitamin A programs and disease prevention, which was the. demonstrated in a major trial involving 25,000 Indonesian children, half of whom were given capsules containing large doses of Vitamin A and half not. The study was undertaken with the Government of **Indonesia** and Helen Keller International (HKI), a U.S. voluntary organization, as part of HKI's ongoing AID-supported Vitamin A distribution program. The Indonesia study—"quite unexpectedly," according to its director—found that otherwise well-nourished children with mild Vitamin A deficiency appear to be more prone to illness and death than even poorly nourished children who have adequate levels of Vitamin A.[1] Mortality rates were 4 to 12 times those of similar children with normal eyes. If these findings are confirmed in other countries, they could move Vitamin A activities into the mainstream of public health action. High-dose Vitamin A capsules cost only 2-4 cents, are easy to distribute, and two a year are enough to prevent deficiency. Fortified sugar has proved an effective preventive in several Latin American countries. AID's Administrator McPherson has suggested that Vitamin A programs have "the potential of another ORT success."

The Child Survival Action Program is making it possible for AID to expand its Vitamin A activity by more than $6 million. Multi-million-dollar agreements have been signed with Helen Keller International and Johns Hopkins to mount programs in **Bangladesh**, **Philippines**, and **Zambia** that will replicate the Indonesia study and test the links between Vitamin A and mortality. The Indonesia program itself is undergoing major expansion. The International Eye Foundation will distribute capsules in **Malawi** and will also test the fortification of salt with Vitamin A. (Monosodium glutamate, used as a seasoning in much of Asia, is another candidate for fortification currently being tested in Indonesia and the Philippines.)

The Peace Corps is tackling the problem from a different angle: Under an agreement with AID, it is holding a series of workshops in Africa and elsewhere to train Peace Corps Volunteers, voluntary organization staff, and local counterparts to teach villagers how to plant home and school vegetable gardens and to preserve the food they grow. Many AID-supported private voluntary organizations have similar programs. Such gardens minimize the need for more heroic measures against Vitamin A deficiency and represent a permanent contribution to community self-reliance. Both the capsule-distribution programs and the garden programs include large doses of nutrition education, often incorporating the social marketing techniques that have been so successful in promoting oral rehydration and family planning.

[1] One theory is that Vitamin A is necessary to maintain the body's mucous membranes—the surfaces of the respiratory, urinary and intestinal tracts which protect against entry of bacteria and viruses.

Breastfeeding

The importance of breastmilk as a source of Vitamin A has already been mentioned. But breastfeeding is far more basic to a child's health and well-being than that. Breastmilk not only provides the child with nutritious, uncontaminated, and easily digested food, it also immunizes the child with the mother's antibodies, thereby helping to fight off infection. Indeed, infants should be breastfed exclusively—that is, without other food supplements—for four to six months. Breastfeeding, complemented with semi-solid and solid foods, should continue for at least one and preferably two or more years.

In many countries, bottle-fed children are five to ten times more likely than breastfed ones to die before they reach their first birthday. Furthermore, breastfeeding is a natural contraceptive, permitting the mother's body to recover from the demands of pregnancy and childbirth before she conceives again. Thus, breastfeeding is one of the most important messages that community health workers and public health nurses carry to mothers in primary health care projects around the globe.

Despite the growing awareness of the importance of breastfeeding, however, there has been a gradual decline in both its incidence and duration, particularly in the cities and towns of the developing world, as women take jobs outside the home and infant formulas become attractive. One reason for this trend is that bottlefeeding is considered "modern" not only by many Third World women but also by many doctors and nurses. Even today, many "modern" hospitals in developing countries separate mothers and infants and start newborns off on infant formula or glucose solution. Few health professionals preach the virtues of breastfeeding, and fewer still study lactation management in medical or nursing school or have experience with it afterward. Unfortunately, most are well versed in management of the formula-fed infant.

AID is helping to reverse this situation through its support of the San Diego Lactation Program. Over the past two years, this California-based program has trained 15 teams of doctors and nurses from Third World teaching hospitals as lactation specialists. These teams, in turn, have trained nearly 2,500 other health professionals in their home coun-

WORLD BANK PHOTO: HADAR

tries and persuaded their hospitals to include lactation management in the training of new obstetricians and pediatricians. The four members of the team from **Thailand**, for example, became the principal trainers at several workshops for staff members of nine hospitals in Bangkok, where 78 percent of the city's births take place.

Infant feeding practices are already changing in the participating Thai hospitals. Some have instituted rooming-in facilities. Most have abolished routine use of formula or other pre-lacteal feeds in maternity wards. All are trying to shorten the time between birth and initial mother-infant contact, which in many hospitals used to be as long as 24 to 48 hours. Furthermore, the Ministry of Public Health has adopted an Infant Feeding Code designed to discourage routine or unnecessary use of formulas and ensure that mothers are able to breastfeed continuously on demand; although the Code does not have the force of law, it serves to galvanize public hospitals into action. Finally, the project appears to be having a snowball effect among non-participating hospitals in Bangkok and elsewhere, several of which have sent observer/participants to the lactation management workshops. In short, says one delighted observer, "hospital-based breastfeeding is becoming 'au courant' in Thailand. . . Those of us who have been involved in nutrition education agree that this is the base from which we must start."

Weaning Foods/Growth Monitoring

As long as they are normal birthweight, infants who are breastfed have an excellent start in life. Danger arises, however, when weaning begins. Most weaning diets in developing countries are based on starchy staples which are too bulky for infants and not nutritious enough in themselves. Contamination of food, bottles, or utensils can bring on diarrhea and infections which further inhibit the child's ability to get the nutrients it needs. If food is withheld during and after a child's illness, the problem is compounded. Between six and twenty-four months, then, is when malnutrition begins in the average Third World child. Weaning practices must be improved—and diarrheal children fed—if malnutrition is to be avoided at this time.

At one end of the spectrum, growth monitoring—regular weighing of babies to check their progress according to country or regional norms—helps to flag cases of incipient malnutrition before they become visible to the naked eye. Sometimes, mothers need only this information, kept at home on a simple chart, to make sure their children get the extra food that will bring them up to standard. Usually, however, growth monitoring is used as an entry point for nutrition education and other elements of basic health care.

Village weighing is the core device, for example, of the AID-supported nutrition education programs getting under way in **Indonesia**, **Cameroon**, and **Ghana**. The advisers for these programs are Manoff International, a New York-based firm which pioneered the use of social marketing techniques to promote better health and family planning practices all over the world. Manoff's earlier work in five Indonesian subdistricts showed that carefully designed nutritional messages, combined with monthly weighing and household visits by specially recruited village volunteers, enabled mothers to make culturally acceptable changes in their traditional weaning foods. Adding drops of coconut oil to the cooked rice in the standard weaning porridge, for example, added fat, thus increasing caloric density; mashing home-grown greens into the porridge added important vitamins. An evaluation showed, among other impressive results, that children in the nutrition education villages weighed almost two pounds more than a comparison group at the age of 22 months. And this was accomplished without any additional food from outside the villages, at a cost of only $2.00 per beneficiary. The original work in Indonesia was financed by the World Bank. Now funds totaling almost $1.4 million, including $500,000 under the Child Survival initiative, are being used to expand it to more subdistricts and to reach people in the two African countries.

In Petit Goave, **Haiti**, the Integrated Project on Health and Population, which is indirectly supported by AID through the Division of Family Hygiene, has made particularly good use of "Nutrition Demonstration Foyers" in communities identified as having many at-risk children. At these Foyers, groups of mothers gather with their children for an intensive course given at a locally volunteered home by a government-trained nutrition worker. Along with general health and hygiene instruction, the three-week course features practice in preparing inexpensive cereal-bean mixtures from locally available foods, using utensils brought by the women themselves. Each day the mothers prepare two substantial snacks and a balanced midday meal for their children, who usually start gaining weight before the course ends. One of the system's planners notes, "A Foyer's most powerful educational tool lies in seeing irritable, lethargic, malnourished children begin to smile, run, play, and interact again." Significantly, it has been found that younger brothers and sisters of children whose mothers attended a Foyer course have substantially lower mortality rates than those whose mothers did not. Haitian villagers call the Foyers "a little school for mothers," evidently with good reason.

Programs like those in Haiti and Indonesia depend on weaning foods made from local ingredients. Often these are relatively hard to make, requiring much pounding and grinding as well as precooking. As a result, groups of mothers in some countries are coming together to prepare these foods for sale, thus providing their children with bet-

FOOD AND AGRICULTURE ORGANIZATION

ter food and themselves with extra income. Mothers in **Sri Lanka**, for example, are successfully producing and selling a nutritious gruel called Kola Kandy which is based on that country's traditional weaning food; the project is sponsored by Save the Children Federation and supported in part with AID funds.

Food Supplementation

Growth monitoring and promotion of breastfeeding are relatively low-cost interventions, although even they entail costs for training, educational materials and, most of all, organization to deliver the messages on a truly broad scale. But malnutrition is, above all, a function of poverty. When families cannot grow or buy enough food, their children are more than likely to suffer. Until and unless general development can remedy this situation, food supplementation of one sort or another will continue to be important for children in their most vulnerable years.

Title II of PL 480, now 30 years old, has enabled the United States to make a major contribution in this regard. United States-financed emergency food aid for refugees, displaced persons, and disaster victims is well known. In FY 1985, in the drought-ravaged countries of Africa alone, such aid amounted to more than two million metric tons valued at around $1 billion. A large share of this aid is distributed by U.S. private voluntary organizations such as Catholic Relief Services, the Adventist Development Relief Agency, CARE and others, usually under the most trying conditions.

But programs supported under PL 480 go well beyond emergency relief. In particular, U.S. foods now form the basis for a number of special foods designed to supplement the diets of young children and pregnant and nursing mothers. These carefully balanced, enriched blends of corn- or wheatmeal, defatted soy flour, soy oil, non-fat dry milk, and premixed vitamins and minerals were developed and tested under the general review of the Department of Agriculture and are currently manufactured by some 50 U.S. firms. They are used to make beverages and quick-cooking porridges specially suited to the needs of weanlings and pregnant and nursing women.

Building on and learning from a long history of CARE and other food distribution programs, AID is now using Title II foods to support the Government of **India's** massive Integrated Child Development Services project, which is slowly making a mark on the health status of children in more than 400 rural districts, each of them with a population of around 100,000.

AID's support, which is reaching some 4,000 village child-care centers in 19 districts, is designed to identify and test various ways to improve services. The project will search for malnourished children under three and women at risk of bearing low-birthweight babies, give them higher daily rations for them over a longer period of time, upgrade nutrition and health education, and improve monitoring and evaluation—all to achieve quicker and greater reductions in malnutrition and of identifying interventions that can be incorporated into the overall Government of India program. With the aim of creating self-sufficient programs, AID is also providing technical assistance for the local manufacture of weaning mixtures in India and other countries.

U.S. PVOs PARTICIPATING IN CHILD SURVIVAL ACTION PROGRAM

Adventist Development Relief Agency
African Medical Research Foundation
Cooperative for American Relief Everywhere
Catholic Relief Services
Foster Parents Plan
Helen Keller International
Project Hope
International Child Care
International Eye Foundation
Meals for Millions
Minnesota International Health Volunteers
Program for Appropriate Technology in Health
Project Concern International
Salvation Army World Service Office
Save the Children Foundation
SETON Institute for International Development of California
World Vision Relief Organization

Village-Level Development

Ultimately, of course, the longest-lasting and most satisfying way to reduce malnutrition is to bring general development to the poorest villages and urban slums. In this sense, all of AID's programs are related to child survival one way or another. Community development programs, in particular, are targeted to this end. But such projects are notoriously difficult to bring off because, in most countries, no single government agency has the focus or capacity to plan and execute multisectoral programs at the community level. Indigenous and foreign voluntary organizations, which can operate around and among the many actors at the local level, may thus hold the best key to successful nutrition-oriented activity at the grass roots.

In **Zaire**, for example, the Area Nutrition Improvement Project is an ambitious effort to improve nutrition at the

SAVE THE CHILDREN®. PHOTO: KEN PHILLIPS

Save the Children promotes 10 "child protective" behaviors in Indonesia.

community level by financing activities by local private voluntary organizations in health, agriculture, and rural development. This project has also developed an innovative curriculum for teaching primary-school children how to provide nutritional care for their younger siblings.

The California-based Meals for Millions/Freedom from Hunger Foundation (MFM) is one of a number of U.S. private voluntary organizations receiving AID support. Having experienced the frustrations of organizing relief programs that failed to make permanent changes in people's lives, MFM now feels strongly that the problems of hunger and malnutrition cannot be separated from the problems of poverty—lack of knowledge, overpopulation, unemployment, poor sanitation, lack of potable water, lack of health services, and low agricultural production. MFM's Applied Nutrition Program therefore promotes a variety of nutrition-oriented development activities in subsistence farming communities, with heavy emphasis on community planning and community self-help. In each project, Meals for Millions' most important function is that of catalyst—a facilitator who, with minimum financial and material resources of its own, is able to identify itself with community concerns and mobilize existing community, government, and private resources.

Specific activities vary from country to country, responding to the needs and capabilities of local governments and communities in a given area. Thus, village health-worker training gets greater attention in **Sierra Leone**, family planning in **Kenya**, and livestock production in **Ecuador**. Revolving loan funds for small income-generating projects are a feature of programs in **Honduras**, **Ecuador**, **Antigua**, and **Thailand**. In general, however, the projects promote production of nutritious foods at the family level, both to improve the diet and, with sales of surpluses, to increase the family's income. Nutrition education and growth monitoring link these activities to the primary health system.

There are already Applied Nutrition Programs in nine countries. Where Meals for Millions has been active for as long as five years, results tend to be impressive in terms of improved nutritional status, community participation, and potential for improving the local economy. Indeed, the program in Kenya was judged one of the top three examples of successful development projects in that country. MFM has now received a $2.9 million AID matching grant, $2 million of which came from Child Survival funds, to enable it to extend the applied nutrition model to an additional six countries which have asked for its help.

Chapter V - Rounding Out the Package

"AID will promote the use of technologies which have demonstrated capability and high potential to reduce mortality of infants and children. . . .The objective is a mix of host country public and private resources which, as part of an integrated system, delivers services most cost effectively."

AID Health Sector Strategy

In order to have greater impact with its limited funds, the Child Survival Action Program deliberately focuses on a relatively few techniques for protecting children's health. However, other interventions also have important impacts on child survival, and comprehensive programs will include some or all of them, depending on the circumstances. Birth spacing is at or near the top of this list by almost any measure. Finding better means to combat acute respiratory infections is also a priority; these infections are the first or second cause of infant and child death in many countries, but their exact dimensions are not yet well understood. Control programs against the vectors that carry disease-causing organisms are relevant in countries where malaria, schistosomiasis, onchocerciasis, and other such diseases are common; of these, malaria is by far the most widespread and carries the greatest cost for children. Clean water and improved sanitation can help prevent the spread of many of the diarrheas and infections that are the focus of the Child Survival package.

The handful of projects described in this chapter does not purport to represent the full range of those supported by AID under these rubrics. Rather, they illustrate the way certain types of projects intersect with and complement other child survival activities.

Birth Spacing and Child Survival

A mountain of research points to several factors which heighten the risk of death in infants. Infant mortality rates for babies born within a year of a previous birth are twice as high as for those born after an interval of two years or more. A child born to a woman under 20 or older than 35 is also much more likely to die in infancy than one born to a woman in her mid-twenties. And the chances of survival for a first or second child, even a third, are significantly better than for a fourth or fifth. When two or more of these factors (short birth interval, mother's age of under 20 or over 35, and high number of offspring) are present, the risk to newborns is even greater. Furthermore, the mother's chances of surviving childbirth are reduced by the same factors. Thus, there is a compelling need for family planning as a public health measure, to save lives of women and children.

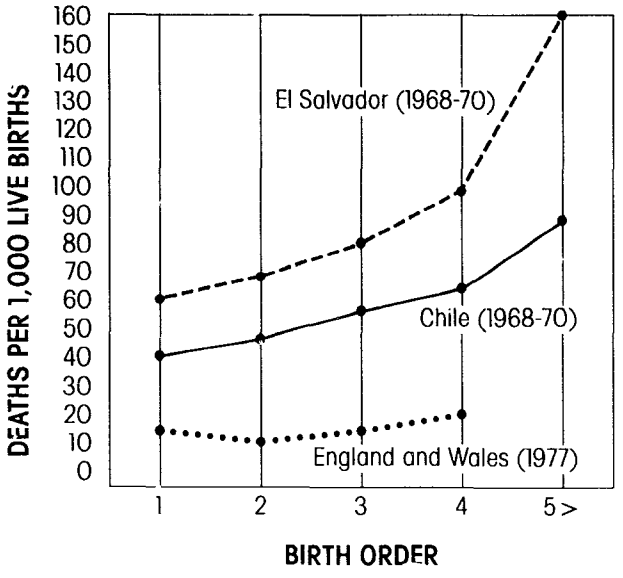
AID encourages primary health programs in developing countries to integrate birth-spacing information and services with other elements of a balanced program and makes resources available to organizations that include birth spacing as part of their child survival program. Many of the maternal and child health-care programs the Agency supports include family planning among their basic services.

The program of the Association of Private Health Institutions (AOPS) in **Haiti** offers a good example of those that AID supports. This program is run by a federation of 37 Haitian and U.S. private voluntary organizations, which work through a network of village "rally posts" to bring health services to otherwise unreached rural people. Mothers bring their children to the rally posts for growth monitoring, oral rehydration, nutrition education, immunization, and other basic services offered by visiting teams of doctors, nurses, and community health workers. Prenatal and family planning care are often offered for the mothers. About 4,000 of these rally posts are held each year, bringing services to a population of 350,000.

The AOPS program has now received $1.19 million through a larger Child Survival grant to the Haitian Arab Center. This will enable AOPS to expand its outreach to one million people. But this time, the program will put special emphasis on the mothers whose children are at high risk of infant death because the mother has health problems of her own (especially anemia or tuberculosis), has borne underweight children, or has other children with severe malnutrition (a clear indication that they are either not getting enough food or are not getting the right kinds of food). Such women make up less than 10 percent of all mothers of young children in Haiti, but their children contribute over 70 percent of infant and child deaths. A program carefully targeted to these high-risk women should produce measurable results more quickly than the broader-based approach of the past. Visiting health teams, therefore, will now seek out and train high-risk mothers in five basic survival techniques (ORT, breastfeeding, preparation of appropriate weaning foods, infection control, and family planning), offer medical care to those who are already pregnant, and encourage women falling into the high-risk group to delay their next pregnancy until risk factors can be

Figure V-1

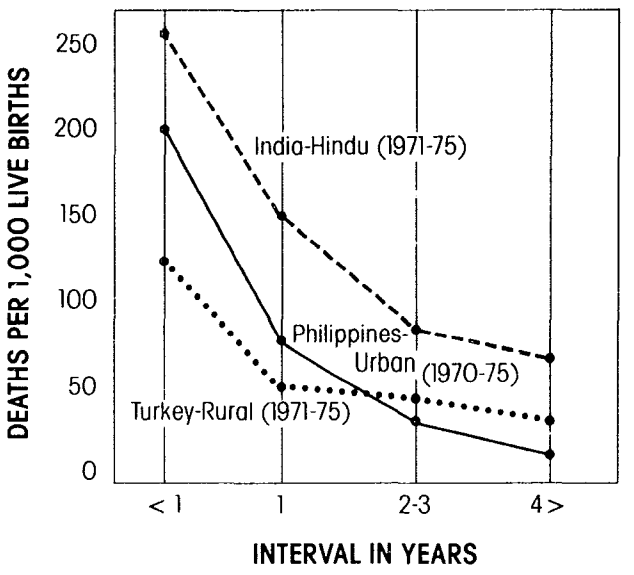
INFANT DEATHS BY BIRTH ORDER



SOURCE: Center for Population and Family Health Columbia University, 1984

Figure V-2

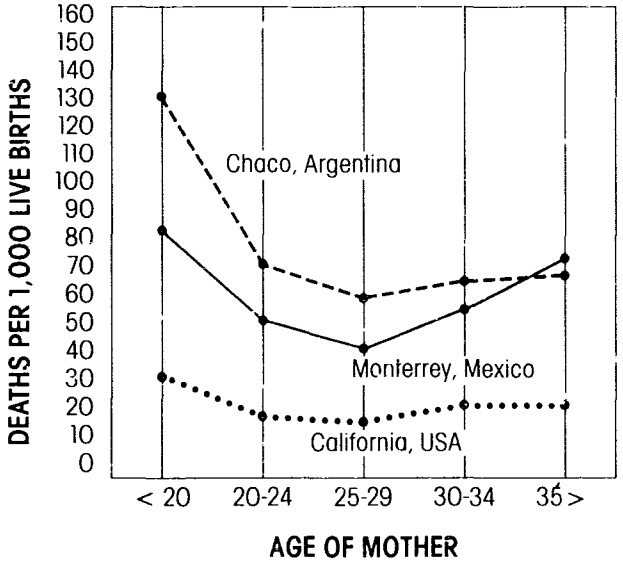
INFANT DEATHS BY BIRTH INTERVAL



SOURCE: Center for Population and Family Health Columbia University, 1984

Figure V-3

INFANT DEATHS BY AGE OF MOTHER (1968-70)



SOURCE: Center for Population and Family Health Columbia University, 1984

reduced or eliminated. Thus, birth spacing is a key part of a targeted effort to lower child mortality and morbidity. A similar program in **Peru**, managed by the Seton Institute for International Development (a U.S. private voluntary organization) under a Child Survival grant, offers natural family planning to mothers and refers those at risk to other health institutions.

Over the years, AID has supported the family planning efforts of dozens of governments and many private voluntary organizations. Perhaps its most creative contribution has been to support research, testing, and promotion of new ways to deliver information and supplies and new ways to combine family planning with other health activities. With AID's encouragement, for example, **Indonesia** has very successfully used traditional midwives and community-based mothers as educators and distributors of family planning services in the most remote villages. This dynamic system is now being used to promote oral rehydration and bring women to clinics for anti-tetanus vaccination.

In **Morocco**, the VDMS (the French initials for systematic home visiting) program provides ORT, promotion of breastfeeding, and immunization referrals along with family-planning services through home visits by health nurses and paraprofessionals. VDMS has shown that properly trained Ministry of Health personnel can deliver these services directly to villages, away from relatively expensive fixed facilities. The VDMS program is now active in four provinces, comprising about 40 percent of the

Moroccan population. Contraceptive prevalence is in the range of 41-53 percent where the system has been in place for two years or more, with notable gains in women's and children's health.

Because the most popular family-planning supplies are available on a nonprescription basis, they can be sold through the private sector, thus helping both to defray some of the costs of government-sponsored programs and to give the products a monetary value in the minds of users. In **Bangladesh**, for example, AID has subsidized a Social Marketing Program since late 1975 to reinforce the Bangladesh Government's larger family-planning efforts. This program—which is run by Population Services, Inc., a U.S. consulting group under contract with the Government of Bangladesh—is operated much like any commercial firm, with an array of divisional and sales representatives who fan out across the country to service some 8,000 wholesalers. AID donates supplies in order to keep prices low and helps to underwrite the advertising and education that keep family planning alive in the popular imagination. Today, the program's products are marketed for profit by more than 100,000 establishments—pharmacies, village doctors and street vendors; their sales account for most of the growth in nonclinical contraception in Bangladesh over the past 10 years. As noted in Chapter II, this same network of salesmen, wholesalers, and outlets is now going to take on the promotion and sale of oral rehydration packets.

The Family Planning Private Sector program supported by AID under contract with John Snow, Inc., in **Kenya**, is equally innovative. In Kenya, as in many countries, private-sector firms of any size are expected to provide health services to their workers, their workers' dependents, and often to the surrounding community. But they do not normally include family planning services. This gap is now being filled by the private sector project, which, in its first 18 months, has helped 22 companies—sugar and paper mills, a canning company, and the like—to add family planning to their existing health services. The project trains necessary clinical staff, provides appropriate supplies, and develops educational materials. A total of 35 such facilities are to be established under this project, but the pace of business inquiries already suggests that the program's momentum will continue after the four-year demonstration project ends. Part of the reason for this success is that the project has the enthusiastic support of Kenya's Vice President (in fact, it is directed by a National Council for Population and Development attached to his office) and other top officials. Another part is that business managers have recognized that the project makes sound business sense, in that birth spacing will result in healthier mothers and children and, therefore, fewer of the social welfare expenses typically provided by private sector employers.

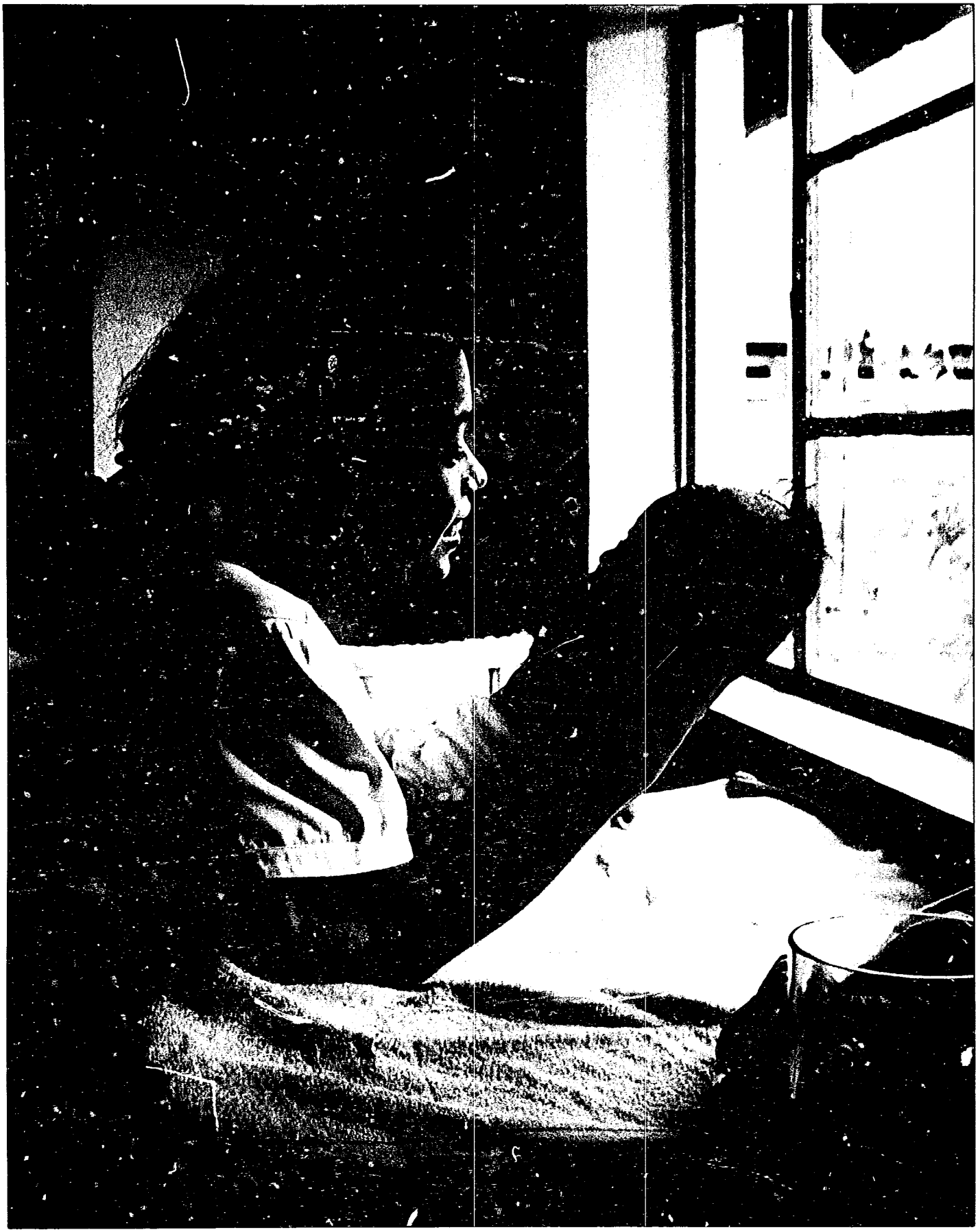
Acute Respiratory Infections

Unfortunately, no single, low-cost technology exists for preventing or treating children with acute respiratory infections, which are among the leading causes of death in Third World children. Although scores of agents cause respiratory diseases, their relative prevalence in developing countries is unknown. Diagnosis is difficult and often inaccurate when modern laboratory facilities are not available. The diseases that are common in the United States may not be the ones most prevalent in the Third World. Nor are the risk factors for mortality due to these infections well understood. Without such information, national programs to combat acute respiratory infections may miss their mark. The necessary research is methodologically difficult, requiring the collaboration of scientists from several disciplines.

AID, along with WHO and others, has begun to support research to answer some of these questions. One of the vehicles for this research is the AID-financed program of the Board on Science and Technology for International Development (BOSTID), which is part of the National Academy of Sciences. As one part of its program, which was initiated in 1981, BOSTID supports research networks led by Third World scientists in six priority research areas, one of which is Acute Respiratory Diseases. Fifteen grants have been approved to date to study the epidemiology and etiology of these diseases in children. Grantees and potential grantees have met with colleagues from the United States and Europe to review laboratory and epidemiological methods, and BOSTID is preparing manuals and training courses at their request.

The AID Mission in **Nepal** is among the first to have mounted a project to investigate acute respiratory infections as part of its Child Survival effort. The project will investigate the scale of the problem in Nepal and whether primary-health-care workers can identify and care for seriously ill children using standard protocols for diagnosis and treatment.

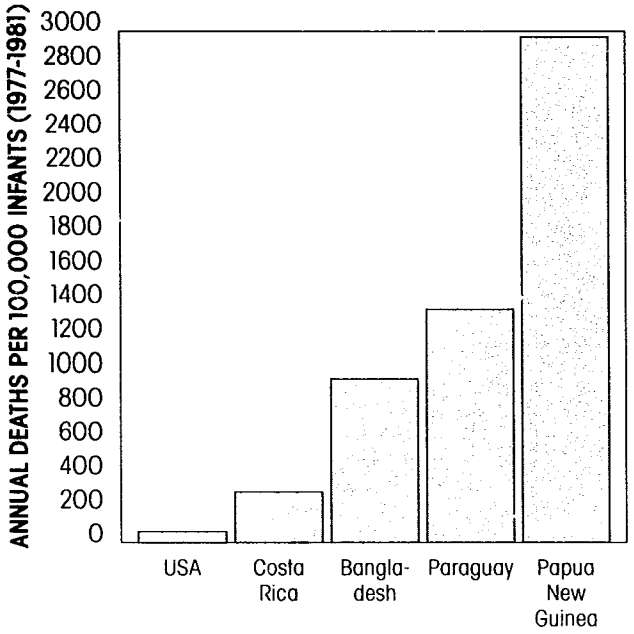
In addition, AID's new $7 million-plus DIATECH Project, managed by the Seattle-based Program for Appropriate Technology in Health, is seeking improved means of diagnosis under Third World conditions. This is needed not only to improve treatment but also to cut down on the inappropriate use of drugs, which in some cases are losing their effectiveness against common diseases such as pneumonia. Diagnostic methods using new biotechnologies now seem to offer hope of producing rapid, simple, accurate, and inexpensive tests which could be used in rural areas without trained personnel and sophisticated equipment. Under the DIATECH project, about 15-25 small grants will be awarded to researchers interested in developing technologies of this sort for malaria and diarrheal diseases, as well as for acute respiratory infections.



WORLD HEALTH ORGANIZATION

INFANT DEATHS DUE TO ACUTE RESPIRATORY INFECTIONS

Figure V-4



SOURCE: World Health Organization, World Health Statistics Annual, 1981

Vector-borne Diseases

Malaria may be the most important single disease agent on earth in terms of its impact on human life. More than half the world's population is exposed to it. An estimated 200-400 million cases occur every year, and 2–4 million die—mainly young children who have not yet developed natural immunity and who suffer from malnutrition and other complications.

Governments and international agencies, including AID, have been seeking ways to control malaria for many years. AID's efforts began in the early 1950's, with extensive support for programs to apply insecticides to reduce or eliminate the vectors—the mosquitos that carry the malaria parasite. Thousands of houses were sprayed and swamps treated or drained by specially trained teams of workers in more than 70 countries. There are still AID-supported programs of this sort in the **Sudan**, **Pakistan**, **Nepal**, **Belize**, and elsewhere. Insecticide spraying against mosquitos and snail control to reduce transmission of schistosomiasis, another serious disease, are features of a major irrigation project currently under way in the Sudan. Many of these programs also supply anti-malaria drugs to malaria victims. For example, chloroquine is routinely distributed through the CCCD project in West Africa.

These programs have had considerable success, particularly in the early years. In **Sri Lanka**, for example, the number of recorded malaria cases dropped from an estimated 1 million to only 17 in 1963. But now malaria is making a comeback because mosquito vectors in a growing number of areas have become resistant to chemical controls. Sri Lanka was reporting 150,000 cases in 1984, and the actual number was probably four times higher. Malaria parasites, too, are evolving in unfortunate ways. The most lethal form of malaria is becoming resistant to chloroquine and may develop resistance to backup drugs eventually.

As and when malaria vaccines become available, some of these problems will be eased. But, as noted in Chapter III, vaccine research is still at an early stage. It is likely to be a number of years before vaccines against one or more of the human types of malaria are ready for mass distribution. Even then, vaccines will be but one component of a broad, integrated approach to malaria control. Thus, much work needs to be done to develop alternative control methods—insecticides, larvicides, biological control agents, source reduction, repellents, mosquito nets, and screens, along with protective clothing. In order to improve such integrated efforts, AID has recently signed a five-year, $8.4 million contract with the U.S. firm, Medical Service Consultants, Inc. to administer the Vector Biology and Control project. The project will provide technical assistance, training, and information to requesting governments.

AID also supports programs to control other vector-borne diseases. One of the most successful is the Onchocerciasis Control Program, to which AID contributes along with the World Bank and other international agencies. Onchocerciasis is commonly called "river blindness," with good reason. In some West African communities, 1 out of 5 adults has lost his sight from this disease, which is spread by blackflies that breed in running water. Thanks mainly to aerial spraying, the Onchocerciasis Control Project is making very good progress in controlling river blindness in **Burkina Faso**, **Mali**, **Ivory Coast**, and four other West African countries where the disease is endemic.

Clean Water and Improved Sanitation

The history of government and international development programs is studded with major investments in improved water supplies and sanitation. Wells have been drilled, pipelines extended, and latrines dug by the hundreds of thousands. Many towns and villages have benefitted. In **Malawi**, for example, the AID-assisted Self-Help Rural Water Supply project has resulted in installation of nearly 2,000 miles of pipe and 3,000 public taps since 1968. This project uses gravity-fed piped aqueducts, a system similar in many ways to the aqueducts of Rome. The government furnishes the material, and the villagers install the system—digging trenches, transporting supplies, laying pipe, backfilling, and building drainage aprons—at no cost to the project; as a result, installation costs are only $10 per capita and annual operating costs only $1.

WATER AND SANITATION FOR HEALTH PROJECT

But for all the advantages they have brought in terms of increased water supplies and shorter trips for women to collect water, these projects have not always had an obvious impact on community health. And yet, contaminated water and poor sanitation make possible the horrendous rates of diarrhea, worm infestation, and other water-borne ailments in developing countries. Indeed, WHO estimates that three-quarters of the illness in the developing world is associated, one way or another, with unsafe excreta disposal, poor hygiene, and water supplies that are inadequate either in quantity or quality.

One missing ingredient in many water and sanitation programs is community education and participation. Unfortunately, the provision of a safe water supply does not in itself guarantee better health in a village. If the inhabitants use safe water for drinking but keep using contaminated water for bathing or washing clothes, if they carry and store well water in unclean containers, if body cleanliness is not practiced and latrines are not kept up and used, then death and disease may decrease very little, if at all.

The ambitious, multidonor Rural Water and Environmental Sanitation project in Togo offers an example of the difference that can be made with a conscious effort to involve villagers in "ownership" of the project. In the beginning, this $19.2 million project was designed to drill and install 1,000 small-bore tubewells to bring safe water to almost 400 villages in two of Togo's five provinces. The UNDP provided preliminary technical assistance and drilling equipment for test borings. AID and the European Common Market financed the well-drilling. French aid paid for engineering supervision and for purchase and installation of foot-pedal pumps for the wells. The Government of Togo paid local salaries and also had its Hydraulic Service supervise well-drilling in the villages.

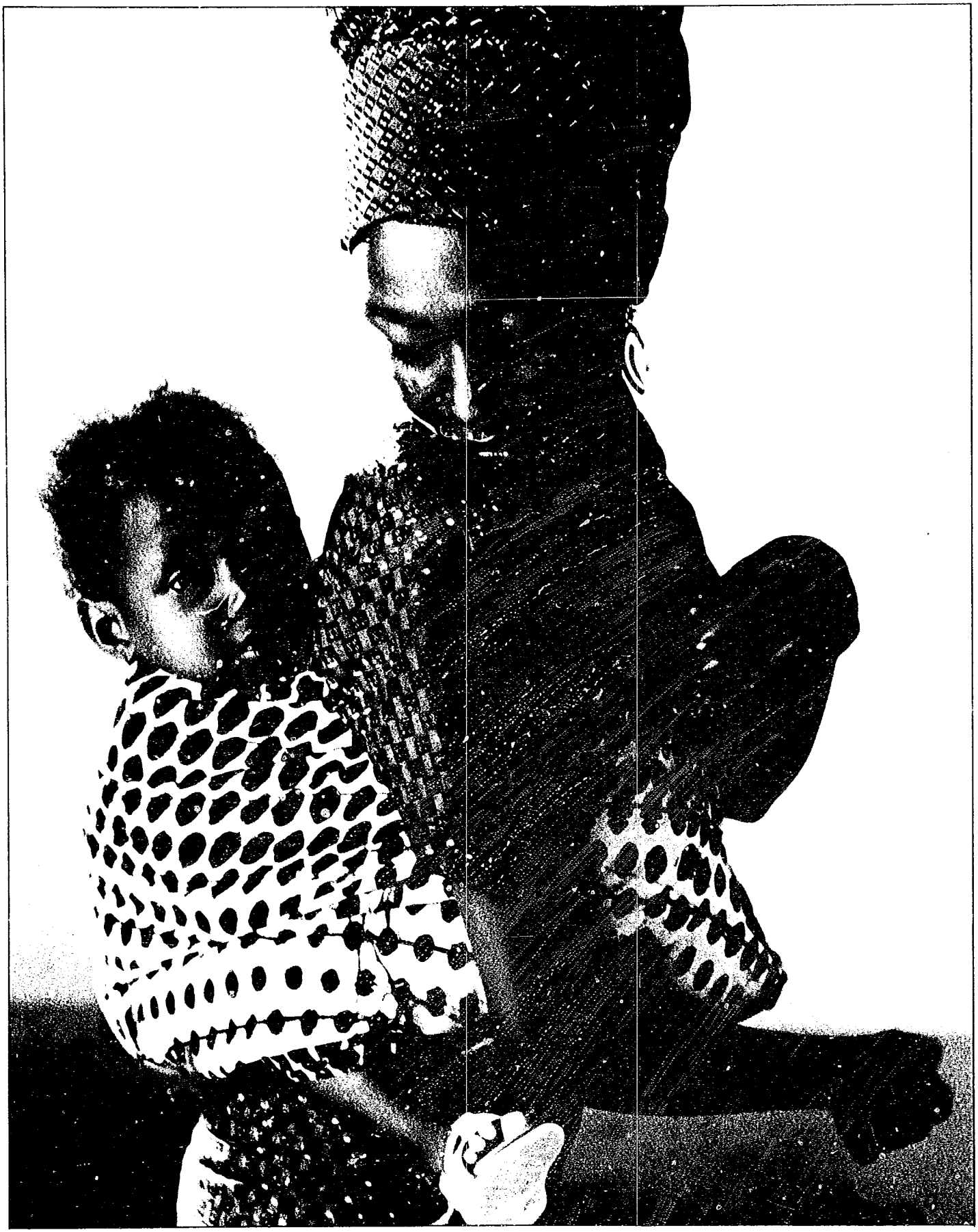
In order to increase the likelihood of improving village health, AID allocated $2.5 million of its $8 million contribution for a "socio-health component" to provide health education and village sanitation in every community where a project well was installed. Beginning in late 1981, after drilling was well under way, a unique system of enlisting village support was gradually developed with the help of two U.S. consultants sent under AID's global Water and Sanitation for Health Project (WASH), which provides technical assistance to requesting governments and private voluntary organizations. The system is designed essentially to help villagers acquire organizing, planning, and decision-making skills, which can then be used to resolve health problems and much more. One of the WASH consultants

who designed the system has explained the rationale as follows:

> "Participatory skills need to and can be learned. . . .It is often assumed that the 'community,' be that a village population, a group of government extension workers, or a learning group, knows how to 'participate' and that all that is necessary to make participation possible is to provide tools, materials, and time schedules. This approach may lead to the completion of the work: the trench may be dug, the health lesson taught, the village pharmacy constructed. However, it rarely leads to an understanding and mastery of the process by which the work was accomplished and consequently, leaves the concerned community poorly equipped to achieve other work until someone else provides a new set of tools, materials, and time schedules."

Under the socio-health component, some 350 village health committees have been established with the help of Togolese Government social promotion agents (and some Peace Corps Volunteers), who have been carefully trained to engage in give-and-take discussion rather than traditional didactics. These committees are encouraged to analyze their community's basic health problems and to identify practical community activities to meet them. The first priority is to maintain the new pumps. By late 1983, maintenance funds had been established in most of the villages; each village had spent an average of $75—no small sum in rural Togo—on constructing well aprons, feeding pump installation crews, and basic pump repairs. The maintenance funds were being replenished either from monthly contributions by villagers or from the sales of produce from communal fields, charcoal production, and the like. At the initiative of project social agents, a program for training local bicycle repairmen in the basic functioning and repair of the pumps has been developed, thus relieving the strain on the one overworked Hydraulic Service technician in each province. The village committees also receive basic training in recordkeeping, simple accounting, group decisionmaking, problem resolution, and disease prevention. They in turn train their compatriots. Health education sessions cover: ORT; use of water to clean wounds, wash hands, and control fever; home and personal hygiene; excreta disposal; and so on.

By emphasizing problem solving and action planning rather than pre-established solutions, the system allows for flexible responses to differing conditions. The problems the villagers have chosen to address have ranged from how to organize to repair and maintain the pumps, to how to combat disease (for example, by village cleanup or drainage of mosquito-breeding sites), to how to negotiate with neighboring villages over water rights. Small amounts are available through the project for activities like latrine building which require some capital expenditure. Those who have visited project villages—and they include, in addition to AID evaluators, representatives from all over West Africa who are interested in copying the approach—are uniformly impressed with the behavioral changes evident in the villages. While it is too early to expect measurable changes in health statistics, the villagers already report that what they value most is their new-found ability to organize themselves for purposeful action. The implications of this insight go far beyond village water projects; they extend to all child survival activities—indeed, to all development activity at the village level.



WORLD HEALTH AGENCY PHOTO: M. JACOT

Chapter VI – Conclusion

"A principal objective of the foreign policy of the United States is. . . sustained support of the people of developing countries. . . to build the economic, political and social institutions which will improve the quality of their lives."

Foreign Assistance Act, Section 101

Between now and the end of the century, many children's lives will be saved by determined application of the technologies discussed in earlier chapters. The results of pilot projects and regional activities already under way attest to this. And the worldwide effort is picking up steam. In addition to AID's Child Survival Action Program and related activities, many other international and bilateral aid programs are involved, to say nothing of scores of governments and private voluntary organizations. Some have even called this international effort a "children's revolution."

Measuring the Gains

Because so much is at stake—and so many actors are involved—it will be particularly important to try to evaluate results carefully.

Precise measurement will be difficult, at best. For example, measuring overall declines in deaths and illnesses ought to be relatively straightforward. But this is not the case. Census data are often unreliable or out-of-date in the developing world. Many births, deaths and illnesses in rural areas are never even registered. When baseline figures are suspect, it is hard to measure improvement and, since many factors are involved, harder still to attribute improvement to any particular project or technology. Ironically, indicators of mortality and morbidity may actually get worse for a time, since, as they improve, health systems do a better job of reporting as well as delivering services.

Benefit/cost measurements also present problems. Even if all inputs are known—and sometimes they are hard to quantify—benefits may depend on how they are defined. For example, the costs of immunization campaigns look very different if they are based the number of vaccinations given rather than the number of children who were fully immunized. Costs per vaccination are, of course, much lower and may be a measure of efficiency, but for impact on mortality and morbidity, full immunization is the more meaningful measure.

Nonetheless, better estimates of the health impacts of child survival activities are beginning to be made. One welcome by-product of the increased interest in universal immunization is that national agencies are paying greater attention to monitoring. WHO, for example, is collecting immunization statistics twice a year and making a concerted effort to monitor children's access to oral rehydration therapy as well. It has also increased its efforts to upgrade the quality of reporting from the developing world.

In the case of the Child Survival Action Program, AID is making a special effort to collect reliable data. A selected number of projects are being required to submit particularly rigorous reports involving studies of mortality and morbidity over time, along with service and impact data. The Institute for International Programs at Johns Hopkins University is helping to conduct these assessments, which are expected to result in improved methods of evaluating child survival interventions generally. Advisers from the Institute have already begun work on AID-supported Child Survival programs in **Ecuador**, **Haiti**, and the **Philippines**. To keep data collection from becoming an end in itself, the majority of Child Survival projects are being asked only to keep careful track of their service statistics and improvements in coverage

Sustaining the Gains

Throughout history, the benefits of revolutions have been notoriously short-lived. If children are not to be cheated by the "children's revolution," ways will have to be found to sustain the gains in child health that are resulting from the many programs now under way.

It will be discouraging, indeed, if polio is eradicated but malaria again blankets the developing world, if a child is protected against tetanus only to die of measles a short time later, if most of today's young children are immunized but future cohorts are not. More fundamentally, advances in health can easily be negated by forces over which the health sector (and international aid to it) have no direct control. Inflation and unemployment, to say nothing of wars and natural disasters, can make a mockery of child survival efforts.

While the world's health establishments cannot control the "external" factors that threaten child survival, they can work to maximize the sustainability of programs they do support. Child survival activities, by their very nature, must be ongoing. There are always new cases of diarrhea to be treated, new groups of mothers to be trained, new candidates for vaccination. Without continuing support and funding, such programs may lose their effectiveness.

With long-term commitment, they are likely to pay off.

In order to maximize this possibility, AID maintains a dialogue with governments through the health advisers attached to its overseas missions and through worldwide projects such as PRITECH and REACH, with the aim of encouraging institutional and policy reforms. On the policy level, AID encourages governments to commit themselves to the principles of child survival, better resource allocation within the health sector, private-sector participation, and community-based support for basic health services. Such policies are essential if child survival programs are to last beyond the first rush of enthusiasm.

At the same time, AID encourages development of effective local institutions. Child survival activities provide an opening wedge for strengthening health services generally. In order to achieve broad coverage, for example, an immunization program must reach areas and people often neglected by the formal health system. Once in place, community health workers, local volunteers, and other means for reaching the poor and the isolated can be used to deliver other basic health services. Social marketing techniques have greatly expanded opportunities for reaching, and teaching, masses of people directly. The demand for services stimulated through such techniques helps to push the entire health system to greater efforts.

A broad-based health system is not sustainable, however, if a country cannot pay for it. Assistance from international agencies often pays for initial construction, supplies, and technical assistance. But recurring costs must sooner or later be covered by the country itself. Thus, AID works with governments to develop ways to meet the financial requirements of ongoing child survival programs. Essentially, there are three ways to find internal sources of the necessary funds: resources can be shifted from other programs; cost-savings can be found in existing programs; and new resources can be found at the local level.

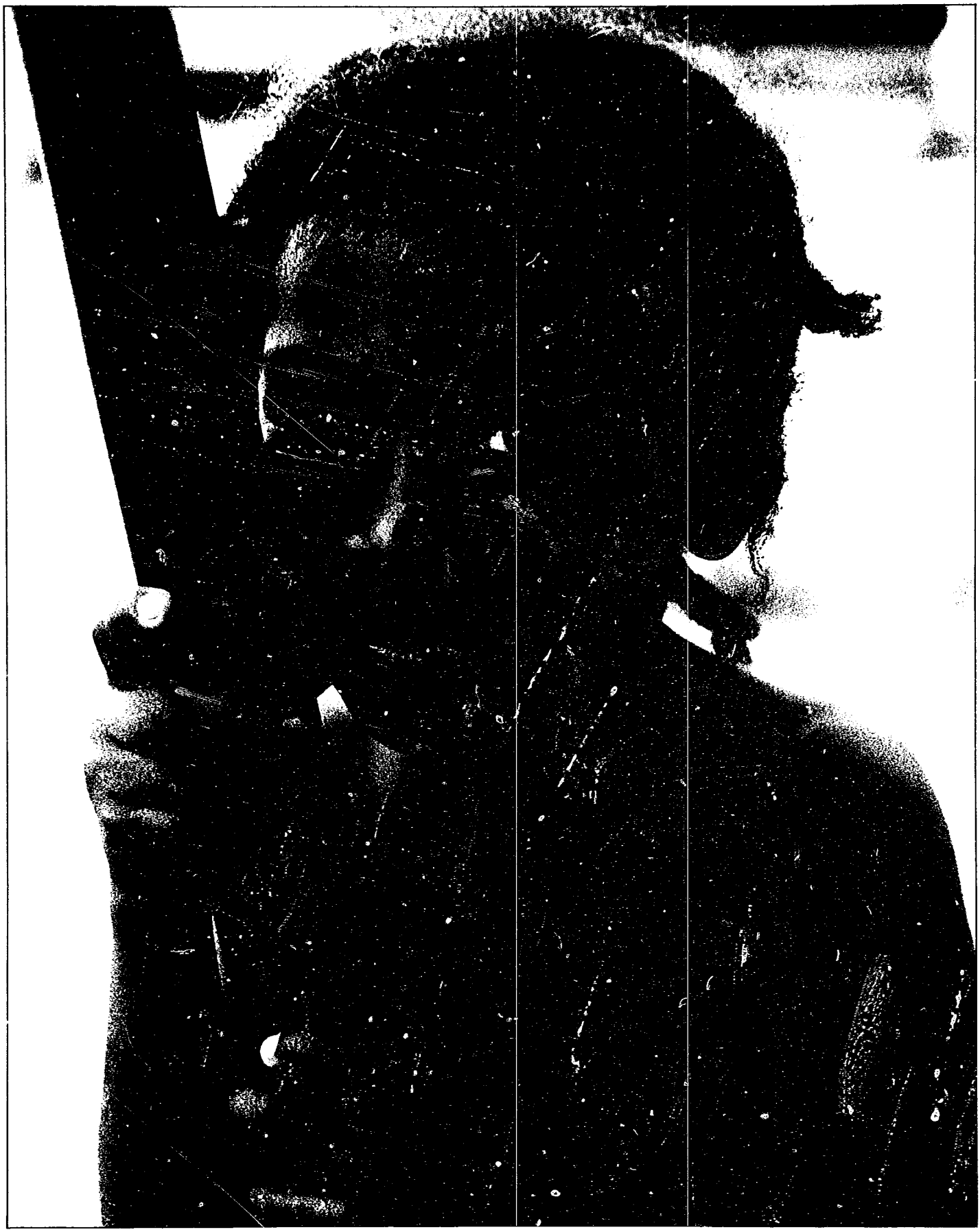
Hospital-based curative systems manned by expensively trained medical personnel eat up the bulk of the money available for the public health sector in many developing countries. There may be little left for supplying rural health stations and paying health workers. AID therefore encourages governments to give higher priority to the basic preventive care that is at the heart of the child survival effort. In addition, through its new REACH project, AID will help governments to identify and implement cost savings and program efficiencies.

AID has also become increasingly interested in exploring the possibilities for community financing, not only to ease the recurrent-cost burden for governments, but also to ensure that ORT and other child survival activities become part of the fabric of village life. Many projects provide for in-kind contributions from village beneficiaries—labor and materials for building health posts, food and housing for visiting health teams, and so on. Other projects envision actual cash payments to support community health workers and/or pay for supplies. In addition to retail sales under social marketing programs, AID is supporting a number of experiments to test the viability of community contributions through prepaid fees-for-service, revolving funds, income-generating community projects, and the like. The success of such schemes depends heavily on whether the benefits of the services being offered are evident to the villagers. Revolving drug funds, for example, often succeed even without government subsidy, because they are associated with the curative care that villagers want. The benefits of preventive care are less obvious, though creation of demand through social marketing techniques may help to remedy this problem.

Capitalizing on the Gains

The waste of a young life is always tragic, the more so if it could have been avoided. But the true value of the Child Survival initiative relates less to simple survival and more to quality of life. The child who grows normally, who does not have to contend with measles or whooping cough, who can bounce back from bouts of diarrhea—that child is likely to be happier and stronger, to learn better, and become more productive. In this sense, AID's Child Survival initiative represents an investment in the future.

In another sense, however, all of AID's programs represent an investment in child survival. AID's overall mandate, after all, is to help bring about economic and social development, so that people in developing countries can fully exploit the capacities they were born with. The child who survives but remains illiterate will not be able to do so. Nor will the child who reaches adulthood only to face a life of underemployment. The moral commitment to save children's lives is compelling. But so is—or should be—the commitment to see that lives once saved are lives worth living. This is the commitment implicit in AID's larger brief, confirmed over many years in the Foreign Assistance Act. It is a commitment worth keeping.



PAN AMERICAN HEALTH ORGANIZATION

Appendix 1 FISCAL YEAR 1985 CHILD SURVIVAL ACTION PROGRAM*

COUNTRY	TITLE	CSF ($1,000's)	HE ($1,000's)	NUT ($1,000's)
AFRICA				
BOTSWANA	GRANT TO UNDP—Technical assistance to improve prenatal services with focus on causes of maternal, infant, and child mortality.	344		
CAMEROON	IMPROVING FEEDING PRACTICES WITH WEANING CHILDREN—Technical assistance to Cameroon to improve child feeding practices.			200
CHAD	GRANT TO UNDP—Expanded immunization program includes provision of vaccine, equipment and training.	1,123		
DJIBOUTI	GRANT TO UNICEF—Support for ORT expansion and Spring 1986 immunization campaign through an indigenous private voluntary organization.	700		
GHANA	IMPROVING FEEDING PRACTICES WITH WEANING CHILDREN—Technical assistance to Ghana to improve child feeding practices.			200
	GRANT TO TUSKEGEE UNIVERSITY –Small research grant for Child Survival related activities in nutrition.			100
KENYA	CHILD SURVIVAL INTERVENTIONS THROUGH HOME LEAGUES—PVO: Grant to Salvation Army World Service Office to train low income women to promote growth monitoring, ORT, immunization, and breastfeeding.		149	
	APPLIED NUTRITION PROGRAM—PVO: Grant to Meals for Millions for community-based health and nutrition interventions.			255
MALAWI	VITAMIN A INTERVENTION—PVO: Grant to International Eye Foundation for Vitamin A capsule distribution, measles immunizations and promotion of ORT in Lower Shire Valley.	442		
	EXPANSION OF ORT TO REDUCE INFANT AND CHILD DEATHS—PVO: Grant to Adventist Development Relief Agency to train health workers in ORT, immunization, nutrition and child spacing in northern Malawi.		308	
NIGERIA	GRANT TO UNICEF—Training in immunization and ORT activities of 250,000 nurses, health care workers, and medical professionals through private professional associations.	900		
RWANDA	REDUCTION OF INFANT AND CHILD DEATHS—PVO: Grant to Adventist Development Relief Agency to train health workers to provide ORT and immunizations		270	
SIERRA LEONE	CONTRIBUTION TO UNDP—Two ORT demonstration and training centers will be established to train health workers in ORT.	300		
	APPLIED NUTRITION PROGRAM—PVO: Grant to Meals for Millions for community-based health and nutrition interventions.			180
SOMALIA	EMERGENCY HEALTH SERVICES—PVO: Grant to AMREF for emergency health services in villages near refugee settlements.		2,000	
	GRANT TO UNDP—Expanded ORT and immunization program will include establishing ORS production facility and provision of cold chain equipment for vaccines.	655		
SUDAN	GRANT TO UNICEF—Immunization, ORT, and health education activities will be conducted through four indigenous private voluntary organizations.	700		
TOGO	GRANT TO UNDP—A national immunization program for yellow fever and meningitis will be expanded.	170		
UGANDA	COMMUNITY HEALTH SERVICES—PVO: Grant to CARE to reach 135,000 children under five through community-health worker network.		512	
	RURAL HEALTH PROJECT WITH MAKERERE UNIVERSITY—PVO: Grant to Minnesota International Health Volunteers (MIHV) to extend health services to children under 5 years and mothers.		344	
ZAMBIA	GRANT TO UNDP—Support will be given to child-survival-related activities in 15 districts most affected by drought conditions.	648		
ZIMBABWE	GRANT TO UNDP—Expansion of PVO community-based activities through training of local women in child survival technologies.	260		
	PROTECTING LIFE AND HEALTH OF CHILDREN—PVO: Grant to Save the Children Federation to expand ORT, growth monitoring, immunization, breastfeeding, and child feeding activities.	964		

* This chart describes activities funded in FY 85 with additional appropriations: Health (HE), $50 million; Child Survival Funds (CSF), $25 million; and Agriculture, Rural Development and Nutrition (NUT), $10 million. Other funds which may have been obligated for these projects in FY 1985 are not included in this chart.

COUNTRY	TITLE	CSF ($1,000's)	HE ($1,000's)	NUT ($1,000's)
	PRIMARY HEALTH CARE—PVO: Grant to World Vision Relief Organization to expand immunization coverage and use of ORT through a national ongoing primary-health-care program.		690	
REGIONAL	GRANT TO MOREHOUSE COLLEGE—Training African medical personnel in child survival strategies.		897	
	GRANT TO ATLANTA UNIVERSITY—Conference on water and sanitation problems of sub-Saharan African countries.		531	
	NUTRITION SURVEYS AND SURVEILLANCE—Assistance for nutrition surveys and nutritional surveillance systems through a grant to Cornell University.			600
	REDUCING NUTRITIONAL BLINDNESS—Program to reduce nutritional blindness through Vitamin A distribution in countries in Africa and to evaluate impact of Vitamin A on child mortality and morbidity.			800
	DIETARY MANAGEMENT OF DIARRHEAL DISEASES—Technical assistance and training of African health personnel in dietary management approaches to diarrhea.			500
	AFRICA SUBTOTAL	7,206	5,701	2,835
ASIA/NEAR EAST				
BANGLADESH	ORT SOCIAL MARKETING—Nationwide ORT social marketing project through 100,000 outlets within the country building on experience with successful family-planning social marketing project.	5,000		
	VITAMIN A PROGRAM—PVO: Grant to Helen Keller International to distribute Vitamin A capsules to three million children under five.	200	559	
	JESSORE RURAL HEALTH CARE—PVO: Grant to Salvation Army World Service Organization to upgrade and expand health services for mothers and children.		611	
	EXPANDING CHILD SURVIVAL ACTIVITIES—PVO: Grant To Save the Children Federation to expand ORT, immunization, and growth monitoring activities in 17 rural villages.	276		
	GRANT TO UNICEF—Diarrheal-disease control and nutrition activities through the International Red Cross for its Child Alive programs in Bangladesh.	500		
INDIA	TECHNICAL COLLABORATION—Support to collaborative efforts of Government of India and the U.S. Department of Health and Human Services focused on vaccine production and delivery.		520	
	TECHNICAL ASSISTANCE FOR SUPPORT CHILD SURVIVAL—Long term technical expertise to India in ORT and immunization through PRITECH.		980	
	GRANT TO UNICEF—Immunization, diarrhea management, growth monitoring, and health and nutrition education will be supported through indigenous private voluntary organizations.	2,000		
	GRANT TO UNICEF—Grant through UNICEF to International Red Cross for diarrheal control and nutrition activities in its Child Alive programs in India.	500		
INDONESIA	MATERNAL AND CHILD HEALTH PROGRAM—Training village health workers in Title II program including nutrition education and growth monitoring.		1,500	
	GRANT TO UNICEF—Support for immunization and ORT through religious organizations, women's groups,and other groups.	1,200		
	HEALTH AND CHILD SURVIVAL—PVO: Grant to Save the Children Foundation to promote 10 "child protective" behaviors in a densely populated slum area of Jakarta.	237		
	CHILD SURVIVAL PROJECT—PVO: Grant to CARE to train 750-900 village health workers to promote and train mothers in ORT.		331	
	VITAMIN A PROGRAM—PVO: Grant to Helen Keller International to integrate vitamin A delivery into child survival programs in Aceh and West Java.		766	
	CHILD SURVIVAL ACTIVITIES IN INTEGRATED PHC PROGRAM—PVO: Grant to Project Concern International to train health workers and traditional birth attendants in north and south-east Sulawesi and in Riau.		500	
NEPAL	INTEGRATED RURAL HEALTH PROGRAM—Nationwide expansion of ORT and immunization through integrated rural health program, and pilot activities in acute respiratory infections.		1,000	
	APPLIED NUTRITION PROGRAM—PVO: Grant to Meals for Millions to expand community-based programs in nutrition and immunization.			200

COUNTRY	TITLE	CSF ($1,000's)	HE ($1,000's)	NUT ($1,000's)
PAKISTAN	EXPANSION OF PRIMARY HEALTH CARE SERVICES—PVO: Grant to Salvation Army World Service Office to intensify ORT and immunization activities in ongoing PHC outreach programs.		626	
PHILIPPINES	PRIMARY HEALTH CARE FINANCING—Increase national use of ORT through acceleration of private production, commercial marketing and use of mass media and home-based ORS preparation.		4,000	
THAILAND	APPLIED NUTRITION PROGRAM—PVO: Grant to Meals for Millions to improve nutritional status in rural development programs through training and nutrition planning.			225
TURKEY	GRANT TO UNICEF—Support to national immunization campaign conducted in part through indigenous private organizations.	1,000		
REGIONAL	STRENGTHENING PHC PROGRAMS IN ASIA—Grant to University of Hawaii to support PHC programs in Asia through Asia-Pacific Consortium.		2,200	
	REDUCING NUTRITIONAL BLINDNESS—Program to reduce nutritional blindness through Vitamin A distribution in Asia and to evaluate impact of Vitamin A on child mortality and morbidity.			2,400
	SAN DIEGO LACTATION PROGRAM—Intensive training program for Nurse/Physician teams to improve infant feeding practices in the Near East.			100
	IMPROVING FEEDING PRACTICES—Improve feeding practices of weaning-aged children in the Near East.			100
	ASIA NEAR EAST SUBTOTAL	10,913	13,593	3,025
LATIN AMERICA AND THE CARIBBEAN				
ANTIGUA	APPLIED NUTRITION PROGRAM—PVO: Grant to Meals for Millions for nutrition intervention focusing on training and nutrition planning.			60
BELIZE	GRANT TO LINCOLN UNIVERSITY—Small research grant for child-survival related nutrition activity.			79
BOLIVIA	CHILD SURVIVAL ACTION PROGRAM—PVO: Grant to CRS to introduce ORT and child growth-monitoring programs into 1,800 Caritas Mother's Clubs.		84	300
	PRITECH—Technical assistance support to Mother's Clubs programs.		300	
	CHILD SURVIVAL ACTIVITIES IN PHC PROGRAMS—PVO: Grant to Project Concern International to reach more than 10,000 children in remote communities with child survival technologies.		525	
	ENHANCING CHILD HEALTH AND SURVIVAL—PVO: Grant to Save the Children Federation for ORT, immunization, and nutrition services in a community-based primary health-care system.	669		
	RURAL HEALTH EDUCATION—PVO: Grant to CARE to train local teachers, health workers, and other leaders in 126 communities in diarrheal-disease control.		625	
	APPLIED NUTRITION PROGRAM—PVO: Grant to Meals for Millions for community-based nutrition intervention.			165
ECUADOR	CHILD SURVIVAL ACTION PROGRAM—Nationwide immunization and ORT program launched Oct. 26, 1985 with first immunization day. Expands successful integrated rural health programs.		3,000	
	MALARIA CONTROL PROJECT—Assistance to National Malaria Eradication and Vector Control Service to reduce malaria-related morbidity and mortality, particularly among pregnant women and small children.		4,000	
	APPLIED NUTRITION PROGRAM—PVO: Grant to Meals for Millions for village-based nutrition intervention in 10 pilot communities.			500
	CHILD SURVIVAL PROGRAM FOR MARGINAL URBAN AREAS—PVO: Save the Children Federation will promote 10 "child protective" behaviors to reach 26,800 children under five.	724		
	APPLIED NUTRITION PROGRAM THROUGH WOMEN'S CLUBS—PVO: Catholic Relief Services will establish self-sustaining nutrition programs operated through women's clubs.	314	47	
GUATEMALA	IMMUNIZATION/CHILD SURVIVAL—Expansion and institutionalization of immunization in 21 areas for children ages four and under through "channelization" of services in existing health system.		3,000	
	MOTHER AND CHILD HEALTH—PVO: Grant to Project HOPE to increase access to effective use of ORT in selected Indian communities.	700		

COUNTRY	TITLE	CSF ($1,000's)	HE ($1,000's)	NUT ($1,000's)
HAITI	MOBILIZING MOTHERS FOR CHILD SURVIVAL—Expansion of proven ORT, immunization, nutrition, and family-planning interventions targeted to mothers at risk of children of prenatal or early infant death.	3,000		
	CHILD SURVIVAL PROGRAM JACMEL—PVO: Foster Parents Plan will expand health services to young children and their mothers in the Jacmel region.		474	
	CHILD IMMUNIZATION PROJECT—PVO: Adventist Development Relief Agency will expand ORT and immunization programs to mothers and children near Port-au-Prince.		310	
	COMMUNITY-INTEGRATED NUTRITION AND EDUCATION CENTERS—PVO: Grant to CARE to enhance basic health services to 30,000 children and pregnant mothers.		696	
	CHILD SURVIVAL PROJECT—PVO: Grant to International Child Care to immunize 150,000 children and mothers.	408		
	CHILD SURVIVAL PROGRAM THROUGH HOME LEAGUES—PVO: Grant to Salvation Army World Service Office to increase immunization and promote ORT through women's groups.		143	
HONDURAS	APPLIED NUTRITION PROGRAM—PVO: Grant to Meals for Millions for community-based nutrition and health interventions.			95
PERU	NUTRITION FOR CHILD SURVIVAL ACTION PROGRAM—PVO: Grant to CARE for support for local community-based PVO nutrition program.			35
	PVO HEALTH PROMOTION NETWORK—PVO: Grant to Seton Institute for International Development to promote child survival technologies to two million women and children in Arequipa, Trujillo, and Lima.			260
	TRAINING IN ORT FOR MEDICAL PROFESSIONALS—Grant to Universidad Peruano Cayetano Heredia to train physicians and nurses in management of diarrheal diseases with emphasis on ORT.			5
	ORT MASS MEDIA PROGRAM FOR CHILD SURVIVAL—Technical assistance through the Communications for Child Survival project to promote ORT and immunization via the media.		500	
	DIETARY MANAGEMENT OF DIARRHEA DISEASES—Technical assistance and training of health personnel in dietary approaches to diarrhea.			500
REGIONAL	REDUCING NUTRITIONAL BLINDNESS—Program to reduce nutritional blindness through Vitamin A distribution in the Americas.			300
ROCAP	ORT, GROWTH MONITORING AND EDUCATION—The Institute for Nutrition for Central America and Panama, in collaboration with appropriate ministries and private institutions in the region, to support programs to reduce infant and child mortality and severe malnutrition.		5,500	
	LATIN AMERICA AND THE CARIBBEAN SUBTOTAL	5,815	19,204	2,299
WORLDWIDE				
GLOBAL	JOHNS HOPKINS INSTITUTE FOR INTERNATIONAL PROGRAMS—Program to improve child survival technologies and evaluation techniques.	1,066	156	
GLOBAL	PHC TECHNOLOGY I (PRITECH)—Technical assistance in Child Survival initiatives, especially ORT.		2,109	
GLOBAL	PHC TECHNOLOGY II (REACH)—Worldwide technical support for immunization and financing of child survival programs.		2,000	
GLOBAL	VECTOR BIOLOGY AND CONTROL—Field support to improve the design and management of efforts to control vector-borne diseases.		580	
GLOBAL	ORT HEALTH EDUCATION AND LONG TERM PLANNING—Information dissemination focusing on ORT		2,989	
GLOBAL	COMMUNICATIONS FOR CHILD SURVIVAL (HEALTHCOM)—Expanded use of mass media for child survival programs.		95	1,200
GLOBAL	CHILD SURVIVAL ACTION PROGRAM—Develop statistical baseline to evaluate child survival programs.		30	
GLOBAL	SUPPLY, PRODUCTION AND PROMOTION OF ORT (SUPPORT)—Expand local production and procurement of ORS, providing technical assistance and loan financing to developing country producers.		2,000	

COUNTRY	TITLE	CSF ($1,000's)	HE ($1,000's)	NUT ($1,000's)
GLOBAL	SMALL RESEARCH GRANTS TO HISTORICALLY BLACK COLLEGES AND UNIVERSITIES—			
	—Atlanta University		69	
	—Howard University			92
	—Morehouse University		351	
	—Benedict College		321	
	—Drew Medical School			89
	—Tuskegee University		280	
	—Texas Southern University			100
	MEALS FOR MILLIONS—PVO: Matching grant for child survival activities.		46	
	TECHNICAL SUPPORT FOR CHILD SURVIVAL—Assistance to PVO's to design, monitor and evaluate child survival projects.			320
	WORLDWIDE SUBTOTAL	1,066	476	40
	GRAND TOTAL	25,000	11,502	1,841
			50,000	10,000

Appendix 2 AID's INVOLVEMENT IN DEVELOPMENT AND PROMOTION OF ORT

Early Clinical Studies

1960's U.S. Navy (NAMRU-2) builds on early work and initiates clinical balance studies on adults documenting the importance of glucose in oral rehydration therapy for cholera in San Lorenzo Hospital, Manila

AID* and NIH fund the Pakistan SEATO Cholera Research Laboratory (CRL) in Dacca, East Pakistan (now Dhaka, Bangladesh). NIH funds the International Center for Medical Research and Training at the Infectious Disease Hospital, Calcutta, (ICMRT) through a grant to researchers at the Johns Hopkins University. Researchers in these institutes conduct research that confirms NAMRU's work and take the lead in research on oral fluid therapy.

1968 CRL researchers publish reports of use of oral rehydration solutions as maintenance therapy for eight adult cholera patients

1969 ICMRT researchers report even more favorable results in twenty patients. Only one patient required intravenous solutions to recover

1970 CRL researchers report successful use of ORT in dehydrated children

CRL, ICMRT researchers report successful use of ORT for dehydration produced by diarrheas of diverse etiologies

1971 WHO sponsors conference which recognizes current glucose, sodium, potassium, bicarbonate formulation developed by CRL and ICMRT

1972 Ex-CRL researcher reports use of ORT in Apache children in the U.S. This is the first use of ORT for rehydration of children outside the Indian subcontinent

Field Studies

1970 AID continues as lead donor to CRL as research moves to field studies:

CRL researchers report that ORT can be used successfully under field conditions in rural treatment centers during epidemic outbreaks of cholera

1975 CRL researchers report use of ORT in a crowded camp for Bangladeshi refugees during epidemic, 3,703 patients were treated with 3.6 percent mortality compared to 25 percent in camps not yet using ORT

1980 Researchers in the Philippines document the nutritional benefit of ORT in a large field trial

AID funds research at ICDDR,B to improve formulation to enhance nutritional benefits of ORT

Development and Institutionalization

1978 U.S. supports World Health Assembly resolution calling for creation of systematic attack on diarrheal diseases. This leads, in the 1980s, to development of program for Control of Diarrheal Diseases (WHO/CDD) to assist National Diarrheal Disease Control Programs in collaboration with UNICEF, AID, UNDP, and other donors and countries.

1979 CRL is reorganized as the International Center for Diarrheal Disease Research, Bangladesh. AID, still the largest single donor, pledges increased funds to expand the scope of work of the Center

1980 to

1985 AID funds pilot ORT delivery programs in Egypt, Honduras, and The Gambia.

Appendix 2 CONT'D.

1980 to 1985 (cont.)

UNICEF commits substantial resources to the production of ORS packets.

AID funds operations research activities to improve delivery of ORT (e.g. PRICOR studies in Brazil, Philippines and Egypt)

AID funds first International Conference on Oral Rehydration Therapy (ICORT I) in cooperation with ICDDR,B, UNICEF and WHO to promote ORT (1983)

AID at the time of ICORT I is supporting ORT activities in 19 countries

AID launches series of ORT technical support activities:

- PRICOR
- PRITECH
- Diarrhea Dialogue (partial support)
- PASA with Peace Corps
- Dietary Management of Diarrheal Disease
- HEALTHCOM
- SUPPORT

1985

ICORT II funded by AID in collaboration with ICDDR,B, UNICEF, UNDP, WHO, and World Bank to improve the delivery and expand the coverage of diarrheal disease control programs worldwide

At the time of ICORT II, AID is supporting activities in 54 countries

WHO estimates that 500,000 children have been saved by the appropriate use of ORT between ICORT I and ICORT II

* AID is used to include predecessor agencies.

SOURCE: Adapted from Levine, M.M. "Oral Rehydration Therapy for Diarrheal Diseases" in U.S. Congress, Office of Technology Assessment, *Status of Biomedical Research and Related Technology for Tropical Diseases*, OTA-H-258 (Washington, DC: U.S. Government Printing Office, September 1985)

Appendix 3 AID's SEARCH FOR A MALARIA VACCINE

Animal Vaccine 1940's

Animal experiments show that malaria can be prevented by vaccination.

Feasibility 1960's

AID funds study of feasibility of malaria vaccine which shows that humans can be protected from malaria via the immune system (University of Illinois).

Vaccine Development early 1970's

AID sets 2 research priorities:
- a sporozoite (mosquito stage) vaccine
- a merozoite (blood stage) vaccine

AID establishes network of research institutions:
- New York University
- Parke-Davis Co.
- Rockefeller University
- Rush Memorial Institute (Chicago)
- University of Hawaii
- University of Illinois
- University of New Mexico

1974

AID supports malaria vaccine workshop to review state-of-the-art malaria immunology and vaccine research.

1975

Breakthrough when red blood cell stages of human malaria parasite are continuously cultivated *in-vitro* (Rockefeller University). Translates "malaria vaccination to the realm of practical feasibility."

late 1970's

AID expands malaria vaccine research network:
- Bio-Medical Research Institute, Rockville
- Gorgas Institute, Panama
- Instituto Nacional de Salud, Bogota
- Walter Reed Army Institute of Research

1978

International workshop reviews collaborative network and research priorities.

1980's

AID collaborative network further expanded:
- American Institute of Biological Sciences
- Battelle Pacific Northwest Laboratories
- Case Western Reserve University
- Centers for Disease Control
- Mahidol University, Bangkok
- National Institutes of Health
- Pan American Health Organization
- Scripps Institute
- University of the Uniformed Services
- University of Maryland

1982

In vitro culture of liver stage of *P. falciparum* and *P. vivax* malaria parasites (Bio-Medical Research Institute)

Isolation of protective antigens from surface coat protecting sporozoite (mosquito stage) of *P. falciparum* (New York University)

1983

Isolation of *E. coli* clones secreting antigen on monkey malaria parasite makes possible large-scale production of antigen (New York University)

1984

Isolation of *E. coli* clones for human malaria parasite (*P. falciparum*)—the most deadly form of malaria in humans (New York University)

1985

Development of prototype synthetic peptide red blood stage vaccines for *P. falciparum* (University of Hawaii, Scripps Institute, University of Missouri, University of Illinois)

Development of prototype vaccine for *P. vivax*—the most common form of malaria in humans (New York University)

SOURCE: AID, *Malaria: Meeting the Global Challenge*, 1985

Appendix 4 AID's EFFORTS TO COMBAT VITAMIN A DEFICIENCY

1965 AID starts Vitamin A fortification of nonfat dry milk and blended foods for U.S. donations program.

1969 AID expands Vitamin A fortification to wheat, flour, and corn meal for U.S. donations program.

1973 AID commissions review of Vitamin A deficiency problems worldwide and possible solutions.

1974 U.S. Government proposes global attack on nutritional blindness at the World Food Conference, pledges support and designates AID as implementing agency.

1975 AID/WHO co-sponsor international meeting in Jakarta, Indonesia to mobilize global attack.

1975 AID creates International Vitamin A Consultative Group (IVACG) to coordinate activities and facilitate information exchange.

1976 AID funds research to evaluate fortification of sugar with Vitamin A in Central America.

1976 First IVACG guidelines report.

1976 AID funds major five year research project in Indonesia to describe etiology of Vitamin A deficiency and to identify effective intervention strategies.

1977 AID funds initial research on Vitamin A fortification of monosodium glutamate in Philippines.

1978 Indonesia project confirms efficacy of orally administered Vitamin A.

1979 AID funds WHO surveys in Near East and Africa; which document that Vitamin A deficiency is widespread in Africa.

1980 AID funds International Center for Epidemiologic and Preventive Ophthalmology (ICEPO) as research and technical assistance resource center.

1981 IVACG meeting in Nairobi, Kenya triggers country programs in Africa.

1982 Publication of *Nutritional Blindness: Xerophthalmia and Keratomalacia*—a comprehensive reference text on Vitamin A deficiency based on the Indonesia research project.

1984 ICEPO reports on Indonesia field research suggesting linkage between Vitamin A, morbidity and mortality.

1985 AID increases support of Vitamin A activities by ten-fold, funding:

- Country programs in Bangladesh, Indonesia, Philippines and Zambia through Helen Keller International and in Malawi through the International Eye Foundation.
- Evaluation of impact of Vitamin A supplementation on child illness and mortality in Bangladesh, India, Philippines and Zambia.
- Planning for Vitamin A country programs in Haiti and Nepal through ICEPO.
- Social marketing and nutrition education expertise to support Vitamin A interventions through Manoff International.

SOURCE: Office of Nutrition, AID