

PW-ABE-127 64414



THIRD INTERNATIONAL CONFERENCE

ON ORAL REHYDRATION THERAPY

PROCEEDINGS

ICORT III

PROCEEDINGS

Prepared for the
Agency for International Development
Office of Health
Bureau for Science and Technology

**Third International Conference
on Oral Rehydration Therapy**

December 14-16, 1988

Washington, DC

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Foreword

As Administrator of the Agency for International Development (A.I.D.), it was a great privilege for me to host the Third International Conference on Oral Rehydration Therapy (ICORT III), held December 16-18, 1988, in Washington, D. C. This conference was sponsored by A.I.D. in cooperation with the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), The World Bank, and the World Health Organization (WHO).

At the first ICORT conference in 1983, A.I.D. called upon the governments of developing countries, other international donors, and private groups around the world to join the United States in an effort to attain near universal availability of oral rehydration therapy (ORT) by 1990. The second conference (ICORT II) highlighted the tremendous successes that had been achieved toward that goal in just a few years and identified ways to overcome barriers to further progress.

By ICORT III, over half of the world's children had access to ORT. Conference reports indicated that more than 300 million cases of childhood diarrhea are now being treated using some form of ORT and as many as one million deaths were prevented in 1987 alone.

The job is not yet finished, however. The challenge now is to sustain the hard won gains of the 1980s, as well as to expand ORT access and use.

It is this need for sustainability that provided the focus for ICORT III. Those attending and leading the conference discussions were primarily decisionmakers who have some responsibility for ensuring the sustainability of ORT programs. Well over one-half of those in the working group sessions were decisionmakers from the 52 invited participating countries and 48 of the 56 speakers at the conference were from the participating countries. Ministers of health and finance, program planners, and managers described program experiences and offered strategies for sustaining ORT programs in the future.

I was especially pleased to hear a number of the conference participants explain how their governments have changed their policies to allow for the commercial production, distribution and marketing of ORS packets. I have already heard how other participants have used those examples in helping to introduce similar changes in their countries. Another commonly shared experience which has a great effect in ensuring successful and sustainable ORT/CDD programs is the education and involvement of private physicians and pharmacists. I found the recommendations concerning the increased focus on medical schools as well as continuing education to be extremely important.

This publication, which summarizes the ICORT III presentations, discussions and recommendations, is intended to be more than a record of conference activities. Rather, it is my hope that it will be both a resource and a motivating force in sustaining and expanding the use of this simple, life-saving technology in the coming decades.

Finally, this Foreword would not be complete without giving recognition to the millions of committed people around the world who are carrying out the day-to-day tasks of controlling diarrheal diseases. These include government and nongovernmental health workers, pharmacists, administrators, community volunteers, and most importantly, mothers. These are the individuals who will ensure the sustainable use of ORT to improve the health of the world's children.

Alan Woods
Administrator
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Acknowledgements

As I review the proceedings of this Third International Conference on Oral Rehydration Therapy (ICORT III), I am reminded of the enthusiasm of the participants, the wealth of program experiences presented by the speakers, and the thoughtfulness with which the small working groups developed recommendations for the future. I believe that much was accomplished during these three days of presentations, discussions and work sessions. I am also aware that as a result of ICORT III, some countries have already taken actions to address recommendations from the conference.

These achievements would not have been possible without those who dedicated themselves in a few short months to planning, coordinating, and organizing this conference.

I am particularly indebted to Ambassador Alan Woods, our A.I.D. Administrator, for his vision and strong leadership in focusing ICORT III on sustainability. I am also grateful to the four cooperating agencies which were instrumental in the planning and implementation of the conference. I especially appreciate the personal support of Dr. Hiroshi Nakajima and Mr. James Grant during the planning phase and during the conference.

Special thanks go to the following staff from the cooperating agencies: Dr. Michael Merson (WHO), Ms. Kathleen Cravero (UNICEF), Dr. Frank Hartvelt (UNDP), and Dr. Bernhard Liese (World Bank). Each participated fully and graciously in the technical and organizational planning. Their ideas and contributions were critical to the success of the conference.

When almost all of the speakers are from countries outside of the United States, there is an enormous amount of effort that must take place to identify speakers, coordinate topics, write papers, and assist in the preparation of presentations. This mammoth task was carried out under the able direction of the Technical Advisory Committee and its Chairman, Dr. Robert Black.

The working sessions were organized by Panel Coordinators in collaboration with Panel Chairpersons. Special thanks go to:

Mrs. Eugenia Kromah, Chairperson, and Dr. Margaret Bentley and Dr. Jon Rohde, Coordinators, Household Behavior and Community Participation Panel;

Dr. Deanna Ashley, Chairperson, and Dr. Norbert Hirschhorn, Coordinator, Health Worker Training and Performance Panel;

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Dr. Antoine Augustin, Chairperson, and Dr. Stewart Blumenfeld and Dr. Ronald Waldman, Coordinators, Evaluation, Monitoring, and Research Panel; and

Dr. Akanni Sorungbe, Chairperson, and Dr. Lukas Hendrata and Dr. Robert Northrup, Coordinators, Linkages with Related Programs Panel.

I am especially grateful to Mrs. Margaret Catley-Carlson, President of the Canadian International Development Agency, who served as Facilitator of the Policy Forum, and Dr. Lee Howard, Coordinator of the Forum.

Dr. Martita Marx of the PRITECH Project and Ms. Linda Sanei deserve recognition for their valuable contributions in the planning and execution of the conference. Special acknowledgement is also due to Creative Associates International, Inc., which handled all the logistics.

I want to express my deep appreciation to the A.I.D. staff who worked so hard in a spirit of cooperation to make this conference a reality. Particular recognition is due Dr. Kenneth Bart, Agency Director for Health, and Dr. Ann Van Dusen, Deputy Director, for their able leadership. Ms. Anne Tinker provided continuous technical and managerial direction. Mr. Lloyd Feinberg managed the overall conference effort, and Mr. Robert Clay assisted at key points in the planning, implementation, and follow-up.

Finally, I offer very special thanks to the ICORT III Coordinator, Ms. Suzanne Olds, who within a very short period of time pulled this entire conference together. Ms. Olds worked long hours in providing the overall technical and administrative direction needed to ensure its success.

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I. Opening Session



Opening Statement by Ambassador Alan Woods, Administrator, A.I.D. On his right, keynote speaker, Dr. Alfredo Bengzon, Secretary of Health, Philippines, and on his left, Dr. N. C. Brady, Senior Assistant Administrator, A.I.D.

1

Introduction

Dr. Nyle C. Brady
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I welcome you to this Third International Conference on Oral Rehydration Therapy (ICORT III) with great pleasure and anticipation. This is a notable gathering of health experts from around the world. You have the ability among you to bring the use of oral rehydration therapy (ORT) technology to a new pinnacle of success.

If we think of development assistance as an effort to preserve and enhance human life, in no way can we make a greater impact than by improving the lives and prospects of the very young. Over the last 30 years, science has opened the door to an array of new health technologies that has significantly reduced childhood illness and death. We in the development community have used and improved many of those technical breakthroughs. The therapy we will celebrate and reaffirm at this meeting may be the most accessible technology that became available through that process. It is certainly the one with the greatest potential for rapid and wide dissemination.

The first ICORT conference, sponsored by A.I.D. in cooperation with the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR, B),

UNICEF, and WHO in June 1983, focused on promoting the use of oral rehydration therapy and encouraging country policies to that end. In December 1985, UNDP and The World Bank joined the aforementioned cooperating organizations to sponsor ICORT II, which emphasized widespread implementation of ORT programs.

Today, only 5-1/2 years after the first ICORT, the donor organizations that have actively pursued the use of this breakthrough technology—UNICEF, WHO, UNDP, The World Bank, and A.I.D.—have convened this meeting to discuss with health experts from the developing countries the next generation of issues.

Our efforts to date have been rewardingly productive. In 1983, only about 22 percent of the global population had access to some 104 million liters of oral rehydration salts. By 1987, those numbers had almost tripled (to about 60 percent and 330 million liters).

Many of the oral rehydration salts available today have been adapted to locally available containers for ease of mixture, and by 1987 the majority (66 percent) were manufactured in host countries. In addition to improving the product, we have learned much about the perceptions of those who provide health care and, thus, have been able to improve communication about diarrheal disease control.

I hope that many of you had an opportunity to attend the Communication Fair last night. It was truly



Dr. Nyle C. Brady

exciting to see demonstrations of the many ways in which we are getting out the message about ORT to mothers, doctors, nurses, and others who provide health care to infants and children. The dramatizations and other communication technologies used to encourage the proper use of ORT exemplify the ingenious creativity and variety of talents human beings employ as they help one another.

ORT has indeed come a long way in a short time and is now at a turning point. Most of the countries represented here have played vital roles in the research, development, production, and distribution processes and have the potential power to maintain and carry forward vigorous ORT programs. The donor community is anxious to reinforce your efforts so that all infants and children who can benefit from its use will have access to properly administered ORT.

I hope and expect that the next three days will afford all of us an opportunity to communicate our thoughts, ideas, and expectations. We share a dream—that the needless suffering of infants and young children throughout the world will be dramatically reduced—and we now have well in hand one important technology which can help make that dream come true.

You will note on the curtain behind us the symbols of the organizations that are cosponsoring this important conference. Joining with the U.S. Agency for International Development are four international organizations, each with unique but very positive concerns for child survival and for oral rehydration therapy. During the past five years, the five organizations have worked exceedingly well together in coordinating efforts to improve child survival programs. We have representatives of each of these organizations on the stand with us today. Most of them will be making specific presentations later during the conference and will be more formally introduced at that time. I would like to take this opportunity now, however, to recognize each of them and the organizations which they represent.

- Mr. James P. Grant, Executive Director of the United Nations Children's Fund;
- Dr. Taguir Bektimirov, Assistant Director-General of the World Health Organization;
- Mr. V. Rajagopalan, Vice President for Sector Policy Research at The World Bank;
- Mr. Andrew Joseph from the United Nations Development Programme; and
- Ambassador Alan Woods, the Administrator of the U.S. Agency for International Development. He is my boss and, perhaps more than any other person, is responsible for this conference.

These five great leaders from the donor community represent the will and desire of the more-developed world to help increase child survival. The financial and human resources of these institutions are critical for the success of child survival and, in turn, oral rehydration programs. But they are only the cheerleaders, so to speak, for the real participants in this struggle to keep children alive. The on-the-ground players, who determine the success of any oral rehydration program, are the children's mothers and families who become aware of and use this simple, easy-to-implement therapy, which has prolonged the lives of so many infants and children.

The coaches and teachers of these players are the health professionals and educators in national and local programs. Most of you represent these national efforts, and it is primarily for you that this conference is intended. You are the ones who can tell us what we can and should do to help you make ORT more sustainable.

We have asked one such leader to help us open this conference. All of you will participate in specific discussions as the conference proceeds. At our head table today is one great leader who will tell us what his country is doing on ORT. We will hear from him later, but I will introduce him at this time—Dr. Alfredo Bengzon, Minister of Health of the Philippines.

I would just like to say a word about one other group that is very well represented at this meeting today. They are the intermediaries between organizations such as those that I have mentioned and the developing country organizations. And I want to pay special tribute to them because they are the ones that do what they can to provide technical assistance in this important field.

In doing so, I would like to pay special tribute to one member of that team who unfortunately is not with us. This is Jane Schlendorf. I would like to take a moment to remember and pay homage to her. She was a senior program manager of the Technologies for Primary Health Care (PRITECH) Project who was responsible for developing and managing their ORT, control of diarrheal diseases (CDD) projects in Nigeria and the Philippines. Jane tragically died this last week from malaria upon returning from an ORT mission to Nigeria. She was only 34 years old. Her life, as short as it was, was a testimony of commitment and devotion to the cause of improving the conditions in the developing world.

We are very pleased to have with us today members of her family, sitting here in the first row. I think it would be appropriate for us to recognize the accomplishments that she made, to recognize in her name the accomplishments of all of those who are so involved, and, on behalf of the agencies represented here, to express our condolences.

Opening Statement



Ambassador Alan Woods

Ambassador Alan Woods
Administrator
Agency for International Development (A.I.D.)
Washington, D. C., USA

It is a pleasure to welcome you to this, the Third International Conference on Oral Rehydration Therapy (ICORT III).

I know that many of you have come great distances to be here. It is a measure of the importance of our topic that you have done so. All of us here today are committed to sustaining oral rehydration programs in the 1990s. So to you, my colleagues in this endeavor, let me say thank you for coming here. We all have a great deal to learn from each other.

As you know, this conference is something of a joint venture. A.I.D. has had marvelous assistance from its cooperating sponsors, and I want to take a moment to extend my personal thanks to their representatives this morning:

- Mr. James P. Grant, Executive Director of UNICEF;
- Dr. Taguir Bektimirov, Assistant Director-General of WHO;

- Mr. V. Rajagopalan, Vice President for Sector Policy Research at The World Bank; and
- Mr. Andrew Joseph, Assistant Administrator and Regional Director for Asia and the Pacific for UNDP.

I also want to say thank you this morning to Suzanne Olds of A.I.D. who took on the strenuous task of planning and managing this conference. Suzanne, you have done a great job.

We had hoped—as this conference was planned—that President Reagan might be able to join us. He knows of the work we are doing with oral rehydration therapy (ORT), and he is supportive of that work. Unfortunately, his schedule did not permit his participation in our conference. He has, however, sent a message that I would like to read to you.

From the White House, Washington, D. C., dated December 12th of this year, comes the following message:

Warmest greetings to the many distinguished participants in the Third International Conference on Oral Rehydration Therapy. My special thanks to the Agency for

International Development for organizing this event, which highlights one of America's major foreign aid successes—expanded availability of ORT to young children around the globe.

Every year, nearly 4.5 million children in the third world die from dehydration, a tragedy especially poignant when we remember that virtually every one of those deaths is preventable by means of ORT. In 1980, fewer than one percent of children suffering dehydration had access to this simple, lifesaving solution of water, sugar, and salts. Today, more than 60 percent do. That's heartening news, but I know you won't rest until it is available to every child.

I am happy that ICORT III will focus on ways individual countries can sustain their own ORT programs. Fostering local private sector initiatives to prepare and market this remedy remains the best approach to making it accessible on a truly worldwide basis.

You have my prayers and best wishes for every success in the year ahead. God bless you.

And it is signed, "Ronald Reagan."

Speaking for A.I.D.'s child survival staff—and I would imagine for many of you, as well—we really have surprised ourselves with all that has been accomplished in the name of child survival.

- Country after country has reached goals that only five years ago seemed unattainable.
- Fully one-quarter of the diarrheal episodes of young children are now treated with oral rehydration salts.
- In a number of countries, we are beginning to see results, in terms of decreasing infant and children's deaths from diarrhea.
- We are also seeing the emergence of creative approaches to the delivery of health services—approaches that build on the strengths of public, private, and academic communities.

As the Administrator of the United States Agency for International Development, I am proud to be a part of this success story. I am gratified, too, by the roles that others have played. Here I think particularly of the developing countries, of private voluntary organizations (PVOs), of private health care agencies, of our cooperating sponsors for this conference, of other donors, and of the Congress of the United States.

Yet even while we applaud our accomplishments, we must recognize that success can be ephemeral. The progress we have made will have little meaning if it is not widened and sustained. That is why we have made the sustainability of ORT programs the central theme of this conference. As we look to the future, we must address the challenges before us.

Expanding programs—so that all children will have effective access to ORT—is one element of the challenge we face. We know, for example, that if we want to ensure the survival of children who suffer from dehydration, we must do more than simply provide oral rehydration salts. Ultimately, success depends on several things:

- creating the capacity to produce and distribute these salts in developing countries;
- reaching families with the information they must have to know when—and how—to use these salts or other appropriate and readily available solutions;
- making sure that families understand the importance of continued feeding during and after diarrheal episodes;
- ensuring that families can get medical help for serious cases—where that is needed; and
- developing financing mechanisms that will sustain these programs.

When properly used, the impact of ORT can be amazing.

As some of you may have heard before, one of my first trips overseas as A.I.D. Administrator was to Egypt. In between talks on macro-economic reform, food imports, and infrastructure projects, I visited a health clinic in Cairo. While I was there, I witnessed the almost-immediate effect that ORT has on dehydrated children. These effects are familiar to most of you—but miraculous nonetheless.

What struck me in particular was the transformation that took place in mothers who were administering the solution.

- They became more confident, more self-assured, and certainly more convinced that ORT was saving the lives of their children.
- When you see ORT in action, it is not hard to understand why the news about its benefits has spread throughout the world.

- Today, almost every mother in Egypt knows how to treat diarrheal episodes in her children.

As A.I.D. Administrator, as an American, and a father, I was deeply touched by the impact of this simple technology. Certainly, sustained economic growth is the long-term answer to assuring adequate health care for all children. Yet immediate measures are also required. My experience in Egypt—and other experiences since then—explain why I feel so strongly about the work we must do to sustain and expand ORT programs.

In Egypt, the ORT program is well advanced. Today, more than 80 percent of all Egyptian families know about ORT and have access to the salts. In more than half of all diarrheal episodes, ORT is used.

Egypt's ORT program stands as an example of what can be accomplished. But that success did not come easily. It took time—nearly 10 years—and careful attention to program planning and evaluation over that period.

The oral rehydration program in Egypt serves to remind us of the work that remains to be done in other countries:

- As of 1986—the most recent year for which we have global data on utilization rates—access to information and to oral rehydration salts in the Sahel was very limited.
- Even in those African countries where access to information and the salts has been relatively high, utilization rates remain low—often below 10 percent.
- In some Latin American countries, utilization rates may be exceeding 20 percent. Yet in other Latin American countries—such as Guatemala and Peru—ORT is used for less than 5 percent of all childhood diarrheal episodes.
- Similar situations exist in Asia and the Near East, where the use of ORT in countries other than Egypt ranges from a high of 51 percent in Bangladesh to a low of 5 percent in Yemen.
- The developing countries are not the only countries where ORT saves lives. As the *New York Times* reported just last week:
 - More than 200,000 American children are hospitalized each year for dehydration due to diarrhea; and
 - Several thousand children die.

The need to expand ORT programs is clear. Yet even as we contemplate the need to expand these programs, the fundamental problem of their sustainability confronts us.

In launching ORT programs around the world, we have relied heavily on donor funds and almost exclusively on overextended public-sector health programs. Over the long term, this is neither a wise nor an adequate approach for sustaining ORT programs or for expanding their coverage. Within our lifetimes, significant demographic changes will make it all but impossible to rely on the public sector to finance this—or perhaps any—major health initiative. We know, for example, the following facts:

- The population of today's developing countries is expected to grow to 3.7 billion people by the year 2025.
- By the turn of the century, more than half of that population will be living in crowded urban areas—where service delivery systems are already strained.
- At the same time, all countries—developing countries included—are facing another major adjustment.
 - The age structure of their populations is changing, with larger numbers of people joining the workforce and the ranks of the elderly.
 - Increasingly, these groups will require care for a variety of chronic diseases.
- With rapid population change occurring in the developing countries, the delivery of essential services (health care, education, sanitation) must increase approximately 2 percent *every year* just to maintain current levels.
- Yet in these same countries, economic growth rates often fail to match the rates of population growth. When that happens, national budgets for health services—as well as individual incomes—stand still or decline.
- Meanwhile, population levels in the donor nations are expected to remain much the same, which means that even with sound economic growth in the developed countries, official donor assistance on a per-developing-country recipient basis is not likely to increase as we approach the 21st century.

It is against this backdrop that we must find ways of sustaining and expanding the coverage of the ORT programs we have initiated.

Our chances for sustaining and expanding ORT programs are best in countries that have or are developing viable health systems. As we work with ORT, we have opportunities to help developing nations strengthen their health systems and put them on sound financial footings. We need to take advantage of those opportunities to ensure that oral rehydration programs will be sustained, and that these countries are prepared to meet the full range of health needs they will face in the 1990s.

As we look toward the future—in this conference and in the months ahead—I will offer three suggestions:

- Let us not avoid the difficult questions.
- Let us express our concerns.
- Let us take each issue head on.

An example or two will illustrate my points. I have heard the argument that the impact of ORT is illusory—that some children saved by ORT die of some other disease. Now at one level, this is true. Oral rehydration therapy cannot prevent tetanus. Then again, a tetanus shot will not prevent diarrhea.

The truth of the matter is that many children from less-developed countries (LDCs) face multiple risks. Diarrheal disease is only one of the illnesses that claim the lives of dramatic numbers of infants and children. Indeed, the overall statistics on infant and child mortality are grim.

- Diarrhea kills 4 to 5 million children each year.
- Roughly another 3 to 4 million die from measles, tetanus, whooping cough, and polio—diseases that can be prevented by immunizations.
- Still another 2 to 3 million succumb to other acute respiratory infections.
- A million people—most of whom are children—still die each year from malaria.

A child who survives any one of these diseases may die from another.

At A.I.D., we know that if we were to eliminate just one of these diseases, the effect on overall infant and child mortality might not be significant. That's why our child survival program—and the child survival programs of other donors—cover a range of interventions.

Oral rehydration therapy is a wonderful tool, but there are no "silver bullets." Oral rehydration therapy

cannot—should not—be the only element of an overall child survival strategy. Nor, in a broad sense, can it be the only way we approach diarrheal diseases.

Improved water and sanitation systems have a clear role to play in reducing death from diarrhea. But water, sanitation, and other basic prevention programs are expensive and require extensive community involvement and education. Most important, they require time. What is more, their benefits are soon lost without parallel investments in operations and maintenance.

Practically speaking, for most developing countries, significant improvements in basic infrastructure accompany solid periods of economic growth. Yet even as countries pursue economic growth and the means to finance large infrastructure investments, children are dying from dehydration caused by diarrhea. In these circumstances, ORT remains an appropriate—and in some cases the only—way to keep children alive. That is why I believe we need to find effective ways of putting ORT programs on solid footings—and expanding their coverage.

Moving on to another issue, I have heard it said that physicians and other health workers do not accept ORT and prefer exclusive use of antidiarrheal drugs. Well, if that were true, it would not be a good sign.

We know that we can use specialized campaigns to teach one generation of mothers about ORT. But knowledge about the effectiveness of this therapy must permeate a society—its health system as well as each successive generation of mothers. Health workers' and physicians' commitment to ORT is thus a serious issue.

It is appropriate for us to ask whether their commitment is adequate.

- At A.I.D., we sense that health workers' training is changing rapidly and that ORT is being incorporated into training curricula.
- We hear that programs in some countries have begun working with private drug manufacturers to apply modern marketing techniques to promoting the use of oral rehydration salts.

The question we need to ask ourselves as we discuss program sustainability is whether these changes are coming fast enough—or going far enough. On this question, it is my sense that more emphasis on public-private partnerships may be needed to heighten the medical community's acceptance of ORT.

Another challenge that comes up when people discuss ORT is that the therapy is too difficult, because it requires mothers to change their behavior. Well, behavioral change is required when ORT is put to work, and behavioral change is difficult. But there are

at least two behavioral factors working on behalf of ORT programs:

- First, mothers are rational; and
- Second, mothers care about their children.

When mothers see ORT save children's lives, they understand the value of behavioral change.

Clearly there is much that can be done to simplify both the message and the steps required to mix the solution. But experience in countries such as Bangladesh and Egypt suggests that mothers *do* learn. Good education is both possible and practical.

I mention these issues and concerns about ORT, not because we are prepared to abandon our support for it. We are not. Its simplicity, its potential for engaging the private commercial sector in health care delivery, its encouragement of active roles for families in their own health care, and its proven record of success make us all the more committed to this lifesaving technology. I mention these issues because a discussion of program sustainability in the years ahead must acknowledge and deal with them. I know you will have other concerns to add to the list, and I encourage you to do so.

This is a time to look forward, to define what needs to be done to sustain and expand the progress that has been made in recent years. Much has been accomplished with ORT, but in another sense our work has just begun.

Diarrheal disease is still the single largest cause of death among young children. Early death and poor health continue to weaken the developing world by eroding families, by keeping productivity levels down, and, ultimately, by keeping economies from growing.

Although sustained economic growth is the long-term answer to assuring adequate health care for all of the world's children, immediate measures are also required. This is where ORT fits in.

Every day, we are learning more about how to save lives with this simple therapy. We know, for example, that mass media is effective in communicating child survival messages. We also know that improving the way health systems are managed is important and that training of health workers is essential.

Our real challenge in the coming years will be to adapt ORT to the obstacles of a changing world. In an evolving environment, we must learn how to build long-term financial viability, technical continuity, and appropriate targeting into our programs. To do so, we must ask some tough questions.

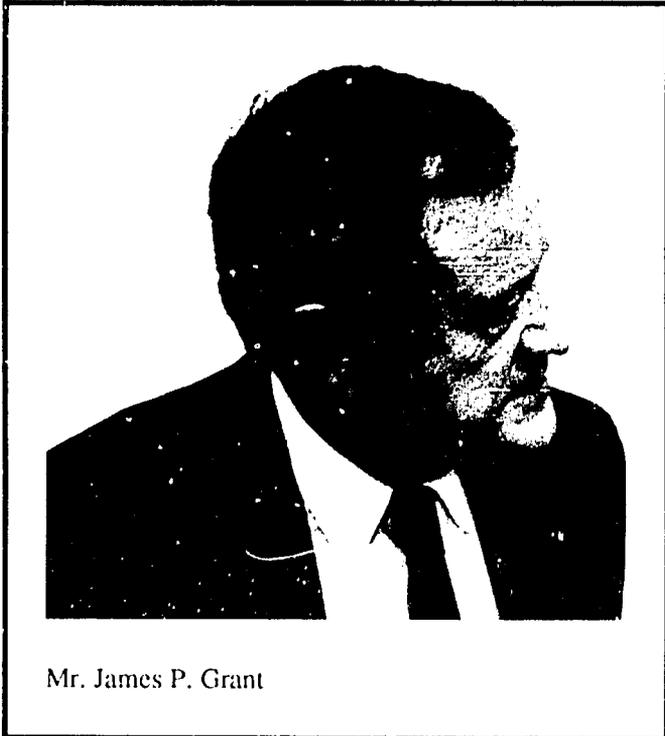
- How can we become better at serving hard-to-reach populations—in urban slums as well as rural areas?
- How can we become better at mounting programs in countries where there are few trained people? How can we make ORT part of a basic health approach that is routinely followed by physicians, health care workers, and parents?
- And, how can we do all this without bankrupting or distorting the health systems of countries struggling to attain some measure of sustained economic growth?

As I said, these are tough questions, but I believe that we are up to answering them. We cannot let protocol interfere with a full and frank discussion of the challenges we face. Instead, we must commit ourselves to spending the next two days searching for practical solutions.

This is a unique gathering of talent and experience. I hope that during these sessions our collective skills will be put to use to identify practical and cost-effective recommendations for ORT programs for the 1990s. I am eager for us to get started on this formidable task.

Thank you, and good luck to all of us. The lives of children depend on the answers we find.

Welcome



Mr. James P. Grant

Mr. James P. Grant
Executive Director
United Nations Children's Fund (UNICEF)
New York, New York, USA

At the outset of the First International Conference on Oral Rehydration Therapy (ICORT I) in 1983, I spoke about a "silent emergency"—a deadly combination of extreme poverty and underdevelopment—that was claiming the lives of over 40,000 small children each day. A global, economic depression was strangling development assistance, government budgets, and family incomes. This depression also threatened to wipe out precious, hard-earned progress toward meeting children's needs in so many countries. In response to this silent emergency, UNICEF had, just a year earlier, invited experts from international agencies (the World Health Organization, The World Bank, the World Food Council, the United Nations Food and Agriculture Organization, the Agency for International Development, the United Nations University and the International Food Policy Research Institute) and nongovernmental organizations to discuss what might realistically be done to protect children from the forces of recession and shrinking resources that we saw around us.

We saw at that time that, despite darkening economic circumstances, an unprecedented potential to improve the health and well-being of children was emerging as a result of certain converging forces. We

saw that the majority of child deaths were due to causes for which we had long since discovered low-cost cures and preventions—such as oral rehydration therapy (ORT). And we saw that the rapidly expanding capacity to communicate with and organize the world's poor could breathe a whole new life into the principles of primary health care, with their emphasis on community participation, self-reliance, prevention, cost effectiveness, and the use of paraprofessionals and appropriate technologies. These can help to bridge the gap between the available health knowledge and its use in community settings by those who need it. It was the combination of these forces, of course, that gave rise to the potential for what is now widely known as the Child Survival and Development Revolution (CSDR) in the content of primary health care. I know that among today's gathering of veterans of this revolution for children, there are those who will remember that we coined a new acronym, GOBI-FFF. GOBI stood for Growth-monitoring, ORT, Breastfeeding with proper weaning practices, and Immunization. FFF stood for the more difficult but also widely applicable Family spacing, Food supplementation, and Female literacy.

We might say that the rest is history, but it is history in the making. Those of us in this room have more than a small role to play in the outcome of the story that is still unfolding.

The magnitude of *potential* in this area was articulated by WHO Director-General Hiroshi Nakajima in an address last August to 1,500 health educators in Houston, Texas:

Parents and families, properly supported, could save two-thirds of the 14 million children who die every year—if only they were properly informed and motivated. Immunization alone could save 3 million lives, and another 3 million deaths a year could be prevented by oral rehydration, a simple and cheap technology.

This breakthrough on child survival and development, to which ORT has contributed so much, has had major additional implications, two of which deserve special mention as we open this session.

First, in many countries, there has been a significant increase in attention at the highest levels to child health and well-being. At a time when economic difficulties were pushing in the opposite direction, we were able to mount the counterattack of "adjustment with a human face." This called not only for promoting—as opposed to sacrificing—investment in the social sectors, but also for making those sectors far more effective by, for example, shifting investment from costly hospitals to far more cost-effective primary

health care, with particular attention to the leading edges of the control of diarrheal diseases (CDD)—ORT and expanded programs on immunization (EPI). Mr. Peter McPherson, a prior administrator of A.I.D., often referred to ORT and EPI as the "twin engines" of child survival. In many countries leaders from several sectors, including presidents and prime ministers, have adopted child survival as their own.

A "Grand Alliance" is now emerging, involving every sector of global and national societies, including the media, nongovernmental organizations (NGOs)—such as the League of Red Cross and Red Crescent Societies; the Rotarians, who, as most of you know, have now raised some \$240 million for polio (more than twice their original target) far before their original deadline of 2005; Save the Children; the Oxford Committee for Famine Relief (OXFAM); and many others—as well as religious structures and thousands of indigenous NGOs and enterprises. For the first time, children have even become the subject of summitry, beginning with the South Asian Association for Regional Co-operation (SAARC) summit in Bangalore in November 1986. Since then, child survival has been discussed at the last two summit meetings of the Organization of African Unity, with more than 30 heads of state participating; and at a summit of Central American leaders. Even at the Moscow summit last May and early June, President Reagan and General Secretary Gorbachev took up the child health breakthrough now in progress, selected a single third-world development subject to concentrate on, promised increased support, and called on others to join. Interestingly enough, General Secretary Gorbachev has been in contact with WHO and UNICEF in the months following that summit to discuss how they could play a greater role. It is worth noting that health structures worldwide are noticeably stronger as a result of the new attention paid to child health and well-being through activities that we have all engaged in.

Second, your successes have contributed to the generally unexpected progress we are now seeing on the draft Convention on the Rights of the Child. This convention addresses the responsibility of societies and parents in assuring a child's rights for survival, protection from abuse, and the opportunity to develop physically and mentally. The draft Convention, first proposed in 1979, is nearing completion. Just last week the Human Rights Commission working group completed agreement on a text that will now go forward to the Human Rights Commission in February. From there, it will go to the U.N. General Assembly, which we hope will adopt it next fall on the 10th anniversary of the International Year of the Child. Adoption and ratification by the 20 countries necessary to activate this, preferably within the first year, would establish by treaty a new set of standards that would serve as a very

powerful additional underwriting of what we are trying to do. Ratification would also make it more and more impossible for individual countries and societies to tolerate the thousands and thousands of readily preventable deaths that we now have in so many countries.

Having set forth all these causes for congratulations, we must remember, as Alan Woods reminded us, that an average of some 10,000 children are dying every day from causes associated with diarrheal dehydration. This week, the number of children who will die from diarrheal dehydration equals the total number of persons who died in the recent terrible Armenian earthquakes. And the same will be true next week, the week after, and the week after that.

Yet, we still don't have the type of response that we should have. Twenty years after the scientific confirmation of ORT's life-saving effectiveness, 10 years after we began to seriously promote ORT, and 5 years after ICORT I, we are still having the equivalent of an Armenia every week. Using another analogy, every week the daily toll is the equivalent of some 30 jumbo jets crashing every day. If there were just one jumbo jet crashing every day, the world would be up in arms. What we are dealing with here, however, is a new opportunity rather than a retrogression, and somehow the world organizes to respond to retrogressions but does not yet respond to new opportunities that people like you have brought to us. A central theme of ICORT III should be how to urgently reduce the unconscionable lag between low-cost, readily usable knowledge and its use in the community.

Today, the silent emergency is still with us, but we are armed for action with proven tools. The fact that considerable progress has been made in this remarkable revolution for children—and that there is potential for further major advances—was affirmed in mid-March at a meeting convened by the International Task Force on Child Survival in Talloires, France. This task force gathered a dozen health ministers and health secretaries from most major developing countries of the world; heads of major international organizations, such as Barber Conable of The World Bank, Halfdan Mahler of WHO, and myself; plus major bilateral-aid agency administrators such as Alan Woods of A.I.D., Margaret Catley-Carlson of the Canadian International Development Agency (CIDA), and Carl Tham of the Swedish International Development Agency (SIDA); and private leadership from the Rockefeller Foundation and Rotary International. Participants concluded that, with a modest additional amount of political will, it *is doable*—by the end of this century—to reduce the 1980 death rate for children by more than half. More than 100 million children could be saved from death and disability during this 12-year period. In fact, one major part of the world from which I have just returned, UNICEF's Middle East and North

Africa region, encompassing the Arab countries, Iran, and Turkey, should achieve this halving by 1990. No part of the world in history has ever achieved that rate of progress in well-being for children.

Another measure of accomplishment is the fact that within the last 12 months alone, the lives of some 1.5 million young children have been saved by immunization, and another million have been saved by the use of ORT. Nearly comparable numbers have been saved from crippling disabilities caused by childhood diseases.

As we begin the deliberations of ICORT III, let us focus the utmost of our skills as scientists, social mobilizers, planners, and creative individuals on these two questions:

1. What needs to be done to reach the 3.5 million children still dying each year—10,000 every day—from diarrheal diseases associated with dehydration?

2. How do we sustain the significant progress that we are making?

The capacity to save these lives is so clearly before us. Gathered in this room are the world's leaders on this issue. This is our domain, our responsibility. While whole societies and communities must become involved in spreading the use of ORT, there is no one else to take the *lead*, other than those of us in this room. Can we emerge from these three days of deliberations with the plan—and the redoubled commitment—that will ensure achieving the WHO Program for CDD goal of providing access to ORT for at least 80 percent of childhood diarrheal cases in developing countries by 1990? This single measure would save the lives of millions of young children annually by the beginning of the decade. Can we reach the unreached with this powerful low-cost intervention? Can we sustain our successes?

Together, through means such as this meeting, I think we can.

Welcome

Dr. Taguir Bektimirov
Assistant Director-General
World Health Organization (WHO)
Geneva, Switzerland

It is a great pleasure for me to welcome all of you to this conference on behalf of Dr. Hiroshi Nakajima, Director-General of the World Health Organization. WHO had the privilege of being one of the cooperating agencies in the first two International Conferences on Oral Rehydration Therapy (ICORTs) and is delighted to again be an active participant in this important international forum.

We are particularly grateful to have the opportunity to collaborate closely with A.I.D., under the leadership of Mr. Alan Woods, which is providing much of the financial support for this conference. A.I.D.'s firm and sustained commitment to child survival is well-recognized and has played an important role in promoting and supporting the development of national diarrheal diseases control and other important child health programs in many countries. WHO is also pleased to be cooperating in this conference with its international partners, UNDP, UNICEF, and The World Bank, all of whom are supporting various treatment and prevention related activities in many countries.

WHO recognizes the great public health burden caused by the diarrheal diseases and continues to give the highest priority to their control. This is evidenced



by the importance that is attached to the successful implementation of national diarrheal disease control programs. Today, such programs are not only reducing diarrheal mortality and associated malnutrition in many countries, but also are contributing to the development of the health infrastructure and the strengthening of primary health care services.

In this regard, we are particularly pleased that this conference is focusing on the theme of sustainability.

On behalf of WHO, I can assure you that we are prepared to provide you with the necessary support so that your programs can continue to develop and be successful in the face of the many social and economic constraints present in many countries. We very much hope that this conference will allow us to learn from each other's experiences in achieving sustainable programs.

Welcome



Mr. V. Rajagopalan

Mr. V. Rajagopalan
Vice President
Sector Policy and Research
The World Bank
Washington, D. C., USA

I am honored to address this Third International Conference on Oral Rehydration Therapy (ICORT III). We at The World Bank are privileged to be associated with WHO, UNDP, UNICEF, and A.I.D. to help countries combat the scourge of diarrheal disease through oral rehydration therapy (ORT). Jointly, with bilaterals and nongovernmental organizations, we have supported important technical improvements and sustained investments in diarrheal disease control and

research. The World Bank is proud to be a part of this team and to collaborate again in this third conference.

While impressive progress has been made, we must be wary of letting the achievements made to date in the use of ORT lead to complacency. Much work remains to be done. Diarrheal diseases still account for more than one quarter of all deaths of children under 5 each year. These deaths can be prevented by low-cost interventions. But this will require a continued commitment of donor agencies and decisionmakers in government to the fight against diarrheal disease as part of a larger effort to improve child health and survival rates in the developing world. The Bank is fully committed to this effort.

In a recent speech on child survival, World Bank President Barber Conable stated that The World Bank is proud to be a part of the "Grand Alliance" to improve health. "The Bank," he said, "is part of that team because it is a development institution and because improving a nation's health is a way to augment its wealth." ORT is an important and critical element in the fight for child survival. We must remember, however, that our efforts to promote and improve ORT represent only one, albeit major, aspect of a broad range of activities required to realize the goal of better health. We must *not* neglect these other critical areas.

First, we must continue support for the Expanded Programme on Immunization, which targets measles, tetanus, polio, whooping cough, diphtheria, and tuberculosis. Together, these diseases account for more than 3 million deaths per year. Although 50 percent of the target population is now covered by immunizations against these six diseases, we need to achieve a goal of 80 percent coverage by 1990.

Second, acute respiratory infection, like diarrheal disease, accounts for millions of deaths annually. Control and treatment of acute respiratory infection is, like ORT, provided on a case management basis, which in turn depends on the primary health care infrastructure. Reducing mortality from acute respiratory infection, like reducing mortality from diarrheal disease, will depend on improving the primary health care infrastructure.

Third, vitamin A and iodine deficiencies are a serious public health problem in many countries, contributing to child morbidity and mortality, and hampering child development. Vitamin A and iodine supplementations are simple, relatively low-cost measures that can be used to combat deficiencies where they exist.

Fourth, half the world's population is at some risk of malaria, and a resurgence of the disease has occurred in many areas. Renewed support is needed for interventions to prevent malaria mortality and to reduce transmission if we are to lessen the great burden of illness and death caused by this disease, especially in sub-Saharan Africa.

Finally, the number, timing, and spacing of births are significant determinants of the health and nutritional status of both children and mothers. Support for and provision of family planning services that facilitate spacing children needs to be expanded.

We need, in addition, to look beyond ORT toward more intensified development of primary health care in the context of the health sector as a whole. While ORT, like immunization, is an excellent vanguard for the development of primary health care systems, implementation of a single intervention, or group of interventions, will not bring about health-sector development, per se. Also, implementation will not lead to the realization of the Alma Ata vision of *Health for All*, which was accepted 10 years ago by all member countries of the World Health Organization. Fulfillment of this vision requires additional inputs ranging from individual and community responsibility and action to commitment to poverty alleviation and social justice, and to intersectoral action.

Achieving the goals set by Alma Ata requires that we set priorities as well as support broad-based health-sector development, without which implementation of ORT and other interventions is severely hampered.

ORT is a selective primary health care intervention using the case management approach. Its success should serve as a model and should inspire efforts to implement other primary health care interventions.

Now let me say a word about The Bank's role in this area. We at The World Bank are trying to contribute to overall development of the health sector. Since we began lending for this sector 7 years ago, lending for health-related projects has gradually risen to \$300 million in the current fiscal year, making The Bank the world's largest lender for health projects in developing countries. We expect that by 1990 health-related lending will reach about \$1/2 billion. Many of these projects include measures to reduce infant and child morbidity and mortality specifically due to diarrhea, vaccine-preventable, and respiratory diseases; malaria; and malnutrition. We will continue to emphasize these objectives in future projects. In addition to project lending, The Bank has conducted extensive research and policy analysis on health issues, including many sector studies providing the empirical basis for these activities.

The Bank is committed to continued development of comprehensive basic health services in developing countries and to the promotion of technically proven, low-cost, highly effective interventions. ORT is such an intervention.

In closing, let me say how much The Bank values the close collaboration between international and national agencies to promote ORT. Such collaboration is critical to the effective and successful implementation of all primary health care interventions. The Bank pledges to continue its commitment to this teamwork and to the promotion of ORT. In this spirit, I hope that the deliberations of your conference will succeed in showing us how we can sustain this remarkable effort over the coming decade.

Welcome

Mr. Andrew Joseph
Assistant Administrator
United Nations Development Programme (UNDP)
New York, New York, USA

I am privileged to represent UNDP at the opening session of the Third International Conference on Oral Rehydration Therapy (ICORT III). I bring you greetings from William H. Draper III, the Administrator of UNDP, who is unable to be with you on this occasion. The United Nations Development Programme is very pleased again to serve as both a participant and as a cooperating agency in this conference.

At the outset of my remarks, I would like to congratulate A.I.D. for its wisdom and, indeed, its consistency in convening an international conference on oral rehydration for the third time since 1983. The remarkable progress that has been made since the first ICORT conference in the reduction of mortality from diarrheal diseases through oral rehydration therapy (ORT), and, indeed, in what is properly called the "child survival revolution," is due in large measure to the contribution of our hosts here in Washington.

Neither these compliments to A.I.D. nor the simplicity of ORT means that the job is done. To the contrary, it is a dismal fact that diarrheal diseases

continue to be a major cause of morbidity and mortality for millions even as we all begin to focus on the quality of life on this fragile planet in the 21st century. I remind you of the words of the poet Robert Frost, who ended his famous poem "Stopping by Woods on a Snowy Evening" with these lines: "and miles to go before I sleep, and miles to go before I sleep." Humanity, too, has all those miles to go in the struggle to overcome the appalling conditions of health, productivity, literacy,

may transcend the specific issues of sustainability and technical progress in ORT and remember that death and disease in the world today are as much a product of our environment—physical, intellectual, and social—as they are a product of infectious diseases. What we are really addressing over the next three days is whether the lot of the poorest of our fellow citizens around the world can be improved, whether the improvements can be sustained, and whether the economically disenfranchised can become productive contributors to the well-being of us all.

As Administrator Alan Woods and James Grant both said earlier, to achieve this we should, as this conference proposes, look to issues beyond rehydration salts and the health infrastructure. Although practical proposals are essential for the immediate future, we must also look further into the horizon at basic political and economic choices, at training, at self-reliance, at multi-sectoral issues, at research, and, most importantly, at integrated development and the elimination of poverty. And this is the role that UNDP, along with its government and institutional partners, is endeavoring to carry out across the developing world.

As the representative of UNDP at a gathering such as this, there is always the welcome opportunity to cite how much in terms of dollars, persons trained, research, or outputs that an organization has contributed. Indeed, UNDP is the largest contributor to WHO's Diarrhoeal Diseases Control Programme, including its operational, training, and research components. And in the region of the world for which I have particular responsibility (Asia and the Pacific), it was the International Centre for Diarrhoeal Disease Research in Dhaka that, with longstanding support from UNDP, pioneered research in ORT.

But there is no need, or room, for institutional chauvinism. UNDP, UNICEF, The World Bank, WHO, A.I.D., and many other bilateral, international, and nongovernmental organizations play fine, collaborative roles in the enormous and continuing task to ensure that the causes of human suffering and indignity are overcome.

When this group assembled last in 1985, James Grant, full of the euphoria of that hour, said, "We are at the start possibly of the greatest breakthrough for the health of children in recorded history." At the same time, with typical balance, Mr. Grant did share a more chastening thought. What he said was that the three years prior to 1985 "could well be described for children as the worst of years and also as the best of years."

I do believe that as ICORT III unfolds, you, the great organizations represented here, and you, the great personalities of this effort, will likewise take stock of the progress of humanity and of the children of the world since those memorable words were delivered by one



Mr. Andrew Joseph

and so forth that currently separate two-thirds of the globe from the privileged other one-third.

Your agenda is rich in its scope. My friend Jim Grant will address you on issues of sustainability, and another respected colleague, Hiroshi Nakajima, will be speaking about the future directions of ORT. In addition, there are the panels of experts and practitioners, including collaborators like Dr. Roger Eeckels and Dr. Michael Merson. I am sure that, as you leave here on Friday, there will be a renewed and enriched commitment to the increased reduction of mortality and morbidity from diarrhea, to interventions necessary for maintaining national programs, and for the steps required to sustain health as an essential key to development.

With your permission, I would like to go just a bit beyond your agenda and urge that, in your deliberations, you bear in mind recommendations that

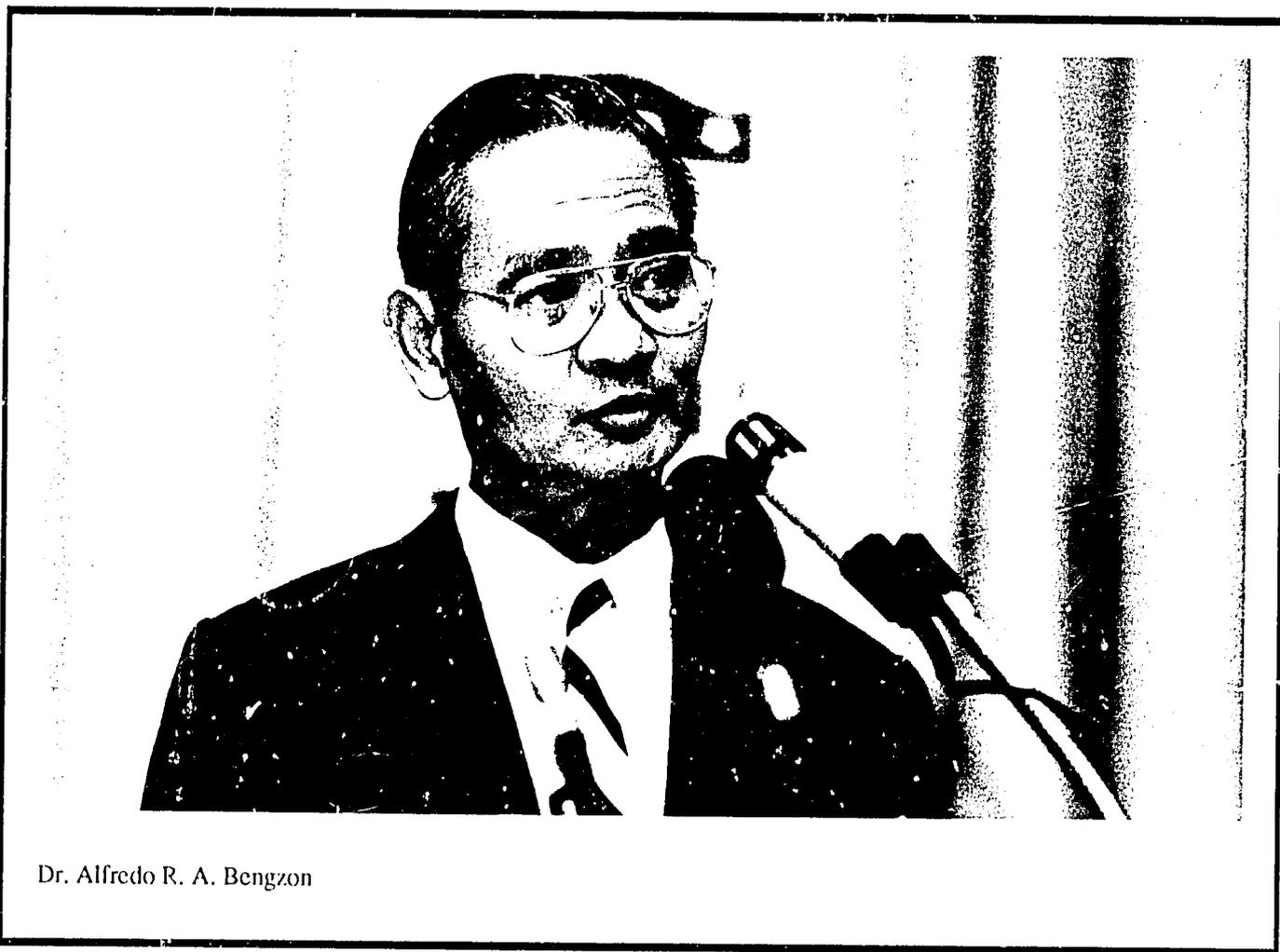
of the leaders of this enterprise. We, the lay cooperators in this effort, all await your verdict at the conclusion of this conference.

Diarrheal disease programs, including their operational, training, and research components, will remain an issue that will focus the attention of the world. The outcomes from ICORT III will be heard by many people in many parts spread over this globe.

You who have gathered here in Washington from more than 50 countries deserve warmest

congratulations for your achievements, your commitment, and your vision of the future. All of us must better coordinate our policies and efforts in assisting national programs as we move into the next decade. I take this opportunity to give assurance to all of the great organizations and persons who are committed to this effort that UNDP is ready—even eager—to remain your partner in these endeavors, and I wish you great success.

Keynote Address: Process, Passion, and Hope



Dr. Alfredo R. A. Bengzon

Dr. Alfredo R. A. Bengzon
Secretary of Health
Department of Health
Manila, Philippines

It is a great honor for me and my country to address this Third International Conference on Oral Rehydration Therapy (ICORT III). Although this is the first time I have come to this meeting, I have heard of many good things that have emerged from previous

ICORT gatherings. Some smart observers note that, although there seems to be no formal commitment to mount this conference regularly, the previous ones have been so successful that sequels became appropriate. So ICORT III can be our equivalent of *Rocky III* or *Indiana Jones in the Temple of Doom* and, I hope, be as successful as these movie blockbusters. Some other observers say that, in a sense, this

conference is part of a series of valedictory events marking the passing of an American administration that has, apart from many other initiatives, supported the worldwide oral rehydration therapy (ORT) effort. I, myself, regard this as a unique opportunity for international dialogue—more broadly based than a scientific meeting, yet more focused than a world health assembly. In any case, a meeting as large and as important as this can surely respond to the opportunity to address many purposes.

I shall take this morning's opportunity to share with you some insights and lessons from our country's experience in diarrheal disease control. Like many countries here today, the Philippines has had diarrhea as a major cause of illness and death since we began compiling health statistics. The numbers do not even begin to approximate the suffering and grief that the disease has brought to my country. Among children under 5 years of age, only pneumonia outranks diarrhea in causing morbidity and mortality. While in gross terms the magnitude of the problem is terrible, it becomes even more distressing when one reflects on the unevenness of this problem among the various areas and sectors of our society. Diarrhea is a disease of the poor and ignorant countries, and the poorest and most ignorant sectors of these countries bear a disproportionate burden of the disease.

For many years, this problem was a cross on the shoulders of my predecessors, and we have had a long and distinguished history in grappling with this problem. Although we launched our current national program in control of diarrheal diseases (CDD) in 1980, the Philippines had pioneered in using ORT as a diarrheal disease intervention long before that time. About 20 years ago, our country conducted clinical trials at the San Lazaro Hospital on various ORT formulas. Then, in the mid-1970's, we worked on field studies in Bacolod City that provided important inputs to the global program. In all our previous as well as our current efforts, we have collaborated very well with WHO, A.I.D., UNICEF, and many other donor agencies.

In 1986, we started the process to restate our CDD policies and plans, based on a clearer understanding of our opportunities as well as our weaknesses. And for the past almost 3 years now, we have put into motion the strategies and tactics we selected. To many of you who have devoted decades and lifetimes to work in diarrheal disease control, I hope you will forgive my enthusiasm and optimism in reporting the glimmerings of progress in our work despite the short period. Please excuse these to the volubility of a new recruit in the long and arduous struggle to retire diarrhea as a major public-health problem. But my awareness of being a neophyte cannot contain my high hopes in the sense of purpose and the drive to

succeed that I see in my country. So let me single out a few elements that I believe are driving our program forward.

The first item of note is a prosaic one. It is our national plan, consisting of a general 5-year directional plan and a specified 2-year operational plan articulated further into annual regional plans. It draws from a wide base of data and experience, and it confronts key policy and operational issues. It was a hotly debated plan and a widely discussed one. It may not be a perfect plan, but it is clear, courageous, and above all, it is ours: We made it; we approved it; we are committed to it. After 2 years of work, we are making adjustments based on our experience, and we look toward making further adjustments in the future. In a sense, it is more than a plan—it is a statement of our will, the ways we express that will, and the means we will use to make it possible.

The second notable item is our approach to clinical training, an approach that seeks to build confidence among practicing health workers in the use and application of ORT in the clinical situation. Apart from the technical content of the training, we seek to infuse a *missionary* spirit in the whole process. We do not simply train health workers—we “convert” them to ORT. Our idea is to cast our trainees as pioneers who bring to their posts the blessings of ORT, as they battle the “heathens” who misuse intravenous (IV) antibacterials and antidiarrheals. We are beginning to refer, sometimes no longer in jest, to our diarrhea training units as “convents for ORT,” and soon we will have three such convents around the country. I believe we have succeeded in infusing a crusading spirit in our clinical training, and this has created a tremendous momentum for better service.

The third program element that we are proud to share is the health-worker mobilization in the field, via program-skills training from region to province to district and to municipalities and villages. This is a three-pronged mobilization. First, it seeks to transfer the knowledge, attitudes, and skills necessary for health workers to practice ORT at household and clinic levels. Then, it builds team relationships between supervisors and subordinates. Finally, it localizes national policies and strategies in terms of specific local solutions and priorities in CDD. This mobilization proceeds on an area-by-area basis. One can almost visualize it as a prairie fire, as it spreads over the 67,000 personnel of our ministry. Administratively, this is a highly decentralized process. Yet the control of technical quality and the sense of the program is constantly maintained. As a result, national policies are adopted, while field units are empowered.

The fourth program element is our successful linkage with the private professional sector and the medical academy. The Philippine Pediatric Society has taken ORT as its own and has supported our national

CDD program not just in spirit, but also in substance. Accredited pediatric training in the Philippines now has taken a very clear and unequivocal stance on ORT as the mainstay of clinical management of diarrhea. At least, now we are assured that new generations of pediatricians will be better informed than their more veteran colleagues, regarding ORT.

In addition, Philippine pediatricians have also been carrying the burden of the professional promotion of ORT—carrying this among the ranks of the more numerous family-medicine practitioners and articulating it in scientific meetings and conferences, and in professional circles. On the side of academic medicine, the Association of Philippine Medical Colleges has spearheaded the revision of the medical school curriculum in order to teach ORT and diarrhea management according to current knowledge. This revised curriculum is now being implemented in six medical schools prior to more widespread adoption.

The key problem that these efforts address is the need to unify the message to mothers by medical practitioners, wherever they come from. For if only the government sector adopts ORT, mothers get confused by the different message they get from the private sector. But when both government and private sectors advocate and practice ORT against diarrhea, the treatment of the patient is improved and professionals affirm each other's use of ORT.

Finally, the Philippine program is notable for its commitment to communication as a key intervention in diarrheal disease control. We are launching a two-stage campaign to support our service activities. The first stage consists of linking diarrhea and dehydration in the minds of mothers, preparing them to create a category for action called rehydration. The second stage promotes prepared packets side by side with home-available fluids as rehydrators.

There are many important policy and operational issues that continue to percolate in our ministry about communication. The debate has been long drawn out. Part of this is due to our relative inexperience and lack of sophistication with respect to communication technology, and part is due to the extraordinary versatility, power, and range of communication. Health policymakers have to navigate through these complexities, so that communication is made to serve health and not the other way around. One thing is sure: Via communication, we are aiming to lay a foundation of awareness and inclinations among mothers, so that service delivery efforts can find fertile ground for proper ORT application.

All of these that I have described are our country's elaboration of our agreed strategies against diarrheal disease. They are, in effect, Philippine variations of WHC themes, our own unique application of established scientific and technical orthodoxy. But I cannot even begin to tell you how field experience

enriches global strategies. Lifeless statements couched in the dry language of technical manuals assume vibrant existence in the hands of trainers, supervisors, and front-line workers. Many times we forget that the most wonderful affirmation for our international agreements is not a resolution in the World Health Assembly or a worldwide declaration by UNICEF. The most important and irreplaceable affirmation of recommendations is the act of implementing, the act of translating words into actions, ideas into movement, and plans into reality. And this is what we have done. We have made Dr. Merson's statement the creed by which midwives act. We have made evaluation reports the stuff of our field operational instructions. And this tapestry of actions and decisions unfolds everyday in our program.

It is still too early to determine whether our investment in ideas and efforts as well as the considerable emotional commitments, will yield better results in terms of morbidity or mortality reduction. But as we reflect on the promise and prospects of these as well as many other initiatives, it might be useful to confront the philosophies behind these practical actions.

First of all, we must be acutely aware that the successful application of ORT within a national diarrheal disease control program requires the widespread adoption and use of new knowledge, attitudes, and practices. This can happen only if ORT supplants the mistaken notions in the existing body of knowledge, attitudes, and practices. We are familiar with traditional and folk superstitions regarding diarrhea, ranging from purging during diarrheal episodes to the use of inappropriate home remedies. We have quickly identified these superstitions, and we have been largely successful in supplanting them.

We have not been as quick or as successful, however, in grappling with what I call "modern superstitions": the use of bottled milk; misuse of intravenous antibacterials in diarrhea; and the rampant abuse of antidiarrheals. Viewed in the light of scientific data, these are superstitions no less pernicious than the unhealthy folk traditions. But whereas the wrong traditional ways are superstitions born out of ignorance, the wrong modern ways are superstitions born out of greed. And we all know that ignorance has weak constituencies, while greed has strong and powerful interests. Many times ignorance is merely local, but greed is international.

If we are to be true to the body of values underlying ORT, we have to align our efforts squarely in behalf of breastfeeding together with assertive restrictions on the use of bottled milk and infant formula, in rational drug-use policies, and in the liberation of professional medical training from commercial pharmaceutical interests. We should increasingly realize that we cannot spend millions in

promoting ORT while other sectors derive billions in income from bottled milk, antidiarrheals, IVs, and antimicrobials wrongly used. This realization is at the root of the sustainability issue.

Can we sustain our efforts in ORT without grappling with interests that erode our gains? I do not think so. For our part, we have placed ORT squarely in the center of our health sector's consciousness. We have set out with the message, "Here is a simpler, cheaper, safer, and more effective way for management of diarrhea." Many have responded, and many continue to respond. In addition, we have also passed a milk code, enunciated a national drug policy, and passed a law requiring generic labeling, prescribing, and dispensing of drugs. Again, we have set out with the message, "Here is a simpler, cheaper, safer, and more effective way to infant nutrition and pharmacology." ORT promotion creates the gains; milk code and drug policy prevent the losses. At some point, these strategic moves shall converge, and, when that comes, we shall have assured the long-term acceptance and development of ORT in our country's health care system.

The issue of sustainability can also be cast another way: How can we sustain a country's will to focus on a disease problem rooted in poverty and ignorance? In the musical, *Fiddler on the Roof*, the lead character says poverty is not a shame but a terrible inconvenience. The inconvenience of poverty makes one very short-sighted and very confused. In this situation, how can we continue to persevere in ORT initiatives?

From our experience in the Philippines, we have found a powerful mobilization tool among health workers. This is the personification of a national disease problem. In the various training programs we have organized, we have found that when health workers translate diarrhea in terms of the death of a familiar child, they begin to make ORT a reality in their lives. Somehow this catalyzing effect needs to be translated in national terms in much the same way that the assassination of Senator Aquino in 1983 catalyzed our country to overthrow a dictator 3 years later. Right now, our country has a remarkable consensus in support of ORT and diarrheal disease control, but we are conscious of the need to continually rally our people to this cause. Recently, our national leadership called for a major effort to achieve widespread availability of safe water. We regard this as another victory against diarrhea.

We see the control of diarrheal diseases as a major objective, but we also see it as a means to revitalize, strengthen, and energize the health system. We have taken the opportunity to do battle against diarrhea as an opportunity to also combat inefficiency, laziness, corruption, and a host of problems not unique to the health sector but particularly dangerous because of

the human lives that are involved. Two weeks ago, I met 700 middle managers from the field of our ministry for a review of our work in the past 1,000 days. After detailing many developments in our recent past, I concluded that as a ministry we have brought clarity to our thinking, uprightness to our actions, and credibility to our public voice. I said that we have regained our self-respect as human beings, as professionals, as a ministry, as a government, and as a nation. And we have regained it the old fashioned way: We earned it. They agreed.

This brings me to a reflection on some aspects of the current international debate on health. I refer particularly to the tension between those who would want a more focused, specifically targeted, disease-control-oriented effort in health and those who would want greater attention to the machinery that generates the social response to health problems: the national health system. Much has been said about these two clearly valid, but apparently competing, priorities. From our standpoint, there is value in advocating and mobilizing on behalf of specific issues that need to be placed on each nation's agenda. In this respect, a focused, disease-control-oriented approach is needed. But at the stage of applying solutions, as global strategies enter into national priorities, there is a need to broaden our concern to include the fundamental strengthening and enhancement of long-term viability of a national health system. I see a clear danger in simply focusing on ORT or even CDD, if in so doing, we compromise basic structures and processes in the national health system that need to be nourished, encouraged, and energized. In this sense, we must reexamine the current fashion in favor of centrally-funded projects that focus on particular items in the overall global strategy. These projects place an added burden on national programs, because the task of blending these activities into a deliberately integrated national effort becomes urgent and demanding.

While all of us want ORT to succeed, I doubt if there is anyone who wants only ORT to succeed. Diarrhea is a worldwide problem, but the world has more problems than just diarrhea. So as we grapple with diarrhea, we must take painstaking care to improve broad managerial skills, strengthen organizations, promote efficiency and equity, and provide for human-resource development in health systems. And as we constantly review work in diarrhea, we must always remind ourselves to look at the complementary actions we create, the unintended benefits we provide, and the synergies that we set into motion.

If we begin to see the control of diarrheal disease as a paradigm for the way the health sector responds to any major health problems, then we shall be attentive to the practical gains as well as the enduring values of struggles for social benefit. The great Chinese leader

Mao Tse-tung wrote about a foolish old man who removed a mountain. The old man decided one day that he would remove a mountain obstructing his view. And so he took a spade and a wheelbarrow and started removing the mountain. A neighbor laughed and said he was foolish. But the old man said, "Every day the mountain will become smaller and the next day I shall make it even smaller. And when I die, my son will carry on and his sons, thereafter. The mountain will be gone, and I shall have prevailed."

The day-to-day gains of diarrheal disease control are the measures of a mountain becoming smaller. But

the values and structures, the process, and passion of a social movement called ORT are the enduring victories equally applicable to tuberculosis control, response to AIDS, universal immunization, and the many component battles within the vast struggle of health for all. For at the heart of it all is the conviction that men under God, working within nations and among nations, can bring about a world that is just and free.

On that note, and during this season of hope and peace, let me wish all of you a Merry Christmas and a Happy New Year.

II. Country Experiences



One of the outstanding features of ICORT III was the opportunities it provided for participants to exchange country experiences.

World Overview



Dr. Michael H. Merson

Dr. Michael H. Merson
Director
Diarrhoeal Diseases Control Programme
World Health Organization (WHO)
Geneva, Switzerland

I have been asked to present an overview of the worldwide efforts in diarrheal disease control and oral rehydration therapy (ORT). You will, I hope, admit that this is a difficult—indeed almost impossible—task, given all the activities underway today throughout the developing world. What I thought I would do in the time available is summarize the technical developments in the field of diarrhea case management since the Second International Conference on Oral Rehydration Therapy (ICORT II) 3 years ago, bring us up to date on the status of national control of diarrheal diseases (CDD) programs, and offer some thoughts on priorities for the years ahead. I have had the privilege of visiting many of your countries during the past 10 years to review your program activities and can only regret that it will not be possible for me to adequately convey the enormous efforts that have made possible the results I will be mentioning here.

Technical Developments

What advances have been made in our technical knowledge about diarrhea management in the past 3 years?

First, there is now general endorsement of the use of a single solution—oral rehydration salts (ORS)—for the treatment of dehydration caused by diarrhea of any etiology in any age group. ORS is safe and effective in neonates, in malnourished children, and in infants with hypernatraemia. Almost all countries are using ORS-citrate in preference to ORS-bicarbonate because the former is far more stable and can be packaged more cheaply, while having equal efficacy.

Second, there is considerable evidence that ORS containing cereal powders, such as rice powder, can shorten the duration of diarrhea and reduce the volume of fluid required for rehydration. It is not certain that it will be possible to package a cereal ORS for the treatment of dehydration. However, we now have an incentive to select some solutions that contain these cereals for the early treatment of diarrhea and prevention of dehydration. But please let us remember that these so-called “nutrient solutions” are primarily solutions to prevent dehydration; they provide little in the way of additional calories and thus should not be promoted to mothers or health workers as having a nutritional benefit, since this could discourage them from giving vitally needed food to children during and after diarrhea.

Third, we now have ample evidence that mothers do not prepare salt-and-sugar solutions accurately, if they lack uniform mixing utensils or are not given intensive training. In many homes, they do not even have the ingredients. This gives us another reason to identify fluids already available in the home, such as cereal-based solutions, for early treatment of diarrhea.

Fourth, despite the fact that more than 30 clinical trials have been performed with ORS containing various amino-acids and dipeptides, and different maltodextrins in place of glucose, we have not yet been able to find a safe and effective “super ORS” made from defined ingredients. However, some promising experimental solutions are currently under study, and new information should be available by the end of next year.

Fifth, we now have conclusive evidence that feeding during diarrhea is beneficial in preventing weight loss, and that continued breastfeeding shortens the duration of diarrhea. We also know that giving whole cow's milk very rarely causes clinically important lactose intolerance in infants above 6

months of age. The rate of intolerance in younger infants has yet to be determined.

Sixth, we have learned a great deal about types of diarrhea that are treated primarily by means other than ORT, particularly diarrhea that lasts two weeks or more, now called persistent diarrhea. It tends to occur in infants who have had previous attacks of persistent diarrhea, are malnourished, and have recently been introduced to animal milk. Important studies are underway to learn how best to treat this condition.

Our case management strategy at the end of 1988 can thus be summarized as follows:

- early treatment of diarrhea to prevent dehydration using a home solution, preferably made up of ingredients, especially cereals, that are already available in the home;
- referral of dehydrated cases to health workers or facilities;
- treatment of dehydration with ORS-citrate;
- feeding of appropriate foods during and after diarrhea; and
- selective use of antibiotics for suspected cholera and dysentery and use of intravenous fluids for severe dehydration.

By ICORT IV, I hope we shall be able to add to this strategy an appropriate treatment for persistent diarrhea.

Status of National CDD Programs

Let us now examine the progress that has been made by national diarrheal disease control programs. One way of assessing achievements is to look at the global indicators.

- Today, about 99 percent of the developing world's population lives in countries that have programs, compared with 95 percent at the time of ICORT II.
- The percentage of the developing world's population that has access to a regularly trained provider of ORS has increased from 6 percent at ICORT I and 33 percent at ICORT II to 60 percent in 1986. We have already attained our original global target for 1989 of 50 percent access and are very likely to reach our revised target of 80 percent.

- Annual production of ORS packets has increased from 60 million one-liter packets at ICORT I and 250 million packets at ICORT II to 330 million packets in 1987. And today, in great part because of the efforts of UNICEF, two-thirds of these packets are produced in the developing countries. I doubt that there is another essential drug whose production is centered so predominantly in the developing countries.

- In the developing countries, the proportion of diarrhea cases that receive ORS or a recommended home fluid for treatment (the use rate for ORT) has increased from about 10 percent of the cases at ICORT II to almost 25 percent of the cases in 1986. This means that more than 300 million childhood diarrhea cases are today receiving some form of ORT.

The critical question, of course, is: What has been the impact of all these remarkable achievements? Data obtained from large health facilities in many of your countries has shown that ORT has led to a decrease in hospital admissions and the use of intravenous fluids and drugs, and thus to a considerable reduction in hospital costs. Because the currently available instruments for measuring childhood mortality, especially cause-specific mortality, are not very sensitive and detect only large changes in mortality rates, it is not possible to know for sure what impact national programs have had in reducing diarrheal mortality. However, it has been calculated, on the basis of results from special studies, that the estimated use of ORT averted as many as three-quarters of a million diarrhea deaths in 1986; if program development continues at the current pace, ORT could avert twice as many deaths by 1989 and four times as many by 1995.

I am sure you will all agree that these numbers represent a considerable achievement. But we have also made much progress in learning how best to implement program activities.

We have learned, for example:

- that CDD programs must receive strong political commitment, if they are to have any chance of being successful, and that this commitment must be founded on growing numbers of community experiences, not on centrally imposed programs;
- that programs must be based on a clear case management policy, especially with regard to the use of home solutions and ORS, before training and educational materials are developed; and

- that health staff who have been properly trained can assess and treat cases correctly; and that such training must, first, include the opportunity to see and actually treat patients and, second, impress upon health workers the need to give caretakers correct advice on the preparation and administration of ORT, feeding during and after diarrhea, the indicators for their return, and the means of preventing diarrhea, as these are usually the weakest aspects of their performance.

We also now know:

- that ORS packets need to be made available through both government and commercial channels, and that a wide range of health workers, including pharmacists, community health workers, traditional healers and school teachers, should receive training in their proper use;
- that short-term, intensive, and isolated communication efforts (or campaigns) achieve, at best, only very short-lived benefits in increasing awareness or knowledge about ORT, but do not produce sustained change in diarrhea treatment—and that such communication activities and social-mobilization efforts can be successful only if they are implemented at appropriate stages of programs and are carefully designed to take into account the attitudes and beliefs of health services providers and families, with a perspective of achieving permanent, sustained, social change; and
- that reducing the use and sales of antidiarrheal drugs and antimicrobials for the treatment of diarrhea in children is very difficult and requires a high-level national commitment to discourage or prevent their use, with support from the recognized pediatric authorities and licensed drug sellers.

In addition, we have seen that supervision of health workers, which includes the regular monitoring of program activities, must be given serious attention, if case management is to be effective. Without it, we will be faced with a scenario of high rates of access to ORS and reported use of ORT but little program impact.

Finally, efforts at evaluation must be realistic and practical and provide information on what caretakers and health workers actually *do*, not only what they *say* they *do*. It is equally important that such efforts be followed up by activities and actions to solve identified problems. Too often, program reviews have produced

well-thought-out recommendations that have not been acted upon.

We saw last night at the Communications Fair many wonderful examples of materials that country programs have produced, and we shall be hearing over the next two days about successful country experiences in many other program areas.

Future Priorities

The world's effort to control the diarrheal diseases is clearly succeeding and there is every reason to believe that this trend will continue. Success will not only avert the deaths and improve the quality of life for millions of children; it will also strengthen the health infrastructure of many developing countries, which in turn will allow the introduction of other important interventions for assuring child survival and well-being. But success will only be achieved if we give appropriate attention to the sustainability of program efforts as we approach the 1990's—the fitting theme for ICORT III.

This commitment to sustainability must be comprehensive. It must include a commitment on the part of each one of us to proper training of health staff and other providers, using the excellent training materials that are now widely available. Perhaps the greatest challenge for national programs in the next few years is to achieve a massive increase in effective managerial and clinical training of staff at all levels, including both government and private health care providers. Programs must also seek to improve the teaching of diarrhea case management in schools of medicine, nursing, pharmacy, and other paramedical professions: it is far easier to train students correctly in the beginning than to retrain them after they have started practicing.

In addition, national programs must enable communities and families to become as nearly self-sufficient as possible in diarrhea management. Communication and educational activities should be designed to ensure that caretakers are able to successfully manage the vast majority of diarrheal episodes on their own, without going elsewhere to purchase ORS packets or useless drugs. And health workers and facilities must serve their needs. Unless families are, themselves, convinced of the basic principles of diarrhea case management, the national, regional, and global programs cannot be sustained.

While training and the establishment of community-focused activities are vital to assure sustainable national programs, they can only be achieved through concerted action. For health workers, this means constant reinforcement through supervision; for communities, it means making sure that there is continuous involvement. Monitoring

these potential problem areas must be given priority in program evaluations.

Many of you are already part of sustainable programs. It is the goal of the five agencies cooperating in this conference that *all* countries have sustainable programs by 1990. These programs should continue to give priority to the case-management strategy, but as this strategy becomes well-established, programs must focus more on diarrhea prevention, giving particular attention to identifying suitable ways of promoting breastfeeding, improving nutrition, and ensuring the consumption of safe water, and the use of latrines and good personal and domestic hygiene. Assuming that the current level of commitment and resources is maintained by the development agencies and the developing countries, themselves, we believe it should be possible, by 1995, for virtually all—say 95 percent—of the developing world to have access to correct case management and for at least three-quarters of those

with access to receive correct case management. Achievement of these targets would prevent, in 1995, an estimated 3.4 million childhood deaths from diarrhea, equivalent to a 50-percent reduction in deaths that would otherwise have occurred in that year. We also believe efforts that are now under way to improve the delivery of available strategies and discover new approaches for preventing diarrhea will begin to show results in the early 1990's, so that modest reductions in diarrheal morbidity, perhaps in the range of 15 to 25 percent, should be possible.

These are indeed ambitious targets. They can be achieved, however, if the developing countries, themselves, are committed to the implementation of sustained programs, and the development agencies are committed to supporting *your* efforts and plans, rather than our own interests. Through this joint commitment to sustainability and to each other, great strides can be made in diarrheal disease control in the 1990's.

The CDD Program in Pakistan

Dr. Syed Azhar Ahmad
Executive Director
National Institute of Health (NIH)
Islamabad, Pakistan

I bring greetings from Pakistan to all of you. I wish to thank the organizers of this conference for inviting me to address this international gathering.

Before I present the overview of the Pakistan Control of Diarrheal Disease (CDD) program, I wish to pay tribute to a very great distinguished scientist in this field: Professor H. L. Marriott, an English physician who worked in the plains of Punjab in Pakistan about 40 years ago. The first book that he published was *Water and Salt Metabolism*, and his paper, "Water and Salt Depletion," was published in the *British Medical Journal* in 1947. The last sentence in that paper reads as follows: "Water and salt are, perhaps, practically the most important substances in our power to administer and they can be so used that they can achieve seeming miracles." That was a prophetic sentence written 42 years ago.

Pakistan: An Overview

Pakistan is a large country with all types of terrains, from the Himalayas to the Arabian Sea. It is a civilization that is about 6,000 years old. I would like to emphasize that most human civilizations started in areas where fresh water and salt were available. We have in this



Dr. Syed Azhar Ahmad

terrain not only the five rivers of Pakistan but also a mountain of rock salt—probably the largest reservoir of salt in the world.

Pakistan also has some areas of difficult terrain, where we have to work. In the river area, there are mountains, and there is a forest on the Himalayan ranges. A pocket of civilization called Kakirastan is in the Chidra Valley. There is also an artificial lake that supplies water to the capital. Because of the topography, we must have very good management skills to run a comprehensive CDD program for the whole country.

Pakistan has four provinces. The largest one is Voulstan; then there are Punjab, Sin, and the Northwest Frontier region. The terrain differs in each area. We have many districts—about 96 of them, in total—and these represent the country's administrative units. There is a CDD Special Coordinator in each province.

As estimated in 1988, the total population is roughly 107 million. Life expectancy at birth is about 58. The adult literacy rate, male to female, is 40 males to 19 females. Now that we have a female prime minister, and a very energetic one, I hope this will improve. The population with access to safe water varies from a high of 83 percent in the urban region to a low of 38 percent in the rural region (see Table 1).

TABLE 1
Pakistan CDD in Brief

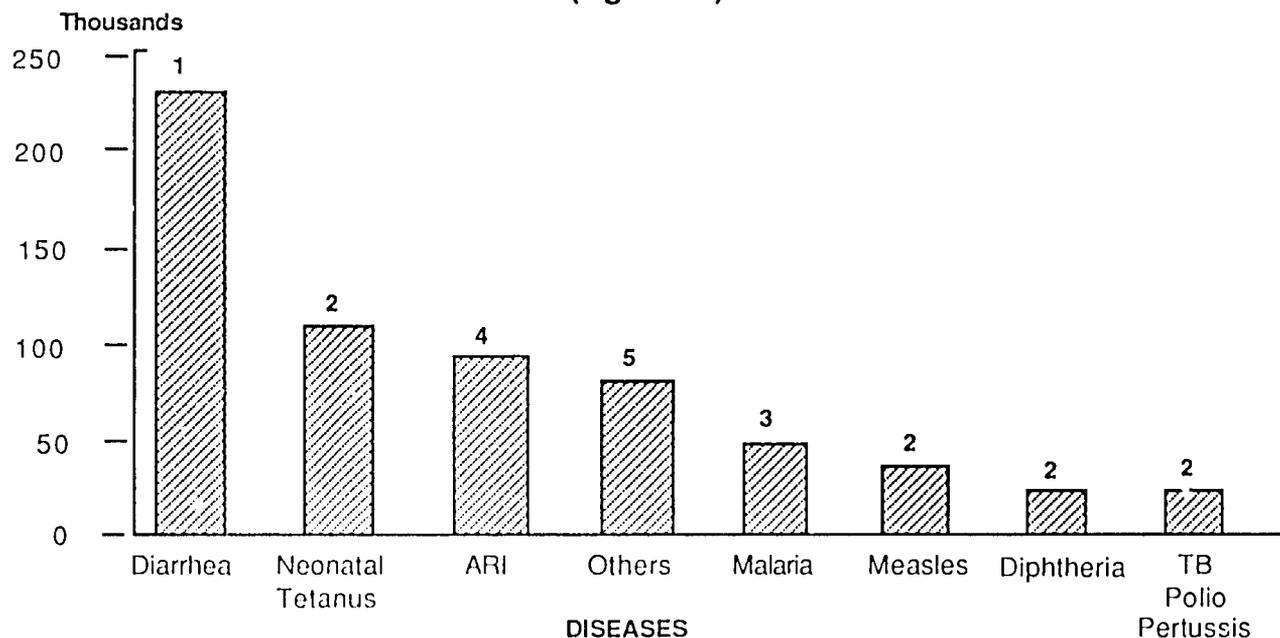
Total Population (in millions)	107
Life Expectancy at Birth (in years)	58
Adult Literacy Rate (male/female)	40/19
Percent of Population with Access to Safe Water (urban/rural)	83/38

Pakistan's CDD Program

All of you have heard that diarrhea is the number-one killer. When children are born into this world, however, they are born into a hostile world. A variety of environmental factors are there to kill them (see Figure 1). They have only their own defense mechanisms and the life-support systems that we provide them. Of these, the most important life-support systems are water and salt. Therefore, in any disease where

FIGURE 1

The Main Causes of Child Death in Pakistan (Ages 0-5)



1. Planning and Development Division, Diarrhea Survey (1984) and NIH Plan of Action, 1988.
2. S. Foster, Report of a Mission to Pakistan, USAID, IBD, (1986).
3. Population Growth Survey (1971).
4. Computed from ARI annual progress report, WHO, IBD (1988).
5. By subtraction.

Source: UNICEF's *Situation Analysis of Children and Women in Pakistan*, June 1987/March 1988

diarrhea is produced, all of the causes put together are much less problematic than the diarrhea alone. That is why we are part of this national CDD program. This program runs with the cooperation of A.I.D., UNICEF, UNDP, and many other agencies, but the bulk of the activity is run by the government of Pakistan itself.

The National Institute of Health (NIH), where I am the humble director, coordinates all the activities of the CDD program. In addition, in provincial headquarters, there are coordinators for the provinces.

Health facilities available in the country include 632 hospitals, as well as rural health centers, basic health units, tuberculosis clinics, and others. All of these are participating in this vertical program. We have matched this program and integrated it with other private health care programs, particularly with the expanded program on immunization (EPI), of which NIH is also the national coordinator. This matching and integration makes our task much easier.

The EPI outlets have very concentrated activity. These outreach teams are all in the field, as field workers. Fixed centers are in the hospitals and clinics and work best in the cities or larger towns. Outreach teams have mobile units; they go down to the villages. Our aim is to provide a packet of oral rehydration salts (ORS) to every hamlet in Pakistan. In providing this service, we must consider the country's terrain, the people's lifestyles, the places where the people are living, and their attitudes.

With the health-command power in Pakistan, the doctors, and others, we have approximately 183,000 people with various levels of training. Because this program is being specially run, most of them have to take some part in the program.

Manpower is specially trained by the CDD program. We have trained approximately 6,000 people in the CDD program.

In the integrated EPI and CDD program, about 8,000 people have been trained at different levels in managerial training and as peripheral workers and field workers. We find that this integration has been much easier for us. The same person who conducts the immunization-program visits, takes a few packets, tells the mother about ORT, and teaches the mother how to make the solution. Because of this approach, our program in many provinces has been excellent.

In terms of the target population, it is very important for us to realize that we have approximately 18 million children under 5 years of age (see Table 2). Our figures show that, on the average, a child below 5 years of age gets about five episodes of diarrhea per year, so that the cases to be treated total about 90 million annually. If each one of the children gets two to three packets each time, you can imagine the magnitude of the problem that we face.

Program Results

Since we started this program in 1982, some changes have taken place. The number of those that have never used ORT has been decreasing regularly with the understanding of ORS; and the knowledge, attitudes, and practices have been improving over the years (see Tables 3 and 4 and Figure 2).

TABLE 3

Pakistan Management Information System Summary

ORS Access Rate	>90%
Total ORS Production (in millions of packets)	26.46
Total Imported/External Supply of ORS	-0-
ORS Use Rate	74%
Home Fluids	6.4%

TABLE 2

Target Population Children Under 5

Population of Children under 5 (in millions)	18
Infant Mortality Rate	100
Annual Number of Diarrhea Cases in Children Under 5 (in millions)	90
Percent of Infants and Children with Malnutrition (severe/moderate-mild)	10/60
Percent of Children Immunized Against Measles:	
Under 12 Months	53
18 - 23 Months	81
24 - 59 Months	70

TABLE 4

ORT Practices in Pakistan*

PROGRAM RESULTS	PERCENT
Awareness of ORS	88.0
Had ORS at Home	71.0
Ever Used ORS	83.0
Could Prepare ORS Correctly	84.0
Gave ORS to Child with Diarrhea	73.0
Gave Home Fluids to Child with Diarrhea	6.4

* AHP/PHC, *Pakistan Review*, February-March 1988.

We also run a very large communication program, which is headed by the Canadians. That program has provided us a tremendous opportunity to reach a vast population through TV, press, and radio. As a result, we now find that the presence of ORS in the homes is increasing, and that families are using it.

Table 5 shows the procurement and distribution of ORS packets. The program runs so tightly that over

the years almost all of the ORS packets that have been procured have been distributed.

The results of a nationwide study conducted after 2 weeks' prevalence of diarrhea show that a low percentage of the children had shown diarrhea and that ORS and homemade fluids were being used (see Figure 3). These results show that the message is reaching our target groups.

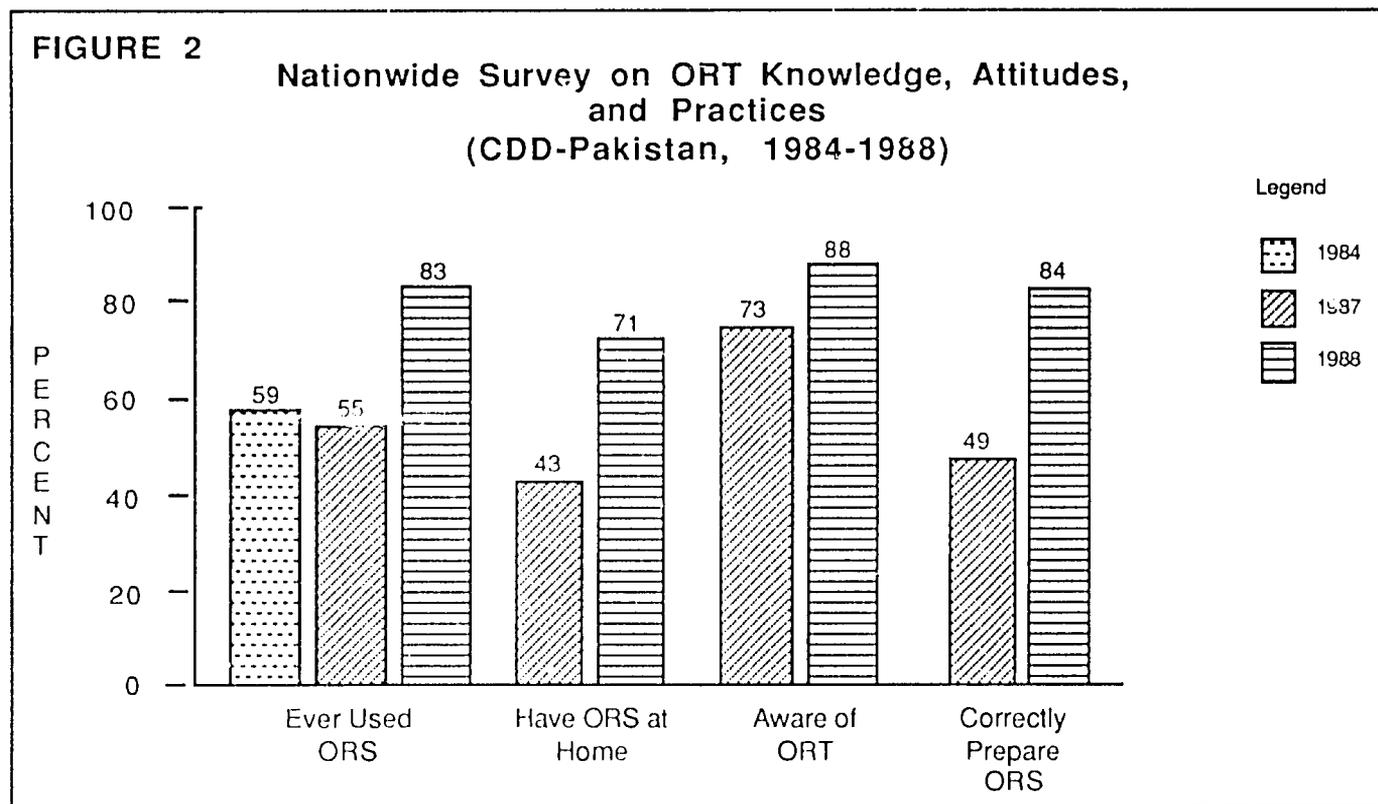
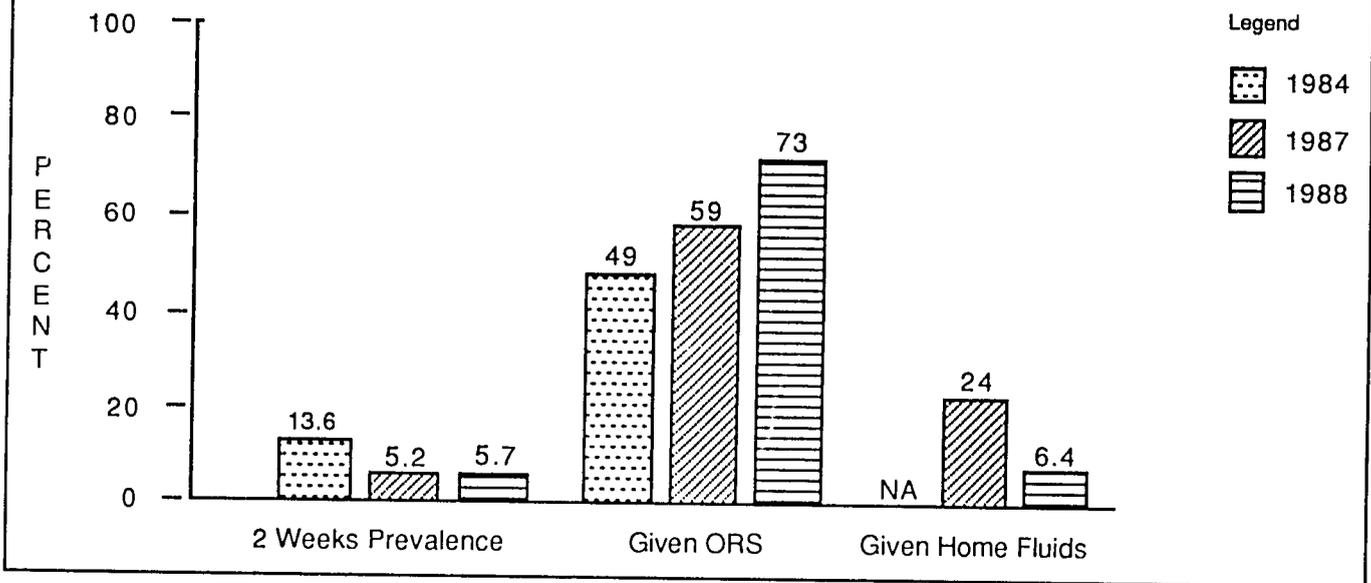


TABLE 5
Annual Procurement and Distribution of ORS Packets by
NIH, UNICEF, and the Private Sector
(CDD-Pakistan, 1981-October 1988)

Year	Procurement by NIH CDD Programme			Total (L) million	Distribution Total (L) million
	1/2 liter	1 liter packet			
	NIH	UNICEF	PVT.MANU		
1981	0.497	---	---	0.249	0.054
1982	0.533	---	---	0.267	0.321
1983	0.960	---	5.000	5.480	5.447
1984	2.455	3.000	20.000	24.228	23.927
1985	1.719	3.000	10.000	13.860	14.195
1986	1.570	---	9.680	10.465	10.354
1987	2.111	3.000	3.640	7.696	7.690
1988	1.941	---	6.318	7.289	5.914
Total	11.786	9.000	54.638	69.531	67.902
Percentage	8.48%	12.94%	78.58%	100.00%	100.00%

FIGURE 3

Nationwide Surveys on Two Weeks' Prevalence of Diarrhea and ORT Practices for Diarrheal Cases at Household Level (CDD-Pakistan, 1984-1988)



It is very important to realize that we have generated a massive capability in the private sector. Currently, we are using only a very small part of that capability. Where initially it was only NIH in the common sector that was responsible for making ORS, we now have allowed the private sector—private enterprise—to take over the production of ORS. By increasing private-sector involvement, we can see increases in both the country's capability and also the actual use (see Table 6).

National Priorities for CDD Implementation

The main theme of ICORT III is sustainability, and these are the programs that we will continue in the coming years: production; procurement; and nationwide distribution of the standard size of package to all health outlets and to the EPI infrastructure.

We will also establish diarrheal training units (DTUs), such as the extensive diarrheal training unit that was started at Velhoor Medical College. We have 17 medical colleges, and each medical college has established a diarrheal training unit. The continuing program is run by the professors of pediatrics in those departments. Their involvement has been a great success in teaching the students and particularly the young physicians now in training how to treat diarrhea with only ORS.

In addition, we are providing training through orientation. Even private practitioners who are doing their own work, rather than providing government service, are being included in the training, to update their skills in the treatment of diarrheal disease.

In terms of incorrect and unnecessary antidiarrheal antibiotics, the Ministry of Health is taking significant steps to redistribute many of those drugs that are considered useless and should not be imported at all.

Currently, we are launching a consistent, nationwide communication, information, and education campaign. Since we wish to improve, do we want to have something like "Super ORS" to generate and sustain public awareness? The idea that maintenance of ORS requires a continuous process has been suggested by previous speakers, and this has to go on.

Lastly, there has to be some research. NIH—in the area, in the country, and in the institution—will continue research on all the CDD program activities in Pakistan.

Conclusions

I offer to the group the following conclusions:

- Oral rehydration therapy is the most important medical discovery for mankind of the century. It must be brought home to every doctor that this is the most important discovery. It is more important than heart transplant and more important than any other medical surgery.

TABLE 6

Survey of ORS Producers

Company Name	Brand Name	Packet Size (In liters)	Production					
			Actual (in millions)			Capability (in millions)		
			1986	1987	1988	1986	1987	1988
PRIVATE SECTOR								
Wilson's Pharma.	ORSAL-F	1	14.10	14.50	11.30	29.20	54.75	54.75
Star Laboratories	HYDROSOL	1	2.36	3.15	0.83	19.20	19.20	19.20
Lahore Chemicals	HOWARDS	1		—	—	35.94	35.94	35.94
Searle (PAK) Ltd.	PEDITRAL	1	0.30	0.17	—	0.50	0.20	0.10
		1/4	1.20	2.40	—	1.50	2.50	3.00
Fakhma Pharma	REHYDRATE	1	2.00	2.50	3.00	18.00	18.00	18.00
Pharmedic Labs.	NEOLYTE	1	7.70	15.50	15.50	15.50	31.10	31.10
Soma Laboratories	REHYDRO SALT	1	0.17	0.51	0.10	2.40	2.40	3.60
Navabsons Laboratories, Ltd.	NAWABSONS REHYDRATE SALT	1	0.05	0.07	0.08	10.00	10.00	10.00
Adil Pharma	A.D. SALT	1		—	0.01	1.20	1.20	1.20
SUB-TOTAL (Private Sector)			26.98	37.00	30.82	132.30	173.40	174.60
NIH		1/2	1.57	2.11	1.94			
GRAND TOTAL for 1 Liter Packets (1/4 liter packet converted to 1 liter)			27.76	38.06	31.79	132.30	173.40	174.60

Source: PRITECH/Pakistan

- Effective ORT training needs to be provided to physicians, private practitioners, pediatricians, health workers, and the general public, particularly mothers.
- Each government must commit itself clearly to the policy of ORT.
- Private enterprise must be involved. Future circumstances might make it impossible for the government sector in many countries in the developing world to bear all of the expenses for the delivery of ORT. I personally believe, and most of my colleagues agree, that private enterprise has to be included. I remember, as a child, having seen TV sold through advertising, and now it is one of the largest selling products in the world. Oral rehydration salts may need private enterprise interest in a similar way.

In involving the private sector, we must also consider the classification of ORS. Because ORS is classified as a drug, it can only be sold by drug dealers. In reviewing the number of dealers (see Table 6), it becomes obvious that ORS can reach only about 35 percent of the population.

But if you change the classification and make ORS an open sale item like a bag of tea, then probably it will be available in all outlets and shops—pawn shops, villages, and tobacco shops. It will be possible to reach close to 100 percent of the population. This is a very important concern for us.

I will close my presentation with one word that historians tell me that Alexander the Great rendered a lot. He went to Persia and some parts of Pakistan, and I am told that he went to Persia to look for what Persians call "adahere," which means the elixir of life. To me, the elixir of life is very simple: It is salt, water, and glucose.

Control of Diarrheal Diseases in Sudan: Regionalization, Involvement, and Cooperation



Dr. Magda Mohamed Ahmed Ali

Dr. Magda Mohamed Ahmed Ali
Director, Control of Diarrheal Diseases (CDD) Program
Ministry of Health
Khartoum, Sudan

On behalf of all the people who have been involved in the CDD program—our staff, the coordinators, the volunteers, and in particular the numerous nameless health workers who are all tirelessly carrying out their work—it is my pleasure today to address our colleagues assembled here. I will share with you our humble efforts to relieve the serious diarrheal disease problem in our country, Sudan, and thus improve by a tiny bit the lives of children born under the curse of poverty and social injustice.

Poverty, illiteracy, limited food and water supplies, poor housing, the low social status of women, daily hard work to meet basic needs for survival, and uneven distribution of limited resources are the cruel realities facing the population in many developing countries. Diarrheal diseases are a part of this picture, and the daily suffering of families seeing their children wasting away after repeated diarrheal attacks and dying of

dehydration is one result of these harsh circumstances.

Every year, an estimated 100,000 children in Sudan die due to diarrheal disease. It is the single most frequent cause of death in the under-5-year-old population.

The country is the largest in Africa—about 10 times the size of the United Kingdom and equal to the whole area east of the Mississippi River in the United States. The population of 24 million people is scattered throughout the nine regions of the country—about 10 percent are nomadic, and 70 percent live in rural areas. The vast territory of Sudan ranges from the barren, sandy, Saharan desert to regions of trackless subtropical savanna in the south. Infrastructure and communication are minimal—for instance, there are only 1,200 miles of paved roads in the country. It takes 4 days to travel across the country in a 4-wheel-drive vehicle, from the national capital of Khartoum to the western regional capital of El Fashir. Telephones are basically nonexistent within the country.

Sudan's National Program to Combat Diarrheal Disease

In September 1985, the Ministry of Health decided to attack the serious problem of diarrheal disease on a national level, and a National Department for the Control of Diarrheal Diseases was established. Initially the two members of the department travelled to all regions of the country and collected information on the status of oral rehydration therapy (ORT) activities. Meetings were held with regional health authorities, pediatricians, medical storekeepers, and paramedics in key positions. It became clear that although oral rehydration salts (ORS) sachets were available in abundance, they were used very little. Some health workers had participated in brief ORT training sessions that used various curricula. None of the training, however, included the practical, hands-on training we knew would be so important. Treatment of choice in the hospitals was intravenous (IV) therapy.

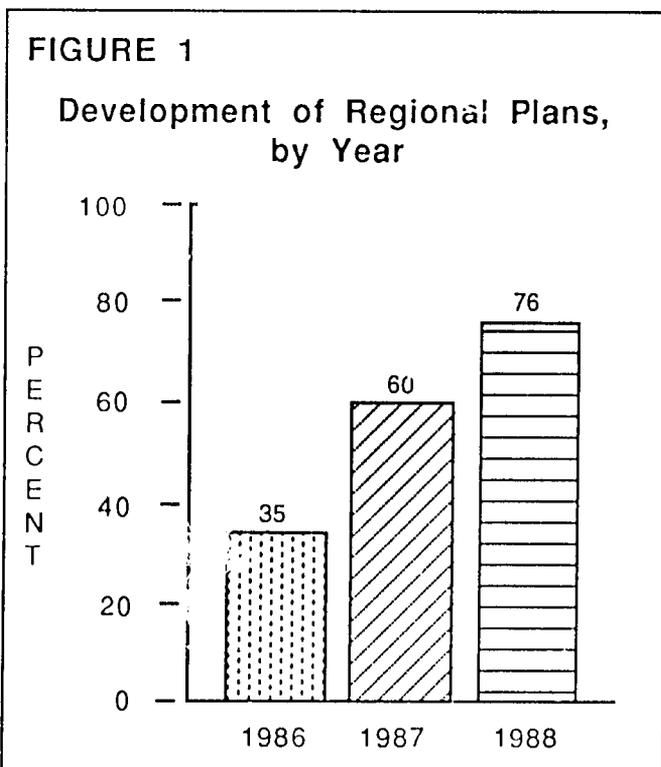
In January 1986, senior health officials and pediatricians were gathered at a National CDD Planning Workshop. Based on their recommendations, the CDD Plan of Operation, 1986-88, was finalized and approved by the Minister of Health. In light of the very high rate of mortality due to diarrhea, the principal strategy of the plan was to improve case management, focusing on the use of ORT and proper feeding. During this 3-year program period, priority was given to

people with access to health facilities—at present about 55 percent of the population.

Regional health personnel were key to the success of our program. Their active participation and collaboration were sought throughout the planning and implementation processes of the program.

A doctor was identified as the regional coordinator in every region. In most instances, the doctor would take this responsibility along with other duties, for example, CDD and School Health duties or CDD and MCH duties. This was done out of necessity, because doctors are scarce in the regions, but it proved very beneficial in terms of integrating CDD with other areas of primary health care.

During the discussions of the National CDD Plan, all regions were interested in starting activities at once. Considering the size of the National Department at that time (two doctors), this was not possible. However, it quickly became apparent that some regions were ready earlier than others. Figure 1 shows the development of regional plans by year. In 1986, about 35 percent of the national population were included in the plan; in 1987, 60 percent were included; and by the end of 1988, 76 percent were included. The remaining regions of the country cannot currently be reached because of the civil war.



As you have seen, Sudan is a vast country, and the regions vary immensely in terrain, demography, climate, ethnic groups, and coverage of health services. Let me emphasize once again that, in order to meet the needs of the individual regions, plans were developed at the regional and provincial levels,

following the principal strategies of the National CDD Plan. Again, maximum involvement of key implementors was sought in the planning process. Our mid-level primary health care (PHC) workers, who are the medical assistants, are the backbone of the Sudanese medical system. Therefore, it was the highest priority of the CDD Department to ensure that these health workers would get the knowledge and practice needed to provide ORT for diarrhea cases.

Training, a key priority for our program, is provided to the existing supervisors at all levels of training. These courses last four days; emphasis is given to practical, hands-on training. Since last year, the CDD curriculum has been adopted by all paramedical schools.

For medical doctors, the training also emphasizes practical training. To date, 69 medical doctors have been trained. Preference is given to doctors from the regions to enable them to establish ORT centers in their areas.

A National ORT Demonstration and Training Center was established at one of the university hospitals in Khartoum in March 1987. Another university hospital opened a center in September 1988.

Health-education activities have focused mainly on basic messages on personal hygiene, breastfeeding, and giving extra fluids as soon as diarrhea starts. Materials, such as posters, pamphlets, and flipcharts, have been developed and are provided to the trained health worker to be used in the individual and group education of mothers. Since 85 percent of all women in Sudan are illiterate, the material is based on pictures to be followed by discussions. In one district in Kordofan in western Sudan, we are pilot-testing training programs for mothers to train other mothers through plays, songs, and poems. Health education through child-to-child activities has also been initiated in schools.

The National CDD Department has expanded significantly during the three years of its existence. From initially only 2 doctors, the staff has grown to 20 people at the national office. Each member has an important role in the implementation of the National CDD Plan—training, health education, logistics, transportation, ORT corners, surveillance, ORS, and so on.

This expansion was possible in spite of the limited resources because of two things:

1. the sincere commitment of the Minister of Health to deal with diarrheal disease as the main cause of death of children under five; and
2. a concept of management based on giving more responsibility to the staff. It was through this spirit that the National CDD Department

was able to cope with the new areas into which it ventured. The staff were creative and presented suggestions and changes to improve the work environment and performance. As a result, several activities were generated, and the National CDD Department rapidly expanded. Hence, the CDD central office was able to respond immediately to all regional needs.

It was crucial to develop a program that complied with the reality of Sudan. Several important approaches were followed. In view of the vastness of the country, decentralization was absolutely essential. In every step of planning and implementation, the regions were made responsible for the decisionmaking process. The role of the National Department is always supportive.

To enable the regions to carry out this task, all coordinators were initially given on-the-job training by the National CDD Department. Furthermore, all coordinators were given formal training—either locally or abroad—in PHC management courses.

Considering the diversity of CDD activities, it was important to create a uniform program based on simple, clear guidelines and messages. These were formulated by the National CDD Department and were ready when needed. These guidelines are now adhered to by all involved in PHC activities, including nongovernmental organizations (NGOs) and other private organizations. Examples of such guidelines are the regional and district plans, training plans, supervisory checklists, and strategies for the development of ORT corners.

Several means of communication are used to ensure close contact between the National Department and the regional coordinators. Regular visits to the regions are conducted. No coordinator goes more than 3 months without a National CDD Department meeting, where outstanding issues and plans can be discussed.

Also, it has been a priority to give the regions opportunities to exchange ideas and learn from each other as we are doing now at this conference. The National CDD Department publishes a quarterly newsletter, where short articles on various activities are printed. This newsletter is distributed to all trained health workers. Moreover, the coordinators meet every year at a national workshop, where activities during the past year and new plans are discussed.

Since some regions are further ahead in implementation, we have successfully utilized coordinators from those leading regions as local consultants for other regions. Knowing the problems from their own experience, these consultants provide very valuable assistance to other regions. However, above all, it is the people who work with the CDD

program who are the single most important factor for our achievements. From the very beginning, the concept of management of the CDD program has been based on giving increasing responsibilities to the staff and providing them with the means to carry out this responsibility and to develop their technical skills.

Allow me to quote from one regional coordinator at our last national workshop who said: "I am grateful that I have been accepted into the CDD family. During my two years with the program, I have learned to think scientifically and to love my work."

It is through the building and stimulation of human resources that the program has developed and progressed successfully and in the future will carry on.

Program Implementation: Practical Application

In August of this year the National CDD program stood a test. Heavy rainfall and floods inundated Sudan. In the national capital alone, more than 300,000 houses were destroyed, and vast areas were covered with stagnant rainwater mixed with sewage. The flooding most severely affected the more than 1 million displaced people living in shanty towns around the city. All means of transportation and communication ceased, and the entire city suffered from shortages of drinking water and food. Other regions were also seriously affected. Since 1986, emergency plans for diarrheal epidemics had been prepared with the regions. They were updated early this year, in preparation for the summer diarrhea season, and buffer stocks were in place in the regional stores. In April 1988, a special publication on cholera preparedness and control had been developed. Twenty thousand had been printed and distributed to all doctors and health facilities.

Based on these plans, the National CDD Department responded promptly by preparing a specific rescue plan, which was adopted as the Ministry of Health's approach for containing the emergency. A surveillance system was put in place, and doctors who had worked with CDD activities were placed in key coordinating positions in the health areas. Emergency health units were established in the most severely affected areas. Doctors and paramedics already trained in ORT and experienced in establishing ORT centers were used as trainers and instructors in these units. Additional supplies, which were needed due to the extent of the disaster, were requested and immediately provided by donor agencies. Mobile teams from EPI, Nutrition, and the National CDD Department covered severely affected areas in the capital for nutrition assessment, vitamin-A supplementation, measles vaccination, and diarrhea case management.

As soon as radio contact to the other regions of the country was reestablished, the National CDD Department contacted the coordinators in the affected areas. Their needs in terms of technical and logistical support were reported and responded to, and emergency activities similar to those in Khartoum were carried out.

Throughout the emergency, no confirmed outbreaks of cholera or dysentery were reported. By the beginning of September, it was clear that the emergency was well-controlled. The availability of an emergency plan with a clear structure and defined roles of CDD personnel at every level, a network of trained medical doctors and paramedics to assume key positions, a regular flow of supplies, good collaboration with NGOs, CDD documents and guidelines, and other technical support, along with secured funds, made it possible for the CDD-program staff to react rapidly and appropriately to the emergency.

Several of the emergency activities have now been institutionalized. Prior to the floods, the Khartoum Region was one of our weakest areas of implementation. Since then, numerous activities have been carried out. Throughout the affected areas, more than 30 ORT corners have been established as a direct result of the flood.

Issues to Be Addressed

Unfortunately, our program is not perfect. There are still several key issues that need to be addressed.

Initially, the National CDD Department had very limited financial resources, and support from international organizations and projects was sought on an ad hoc basis. Following the development of the CDD Plan of Operation in 1986, 3.9 million Sudanese Pounds (US \$1.6 million) were granted through a special development fund. An independent budget has made it possible to operate according to the priorities and needs set by the Department, without having to bend to certain priorities and needs felt by various donating agencies.

All interventions have been implemented through the existing Ministry of Health structure. The program did not try to recruit cadres by offering extra salaries or incentives that would leave us at a loss the day funding for these increments ended. This particular policy was initially difficult to implement, as other programs with international focus are offering such incentives. However, experience has shown us that the quality of staff depends not on salaries, but on commitment.

Nevertheless, sustainability has to be ensured through incorporation of CDD activities into the Ministry of Health's regular budget. The CDD Department has made several unsuccessful attempts in this matter, but it still remains a priority issue to be solved.

At present, ORS is made available through the government health-facility structure, where only 55 percent of the population has access to health units. Local production, using the private sector and its distribution network, would make ORS accessible to 95 percent of the population. The National CDD Department has given much attention to ensuring the start of local production. However, remaining issues of funding are still to be resolved.

Although diarrheal morbidity and treatment surveys have shown a significant improvement in the use of ORS—from about 20 percent in 1986 to 50 percent in areas with trained health workers—we still have to look at the quality of the ORT given. Just to mix the 1-liter sachet correctly is a problem. The understanding of the need to give ORS in big amounts and to increase fluid intake during diarrhea is still lagging.

Because there is no uniform container in Sudan that can be used as a measure for 1 liter, the National CDD Department has started production of a locally manufactured one-liter container. Much more work is needed to improve the concept of fluid therapy among the mothers. A pilot study on mass communication is currently being conducted in one of the provinces. The CDD coordinator for this area is here, and we hope to learn much more from your experience with communication.

In Sudan, the average child experiences five episodes of diarrhea per year. The common practice is to decrease food intake during and after diarrhea. The impact of such frequent episodes of nutritional deprivation is serious and needs to be addressed more strongly. In most of the larger ORT centers, located at hospitals and health centers, meals are provided after initial rehydration as part of the treatment. Collaboration on this issue has started with the Department of Nutrition, and a nutritionist has recently been seconded to our department.

Nonspecific antidiarrheals have been banned in the country since 1982, but antibiotics are widely used as treatment for diarrhea. This problem goes along with the relatively weak involvement of clinicians. We need to increase our capacity for training doctors and to include proper theoretical and practical training on ORT in the medical schools.

We are looking forward to learning here about the activities, problems, and solutions found in other countries. We in Sudan have made some progress toward improving the management of diarrhea for our children. The national CDD program is moving forward, but there are still many difficulties to overcome—and still a long way to go.

Oral Rehydration in Mexico

Dr. Felipe Mota Hernandez
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Diarrhea has been the most frequent cause of death among children under 5 years of age in our country, followed very closely by acute respiratory infections. The mortality rates are derived from the most recent official reports and from a national survey. Official reports show a mortality rate of 224 due to diarrhea for 1982, and the national survey conducted in 1985 reported an estimated mortality rate of 480 per 100,000 children under 5 years of age. The difference can be explained by the underrecording of information and the method of data collection (data on associated deaths were captured directly from the population in the survey).

Given its effectiveness, oral rehydration therapy (ORT) has been recommended by the Mexican Academy of Pediatrics as the treatment of choice for acute watery diarrhea in children of any age.

Dr. William Hernan Cevallos was one of the world's pioneers in demonstrating the impact of oral rehydration on deaths due to diarrhea among children under 5 years of age. In 1959, in a locality in central Mexico, Dr. Cevallos compared the mortality rate due to diarrhea in seven towns where oral rehydration was used, with the rate due to diarrhea in control populations. In this study, he observed a reduction in the death rate in the experimental group from 32 to 7.4 per 10,000 children under 5 years of age.

Mexico's National Oral Rehydration Program

The National Program for Oral Rehydration for Diarrhea was begun in Mexico in 1983. At the beginning, this program was coordinated by the National Institute of Health. Later, an action plan was designed to involve the collaboration of representatives from various health, educational, and international organizations. This plan was approved by the health sector authorities in 1984.

The program was begun in May of the same year with the distribution of 15,000 copies of a monograph published in the journal, *Salud Publica de Mexico (Mexican Public Health)*, and the holding of the first international workshop on "Oral Rehydration for Diarrhea." Two hundred representatives from all of the institutions of the health sector attended this workshop and approved the beginning or continuation



Dr. Felipe Mota Hernandez

of the program throughout the country. Two thousand copies of the reports from the seminar were printed and distributed throughout the Republic.

The objective of the program is to decrease the rate of mortality due to diarrhea in children under 5 years of age by providing them with oral rehydration treatment. During the first stage, treatment would occur through formal health institutions. During the second stage, treatment would be provided directly in the community.

Stage One Activities

During the first years of the program, special emphasis was given to four fundamental aspects. First, the program estimated the use, budgeting, and distribution of free packets to official health institutions. Second, radio and television spots were developed and broadcast.

Next, conferences and organizing courses and seminars were held throughout the country, achieving the coordination of various international organizations that supported all of these activities. (One of several initial results of international collaboration was the visit from the UNICEF/WHO advisor, an expert in the

manufacture of packets, who made a favorable statement regarding the quality of the packets produced in our country.) In addition, the Technologies for Primary Health Care (PRITECH) Project developed an analysis and provided very useful suggestions for continuing the program in 1985. In order to achieve the objective of the first stage of the program, various managerial courses for the control of diarrheal disease were organized with the support of the Pan American Health Organization (PAHO). A total of 195 physicians were trained with the knowledge necessary to direct the program in all of the federated states of the country. Beginning in 1985, 34 courses on supervisory skills were given at the national and state levels to 997 participants, also with the support of PAHO.

Finally, came efforts to support the motivation and training of health personnel and the community through the design, development, and distribution of posters, audiovisual materials, educational pamphlets on health, a flipchart, a photo story, two plays with children, and two films on videotape.

Oral Rehydration Service

Another source of support considered appropriate for the infrastructure of the program was the creation of the Oral Rehydration Service in the Hospital Infantil de Mexico Federico Gomez (Federico Gomez Children's Hospital of Mexico). The Oral Rehydration Service was begun in 1984 in space connected to the Emergency Service. With the support of UNICEF, this space was redesigned and specially constructed the following year.

This service has operated as a center of training and referral for walk-in patients, providing education and obtaining the support of promoters and those who disseminated the training. The service also has a small area for clinical research where 20 works have been produced, the majority of them published in the medical bulletin of the hospital, itself.

During the 4 years that the service has been operating, more than 6,000 children with diarrhea have been served on a walk-in basis. The percentage of hospital intakes was reduced from 13 percent in 1983 to 3.3 percent in 1987—almost 75 percent fewer intakes per year (see Table 1). By obviating the hospitalization of 130 children, the clinic saved the hospital an estimated \$16,050 in the treatment of patients with diarrhea during the first year the service was in operation (see Table 2).

Program Awareness

The national survey on morbidity, mortality, and the treatment of diarrhea, performed in 1985 by the General Epidemiology Administration, was very

important in increasing awareness of our situation and in advancing the National Program of Oral Rehydration for Diarrhea. The survey results showed that diarrheal diseases were by far the most frequent cause of death in children under 5 years of age, with regional variations and estimated national mortality rates much higher than those officially reported. The survey results also showed that treatment with oral serum was used in only 9 percent of the program's targeted patients.

With these results and other domestic and international experiences, a workshop on diarrheal diseases and oral rehydration was held in April 1986. This seminar had the support of the international agencies and the participation of all of the federated states representatives, who revealed and discussed their results during the workshop. As a result of this workshop, other reports and various activities to strengthen the program were generated.

Package Design

Also in 1986, we found two factors involved in the poor use of the oral serum: the name of the packet and the presentation of ORS. In a marketing survey, we found that mothers related the name "oral electrolytes" with electricity, electrical shocks, automobile batteries, or something extraterrestrial. On the back of the packet, only technical information was provided—on the composition of the contents in grams and milli-equivalents per liter. There were warnings: "This medication should be used carefully"; and "Do not leave within the reach of children." The caloric value was mentioned, along with some negative recommendations.

With the support of international organizations, we used an advertising agency to develop a new name and new presentation for the packet, reflecting the results of public opinion surveys on the qualities of the oral serum. One of the outstanding properties recognized by the mothers was that of rebuilding the vitality of the child, so that the name "life oral serum" was selected. The design included a healthy, happy breastfeeding child, with the tree of life in the blue background, in order to relate the water that gives life to the tree to the serum that gives life to the child. The packet also included an inscription of the serum's effects and the logos of the organizations that comprise the health sector in Mexico, which distribute the packets free of charge to children with diarrhea under 5 years of age, at the rate of three packets per consultation. The back of the packet included graphic instructions on how to prepare and use the serum. Instructions emphasized the importance of continuing regular feeding and provided some hygienic recommendations (see Figure 1).

TABLE 1

**Admittances Diagnosed with Diarrhea
(Federico Gomez Children's Hospital of Mexico)**

YEAR	TOTAL ADMITTANCES	ADMITTANCES WITH DIAGNOSIS OF DIARRHEA	PERCENTAGE
1981	6,305	732	11.6
1982	6,576	807	12.3
1983	7,000	911	13.0
1984*	7,710	930	12.0
1985	7,714	644	8.3
1986	7,685	630	8.2
1987	7,676	252	3.3
Total	50,666	4,906	9.7

* SAHO, Oral Rehydration Service began in April.

TABLE 2

**Cost and Savings Resulting from the Creation of an Oral
Rehydration Outpatient Service for the Treatment of Diarrhea
(Federico Gomez Children's Hospital of Mexico)**

CASES	AMOUNT (in pesos)
Cost per individual hospitalized with diarrhea	218.980 (a)
Cost per outpatient diarrheal care	5.000 (b)
<i>180 diarrhea cases were admitted in the year that SAHO was established.</i>	
Total savings by nonhospitalized patients (180 x a)	39,416.400 (c)
Total cost of treatment of those patients as outpatients (180 x b)	<u>900.000</u> (d)
TOTAL SAVINGS (c - d)	38,516.400 (US \$16,650)

Source: M. Phillips, J. Kumate, F. Mota (unpublished data).

Clinical Training

During the biennium, 1986-87, greater emphasis was given to the clinical training, communication, and coverage-broadening components. Technical assistance was received from the PRITECH and Health Communications for Child Survival (HEALTHCOM) projects sponsored by A.I.D. as well as from UNICEF

and WHO, to provide successive courses in clinical training for personnel selected from each of the 32 federated states that comprise the Mexican Republic.

A.I.D. and PAHO funded one week of technical assistance for the staff of the Oral Rehydration Service of the Hospital Infantil de Mexico Federico Gomez. A

FIGURE 1

PREPARACION Y USO



pediatrician, a nurse, and the state official responsible for the Diarrheal Disease Control Program were trained to create a state training center for the modern treatment of diarrhea. Training included practices, knowledge, skills, and confidence in the use of oral rehydration therapy for diarrhea.

These centers are already spreading the treatment throughout the Mexican Republic, and in six priority states more than 1,700 professional personnel have been trained. The clinical training courses of the Hospital Infantil de Mexico Federico Gomez have been approved by PAHO for the training of health personnel, the majority of them professors of pediatrics, from Guatemala, Brazil, Colombia, Ecuador, Venezuela, and a Spanish-speaking African country, Equatorial Guinea.

Other Activities

In addition to the new packet design and the clinical training courses, other activities, such as the community messages in which Mr. Mario Moreno (Cantinflas) promoted the use of the oral serum, were conducted simultaneously in Mexico. There were also numerous conferences, four regional seminars, four international seminars for health personnel, supervisory activities, and support for state programs. As a result of a regional seminar conducted in April 1987, two private clinics began offering the oral rehydration program for children under 5 with diarrhea.

Stage Two Activities

In 1986, we began the second stage of the program: providing the oral rehydration therapy directly in the home. The first activity was to bring the packets used to prepare oral serum to communities of less than 1,500 inhabitants. Packets were provided through health aides and volunteer promoters, who participated in the coverage-extension program of the General Administration for Family Planning. At the same time, packets and instructions were distributed free of charge on national vaccination days. Lastly, the availability of the treatment increased through the progressive increase in sales of the packets in pharmacies and distribution centers of the Compañia Nacional de Subsistencias Populares (CONASUPO), which has more than 20,000 distribution points throughout the entire Mexican Republic. Currently an educational program sponsored by UNICEF is being started in these centers, to provide information to users regarding the benefits of oral rehydration therapy, its preparation, and the use of the packet.

Summary

As its basic strategy for decreasing the mortality and morbidity caused by diarrhea in children, Mexico has used educational programs to achieve, first, the training of health personnel in new concepts for the treatment of diarrhea and then, the awareness and use of the oral rehydration therapy by the community to improve the treatment of diarrhea in the home. In implementing that strategy, the first step was to inform and motivate health personnel regarding the scientific bases of the oral rehydration therapy. The second step was to train those responsible for diarrheal disease control programs in the states. The third step focused on the clinical training of health personnel, and the fourth step, on the participation of the community in this priority program of primary health care.

As a result of all of the above, a second national survey was conducted in Mexico in 1987, a year and a half after the first, on practices, attitudes, and knowledge of diarrhea and oral rehydration therapy among mothers of children under 5 with diarrhea. This survey showed that the use of the oral serum had increased from 9 percent to 24 percent, and the use of the oral rehydration therapy, including other liquids, had increased to more than 70 percent. The survey also showed some negative aspects, such as the interruption of breastfeeding among 44 percent of children with diarrhea and the indiscriminate use of antibiotics and antidiarrhetics. It remains for these and other erroneous practices to be eradicated through participatory educational methods.

In describing this evolution, I have attempted to show a series of results in terms of practical actions, which we believe have created and consolidated the infrastructure required to achieve the objectives of the priority program of oral rehydration for diarrhea. In various countries, it has been observed that it is not possible to evaluate results indicating a national impact on mortality within 5 years of the start of an oral rehydration program—not even in the smallest countries such as ours. Nevertheless, in April of this year, an evaluation conducted by PAHO demonstrated positive results with respect to administrative evolution during the 4 years of the program in 9 of the 32 states of the Mexican Republic. The Mexican Institute of Social Security, which introduced oral rehydration in an isolated manner in 1981, has reduced mortality from intestinal infection for its clients under the age of 1 from 4.9 to 2.2 per 1,000 live births from 1980 to 1987.

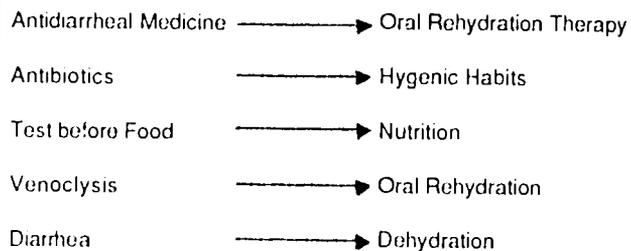
Based on this experience, we will suggest that the Diarrheal Disease Control Program should be continued over the next several years, with information disseminated through mass-communication media, clinical training, and supervision of oral rehydration therapy. Logistical support, which would allow greater availability of packets and clinical-research studies on new oral rehydration formulas, should also be provided. In addition to preventing dehydration, new formulas might also favor intestinal absorption and decrease the intensity and duration of the diarrhea.

If all of the above achieves the replacement of the use of antidiarrhetics with the early home use of oral rehydration therapy, of the abuse of antibiotics with hygienic practices, of fasting with feeding, of venoclysis with oral rehydration, and even of mothers' and doctors' anxiety about diarrhea with the fear of dehydration, the coming year holds the following

prospects: the use of oral rehydration therapy in 50 percent of children under 5 with diarrhea; a reduction of at least 50 percent in mortality rates, hospital intakes, and the cost of treatment; and a contribution to the unification of primary health care criteria (see Figures 2 and 3).

FIGURE 2

Five Necessary Changes in the Treatment of Diarrhea

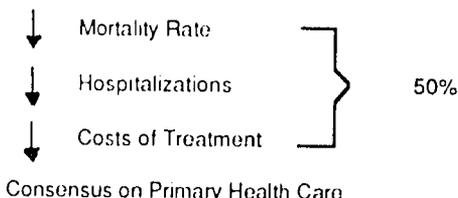


Oral Rehydration Service, HIMFG, 1987

FIGURE 3

National Program of Oral Rehydration in Diarrhea 1989 Perspectives

Use of Oral Medication 50%



Training and Supervisory Skills for CDD in Tanzania

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This presentation will cover issues and experiences of training CDD supervisors in Tanzania. Let me, therefore and foremost, thank all of my colleagues in the national control of diarrheal diseases (CDD) program, collaborating agencies, and the Ministry of Health and Social Welfare at large, without whom this presentation would not have been complete.

Program Overview

Tanzania's National Diarrheal Disease Control Program (NDDCP) was officially launched in 1985. In July 1987, a national program review identified a number of issues limiting the effectiveness of our activities.

Shortcomings

The following shortcomings were identified:

- unclear objectives, strategies, and guiding policies at all levels;
- unclear program structure and functions; and



Dr. Romanus N. S. Mkerenga

- haphazard training and poor supervision.

As a result, the review documented that few CDD activities were occurring at the operational level.

Administrative Levels

The review prompted our program to produce an overall operational framework and plan for CDD in Tanzania. This plan, the *CDD National Guidelines*, was a manual for use by all levels of health personnel—and especially supervisors—in Tanzania.

The manual covered guiding principles for organizational, technical, and policy issues in a simple form for quick reference. It was distributed to all leaders at different levels. This distribution was a key turning point in the progress of the NDDCP in Tanzania.

Training Components

Training was critically analyzed and summarized in the program review. The planning strategy would focus on six training components:

1. supervisory skills courses;
2. clinical management courses;
3. curricula development and review;
4. teacher orientation;

5. distance teaching; and
6. health learning material development and a newsletter.

Tanzania's Training Strategy

The program staff decided to undertake supervisory skills training before the clinical and other types of training. We made this decision because we believed that if the clinical training were done first, health workers would not have the support and commitment needed to execute CDD activities at the operational level. Therefore, it was important to secure this support at all levels prior to launching the other training activities. For this reason, supervisory skills courses were given priority in the annual plans for 1988.

Adequate training was accepted as the cornerstone for the correction of the shortcomings found in the program review.

Training Objectives

The *CDD National Guidelines* training strategy had the immediate aim of streamlining and improving the training. The strategy focused on three major areas:

1. clarification of the objectives of supervisory skills courses training;
2. clarification of the target groups; and
3. clarification of the training strategies.

Four training objectives were set:

1. to give supervisors a clear understanding of the new CDD guidelines;
2. to provide supervisory tools;
3. to strengthen monitoring of implementation; and
4. to provide planning and evaluation skills.

In order for supervisors to comprehend the *CDD National Guidelines*, we presented the standard WHO supervisory skills courses, with two important modifications. First, the last day of the 6 days usually covered by the course was devoted exclusively to reviewing the *Guidelines*. This oriented the course participants (usually health leaders at regional and district levels) to the details of the national CDD program. The preceding 5 days had provided them with technical skills in CDD supervision. The second important modification included the preparation of action plans by the participants. On the last day, the participants prepared action plans to be implemented in their localities.

The next objective was to provide supervisory tools to the supervisors. The most important supervisory tools are the skills learned and applied. The *Guidelines* we developed also included reinforcement of these principles. The program made a special effort to ensure that returning trainees had the other tools they needed (transportation, funds, equipment, and supplies) as well as personal enthusiasm and administrative capability.

To meet the third objective, the supervisory skills courses were designed to acquaint leaders with the guidelines and the skills to enable them to monitor CDD programs at their level of implementation.

Finally, providing planning and evaluation skills was the most challenging objective and entailed enthusiasm and commitment.

Training Target and Subtarget Groups

After establishing our objectives, the next important action was to define the training targets and target groups. The subtarget that we set was that "By the end of 1988, 100 percent of the staff in the health leadership role at all levels above the district would have training in supervisory skills courses for diarrhea management." This showed that supervisory skills training was a priority for the national program.

Two types of target groups of supervisors were identified to receive training: regional and zonal supervisors who had already received training; and district-level supervisors.

The first group included supervisors and leaders at zonal and regional levels who had received supervisory skills courses and needed retraining. For this group, the following problems were noted.

- Poor organization of the training had resulted in only some health team members receiving the training. Most of those who had received the training were no longer working in CDD.
- Training records for those who had participated in supervisory skills training in the past were absent or incomplete. The program, therefore, could not identify its resource people.
- Lack of a program plan meant that trainees had returned to a structural vacuum.

Tanzania therefore decided that reorientation courses (in the form of refresher workshops) were needed for all zonal and regional staff. These courses—an adaption of the supervisory courses—were conducted at zonal headquarters between July 1987 and January 1988, covering staff from 19 regions. By early 1988, all zonal and regional staff had received program updates. This was a great boost to the program, because it was the first time that the

scope and vision of the program had been communicated. Each of the key individuals at the zonal and the regional levels participated in those courses.

At the district level, district leadership health teams from seven regions had already received supervisory skills training before the review of the program in July 1987. However, this group experienced the same problems that the first group experienced. Because of their large numbers, it was impossible to repeat the courses or conduct refresher workshops for each one. Hence, one day was set aside during clinical courses to review the supervisory skills course materials. Review of the *Guidelines* was emphasized, as well. However, the objective was to cover the remaining 13 regions by the end of 1988. Here again, we focused on training the complete team.

To date, 17 out of a total of 20 regions have been covered. To ensure the participation of those required to attend the course, a training-attendance record was used to report attendance, representation, and absences.

An important strategy was to use the zonal coordinators to train the district-level teams. Progress in training improved dramatically after the zonal coordinators started running the courses simultaneously in their zones.

Finally, we arranged for the national and zonal coordinators to receive some additional training outside of Tanzania. We believed that exposure to other programs would widen their scope.

Quality of Training

The quality of supervisory skills training is as important, if not more important, than the numbers trained. We considered the following issues:

- selection of participants for supervisory skills courses;
- selection of facilitators for these courses;
- course duration and methodology; and
- regional action plans.

The program decided that we must include as participants all those in the district-health-leadership team. If individuals could not attend the course in their areas, they were required to attend the course elsewhere. We also adjusted slightly the length of the course, according to the nature of the participants, to make sure they attained a satisfactory level.

A special feature of our training approach has been the use of facilitators. These have included the zonal CDD Coordinator, a representative from the Ministry, and others specifically appointed by the Ministry. The

facilitators make sure that all relevant preparations are completed beforehand.

The duration and methodology of the course is as stipulated in the *WHO Guidelines*. However, we have lengthened the time for the "Target" module because it has usually required more time than others. Most participants complete the materials quite well with this adjustment.

Finally, to give participants a chance to apply the skills they have learned in the course, 3 to 4 hours are provided on the fifth day for district teams under their District Medical Officers to prepare action plans for CDD for their districts for use when they go back. These plans are reviewed and modified on the last day after discussing the *Guidelines*. This activity has been invaluable because otherwise participants would return home and not plan or implement CDD activities.

Program Achievements

Tanzania's NDDCP has seen the following achievements:

- Knowledge about the CDD program has quickly spread through the regions and districts, because most leaders were involved. The absence of one or two people during the courses was not a negative factor because the remaining participants were knowledgeable about the program. Seventeen out of twenty regions now have trained district staff.
- Training the entire team and focusing on action plans resulted in the opening of diarrheal treatment centers and corners in regional and district hospitals and even in some health centers. Focus on action plans and the team approach also led to the development of immediate plans and implementation of CDD activities in the regions and districts.
- More attention is now given to procurement and program logistics, especially at the district level. More oral rehydration salts (ORS) was ordered and distributed, and its use was monitored.
- Supervisory efforts were intensified. Initially, these efforts were not coordinated adequately, but now there is more supervision due to meetings and workshops.
- More records on cases (numbers and degrees of dehydration) and services (ORS use and equipment) are starting to be kept and forwarded to regions and zones. Still more followup is required.

- Finally, more utilization of oral rehydration therapy (ORT) is apparent, especially in urban areas. Public mobilization and demand for CDD services are becoming apparent in many facilities. Mothers are very fond of the service and always ask for ORS sachets. In areas where ORS previously was stockpiling, the situation has changed, and scarcity is appearing. This situation obviously now has to be addressed.

Issues to Be Addressed

The remaining issues in supervision after training are challenging, indeed. One result of the supervisory skills courses is an annual plan of action at the national and zonal levels. At levels below this, we have not been as successful, because of weaker supervision efforts at the zonal level. Supervision schedules are prepared but not always followed.

Our supervisors have produced one annual report and about three or four quarterly reports. These could be improved but are something for us beginners. We hope that intensified followups and meetings will help improve this aspect of post-training.

We have instituted two types of mechanisms to address these concerns.

1. *Supervisory Checks*. Using the action plans, work schedules, and monitoring checklists that the supervisors developed during the supervisory skills courses, performance is monitored by the national and zonal CDD Coordinators, when they visit the regions. Although much needs to be done before good work is realized, progress is being seen in most places.
2. *Routine Meetings of Supervisors*. Zonal and national CDD Coordinators meet together with the staff of the hosting region every 3 months to review activities in the preceding period, to exchange experiences gained in the field during the program's implementation, and to plan for the future. These meetings last 3 days, 2 days of which include visiting all the districts in the region to hold discussions and see what is being done on site. Discussions are then held and recommendations provided to the regional team to be followed up by the respective zonal coordinator. Three such meetings have taken place since January of this year and have been very worthwhile in helping local supervision.

The challenge now facing the program in Tanzania is the *technical training of peripheral staff*, i.e., staff

below the district level. This phase will begin in early 1989.

We must address the following issues:

- providing training for a large number of staff (7,000 people, at a rate of 2 people per unit) in 108 districts;
- choosing an approach that is the most cost-effective (We do not yet know which this is, but we do know we will emphasize hands-on practice.);
- determining the amount and type of teaching and training materials required;

- finding the resources required, which will be quite substantial because the task is large;
- developing health education activities for mothers, which will be equally important to prevent dehydration and diarrheal disease; and
- delegating training responsibilities, which will be important if we are to deliver meaningful coverage (We do not want to jeopardize the training's quality as we reach large numbers.).

In closing, we believe we have achieved much in the last 18 months, but we have many challenges ahead.

Closing Remarks

Ms. Anne Tinker

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I wish to thank all the speakers, not only for their excellent presentations, but also for their tireless efforts over the past 2 days in preparation for this meeting.

We have seen in these brief presentations how four countries—from different cultural traditions—are working to expand and sustain the use of oral rehydration therapy (ORT).

In Pakistan, an audacious program of mass distribution has capitalized on the enormous productive capacity of local pharmaceutical companies to introduce oral rehydration salts (ORS) packets to homes throughout the nation. Dr. Ahmad demonstrated that one important step in sustainability is widespread, popular recognition of ORS and ORT.

In Sudan, where distances are great and limited transport hampers program implementation, the government has focused on regionalization, using training and supervision to develop decentralized cadres of promoters and supervisors. Their emphasis on training methods that actively involve participants, their willingness to cooperate with other primary health programs, and their extraordinary spirit of teamwork has allowed the Sudanese program to grow from 2 to 20 people working full-time on diarrheal disease control.

In Mexico, the enormous creative capacity of the partnership between the private and public sectors has created a new image for ORS and expanded the possibilities for self-financing through social marketing. Yet, at the same time, emphasis on regional ORT

training centers has demonstrated the critical role that the health-system physician, nurse, and staff must play, if we hope to sustain programs beyond superficial, one-time campaigns.

Finally, in Tanzania, we have seen how training can be organized and delivered, not only to front-line health staff but also to supervisory personnel—a process so critical to program sustainability. In addition,



Ms. Anne Tinker

Dr. Mkerenga highlighted the role of a comprehensive program review to continually shape programs over time.

We have seen several elements common to all these programs:

- training;
- education and communication;
- self-financing;
- policy guidelines; and
- popular acceptance of ORT.

The Third International Conference on Oral Rehydration Therapy (ICORT III) is exciting because these stories are being echoed around the world. Each of you here today has your own story to tell—a story of lessons learned, of programs expanding, and of difficulties unanticipated. If today you have listened,

tomorrow the voice of the conference will be yours.

When we sat together at ICORT I, ORT was a dream. Today it is a reality.

Unfortunately, there is no real hope that diarrheal disease, itself, will dramatically disappear over the next decade. Children will continue to become sick and to die from diarrhea. While we build new water systems, expand electrification, and educate our people about hygiene, breastfeeding, and nutrition, we must also increase a safety net for child survival.

Our challenge this week is to determine how that web of survival can be sustained, given the increasing assaults on our already limited health resources—assaults like rising costs, population growth, and new diseases like AIDS.

I hope that in your panel discussions you will take the opportunity to reflect, not only on what has been accomplished already but also on how we can sustain the political, technical, financial, and popular resources needed to ensure that ORT and diarrheal disease control will continue to save lives throughout the world of tomorrow.

III. General Sessions



Mr. James Grant, Executive Director of UNICEF, greets Dr. Mamdouh Gabr, President, Medical Syndicate, Egypt, the featured luncheon speaker.

Overview: Critical Elements in Program Success and Issues for Sustainability



Mr. James P. Grant

Mr. James P. Grant
Executive Director
United Nations Children's Fund (UNICEF)
New York, New York, USA

In my remarks yesterday, at the opening of this conference, I spoke about the accomplishments in saving children's lives that have emerged as a result of the so-called "simple solution" to the lethal effects of diarrheal dehydration—oral rehydration salts (ORS). Broad-scale training in the use of oral rehydration therapy (ORT), especially among the poorest sectors of a population, has resulted in saving the lives of 1 million children in the last 12 months, alone. I also spoke yesterday about the possibilities for expanding on such successes; they are vast. The grim reality that 10,000 young children still die each day from this cause attests to the fact that much remains to be done. Nor does this emphasis on continuing mortality reflect the tremendous impact of diarrhea as a nutritional disease and, thus, as a major contributor to malnutrition. Proper diarrhea management could greatly reduce the nutritional drain of current cases of diarrhea, to say nothing of the further tremendous

nutritional gains if diarrheal incidence could be sharply reduced.

Exactly how far we go with realizing these potentials depends, to a significant extent, on our deliberations here at the Third International Conference on Oral Rehydration Therapy (ICORT III). But also important to remember, as we turn our attention to the sustainability of what has been achieved, is the hard reality that there is still much that has not been achieved—because well over half of the world's children in need still do not benefit from ORT. Our efforts to accelerate and extend coverage also require sustainability and should be an important concern in this conference.

As I stated at the second ICORT in 1985, I have been surprised that the most dramatic advances in child survival and development activities have been made in immunization rather than in control of diarrheal diseases (CDD), since the CDD cost is so low and the impact so dramatic, with interventions such as oral rehydration therapy. Although many of you are aware of a full range of causes for this phenomenon, I would like to highlight three contributing factors, from which lessons can be learned for ORT.

First, at the outset, a better, more extensive delivery infrastructure existed for expanded programs on immunization (EPI) in many countries. CDD is now catching up, and this should be accelerated further. Second, immunization is in many ways less complicated than CDD, in which people's behavior must be changed—whether from the use of traditional remedies or from the use of antibiotics and intravenous solutions. Thus, even though immunization requires more of an infrastructure than CDD, CDD has many more obstacles—and even enemies—to overcome, especially within the health care system. We are beginning to recognize more fully that diarrhea is a largely private-sector disease requiring a much heavier involvement of the private sector. Third, immunization efforts have been planned with more clearly quantifiable goals than CDD efforts have. Clear and feasible targets—with specific timetables—help tremendously to motivate social mobilization around achievement of the goals. They also make our programs more understandable and attractive to the political leadership, which is a first requirement for real institutional momentum among governments.

Nonetheless, during the past 5 years, the commitment to CDD has been growing steadily. Ninety-six countries (with an estimated 98 percent of the total population in developing countries) now have control of diarrheal diseases programs, to at least a

modest extent. This expansion has paralleled—and been reinforced by—a growing realization that oral rehydration therapy, if utilized correctly, is one of the most powerful strategies for reducing infant mortality rates in developing countries. In Egypt, for example, the Physicians Association estimates that the sustained, nationwide ORT effort in that country has reduced dehydration-related deaths in some areas by a full 50 percent. Similar results are reported in Honduras, Bangladesh, and Jordan, to name just a few. A critical mass of support—among governments, health professionals, the international community, and families, themselves—is building for a concerted push toward ensuring that ORT is available to all children who need it by the end of this decade.

Diarrheal dehydration remains the biggest killer of children in most developing countries, however, still taking the lives of some 10,000 young children each day, two decades after the discovery of ORS. The gains of immunization could be wiped out quickly if dehydration continues at current rates.

The very level at which we begin deliberations on CDD at this conference is cause for optimism. In 1983, at ICORT I, the challenge was to garner support for ORT, to convince policymakers and health professionals that the strategy worked, and to encourage the launching of national programs. At ICORT II, we examined different aspects of ORT programs and discussed ways to improve communication, distribution, training, monitoring, and evaluation. Now, at ICORT III, we have moved to the issue of sustainability—the continued growth and institutionalization of ORT/CDD in the 1990's. The value of ORT is no longer questioned, although inappropriate use of drugs and intravenous treatment persists to some extent in almost every country. The expertise to implement successful programs is also well-established, as demonstrated by the fact that every panelist and resource person at this meeting is from the developing world. This is a vast change from 5 years ago, when our colleagues from developing countries were listening to the representatives of international agencies and Western institutions extoll the virtues of this technique. Today, you are the experts, at the forefront of knowledge and advances. We have come a long way since ICORT I!

The challenge now is to ensure the long-term impact of efforts already underway and to expand programs where coverage is insufficient. The World Health Organization (WHO) Programme for the Control of Diarrhoeal Diseases has specified a number of targets against which progress can be measured. They include:

1. Reducing the number of childhood deaths from diarrhea in developing countries by 25 percent, or 1.5 million, in 1989;
2. Providing access to oral rehydration salts—meaning access to a trained, regularly supplied provider of ORS—and information on related child-care practices for at least 80 percent of childhood diarrhea cases in developing countries by 1990 (At the end of 1986, 59 percent—almost three-quarters of the original goal had been reached.);
3. Actually delivering this therapy and information for at least 50 percent of childhood diarrhea cases in developing countries in 1989 (Half this target—23 percent—had been reached by the end of 1986.); and
4. Providing senior and supervisory level management training courses and materials to at least 2,000 appropriate staff from all countries with CDD programs (As of last year, only 7 percent of this target had been achieved.).

The challenge is clear. Can we, as leaders on this vital front, see that all of the steps necessary to go that crucial distance are taken?

The panels in which you will participate today touch on several issues and problems of direct relevance to these targets. The priorities you delineate—the recommendations you make—will directly influence national and global progress for the next 10 years.

The first panel, which addresses the practices of mothers and community participation, speaks to the very theme of this meeting, i.e., sustainability. In the final analysis, it is the mother or another family member who decides when and how a child with diarrhea will be treated. No amount of ORS, no number of trained health workers can compensate for an educated public that is knowledgeable and committed to ORT. UNICEF's experience has demonstrated that when a life-saving technique like ORT is explained fully to mothers—and when its effects on improving their children's health are clearly demonstrated—mothers respond quickly, positively, and responsibly. Poor families know a cost-effective solution when they see one. Women in developing countries have no time to waste.

One of the biggest challenges is reaching the mothers of children who need ORT. A recent study in India revealed that 80 percent of mothers of children

with diarrhea do not seek help from the formal health sector. Instead, they turn to private practitioners, religious leaders, or community elders. Similar trends are evident in Brazil, Mozambique, Bangladesh, and several other countries. We need to broaden our scope on who should be coopted as sources of information and advice, i.e., on what channels should be used to spread the ORT message. We need to reach beyond government health systems to the private sector, involving the private practitioners who, as a group, care for millions of children with diarrhea each year. How to improve their practices, change traditional feeding behaviors, sustain community-level use of ORT, and mobilize communities in the management and prevention of diarrhea—these are just a few of the issues that will challenge the panel on community participation.

To the targets already accepted concerning CDD, let us add the following: that by 1995 every mother should have the knowledge, support, and resources to care appropriately for her child's diarrhea. Let this goal guide us in our discussions today, as well as in the formulation of recommendations that emerge from this meeting.

The panel on communication strategies must touch upon similar issues, i.e., how to extend the scope and outreach of CDD messages. As in immunization, effective, broad-based social mobilization is essential to program success. But we cannot adopt the same strategies. CDD messages are more numerous, more complicated, and harder to convey than those linked to vaccination days or immunization campaigns. Diarrhea occurs every day—not just 2 or 3 days a year—and responding to it effectively, either with treatment or preventive measures, requires the application of correct case management, communication with mothers, and changes in deep-seated behaviors of both health workers and mothers. This kind of sustained attention needs sustained promotion, just as maintaining a high market share of soft drink sales demands extensive advertising. Governments—and donors—must prepare themselves for a persistent effort; a quick fix will not work.

Equally important is broadening our vision as to the people and the channels through which to communicate CDD messages. Village priests, imams, local authorities, school teachers, and traditional healers—all these remain largely untapped resources for building sustained, broad-based commitments to CDD. Our new capacity to communicate with families in need—through the growing power of radio, television, and other mass media—has created an unprecedented potential to change minds, behaviors, and unhealthy practices. The opportunities are

limitless; the challenge is to seize them now, while the momentum is in our favor.

The panel on health worker training and performance faces a special challenge. This is the area where the least progress has been made, despite the plethora of programs and materials developed during the past 10 years. Why has so little been achieved? Why have so few medical and nursing schools revised their curricula? Why haven't diarrheal training units—which have been so effective in changing health worker behavior—been established in every major health facility? We need to identify bottlenecks, propose solutions, and provide appropriate support to governments committed to health worker training. Let this be another achievement of ICORT III—that appropriate, broad-based training be recognized as essential to sustainability of ORT in the 1990's.

The panel on the production and distribution of ORS has a number of issues to consider. First, there is local production. UNICEF has provided assistance to more than half of the 55 countries now engaged in local production, contributing substantially to further reductions in the already-low cost of ORS. Attention is now turning to issues of quality control and the increased efficiency of current operations—and to innovation. Cooperative efforts among organizations are fostering some creative solutions. In Ghana, for instance, an innovative, four-way partnership has been forged between the government, UNICEF, A.I.D., through the Program for Appropriate Technology in Health (PATH), and a private firm. The private firm receives technical support and equipment from PATH and raw materials from UNICEF; in return, the private firm provides packets at cost to the Ministry of Health. If successful, this scheme can be replicated in several other countries. The support that A.I.D. has given to the private local production of ORS has also made a substantial contribution to its increased availability. Furthermore, where local production is impossible or not yet underway, UNICEF has donated packets or provided them at low cost to governments and other organizations.

The delivery of ORS on a regular basis and at low cost requires that we reach beyond the formal health sector to the small pharmacies and bodegas that low-income families depend on in so many countries. The owners of these stores—like traditional healers—are often more influential than health professionals or local authorities. A recent study in Mexico, for example, suggests that pharmacists are willing to promote ORT, if they are correctly trained and motivated. Their enhanced status in the community as the one who "cures" diarrhea can help outweigh low profit-margins; the use of higher profit-margins to motivate retailers without discouraging the use of ORT warrants further

exploration. Again, these retailers are an untapped ally in the CDD effort.

Increasingly, we must promote cost recovery in the context of CDD programs. As in other areas, populations can—and should—shoulder some of the burden of health care. Otherwise, services simply cannot be sustained. Parents are willing to purchase millions of dollars' worth of antidiarrheal drugs each year, which are both useless and more costly than ORT. Again, past experience in many countries suggests that charging a small amount for ORS increases its perceived value to parents and communities.

It is also important to note that using ORT saves money—and not only for the family. Recent data compiled by WHO from major health facilities in 14 countries indicate a 61-percent median decrease in the diarrhea admission rate, following the introduction of ORT. I am sure that those among you who work in planning and finance ministries understand what a savings of that magnitude means for budgets undergoing the trauma of recession and adjustment.

The evaluation and monitoring of CDD programs need special emphasis in the next few years. We need to know more precisely what works and how successful strategies can be replicated. We need constant, relatively quick feedback to ensure continued progress. More must be done, for instance, to measure more exactly the impact of ORT on infant mortality as well as what is happening to infant mortality in general. Current attempts to perfect the "Brass Method" and other interview techniques are encouraging. Effective use of ORT (especially the large gaps that persist in knowledge and use levels), the practices of health professionals, the availability of ORS—all these are areas requiring intensive investigation. Furthermore, ongoing activities must be adjusted to reflect the results of evaluation efforts.

Finally, the panel on linkages with other programs raises the issue of prevention, i.e., the point at which we move from oral rehydration therapy to control of diarrheal disease. ORT treats problems associated with diarrhea once they occur; it does nothing to prevent the incidence of the disease. In other words, ORT will reduce the duration but not the number of diarrheal episodes that attack young children each year. Unhealthy environments, poor nutrition, lack of access to clean drinking water—these are the problems we must address to protect children more fully against the deadly combination of diarrhea and dehydration.

Three of the most effective strategies for reducing

the incidence of diarrhea are the promotion of breastfeeding, the improvement of water supplies, and the establishment of sanitation facilities. We have learned through long experience that, if investment in this area is to reach its full potential, the provision of equipment is only one step in a long process of community training and education. In Lesotho, for instance, CDD activities have been fully integrated into a nationwide rural-sanitation project. A recent evaluation reveals that children in households with access to latrines have 24 percent fewer episodes of diarrhea than do those without such access. Guinea-Bissau, Rwanda, Botswana, Madagascar, and Mauritius are pursuing similar strategies.

Effective prevention of diarrhea is a long-term, difficult process. It requires intersectoral coordination, high-level advocacy, broad-based community participation, and constant, tireless support at all levels. But if our goal is sustainable ORT/CDD initiatives in the 1990's, prevention must assume priority status in all program efforts.

The prospect of achieving and sustaining global use of ORT whenever the need arises is a formidable challenge. Indeed, what we are really dealing with here is a 10-cent cure for the number-one killer of young children. Surely, a civilization that can split atoms and send people to the Moon and back can ensure that the life of any child threatened by diarrheal disease is saved by this simple solution.

As it becomes increasingly undeniable that the capacity to save the lives of so many children, and to improve the health and well-being of so many more, is well within our reach, it becomes increasingly unconscionable not to act on these new possibilities. Never before has the health community been faced with the opportunity—and the challenge—to do so much, for so many, for so little.

The time has surely come to put the mass deaths of children from diarrhea—and from immunizable diseases and other low-cost preventable causes—alongside slavery, colonialism, racism, and apartheid on the shelf reserved for those things that are simply no longer acceptable to humankind. The time has come to say that it is obscene to let this continue day after day, year after year, as our civilization moves into the 21st century.

It is you—the world's leaders in this health movement—who must take responsibility for making these possibilities realities throughout the world. I urge you to take even stronger leadership in this peaceful revolution for the health of children, and of all the world's people.

The Oral Rehydration Program: The Egyptian Experience

Dr. Mamdouh K. Gabr
President
Medical Syndicate
Cairo, Egypt

Once again, it is a privilege for me to participate in another International Conference on Oral Rehydration Therapy (ICORT). In the 3 years since our last meeting, much progress has been made towards achieving the 1989 global objectives set at ICORT II of accessibility to oral rehydration salts (ORS) for virtually every child who needs it and a 45 percent use rate.¹

But there is still work to be done, if we are to achieve these objectives by the end of next year. It is timely that we have met again now to review, assess, revise, and affirm our commitments and plans for meeting our oral rehydration therapy (ORT) objectives. We are all acutely aware of the magnitude of the problem and the fact that the future of the world's children is at stake, and we hope that every step we take will mean that young lives are being saved. It is an honor that I have been invited to share with you some of the developments that have taken place in Egypt's ORT program since our meeting at ICORT II.

Recent Program Achievements

Egypt's ORT program made a number of important achievements. There was an increased use of ORT—from 44 percent in 1984 to 66 percent in 1988—through the more than 3,200 ORT centers within the large network of Egypt's health care system.² Almost all private physicians provide ORT services, and more than 6,000 pharmacies sell ORS. More than 1.2 million children visited Ministry of Health (MOH) ORT centers in 1987.³

Local production of ORT increased from 2.3 million liters in 1982 to more than 8 million liters in 1985, and then dropped to 5 million liters in 1987.⁴ The drop in production in 1987 reflects the progress made by the program: Severe cases are decreasing, so less ORT was needed for dehydrated children in 1987 than in 1985. The drop in production might also reflect an excess build-up of stocks in 1985 (see Figure 1).

Mothers' knowledge of ORT has improved dramatically. Although 94 percent of Egyptian mothers had heard of ORS in 1984, only 53 percent could mix it properly. In 1988, following a successful mass-media campaign, 96 percent could mix it properly. Those who had used ORS increased from 50 percent in 1984 to 66 percent in 1988.⁵ Mothers who continued breastfeeding during diarrheal



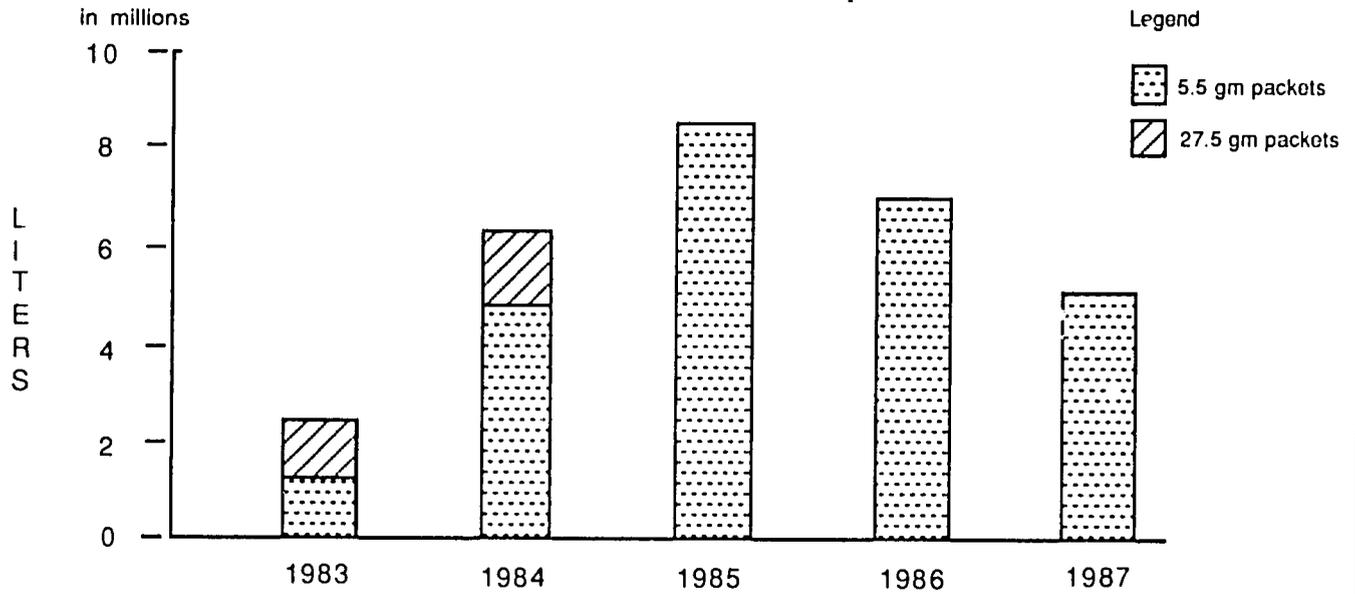
Dr. Mamdouh K. Gabr

episodes increased from 68 percent in 1984 to 83 percent in 1988.^{5,6} (See Figure 2).

These achievements had a pronounced effect on mortality. Figure 3 shows the decrease in infant and childhood mortality from 1981 onward and the sharp drop since 1983.^{7,8} Figure 4 shows official national figures for diarrheal mortality during infancy. The drop is obvious. Death from other causes remained stable after 1978. Figure 5 and Table 1 show the numbers of deaths of children from birth to 4 years old resulting from four main causes, for 1983 through 1986. For diarrheal disease, the absolute number declined by more than one-third, whereas for most of the other causes, the numbers increased slightly.^{7,8} Acute respiratory infections have replaced diarrheal disease as the leading cause of childhood mortality in Egypt. Figure 6 compares infant mortality in summer with that in winter.^{7,8} Diarrhea in Egypt is a highly seasonal disease, with the highest mortality occurring in summer. This table provides further evidence of decreased mortality from diarrheal diseases. These data are not subject to the same classification biases as those affecting the causes of death.^{7,8} To grasp the

FIGURE 1

Production of ORS in Liter Equivalents



Source: NCDDP production data.

FIGURE 2

**Selected Indicators Regarding Diarrheal Diseases
KAP Survey
(1984 and 1988)**

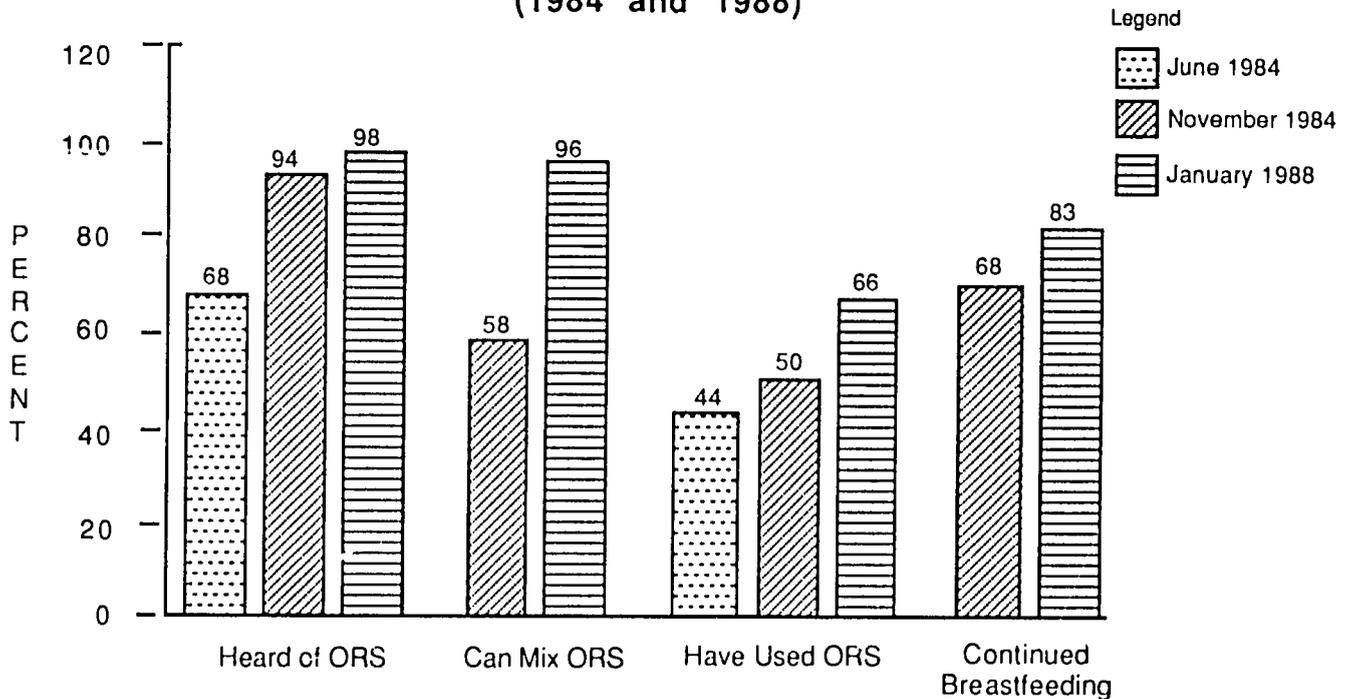
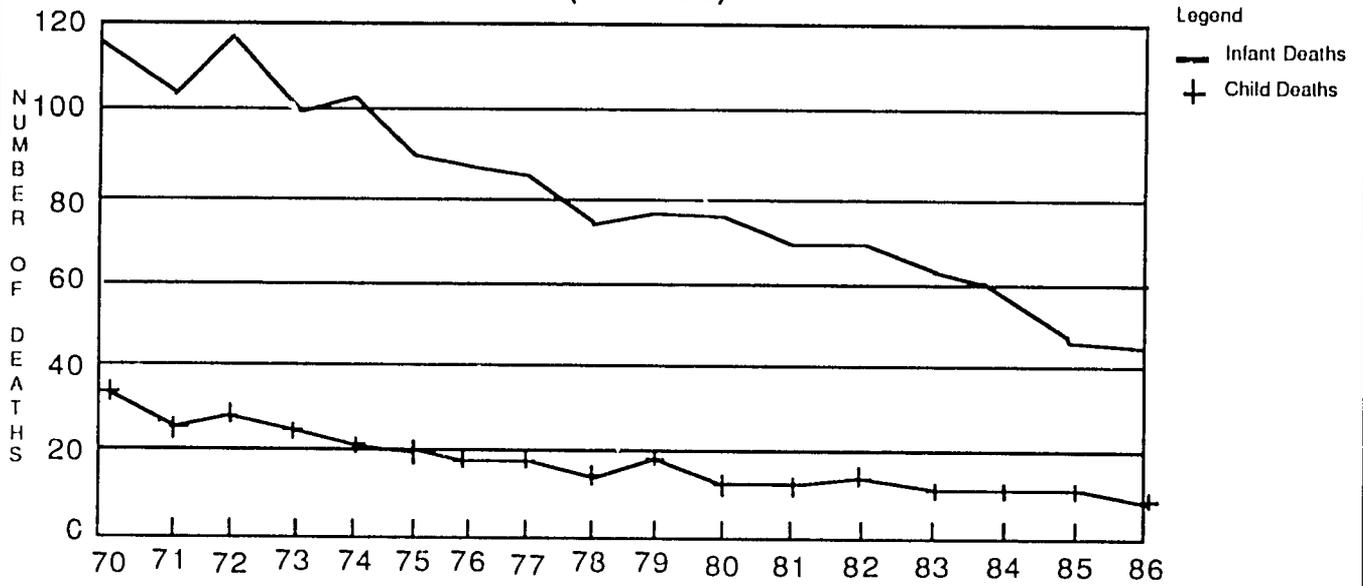


FIGURE 3

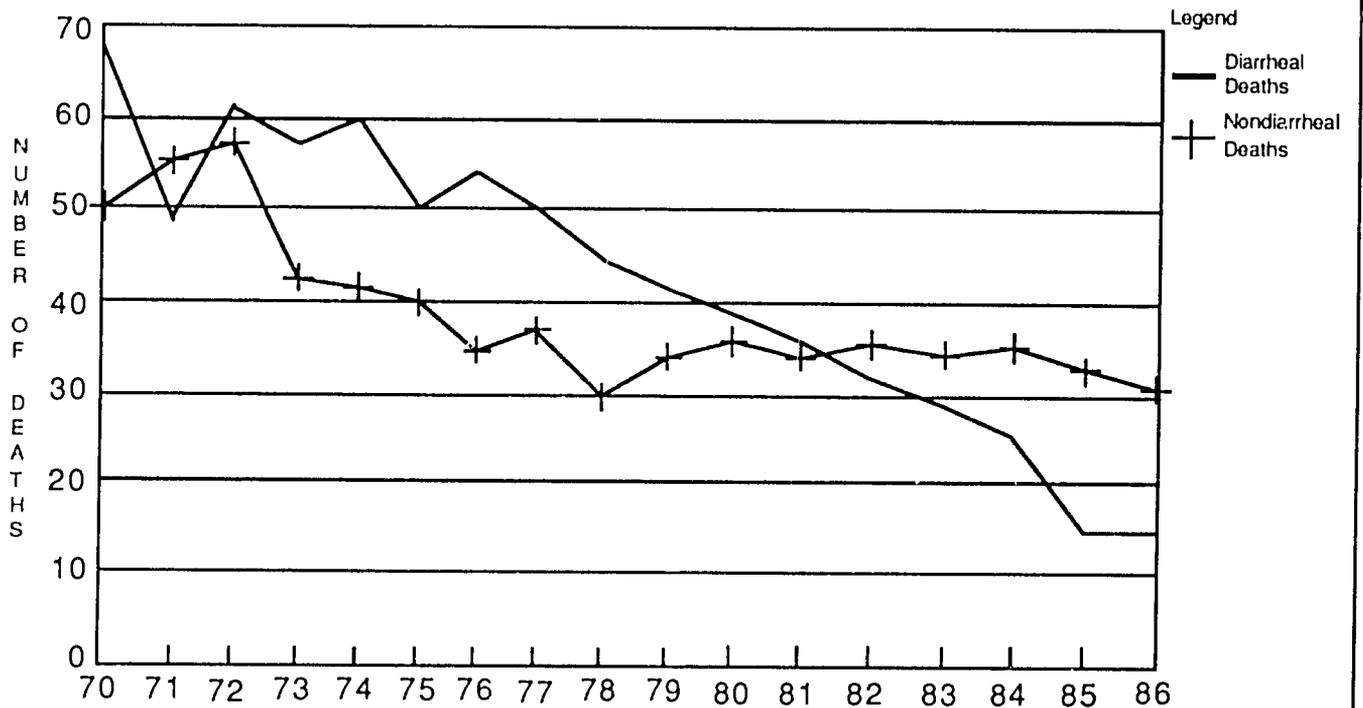
**Infant Mortality and Child Death Rates, Ages 1-4
(1970-86)**



Source: CAPMAS

FIGURE 4

**Infant Deaths per 1000 Live Births,
Diarrheal and Nondiarrheal**



Source: CAPMAS

TABLE 1**Child Deaths by Cause
(1983 and 1985)**

CAUSE	1983	1985
Diarrheal Disease	43.5%	30.1%
Respiratory Disease	29.8%	31.2%
Perinatal Disease	5.7%	6.5%
Other	21.1%	32.2%

Source: CAPMAS

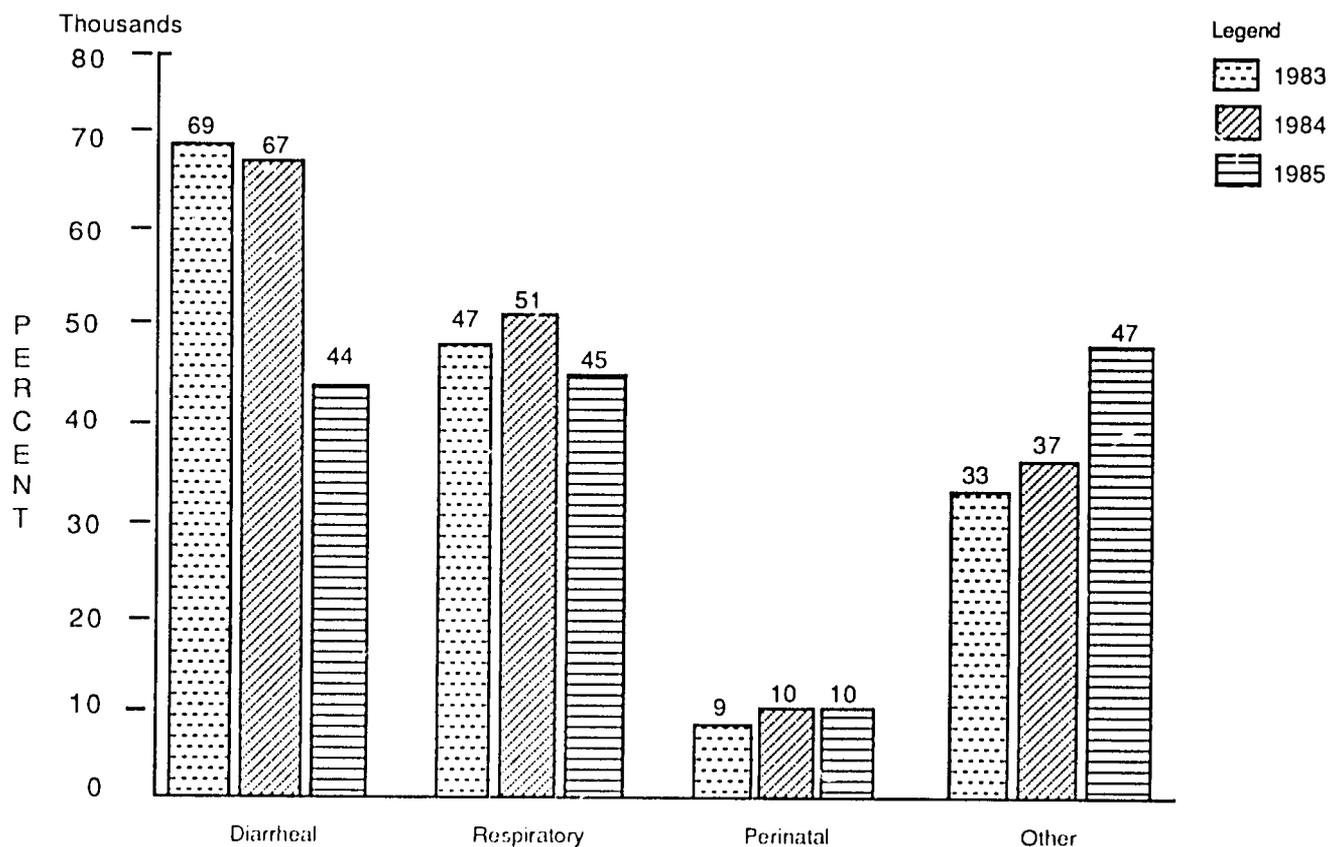
data confirm previously reported findings from mortality surveys and small area studies. For example, a study in Dakahlia Governorate in 1980 showed that diarrheal mortality in villages receiving an experimental ORT program was less than half as high as diarrheal mortality in randomly selected control villages, whereas nondiarrheal mortality in randomly selected control villages, was essentially the same. As part of a recently published study, those areas were revisited in 1986. Mortality in both experimental and control areas was down substantially from 1980, due to declines in diarrheal mortality. Data from surveys and from civil registration reports during the intervening period strongly suggest that the changes were due to improved case management of diarrhea.^{7, 8, 9}

effect of these changes, consider that if the 1983 rates for mortality from diarrhea had continued through 1986, more than 73,000 additional children would have died from diarrhea between 1984 and 1986.

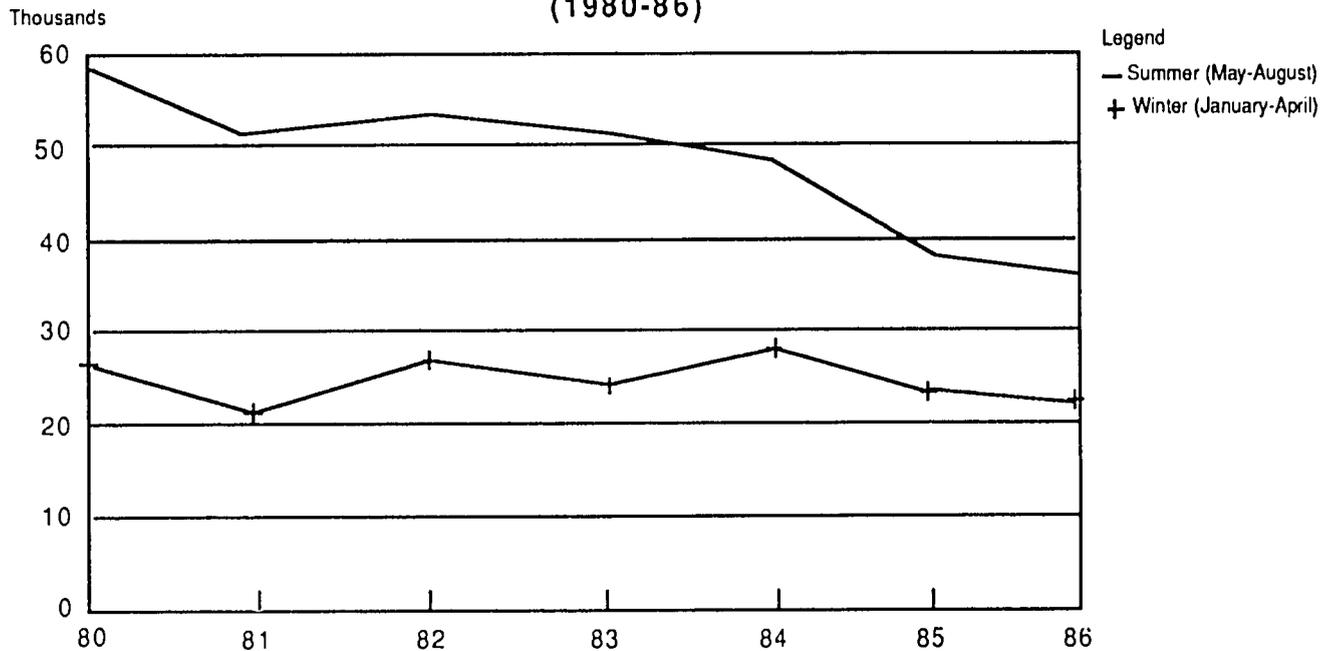
These newly released, national civil registration

Implementation Strategies

The particular element of the social system that is of concern to Egypt's ORT program is the primary

FIGURE 5**Deaths of Children from Birth to Age 4, by Cause
(1983-85)**

Source: CAPMAS

FIGURE 6**Number of Infant Deaths by Season
(1980-86)**

Source: CAPMAS

health care system (PHC). In conceptualizing the PHC system, the program staff did not limit its thinking to the formal health system of clinics, hospitals, and pharmacies or health professionals. The PHC system was thought of as one of the many elements of society that influence the quality of children's health. With this philosophy, the program developed an organization and strategy aimed at approving, enhancing, and expanding primary health care, with the particular concern being diarrhea-related illness and death. The focus on primary health care led the program staff to include not only the formal health system but also mothers, families, communities, communication systems, social services, educational programs, traditional health providers, private enterprises, researchers, and, in fact, any person or institution that had any influence on children's health. The philosophy reflects a multi-sectoral approach to children's health.

A major innovation has been the blending of modern health services with a social marketing approach. Social marketing is the application of a modern marketing approach and technology toward the promotion of socially desirable goals. The goal, in this case, is the reduction of diarrhea-related morbidity and mortality in children. The marketing technology included market research; communication technology; production and distribution channels; calculations of absolute and opportunity costs to providers and consumers; evaluation; and replanning. To launch the

program, the public and private sectors of Egypt, including the Ministry of Health, universities, industry, businesses, private practitioners, pharmacies, nongovernmental organizations, and, last but not least, the first-line caretakers—the mothers—were mobilized. As a semi-autonomous unit within the MOH, the program has built upon and strengthened the existing primary care services for mothers and children, thus leaving in place the sustained ability to prevent and treat dehydration from diarrheal disease.

Key factors for the success of the Egyptian ORT program include the following:

- political commitment;
- sufficient resources;
- public mobilization through social marketing;
- involvement and commitment of the medical and paramedical profession;
- harmonious coordination between the central and peripheral levels, governmental and nongovernmental organizations, and between the MOH and donor agencies, UNICEF, WHO, and A.I.D.;
- a single, semi-autonomous administrative unit controlling all activities, to ensure finance,

production, marketing, distribution, and other logistics with appropriate contingency plans (Effective use of the huge network of health services and mass media is available in Egypt.);

- an elaborate training program for all disciplines possibly concerned; and
- a research program seeking answers to all possible questions or constraints, as well as identifying and trying innovative activities.

Innovative Approaches

Three innovative approaches have been carried out in the program during the past few years:

1. involvement of the health profession and medical and paramedical schools;
2. preventive approaches, especially feeding, during diarrheal episodes; and
3. the utilization of research findings toward program implementation.

Involving the Health Profession and Medical and Paramedical Schools

It was obvious from surveys carried out by the program staff that, although most physicians, nurses, and pharmacists had positive attitudes toward the utilization of ORT, there was a need to disseminate more information among the health professionals, especially regarding the advantage and efficacy of ORT and the lack of need for—or even the disadvantages of—using other drugs. It was further noted that this should be combined with intensifying the mass-media program aimed at the public (mothers) to increase the demand for ORS.¹⁰

There was more concentration and attention on the private sector. Survey results revealed that 88 percent of the pharmacists were not working in the public sector and that most public sector physicians had their own private clinics.¹¹ The private sector was reached by holding conferences and seminars with leading physicians or pharmacists, as well as by getting the support of leading professional societies and institutions, such as the Egyptian Pediatric Society, Medical Syndicate, and Pharmacist Syndicate. Seminars were carried out in seven governorates during 1987 and 1988. A national regional conference on ORT was held in 1986, with more than 300 participants and 20 speakers from Egypt and 12 Arab countries. Another national conference and several meetings with the pharmaceutical societies were held in 1987.

Radio and television roundtable discussions with eminent and influential physicians and pharmacists helped to secure the approval of the health profession and, at the same time, helped convince the mothers that ORT was worthwhile.

Involving leading professionals in research activities with the program was very useful when such research results had to be implemented. It also served to channel any scientific doubts into research to prove or disprove claims about ORT, rather than leave it open to undocumented criticism. In this way, the program gained support from many eminent scientists who had originally doubted its efficacy. Crucial issues, such as epidemiology, etiology, the use of drugs, the size of the packets, the design of the materials for the mass-media campaigns, the composition of the solution, and super-ORS, could have shaved the success of the program, if not for the fact that many leading, concerned scientists were involved in related research.

It was the decision from the start to use the private sector for the distribution of ORS. More than 6,000 private pharmacies are now involved in distribution. These, together with the 3,272 ORT clinics in health units, provide a distribution network within easy access of 98 percent of the population. Approximately 60 percent of all ORS in Egypt is now sold through private pharmacies and distributed in even the remote rural villages.¹² Pharmacists in such villages frequently act as health providers, giving advice to mothers. Their involvement in the program is essential, especially in view of the fact that, because of the wider profit-margin, they also promote the sale of antidiarrheal drugs. Like other health professionals, the pharmacists received with great enthusiasm their involvement in promoting sales of an effective and dramatic treatment like ORS.

In Egypt, there are many administrative and legal restrictions on advertising drugs by mass media or selling them without prescriptions. The program staff succeeded in having ORS considered an over-the-counter drug to be sold freely by the pharmacists, or even by depot holders, and to be promoted through mass-media campaigns.

Professional medical sales representatives were hired and trained by the program for face-to-face contact with private physicians and pharmacists. The program staff supplied the necessary brochures and pamphlets and used the sales representatives to find out the response of the health professionals. The representatives made more than 16,000 visits over the last years in the governorates, and their feedback reports were highly positive.

Collaboration between the Ministry of Health and medical schools to combat diarrheal diseases existed before the program began in 1983. The Alexandria

Faculty of Medicine (with assistance from WHO) established a regional demonstration and training center for oral rehydration in 1981, and similar centers were soon established in all the medical schools. These centers served in the following four capacities:

1. as demonstration centers, to convince academic staff of the efficacy of the use of ORT and the program;
2. as service centers, to provide successful ORT case management to dehydrated children;
3. as ORT training centers, for health personnel in the university and the Ministry of Health; and
4. as implementation centers to carry out ORT research activities identified by the program's scientific-research committee.

The centers achieved great success in all four areas. Furthermore, they were the tools that developed and promoted ORT and introduced it into the teaching curricula and into the examinations of medical and paramedical schools.

Intensive training courses were carried out by the program for all health personnel, including physicians, nurses, and pharmacists. Training of other disciplines was also carried out to ensure a proper marketing mix.

The university centers and ORT centers, established by the program in the Ministry of Health, participated in the training.

Preventive Approaches

Following the successful response to the program on case management, it was decided that the program could focus on certain preventive activities, as well as on the importance of maintaining adequate nutrition during and after ORT. The campaign stressed several items.

1. *Promotion of personal and domestic hygiene through appropriate messages in the mass media.* Because of the complexity and socio-economic constraints facing environmental sanitation, this was not included in the program at this stage.
2. *Promotion of breastfeeding and proper weaning practices to raise the nutritional status of children.* Morbidity and mortality from diarrhea are several times greater among malnourished than among well-nourished children. The opportunity was used to promote the maintenance of breastfeeding and the provision of appropriate semi-solid

food for older infants during and after diarrheal episodes. The success of this approach is evident from the results of knowledge, attitude, and practice (KAP) studies. Continuation of breastfeeding during episodes of diarrhea increased from 67 percent in 1985 to 83 percent in 1988. The maintenance of breastfeeding is not a problem among Egyptian mothers, 85 percent of whom breastfeed their infants for at least the first 6 months.^{5,6} Continued provision of semi-solid food or certain kinds of food is a more difficult issue, which the program is trying to tackle.

3. *Promotion of measles immunization.* The ORT program has partially participated in several health campaigns, which increased the coverage of measles vaccination for children aged 12 to 23 months from 41 percent in 1983 to 76 percent in 1987.¹³ There is evidence that this will have a positive effect on reducing the prevalence of diarrhea.¹⁴

Utilization of Research Findings

The programmatic use of research findings has made an essential contribution to the overall program effort. From the very beginning of the national program, research has been an integral part of the planning and decisionmaking process. The program questioned virtually everything and sought answers through research. The program has made maximum use of the existing research capabilities in universities, private organizations, and ministries by awarding research grants and contracts.

Research includes the following:

- anthropological and KAP studies;
- mass-media and market studies;
- epidemiologic and community-based studies; and
- clinical (biomedical) studies.

Examples of how research results affected the program follow.

Anthropological and KAP Studies. Anthropological and KAP studies were used to determine the concepts, cultural traditions, and preferences of mothers, as well as the knowledge, attitudes, and practices of mothers and health providers in reference to diarrheal diseases, dehydration, and the treatment of children.

Results from these studies have been used as an essential program tool for monitoring the degree of

success in promoting knowledge and use of ORT, evaluation and design of the mass-media campaigns, and health provider training.

For example, one of these studies (the Container Study), which was conducted in 1983 when ORS was produced in 1-liter (27.5-g) and 200-cc (5.5-g) sizes, indicated that 1-liter measures were not commonly available and that mothers did not know how large a liter was. A 200-cc cup was the most common-sized container used for feeding young children, but when mothers were asked to use the cup to mix ORS, they used an average of only 125-cc of water to dilute the ORS.¹⁵ Based on these findings, the program standardized the ORS packet size at 200-cc (5.5 g), discontinued the production of 1-liter (27.5 g) packets, and promoted mixing instructions as a part of the mass-media campaign and health personnel training.

Mass-Media and Market Studies. Mass-media and market studies were used to learn about the target groups (children, mothers, and health care providers). These studies were also used as a basis for developing and evaluating the program's communication strategy.

One example of this is the use of media-survey and focus-group-study results that revealed that radio was less influential than television. Eighty-five percent of mothers viewed television regularly, especially in the evenings, and they preferred short, specific messages.¹⁶ As a result of these findings, television was used as the priority media for messages, which were kept short, explicit, and instructive and were scheduled to be shown in the evenings.

Epidemiologic and Community-Based Studies. The results from epidemiologic studies were used to understand the level of the problem (i.e., the frequency, duration, and nature of diarrheal episodes and the segment of the target group that was most vulnerable) and to determine the amount of ORS required annually.

For example, results from the study on the clinical epidemiology of acute diarrheal diseases indicated that:

- the most vulnerable age group was infants under 18 months;
- day-point prevalence of diarrhea was as high as 45 percent during summer months;
- 20 percent of the children sampled were dehydrated, and 65 percent of these had watery diarrhea; and
- although "starvation" was not common, feeding was reduced during diarrheal episodes.¹⁷

Based on these findings, the program focused on children under 2 as the primary target group, determined ORS-production requirements, and used mass-media messages to stress the need for continued feeding during diarrheal episodes.

Community-based studies were used as a means of determining the most effective way of developing community-based ORT activities. Results from initial "Depot Holders" outreach trials indicated that communities have people who are consulted on child care issues. After receiving training in ORT, these people can provide face-to-face educational services as well as referrals of dehydrated children to Ministry of Health clinics.¹⁸ This also strengthened the linkage between the community and the primary health care system. Based on these pilots, the program established outreach Depot-Holder activities in six governorates, especially in remote areas.

Clinical (Biomedical) Studies. Clinical research studies had a significant impact on the program by providing an acceptable means of resolving or responding constructively to technical issues and questions from physicians on the efficacy of ORT and by involving them in ORT research activities as a part of the process.

For example, double-blind clinical trials of antidiarrheal and anti-emetic preparations were conducted by university clinicians to determine the efficacy of using these drugs. The drugs proved to be ineffective and, in a significant number of cases, made vomiting and diarrhea worse.¹⁹ These findings were then used in the training programs as Egyptian-based data and justification for recommending that doctors avoid or reduce the use of these drugs.

Another example is a followup study of clinic patients treated for dehydration, undertaken to determine whether ORS was being used effectively. It was found that mothers tended to make mistakes in mixing ORS, and that hypernatremia was more related to incorrect mixing than to the use of ORS, per se.^{20, 21} As a response to these data, the program strengthened the televised mixing messages and initiated double-blind trials of WHO formula and ORS with a lower sodium content.

The program also conducted research on the effect of enriched, rice-based ORS, and the results indicated a marked reduction in stool output and duration of diarrhea. Based on this study, the program is now developing an enriched, instant, rice-based formula for ORS.

Studies of severely dehydrated children needing intravenous rehydration resulted in the development of a single multi-electrolyte solution.

Future Challenges

For every successful program, there is a peak. To keep the program at the peak of its performance is as difficult as reaching this peak is. The major challenge that we will face in the next few years will be to sustain the success of the program if many of the key factors for its success are not maintained. I shall just cite, very briefly, some of these factors:

- political commitment;
- the attitude of the medical profession;
- resources; and
- administration.

Political Commitment

With so many diversified health problems facing decisionmakers, there is a tendency to shift interest away from what we think we have achieved and toward a new challenge. It is our responsibility, as pediatricians and primary health workers, to maintain the political commitment in favor of oral rehydration programs. Until everybody is really convinced that ORT saves thousands of children from dying and enables them to enjoy a better quality of life, we must keep on hammering and maintain a strong program. It is true that in Egypt there is significant evidence that we have almost achieved this goal. It is also true that the success of oral rehydration, especially as perceived by the mothers, is the best guarantee that the program will be sustained. We should not, however, prematurely shift the emphasis from case management to other approaches, such as those involving cultural attitudes or environmental interventions, which are more difficult to achieve.

The Attitude of the Medical Profession

Although medical personnel are convinced of the effectiveness of ORS, professional competition and expressed expectations from the mothers, create pressure to prescribe constipating drugs and intestinal disinfectants. Mothers are still scared when their children have loose and frequent stools. They still remember a time, not so long ago, when watery diarrhea meant death.

Drug-producing companies, in their efforts to promote the sale of antidiarrheal drugs, are indirectly undercutting the value of ORT. The low profit-margin of ORS does not encourage pharmacists to promote its sales.

Research on such things as better formulas, super-ORS, and less sodium might shake professional opinion or create opponents to the existing program.

ORT has been accused, on no grounds, of being concerned only with saving life and not with maintaining a good quality of life, because more undernourished children survive only to die later from other causes. We should not forget, that before the ORT era, many children who survived the intravenous rehydration therapy suffered brain damage, and many cases of acute malnutrition followed acute diarrhea because of uncontrollable vomiting and starvation.

These are a few examples of small but important challenges that can be overcome only by maintaining the strong information campaign to both the public and the professionals.

Resources

At present, there is a separate budget for the national diarrhea control program. Foreign donor contributions represent more than 50 percent of the budget. UNICEF funds cover the cost of all the material for the salts and packaging of ORS, as well as the initial machines that were needed for local production. A.I.D. supports much of the cost of ongoing activities, such as distribution, the mass-media campaign, training, research, and evaluation, and WHO covers the cost of technical assistance and selected CDD research and surveillance activities.

In 1986, an international joint review team estimated that providing access to ORS to the 7.5 million women in the target group, has been achieved at a cost of more than little over 1 Egyptian pound (US \$0.43) per woman. This includes all the extra costs of research, evaluation, and technical assistance required.²²

The agreement with UNICEF ends in 1989 and that with A.I.D., in 1990. Studies are currently being conducted to determine how to keep ORS available at a reasonable sale price, covering its cost in the private sector and ensuring sufficient funds in the Ministry of Health budget to supply it free to the public sector. It is hoped that cooperation between the Ministry of Information and the Ministry of Health will keep the information campaign maintained at a low cost.

Administration

The semi-autonomous nature of the program is one of the main reasons for its success. This can no longer be maintained; after 1990, the program's activities must be incorporated within the Ministry of Health's primary health care activity and child survival strategy. This should not render much difficulty because execution, at the peripheral level, is fully integrated within primary health care services. Difficulty might be faced in coordinating different activities of the program at the central level. It is expected that a small central office, coordinating all activities of the program, will take over the responsibility of the program. The

number of well-qualified and trained staff has been sufficient to successfully carry out this endeavor.

I am optimistic, as long as good will is maintained between all cooperating agencies and institutions worldwide, as is taking place today at ICORT III, and as long as love for children endures. The simplicity and feasibility of oral rehydration therapy will ensure its sustainability and success. Not only this, but the lessons we have learned from ORT will benefit and enhance other vital health-intervention programs.

Summary

Some of the experiences of the ORT program in Egypt, particularly in reference to its achievements, basic philosophy, and strategies, are as follows.

- Key factors of the success of the ORT program in Egypt include political commitment, public mobilization, involvement of the health profession, proper coordination, semi-autonomous administration, sufficient funding, training, and research.
- In the past few years, the use of ORT in Egypt increased from 44 percent in 1984 to 66 percent in 1988. Mothers' attitudes towards diarrhea improved, with 83 percent of the mothers maintaining breastfeeding during diarrheal episodes in 1988, compared with 66 percent in 1984. This was accompanied by a decrease in infant mortality from 64.6 percent in 1983 to 47.1 percent in 1986—mainly because of the decrease in diarrhea-related mortality, which dropped from 29.1 percent in 1983 to 15.2 percent in 1986.
- Certain innovative activities—including the involvement of the private sector and of medical schools; preventive approaches, especially feeding; and applied research—were successful.
- Future challenges facing the program include maintaining political commitment and support from the medical profession, securing new resources, and including the program in routine primary health care.

It is hoped that the lessons Egypt has learned from ORT will benefit and enhance other vital health-intervention programs for children as we endeavor to take a more holistic view of children.

I am optimistic that the success and sustainability of ORT programs will be ensured as long as good will is

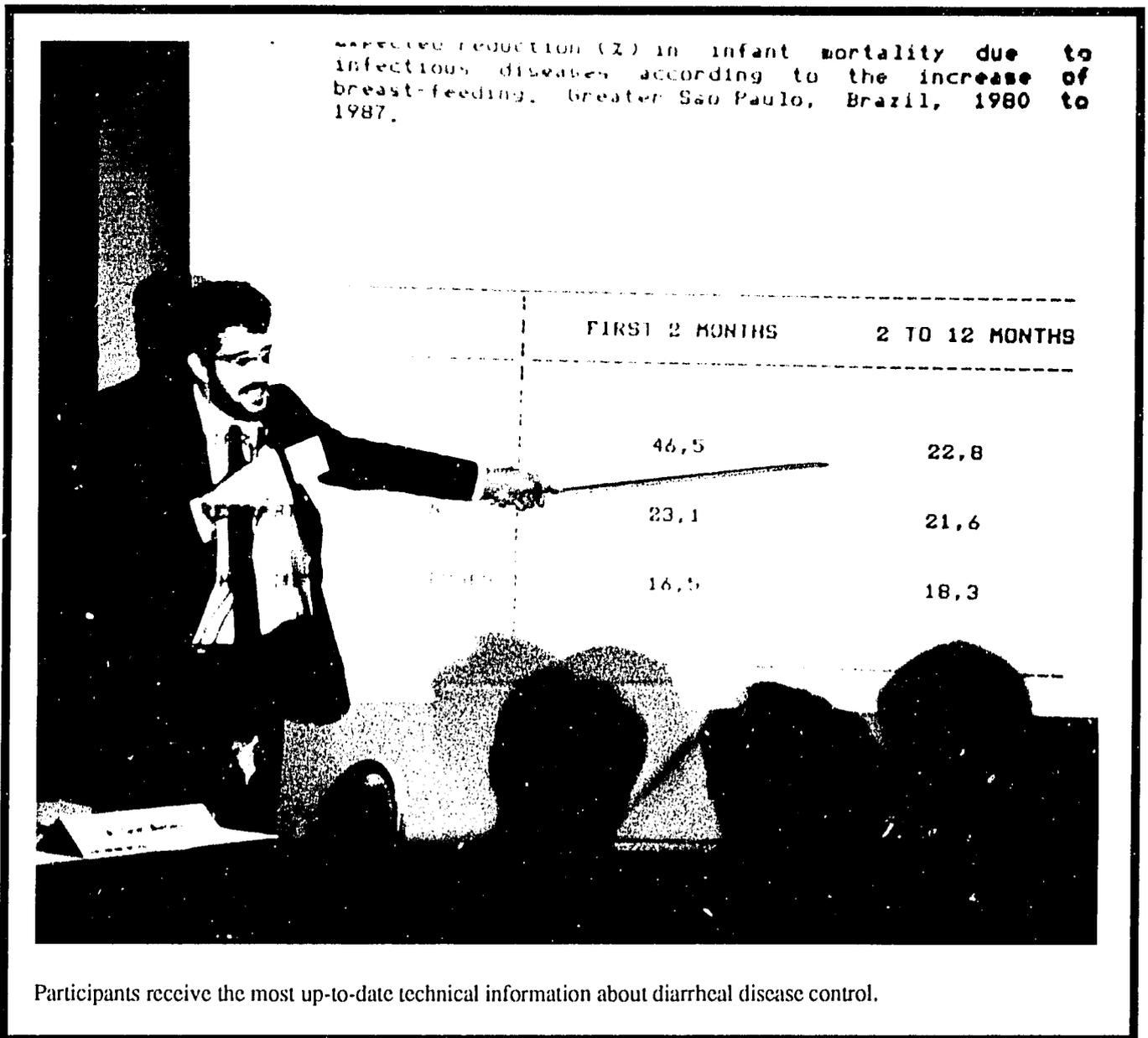
maintained between all cooperating institutions and as long as love for children, the fundamental truism behind all our efforts, endures.

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IV. Technical Update Session



Recent Advances in the Composition of ORS



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Introduction

More than 20 years have passed since the demonstration, with cholera patients, that an optimally constituted oral rehydration fluid could replace massive amounts of fluid lost through acute secretory diarrhea. Today, I have been asked to review data on the composition of oral rehydration salts (ORS) solutions containing carbohydrates and amino acids; to review the use of cereal-based solutions, both in treatment facilities and in the community; and to summarize what issues remain and how the research underway worldwide is addressing them.

Oral rehydration therapy (ORT) is a major scientific advance of practical importance. It is a powerful tool for the treatment of dehydration due to acute diarrhea, an

invaluable public health weapon, an essential component of primary care, and a useful entry point for other child survival interventions. Appropriate feeding during and after diarrhea is an essential part of optimum ORT. The ORS solution recommended by the World Health Organization (WHO) contains glucose (20 g) and three salts—sodium chloride (3.5 g), trisodium citrate dihydrate (2.9 g) or sodium hydrogen carbonate (1.5 g), and potassium chloride (1.5 g)—to be mixed in 1 liter of water. Currently, the ORS formula alone can rehydrate 90 percent of the patients with dehydration; can reduce the hospital admission rate for treatment of diarrhea by at least 50 percent; can reduce diarrheal mortality; and can limit weight loss, when used with appropriate feeding. In addition, using the present ORS formula, ORT is one of the least-expensive health interventions.

Stability of ORS Formulas and Use of Trisodium Citrate

Initially, standard ORS formulas contained bicarbonate as the base, and, until recently, ORS packets supplied by UNICEF were based on bicarbonate. ORS containing sodium bicarbonate, however, has problems of stability under the conditions of high humidity and heat found in many developing countries. Nine clinical trials were undertaken to compare the efficacy of ORS citrate and ORS bicarbonate. Three of the eight studies involved adults and older children with cholera who experienced dehydration and acidosis. In one of the studies of adults with cholera, diarrheal stool output was significantly less in those treated with ORS citrate. In the other two studies there was a similar trend. In a just-completed study of adults with cholera at ICDDR,B, Dhaka, however, these findings could not be confirmed (i.e., the volume of diarrheal stool output was no different between groups treated with citrate-ORS and bicarbonate-ORS). Five studies were undertaken with children 3 years of age with moderate to severe dehydration resulting from non-cholera diarrhea. The ORS citrate was found to be uniformly as effective as ORS bicarbonate in correcting acidosis. No reduction of diarrheal stool output was observed in children treated with ORS citrate, however.

In conclusion, ORS citrate was found to be as effective as ORS bicarbonate, and its much longer shelf life makes it the preferred product. One should not hesitate, however, to use ORS bicarbonate, which is highly effective in the treatment of dehydration, when the situation demands.

The Limitations of the Present ORS Formulas

Oral rehydration therapy using the present ORS formulas does not reduce the volume, frequency, or duration of diarrhea. This raises the practical problem of ORT's acceptance: During diarrheal episodes, a major concern of the mother, and consequently of the health worker, is the reduction of the frequency and volume of the child's stool. This leads to a persistent desire to use antidiarrheal drugs. Research on medications and antisecretions for diarrhea has so far been disappointing. Although WHO's global Diarrhoeal Diseases Control Programme has been successful in promoting ORT as a part of national diarrheal disease control programs, it has to date had little influence in reducing the extensive and inappropriate use of antidiarrheal drugs that are either harmful or ineffective.

Improved ORS Formulas

It has been postulated that development of an improved ORS formula should include the optimum exploitation of the following elements: a) organic nutrient-linked absorption; b) weak organic acid-linked absorption; c) osmotic and kinetic advantage of polymers; and d) colonic salvage of salts (sodium, potassium, and chloride) and water by short chain fatty acids produced by fermentation of unabsorbed carbohydrate. This improved formula would not only successfully replace the deficit of salts and water in diarrhea but would also induce the reabsorption of endogenous intestinal secretion and thus reduce the volume and duration of diarrhea. In other words, it would then act as an absorption-promoting antidiarrheal drug. A few early studies and some clinical trials that were recently conducted have suggested that the development of an improved ORS formula is feasible. An improved ORS formula might be defined as one that does the following:

- reduces diarrhea volume by inducing reabsorption of endogenous secretion into the small intestine;
- shortens diarrhea duration by reducing effluent flow into the colon to less than its maximum absorptive capacity;
- reduces the failure rate of such therapy due to high purging; and
- provides a nutritional benefit by permitting early and effective feeding.

In 1984, encouraged by the promising results from several clinical trials, WHO's Diarrhoeal Diseases

Control Programme began supporting research projects to develop improved ORS formulas. In addition, several investigators around the globe began to evaluate improved ORS formulas independently. Such a solution, if successfully developed, would combine the benefits of oral rehydration with those of an antidiarrheal medication.

Two general approaches are being studied. In both types of projects, the objective is to enhance the intestinal absorption of sodium and water by providing larger amounts of different types of organic carriers than are present in the standard glucose-based ORS. In one approach, glucose (20 g per liter) is replaced by a starch-based cereal powder (50 g per liter), such as cooked-rice powder. In the other approach, chemically defined ingredients such as glucose polymers (maltodextrin) or amino acids are either combined with or used in place of glucose in the ORS preparation. The advantage of using a starch-like material is that, during digestion, glucose is released slowly and promotes sodium absorption, as it does in glucose ORS. Because of its polymeric structure, however, relatively large amounts of starch can be given without causing ORS to become hyperosmolar. If these amounts of starch were given as glucose, the osmolality of the solution would be excessive and would cause an outpouring of fluid into the intestine, which could worsen diarrhea. In addition, amino acids and small peptides liberated from the digestion of cereal proteins might further enhance sodium absorption. The use of synthetic amino acids and dipeptides is based on evidence that these can promote the absorption of water and salt by mechanisms that are distinct from the mode of action of glucose. These results suggest that the use of synthetic amino acids and dipeptides might provide an additional benefit when combined with glucose (or a polymer).

Cereal-Based ORS

Two recent studies—one in Egypt and one in India—have evaluated ORS containing cooked-rice powder (50 g per liter) in place of glucose (20 g per liter) and have confirmed the greater efficacy of rice-based ORS reported earlier by Dr. Patra from Calcutta and Dr. Molla from ICDDR,B, Dhaka. In these four studies, undertaken in children aged 4 months to 10 years, the rate of stool output in the first 24 hours was reduced by 13 to 42 percent, total stool output by 15 to 49 percent, ORS intake by up to 31 percent, and duration of diarrhea by 17 to 30 percent, in groups receiving the rice-based ORS.

Further studies are underway to evaluate the safety and efficacy of rice-based ORS in severely malnourished children and in infants under 4 months of age. The preparation of rice-powder ORS is time-consuming and requires fuel. Therefore, studies have

been initiated by WHO to determine whether an ORS that contains precooked rice could be made sufficiently stable to be used in a prepackaged form as the present glucose ORS is. Similar studies are also ongoing at ICDDR,B, on a laboratory scale. Precooked-rice preparations are now undergoing stability tests, using simulated tropical storage conditions. ORS formulas based on other cereals such as sorghum, maize, and wheat are also currently being evaluated. Data on a recent field study with rice ORS conducted at ICDDR,B, Dhaka, and on the future research needs for cereal ORS are presented later in this paper.

Improved ORS Based on Defined Solutes

Glucose Plus Glycine (and Glycyl-Glycine). Earlier studies by David Nalin and colleagues in Dhaka and Patra and by colleagues in Calcutta suggested that the addition of glycine to glucose ORS improved fluid absorption and reduced stool volume during acute diarrhea caused mostly by a toxigenic bacteria (e.g., *V.cholerae* 01, enterotoxigenic *E.coli*). Glycyl-glycine was considered as a substrate, because of some experimental evidence that it enhanced sodium absorption by a mechanism apparently independent of that of glycine. One recent study conducted in adults with severe cholera showed a 19-percent reduction in the stool output of the patients receiving the ORS that contained glucose and glycine, as compared with the output of the patients given standard ORS. Results from six other studies, however, showed that the addition of glycine (and, in some studies, glycyl-glycine) to glucose ORS had no consistent beneficial effect on the rate of stool output, ORS intake, or duration of diarrhea in children under 3 with acute diarrhea. Based on these results, it was concluded that although this approach might have some advantage in treating cholera and possibly diarrhea caused by other toxigenic bacteria, it was no more effective than standard ORS for infants and children with diarrhea of more diverse etiology.

ORS Containing Glucose Polymers (Maltodextrin) and Amino Acids. By substituting maltodextrin for glucose in ORS solutions, it is possible to provide a source of glucose (in the form of medium-length polymers) equivalent in amount to that in standard ORS and to add an amino acid or dipeptide without the solutions becoming hyperosmolar. Several studies were promoted by WHO's Diarrhoeal Diseases Control Programme, and results from these studies suggest that an intermediate grade of maltodextrin plus glycine (and sometimes glycyl-glycine) had no beneficial effect, in comparison with standard ORS.

ORS Containing Minimally Hydrolyzed Maltodextrin. WHO has promoted several studies to evaluate an ORS containing 50 g per liter of a minimally hydrolysed, more starch-like maltodextrin in place of glucose. This

maltodextrin is of particular interest for inclusion in ORS, because, in addition to being readily soluble and relatively inexpensive, it is stable when stored under tropical conditions. Studies of such an ORS formula are being done to determine whether this maltodextrin can enhance ORS efficacy to the same extent as rice-based ORS. Preliminary results from these studies, however, have revealed no appreciable benefit from ORS containing this type of maltodextrin in larger amounts.

L-alanine Glucose ORS. Results presented to you so far with the improved ORS formula containing defined ingredients have been negative. We shall now present to you data from a recently conducted clinical trial at ICDDR,B, Dhaka, and supported by WHO's Diarrhoeal Diseases Control Programme.

Using experimental evidence that L-alanine is highly effective in transporting sodium across the intestinal brush border membrane, Patra and colleagues at ICDDR,B, recently conducted a study of adults and older children with cholera. Comparing a glucose and L-alanine ORS (16 g and 8 g per liter, respectively) with standard ORS, they demonstrated that the glucose and L-alanine solution is highly absorption efficient. Results indicated that the experimental ORS was associated with a 44-percent reduction in total stool output and a 25-percent reduction in ORS requirement. In addition, 37 percent of the patients treated with standard ORS required additional unscheduled intravenous therapy after starting oral rehydration, whereas only 4 percent of the patients receiving experimental ORS needed such therapy. Please note that the patients did not receive any antibiotic for 24 hours after starting treatment. These promising results led to further studies in young children with diarrhea, and the results are being awaited with interest.

A Field Evaluation of Packaged-Rice ORS. The results of a field study with a rice-based ORS at ICDDR,B Dhaka follow. If confirmed, some of the findings of this study will have important implications for global diarrheal diseases control programs.

The study was conducted in three communities near the Matlab field station of ICDDR,B, Dhaka, by Dr. Bari and his colleagues in Chandpur. Packets of rice ORS (which needed further cooking) and standard glucose ORS were made available in two communities, respectively. All the mothers of children from birth to 4 years old in these two intervention cells were trained to prepare and use their respective types of ORS. A selected number of mothers were depot holders and community distributors of ORS. The third community, used as the comparison group, was advised to use locally available treatment facilities provided by village practitioners.

The overall impact of these interventions on diarrheal morbidity and outcome in the communities

was observed for 2 years through surveillance and followup of diarrheal episodes. Results showed that the failure rate (as defined by hospitalization or death) was significantly less in the community provided with rice ORS (1.2 versus 5.5 per thousand episodes). Mean duration of diarrhea was significantly less. Although further in-depth analysis of the data is required, with particular reference to the two groups' comparability with regard to factors such as their nutritional status (and analysis should also be done taking into account the important confounding variables), the results have important implications for the prevention of prolonged diarrhea and for policies on early home therapy. Therefore, further studies are being planned at ICDDR,B, to confirm these findings.

Present Position on ORS Composition

The exact role of cereal-based solutions in the global effort to control diarrheal mortality remains to be defined. Sufficient evidence is available, however, to support the promotion of early home therapy of acute diarrhea using cereal-based fluids. Early home therapy

with cereal-based fluids must be combined with continued feeding, which is an essential component of a diarrheal disease control program. A considerable amount of research is required to adapt the findings on cereal-based ORS to community settings.

The following summarizes the present position on ORS composition.

- Standard glucose-based ORS should be promoted globally to treat dehydration, and in some national programs, to prevent dehydration.
- Cereal-based fluids for early home therapy should be promoted along with appropriate feeding.
- The use of a precooked-cereal powder in a packaged ORS is a research issue.
- An improved ORS, based on defined ingredients—such as L-alanine, L-glutamine, and glucose (or its polymer)—is also currently being researched.

Nutritional and Dietary Considerations in Acute Diarrhea

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Mortality rates due to rehydration as a consequence of diarrhea have decreased with the widespread use of oral rehydration therapy (ORT). Malnutrition induced or worsened by diarrhea has not decreased, however, largely due to inadequate food intake during the illness and after the illness has subsided.

Diarrheal diseases can produce nutritional damage, because of decreased appetite leading to reduced food intake and large fecal losses of incompletely absorbed nutrients. Poor dietary practices contribute to the nutritional deterioration, especially among children with frequent or prolonged episodes of diarrhea. The damage increases in severity with each new episode and is worse when the poor dietary practices continue into convalescence. Thus, it is not surprising that diarrheal diseases are among the major precipitating factors of severe malnutrition.^{1,2}

Importance of Feeding During Diarrhea

Forty years ago, Chung^{3,4} clearly showed that the practice of continued feeding made children with diarrhea fare better than they did when they were starved for 1 or 2 days. This finding was disregarded by the medical community, however, and during the 3 following decades the withholding of food during the early stages of acute diarrhea continued to be a common practice. In the past decade, however, numerous studies in various parts of the world have supported renewed statements about the advantages and indications to continue feeding during diarrhea.^{4,5,6,7,8,9,10} The main issues that clinicians, nutritionists, and medical and social scientists have been trying to solve in recent years are what and how to feed.

Adequate dietary practices during and after diarrhea are extremely important because they achieve the following: a) reduce or prevent the damage of intestinal functions induced by withholding food;^{11,12,13} b) prevent or decrease the nutritional damage caused



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by the disease;^{14,15,16} and c) allow catch-up growth and a return to good nutritional conditions during convalescence. Furthermore, recent studies have shown that some diets improve the clinical course of the disease by shortening its duration and reducing total stool output.^{16,17} This is particularly important from the perspective of the sick child's mother, who wishes that her child would defecate less frequently and that the diarrhea would stop as soon as possible. The coupling of diets that have such effects with recommendations for oral rehydration might, in fact, have a positive effect on the mother's attitude toward continuing ORT as recommended.

Good dietary practices require the use of foods and diets with the following characteristics:

- nutritional, in terms of nutrient quality, density, and balance;
- adequately digestible, with nutrients that can be absorbed during diarrhea and convalescence;
- non-deleterious, in terms of the evolution of the disease;
- palatable (to the child and his or her mother) and easy to prepare;
- culturally acceptable to the child's parents; and
- accessible, in terms of cost and availability.

Nature of Foods and Diets

Although there is a reduction in appetite in acute diarrhea, children still eat significant amounts of food.^{14,15,16,18} The decrease in appetite seems related to fever and other malaise rather than to diarrhea itself.¹⁵ There is also evidence that many children have compensatory increases in appetite during convalescence.^{16,16a}

Children with diarrhea and severe anorexia should be fed by nasogastric tube, although this is only feasible in clinical settings. To counteract the lack of appetite, food should be palatable, and offered frequently and patiently, and liquid foods should be given priority to take advantage of the child's thirst. In addition to providing nutrients, liquid food provides water and electrolytes to compensate for fecal losses.

Breast Milk

If the child is breastfed, the mother's milk is the liquid food of choice. In addition to the nutritional, hygienic, immunological, psychological, social, and economic advantages of breastfeeding, it has a beneficial effect for children with diarrhea. Controlled studies in which breastfeeding continued during the rehydration phase of acute diarrhea showed an improvement in stool consistency,¹⁹ a reduction in the number of stools,²⁰ and a tendency toward lower fecal output and improved rehydration. An analysis of the incidence and prevalence of diarrhea in a poor peri-urban neighborhood in Peru suggested that infants

who were exclusively breastfed had shorter diarrheal episodes. The prevalence of the disease was lowest among these infants, intermediate among infants who were partially breastfed, and highest among fully weaned infants.¹⁵

Cow's Milk

Children who have been weaned must receive another liquid food. If they are still being partially breastfed, continuation of this practice should be encouraged, alternating the breast with the other food. The most commonly used liquid food (due to availability and custom) is milk from other species, notably cow's milk.

There has been a long-lasting and not yet fully resolved controversy about the use of cow's milk during diarrhea. This controversy stems mainly from physiopathological considerations, clinical observations, epidemiological data, and experimental studies—not all adequately controlled—on the decrease of lactase activity, the incomplete absorption of lactose, and the purging rate and duration of diarrhea. The issue of intolerance to milk or milk proteins has also been addressed by some clinicians and investigators.

The conclusions from different studies in relation to lactose malabsorption have led some pediatricians and gastroenterologists to recommend the discontinuation of milk in children with diarrhea or the use of dilute formulas, modified milks with hydrolyzed or reduced lactose content, and partial substitution of milk with other protein and energy sources. Other doctors advocate the uninterrupted use of cow's milk throughout the diarrheal episode, either whole or modified according to infants' ages.

Some pediatricians recommend the gradual reintroduction of milk during or after acute gastroenteritis. A series of studies in countries such as Egypt,^{21,21a} Saudi Arabia,²² Australia,²³ Finland,²⁴ and England,^{25,26} however, showed that gradual schemes have no advantage over the use of full-strength, non-diluted milk from the start, and that the latter might, in fact, be associated with better weight gain. Furthermore, a practical disadvantage of gradual increments in milk concentration is that they might lead mothers to use diluted milk more often and longer than necessary, thus providing insufficient amounts of nutrients to their children and exacerbating malnutrition.

Consequently, the continued use of full-strength milk to feed children during diarrhea and convalescence should be recommended. An exception should be made for children who suffer intolerance to milk beyond certain levels of intake. In these cases, the parents must substitute other nutritious foods for part or all of the milk, rather than

dilute the milk with water. Soy formulas are among the most popular and usually give good results.²⁷

Fermented milks and yogurts have also been successfully used to feed children with lactose intolerance, in hospitals or in communities where such dairy preparations are culturally acceptable.²⁸ Not all yogurts have low concentrations of lactose, however. It has been shown that, depending on the bacilli and enzymes used and on the commercial process employed, the lactase activity of yogurts can vary markedly.^{29,30}

In any event, the following factors must be considered in making recommendations concerning cow's milk for patients with diarrhea.

- Children of different ages, races, and geographic origins can have different genetic and epidemiologic characteristics related to lactase deficiency and lactose intolerance.
- Dietary habits, possibly associated with genetic traits, might also play a role, as reported in comparisons between some milk-drinking and non-milk-drinking populations.³¹
- Lactose malabsorption is not necessarily accompanied by gastrointestinal manifestations of intolerance.^{32,33} Infants usually tolerate human milk quite well, although its lactose concentration is 50 percent higher than that of cow's milk.
- Intolerance to the pharmacological doses of lactose used in some diagnostic procedures does not necessarily indicate intolerance to dietary amounts of lactose.³² Most patients with diarrhea, lactose malabsorption, and certain degrees of intolerance will tolerate small amounts of milk, either alone or as part of a mixed diet.^{24,26,34}
- In most instances, milk can be fed at full strength. When milk intake is to be reduced because of intolerance to larger doses, it is better to recommend the *partial substitution* of milk with another nutritious food rather than the *dilution* of milk.
- When gradually increasing concentrations of diluted milk are indicated, each level of diluted milk must be given for a short period of time (1 or 2 days). This must be clearly explained to the mother to avoid the prolonged use of diluted milk.
- When culturally acceptable, yogurts and fermented milks might be practical dietary options for children with lactose intolerance.²⁸

- Full-strength milk is usually well tolerated in convalescence, and this should be made clear to the child's mother.

Other Foods

Jelliffe and collaborators³⁵ recently analyzed information on traditional practices concerning feeding during and after diarrhea, in 74 countries. There was a wide discrepancy in the results, with particular foods being avoided by some people and recommended by others. Moreover, several population groups withheld all food during diarrhea. Nevertheless, people in many countries use dilute, soft preparations of local staples—mainly rice and other cereals (wheat, corn, millet, barley, oatmeal, sorghum), potatoes, and cassava. Bananas, apples, carrots, and some animal foods (such as chicken and fish), are used by some populations, when those foods are available.

Although this type of information is useful in terms of identifying cultural patterns and potential acceptance of some diets, it is difficult to assess its validity for dietary recommendations, because of the contradictory information, the anecdotal nature of some reports, and the circumstantial use of some foods due to geographic or seasonal availability.

Various elemental and semi-elemental diets have been used for children with intolerance to mono- or disaccharides,^{36,37} but they are expensive and nonessential in the treatment of the vast majority of infectious diarrheas that prevail in developing countries. Soy- and chicken-based formulas have been successfully used, mainly for children with milk intolerance,^{22,37,38} but they also tend to be expensive or are not always accessible to people in rural or poor peri-urban communities.

Of the few studies that have been done in the past 10 to 15 years with local, customary foods, almost all have been in clinical or institutional settings. Although some did not have adequate controls or large numbers of patients, the conclusions and comments in Table 1 indicate that a wide variety of foods, many of vegetable origin, can be used. Diarrhea did not become worse with any of those diets, and intestinal absorption permitted a fairly good retention of macronutrients in the acute stage and, better yet, in convalescence (see Table 2). Although the time span in most studies was too short to evaluate growth or weight gain, there was no evidence of an important negative effect.

Two of the studies mentioned in Table 1^{16,17} actually showed a marked decrease in the duration of diarrhea, with diets based on local traditional foods, compared with more conventionally accepted diets. Alarcón and co-workers¹⁷ reported a mean duration of 1.5 days of diarrhea in children fed "Sanquito" (toasted pea flour, toasted wheat flour, carrot, oil, and sugar),

compared with 2.7 days with a potato-and-milk diet, and 4.9 days with a soy-protein formula (Isomil). My colleagues and I¹⁶ observed a median duration of 1.8 days for 31 children fed "Incaparina" (corn, cottonseed flour, lysine, mineral-vitamin mix, and sugar) and a pap of rice, corn, black beans, oil, and sugar, compared with 5.3 days for 22 children fed lactose-hydrolyzed milk and a pap of rice, egg, oatmeal, oil, and sugar. Among those fed with the Incaparina diet, 32 percent had diarrheal episodes of less than 1 day, and 3 percent had episodes of more than 10 days; the corresponding proportions among children fed the milk diet were 14 percent with less than 1 day, and 23 percent with more than 10 days.

This improvement in the clinical evolution of diarrhea with local, vegetable-based foods is consistent with the preliminary results of other studies currently being conducted in Peru and Nigeria. The evidence available can reassure investigators of the safety of feeding many local foods to children with acute diarrhea and can support the conduct of other studies, especially community-based studies to test the acceptability of those diets for sick children and to assess their impact in wider population groups. In the meantime, tentative recommendations can be made on the use of local vegetable-based diets and other foods (e.g., chicken and milk) for the nutritional and dietary management of acute diarrhea.

Role of Micronutrients

In addition to providing protein and energy sources, diets must provide adequate amounts of micronutrients. Anecdotal reports and some experimental and epidemiologic information suggest that a deficiency of specific vitamins or minerals might produce or prolong diarrhea and that their administration would reduce its duration or incidence. These micronutrients include vitamin A,⁴⁶ folic acid,⁴⁷ and zinc.⁴⁸ Further investigations, some of which are currently in progress, are needed to clarify the roles of those and other specific micronutrients in the pathogenesis and treatment of diarrhea.

Conclusions and Recommendations

From the preceding discussion, the following conclusions and recommendations can be drawn.

- Feeding must be continued during diarrheal episodes. The withholding of food contributes to intestinal damage and dysfunction and increases the nutritional deterioration caused by the disease.

TABLE 1

Studies Using Staples and Other Local Foods in the Dietary Management of Children with Acute Diarrhea

DIET WITH STAPLES OR COMMON LOCAL FOODS	COUNTRY REFERENCE	NUMBER AND AGE OF CHILDREN*	CONCLUSIONS AND COMMENTS
Chick-peas (16%) skim milk	Chile, García et al. (39)	68, 1-21 mo	More children improved within 6 days than 36 others who received acid milk.
Carrots (5 or 20%), acid milk, sugar, oil	Chile, Ibañez et al. (40, 41)	56, mean 4.6 mo (40) 11, mean 5.4 mo (41)	Shorter duration of diarrhea, similar N absorption and weight gain than similar children fed acid or dilute cow's milk.
Chicken-lentils-oil, rice-egg-milk-butter-sugar; bread, banana, milk	Bangladesh, Molla et al. (14, 18)	32, 3.5 ± 19 mo (14) 68, < 5 mo (18)	Absorption of macronutrients relatively good during diarrhea and increased in convalescence. A gradual increase in food intake did not increase fecal output. No control diet.
Wheat noodles (gradual increase to 50% of energy intake), casein-oil-sugar	Perú, Brown et al. (42)	10, 7-28 mo	Feeding began after 2-8 days with oral or IV glucose-electrolytes. Absorption of macronutrients was relatively good. No control diet.
Potatoes (50% of energy and 60% of protein intake) and casein-oil-sugar or milk	Perú, Gastañaduy et al. (43); Alarcón et al. (17)	12, 4-31 mo (43) ? (17)	Absorption of nitrogen was adequate. Clinical evaluation and recovery were similar to historical controls fed casein-sucrose-oil or soy formula.
Soft rice and fish, or soft rice and pulses, or baked banana	Burma, Soe Soe Aye (Cited by Khin-Mang-U, (44))	?	Preliminary results indicated no difference in severity of diarrhea compared with experiences of control children whose mothers decided to withhold feeding.
Wheat-peas-carrots-oil-sugar	Perú, Alarcón et al. (17)	?	Purging rate lower than with soy formula. Duration of diarrhea markedly shorter than with soy formula or potato-milk diet.
Corn-cottonseed flour; rice-corn-black beans-oil-sugar	Guatemala, Torún et al. (16)	31, 7-32 mo	Duration of diarrhea and fecal excretion markedly lower than in children with lactose-hydrolyzed milk and rice egg-oatmeal diet. Absorption of macronutrients was relatively good.
Milk-corn, or corn-cottonseed flour; rice, or corn-black beans, or mixed hospital diet	Guatemala, Dárdano et al. (45)	12-16 with each diet, 6-36 mo	Preliminary results indicate no increase in duration or severity of diarrhea. Adequate growth, especially with milk-corn.

* Number of children who received the diet with local foods. Ages shown as means ± standard deviation (when known) or ranges. References in parenthesis when more than one study was done.

TABLE 2

Apparent Absorption of Macronutrients with Different Diets in the Acute Phase of Diarrhea and Early Convalescence

DIET	NO. OF PATIENTS	COEFFICIENTS OF ABSORPTION (%)			REFERENCE
		Energy	Protein	Fat	
ACUTE DIARRHEA					
Mixed Bangladeshi*	39	71 ± 24	47 ± 33	58 ± 36	Molla 1983 (18)
Mixed Bangladeshi* (cholera)	29	81 ± 10	47 ± 26	70 ± 22	Molla 1983 (18)
Guatemalan, with milk*	20	71 ± 16	63 ± 19	74 ± 18	Torún 1988 (16)
Guatemalan, all vegetable*	26	70 ± 10	47 ± 15	63 ± 16	Torún 1988 (16)
Casein-sugar-oil Noodles,	50	appr. 83	appr. 71	--	Brown, 1988 (43)
casein-sugar-oil* **	10	88 ± 10	83 ± 11	85 ± 15	Brown, 1982 (42)
CONVALESCENCE					
Mixed Bangladeshi*, &	39	85 ± 10	66 ± 23	83 ± 15	Molla 1983 (18)
Mixed Bangladeshi*, & (cholera)	29	91 ± 4	73 ± 11	90 ± 9	Molla 1983 (18)
Guatemalan, with milk*, &&	16	88 ± 6	83 ± 9	86 ± 12	Torún 1988 (16)
Guatemalan, all vegetable*, &&	26	88 ± 4	67 ± 10	91 ± 10	Torún 1988 (16)

* Described in Table 1

** After 2-8 days of treatment

& Days 15-17 of convalescence

&& Days 1-3 of convalescence

NOTE: Under normal circumstances, the apparent protein absorption of vegetable-based diets at these levels of intake are 20 to 30% lower than the absorption of animal proteins.

- Virtually all foods allow absorption and retention of substantial amounts of nutrients. This absorption and the clinical state of the child are more important than the proportion of nutrients that are lost through the stools.
- Breastfeeding must be encouraged during diarrhea, as it improves hydration and seems to reduce the severity and duration of the disease.
- Most children with diarrhea tolerate cow and other animal milks well. Practical measures include:
 - feeding the type of milk used by the child prior to the disease;
 - increasing the energy density of skim milk with 2 ml of vegetable oil or 2-5g of sucrose (according to tolerance) per 100 ml;
 - feeding full-strength milk unless intolerance is likely to occur (in which case, substitute 50-percent milk with other liquid food for 1 or 2 days, followed by full-strength milk);
 - feeding small amounts of milk frequently (six or more times per day) (when appropriate, combining milk with other foods in the same meal);
 - using certain yogurts and fermented milk when lactose intolerance is suspected;
 - using soy-based formulas, other non-dairy foods, or lactose-hydrolyzed milk for children with intolerance to milk or lactose; and
 - testing tolerance to milk in convalescence, and reintroducing milk to the diet according to the results.

- Lack of appetite is transient and can be counteracted by small and frequent feedings. Nasogastric alimentation is recommended in severely anorexic patients who seek medical attention, but force-feeding should be avoided.
 - Many local animal- and vegetable-based diets, which include cereals, some pulses, sugar, and vegetable oil, are well tolerated and assimilated in diarrhea. Some local foods reduce—or at least do not increase—the duration of the disease.
 - Further investigations, especially at the community level, are needed to determine the acceptance of diets with local foods during diarrhea and to assess the diets' short- and long-term effects on children with repeated episodes of diarrheal diseases.
 - The mother's attitude towards feeding practices must be taken into account. Although the growth and clinical evolution of the child are more important than the number and characteristics of the child's stools, modification of the latter may be important to gain the mother's confidence in the feeding practices that are recommended.
 - Good feeding practices are particularly important during convalescence to allow catch-up growth and nutritional recovery. Diets with good nutritional quality and high concentration of macro- and micronutrients should be used.
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Management of Dysentery and Prolonged Diarrhea

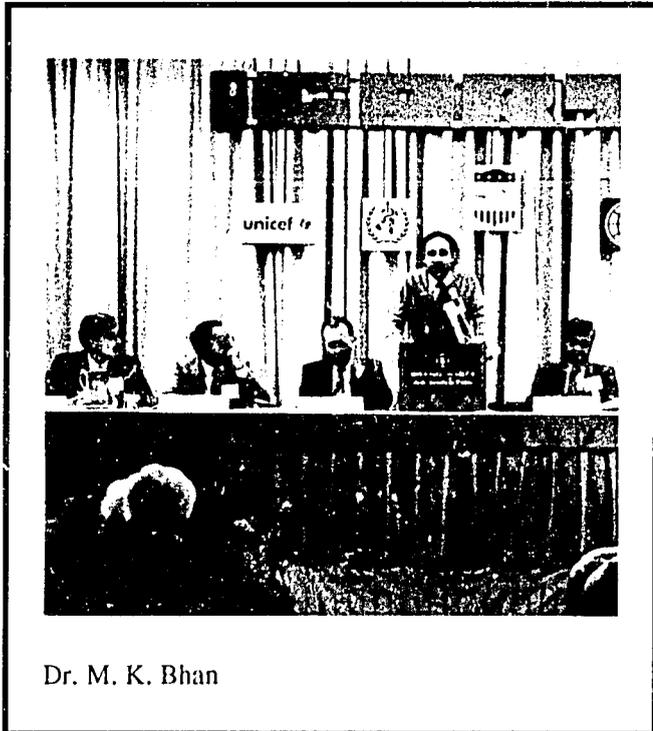
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The value of oral rehydration therapy (ORT) in preventing and treating dehydration and in reducing mortality associated with dehydrating diarrhea is well recognized. Dysentery and prolonged diarrhea are other subsets of diarrheal episodes associated with a high risk of mortality and adverse nutritional consequences, and these are not effectively managed with ORT alone.

Dysentery

Available estimates suggest that about 20 percent of all diarrheal episodes in children under 5 years of age are dysenteric (bloody stools). Fatality rates for dysentery are difficult to estimate. It can be safely assumed that dysentery-related mortality is mostly due to shigellosis. In patients with shigellosis who reach a treatment facility, the fatality rate is about 1.2 percent. A high fatality rate of 6 percent is reported during epidemics of *shigella dysenteriae* type 1. Community-based data on mortality rates are not available. Prior to the advent of ORT, it was estimated that dysentery accounted for 20 to 25 percent of all diarrheal deaths. Once wide and effective use of ORT for watery diarrhea is achieved, this percentage could increase further.



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The clinical syndrome of dysentery has the following characteristics:

- blood and pus in the stools;
- abdominal cramps; and
- fever.

A broader definition could also include presence of pus cells in the stools.

The practical definition of dysentery is the presence of gross blood in stools, as it facilitates early recognition by the mother and the health workers and identifies a more severe form of the disease.

Etiologic diagnosis can be made in 50 to 70 percent of patients with gross blood in their stools. Enteropathogens causing dysentery are listed in Table 1.

Of these, shigella and campylobacter account for a majority of the cases of dysentery. Clinically severe disease associated with a substantial risk of mortality is caused by shigella. The mortality of dysentery associated with pathogens other than shigella is likely to be low. Therefore, empirical treatment of dysentery should be directed against shigella species. Several studies show that about 50 percent of patients infected with shigella have gross blood in the stools. Stool microscopy as a screening test for identifying patients who require empirical antibiotic therapy is impractical in the Third World. Studies in Bangladesh

TABLE 1

Etiologic Agents of Dysentery

- Shigella*
- Campylobacter*
- Invasive E.Coli*
- Enterohemorrhagic E.Coli*
- Salmonella*
- Clostridium Difficile*
- Yersinia Enterocolitica*
- Aeromonas Hydrophila*
- Vibrio Parahemolyticus*
- Entameba Histolytica*

show that history of bloody diarrhea reported by the mother correlates well with the appearance of stool passed at the time of the visit to the treatment facilities. These studies also show that a simple history of bloody diarrhea gives a balance of positive and negative predictive values that is as good or better than that provided by diagnostic algorithms incorporating clinical findings, such as fever or abdominal pain. The presence of blood thus serves as the most practical indicator for antibiotic therapy.

The Clinical Problems Associated with Acute Shigellosis

During acute illness, anorexia may be particularly severe. Seizures are related to hypothermia. Dehydration, though infrequent, indicates severe illness. Bacteremia with shigella or other enteric organisms is not uncommon and is associated with increased mortality. The other associations of acute shigellosis are leukemoid reaction, prolapsed rectum, toxic megacolon, and intestinal perforation. Clinical complications of a subacute or chronic nature are growth faltering, prolonged diarrhea, and hemolytic uremic syndrome. Prolonged diarrhea in shigellosis is mostly related to the persistence of the organism; it is not clear whether a disorder simulating inflammatory bowel disease exists.

Antimicrobial Therapy

The rationale for antimicrobial therapy for childhood dysentery is to decrease associated mortality and to reduce the adverse consequences of nutritional wasting. Antimicrobials shorten the duration of illness and the period of shigella excretion. During epidemics of shigella dysentery, antibiotic therapy reduces mortality rates. There are no data on the effect of early, appropriate antibiotic therapy on preventing the wasting associated with dysentery.

The antibiotics shown to be effective in the treatment of shigellosis are listed in Table 2.

TABLE 2

Antibiotics Effective in The Treatment of Shigellosis if Strains Are Sensitive

Tetracycline*
Ampicillin*
TMP-SMX
Trimethoprim
Bicozamycin (Adults)
Norfloxacin (Adults)
Nalidixic Acid
Pivmecillinam (Adults)
CHLOROMYCETIN
CEFTRIAXONE

* Single Dose

In recent years, strains of shigella resistant to several of these antibiotics have emerged, necessitating changes in the treatment policy. Selection of an antimicrobial agent should be based on the drug susceptibility pattern of either the strains isolated from local cases or of strains recently isolated in nearby areas.

If laboratory support is not available, and there is no information on the drug resistance pattern of recent isolates, empiric therapy can be initiated with Ampicillin or Trimethoprim-sulphamethoxazole (TMP-SMX). Ampicillin is used in multiple doses over 5 days. One study suggested that children over 4 years of age and adults could be treated with a single dose of ampicillin. Although the simplicity and economic advantages of this dosage are obvious, its efficacy needs to be confirmed by additional studies before it can be recommended.

In the presence of a poor clinical response and/or resistance to ampicillin and TMP-SMX, nalidixic acid is used. Although nalidixic acid is used widely for treatment of shigellosis caused by *S. dysenteriae* type I strains that are resistant to ampicillin and TMP-SMX, some studies have shown it to be less effective than ampicillin in patients infected with ampicillin-sensitive strains.

Sulphonamides, streptomycin, tetracycline, and chloramphenicol should not be used, unless a strain has been shown to be susceptible to them.

Because resistance to antibiotics develops rapidly during epidemics, arrangements for monitoring drug resistance are needed within a country or region.

In view of the emergence of strains that are resistant to available antimicrobials, there is an urgent need to develop new and safe antimicrobials for shigellosis. Newer antimicrobials currently under evaluation or consideration include fluoro-quinolones,

pivmecillinam (a penicillin derivative), norfloxacin, ciprofloxacin, ofloxacin, enoxacin, and oral gentamicin.

Pivmecillinam has been shown to be effective in adults but has not yet been evaluated in children. It is marketed in Europe. Norfloxacin and ciprofloxacin have also been shown to be effective in therapy for shigellosis in adults, but their use with children is not currently approved, as these antimicrobials—like other quinolone derivatives—have adverse effects on cartilage and bone growth in animals.

Furazolidone, kanamycin, neomycin, and amoxycillin have not been shown to be efficacious, and are not recommended.

Prevention and Treatment of Dehydration

Clinically evident dehydration is not common with dysentery, but its appearance indicates a serious illness. The complete oral rehydration solution (ORS) recommended by the World Health Organization (WHO) is adequate for treatment of dehydration and for maintenance therapy. Foods rich in potassium are useful particularly in the malnourished children who have significant potassium depletion. Intravenous rehydration using Ringer's lactate is required only for severely dehydrated or extremely weak patients.

Nutritional Management

In shigellosis, although feeding is sometimes difficult, it is extremely important because the disease has significant adverse effects on nutritional status. Preliminary data for the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), suggest that, even during the acute phase of illness, a significant amount of food intake ranging from 50 to 110 kcal per kilogram of body weight is achieved when food is generously offered. Breastfeeding should be continued with greater-than-usual frequency. Children older than 4 months should receive energy-dense, weaning foods consisting of milk and cereal diets with added fats and sugar. Repeated smaller-than-normal feeds may be better tolerated. Extra food should be provided during convalescence. The treatment of dysentery is complete only when the affected patients are gaining optimal weight. Daily weight measurement during hospital treatment is adequate to monitor nutritional therapy.

Implications for Diarrheal Control Programs

Treatment algorithms to assist peripheral-level health workers need to be developed for use in national programs. The presence of blood in the stools can be used to identify cases for empirical antibiotic therapy, the nature of which depends on the local pattern of microbial drug resistance.

Patients who respond poorly to the initial antibiotic require alternative therapy by the community health

worker (CHW) or by more highly trained medical personnel; the criteria for treatment failure need to be evolved. Patients of shigellosis with factors known to be associated with a high risk of mortality might require referral to a treatment center at the time antibiotic therapy is initiated by a CHW. These risk factors include age of less than one year, the absence of breastfeeding, moderate to severe malnutrition, and clinically evident dehydration.

An unresolved issue is whether individuals like community health workers and pharmacists can be trained to appropriately use antibiotics for dysentery but not for other diarrheas. Also, central to community-based management of dysentery is the issue of the management of malnutrition. This can be achieved in an ongoing growth-monitoring program by the early detection of growth faltering or malnutrition, before dysentery recurs. When routine growth monitoring is not in practice, followup and nutritional rehabilitation are essential.

A suggested algorithm for treatment of dysentery by the community health worker is provided in Table 3.

Prolonged Diarrhea

The term *prolonged or persistent diarrhea* refers to diarrheal episodes of presumed infectious etiology that begin acutely but have unusually long durations. Recent studies show that the duration of acute diarrhea forms a continuum, with most episodes terminating within 7 days and progressively smaller proportions persisting beyond 14, 21, or 28 days.

The delineation of prolonged diarrhea as a subgroup distinct from acute diarrhea is, as such, arbitrary. The most commonly used operational definition of prolonged diarrhea is an episode that lasts for 14 or more days. This definition is used for the purpose of this review. A proportion of prolonged episodes, thus defined, are associated with growth failure.

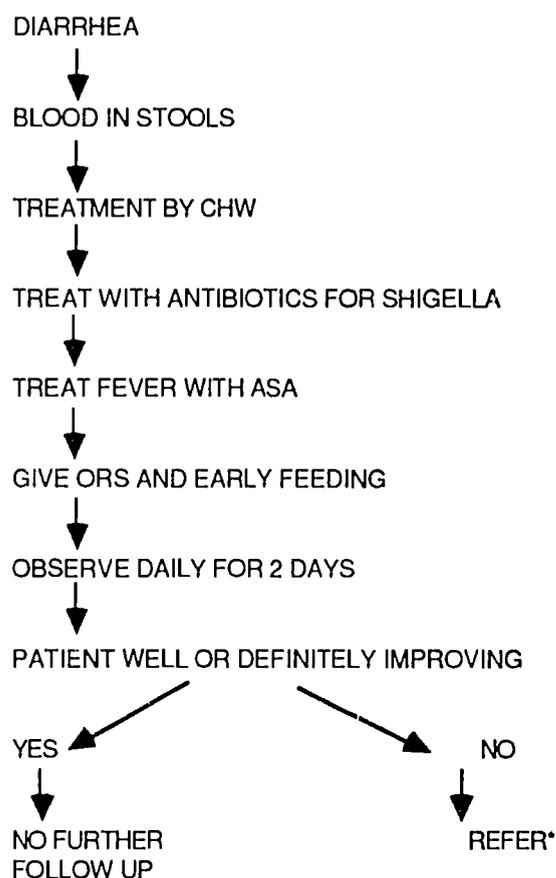
In defining strategies for prevention or therapy, the focus should be on decreasing diarrheal duration, rather than on preventing arbitrarily classified prolonged episodes.

Consequences of Prolonged Diarrhea

Several ongoing or recently completed studies show that between 3 and 15 percent of acute diarrheal episodes in children under 5 run a prolonged course. Episodes of persistent diarrhea, although fewer in number than acute diarrhea, are more likely to have severe consequences. Studies in Peru, Bangladesh, Brazil, and India suggested that 36 to 56 percent of all diarrhea-associated deaths are related to episodes of prolonged diarrhea. These include deaths from dysentery as well as from prolonged

TABLE 3

A Suggested Algorithm for Treatment of Dysentery by the Community Health Worker



* An alternative might be for the CHW to dispense an alternate antibiotic, but the feasibility of such an approach must be ascertained.

watery diarrhea; the proportion of patients in either subset would have associated lower-respiratory-tract infections. Children with a high prevalence of diarrhea have the greatest growth retardation, and these children usually have prolonged diarrhea. The reasons for growth retardation include reduced dietary intake due to anorexia, food withdrawal during illness, malabsorption, and endogenous loss of nutrients. There might also be little or no catch-up growth after recovery, because of inadequate nutrient intake or additional nongastrointestinal illnesses.

Clinical Categories of Prolonged Diarrhea

Two broad clinical categories of persistent diarrhea are seen by pediatricians in the developing world. The first category applies to patients who pass several

liquid stools in a day, without imperiling hydration. This category is important, because associated growth retardation might contribute to intercurrent, non-gastrointestinal infections and increased risk of death.

The second category applies to infants or young children who have severe and persistent watery diarrhea and in whom maintenance of hydration without intravenous fluids is difficult. The deterioration in nutritional status is rapid and mortality is high, even under reasonable medical supervision. This category is likely to constitute only a small proportion of the prolonged diarrheas in the developing world. Whether important etiological and pathophysiological differences exist between the milder and the severe forms of prolonged diarrhea is not known.

Etiopathogenesis of Prolonged Diarrhea

The findings from several ongoing or completed studies, which are summarized below, form the basis of treatment recommendations. Theoretically, diarrheal illnesses can be prolonged by either of two factors: a) continued damage to the intestinal mucosa; or b) failure of the intestinal mucosa to heal after an initial insult. In either case, impaired absorption and/or abnormal secretion of solutes and water persists. The probable causes of continuing mucosal damage include the persistence of microorganisms that elaborate toxins, attach to the mucosa, or invade it; and a response to the dietary constituents, notably disaccharides (especially lactose) and possibly animal proteins. The role of animal protein in causing continued mucosal injury following acute diarrhea has been suggested by studies on experimental models of acute gastroenteritis, but its importance in prolonged diarrhea, as it occurs in the Third World, remains to be proven.

Role of Microorganisms

Specific pathogens isolated in stools or duodenal fluid of patients with prolonged diarrhea are listed in Table 4. These include nearly all pathogens causing acute diarrhea, with the exception of *V.cholera* and rotavirus.

The frequency of isolation of several pathogens—including shigella, non-typhoid salmonella, enterotoxigenic *E.coli*, campylobacter jejuni, aeromonas hydrophilia, and others—is similar in acute and prolonged episodes. Persistence of these pathogens might reflect an impaired ability of the host to clear them, perhaps because of relatively impaired immunocompetence, such as is found in malnourished children or during early infancy.

However, enteroadherent *E.coli* (EAEC), enteropathogenic *E.coli* (EPEC), and, perhaps, cryptosporidium might have a predilection for causing

TABLE 4

Excretion of Stool Pathogens in Prolonged Diarrhea

SAME AS IN ACUTE	HIGHER THAN IN ACUTE
Shigella	EPEC
Non-typhoidal Salmonella	Enteroadherent <i>E. Coli</i>
EPEC	
C.Jejuni	
A.Hydrophilia	
G.Lambliia	
Y.Enterocolitica	
C.Difficile	
E.Histolitica	

Source: *Persistent Diarrhoea in Children in Developing Countries*. Report of a WHO Meeting, WHO/CDD 88.27, 1988.

prolonged disease, because the rates of isolation for these agents are greater in persistent episodes than in acute episodes. There might be important differences in the occurrence of various pathogens in different geographical areas. For example, nearly half of the prolonged diarrheal episodes in Bangladesh are associated with either shigella or enterotoxigenic *E.coli*, whereas, 35 percent of the prolonged episodes (as opposed to 11 percent of acute episodes) in northern India have EAEC with aggregative phenotypes in the stools.

Appropriate antibiotic therapy early in the illness is likely to prevent the majority of prolonged episodes related to shigella, but it is not known if the same holds true for other pathogens, particularly EAEC.

Although specific pathogens are yielded by only a proportion of the patients with persistent diarrhea, few studies have shown significantly increased numbers of aerobic and anaerobic bacteria in the small bowel in these patients.

Recent studies by Hill et al. reported reduced stool weight and nutrient losses in prolonged diarrhea treated with oral gentamicin and cholestyramine. These results might be interpreted to indicate an important pathogenic role for small bowel bacterial overgrowth. They defined prolonged diarrhea, however, as persistence of diarrhea for more than 6 days after the hospitalization in episodes that were less than 3 days' duration at admission, and they excluded children with known pathogens.

Observations in a recent study of Peruvian children with prolonged diarrhea by M. Penny et al. (unpublished) raise doubt as to the pathogenic role of small intestinal bacterial overgrowth. They found an increase in small intestinal bacterial flora even in children with acute diarrhea and in healthy controls.

The therapeutic benefit of oral gentamicin reported by Hill et al. (1986) might well have been related to the eradication of specific pathogens that remained unidentified. Indeed, Croft et al. (unpublished), comparing oral gentamicin with a placebo in treating prolonged diarrhea, showed gentamicin to be effective in shortening the duration of illness, but only for patients harboring EPEC or EAEC in their small bowels.

Issues of Nutritional Management

Dietary intake in prolonged diarrhea might be reduced due to anorexia, vomiting, or decreases in the amounts of nutrients offered. Some studies suggest that in acute diarrhea, true reduction in dietary intake is restricted to the febrile period. Tomkins, however, concluded that reduced dietary intake was more important than malabsorption in explaining the weight faltering for prolonged diarrhea in children fed on a rice-millet diet. In a study where 40 hospitalized children with prolonged diarrhea were offered generous amounts of a mixture of soy formula and energy-dense, semi-solid gruel containing rice powder, lentils, and oil, the median energy intake on days 1, 3, and 5 of hospitalization were 55, 68, and 82 kcal per kilogram of body weight per day. At the time of recovery, energy intake expressed as above ranged between 72 and 135.

Hospitalized patients are more seriously ill, and true reduction in dietary intake might be less significant for prolonged diarrhea at the community level. In children from north India, Bentley (in press) observed that mothers were more likely to withhold foods during episodes of prolonged, rather than acute, diarrhea. Thus, child care behaviors might be an important determinant of the growth faltering associated with prolonged diarrhea.

Intestinal malabsorption of macronutrients and, presumably, micronutrients occurs in both acute and prolonged diarrhea. Recent studies in Bangladesh (unpublished) and Peru show markedly reduced absorption by infants with prolonged diarrhea. Steatorrhea leads to energy loss: It can cause deficiency of fat-soluble vitamins, probably bacterial metabolites of unabsorbed fat, which might exert a secretory effect in the colon.

The same studies showed absorption of carbohydrates from mixed diets to be less affected. Although lactose is most severely affected, alterations in digestion and absorption of other disaccharides are also reported. It is only in a small proportion of infants with severe prolonged diarrhea that clinically significant impairment in jejunal glucose and fructose absorption can occur. Apart from energy loss, carbohydrate intolerance results in an increased intraluminal osmolar load and diarrhea.

Endogenous proteins are lost in prolonged diarrhea due to shigellosis and to a lesser extent with some other pathogens. Protein absorption may also be impaired. A generous intake of protein, however, maintains a positive nitrogen balance.

Clinical Experience in Dietary Management

In developed countries, patients with persistent diarrhea usually receive "semi-elemental" formula or parenteral nutrition. Studies now suggest that, even in these settings, enteral therapy results in faster recovery from diarrhea and in a better absorption status than does the total parenteral nutrition.

Few carefully controlled studies on the dietary management of prolonged diarrhea in the developing world have been performed. Useful lessons have been learned, however, in studies on dietary management of acute diarrhea and nutritional rehabilitation of malnourished children, and these can be applied to the prolonged diarrhea.

It is now established that continued feeding of breast milk and semi-solid foods during acute diarrhea is safe and advantageous. One study in Burma observed shorter duration of acute diarrheal episodes during which breastfeeding was continued. The use of undiluted animal milk during the convalescent phase of acute diarrhea has been shown to be safe in most settings, although in a few countries, a few children experience increasing diarrhea when full-strength whole-milk formula is reintroduced in the diet.

Infants with persistent diarrhea might be more difficult to manage with undiluted milk as the sole or major source of nutrients. Preliminary results from studies in Peru by Penny, Brown, et al. (unpublished) suggest that early feeding with lactose-containing whole milk results in significantly greater stool losses than with lactose-hydrolysed milk or milk-noodles mixtures. Although controlled studies have not been performed, milk-cereal mixtures might be safe and nutritionally advantageous in prolonged diarrhea, as has been previously shown for acute diarrhea.

Recommendations for Management

Fluid Therapy. It is unlikely that most children with prolonged diarrhea have clinically detectable dehydration, but they require replacement of ongoing fluid and electrolyte losses. A complete oral rehydration solution is more suitable, because it corrects negative potassium balance due to poor nutritional status and illness of long duration. In a small number of patients with high purging rates (> 10 ml/kg/h) or extreme inanition, intravenous Ringer's lactate solution can be used. The composition of intravenous replacement fluid for critically ill infants is

more appropriate when based on a stool-electrolyte pattern that often varies considerably.

Antimicrobial Agents. Dysenteric episodes can be managed as outlined previously. Prolonged diarrhea without blood caused by specific pathogens might well respond to appropriate antibiotics, but a specific etiological diagnosis is still problematic. At present, antimicrobials can be given only when a specific pathogen has been isolated. The nature of antibiotic therapy could be based on the sensitivity of isolated pathogens. Empirical therapy with oral antibiotics directed at either aerobic or anaerobic flora cannot be recommended at present, but this approach might need to be modified, as results of several ongoing studies become available.

Antidiarrheal Agents. Antimotility or antisecretory agents in usual or larger doses have not been demonstrated to be useful and, therefore, should not be used. The use of cholestyramine, which binds unconjugated bile salts or bacterial toxins, is not recommended on similar grounds. Cholestyramine can aggravate steatorrhea. Lactobacillus or fecal streptococci to replace intestinal microflora have not as yet been shown to offer significant therapeutic effect.

Diet Therapy. Feeding should be continued during prolonged diarrhea, using diets that are sufficiently dense to meet the usual and extra nutrient requirements. When artificial milk is removed from the diets of children in whom it was the major nutrient source, it must be replaced by other nutrient sources. Exogenous beta galactodidases added to milk and fermented milk products are promising alternatives to lactose containing whole milk.

Food should be offered in small amounts and at greater than usual frequency, to maximize tolerance and absorption. Abundant, nontoxic amounts of vitamins and minerals should probably be supplemented, as these are involved in mucosal repair and immunological processes. These might include folate, zinc, iron, vitamin A, vitamin B-12, and probably

others. Additional studies are required to determine the role of micronutrients in preventing or treating prolonged diarrhea. Extra nutrient supplements during convalescence are essential for catch-up growth. These levels of intake can promote rates of growth far in excess of those expected for normal children of the same group, aiding nutritional recovery. These diets can be prepared with staple foods enriched with fats or sugar.

Several issues regarding management of prolonged diarrhea at a community level remain to be resolved. What duration of diarrhea warrants referral and evaluation? What identifiable risk factors for mortality or growth-faltering associated with prolonged diarrhea could be used to determine the need for evaluation or treatment? Are there approaches to treatment of acute diarrhea that would reduce the risk of prolonged diarrhea? These are some of the important issues for future research.

Footnotes

1. M. E. Bentley, "The Household Management of Childhood Diarrhea in Rural North India," *Soc Sci Med* (in press).
2. Brown, et al. unpublished data (n.d.).
3. Croft, et al. unpublished data (n.d.).
4. J. D. Hill, et al. "Use of Oral Gentamicin, Metronidazole, and Cholestyramine in the Treatment of Severe Persistent Diarrhea in Infants," *Pediatrics* 77 (1986): 477-81.
5. M. Penny, et al. unpublished data (n.d.).
6. *Persistent Diarrhea in Children in Developing Countries*. Report of a WHO Meeting, WHO/CDD/88.27, 1988.

V. Policy Forum



Mrs. Margaret Catley-Carlson, President of CIDA, facilitated the Policy Forum.

Sustaining the Momentum of ORT



Mrs. Margaret Catley-Carlson

Mrs. Margaret Catley-Carlson
President
Canadian International Development Agency (CIDA)
Quebec, Canada

Opening Remarks

I feel very honored that I have been asked to chair this session, because it is the session that has the potential of being one of the most interesting parts of this conference. If we devote some time to sharing our views and developing some conclusions, we might provide ourselves with a roadmap for the action that must be taken next, whether it is to be taken by the international organizations represented here, by the development agencies, or by the countries, themselves.

Please note here that I do not say "developing countries." One of the things that has always fascinated me is how those from the industrialized world talk about oral rehydration therapy (ORT) as something that only has relevance for developing countries. That would presume that only developing countries have children, which—given our birth rates—might soon be true, but it is not quite true yet. ORT is something that we need to look at in all of our national schemes.

The world, for a large number of children, is far too harsh and inhospitable. During the course of the conference, you have been reviewing some of the statistics and facts that are still unfortunately true. Each week, more than a quarter of a million young children—around 13 to 14 million each year—are dying from frequent infection and prolonged undernutrition. I am bringing these figures to your attention again, so that they will inspire us to share our ideas. As depressing as these statistics are, however, they would be even more depressing if there were nothing that we could do about them.

But of course, the reason that we all are here is that there *is* something that we can do. A number of low-cost remedies are available and are becoming widely known. They are disseminated through social-mobilization techniques that are widely used and widely applicable.

As a result of these remedies, positive developments—such as immunization and ORT—are, in fact, saving millions of lives every year. This is to be applauded and encouraged. We know, however, that these measures are not enough to solve the problem of early childhood mortality. We need to combine these with many other measures. Some of them (such as breastfeeding, improved weaning practices, clean water, and sanitation) are available and inexpensive. Some of them, however, are much more difficult. What do we do with the life of a child, once the child has been saved by these measures? How do we then improve health practices and accessibility to health services? We know that what we are looking at is the beginning of a chain, not the ending. We also know that, even at the beginning, there are some very real questions.

We have made a start. But we can—and *should*—do much more. There are obstacles in our path. Wars and conflict in some parts of the world have prevented us from reaching many of the neediest. Economic crises in many countries have forced cutbacks in government services. In looking at the debt crisis and structural adjustment, or at the need to cut back government expenses, we see that in both the industrialized world and the developing world alike, far too often the first targets are health services, educational services, and social services. Nevertheless, there is an increasing commitment on the part of all countries to work toward stronger health care policies, and the momentum is with us to extend the benefits of ORT and other primary health care methods to the millions who have not been reached.

Let me ask you—policy practitioners and people who deliver services—the following questions under six broad categories.

1. *Needs.* What do we need? We need policies that set out clear and well-articulated goals and objectives. These policies should also take into account other essential, related health care components, such as stronger health practices for mothers and children, improved environmental sanitation, and epidemic control. What greater assistance is needed on policy? What are the obstacles to policy formation? Are the policies sufficiently clearly enunciated? Are there mixed messages coming from various policy players? What additional work is needed in the policy area? We have to start with policy, because that becomes the groundwork for budget-making, 5-year plans, and task-force formulas.
 2. *Political Commitment.* The importance of political will and leadership obviously cannot be too strongly emphasized. The political commitment of a nation's leadership is crucial to program success. Without political leadership, we can't mobilize a society or bring together the resources needed to get the job done. We need political leadership to coordinate supply and demand, and to throw the full weight of permanent government services behind a sustained national effort. We obviously need political commitment to get budgetary support for health programs and to get all the relevant government departments that support services—as well as the sectoral departments—behind these programs. Once policy is established, what do we do to get that political commitment? What have been the experiences that have worked? What has not worked? What would you recommend against, in the realm of political commitment? What do we need to do about political commitment, in fostering and engendering ORT?
 3. *A Practical Approach.* We need technically feasible methods that will encourage communities to use home-based solutions in the treatment of common diarrhea and other diseases. We also have to design our policies to ensure that health personnel receive appropriate training and orientation in these methods. Are we sufficiently practical? Are we still letting obstacles stand in the way of the most practical approach possible? Since the very virtue of ORT is its simplicity, are we going about this in a sufficiently pragmatic way?
 4. *Organization and Administration.* We have to ask ourselves what organizations are best able to deliver ORT services to the community in a timely fashion. Governments are effective in delivering health care at the community level, but they cannot do everything themselves. Instead, there is a wealth of organizations and associations that can do as good a job—sometimes better—in delivering services to the community. In one situation, this might be the army or the police; in another, the church; in yet another, the schools, a women's network, a union, or some form of social or service club. We should be creative, ingenious, and open to new possibilities. We should explore new forms of cooperation with other groups in our own society, and in others.
 5. *Money.* We need to ensure the financial feasibility of our programs. We have to ask ourselves how much these programs will cost if external sources of financing are required, and what sort of long-term contribution the national private sector can make in terms of procurement, distribution, and the sale of ORT and other supplies at low cost. If we find that the public budget is inadequate, how can we encourage self-financing at the community level? And are we making the optimal use of voluntary, nongovernmental organizations for advocacy, training, and the supply and distribution of oral rehydration salts?
 6. *Information.* How do we make the public more aware of ORT and related measures to save children's lives? This is absolutely vital. We know from experience that the very poor and uneducated parents can and will put today's child health information into action—if all possible channels are used to inform and support them in doing so. Countries such as Colombia, Turkey, Syria, Senegal, Pakistan, India, Brazil, Bolivia, Egypt, Ecuador, Thailand, and Bangladesh have saved millions of young lives during the 1980's by doubling or tripling immunization coverage, by making ORT available to parents, by promoting breastfeeding, and by monitoring child growth. In each of these countries, vigorous communication programs made a vital difference.
- I am optimistic about our ability to spread the word about ORT. Sixty percent of the developing world's adults can now read and write. Eighty percent of its children now at least enroll in school. Radio reaches into a majority of homes of the developing world, and television reaches into a majority of its communities. Government services now reach into almost every community. Millions of doctors, nurses, and

community health workers are now at work. Tens of thousands of organizations, cooperatives, unions and associations, teachers, and religious leaders can be called upon to spread the word. Together, all of these groups and individuals can encourage public demand for—and practical knowledge of—the simple medical techniques that can bring about a revolution in child survival and development.

In addition to these six points, I would like to raise two more questions that could serve as a useful starting point for our discussions.

1. What are the obstacles to the expansion and continuation of ORT programs?
2. What can cooperating agencies and individual countries do to meet these challenges?

Given the people assembled today, I am sure that we can come up with some creative and innovative answers to these questions. I look forward to your ideas.

Closing Remarks

Some of the interesting observations that I heard during today's discussion can be summarized under four broad categories: policy; obstacles; delivery; and indices. Within these categories, there was a good deal of contradiction, which I think was good. As the world is not a homogeneous place, I think these contradictions were productive.

Our member from Zimbabwe said that it is very important to include ORT in the government policy framework. Many governments function with a policy framework, which is part of the accepted process for developing budgets and plans. Dr. Nakajima reminded us that many successful countries do not have that kind of policy process. In countries where policies are essentially announced and then forgotten, it might be better to work on goals and to identify some resources to support those goals until the program becomes self-sustaining. Stated differently, where a policy framework works, use it; where a policy framework is not yet a useful tool of national planning, use a goal approach and line up national resources behind it.

It was pointed out that, to be useful, policies have to be backed up by specific measures. Policies aimed at political leaders are only as useful as the political leaders' statements. On the other hand, policies aimed at mothers are thought to be of more general, universal utility. In other words, you can try to convince the political leaders, but it is more important to convince the mothers. If political leaders can convince mothers, use them, but remember that the ultimate goal is to convince mothers.

An interesting perspective was given by the Nepalese representative, who said that leaders can be made accountable, if there is a demand. With increased demand, eventually political leadership can be convinced and can become useful in this cause, so that a virtual circle can be established.

The group thought, however, that you do need policies where they are useful. Otherwise, you might have to find other ways to reach the primary target, i.e., mothers or possibly pediatricians. There is still some uncertainty as to who the primary targets are.

The group identified the following obstacles to ORT programming:

- *Money.* For anybody who wants to help significantly with the dissemination of ORT or other primary health care products, the first and foremost concern is to secure resources for this task.
- *Communication Linkages.* These were also felt to be obstacles, but communication linkages do not always exist. Again, this is an issue that varies from country to country.
- *The Distribution System.* Doctors were named as possible obstacles to distribution. Pakistan said that doctors won't create obstacles, because they are convinced of the usefulness of ORT. Nigeria said that doctors can and will create obstacles. Obviously, countries have had a variety of experiences, and the tactics for removing obstacles to the distribution system have to vary from country to country.
- *The Presence of Other Uncontrolled Medical Problems.* If the practitioner is not in a position to offer a mother something that will bring health—i.e., if the treatment cannot result in improved health, because of malnutrition or other diseases—then, despite the improvements made, ORT, will itself, be an obstacle.
- *Policy Pronouncements.* A country's policy pronouncements often do not result in actual progress.

As we were reminded by Dr. Nakajima, because all ideas really get integrated only at the very edge of the field, where resources are in short supply, the approach must be integrated. We still have a way to go in integrating the various concerns at the headquarters level—not only within international organizations but also within universities, hospitals, and research entities, where things tend to get integrated into vertical columns. We can cross these vertical columns

in order to integrate delivery, by using campaigns and delivery systems that can deliver health system components as well as ORT.

The need for indices was, by far, the most perplexing topic, and there were many differing viewpoints. Egypt said that we need them badly; the Philippines said that we might not need them at all. Other viewpoints follow.

- The existence of indices and progress are linked with measurement.
- ORT works, and there are already enough people who know that it works. In addition, data collection can be very expensive and time-consuming, particularly in complicated situations at very basic levels. Available resources should not be used to continue proving that ORT works but, rather, to implement programs.
- Even if indices are necessary, data collection can be shared. Everyone doesn't have to collect the same indices at the same time. We need a national or, perhaps, a global effort to define baseline data and collect measurements of progress.
- There are global indices that are involved with either half the current rates or the descent to a precise numerical ratio for both mortality and morbidity.

- In order to assess whether progress is really being made, implementors must show some measurable progress, according to some selected indices.
- Two kinds of indices are needed: a series of popular goals; and a series of medical goals. For the popular goals, measurability is not essential. What is needed is something that will grab, something that will hit, something that will appeal to populations. Language does not have to be as precise as it would be in medical research terms. Goals can address universal acceptability, or 90 percent of the people, or all of the mothers. Medical goals, however, should be established in terms of infant mortality or morbidity.

There were two other very interesting suggestions for statistical indicators: the percentage of 12-year-olds who are near normal weight; and the recurrence of diarrhea, as measured by several episodes of diarrheal diseases in village or community-level clinics. There is much thought to consider concerning how to create indices, if, indeed, they are needed and how to make the best use of them.

Thank you very much for being such an inspiring group.

VI. Panel Presentations



Health Worker Training and Performance Panel: Dr. Sileshi Lulseged, Ethiopia; Dr. Perla Santos Ocampo, Philippines; Dr. Deanna Ashley, Chairperson, Jamaica; Dr. B. B. Karki, Nepal; and Chief Sola Alalekan Atanda, Nigeria.

Instructions to Panels

Dr. Robert Northrup
Technical Director
The PRITECH Project
Arlington, Virginia, USA



Dr. Robert Northrup

Mr. Grant's provocative and inspiring speech has laid out for us where we stand in our progress in the fight against diarrhea, has reiterated the current WHO targets for our efforts, and has touched on a few of the issues and problems we face in reaching those targets.

You know those issues and problems all too well: You have been facing them daily in your work. We salute and admire you for your strength and courage and cleverness, and your persistence—your ability to persist, your sustainability—in dealing with these issues and problems. And we hope that the sessions yesterday, and the panel sessions about to begin, will provide useful opportunities for you to share your experiences with your counterparts from other countries and to tell us all how you have managed to overcome many of those problems.

The panel sessions have been designed to provide an opportunity for everyone to participate in this interchange of experience and wisdom. Each panel will be conducted twice in the same way—once

in the morning and again in the afternoon. During the first part of each session, the chairman and each of the panelists will make 10-minute presentations, which will be followed by discussion. Then the chairman will present the draft recommendations from the panel discussions on Monday and Tuesday, for further discussion and revision by you. Since these recommendations will be the conclusions of the conference, we hope that you will listen to them carefully and critically, and then respond with your suggestions as to how the recommendations should be changed to fit your circumstances or experience, or can be made more practical or useful.

Unfortunately, there are seven panels and only two sessions. Thus, you will have to choose which two panels you will attend.

Each of us involved with the struggle against diarrhea is faced with a range of decisions, of choices. If we make the right choices, we can move forward. If we make the wrong ones, our programs, and the diarrheal morbidity and mortality rates, will stand still or become worse.

The panel sessions are designed to review those choices. They might be choices at the level of the control of diarrheal diseases (CDD) program manager—operational choices, such as a choice between different ways to carry out an educational program for village health workers. Or they might be choices of strategy or priority, which need a decision at the level of the minister of health, or the director general, or the president of a private pharmaceutical company. What then are the key choices and decisions to be discussed by each of the panels? Knowing these, perhaps you can better choose in which panel sessions you wish to participate, based either upon what you have to contribute or upon what you wish to learn more about.

The panel on household behavior and community participation faces two large and fundamental problems: that changing behavior is very difficult under even ideal circumstances; and that there are many, many households and communities, which makes the job of reaching them a huge and difficult managerial task.

Given these two immense handicaps, making choices that are practical becomes terribly important. What is practical for mothers to do for their children's diarrhea? And what is practical for the diarrheal program to do to teach them? For example, is it practical in your country to carry out an educational campaign that will not only teach mothers how to correctly mix a complex solution like sugar-salt solution, but also motivate them to use it every time their child has diarrhea, even mild diarrhea?

We have seen in many places a large gap between knowing about oral rehydration therapy (ORT) and using it: Many more know how to mix solutions than use them when diarrhea occurs. Is it practical for your program right now to carry out the activities needed to reach the less compliant mothers and convince them to give a special solution when their children have diarrhea? Or would it be more practical to ask them to come to a health facility for help?

Specific recommendations and messages tailored to the circumstances and beliefs of mothers seem to work better than general, nonspecific ones. This is particularly the case with feeding during diarrhea. But, developing specific recommendations requires field research, that takes attention, resources, and time. What are the circumstances that should encourage a program manager to choose to do such research? What methods are most cost-effective?

Regarding community participation, the issues paper describes the various degrees of participation that may be chosen, from none—the program works only within the formal health structure and ignores the community—to just getting the agreement of community representatives to what you are going to do (so-called community cooperation), to community empowerment, where the community really gets to make the decisions and might decide not to do diarrheal control this year. Given the practical circumstances of your program right now, which of these choices would you recommend?

The panel on communication strategies emphasizes in its issues paper the need for choosing a balance between instruction and demand-creation; between teaching mothers all about ORT and feeding, and getting them to want to use it. They point out that it might be easier to create demand for a packet of oral rehydration salts (ORS), a definite thing, than for a set of behaviors, which are much more vague. Choosing an appropriate role for ORS, thus, becomes an important decision for the communications component of the program. Should its use at home be emphasized? At least one program—Nigeria—has emphatically said, “No,” and uses ORS only in health facilities.

The communication panel will also be dealing with three additional important choices.

1. What choices in communication strategies will enhance the likelihood that mothers and health workers will go beyond just trying ORT once, or trying an ORS packet, to adopting that behavior every time diarrhea occurs, bringing about a sustained demand?
2. What are the alternative communication strategies for reaching the providers of health care—the doctors and nurses—first, to get

them to accept and prescribe ORT and ORS, but, equally important, to get them to teach mothers effectively about ORT, to give them the skills and the interest needed to communicate effectively?

3. What are the choices that a program must make to ensure that its communication activities can, themselves, be sustained? Some of the alternatives—setting clear priorities and not trying to communicate everything; choosing communication strategies and channels to be effective yet cheap enough and sustainable; and considering integration of communication about diarrhea with other types of messages—have that ring of practical realism that comes from having made mistakes and learned from them. I am sure that those who participate in that panel will find it provocative and useful.

The panel on health worker training and performance focuses on the activity which has been the major emphasis of most CDD programs. Everyone recognizes that sustained health worker adoption of appropriate diarrheal case management is the cornerstone of a good program. Yet many, many health workers remain unconvinced, unconverted to ORT, despite the training they have had.

The important choices about training can be categorized as when, what, and how:

- First, when: When should programs try to train health workers? After they have graduated and are working in the field, or before graduation, as so-called “pre-service” training? Sustainable programs will surely emphasize pre-service training. WHO has been developing new teaching materials for undergraduate medical education—doctor training—which have already been introduced in the Philippines and Indonesia. So the question becomes: When in the course of program development should a CDD program take on the big task of trying to influence the diarrheal curriculum in medical schools, in addition to training the staff already in service?
- Second, what: What do health workers need to learn? Are there some topics within case management that need additional stress in training activities—such topics as feeding during diarrheal episodes, or the skills of communicating with mothers? Because doctors often do not have time to teach mothers well or to take complete histories should we teach them how to delegate certain tasks to nurses or

paramedical workers and how to monitor what those people then do, to be sure that it is being done well? Should this be part of routine clinical teaching?

- Third, how: How should we teach, and what methods should be used under different circumstances? Everyone knows that hands-on learning—giving ORT directly to real patients—is much more effective than listening to lectures. Is there any appropriate role for lectures? How should methods differ for training different types of health workers—doctors, paramedics, and community health workers?

Beyond when, what, and how, this panel must deal with the sustainability of training. With high rates of dropout or transfer of health workers, a big initial investment in training might have no effect after 1 or 2 years. Neither governments nor donors are willing to continually make such training investments. One alternative is pre-service training. Another is continuing education—training during supervision or routine meetings. A third is considering nontraining alternatives to changing health worker behavior, such as removing antidiarrheal drugs from health facilities or using incentives to promote good diarrheal management.

The panel on ORS production, supply, and distribution has to deal with a major underlying problem: that many managers and decisionmakers neglect this area, because it is not part of usual medical training.

For high-level decisionmakers, there are many critical choices to be made in this area—choices that are critical to sustainability. When and how should the ministry switch from donor-provided ORS to ORS paid for by the government? Should ORS be made locally? How can one judge whether the technical and management skills of local pharmaceutical manufacturing facilities are sufficient to carry out the 33 different tests of ORS during manufacture that are required to ensure the quality and safety of the product? Should the government make a special exception to eliminate taxes on the imported raw materials for ORS, because of the humanitarian nature of the product and its slim profit-margin?

The question of cost-recovery has already been raised this morning by Mr. Grant. Should the government distribute ORS free to everyone, ask just the wealthy to pay, or ask all to pay? Should the government set the price of ORS? If they did, should it be kept low, so the poor could afford it? If the price were too low, no one might be interested in buying it, as they would think it had no value, and manufacturers

might lose interest in making and selling ORS, as there would be no profit in it for them.

What alternatives would help ORS move beyond the usual urban pharmacy outlets to more peripheral rural areas? Would regulating the sales and distribution of ORS as a food help it get into the small shops that sell soap and matches in every village—and which usually sell antidiarrheals, also?

A range of formulas for ORS is now being made and sold: flavored ORS; ORS with a low sodium content; ORS as tablets; or ORS already mixed with water. Should governments choose to eliminate all but the official WHO formula?

Lastly, what are the action alternatives to improving distribution of ORS within the health system? Studies, improved drug information and ordering systems, incentives such as revolving drug funds, and integrated management might be considered.

The panel on policy, program planning, and financing will discuss the need for and characteristics of, a meaningful overall policy for CDD establishing where CDD ranks in priority relative to other goals of the health ministry and the government overall, and setting general implementation approaches. Such a policy provides a basis for subsequent decisions about the provision of resources and funds, about the degree of autonomy or integration of the CDD program, and even about such matters as whether fees will be charged for ORS. How these decisions translate into an effective planning process that ensures both the success of the program and its sustainability will also be discussed.

This panel will also deal directly with the choices related to financing ORT and CDD: the proper role of donors' financial support at various stages of CDD program development; alternative sources of funding; the role of cost-recovery through user fees; and so forth.

The panel on monitoring, evaluation, and operations research must face squarely the fundamental question: What proportion of program resources—money, but also time and manpower—is it appropriate to spend on information? There is certainly no question but that we need to measure progress and define the size and locations of problems if we are going to make our CDD programs run well. Yet all of you have doubtless experienced the field study or evaluation that got out of hand, that just kept growing and expanding and taking up more and more time and attention, so that nothing else happened in the program for 6 months.

With this in mind, this panel will struggle with the following choices.

- What data are really needed, at a minimum, to make the program work?

- Who needs the data? Policymakers? Managers? Service providers? Even the community itself? What specific data do each of these users need?
- What baseline data are needed? Can baselines be reasonably assumed for some data, thereby avoiding big baseline studies at a time when maximum attention is needed for implementation problems?
- What should be the role of computers?
- What methods of information collection—for example, surveys or sentinel systems—are best for particular needs?

And a last question of particular importance is: How can programs best ensure that collected data are used to make program decisions?

Good choices in these areas will lead to a sustainable information system that functions and is used.

The seventh panel, on linkages of CDD/ORT with prevention and other programs, begins its considerations from a choice that most programs have already made: that ORT and diarrheal case management are the first priority of the efforts to control diarrhea. Based on that decision, then, how can CDD programs take on the equally important long-term goal of reducing the incidence of diarrhea, without endangering the successful performance of diarrheal case management?

Recognizing that people generally cannot take in more than two or three ideas at once, what should be the timing and methods, of encouraging mothers to

breastfeed or wash their hands or adopt better weaning practices, within the context of case management, and the timing and methods of taking on other approaches to prevention, outside the context of case management?

What should be the role of CDD programs in the area of water and sanitation or of measles immunization—two of the most effective techniques to prevent diarrhea? Should the programs have any role other than being supportive in government meetings? How should CDD programs relate to growth-monitoring programs and other nutrition efforts? At a higher policy level, to what extent should CDD programs be integrated structurally with other maternal and child health or primary health care programs, such as those to combat acute respiratory infection?

Friends and colleagues in the diarrhea struggle, you all know very well the many tricks and difficulties of diarrhea and diarrheal programs. Most of us have had to face, more than once, our errors in judgment, our mistaken strategies. I hope you haven't repressed those incidents so much that they have been forgotten, because I know that we will all benefit from sharing those lessons with each other in the course of the panel sessions today.

I encourage, once again, your active and critical participation in the panel discussions. The recommendations should represent your experience and conclusions, as much as possible. As Mr. Grant said, the priorities and recommendations that will come from this distinguished and experienced group will influence donors and national programs for the next 10 years.

So, with that challenge inspiring us, let's go to work.

Household Behavior and Community Participation

Panel Chairperson:

Mrs. Eugenia Burphy Kromah
Director of CDC/CCCD Project Manager
Ministry of Health and Social Welfare
Monrovia, Liberia

The panel focused on several issues important to program sustainability. The most important issues that panel participants identified as guides for program activities in the years ahead are summarized below.

Cultural and region-specific program information must be collected for program design and message development. It will be necessary to identify the target groups for whom information is required and to clearly define what information is needed. This should include information about cultural beliefs and practices concerning the definition of diarrhea, how diarrhea is

perceived and classified, the local causes of concern, which are offered during diarrhea, why they are chosen, and so on. There was broad agreement that to achieve higher adoption and sustained use of oral rehydration therapy (ORT), this culture-specific program information is required.

Methods used to collect this information should be based on the type of information required, the level of precision needed, and program resources. It was concluded, however, that qualitative research techniques are better for describing cultural perceptions of diarrhea and ORT. This means that the involvement of social scientists in control of diarrheal diseases (CDD) program activities is needed.

Mothers need to be provided specific advice. Because the early administration of fluids to prevent dehydration is an important program goal, there is a

need to be able to provide mothers with *specific* advice. This requires documentation of the fluids traditionally offered in the home. Documentation should include descriptions of exact recipes or preparations, amounts given, and general patterns of use during diarrheal episodes. The fluids to promote should be chosen only after this information is collected.

Specific messages for mothers need to be developed. Mothers need to know exactly what to give and when, how to give it, how much to give, and how long to give it. These messages need to be consistent, whether they are given by health workers or rural doctors.

Mothers need to know when they should seek outside help and where to get it. This means they need to know the danger signs of dehydration and to understand the concept of fluid replacement.

ORT should be promoted based on local cultural concerns about diarrhea and on mothers' expectations. For example, if mothers are worried about children's weakness or loss of appetite, ORT can



Mrs. Eugenia Burphy Kromah



ORT promotion should respond to local cultural knowledge, attitudes, and practices.

Photo by Véronique Léger for John Snow, Inc.

truthfully be promoted as a therapy for these symptoms. Many program evaluations, however, show that mothers often expect ORT to stop or cure diarrhea, which it will not do. It is important that mothers know what ORT can—and cannot—do.

Solutions are needed to decrease the use of drugs during diarrheal episodes. As the distinguished keynote speaker Dr. Bengzon noted, the prescription and use of antidiarrheals and antibiotics during diarrheal episodes is a global problem. Panel participants confirmed this, based on their experiences from many different parts of the world. A priority must be to seek national and global solutions to this problem.

Messages about feeding, along with messages about fluid replacement, should be presented during and after diarrheal episodes. These messages should be *specific* and need to go beyond the messages to “keep on feeding.” Programs need to define what foods, in what amounts, and when during the episode children should receive the foods. The foods to be promoted should be based on their cultural acceptability and nutritional adequacy. This will require the involvement of nutritionists and social scientists. Many participants noted that malnutrition is a major problem for children generally, especially when associated with repeated diarrheal episodes. A long-term program activity, therefore, is to improve infant feeding and weaning practices in general, so that child nutrition is improved.

Whenever possible, the training of mothers should involve a face-to-face, hands-on interaction. Experience has shown that this leads to higher adoption and safe and effective use of ORT. This type of training also involves more of a community approach.

Increased community participation is the key to program sustainability. During both panels yesterday, the presentation and discussion on the role of community participation generated the most interest and enthusiasm. Panelists and participants both told of promising experiences, and there was great hope that increased efforts to expand the role of community participation is the key to higher acceptance of ORT and to program sustainability. A first step should be to identify local organizations already involved in primary health care activities. CDD programs should work as team members with the identified organizations to develop innovative, grass-roots interventions and to determine the level of technical assistance required.

Many participants noted that diarrhea is a problem of poverty and inequity; others were concerned that we ask ourselves just how much can be asked of mothers, for whom time is a major constraint. Although CDD programs cannot solve these problems directly, the programs must put greater emphasis on involving the community, mothers, and women in the process of deciding what activities should be conducted and how they should be carried out.

Health Worker Training and Performance

Panel Chairperson:
Dr. Deanna Ashley
Senior Medical Officer
Maternal and Child Health
Ministry of Health
Kingston, Jamaica

The following conclusions were drawn at the panel on health worker training and performance.

Conclusions

Training programs need to be planned and systematically implemented. A manageable number of health workers should be trained at each session, to ensure a steady increase in coverage by health workers competent in the use of oral rehydration therapy (ORT).

Training activities must be coordinated with other elements of the national control of diarrheal diseases (CDD) program. Coordination is needed to ensure that

trainees can return to their work settings and apply their newly acquired knowledge and skills.

A monitoring and supervisory system is necessary. Such a system helps to ensure that the health workers practice as they have been taught, to identify weaknesses, and to guide retraining, where necessary.

It should not be assumed that every trainee will, in turn, be a competent trainer. If trainees are going to be required to train other health workers, they must be taught training techniques and given the necessary support and guidance to carry out their own training programs.

Innovative incentive schemes are necessary to ensure the full participation and commitment of health workers in the program. Incentives can take the form of awards, fellowships, and opportunities for consultancies, as rewards for good performance.

Donor support is needed and should be used strategically to assist in program development and increased coverage. At all times, however, care must be taken to prevent the program from becoming dependent on this external support.

Hands-on experience is an essential element of training. This holds true at whatever level the training takes place.

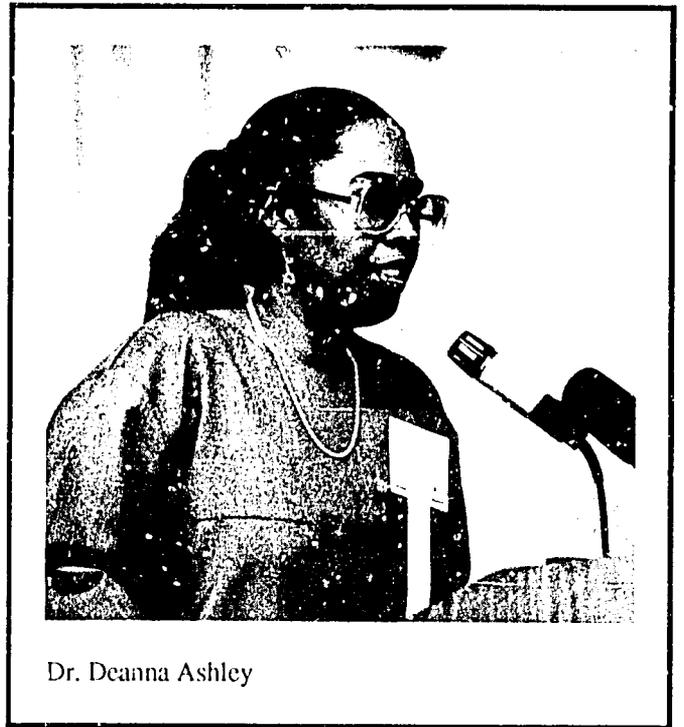
The combined training of different categories of health professionals has been shown to be beneficial. Training doctors, nurses, and midwives, for example, helps them work together as a team.

The establishment of a diarrheal training unit (DTU) is a useful strategy. The DTU provides the necessary facility for effective hands-on training of health professionals and also for demonstrating the effectiveness of ORT to skeptics.

Emphasis should be placed on modifying curricula so that new graduates of medical and nursing schools will be competent in ORT upon completion of their basic training. Modifying curricula is an efficient way to reach health professionals.

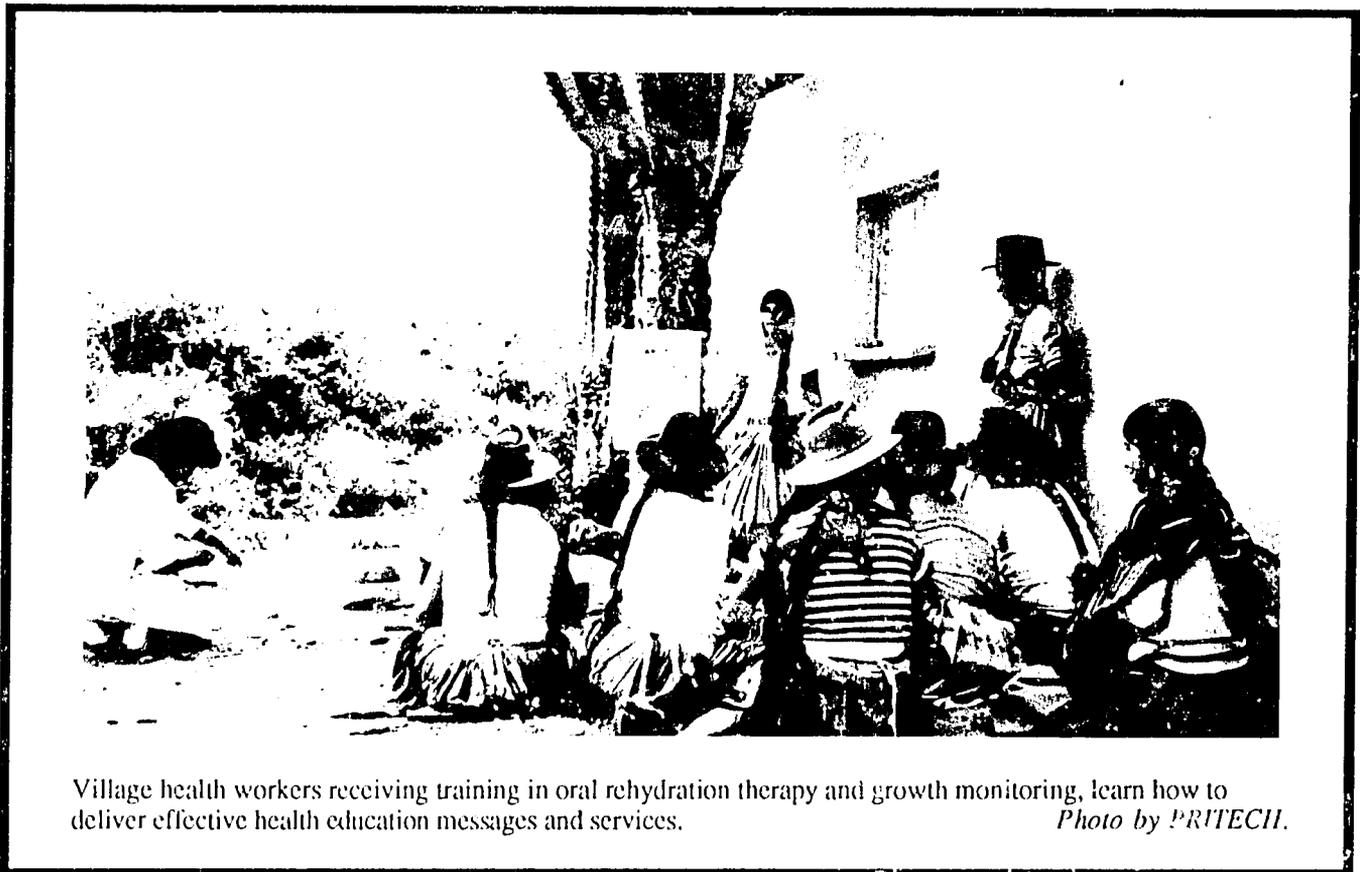
New approaches can be used to try to reach professionals and others in the private sector. Examples of such approaches might include self-learning packages, correspondence courses, and short video presentations.

Traditional health workers can be used to assist in the delivery of ORT. In countries where large proportions of the population use traditional health workers, ORT coverage can be increased through the adoption of government policies recognizing these workers as an official arm of the health sector



Dr. Deanna Ashley

and organizing and training them to assist in the delivery of ORT. Proper training will help to establish links between the traditional and orthodox health systems.



Village health workers receiving training in oral rehydration therapy and growth monitoring, learn how to deliver effective health education messages and services.

Photo by PRITECH.

Communication Strategies



Mr. Mario Taguiwalo

Panel Chairperson:
Mr. Mario M. Taguiwalo
Undersecretary of Health and Chief of Staff
Department of Health
Manila, Philippines

The panel presentations and discussions raised four categories of recommendations related to communication and sustainable control of diarrheal disease (CDD) programs: operationalizing CDD policies and communication; supporting sustained behavioral change via communication; building a capacity for systematic communication; and using resources properly.

Operationalizing CDD Policies and Communication. Communication policies must be based on national CDD policy. Field experience in operationalizing policy suggests that more dialogue and discussions within countries are needed to further clarify, better articulate, and, in some cases, adjust policy in the course of translating CDD policy into communication efforts.



A demonstration during the ICORT III Communications Fair shows how interpersonal communication, with the aid of visuals, is one important component of an effective communication program.

Supporting Sustained Behavioral Change via Communication. Considering that behavioral change does not occur spontaneously and that the use of oral rehydration therapy (ORT) requires people to give up many competing and even contradictory behaviors, there are reasons for sustained communication to support the behavioral change necessary to adopt ORT. In this regard, communication strategies and programs should be as follows:

- long-term, from 5 to 10 years;
- systematic, with planning based on research, positioning, pre-testing, creative strategies, respect for cultural preferences, and evaluation;
- integrated with provider-education and ORS-supply components; and
- two-phased, with an intensive period generating a critical mass of awareness followed by a maintenance phase. (In this regard, operations research may be necessary to identify effective and cost-effective maintenance strategies).

Other suggestions were to expand interpersonal networks among decisionmakers, such as pharmacists and drug supply outlets with influence over mothers; and to utilize traditional and folk medicine to

supplement the conventional use of mass media and face-to-face communication.

Building Communication Capacity. The key issue is the creation of a core of active, conscious, and productive communication specialists or professionals operating in the country within CDD programs and within other health programs. In this regard, there has been a recent need to target organizational development of communication capacity as a priority. Local resources to fulfill this capacity might be in the ministry of health or in nongovernmental organizations, universities, and the private commercial sector. There is a need to increase two types of communication training: (1) training for health providers, in more effective face-to-face skills; and (2) specialized training for health educators, particularly in the areas of planning, formative research, and management of communication programs. There is also a need to further strengthen interdepartmental and intersectoral linkages among communications professionals. Finally, there is a need to expand and decentralize the communication capacity.

Use of Resources. The bottom line is that countries must decide to commit the resources needed over the long term to reach the levels required and to maintain the resources at those levels. A blend of foreign and local resources might be necessary to fund such long-term efforts.

ORS Production, Supply, and Distribution

Panel Chairperson:

Dr. Miguel Eduardo Chumpitasi

General Manager

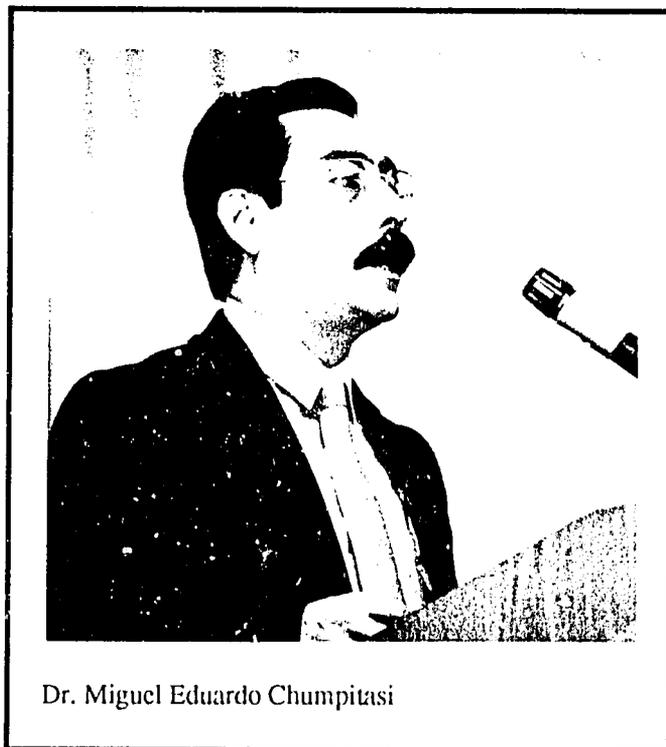
Laboratorios Unidos, S.A.

Lima, Peru

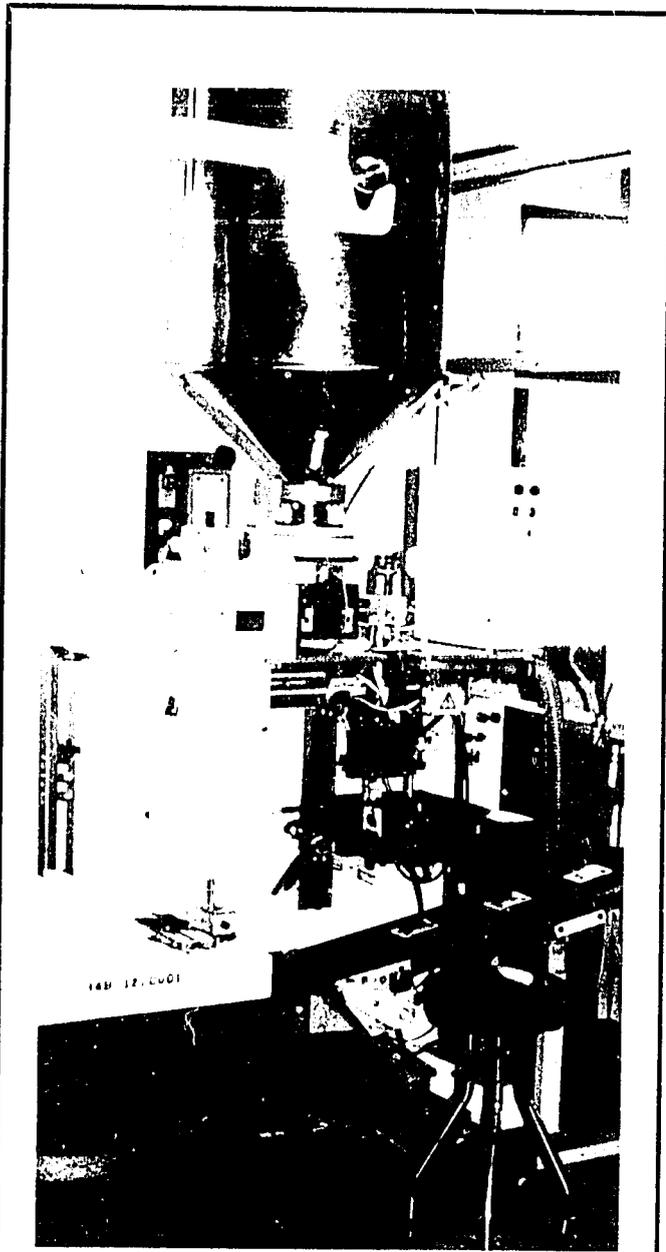
The panel on local production, quality assurance, and distribution of oral rehydration salts (ORS) made the following observations.

If a government chooses to endorse local production of ORS, attention should be given to ensuring an appropriate financial commitment within the national budget. If local production is initially supported by resources from an international donor, the national government should develop a strategy that specifies how and when local resources will be used to replace donor assistance in order to ensure long-term sustainability. The decision to embark on local production, however, need not be based exclusively on technical or financial considerations.

Governments should consider classifying ORS as a drug and insist that it be manufactured in compliance



Dr. Miguel Eduardo Chumpitasi



Producing ORS locally, as in this Egyptian facility, is an important step toward sustainability.

Photo by Frank Nesbitt.

with Good Manufacturing Practices (GMPs) for pharmaceuticals. At the same time, governments should investigate ways to promote ORS as an over-the-counter product to achieve the widest possible distribution.

To encourage widespread use of ORS and to comply with national policy on case management, governments should consider investing resources for training and motivating influential health providers (i.e., opinion makers in the health sector) to endorse and use ORS. In addition, governments should explore the prospects of using all effective, existing, and reliable distribution channels to ensure the widest possible distribution. Finally, market research, focused on the user and taking into account the national policy on ORS use, should be one foundation for local production programs.

To promote availability, to keep costs of materials as low as possible, and to ensure readily available supplies, the following suggestions should be considered:

- *National Governments should consider developing a realistic perspective of the time required to initiate local production after a decision has been made. National governments should also continue to make every effort to refine production requirements in light of actual demand and use rather than theoretical need.*
- *International Donors should consider guaranteeing the credit-worthiness of local producers. This would help to ensure that raw materials are provided in timely fashion at the lowest possible prices.*

To ensure sustainability and give value to a locally manufactured ORS product, national governments should consider selling ORS in both the public and private sectors. The price in the public sector should be as low as possible—perhaps an amount sufficient to cover the cost of production. The private-sector price might reflect local pricing policy and market conditions. ORS should always be available at no charge in the event of national emergencies.

Policy, Program Planning, and Financing

Panel Chairperson:

Dr. Thomas A. Ogada
Director of Medical Services
Ministry of Health
Nairobi, Kenya

Dr. Kadri Tankari of Niger discussed the integration of oral rehydration therapy (ORT) into primary health care. This was done in Niger. Dr. Tankari gave a brief history. He also discussed the problems encountered and some solutions to the problems.

Dr. Nyoman Rai from Indonesia discussed how the national policymakers in Indonesia reallocated resources within the health sector from the curative section to the preventive section, and especially to the control of diarrheal diseases (CDD) program. He also highlighted the strategies for encouraging the private sector and the community to become involved in CDD activities.

Dr. Michael Mbvundula from Malawi described how the establishment of ORT units in referral horizontal programs in Malawi reduced the incidence of admission of severely dehydrated children, the use of



Dr. Thomas A. Ogada



At a policy-level meeting, officials plan the financing aspects of an ORT program.

Photo by Maria García Farr for AED.

intravenous fluids, and the cost of treatment of diarrhea.

Dr. Reginald Boulos from Haiti gave a presentation on the participation of the private sector in ORT and the role of user fees in ORT.

The following recommendations were compiled after the morning and afternoon sessions.

The sustainability of ORT activities requires continued and increased attention to resources and preventive measures. Such measures might include the provision of safe drinking water, environmental sanitation, and improved nutrition.

Health policymakers must take full advantage of the potential to work with professionals from other sectors. Contacts should be made with professionals from the education, water development, agriculture, and livestock sectors.

Health policy leadership must play an active role in overall development policy and the allocation of national resources. Their involvement will ensure the success of ORT activities.

Affordability of technologies is essential to sustainability. For example, education is important in the use of home-based solutions.

Sustainability requires integration of ORT into primary health care systems. This should include decentralization of services and resources at all levels (including the village level) of the health infrastructure.

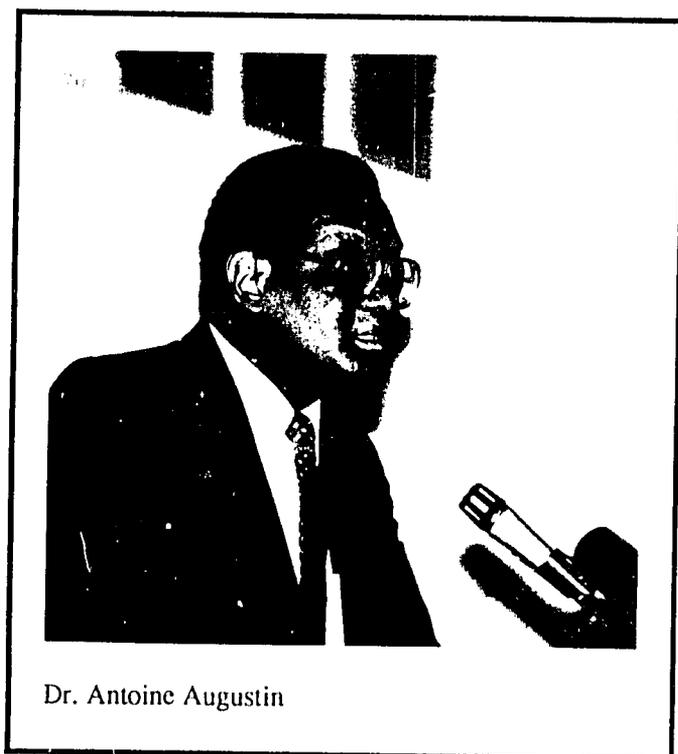
Functional sustainability requires attitudinal and behavioral changes. Mothers and health workers must alter their attitudes and behavior with regard to ORT.

International assistance must give highest priority to developing in-country capability and resources. Indeed, our concentration on sustainability at the present time should not imply that present coverage is anywhere near adequate or that donor resources can in any way be reduced in the foreseeable future.

Ministers of Health should:

- establish national policy and plans for ORT/CDD;
- define the roles and responsibilities of the private and public sectors; and
- manage and coordinate all activities, whether public or private, so that ORS prices are reasonable and ORS is more accessible to the populace.

Evaluation, Monitoring, and Research



Panel Chairperson:
Dr. Antoine Augustin
Director
Child Health Institute
Port-au-Prince, Haiti

The panelists and participants focused on two clusters of issues:

- the appropriate exploration of data collected through the routine monitoring process; and
- mortality data, as a measure of program impact.

From a discussion of these issues, seven points emerged for consideration.

Routine data collection procedures should be streamlined and improved. This can be achieved through the following steps:

- better training of personnel involved in data collection;



Collecting field-level data provides an important means for monitoring and evaluating the effectiveness of ORT programs.

Photo by Sally Foster for Project Hope.

- simplification of data collection instruments; and
- limits on the amount of data collected (i.e., collecting only what is needed for decisionmaking).

There are valid uses for these kinds of data collected at the periphery. They are useful in assessing the allocation of resources in general and commodities in particular. These kinds of data are also useful in identifying institutions or districts in need of greater supervision.

The use of data should be encouraged at all levels. Appropriate feedback mechanisms should be instituted for this purpose.

The routine monitoring process should be supplemented by an ad hoc intermittent survey to assess program effectiveness. Indicators of effective case management, either in the home or in an

institutional setting, should be incorporated into such surveys.

The panel recognizes the importance of mortality data as a powerful tool in eliciting political support and maintaining the morale of health personnel. Using mortality levels as a measure of program impact is particularly suited to situations where input process and output indicators suggest that a given program might have reached a threshold of effectiveness.

Newer, promising methods of assessing mortality levels and trends, should be tested further and validated. One such method might be the preceding-birth technique tested further and validated.

A continuing need will exist for technical assistance to ensure validity and a high degree of performance. Efforts should continue to strengthen capacities for self-evaluation at the national and local levels, for the foreseeable future.

Linkages with Related Programs

Panel Chairperson:

Dr. Akanni Olufemi O. Sorungbe

Director, Primary Health Care

Federal Ministry of Health

Lagos, Nigeria

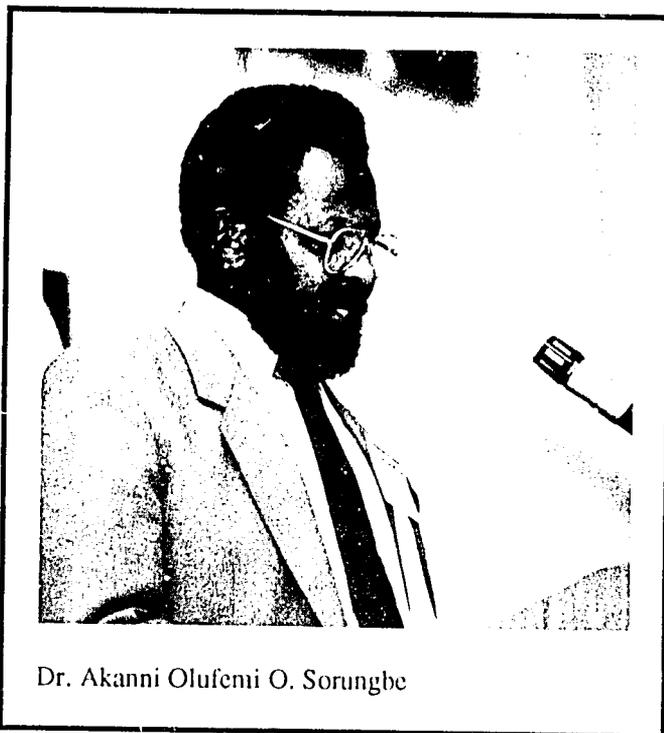
Dr. Carlos Monteiro from Brazil demonstrated the importance of exclusive breastfeeding in reducing diarrheal mortality, especially in infants under 6 months of age. He also warned that the apparent success in Sao Paulo might be due to local conditions, i.e., the very early weaning pattern, the high number of bottle-fed babies, and the availability of potable water to 96 percent of the population. These conditions made it appropriate to target the programs to that specific group. A dramatic impact was seen.

Dr. Ruth Engo discussed water and sanitation projects in Bangladesh, Kenya, and Mali. These projects incorporated substantial community participation and major family education efforts on the effective use of water to prevent diarrhea. She also reported an important improvement in the nutrition of babies, partly because women were freed of the task of fetching water and had more time for growing food and other income-producing activities.

Dr. Sutoto reported on the Indonesian experience linking diarrheal control and growth monitoring with immunization, family planning, and prenatal services in the posyandu or integrated community health post. He stressed the possibilities of linking diarrhea treatment actions to growth monitoring, as a way of providing nutritional followup to diarrheal cases. He also discussed strengthening diarrhea-related activities of growth monitoring by using the same posts to teach oral rehydration therapy (ORT) and diarrhea prevention, when growth failure due to diarrhea was detected.

Dr. Vijay Kumar discussed a substantial reduction in diarrheal and pneumonia mortality in a district in India resulting from a program that integrated nutrition, ORT and treatment for pneumonia, and immunization, particularly for measles. He stressed that linkages in these services are needed to sustain the decrease in mortality and to prevent a shifting pattern of mortality. Such linkages enhance the credibility of primary health care (PHC) workers, who can then promote water and sanitation messages more forcefully. Such linkages also avoid overlap and reduce costs.

Dr. Gao Shufen and Dr. Li Qing Xiu reported on the multi-component approach to maternal and child health in China. This approach, which emphasizes preventive efforts and incorporates nutrition



Dr. Akanni Olufemi O. Sorungbe

education, growth monitoring, a very successful immunization program, breastfeeding promotion, hygiene education, and an amazing water program, has now reached 476 million people and has been given \$1.2 billion in government funds. They emphasized the importance of these efforts being based in a PHC system, which ensures available manpower and community participation. They also emphasized the importance of targeting these efforts, e.g., stressing the water-supply activities in areas where inadequate water supply caused a high rate of diarrhea.

The following conclusions emerged from the panel meetings:

Control of diarrheal diseases (CDD) programs, countries, and donors must begin to give greater emphasis to preventive and linked efforts, in order to produce a sustained decline in diarrheal mortality. ORT is not enough, but preventive efforts and linked CDD/ARI/EPI water and hygiene education efforts have proved remarkably effective and practically feasible.

The following preventive actions should be added to diarrheal case management:

- adding sequentially to the mother's knowledge, from ORT, to better feeding, to hygiene education;



Programs promoting the use of ORT should be linked with complementary programs, such as hygiene education.

Photo by D. Henrioud for WHO.

- referring children for measles immunization;
- weighing all children and giving special attention to undernourished children;
- administering vitamin A when needed; and
- using health facilities and the behavior of the staff to model good hygiene behavior.

These preventive actions should take place in hospitals as well as in primary health centers. Teaching materials might be needed for this, but implementation should not strain the management capabilities of the CDD program. In brief, CDD must be integrated at the service level: the consumer is a single unit.

Ministry health planners should conduct field studies needed to establish local priorities for preventive activities. Such activities might include water programs, breastfeeding promotion, and growth monitoring or nutrition. Activities should be targeted on the basis of those research results.

Ministry health planners should ensure that water and sanitation programs are linked with health education involving ORT and diarrhea prevention. They should take steps to include water and sanitation technical topics in PHC training and ORT and diarrhea treatment in water and sanitation technician training. Water and sanitation are not expensive—only \$6 per capita. They compare favorably with ORT in cost-effectiveness as well as impact, and should produce a more sustained effect.

CDD programs, health ministries, and donors should give more attention to the great potential for preventing diarrhea by promoting exclusive breastfeeding in the right circumstances. The need for multi-faceted and complex activities makes it likely that an autonomous breastfeeding unit, rather than a unit that is a part of another program, would be required to implement the effort effectively.

It is clear that adequate community participation in all these efforts is essential to a sustained effect. Community participation can be made more feasible by providing communities with choices rather than with

vertical, single component projects. Donors should make efforts to link their inputs to allow this to happen, as well as to ease the managerial burdens of government.

Preventive efforts should be targeted to high-risk groups. Where growth-monitoring efforts exist, they should be used to select children who are high-risk, nutritionally. Other groups such as teenage parents, children in larger families, or low-birth-weight babies might also be targeted.

Particular efforts to link CDD with primary education should be made, starting with advocacy at the ministry of education, and including multiple activities at the school level. These activities might include:

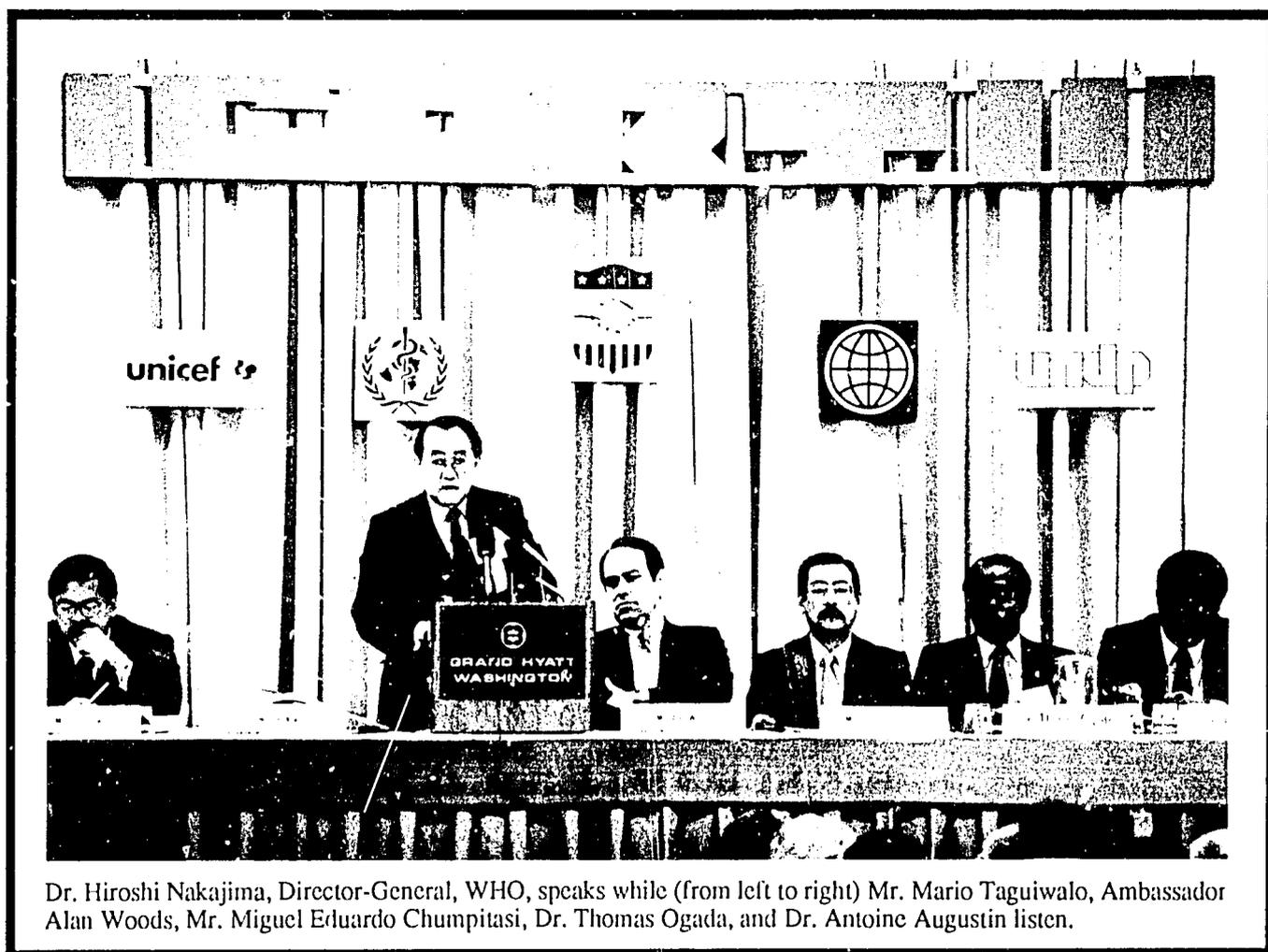
- child-to-child and child-to-parent transfer of information;
- use of the school as a location for a health post;
- teacher training to prepare teachers to serve as village health workers;
- introduction of special health curricula in the daily school lessons for the children; and
- detailed regulations from ministries of public health on health practices and facilities at

elementary schools, so that the schools would be a model of a healthy environment for the students.

Donor agencies should place more emphasis on preventive measures, rather than an overconcentration on ORT and diarrheal case management. Donor agencies should give greater recognition in their funding to local needs and priorities, rather than adhering rigidly to their own global action approaches. In addition, donors should continue or increase their support for less visible infrastructural areas essential to CDD and other PHC program successes, such as improvements in informational systems, drug-supply systems, and educational materials development.

Linkages and prevention are the most important factors in combatting diarrhea. The group noted that linkages and prevention was made the last of the panels—Panel Number 7. In reality, linkages and prevention should be first, because they are the most important. Success in linkages and prevention minimizes severe episodes of diarrhea. Success in linkages and prevention will decrease the need for ORT over time and perhaps will make ICORT IV unnecessary.

VII. General Closing Session



Dr. Hiroshi Nakajima, Director-General, WHO, speaks while (from left to right) Mr. Mario Taguiwalo, Ambassador Alan Woods, Mr. Miguel Eduardo Chumpitasi, Dr. Thomas Ogada, and Dr. Antoine Augustin listen.

Closing Address

Dr. Hiroshi Nakajima
Director-General
World Health Organization (WHO)
Geneva, Switzerland

I am honored and privileged to participate in this international conference. The issue you are addressing is how we can best confront one of the most important public health problems that the developing countries face today. Despite all the advances in knowledge and technology during the past 3 decades, millions of young children are still affected by diarrheal illness for as much as one-quarter of their lives. As many as 4 to 5 million evidently die every year from their illness, while many more suffer from nutritional consequences. I am particularly pleased that the agencies participating in this conference have decided to once again come together to discuss the progress we have made in

combating this problem, and to agree on priorities for sustaining national control programs. This type of international collaboration is clearly a model for addressing other high-priority health problems.

I am aware that my predecessor addressed the two previous ICORT conferences and stressed WHO's commitment to diarrheal disease control as an integral part of primary health care, and to our overall goal of *Health for All by the Year 2000*. I would like to assure you that this remains WHO's overall goal. But what does this mean in practice? It implies:

- a true political commitment by countries to improve the health of their people;
- increased participation of the social and economic sectors concerned with national and community development in the delivery of health care;



Dr. Hiroshi Nakajima

- real involvement of communities in shaping their health and socioeconomic futures;
- equitable distribution of health resources within and among countries; and
- technical and economic cooperation among countries, in the field of health.

The international commitment to these principles was made at Alma-Ata 10 years ago, and after a slow start, they have become widely accepted. I admit that we still have a long way to go, but the goal of *Health for All* can be achieved only if there is a clear agreement that health is a positive contribution to development rather than a cost burden on economic development. Indeed, are not human health and well-being the ultimate objectives of development?

The theme of this session and of this entire conference is ensuring sustainability. For the past 2 days, you have been hearing the experiences of national diarrheal disease control programs and discussing their important individual components—community involvement, training, health education, and evaluation, to name a few. I do not want to diminish the importance of these; rather, I would emphasize their critical importance in assuring successful programs. But I would also ask that we remember that the implementation of any of these program activities requires a sound infrastructure that is well managed and built up from sustained and technically sound programs and activities. Let me illustrate what this means in practice.

First, it means, that we must be patient and not use a short-cut approach to programming, instead of the primary health care approach. Much as we might feel the need to engage, from time to time, in special "campaigns" in such areas as immunization and diarrheal disease control, our main focus should always be on building up the infrastructure, so that it can support continued and sustainable health development. Programs must be based on activities that countries, themselves, can afford in the long run without resources from external donors.

Second, it means that we must emphasize those actions that mothers and other care providers can carry out at home. No health program can have an impact if it cannot be translated into family and community self-sufficiency. This means, for example, using all available channels of communication—government and nongovernmental health workers, traditional healers, teachers, agricultural extension workers—to teach mothers how to mix the right home-available fluids and give them to their children with diarrhea, which requires more than merely telling mothers where to go to buy an ORS packet. True community participation begins when the people involved decide

what needs to be done, and particularly what needs to be done first.

However, we must ensure not only that individuals receive the right knowledge to allow them to make the right decisions, but also that they receive adequate support to enable them to sustain the decisions they make. In order for individuals to act on their knowledge, they need a favorable social climate and adequate support systems. Thus, we must aim at large-scale "mobilization" of societal forces for health development. In other words, to make progress in health, one needs both active community participation and supportive social policies.

Third, sustainability requires a real commitment to sound program management and delivery. In the area of diarrheal disease control, this means serious efforts at training and the strengthening of comprehensive health education activities, which might range from face-to-face interactions to the use of the mass media and a willingness to acknowledge and solve delivery problems. It means regular supervisory and monitoring visits and periodic evaluations of the performance of health workers and mothers in treating diarrhea cases. All of these types of activities, if implemented in a well-planned and organized manner, are important to assure sustainable programs.

Fourth, if we want to have sustainable programs, we need to enlist the support of the private sector. I use this term in its broadest sense—to include, among others, private practitioners, other nongovernmental health workers and pharmacists. In the area of diarrhea management, we must convince them of the benefit of oral rehydration therapy (ORT) and the importance of feeding during diarrhea, and we must discourage their use of the many costly antidiarrheal drugs that are either potentially harmful or useless to young children, and that detract from the use of ORT. Support from the private sector is not only important for diarrhea management, but for other programs as well. For example, support from the private sector is needed to assure that young children with acute respiratory infections are given antibiotics only when they are essential and when they are not costly, and that children are not given inappropriate cough mixtures or nose drops. We must work with the private sector in striving towards *Health for All*.

WHO is very encouraged that so many developing countries have made diarrheal disease control a high-priority health program, and that the international community is supporting your efforts in the spirit of cooperation and collaboration illustrated by this meeting. The implementation of sustainable activities must, indeed, be your priority. But let me share with you a few other thoughts for you to consider as you plan your efforts for the 1990's.

I would like to urge that your efforts at diarrheal disease control extend beyond treatment and include

simple strategies for preventing diarrhea. There can be no doubt in any of our minds that breastfeeding directly reduces diarrheal mortality and morbidity in the young infant; that the preparation of nutritious weaning foods prevents malnutrition, which is the main risk factor for diarrheal mortality; or that the consumption of clean water, the use of latrines, or hand-washing can prevent diarrhea. No doubt, there is still much to learn about how best to implement these strategies in different settings, but let us search for the answers actively and with some urgency. The curative action of oral rehydration therapy opens the way for mothers to be convinced of these preventive strategies. We should not lose this opportunity by having our programs focus too narrowly.

And when we implement these strategies, we must also be realistic in our approaches. For example, we cannot ask a mother to boil water to make it safe, if we do not also consider from where she will get her fuel. And we cannot ask her to prepare a weaning food using ingredients that she cannot afford or a recipe that she cannot easily follow. Here, again, we need to remember our commitment to health and to sustainable development.

We also must continue our efforts in research and development to improve our strategies for diarrheal disease control and to find new tools for control. I am thinking of socio-behavioral research to better understand how programs can make use of what families already know or believe, to improve delivery of known strategies, as well as intervention-oriented research to examine the impact of other health interventions—such as vitamin A distribution—on the severity and morbidity of diarrhea. We also must continue to enlist laboratory scientists in a drive to develop vaccines to prevent the most common causes of severe childhood diarrhea. The great progress we have made this decade in developing vaccines against hepatitis B and leprosy, and a new vaccine against measles gives us much hope that we can develop an effective, safe, and cheap vaccine against rotavirus, cholera, shigellosis, and typhoid fever.

I hope that as much of this research as possible will be undertaken by national institutes and scientists in close collaboration with those responsible for the implementation of health services activities. Those of us in the international community who support this research must accelerate our efforts to strengthen the capabilities of national institutes so that they can undertake the necessary studies. Such strengthening requires long-term investment before we can expect demonstrable results. But we must make this investment, using sustainable approaches.

WHO's view is that it is best not to implement diarrheal disease control programs in isolation, but rather to see where program activities can be undertaken closely with those of other programs. The

most obvious example of a program that lends itself to such a close relationship is the Acute Respiratory Infections Control Program. Like the diarrheal diseases, the acute respiratory infections, particularly pneumonia, are responsible for high mortality rates in young children—rates that can be significantly reduced by the implementation of a relatively simple, standardized case management approach. The lessons we have learned about the importance of careful planning, proper training, integrated health education activities, and evaluation in implementing diarrhea case management can now be used to help assure more effective pneumonia case management. I know that teaching health workers and mothers to recognize dehydration is simpler than teaching them to recognize pneumonia, and that the practice of ORT lends itself more to the primary health care approach than does the distribution of cotrimoxazole, but we must have the courage to launch control programs, if we are really serious about child survival and healthy development. WHO is currently undertaking a number of initiatives that we hope will help you succeed in your national efforts to control acute respiratory infections.

There are, of course, other programs—immunization, malaria control, AIDS and HIV control, essential drugs, to name but a few—where training, communication, and supervision should be implemented in close collaboration with diarrheal disease control programs. Let us remember that a single measles immunization not only can prevent measles and the malnutrition that follows; but also can reduce the number of pneumonia cases by 25 percent and diarrheal deaths in some areas by 15 percent. Let us also remember that we cannot draw up a proper, national essential drug list without first deciding which drugs are or, more important, are not appropriate in the management of diarrhea, or acute respiratory infections.

Finally, I would like to return to the theme of this conference—sustainability. Whatever the health program, WHO sees its task as working *with* countries so that they can best implement the strategies *they* consider most appropriate to meet *their* needs. I am aware of the great commitment that the sponsors of this meeting—as well as many other bilateral agencies, nongovernmental organizations, and private institutions—are making to diarrheal disease control and to child survival in general. My appeal is that we support national, district, and local priorities and efforts, and *not* our own. If we are truly committed to primary health care, to infrastructure development, to sound health planning, and to supporting national and community priorities, we will ensure sustainable programs. These programs will increase child survival and allow children to grow up healthy, so that they can reach their potential and participate fully in social and economic development.

Diarrheal Disease Control in Honduras

Dr. José T. Oqueli Carcamo
 Vice Minister of Public Health
 Ministry of Public Health
 Tegucigalpa, Honduras



Dr. José T. Oqueli Carcamo

Our country, the Republic of Honduras, has been invited to this conference, and I, as Vice Minister of Public Health, have the honor of leading a delegation of physicians and business representatives.

Permit me to express our point of view, not only in noting the most persistent diseases that afflict the Honduran population, but also in addressing a specific subject, which we, in our Ministry, call the Diarrheal Disease Control Program (DDCP).

Country Overview

Honduras is located in the very center of Central America, with the Caribbean (or Antilles) Sea to the north, the Gulf of Fonseca and the Republic of El Salvador to the south, the Republic of Nicaragua to the east, and the Republic of Guatemala to the west.

According to the latest statistical data, Honduras covers 112,088 square kilometers of land and has a population of 4,576,244. Our government is a democratic, representative republic.

More than 46 percent of the Honduran population are under 15 years old. Four percent are under 1 year; 14 percent are between 1 and 4; 28 percent are between 5 and 14; and 50.8 percent are between 15 and 64.

More than 60 percent of the population live in rural areas, where the annual population growth rate is 7 percent.

Life expectancy is 61 years; the rate of live births is 44 per 1,000 people; infant mortality is 70.6 per 1,000 live births; and gross mortality is 9.5 per 1,000 people.

In terms of the nutritional status of the children who are under 5, the weight-to-age relationship is 38 percent below the average rate, and the height-to-age relationship is 44.7 percent below average. The deficit in the weight-to-height relationship is 3.4 percent. As Table 1 shows, diarrhea is the second largest health problem. Table 2 shows the diarrheal mortality rates for children under 5 during the period from 1982 to 1985.

The diarrheal mortality rates are highest for children between 6 months and 1 year; the rates decline significantly beyond this age. Children from birth to 5 years of age are the targets of the DDCP.

TABLE 1

Rates of Incidence of Transmissible Diseases in Outpatient Care, 1987

TRANSMISSIBLE DISEASE	RATE OF INCIDENCE*
Poliomyelitis	0.2
Whooping Cough	11.1
Measles	30.9
T.B.C.	84.7
Syphilis	125.1
Gonococcal infections	183.4
Malária	410.1
Dengue	4.3
Diarrhea	6,210.8
Respiratory Infections	13,839.4

* Calculated per 100,000 Inhabitants

TABLE 2

**Death Rates of Children
Under 5 Years of Age
Treated for Diarrhea**

YEAR	NUMBER OF CHILDREN TREATED	DEATHS	RATE PER 1000
1982	757,363	1,474	1.9
1983	783,081	971	1.2
1984	809,232	931	1.1
1985	835,653	—	—

The Diarrheal Disease Control Program (DDCP)

The DDCP was created by a Ministerial Resolution in April 1982. The Ministry of Public Health has divided the country into eight health regions, in which a total of 1,177,732 children under 5 received health services in 1987. Of this number 18 percent, or 216,523 children, were treated for diarrheal diseases.

In coordination with the various health programs and with the active participation of the community, the DDCP has performed program promotion, preventive care, curative care, and rehabilitation for patients with diarrheal diseases.

The Oral Rehydration Therapy (ORT) Program

The ORT program, which works in conjunction with the DDCP in the Ministry of Public Health, was strengthened in 1987 with the development and implementation of a reorganization and communication plan. The objectives of the plan were to improve services to the community, both qualitatively and quantitatively. The plan's goals included: broadening the coverage; improving the care provided in health centers; improving the process for distributing oral rehydration salts (ORS); increasing the accessibility of ORS treatment and support services; ensuring health personnel's compliance with set standards; and participating in ORS distribution.

The staff of the ORT program is responsible for defining the standards for the operation of the program; providing an information system; acquiring and distributing ORS; and supervising and evaluating the program. These activities have constituted the basic elements of the personnel training.

The ORT program's overall objectives are to decrease the morbidity and mortality rates in children under 5 years of age and to decrease dehydration.

The program also has seven related and more specific objectives, as follows:

- to educate mothers and families in the prevention and treatment of diarrhea through the use of hygienic practices;
- to provide care to children with diarrhea in order to prevent dehydration;
- to replace the liquids and electrolytes children lose through diarrhea;
- to treat children suffering from dehydration, and provide followup care;
- to train mothers and families on the proper methods for feeding children before, during, and after diarrheal episodes;
- to educate communities, utilizing the mass media to increase general awareness, about taking preventive measures to protect children's health; and
- to implement improved coordination mechanisms to increase the health coverage available to communities.

The provision of ORS is part of the general distribution system of the Ministry of Public Health. The central warehouse, regional warehouses, hospitals, and area warehouses (*cesamos* and *cesares*) serve as distribution centers. Requests for supplies are made every 3 months, with sufficient notice so that the order can be filled in time.

In order to improve health services qualitatively and quantitatively, both institutional and community personnel are trained. This training facilitates the distribution, supply, and consumption of ORS, particularly in areas where access to health centers is limited.

Information is provided to the health providers and is intended to motivate personnel to properly comply with program standards. The training is practical, so that the trainees can, in turn, train their colleagues.

Acting individually or in teams, physicians, professional nurses, health workers, community midwives, and volunteers are the educational agents and distributors of ORS.

Program Limitations

Currently, the DDCP faces several limitations.

- There are delays in the allocation of funds, which delays supervisory activities.
- The methods of field supervision, especially at the regional level, are not updated.

- Inadequate resources are available for following up personnel training.
- A lack of managerial capability at the regional level manifests itself in poor decisionmaking and information analysis.
- There are limitations in the information system designed to track the rate of consumption and to keep an updated inventory of ORS supplies.
- The medical supply purchasing policies of the Ministry causes administrative problems.

Program Achievements

Despite these limitations, the DDCP and the ORT program have been successful. The program has:

- supervised 75 percent of the target population;
- trained 90 percent of the Ministry's personnel in the administration of ORT;
- developed an educational communication plan and used the mass media to increase the participation of targeted communities;
- implemented community level studies resulting in improved management strategies and the development of model programs;
- developed and distributed a Standards and Procedures Manual, which was written in coordination with the nation's control of diarrheal diseases program, the acute respiratory infections program, the expanded program on immunization, and the Nutrition Child Care programs; and
- provided 90 percent of the agencies with adequate supplies of ORS.

Oral Rehydration Salts Market

The highest priority of the Ministry of Public Health is the care of economically and socially depressed groups, especially in rural and marginal urban areas. Nevertheless, the Ministry decided to market ORS through private companies. The following strategies were proposed:

- producing and packaging the ORS product, using the WHO formula;

- distributing ORS through existing commercial channels concentrated in rural areas;
- making the product more accessible to the target population by lowering the costs; and
- undertaking promotion activities to stimulate demand for the salts.

An improved ORS product is expected to be available in 1989. Litrosol will continue to be distributed free of charge to official health centers. Moreover, a commission has been created to oversee the social marketing of the product.

Summary

It would be too time consuming to provide a detailed description of the geographical conditions of our country, which is a member of the so-called Third World, or developing nations, as poor countries are euphemistically called. These countries confront large problems in the political, social, and cultural spheres. Nevertheless, we have an incentive to make ourselves heard by the developed nations, and we provide evidence of our struggles to attain better living conditions for our inhabitants.

At this time, our delegation, which represents our people and government, would like to gratefully recognize the contributions that have been made periodically by international organizations such as the Agency for International Development, the United Nations Children's Fund, the Pan American Health Organization, the World Health Organization, and others, to promote this kind of forum at the global level. We would also like to acknowledge the enormous efforts at various levels, including economic, to reach out in solidarity to the peoples of the world. This assistance contributes to the achievement of goals that would be unattainable without the international solidarity that is demonstrated today by our meeting here.

To conclude, I would like to reiterate the firm position of the people and the Government of Honduras: to always recognize good will and to continue our constant efforts to carry out our own responsibilities, not only in the field of health, but in all enterprises undertaken for the well-being of mankind as we progress on the road of integral improvement.

Policy Forum Report: Sustainability

Dr. Daniel G. Makuto
Permanent Secretary
Ministry of Health
Harare, Zimbabwe



The Policy Forum was convened for ministers, vice ministers, heads of delegations, and representatives of external cooperating agencies to discuss policies and strategies needed to sustain programs aiming to control diarrheal diseases, and to assure the use of oral rehydration therapy (ORT).

Policies to Sustain ORT Programs

Several policies should help to ensure the sustainability of ORT programs. These include political commitment at all levels and financial commitment to sustain the programs.

Political Commitment at the Highest Level

Experiences from some countries indicate that this is crucial to the success and sustainability of not only

the ORT program, but also the primary health care (PHC) approach. It was pointed out, however, that when high-level political commitment is not forthcoming, setting definite goals for the ORT program to address could provide an alternative way of ensuring sustainability.

Political Commitment at the Operational Level

It is essential that all people involved in the ORT program (i.e., health workers, community leaders, mothers, and the community in general) be fully committed to the activities of the program and to sustaining all of the activities. This can be ensured by educating and motivating both the health workers and the members of the community.

Financial Commitment to Sustainability

Political commitment must be buttressed by a financial commitment that ensures that all activities necessary for sustaining ORT programs remain viable. The following are examples of such commitment:

- Funds should always be readily available to motivate mothers and to ensure that workers can continue using ORS in the treatment of diarrhea.
- Resources are needed to ensure that ORS packets are readily available whenever they are needed.
- Funds are needed to ensure the establishment and maintenance of a sound system for procuring or manufacturing ORS and for distributing it.

Strategies to Sustain ORT Programs

Several strategies can be employed to help ensure the sustainability of ORT programs. These include demonstrating ORT's effectiveness, cultivating public confidence in the health system, providing training and motivation for using ORT, and making ORS readily available.

Demonstration of ORT's Impact on Diarrheal Epidemiology

To measure progress in diarrheal disease control, there is a need to identify and use indicators that are sensitive to ORT interventions. ORT utilization indicators might include reductions in the use of intravenous solutions in hospitals and decreases in

diarrheal mortality. It should be noted that indicators for mortality are more difficult to interpret, because they are sensitive to many other PHC interventions. Given the development of sound health information systems and monitoring and evaluation techniques, however, it should be possible to relate and attribute certain trends in the reduction of morbidity and mortality to ORT use and program development.

Cultivation of Public Confidence in the Health System

If the public perceives the health system as effective in coping with other health problems, such as malaria, tuberculosis, and other communicable diseases, people are likely to have confidence in ORT when it is promoted. In order to earn public confidence, the health sector must be completely geared to resolving the community's overall health problems in a comprehensive manner in keeping with the primary health care approach. Therefore, diarrheal disease control should become an integrated, inextricable component of the overall primary health care strategy. It is impossible to overemphasize the need to establish linkages between the ORT program and other programs, such as the acute respiratory infection (ARI) program; the expanded program on immunization (EPI); and nutrition, water, and sanitation programs.

Training and Motivation on the Use of ORT

Both mothers and health workers require training, if sustainability is to be assured. The training must be an ongoing activity, and pediatricians must participate actively in ORT programs.

ORS Affordability and Availability

To ensure the sustainability of ORT programs, ORS must be affordable and available. For that reason, each country must decide what solutions or combinations of rehydration solutions should be utilized at each level, from the community level to the primary, secondary, and tertiary hospitals or institutions, taking into account the resources that can be marshalled.

To guarantee sustainability, ORT programs must

promote self-reliance at the community level, which accounts for the importance of choosing solutions (e.g., cereal-based solutions) that can be easily prepared at home with readily available fluids.

Cooperation to Sustain ORT Programs

Individual countries and international organizations can collaborate effectively to sustain ORT programs by ensuring that the activities enumerated above are implemented successfully. Collaboration might involve the following activities:

- demonstrating the impact of ORT on diarrheal epidemiology;
- cultivating public confidence in the health system by strengthening the overall health care system to provide for comprehensive disease control as well as treatment and health promotion;
- training and motivating both health workers and the community at large concerning ORT use; and
- making ORS affordable and readily available, wherever it is needed.

Conclusion

In most communities, ORT is now accepted as the treatment for diarrhea. Our duty is to ensure that this acceptance is sustained. Since the introduction of ORT, millions of children with diarrhea have been successfully treated each year, and the mortality rate for children under 5 years of age has steadily decreased.

ORT is indeed one of our most effective tools in the fight against diarrhea and, is therefore, also one of the most effective tools for attaining *Health for All*. By ensuring the sustainability of ORT programs, we will be helping to keep our goal of *Health for All by the Year 2000* realizable.

Unfinished Business: In ORT, CDD, and Child Health

Dr. Richard G. Feachem
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The previous speakers—Dr. Nakajima, the panel chairpersons, and the distinguished delegates from Honduras and Zimbabwe—have provided excellent summaries of the field of diarrheal diseases control and of the deliberations of this conference. I will not, therefore, bore you with a summary of their summaries. Instead, I will echo and expand a little on the theme of *unfinished business*—a theme that has resonated clearly and loudly during these past 3 days:

- unfinished business in ORT;
- unfinished business in CDD; and
- unfinished business in child health.

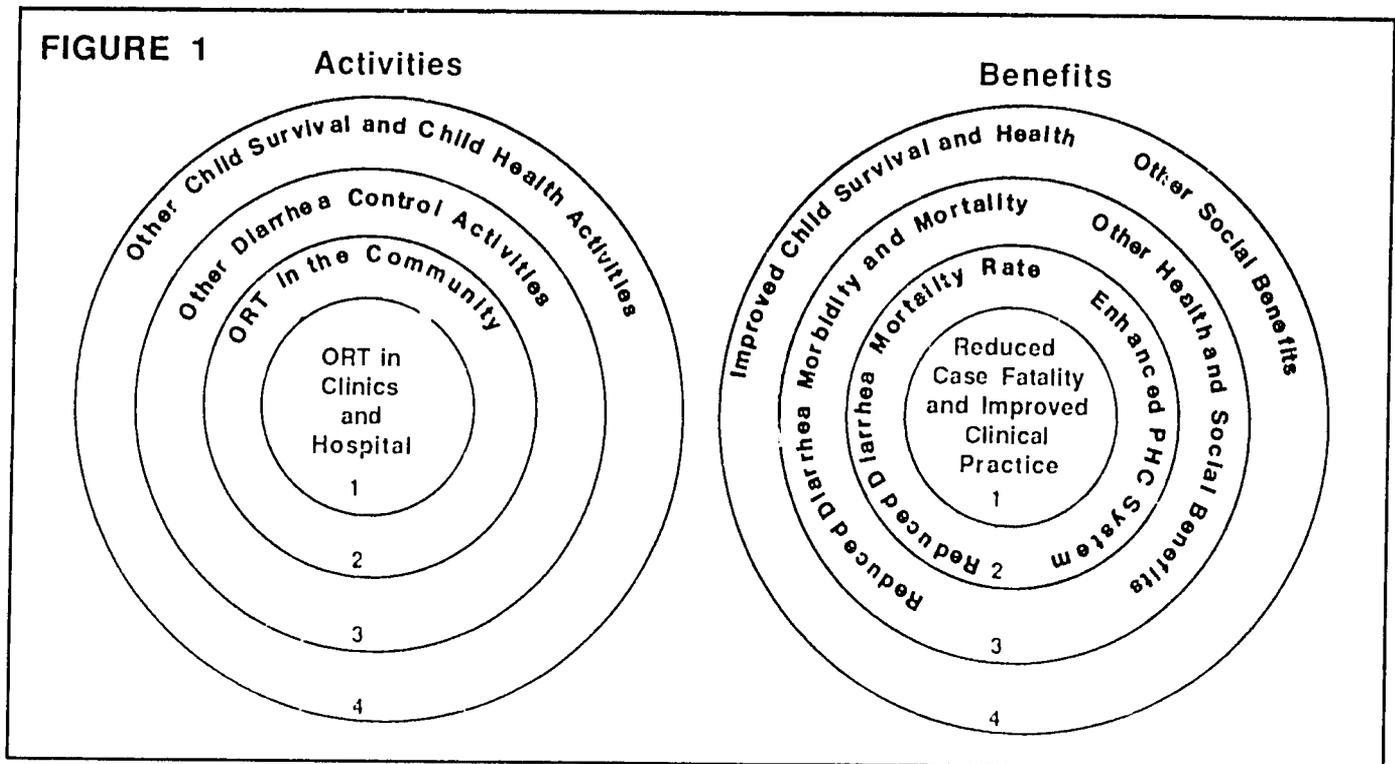
Figure 1 is a graphic illustration of these elements.

Let us start at the innermost circle on the two sets of rings in the diagram and work our way outward. The innermost circle depicts the use of ORT in clinics and hospitals. This is the beginning of ORT and remains its heartland. If ORT is not correctly and effectively used in health facilities, there can be little hope that it will be effectively used in the community. Great progress has been made. In many clinics and hospitals, admission rates are down, case fatality rates are down, and costs are down. These successes were not achieved by ORT alone, but by attention to all aspects of the management of severe diarrhea and its serious complications in young children. Where emphasis is not given to the overall quality of pediatric care, including the care of persistent, dysenteric, and complicated diarrhea, case fatality rates will remain high. A recent study in a hospital in Africa showed that, *after* the establishment of an ORT outpatient unit, the introduction of ORT for inpatients, and the training of staff in ORT, the case fatality rate among admitted children with diarrhea was 12 percent. The explanation for this high rate might lie partly in the fact that 65 percent of the children admitted with diarrhea also had otitis media, measles, pneumonia, or malaria. *Our goal is good pediatric practice*, and ORT is an essential step toward this and a catalyst for other changes.

We now move to the second ring, which depicts ORT in the community. Here the unfinished business is very clear: It is the achievement of effective case management in the home. Effective case management in the home comprises the following elements:

- correct use of fluids to prevent dehydration;
- continued feeding; and
- the ability to recognize the danger signs that require children to be taken to a clinic or hospital.

Recent data from several countries show that there is a large and difficult gap between maternal knowledge of ORT and effective use of ORT. In one African country it was found that, among mothers returning home after having taken their sick children to an ORT unit and having received ORT packets and advice, some were giving ORT at the rate of 1 teaspoonful three times per day and others—60 percent of the mothers—were giving their children less than 500 ml. per diarrheal episode. It is this gap between use and *effective* use that may partly explain



the frailty of the current evidence that community-based ORT programs have caused declines in childhood mortality rates. We must *strengthen our efforts* to convert use of ORT into *effective use of ORT*.

Let us now move out to the third circle, which depicts other approaches to the control of diarrheal diseases. Here the magnitude of our unfinished business is exceptionally large. We know that breastfeeding, correct weaning practices, personal and domestic hygiene, and improved water supply and sanitation facilities are all powerful weapons to reduce diarrheal incidence rates and mortality rates. All countries have major programs in the field of water supply and sanitation. But how many countries have programs in the other areas of prevention? Very few. These are not minor or trivial interventions. A recent study in a middle-eastern city showed that, if all mothers exclusively breastfed their infants for the first 6 months of life and gave breast milk and supplementary foods for the second 6 months, the number of pediatric admissions for diarrhea would decline by 60 percent. Such a decline would be similar to that reported to result from ORT programs. Unlike ORT programs, however, breastfeeding achieves its impact through prevention rather than through case management. The implementation of known and *cost-effective preventive measures* against childhood diarrhea is a *major priority* for all national programs over the next few years.

The outermost ring depicts the broader challenge of helping children to survive and to live healthy lives.

If we apply the child mortality rates of Japan to the developing world, we conclude that 12.5 million children under 5 die needlessly every year. Diarrhea causes 3 to 4 million of these avoidable deaths. The rest are caused by acute respiratory infections and by a variety of other diseases, which vary considerably from country to country. For example, in some parts of West Africa, 25 percent of all deaths between the ages of 1 and 5 are caused by malaria. I look forward to attending ICIB III—the Third International Conference on Impregnated Bednets, which I hope will be held in Banjul, or Zanzibar, or Madang.

It is essential that we supplement our current interventions against diarrhea and the diseases targeted by the expanded program on immunization (EPI) with effective and low-cost interventions against acute respiratory infections and malaria, in order to produce *an integrated intervention package that can achieve a major impact on child survival*. An essential part of such a package in many countries would be family planning programs to promote smaller and better-spaced families.

To conclude, I wish to refer to the remarks of Dr. Nakajima this morning. Dr. Nakajima emphasized the importance of working *with* countries, to implement strategies that *they* have developed and evaluated, to meet *their* needs. These are wise remarks, and they raise important questions concerning research capacity and human resources. Countries need to be able to study their own problems and to design and evaluate their own strategies and programs. This requires a cadre of epidemiologists, health planners,

and economists, who are in very short supply. Some of the countries represented here today have no practicing health economists, and others have perhaps 50 percent of their epidemiology expertise sitting in this room. This situation is improving only slowly. Epidemiology remains a relatively unattractive subject for medical students, and qualified doctors are generally drawn into clinical practice by the financial

rewards that are offered. We need to greatly accelerate the creation of human resources in the fields of epidemiology, health planning, and health economics, so that diarrheal control and other child health programs can be designed and evaluated locally, and so that policy can be determined in Katmandu and Kigali rather than in Geneva or Washington.

Closing Remarks

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On behalf of UNICEF, I would like to express my sincere appreciation to the United States Agency for International Development (A.I.D.) and to its Administrator, Alan Woods, for taking the initiative to organize ICORT III. During the past 5 years, A.I.D. has demonstrated extraordinary commitment to going to scale with oral rehydration therapy (ORT) in order to reach the unreached with this, to quote *Lancet*, "potentially greatest advance of this century." This A.I.D. leadership is particularly appropriate, because it was A.I.D. that in the late 1960's and 1970's provided the majority of the funding that led to the ORT breakthrough in Bangladesh, which was supported by research elsewhere, including notably Egypt and the Philippines. We thank A.I.D. for its many contributions in this area and, especially, for its leadership in making ICORT III a reality. We are also grateful to the other cooperating agencies—WHO, UNDP, and The World Bank—and commend the spirit of "shared mission" and the unity of purpose that guided the planning and organization of ICORT III. Most important, we thank all participants for so generously sharing their time, energy, wisdom, and experience.

With respect to the substance of ICORT III, the satisfying consensus we have reached in the past 2 days, so effectively described in the group reports this morning, tells us of a new miracle in the making.

This great achievement, however, must not lull us into a sense of complacency.

We must always remember that, despite the simplicity, feasibility, and low cost of the ORT message, a staggering 10,000 children die each day from diarrhea-related causes. In other words, every day the number of children who die from diarrhea is four times as great as the death toll at the Bhopal tragedy of 4 years ago, which commanded the headlines of every newspaper in the world. Each week, the diarrheal death toll exceeds that of the recent massive disaster in Armenia. With this in mind, I offer four priorities to guide our work in the years ahead.

- First, we need to build a greater sense of *urgency*—of increased political commitment at all levels. The deaths and nutritional havoc wreaked by diarrhea should be dramatized in almost every country. No less than the *elimination* of dehydration as a major cause of child mortality should be our goal in the coming decade.
- Second, we need to reach the remaining unreached majority who are still not using ORT—the most isolated, vulnerable, and underserved families within each country. As Dr. Bengzon pointed out 2 days ago, not only the magnitude but also the unevenness of this problem requires response. The poorest children suffer first, most, and with the least assistance.
- Third, to succeed in reaching the unreached and sustaining the program, we need to reach more effectively the *unreached leadership in the medical system*—the medical schools and their curricula; hospitals and private practitioners; and drug manufacturers and pharmacists.
- Finally, we need to build on our success and develop still-broader alliances in this struggle. While continuing to recognize the important role played by health personnel, we need to enlist

the support of potential political leaders, educators, religious leaders, traditional healers, nongovernmental organizations, the media, and others in the struggle for sustainable, effective ORT programs in the 1990's.

These are just four of the challenges that face us as we conclude ICORT II.

I wish you courage, determination, and continued

success in your efforts, during the years immediately ahead, to overcome this tragic disease and its consequences, which together have taken the lives of more than 500 million children in the past 40 years and which, even under the best of circumstances, will take the lives of tens of millions more in the remaining years of this century. You, who are on the front lines in individual countries, can count on the continued support of this organization.

Closing Remarks

Ambassador Alan Woods

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We have come to the close of a remarkable 3 days. I'm pleased that our discussions during this conference have been candid and creative.

We have heard some remarkable examples of program challenges, and we have seen solid evidence of program success. Dr. Magda Mohamed Ahmed Ali from Sudan and Dr. Romanus Mkerenga from Tanzania told us about important work that is being done in training health workers. Dr. Felipe Mota Hernandez and Dr. Mamdouh Gabr shared with us their experiences in Mexico and Egypt, where they achieved successful collaboration between the governmental and private sectors. Dr. Syed Azhar Ahmad, reflecting on Pakistan's experience, reminded us of the importance of marketing and communication. Speaking broadly, Dr. Alfredo R. A. Bengzon warned us of three formidable obstacles to sustainability: ignorance; prejudice; and poverty. Over the past 3 days, we have heard oral rehydration therapy (ORT) described as everything from a "ten-cent cure" to a "social movement." But what is more important, we have heard of dramatic successes—in Egypt, Indonesia, Malawi, Haiti, and elsewhere. That success is measured in terms of:

- increasing knowledge and use of oral rehydration therapy;
- fewer hospitalizations for rehydration;
- lower costs for government programs; and
- lower family expenditures for health care.

Most important, success means that more children are being saved.

We have also heard some very practical recommendations:

- First, bring oral rehydration therapy into the hospitals. The payoff will come in the form of reduced medical-care costs and in the way mothers and medical professionals view ORT.
- Second, work through existing communication and distribution channels—even informal and traditional channels—where this is the best way of reaching people.
- Next, at every step of the way, maximize self-reliance on the part of the mother, the family, the community, and the economy. Also, do not ignore the roles that educational, religious, and commercial organizations can play.
- Finally, build bridges to other elements of the society.

We know oral rehydration therapy works. It is a simple, cost-effective, life-saving therapy.

I strongly agree with Dr. Bengzon's observation that the control of diarrheal diseases is not only a major objective in its own right, but it is also a means to revitalize, strengthen, and energize the entire health system. Let me repeat what he said:

We have taken the opportunity to do battle against diarrhea as also an opportunity to combat inefficiency, laziness, corruption, and a host of problems not unique to the health sector—but diarrhea is particularly dangerous because of the human lives that are involved.



Ambassador Alan Woods

Oral rehydration therapy works. Yet, the more we learn, the more we appreciate the complexity of the problem that sustainability poses for all of us.

There are, indeed, challenges to sustainability. Sustainability requires commitment, patience, and time:

- time to plan;
- time to influence health behavior; and
- time to reach beyond the public health infrastructure to encourage a much more active role for private service providers.

Unfortunately, time is not necessarily on our side. In countries that are failing economically, the situation is going to worsen, no matter how many campaigns we mount to combat specific diseases.

If we look beyond the year 2000, we see demographic trends that will magnify every health

problem that developing countries face.

- The world's population continues to explode.
- We are now 5 billion strong, and we are growing exponentially.
- Most of the growth is coming from the developing world, where basic systems, such as health, education, and water, are already strained to the limit.

Finding sustainable solutions to health care problems is the central challenge we face as we move forward. We need to examine what steps can be taken by families and by private businesses in developing countries to address health care needs.

I don't want to suggest that there are no roles for ministries of health and public health care providers—because there certainly are. But if we focus only on what the public sector can do to improve health

standards in developing countries, we will not succeed. I believe that if we want health care improvements in developing countries to become permanent, we need to look in several directions.

- First, we need general economic growth—the creation of the domestic means to finance health care services.
- Second, we need more pluralistic health care systems. Countries need to strive for a better balance between private care and government programs.
- Third, families must be encouraged to become more involved in their own health care.
 - We know that even the poorest households are spending some money on health care.
 - In fact, the resources families spend are already much greater than public expenditures on health.
 - We need to think about how we might help families get more for the money they spend on health care.

So, we must recognize that health programs have to wear a new face in the 1990's. They must reflect rapidly changing economic, political, and demographic trends.

We must be prepared to learn and to change. New problems arise, as do new opportunities.

- The family itself is changing. More mothers are working outside the home.
- Older girls who traditionally helped their mothers with child care and household chores are now in school. We need more of this.
- People in isolated rural households now have access to radio and, in many cases, television—and they know that life can be different for them and their children.

The world is changing, but it seems to me that what must be preserved at all costs is a family's ability to act in its own self-interest. There is ample evidence that, where health services, schools, and jobs are available, families will make extraordinary sacrifices to take advantage of these opportunities.

It is fair to say that we have only begun to tap the potential of oral rehydration therapy.

- ORT is a life-saving therapy;
- ORT has energized a wide range of institutions—both public and private—in the fight for improving children's health; and
- ORT has paved the way for the introduction of new health technologies.

Thus, it is an extremely cost-effective technology for enhancing children's health. It is also a model that opens the door to new approaches to child health.

We share an ambitious goal—to make oral rehydration therapy and immunizations available to virtually every child in the countries where we work. We share a similar determination—that children should not die from dehydration or from diseases that could easily be prevented. Finally, we share a high regard for human life. As parents, we believe that every child born into this world deserves the chance to live without pain and suffering.

In 1985, we set important goals for ourselves. And there is ample evidence that these goals are now being achieved. We will not abandon our commitment. With that in mind, let's take this opportunity to rededicate ourselves to our child survival goals.

- We must work to maintain our enthusiasm and concern—while planning for the future.
- We must work to sustain—and add to—the remarkable accomplishments we have achieved to date.
- We must use the methods we now have, recognizing that new tools will be needed, as well.

We must work to sustain—and add to—the remarkable accomplishments we have achieved to date.

I believe this investment will pay off:

- for countries,
- for communities,
- for families, and
- most important of all—for children.

They are our future.

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THIRD INTERNATIONAL CONFERENCE

ON ORAL REHYDRATION THERAPY

A D D E N D U M

to the **PROCEEDINGS**

ICORT III

ADDENDUM

TO THE PROCEEDINGS

Prepared for the
Agency for International Development
Office of Health
Bureau for Science and Technology

**Third International Conference
on Oral Rehydration Therapy**

December 14-16, 1988

Washington, DC

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Introduction

The activities of the Third International Conference on Oral Rehydration Therapy (ICORT III) were designed to allow the participants to share their experiences in promoting ORT and developing programs to control diarrheal disease. Much had been learned about how to accomplish these goals in the six years since the First International Conference on Oral Rehydration Therapy (ICORT I). The participants—both those involved directly with program implementation, and those making broader policy decisions—had solutions and results to contribute to other countries facing similar problems.

The first volume of the Proceedings presents the plenary overview presentations and a summary of the discussions and conclusions in each of the seven panel working groups. This second volume, Addendum to the Proceedings, provides the data and specific descriptions of programs and experience from which those conclusions were drawn. It consists of the reports which each of the panel members delivered during the seven panel sessions. Many successes have been achieved, and these papers document the approaches used to achieve them. We believe you will find many ideas and approaches in them which will be useful to you in future efforts to control diarrheal disease.

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Panel 1

**Household
Behavior and
Community
Participation**

Opening Remarks

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Good morning, and welcome to the panel session entitled, "Household Behavior and Community Participation." Although I feel very grateful for the opportunity to participate as a member of this panel, I also feel very humbled by the task. We are aware of the importance of involving the family and community in the distribution and provision of oral rehydration therapy (ORT). Accomplishing this objective, however, is not a simple task. Despite the overwhelming acknowledgement of the important role of mothers in recognizing and treating children with diarrhea, considerable debate continues concerning how best to reach and involve mothers and other essential caretakers so as to achieve the goals of sustained and effective use of ORT. "More community participation" is a cry from nearly every development program. Yet, defining appropriate community action and the means to mobilize and sustain community support for ORT remain critical issues.

There are a myriad of other, perhaps more specific questions, that remain unanswered. For example, what cultural beliefs and practices influence a community or an individual mother's likelihood to use rehydration solutions? Although no one argues that information of this nature is necessary in order to design effective outreach strategies, a lack of consensus exists regarding how much information should be collected, which information is essential, and which information is perhaps less important to the overall objectives of control of diarrheal diseases (CDD) programs. Standard descriptive parameters such as diarrheal attack rate, the mother's awareness of ORT, and the mother's "ever use" of ORT can be measured using relatively simple survey techniques. Qualitative research methods, however, that involve unstructured interviews focusing on a smaller number of respondents from different social, religious, and economic backgrounds, may be more helpful in understanding cultural beliefs about a community or an individual's approach to the diagnosis and treatment of diarrhea.

The seemingly simple question—What exactly do we want the mother to do when her child has a diarrheal episode?—is more often than not completely left out of national CDD policy and program plans. The role of mothers regarding issues such as when and how they should intervene in diarrheal episodes, and when they should seek help outside the home, should be as clearly defined as that of other health workers.

A third question concerns how programs might better promote the acceptance and sustained use of ORT. Although programmatic efforts in many countries have been highly successful in creating awareness of ORT and in encouraging an initial trial, indicators of continued use have been less encouraging. Many mothers who have tried ORT deny using it during the most recent episodes or report that they do not intend to use it during future episodes. A basic issue that must be addressed in considering how best to promote ORT acceptance and sustainability revolves around the precise definition and measurement of sustained use of ORT. For example, are mothers expected to give ORS during every episode of diarrhea—even during mild episodes involving only three stools?

Another question focuses on ascertainment of the most important determinants of sustained use and the clarification of which of these determinants can be influenced by the CDD program. Some factors that impact on whether ORT use is sustained, such as educational background, rural versus urban residence, and socioeconomic status, cannot be influenced by CDD programs. Programs do, however, have opportunities to make decisions on many other factors, such as whether hands-on experience is used to teach about ORT, what groups are targeted to receive messages, how ORS is positioned in the market, and what expectations are created in the community regarding the effects of ORT.

There are numerous other questions to consider, including: What nutritional and feeding recommendations during and after diarrhea are most appropriately given to the mother? and Which community groups are best utilized to achieve the greatest influence on household

diarrhea related behavior? Each of these issues and many, many others impact on household and community participation in diarrheal diseases control.

Rather than continue to raise additional questions, I will defer at this point to my colleagues on the panel, who will share some of their personal experiences with ORT programs. Our panel members and their topics are as follows:

- Dr. Guillermo A. Lopez de Romana, Peru—*The Dietary Management of Diarrhea Project in Peru*;
- Dr. Ahmed Mushtaque R. Chowdhury, Bangladesh—*Reaching Millions with the Message of ORT*;
- Ms. Hema Vishanathan, India—*Developing Diarrheal Disease Control Strategies and Messages to Reach Mothers*;
- Dr. Klaus Th. Finkam, Brazil—*The National Oral Rehydration Program of the National Council of Brazilian Bishops: 1987-1990*; and
- Dr. Leonardo Simao, Mozambique—*Community Participation and Mobilization in Mozambique*.

I am confident that the lessons they share will assist us in identifying more appropriate means by which to further involve the household and community in ORT programs.

The Dietary Management of Diarrhea Project in Peru

Dr. Guillermo A. Lopez de Romana
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Introduction

Diarrheal diseases control (CDD) programs have in the past placed most of their efforts on the promotion of oral rehydration salts (ORS) with important results, including a decrease in childhood mortality in some countries. The high rates of mortality associated with diarrhea, however, are also a consequence of the negative impact of illness on the nutritional status of children. In countries with incidences as high as 6 to 10 episodes per child per year, with a large number of them lasting more than two weeks, and with high prevalence of malnutrition, the impact of diarrhea on nutritional status deserves special attention. Moreover, the severity of diarrhea and case fatality rates are greatly increased among malnourished children.

During the last ten years, most CDD programs have been delivering general messages in relation to feeding, such as "continue breastfeeding" and "offer the same foods to the child that he or she was receiving before the episode." These messages need to be more specific and should answer the following simple questions: What foods? How much should be offered? How should the recipe be prepared? These recommendations should be determined by the local food availability patterns and the cultural beliefs of the population. With this approach, it is understandable that the dietary management of diarrhea should take place at the household level by the principal caretaker of the child, the mother.

To formulate a dietary management of diarrhea (DMD) project, the answers to some basic questions are needed. What do people do in relation to the following issues:

- With regard to feeding infants and children:

- How long is breastfeeding continued?
- What is the weaning age?
- What foods are used during this period? and
- What are the normal feeding patterns for older children?
- With regard to diarrhea:
 - How is it defined? and
 - When the mother considers the diarrhea severe, how is it treated?
- With regard to feeding during and after diarrhea:
 - Is it done?
 - How is it done? and
 - What foods are used?

It is also important to find out why people do what they do.

- This information is essential to the success and sustainability of any project, and should not be assumed. Special efforts should be dedicated to collecting this information.
- The success of the program will probably depend on the ability to incorporate the messages within the context of the cultural beliefs of the population, with the idea that after a certain period of time the messages will become part of their beliefs.

Program planners need to know what foods are available during the year.

- Foods need to be nutritionally adequate;
- Foods need to be cheap; and
- Foods need to be easy to prepare.

Finally, information is needed about how mothers should be reached.

- What do mothers consider to be the credible sources of information—doctors? local healers?
- What local institutions are working effectively in the area that can be incorporated to assure the sustainability of the project? and
- Which media channels can be used?

With this information it should not be difficult to select the appropriate food items to formulate a recipe. Once this is done, recipe trials should be conducted to learn the proper way to combine and prepare the foods. Only after the previous phases have been completed can an intervention be designed and launched.

Project Overview

Today I want to present the project implemented in Peru by Instituto de Investigación Nutricional (the Nutritional Research Institute), the Ministry of Health of Peru, the Johns Hopkins University, and the Academy for Educational Development (AED), with support from the Office of Nutrition in the Agency for International Development (A.I.D.).

The project logo represents the two principal components for the management of a child with diarrhea—fluids and food—which are symbolized by a glass of water and a bowl. With these two components, the child can continue to grow and remain healthy.

The project was carried out in an Andean valley located 250 km northeast of Lima, the capital of Peru. The valley extends between two mountain chains and the population lives at altitudes that vary from 8,000 to 14,000 feet above sea level.

Since this has been one of the first DMD projects, more research methods than the ones that would be required in most countries to develop similar projects have been used. The lessons learned in the project and a simplified methodology for undertaking similar projects are summarized in a manual that is available upon request.

Data Collection

Information was collected using the following methods:

- *Ethnographic Studies.* Three types of communities (urban-rural, "rich," and "poor"), were selected. A rapid ethnographic assessment methodology was used to collect the information during a 1-week period in each community. A large number of brief, unstructured interviews were conducted with mothers with children under 4 years of age, some of whom had diarrhea. These studies provided most of the qualitative information required, but the results were not representative of the total area population.
- *Population Survey.* A survey was conducted with a representative sample of the population (50 clusters, totalling 2,600 mothers with children under 3 years of age were interviewed). Quantitative information was collected, but no significant differences from the results of the ethnographic studies were found.
- *Dietary Observations.* During these studies the food consumption of children was measured in three instances: during the acute episode of diarrhea; in the convalescence stage; and during a healthy stage. These studies provided information in relation to the role of anorexia versus food withholding and an accurate assessment of nutritional intake.
- *Market Surveys.* Market surveys were conducted at least four times a year to evaluate food availability and prices during different seasons.

Summary of Key Findings

Data analysis revealed the following findings:

- Mothers continue to feed their children during diarrhea.
- Children's loss of appetite was observed during the first days of diarrhea.
- Food consumption, even in healthy children, was insufficient to meet requirements.

- Foods selected for the recipe included a staple (toasted wheat flour), a source of extra protein (toasted pea flour), a source of vitamin A (carrots), and an extra source of energy (oil or sugar).
- Intervention materials developed for the target audiences included:
 - for mothers: radio (song, drama, and spots) and face-to-face demonstrations (mother's club, where flipcharts were used and market demonstrations in the form of theater); and
 - for health workers: seminars, training sessions, newsletters, and prescription pads with a recipe.

Evaluation

Eighty-two percent of the population heard the message. The principal channel was the radio. Ten percent of the mothers who heard the message via the media but without a face-to-face demonstration prepared the recipe within 9 months of project launch in comparison to 25 percent who had prepared it within 9 months after a face-to-face demonstration. Ninety-five percent of the population that ever prepared the recipe would like to continue using it.

Lessons Learned During the Project

The following lessons were learned:

- Mothers do not commonly withhold food.
- A child's appetite decreases during the first days of an episode.
- Both the quality and quantity of food consumed are important.
- Methods of obtaining information should be determined by available resources and expertise.
- Mothers should be involved in the research process.
- Specific recommendations get better results.
- Programs should use more than one channel of communication.
- Community organizations must be involved to assure sustainability.
- Success requires interdisciplinary teamwork.

Reaching Millions with the Message of ORT

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Introduction

Diarrhea is a major cause of mortality, morbidity, and malnutrition, particularly in children, in developing countries. Oral rehydration therapy (ORT) is a proven treatment method for most types of diarrhea. During the past few years, ORT programs have been started in many developing countries, some promoting pre-packaged oral rehydration salts (ORS) and others promoting home solutions.

One of the largest and most frequently discussed programs is the one run by the Bangladesh Rural Advancement Committee (BRAC) in rural Bangladesh. Over the last eight years this program has reached mothers in 10 million households through house-to-house teaching visits by BRAC's health workers. Numerous articles have been published highlighting the results from this program (listed in the References at the end of this paper).

In my presentation, I will review this program and examine some of its important features.

Background: Development of the Bangladesh Rural Advancement Committee (BRAC) Program

The Bangladesh Rural Advancement Committee (BRAC) is a Bangladeshi nongovernmental organization (NGO) that has worked for the development of rural Bangladesh since its inception in 1972. Health has been an important component of BRAC programs, and diarrhea was recognized as a major disease experienced by the rural population. Packets of ORS were distributed by BRAC through paramedics and volunteers, but several problems arose, particularly with respect to the distribution of packets to the villagers. There were also problems with management and costs (BRAC, 1980).

Because of these problems, an alternative was then tested. Field research showed that a pinch of *lobon* (common table salt) and one fistful of *gur* (unrefined local sugar), when mixed in a half-seer (467 ml) of water, produced a solution with many of the essential properties of an ideal ORT solution. Lobon supplied sodium and chloride, while gur supplied sucrose (glucose) and some potassium. Table 1 compares the composition of an average lobon-gur solution (LGS) with that of the World Health Organization (WHO) recommended solution. Based on experiences from a pilot project (Ellerbrock, 1981), BRAC began a program in 1980 to introduce the homemade solution to all mothers of rural Bangladesh.

Program Strategies

The Seven Points to Remember

The core of the program is teaching of a diarrhea message called the *Seven Points to Remember*, to individuals. This message contains all of the information that a villager needs to know to treat diarrhea at home, including the preparation and administration of an ORS made with home ingredients (see Figure 1). Female health workers, called oral replacement workers (ORWs), were trained to teach mothers the *Seven Points*. During a face-to-face session, one mother from each household was taught and then supervised while she made the LGS herself. Using this approach, the ORWs reached most of the village households under the program. If ORWs identified diarrhea patients during their home visits, they treated them immediately with LGS. This treatment proved helpful in creating demonstration opportunities.

TABLE 1

**Comparison of Electrolyte and Glucose Contents In ORS
As Suggested By World Health Organization (WHO)
and In Lobon-Gur Solution**

	ORS FORMULA (MMOL/L)	
	WHO	BRAC (LGS)*
Sodium	90	60
Chloride	80	60
Potassium	20	15
Bicarbonate	30	---
Glucose	111	100

* approximate

Since 1986, however, the mode of teaching has been changed. Instead of teaching one mother at a time, the ORWs now teach mothers in groups. The group teaching has helped reduce the cost of the teaching by half without affecting program quality (Chowdhury et al., 1988c). Each ORW now teaches approximately 20 mothers per working day. When she finishes teaching the mothers in one village, she moves on to the next one.

The ORWs work in teams of about seven ORWs and two male workers. The male members handle logistics and do the male contacts (see the section on Male Contacts later in this paper).

Incentive Salaries for ORWs

Another group of workers monitors the work of the ORWs. They visit 10 percent of the households visited by ORWs one month earlier to evaluate (a) the information collected on the women visited; (b) the village women's retention of the *Seven Points*; and (c) the skill and accuracy of these women in preparing the LGS. The monitors take a sample of the LGS prepared by mothers to perform electrolyte and glucose analyses.

The monitoring results are used to determine the monthly remuneration of ORWs.¹ Each village woman interviewed by a monitor is graded according to her answers on the *Seven Points* (on a scale of 10) and her ability to prepare a correct solution. Grade A means that the mother remembers all of the *Seven Points* (i.e., scores 10) and prepares the solution correctly; Grade B means that she scores 7-9 points and prepares the solution correctly; Grade C means that she scores less than 7 points but still prepares the solution correctly; and Grade D means that she fails to make the solution correctly. ORWs receive Taka 4 for households that earn Grade A, Taka 2 for those that earn Grade B, and Taka 1 for those that earn Grade C.² There is no remuneration for Grade D, which means that an ORW gets no remuneration for the mothers she taught who cannot make LGS correctly. Table 2 provides the scores that are assigned to each of the *Seven Points*. Clearly, the major purpose of this incentive salary system is to ensure quality teaching, and the most important consideration is how well ORWs have taught the technique to the mother.

Male Contacts

Taking the male community into confidence was a major challenge during the program's early stage. As the males are the decisionmakers in Bangladeshi families, their perceptions and views about LGS were considered crucial to the success of the program. Accordingly, a number of new components, including meetings at mosques and weekly markets, were added to win the support of the male community.

¹This remuneration system has now been discontinued because BRAC added instructions that were difficult to evaluate quantitatively.

²US \$1.00 = Taka 30.00

FIGURE 1

The Seven Points to Remember

1. *What are dud haga, ajirno, amasha, daeria, and cholera and their bad effects?*

Dud haga, ajirno, amasha, daeria, and cholera are all characterized by loose motion. With each loose motion, salt and water drain from the body. If this draining of salt and water continues for some time, the body becomes *dehydrated*. Severe dehydrations usually lead to death, so, necessary steps should be taken in time in cases of dud haga, ajirno, amasha, daeria, and cholera.

2. *Symptoms of dehydration*

In dehydration, the patient develops certain signs, i.e. sunken eyes, dry tongue, thirst, sunken fontanelle (in young children), severe weakness, reduced urine, etc.

3. *Simple management of loose motions*

The simple management of dehydration is the replacement of salt and water lost from the body. Remember, a patient can die of dehydration (loss of salt and water). So, whenever a patient gets dud haga, ajirno, amasha, daeria, or cholera, give oral saline from the very onset of the disease or immediately after the first loose stool.

4. *Preparation of oral saline*

Oral saline is prepared with a third-of-a-finger pinch (up to the first crease) of lobon and one fistful of gur in a half-seer of drinking water, well stirred. Care should be taken to mix lobon, water, and gur in the right proportion. A fistful of (refined) sugar can be used if gur is not available.

5. *Administration of oral saline*

Adult patients should take a half-seer of oral saline after each loose motion. Children should be given only as much as they want, but at frequent intervals. Once saline is prepared, it may be kept 4 to 6 hours only.

6. *Advice on nutrition*

During dud haga, ajirno, amasha, daeria, or cholera, the patient should be given plenty of water and food-stuffs like rice and curry along with the oral saline. In case of children, breast milk and/or a normal diet should be continued. An increased amount of food should be given for at least 7 days after recovery. This will prevent malnutrition and weakness of the patient.

7. *Prevention*

To save ourselves from this disease, we should drink tubewell water. If tubewell water is not available, water from other sources should be boiled and then cooled before use. Rotten food should never be eaten. All food-stuffs should be covered well so that flies cannot light on them. Hands and mouths must be washed by soap or safe water before eating. Hands should be washed by soap or ash after return from the latrine and even after cleaning the babies after defecation. Remember that breast milk is harmless. Children put to breast immediately after birth and breastfed continuously rarely have dud haga.

School Meetings

For every three villages in rural Bangladesh, there are about two primary schools and some secondary schools. BRAC took advantage of this by teaching the *Seven Points* to the students and teachers at these schools. Many of these young students became very effective promoters of LGS in their own homes and neighborhoods.

Quack Meetings

Bangladesh has a large number of quacks and village doctors who are popular among villagers. BRAC workers arranged meetings with them to communicate the ORT message. They are one of the few groups that continues to have an antagonistic attitude towards LGS.

TABLE 2	
Scoring System In Knowledge Test for The Seven Points to Remember	
MESSAGE	SCORE FOR CORRECT ANSWER
1. Definition of diarrhea	1
2. Identification of when loose motion becomes diarrhea	1
3. Treatment	1
4. Identification of when to begin LGS and why	1 + 1
5. Amount that should be given (for children and adults)	1 + 1
6. Prevention	1
7. Nutrition (during and after episode)	1 + 1
TOTAL SCORE	10

Print Materials

BRAC also produced a number of print materials, which included posters, leaflets, and flipcharts. Flipcharts are used by ORWs in their teaching sessions with mothers. The posters and leaflets are distributed in villages.

Radio and Television

Even though a negligible proportion of rural households in Bangladesh own radios and televisions,³ BRAC included these mediums in their drive to popularize ORT in Bangladesh because studies found that radio has a tremendous impact in disseminating information on LGS, even in areas not covered by BRAC. In addition, although television is an urban luxury, televised messages on LGS popularized the solution among urban middle and lower middle classes, who in turn communicated it to their respective rural kins. The most important benefit of this drive was that it gave credibility to what the ORWs and other BRAC workers had told the villagers during house-to-house visits. The number of times that the messages were aired depended on the season, with more aired during diarrhea seasons and at times of epidemics.

Epidemic Control

At the news of the outbreak of a diarrhea epidemic in an area, BRAC sends special teams to take care of the patients. Patients are initially provided with packets of ORS (and intravenous solutions in special circumstances) and then are told to use LGS if packets are difficult to obtain locally.

Policy Change

The Bangladesh government has its own CRT program. This program promoted ORS packets but now also promotes LGS as an alternative. Since BRAC promotes a half-seer for the preparation of LGS, the government has also accepted this as the standard for Bangladesh and produces half-liter packets. All of the commercial manufacturers also switched to half-liter packets instead of the standard one-liter packets.

³About 20 percent have radios, and an insignificant proportion have televisions.

Training

Training is an important element of the program. All workers are appropriately trained before being sent to the field. Moreover, refresher trainings are organized quarterly.

Assessing Effectiveness

Assessment Methods

Among the many indicators of the effectiveness of community ORT programs (Chowdhury, 1986b), the composition of the solution prepared by mothers and its usage are continually assessed in BRAC through epidemiological methods. Such assessments are done at two levels as described below.

Program Monitoring. The method of assessing teaching quality one month after the completed training was described earlier in this paper. The sample solutions that are collected by the monitors are analyzed for chloride⁴ at the field laboratories using titration and the results are returned to the managers for program and staff development. ORWs who receive a sizeable proportion of D's for three consecutive months are dropped from the program.

Research by the Research and Evaluation Division. The Research and Evaluation Division, which is an independent unit within BRAC, has played an important role in the program. Since the program was started in 1980, scores of studies have been conducted, many of which have been published. Such studies evaluated different program components and resulted in modifications and changes in program strategies. The following section discusses several program modifications which were the direct or indirect result of research findings.

Use of Research Findings in Program Development

Male Contacts. The pilot project for this program had only the face-to-face teaching component through which only mothers received the ORT message. Soon it was suggested that such a strategy might jeopardize the whole effort, as any family decision concerning whether to use LGS or not is influenced, and in many cases made, by the male members. Females are dependent on their male counterparts for such decisions. Any attempt to bypass the males would not bring the desired results. Later, new program components (see the previous section, Program Strategies) to involve the male community were developed and are now being implemented.

Dispelling Doubts about ORW Intentions. Before BRAC's ORT program, the only female workers seen in rural areas worked for the family planning department. For some reasons, family planning was not popular, and in many cases the family planning workers were not welcome. When ORWs started to visit rural areas, many people thought they were family planning workers in the guise of ORT workers. Rumors started to spread that anyone who drank LGS would become sterile. Because such rumors were detrimental to the success of the program (Chowdhury, 1980), efforts were taken to neutralize the rumors by making more pre-contacts, particularly with the male members of the community, and by taking the elite sections into confidence through meetings, discussions, and a media campaign.

Substitute for Gur. Gur is unrefined local sugar that contains both sucrose (glucose) and potassium. The ORS formula was made with gur and lobon (common table salt). When the program was half completed and nearly half of the country had been reached, it was determined that the infrequent availability of gur was one reason that mothers did not use LGS (Chowdhury, 1986a).

Soon the teaching message was modified to advise mothers to use refined sugar⁵ when gur was not readily available. To study the feasibility of using rice powder, a community research study was started to look at the capability of mothers in preparing a rice-based ORS (Chowdhury, et al., 1987b).

Use of People's Perception. During a village-level micro study of the mothers' infrequent use of LGS, mothers identified four different illnesses that had similarities with the clinical symptoms of diarrhea. A subsequent community survey that included questions about these four types of

⁴Chloride is a good proxy indicator for sodium in LGS (Chowdhury, 1986).

⁵This is available in about the same proportion of households as gur but does not contain potassium.

diarrhea found a much higher usage rate of LGS (up to 55 percent) for one of the types, which was daeria, or severe watery diarrhea as per people's described symptoms. Further analysis revealed that this result (of higher use rate for daeria) was related to the way the mothers were taught by ORWs. In their teaching, the ORWs instructed the mothers to use LGS if their children had *diarrhea* which the mothers took to be daeria, only one of the four diarrhea types. Since the ORWs did not talk about the other three types, the ORS usage rate for these types was very low. As daeria was the most infrequently occurring type (about 5 percent of all episodes), a higher usage rate for this type could not make much of an impact on the overall usage rate (Chowdhury, 1986a; Chowdhury, et al., 1988b).

Based on these findings, the *Seven Points* message was revised to include all four types of diarrhea (see Figure 1).

Emphasizing Rehydration Property. The common ORT solutions such as LGS are not supposed to stop diarrhea, however, the research showed that mothers somehow interpreted that LGS was like a medicine and that it would stop diarrhea, as a medicine does in the case of most diseases. Thus, when the mothers tried LGS and the diarrhea did not stop immediately, they started to lose faith and hesitated to use it in later episodes. Further changes were made to the message and ORWs were retrained to emphasize that LGS is a rehydration solution and that it is not supposed to stop diarrhea.

Changing the Formula of LGS. When the program began, it used the following formula: one-third-of-a finger pinch of lobon and two scoops of gur in a half-seer of water (Ellerbrock, 1981). A few months later, reports started to pour in that some mothers were confusing "one pinch" and "two scoops" and instead using two pinches and one scoop, leading to a hypertonic solution. This led BRAC to change the formula to *one pinch* and *one fistful*, in a half-seer of water, a modification that was less likely to be confused but that kept the composition of the solution unchanged.

More Care in Teaching. Initial monitoring results found excellent message dissemination, with more than 90 percent of the mothers found capable of preparing a safe and effective solution (with a sodium concentration of 30-99 mmol/L), one month after being taught. But later surveys, conducted in areas which were taught up to 24 months previously, found a decline in the mothers' ability to prepare a safe and effective solution (Chowdhury, Vaughan, and Abed, 1988a). Three reasons were discovered for this decline: a reduced emphasis by ORWs on the danger of using too much lobon; a rapid expansion of the program, leading to a shortage of experienced managers; and mothers' forgetfulness because of the infrequent use of LGS (Chowdhury, 1988).

BRAC responded to this by retraining ORWs, reemphasizing the *Seven Points*, and by initiating an expanded media campaign through radio and television. Recent studies reveal an improved picture (see the section, Some Results below), however, the program requires continuous monitoring.

Some Results

Coverage

By October 1988, mothers in 10 million households (population 57 million) have been visited by ORWs and taught the *Seven Points*.

Composition

The monitoring conducted one month after the ORW teaching shows excellent knowledge retention, with more than 90 percent of the mothers preparing a safe and effective solution (with sodium 30-99 mmol/L). Similar results were found among mothers who were taught three or six months previously (Chowdhury, 1982). As mentioned earlier, because of the alarming results found in mothers who were taught 12 and 24 months prior to assessment of their ability to prepare LGS (Chowdhury, Vaughan, and Abed, 1988a), several corrective steps were undertaken (see the previous section, Assessing Effectiveness). Recent data show improved results (Chowdhury, et al., 1988c). Table 3 shows the sodium concentration in LGS prepared by mothers in different studies.

TABLE 3

**Sodium Concentration In LGS Prepared By Mothers
In Different Time Periods Following Teaching**

Na+ (In mmol/L)	MONTHS AFTER TEACHING (PERCENTAGE OF SOLUTIONS)					
	1 (1983-86)	3 (1982)	6 (1984)	12 (1984)	24 (1984)	12 (1987)
<30	1.4	2.4	0.8	2.5	4.4	6.2
30-99	90.5	89.2	89.6	63.3	71.4	88.9
100-119	5.7	5.2	6.4	16.0	9.5	2.8
120+	2.4	2.8	2.8	18.2	14.7	2.1
N	172,750	250	250	156	179	144
Mean	68.1	65.4	71.2	93.0	81.4	55.1
S-d	24.9	21.4	22.0	49.9	44.9	19.6

Usage

Usage was defined as the proportion of diarrheal episodes in which LGS was used during a recent reference period (Chowdhury, 1986b). Initial usage results from the BRAC program were very discouraging, with only 17 percent showing usage (Chowdhury, 1982). A large survey carried out in 1984 evaluated usage in areas taught one or two years previously and computed usage rates for different types of diarrheal episodes. Usage varied among different types, with the highest usage for episodes of daeria.

Costs

The cost data for the first phase of the program were examined. During the 39 months of this phase, US \$1.8 million were spent on visiting and teaching the *Seven Points* message to 2.5 million households, at an average cost of US \$.72 per household taught. Of this average household cost, US \$.43 were spent in supporting the ORW teams and US \$.05 were spent on administration. The remaining US \$.24 were used for field staff recruitment and training, publicity, laboratory costs, and evaluations (Chowdhury, 1986a).

The Impact on Infant and Child Mortality

Preliminary results from the first phase study on the program's impact on mortality are now available (Chowdhury, et al., 1987a). Although clear differences are seen between mortality levels in pre- and post-program years, the causes of such reductions are probably not only ORT, but also some other unknown factors. Table 4 shows the mortality levels in different age groups in pre- and post-program years (years 1 and 2 respectively). Rates for all eight categories under study have been pooled here.

Summary

This paper discussed the ORT program that is being conducted by BRAC throughout Bangladesh. BRAC used almost all conceivable methods to popularize LGS and such methods were incorporated into the program over time as the program matured and as new information was received, mostly through the use of research studies.

The BRAC program is probably the largest in the world in the sense that no other ORT program has reached so large a population through intensive face-to-face teaching. Many of the results are, however, not that encouraging. The overall usage rate for all types of diarrhea together has not been encouraging, and there was a decline in mothers' ability to prepare a safe and effective solution after a period of 12 to 24 months.

Many observers, however, would argue that such results are not at all discouraging, as the results should be evaluated in context. Whatever BRAC achieved is spectacular, not only

TABLE 4**Mortality Rates In Pre- and Post-Program Years
(Years 1 and 2 Respectively) For Different Age Groups**

<u>MORTALITY RATES</u>			
<u>Age Group</u>	<u>Year 1 (Pre-program)</u>	<u>Year 2 (Post-program)</u>	<u>Significance</u>
All deaths	18.2	14.3	p<.05
Neonatal	85.3	78.0	
Post neonatal	71.3	64.8	p<.05
Infant	156.7	135.9	p<.01
1-4 years	26.5	17.2	p<.005
5-14 years	3.7	3.2	
15-44 years	2.9	2.7	
45+	37.1	30.6	p<.05

because the program covered a large population but also because of general expectations for such a program. This is an extensive program that provides mothers only one face-to-face training session, and there is no substantial reinforcement except through radio and television, the access to which very few rural people have.

Some others would argue that maybe the overall usage is low for all types of diarrhea, which include mostly the mild cases. The cases that are most at-risk and lead to dehydration and deaths are those of severe, watery diarrhea. For these, LGS was used by a large proportion of the mothers (up to 57 percent) with children under 5 years of age. ORT (or LGS) is primarily a mortality intervention, and the preliminary results also indicate a reduction in mortality in the appropriate age group.

The real impact of the BRAC program, however, is evident in another way. LGS has now become a household word in Bangladesh and has assumed the look of a movement. The government has started a national program, and many NGOs have come forward to promote ORT. Many companies have started to manufacture ORS in their own plants. A number of pharmaceutical companies now sell their own ORS brands, and the sales are shooting up. During the recent disastrous floods, when numerous relief operations were carried out, ORS was the most commonly used item. Many voluntary groups started make-shift ORS production centers and produced millions of packets of ORS that were distributed to the flood-affected people. In contrast to the 1974 floods, which resulted in an outbreak of an epidemic, this year's epidemic was contained, largely due to the widespread knowledge of ORS and its availability. A quiet revolution has begun in Bangladesh, and this needs to be sustained through continuous reinforcement and proper monitoring. The challenge ahead is to make LGS a part of the culture as a safe and effective folk medicine for diarrheal episodes.

Acknowledgements

This program is conceived and directed by Mr. F. H. Abed, the Executive Director of BRAC. The author is grateful to Mr. Abed for his support in undertaking studies on the program.

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Developing Diarrheal Disease Control Strategies and Messages to Reach Mothers

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Control of diarrheal diseases (CDD) programs need to understand mothers and their environments, their language, the people with whom they interact, and their practices, to be able to reach out to mothers and ensure sustained use of oral rehydration therapy (ORT). The focus of this paper is on the process of studying and understanding the rural mother. It addresses the question: What investigation of cultural beliefs and practices is needed?

Need for the Study

The government of India and UNICEF recognized the need for an all-India study. India is a diverse and complex country with over 16 major languages and extreme diversity in food, social customs, dress, climatic and geographic conditions, and even traditional medical treatment.

Recognizing this diversity, the Indian government identified the need to complete the following tasks:

- map diarrhea related practices, beliefs, and knowledge;
- understand commonalities that could form the basis for a national program of communication;
- understand differences in detail and formulate state-specific communication programs; and
- list terminologies—related to foods, fluids, types of diarrhea, and remedies—in order to understand and address the mother in her language.

The Purpose of the Study

The purpose of the first stage of the study was to understand the range and variety of beliefs and practices related to diarrhea in rural India. Activities included gathering information, mapping the range and differences, and understanding and designing the quantitative instruments.

The purpose of the second stage was to quantify data on major parameters, after identifying areas where investigations were needed and knowledge could be applied. Essentially, data were quantified with regard to practices related to food and fluids, beliefs regarding diarrhea, the acceptability and feasibility of home-available fluids, the mother's treatment-seeking behavior, and awareness and use of the sugar-salt solution and oral rehydration salts.

The study was designed to ensure representativeness as well as validity. It had to explore the issues in an open-ended manner and yet be statistically valid.

To begin, the country was divided into 35 relatively homogeneous, sociocultural regions. Each region was studied separately in two stages:

- Stage one used qualitative research to understand knowledge, attitudes, and practices, using focus group discussions and in-depth interviews; and
- Stage two used quantitative research to measure specific knowledge, attitudes, and practices, using structured, standardized questionnaires.

The study was conducted using 14 of India's 16 officially recognized languages. The sample plan was designed to represent each region as follows:

- A total of 140 group discussions were conducted. In addition, 520 in-depth interviews were conducted—280 by health practitioners and 140 by medical retailers. All discussions and interviews were tape-recorded, translated, and transcribed.
- Structured interviews were conducted with 5,310 mothers of young children with recent episodes of diarrhea. These mothers came from 408 villages that had been chosen on the basis of rigorous, stratified random sampling techniques.

Research Findings

Findings represent the common thread; there were wide regional variations. This paper raises an important question: "What do you want the mother to do?" In order to understand the communication and education efforts required to get the mother to do what we want her to do, it is necessary to understand her current practices in the context of intervention and medical help-seeking behavior.

The study found that the mother acknowledges that her child has diarrhea, on an average, after four to five loose motions have been passed in a day; she gets concerned, on an average, when the child passes six to seven loose motions in a day.

Her first reaction is to wait and watch, even after she recognizes that the child has a diarrheal problem. If the situation does not worsen, she might be willing to leave it alone. If it does worsen, however, she intervenes, changing to a lighter and more liquid diet. Communication needs to be designed to help the mother recognize diarrhea early and start giving fluids early. If a change in diet does not stop deterioration, she may attempt traditional remedies.

If these home-based attempts do not slow the deterioration, the mother seeks outside help. Mothers expressed a low level of confidence in the ability to manage diarrhea at home. Sixty-five percent had sought medical help during the recent diarrhea episode, which meant that they sought guidance and a medicine or product for treatment. Of those who had sought treatment, over 80 percent had consulted a private practitioner, while less than 8 percent had approached the public health network.

The question for program development is: Should an attempt be made to draw the mother towards the health center, or should the program equip the private practitioner to provide correct treatment? The findings of this study show that the influence of the rural, private practitioner on the mother is high and that he is a potential resource who may be usefully harnessed.

The acceptance and sustained use of ORT needs to be studied in terms of all three forms of ORT: home-available fluids, sugar-salt solutions (SSS), and oral rehydration salts (ORS).

Home-available Fluids

The study found that fluids are not withheld. Ninety-nine percent of those who were breastfeeding the child during the recent episode had continued to do so. In addition, 75 percent had given water, and 42 percent had given other fluids.

During the qualitative stage the study found that although traditionally a wide range of fluids are known and recommended, mothers had given mainly milk and tea during the most recent episode.

Therefore, it was found that fluids are acceptable and are used, however, they lack salts. Also the fluids used are not given in sufficient quantities—over 60 percent of those who gave any fluids (other than water and breast milk) gave less than 100 ml at a time, 2-3 times in a day.

The recommendation, therefore, is that the mother should be encouraged to follow her currently correct practice, i.e., the giving of fluids, and that she be helped by offering her a choice of fluids that would be both feasible and acceptable. Feasibility and acceptability would be a function of the availability of necessary ingredients in the house, the effort required, and the intrinsic acceptability of a fluid.

The study showed that an energy source in the form of rice or sugar or jaggery was available in 92 percent of the households. Coarse or powdered salt was available in 95 percent of the households.

Kitchen fires were lit twice a day on an average, using either wood or cowdung. This would have an impact on the mother's willingness or even ability to make a fluid at odd hours.

Nine fluids were checked for intrinsic acceptability as well as acceptability with salt and sugar/gur. Rice water with salt appeared to be a viable option.

The Sugar-Salt Solution (SSS) and Oral Rehydration Salts (ORS)

The sugar-salt solution had low awareness, with only 17 percent indicating awareness even when the fluid was described in detail. Only 7 percent had ever used it, and the majority of

nonusers could state no reason for not using the solution (see Table 1). The reasons could lie in the lack of conviction and motivation and possibly in the lack of reinforcement.

ORS packets were recognized by 37 percent of all respondents. Twenty-seven percent had used them at some time, but only 3 percent mentioned the use of ORS during the recent episode (see also Table 1). Problems could lie in the area of availability, product salience, or both. ORS had been provided by only 6 percent of the doctors during the recent episode. There is a need for research to identify the sustained use of ORS and important determinants of the same.

FORM OF ORT	PERCENTAGE
SSS	
Awareness	17
Ever used	7
ORS	
Recognized ORS packet	37
Used ORS at least once	27
Used ORS during recent episode	3

The rationale for the promotion of ORS that has evolved from this study is as follows:

- ORS is a branded, packaged item having the appeal of a modern remedy which SSS lacks.
- ORS must be purchased, which lends credibility and value.
- ORS had been expected to stop loose motions by 48 percent of the users, to prevent thirst by 14 percent of the users, and to keep the child active by 13 percent of the users. Over 85 percent were satisfied that performance matched their expectations.

Please note, however, that these are findings from one study and may not be borne out by longitudinal studies.

This paper also raises a question regarding messages about feeding during and after diarrhea. In that context, it becomes pertinent to look at current food-related beliefs and practices. Studies indicate that "heavy" or "difficult-to-digest" foods are discouraged. Forty-eight percent continued to feed their children normal quantities of food; 41 percent reduced overall quantities.

The belief is that the digestive system becomes weak and must not be strained. The program and all communications would need to suggest traditionally acceptable, nutritious foods and ways to prepare them.

The need for additional food after diarrhea was not perceived; normal food was given to match appetite, as demanded.

In the context of involving the community in diarrheal diseases control, the study identified two influencer groups: currently, the rural doctor was a major influence and potentially, the school teacher could be a major influence.

In order to understand how best to harness the influence of the rural doctor, additional studies were conducted to recognize the rural doctors' knowledge and practices vis-a-vis diarrheas.

The village school teacher was known and recognized by 735 of the respondents.

Within the family, advice had been sought from the husband and mother-in-law during the recent diarrheal episode.

Recommendations

Communication to the mother should address the following issues.

- It should teach her to recognize diarrhea earlier than what is currently done.
- It should encourage her to continue giving home-available fluids and recommend some traditionally known fluids.
- It should encourage her to continue feeding the child and should help her by recommending food items which should be selected in keeping with cultural categorizations of light and heavy or hot and cold.
- It should teach her to seek medical help if the situation worsens and train her to understand that ORS use denotes good medical care.
- Finally, it should tell her to administer ORS from pre-packed 200 ml portions, as recommended.

This type of programmatic information is absolutely essential to the design and planning of a diarrhea management program.

The National Oral Rehydration Program of the National Council of Brazilian Bishops (CNBB): 1987-1990

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Background

In 1984 the Catholic Church, stimulated by UNICEF, started a basic health actions project entitled *Child Pastorate* to give continuity to the struggle against the deaths of so many Brazilian children.

The National Oral Rehydration Therapy (ORT) Program, a four-year preventive and educational action, is part of that larger project. The program is implemented by UNICEF and the Brazilian Pediatric Society, and supported by the Ministry of Health, the National Council of Christian Churches, the National Advertising Council, and the Globo Television Network.

The National ORT Program is justified by the tragic fact that, in Brazil, according to estimates based on several studies,^{1,2} 64,000 children die each year as victims of dehydration. On the other hand, public health assistance is inadequate. In addition, in the poorest areas, especially in the Northeast where the largest number of diarrheal deaths occur, local health stations are closed, too distant, or nonexistent.

In 1981, the Ministry of Health published a document and started a program of diarrhea control.³ Although these actions have yielded some positive results, full execution of the program

has been limited by one serious factor: the ORS packets are not produced or distributed in sufficient numbers, because of administrative, financial, or transportation problems.

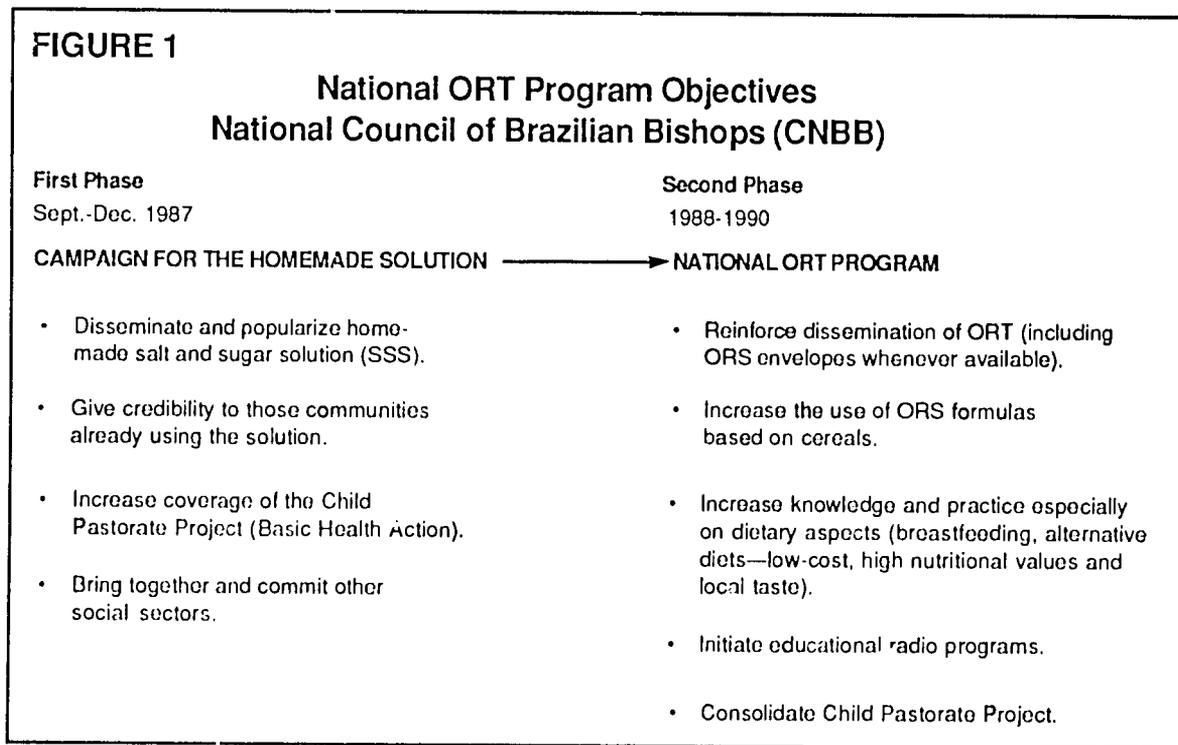
For these reasons, the Catholic Church felt a responsibility to intervene in the lives of many children through the implementation of the National ORT Program. The goal of this initiative was to accelerate the dissemination of the homemade solution already used by the Child Pastorate Project, the ORS packets (whenever available), and the cereal-based solutions.

In 1987, this project reached 120 dioceses and 1,500 parishes. In addition, 2,500 communities with 40,000 women (leaders) were trained to apply basic health action in all Brazilian states.

Planning and Implementation

The National ORT Program was planned in two phases. The first phase, from September to December 1987, was launched as a campaign for the homemade solution. The objectives of this phase were to disseminate and popularize the home-prepared salt and sugar solution; provide recognition to those communities already using it; enlarge the Child Pastorate Project; and bring together and commit other social sectors (see Figure 1).

The level of mobilization and participation needed during the campaign indicated some educational challenges for the second phase. Therefore, in the second phase, from 1988 to 1990, the campaign became the National ORT Program, with the following objectives: reinforce ORT dissemination; increase the use of cereal rehydration solutions; intensify knowledge and practices, especially concerning nutrition; initiate educational and preventive radio programs; and consolidate the Child Pastorate Project (see also Figure 1).



Financing

The financial resources (59 million cruzados) of the first phase represent the generous donations of Brazilian people to Brazilian children. These resources were donated in only one day in 1986 through the television program, *The Child and I Hope*, with the support of the Globo Television Network. The Catholic Church obtained additional financial resources from the Federal government.

Management

The utilization of the Child Pastorate structure permits the mobilization and the involvement of the Catholic Church as a whole. This included 236 dioceses with 8,000 parishes and approximately 100,000 ecclesiastic communities. The national coordination was able to count on 180 diocesan coordinators, covering 4,000 parishes and 60,000 communities.

In the second phase, the National Coordinating Group was formed through strategic alliances among the Child Pastorate, UNICEF, the Brazilian Pediatric Society, the Ministry of Health, the National Advertising Council, the Globo Television Network, the Health Pastorate, and the Catholic Radio Network. From this group, a technical group and a communications group were formed. In the Northeast, interinstitutional groups were established to support communication. All diocesan coordinators were specifically trained.

Instruments

Advocacy materials were sent to more than 20,000 addresses. In addition, educational and mobilization materials were provided to the dioceses, parishes, and other entities. Among them were 10.5 million measuring spoons; 13.5 million leaflets, posters, fliers, and training booklets; as well as communicators' booklets, spots, and jingles for all television and radio networks.

Evaluation

Two evaluation processes are being implemented:

- a public opinion survey in four capitals and two rural areas; and
- a study on the impact of the first phase of the program (IBASE, Rio de Janeiro) in order to evaluate the knowledge and the behavior of mothers.

Program Achievements

The program has brought about the following results:

- achieved the dissemination and popularization of information regarding the utilization of sugar and salt solutions for the prevention of dehydration.
- enhanced the credibility of a technique that was already being practiced;
- legitimized a practice that was new to the general population;
- notably diminished hospital admissions;
- increased the rate of correct preparation of solutions in communities with the Child Pastorate Project; and
- mobilized various sectors of society in several ways, achieving the participation of the press as well as radio and television networks.

The National ORT program has obtained the collaboration of influential organizations, such as the Brazilian Pediatric Society and several sectors within the Church. They, in turn, have sensitized the medical profession and the general population regarding the problem posed by diarrheal disease and its important impact on child mortality. Thanks to the national ORT Program, the Church has extended its work in basic health—from June 1987 to June 1988, the Child Pastorate Project increased its coverage from 639 to 1866 communities in the Northeast.

Program Difficulties and Challenges

The program has not been extended to its full potential because of a lack of qualified personnel in some dioceses. Also, much work still needs to be done in order to obtain the medical profession's full support; a large proportion of pediatricians and clinicians remain uninformed or reluctant to accept the use of ORT. This is especially true for homemade solutions. Antidiarrheal medicines are still much in use; many of them are even advertised on radio and television.

In order to ensure good ORT practice, much emphasis is given, through the teaching aids as well as during practical training, to the fact that mothers must understand the simple process by which dehydration occurs. The signs of dehydration and rehydration are also stressed. Much emphasis is given to the early rehydration within one hour of the first diarrheal discharge. Continued normal feeding during the episode is stressed. A very important issue is where the mother should go if dehydration gets worse. Also important in the teaching process is assuring that the mother uses sufficient amounts of liquid and learns how to respond to difficulties such as vomiting. The program is helping the mother to cope with her daily domestic chores while taking care of her child with diarrhea.

The following activities are helping with this training task:

- demonstrating the simplified process of diarrheal dehydration using Werner's self-explanatory model (gourd baby);
- presenting the practice within the community's religious and cultural settings (songs, poetry, drama, presentations during religious services, and other activities);
- referring to examples of ORT successes in the community; and
- using professionals and popular persons through the mass media to legitimize the practice.

Perspectives for the Future

The National ORT Program makes the following recommendations for the future:

- that the same participation methodology be applied by government agencies and nongovernmental organizations (NGOs) and used for the popularization of other basic health measures;
- that the ORT program serve as a model for a permanent training program on primary health care for mothers and communities; and
- that the program be held as a model to provide incentives for impoverished populations to demand basic sanitation, health services, education, and a more dignified life.

Footnotes

1. Perfil Estatístico de Crianças e Mães no Brasil, IBGE/UNICEF, Rio de Janeiro, Brasil, 1986.
2. Becker, R. and Lechtig, A. *Brasil: Evolução da Mortalidade Infantil no Nordeste, 1977-1984*. Brasília: Centro de Documentação do Ministério da Saúde, 1986.
3. Ministério da Saúde, Secretaria Nacional das Ações Básicas de Saúde, Secretaria Nacional de Programas Especiais de Saúde, Proposta de Ação de Controle das Doenças Diarreicas, Brasília, 17 de Junho de 1981.

Community Participation and Mobilization in Mozambique

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Program Overview

Mozambique is situated in the southern part of Africa and is divided into 10 provinces. People are organized at the local level by communities and peoples' assemblies. The Ministry of Health also works with larger organizations, which include the Mozambique youth organizations and trade unions. Although these once were the main social organizations with which we worked, we always understood that it was also important to involve other social organizations such as churches and schools, including children and teachers. These organizations are needed first of all to identify people to participate in the discussion and decisionmaking process about local and national issues and problems. Another goal is to have the technologies and knowledge transferred through these organizations to the local communities. Community participation is our political goal, and people are encouraged to participate, not only in health or health-related issues but also in many other issues such as agriculture, education, and the local administration of justice.

Because of the community involvement and the relationship of the health sector with these communities, CDD has become a part of the political component of Mozambique. We have regular meetings with local leaders to discuss projects, planned activities, and the feelings of the communities in relation to our performance or the performance of local health units. We also hold direct discussions with health workers and local leaders on health education with local populations in general meetings, and we hold discussions with health workers and local leaders on many other issues. We discuss health issues, including the CDD program, in the waiting rooms of our health units.

We have house-to-house campaigns for families' specific concerns. When we decided to increase our expanded program on immunization (EPI) coverage in the main cities, we launched a house-to-house campaign. We increased EPI coverage in the capital city, for example, from about 60 percent three years ago to more than 95 percent coverage.

We also use the schools. About two years ago, we started experiments with one of our programs to involve school children and teachers because we decided to build our relationships with other social organizations. We have several agreements with these and other organizations—the women's organization and trade unions—on the definition of specific tasks to be carried out by our units and local communities in order to build interest. An example of such an agreement is the involvement of the women's organization to select people to be trained in traditional birth attendance (TBA).

Problems

Problems that we have experienced can be organized into several areas: displacement, comprehensiveness, incomplete messages, low health facility coverage, and evaluation.

Displacement

Many Mozambiquans have been displaced by the war situation. The main objective for the CDD program in this regard is just to save lives. Case management control is the main objective. We are not worried about education or about program managers. The first task to be accomplished is just to save lives—to address this problem of displaced people.

Comprehensiveness

The second difficulty we have is that we are in the process of discussing whether or not this approach is enough. Although we are focusing our attention on the primary matter, we do believe that children's problems are, and must be, family problems. Grandmothers must be involved, and the fathers also must be involved. We are working outward to reach the family as a whole to convey the same message to different members of the traditional Mozambiquan family. We have to understand the dynamics inside our families, and we are developing such an approach.

Incomplete Messages

Sometimes we are delivering incomplete messages. Occasionally we fail to teach mothers how to give oral rehydration therapy and how much to give. Sometimes mothers become confused or have incomplete information. These can create some problems in the mismanagement of diarrheal disease.

Low Health Facility Coverage

Our health facility coverage is low. It is not enough to cover the country as a whole, as the war situation destroyed more than 700 health units. This means that our capacity to tackle health issues is now much lower than it was about five years ago.

Evaluation

We need to evaluate all of these approaches. Simple techniques are needed to enable local levels to perform the evaluations to correct programs and to improve their performance. We use a qualitative method and direct discussions with local communities, but we feel that these are not enough to provide a global view of our performance.

Summary

We have learned some lessons in this process. One lesson is that we can sustain our programs. We started in 1975 just after our independence, and we feel strongly that we are maintaining the continuity of the health programs. On the other hand, this approach creates some capacity for continuous training for health workers. Most Mozambiquan health workers—including the minister himself—are very young. Because of this, everybody must learn in this process. When we keep these types of linkages with the communities, we feel that over time we will learn a great deal.

Panel 2

**Health Worker
Training and
Performance**

Opening Remarks

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The discussions in this panel will center around two overall questions: How can we assure that a large enough pool of health workers is trained to effectively deliver oral rehydration therapy (ORT) to those who need it? and How can we ensure that this training is institutionalized so that there will be a trained pool of manpower to sustain the program in the long term? Panelists will address these issues based on their own experiences in their countries. Some of the issues that these questions raise include the following.

- What is the most efficient and effective means of training health professionals?
 - Can different members of the health profession be trained together?
 - How best can one insure that the knowledge and skills gained in the training session are put into practice in the work setting?
 - What are the motivating factors that would make people become committed to applying their knowledge and skills?
 - What other actions are needed to encourage health workers to apply their knowledge?
 - What is the support system that is needed?
 - Is there a need for incentive schemes of any form to ensure the full participation of health workers at training sessions?
 - How do we involve people and for what length of time? Many have commented on how difficult it is to get people to come and stay for any length of time.
- How should persons who are allied and are practitioners in their own right be involved?
 - How can we involve the traditional pool of health workers, and how can they be organized and trained to be effective in the health sector for ORT delivery?
 - What are the best approaches to use in reaching health professionals and self-employed persons who are in the private sector?
 - When you don't have the materials that are allegedly the best, when you don't have the audiovisual tools that some feel are very useful, and when you don't have active cases during the training, what do you do as alternatives?
 - What innovative ideas can one use?
- How can the program achieve sustainability in the absence of donor support?
 - Should one continue to look for donor support in order to sustain the training program?

- What is the role of the nursing schools, and how can one really involve the faculty and convert them to becoming involved in the teaching of ORT?

Today's panelists are:

- Dr. Sileshi Lulseged, Assistant Head of the Diarrheal Diseases Training Unit at the Ethio-Swedish Children's Hospital in Addis Ababa, Ethiopia, who will speak about diarrheal training units;
- Dr. Perla D. Santos Ocampo, Professor in the College of Medicine of the University of the Philippines, in Manila, Philippines, who will speak on training at health professional schools;
- Dr. B. B. Karki, Program Manager of the National Diarrhoeal Disease Control Programme, in Kathmandu, Nepal, who will speak on Nepal's efforts, successes, and failures related to health worker training; and
- Chief Sola Olalekan Atanda, the Asiwaju Awo of Lagos, Nigeria, who will speak on the involvement of traditional healers in CDD programs.

The Role of Diarrheal Training Units: The Example from Ethiopia

Dr. Sileshi Lulseged

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Introduction

The purpose of this presentation is to describe the operation of a diarrheal training unit (DTU) located in Addis Ababa, Ethiopia, including its strengths and weaknesses, in order to provide a lesson for others. Started 5 years ago, this unit is directly or indirectly responsible for the establishment of over 10 other DTUs in Ethiopia and the rest of English-speaking, sub-Saharan Africa.

History

In 1980, the regional diarrheal diseases study group of the WHO regional office for Africa met in Brazzaville and recommended, among other things, that Ethiopia make optimal use of the technical cooperation among developing countries in promoting a national diarrheal diseases control program. This could be done by strengthening inter-country collaboration in various fields, especially in oral rehydration salts (ORS) production, training, research, and information exchange activities.

In response to this program requirement, regular study group recommendations, and the need to extend oral rehydration therapy (ORT) as rapidly and as widely as possible, the regional director decided to establish three training centers for the control of diarrheal diseases. Initially, there was one center per Technical Cooperation Among Developing Countries (TCDC) subregion to strengthen TCDC mechanisms and to provide a national character.

Ethiopia was chosen in 1983 as a base for Subregion II's first center. A request was made to select a national institution, and the Ethio-Swedish Children's Hospital (ESCH) in Addis Ababa was nominated for this purpose.

A diarrhea treatment facility located in the outpatient department (OPD) of ESCH was started in January 1984. The unit has managed a total of over 40,000 patients since its establishment. The Ministry of Health assigned one experienced nurse and a health assistant to the facility. Two small rooms (total area of 20 sq. m) with minimal equipment and supplies were placed at its disposal. Two national courses on diarrhea management followed soon after.

Through the assistance of UNICEF and WHO, a physical facility was constructed adjacent to the outpatient department of ESCH and became fully functional in May 1985. This provided a space to hold inter-country training courses on a regular basis.

The Training Unit

The unit is located on the premises of ESCH, which is the main teaching hospital of the Department of Pediatrics and Child Health, Faculty of Medicine, Addis Ababa University. The unit has five rooms, a reception hall, and two toilets and is located directly adjacent to the OPD of ESCH. The first head of the unit was the Chairman of the Department of Pediatrics and Child Health, and director of the hospital.

The staff consists of a head and a deputy head (both pediatricians who are members of the Department of Pediatrics), a head nurse, two staff nurses, two health assistants, and two custodians. The pediatricians have other responsibilities as well and have primarily supervisory roles except during training programs, when they work full time. All staff are full-time government employees.

The unit is closely linked with the children's hospital from which all patients come and utilize the hospital's resources for the care of these patients. During the 12 hours when the unit is closed, the hospital emergency services assume full responsibility for patient care.

The Office of the Control of Diarrhoeal Diseases (CDD) in the Ministry of Health determines who should participate in the national training program and administers the funds for this purpose. The WHO CDD office in Brazzaville selects participants for the inter-country courses and provides full support. Thus, the training unit is answerable to several institutions.

Training Programs

Participants

During six national and five inter-country training programs, 121 national and 54 health professionals have been trained. These participants were drawn mainly from English-speaking African countries.

In all the inter-country training programs, a mix of health professionals was promoted to involve clinicians (mainly pediatricians), nurses working at ORT facilities, academicians, and CDD program managers/administrators, etc. Several of the participants were groomed as future heads or members of DTUs in their respective countries. It is no coincidence, therefore, that many returned and started DTUs.

Participant selection for the national courses was carefully planned to make optimal use of participants' potential to make an impact. Thus, initially, priority was given to key clinicians in existing children's hospitals, academic pediatricians in the three medical schools, and tutors of nursing schools and schools for health assistants, in this order. One objective was to change the curriculum in training institutions to accommodate new ideas in diarrhea control and management. This has been particularly successful in nursing and health assistant schools.

Besides the formal training programs, the DTU accepts medical and nursing students on a continuous basis. These students are assigned for 3 to 5 half-days to learn diarrhea management. They receive unstructured, on-the-job training including patient management, slide shows, and independent reading.

Facilities

Experts drawn from within and outside of Ethiopia are used as course facilitators. In the beginning, experts supplied by WHO assisted, but during the last 2 years the center has drawn facilitators from specialists within Ethiopia. Particular effort is made to include staff from the other three DTUs in the country.

The Curriculum

The curriculum has evolved, being modified progressively by each course and by input from WHO and others. The overriding goal has been to design a training program that will ensure the production of a critical mass of health professionals and changemakers who will promote the correct management of diarrheal diseases in their respective institutions and beyond.

To this end, the curriculum is task-oriented and competency-based. Over two-thirds of the time is devoted to hands-on training. The remaining one third of the time, which consists of lectures, discussions, visits, etc., supplements the practical training.

We believe that the following features have made the training a success:

- It is an *intensive*, 10-day course during which participants devote between 8 to 12 hours a day to the course, and are not expected to engage in any other activity. The participants are truly a *captive audience*.
- Active participation in patient care and followup constitutes the most important component of the course. Each participant manages 6 to 10 cases, but also sees a much larger number being handled by co-participants. All patients are followed for at least 24 to 48 hours after discharge, and occasionally over several days. Facilitators supervise the participants and closely monitor their performance.
- Case presentation and discussion are also integral training components. At the end of each day, participants gather and tell each other about their cases. The purpose is to learn from each other and to reinforce or reject certain practices and habits. Controversial issues, for example problems of vomiting during ORS administration, feeding, use of drugs, use of the nasogastric tube, and parent health education are deliberately raised, discussed in relation to a case being presented, and thrashed out. No attempt is made to force participants to share their information, but they are encouraged to air their fears, share their previous practices, and make conclusions arrived at by persuasion. The role of the moderator is critical in these sessions.
- Liberal access to educational materials, audiovisual aids, and reprints is necessary to quench the "scientific appetite" of participants, particularly those from academia. WHO has been generous in providing these materials.
- Participants are selected to include a mixture and balance of various groups of health professionals, i.e., doctors and nurses, academicians and clinicians, clinical care providers and administrators and program managers. Such a mix greatly contributes to the likelihood that what is learned will be implemented.

Evaluation

Evaluation was built into the program design and included pre- and post-tests, informally collected observations of participant performance, and feedback questionnaires.

Followup of the national training program participants was conducted but not on a systematic basis. All MCH clinics and the children's outpatient departments of hospitals in Addis Ababa now have established an ORT corner and handle most patients coming to them. Three other DTUs have been established and have already started to provide courses.

Participants of inter-country training programs write occasionally to tell us that they have started a DTU. Apparently, some seven such centers have been established by graduates of the inter-country training courses. However, again to date, no systematic follow-up evaluation has been conducted.

Our unit has utilized forums of professional health associations and the mass media to disseminate relevant information. Teaching manuals for the management of diarrheal diseases have been translated into Amharic.

Our DTU staff have visited similar facilities in Alexandria and Bangladesh and were able to compare notes.

Research

Research is not a priority at the DTU. During the last few months, however, a project has been initiated to study the feasibility of the use of a cereal-based salt solution in early home therapy of acute diarrheal diseases.

Future Plans

Ethiopia has the following plans for the future:

- The DTU will continue to provide four national and two inter-country training programs.
- Attempts will be made to systematically infiltrate the curricula of training institutions, including medical, nursing, and health assistant schools.
- A system of evaluation will be refined to determine the impact of trainees on diarrhea management.

Health Professional School Training

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Rationale

To ensure the success of a control of diarrheal diseases program (CDD), it is essential that a considerable number of upper-level or professional health workers, physicians, nurses, and midwives be fully motivated and knowledgeable concerning appropriate diarrhea case management using oral rehydration therapy (ORT) when necessary. It has been observed that it is difficult to change the prescribing habits of professional health workers once these are set. To reach these workers after they have completed their basic training, it is, therefore, important to ensure that nursing, midwifery, and medical students learn correct diarrhea case management before graduation, while they are "captive" trainees.

The Philippine Experience

Nursing and Midwifery Training

In October 1986, the nursing schools, through the Association of Deans of Philippine Colleges of Nursing and with the support of the Department of Health, the Department of Education, Culture, and Sports, and WHO, convened several workshops throughout the

Philippines on "Strengthening CDD and Expanded Programs on Immunization (EPI) in the Nursing Curriculum." Subsequently, from February 15-20, 1988, a workshop was organized to develop syllabi for both EPI and CDD and to integrate these into the midwifery curriculum. In the Philippine setting, the midwives are the frontliners in health care delivery. A recent meeting with the officers of both the Nursing and the Midwifery Associations has shown that implementation has not been problematic, although structured monitoring cannot be done until the first quarter of this coming year.

The Medical Training

Since January 1985, a series of workshops involving deans and pediatric faculty of all 27 medical schools in the country has led to the formulation of problem-based, community-oriented competencies and has enhanced commitment to child survival strategies, including EPI and CDD programs.

In August of this year, an 8-day workshop on enhancing the teaching about diarrheal diseases in medical schools was held. Attendees included the chairmen of pediatrics and faculty members who oversee the teaching of diarrheal diseases in Philippine medical schools. At the end of the workshop, the attendees recommended implementation of a 90-day action plan by the involved medical schools. The schools opted to implement the following as immediate priorities:

- strengthening DTUs;
- training key people;
- obtaining the commitment and support of administrative officials, sought primarily through a special meeting with deans; and
- revising undergraduate teaching programs.

Subsequently, several meetings and consultations have provided followup to this medical school training.

The Need for a Diarrheal Training Unit (DTU) In Teaching Hospitals. Early on, it was the consensus of the group that medical schools need DTUs to provide more effective clinical teaching of diarrhea management. The presence of a DTU facilitates patient identification, correct case management, and supervision, including evaluation and monitoring. It can be the site for enhancing both clinical skills for appropriate case management and skills for communication, with students actually seeing their instructors practicing correct diarrhea management.

As repeatedly demonstrated, there is no alternative to learning diarrhea management by practical, hands-on experience. Medical schools should provide adequate clinical experience for students during their graduate years, usually during their clerkship. Skills and attitudes acquired by students in real patient situations are usually more meaningful, carry more impact, and are more lasting than those acquired in a classroom setting. Although this type of learning activity is more difficult to institute and requires more resources, the benefits more than compensate for the cost, time, and effort invested.

Teaching Methodologies. For the initial 90 days, the six medical schools are trying new and innovative teaching methodologies. These methodologies include case studies, case simulations, audiovisual presentations, role-playing demonstrations and counter demonstrations, readings and discussions, lectures and discussions, exercises and discussions, written exercises, and debates. The faculty feedback has been very encouraging, and the improvement in teaching has been noted to be quite palpable, as documented through student feedback. Since the school year in the Philippines begins in June, the medical schools have not yet been able to implement these changes completely. Time constraints, due to a limited number of hours allocated for diarrhea teaching, is an important deterrent. Most schools have only two hours to discuss diarrhea and another two hours for ORT.

Teaching Materials. The group concurred that the availability of teaching aids, such as printed materials, are essential during the training. The materials must be relevant and, appropriate, and sufficient copies should be available.

The Medical Education for Diarrhea Control (MEDIAC) materials were found useful and greatly facilitated the teaching-learning process. These materials are rated very highly by the users in terms of usefulness, relevance, and completeness. Users found them exemplary in the incorporation of innovative teaching methodologies that are applicable, not only for diarrhea teaching, but also for other subject matters.

Process to Bring About Changes (The Workshop). The workshop was used effectively to bring together people who had to be involved, getting them more involved, and, hence, instituting changes without too much pain or difficulty. The workshop permitted the participants to pinpoint their problems and work them out in the context of their resources.

Deterrents such as teacher resistance to change were not encountered. This was attributed to several workshops held prior to 1985, which emphasized the need for changes in the diarrheal diseases module and in other aspects of the pediatric curriculum.

Problems and Solutions for Medical Schools. A variety of problems were identified by the six medical schools. These problems and recommended solutions are summarized in Figure 1.

FIGURE 1	
Medical Schools Problems and Solutions	
PROBLEMS (ISSUES)	SOLUTIONS (APPROACHES)
Faculty (supervisors)	
1. Resistance to change	Convince faculty of the importance of ORT. Provide hands-on experience.
2. Lack of supervisors (instructors)	Recruit additional faculty. Provide additional incentives for the faculty.
3. Inadequate skills	Train medical instructors in suggested educational methodologies
4. Supervisors (instructors) giving different messages about rehydration, nutrition, and other aspects of management	Update supervisors on diarrhea management through publications, follow-up workshops, and other sources of information.
5. Inadequate time	Add more curricular hours to the training.
Training Resources/Needs	
6. Insufficient DTU materials such as clinical forms, supervisory lists, and equipment for mixing and giving ORS	Strengthen DTUs. Obtain support and funding. Promote the routine use of forms, clinical forms, patient progress forms, and supervisory lists. Make inexpensive equipment available.
7. Meager teaching materials such as handouts, audiovisual aids, pamphlets, and growth charts	Supply teaching aids and printed materials to medical schools.
8. Inadequate library facilities	Supply activity library; keep the library on mailing lists for relevant publications.
9. Inadequate numbers of cases due to large numbers of medical students	Carefully assign students to various areas where diarrhea patients may be encountered, such as the outpatient department, the emergency room, the gastroenterology and nutrition service areas, and the community. Assign students to other hospitals/clinics, such as San Lazaro Hospital, where diarrhea patients go.

PROBLEMS (ISSUES)	SOLUTIONS (APPROACHES)
10. Seasonal occurrence of diarrheal cases	Prepare audiovisual presentations of cases on video, slides, pictures, or posters. Use case studies. Use simulated patients.
11. Lack of evaluation and process monitoring	Conduct follow-up workshops for the six medical schools to plan for evaluation and monitoring with an advisory group.
Administrative Support	
12. Lack of commitment of administrators and other hospital staff	Reorient administration and other hospital staff to obtain commitment and support.
Refusal of administrators to keep patients during rehydration phase	
Resistance to assign space for an ORT area and to give other support	
13. Irregular supply of ORS	Ensure steady, adequate supply of ORS.
Sustainability	
14. Waning medical school interest, commitment, and efforts in teaching about diarrhea	Convene MEDIAC Steering Committee as often as necessary. Organize a strong advisory component. Sustain physician skills through CME, media support, etc.
Others	
15. Patient resistance to accept ORT	Seek mass media support. Develop community education.
16. Unavailability of funds/delay in release of funds	Solicit more donor support. Facilitate release of funds.
17. Lack of support from other members of health team: nurses, midwives, and pharmacists	Synchronize health worker training.

Summary and Recommendations

A successful CDD program is, to a large extent, dependent on the performance of health workers, particularly, the physicians. The Philippines has embarked on initiating changes in the curricular offerings of schools for nurses, midwives, and physicians. Efforts have been well-received, and plans are being implemented. It has been found that enhancing and sustaining the commitment and skills of the physician and other professional health workers can influence the success of a CDD program.

The following recommendations and lessons learned can be offered:

- The establishment of DTUs in teaching hospitals is necessary to enhance diarrhea teaching, provide hands-on experience, and facilitate appropriate management and supervision.

- The workshop is an invaluable and important venue to bring about change.
- There is no substitute for hands-on-experience involving real patients in diarrhea management to strengthen commitment to ORT.
- To be effective, teaching materials should be relevant, stimulating, interesting, and sufficient. To facilitate the teaching-learning experience, teaching methodologies should be innovative and appropriate.
- Administrative support from deans, directors, and other key people should be obtained as early as possible.
- All members of the health team, especially the nurses, midwives, nursing aides, and pharmacists, should be simultaneously oriented and trained.
- Physicians' commitment and skills, both for clinical management and communication, should be sustained and enhanced by providing opportunities for continuing medical education, constantly available resources for the clinical application of appropriate diarrhea management, and consistent support from their environment.
- There should be close coordination with national CDD program activities.

Efforts, Successes, and Failures

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 National Diarrhoeal Disease Control Programme
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Introduction

Nepal is a mountainous country located between China to the north and India to the south. In 1988, the population was approximately 17.5 million, with a per capita annual income of about US \$200. The health services are still inadequate to meet the needs of the large section of the population living in the country's vast rural areas. Infant mortality is estimated to be 111 per 1000 live births, and the life expectancy is 52 years.

Diarrheal and respiratory diseases are the major causes of death of children under 5 years of age. Nearly 98,000 children die annually, and most of these deaths could be prevented by providing simple health services to children who live, for the most part, beyond the most peripheral health institutions or health posts.

Oral Rehydration Therapy (ORT) Services

Nepal initiated the use of oral rehydration therapy (ORT) during the early 1970's with the introduction of an oral rehydration salts (ORS) packet produced in Nepal. Since then, the use of ORS has been emphasized at every level of health service—at central hospitals; regional, zonal, and district hospitals; health posts; and in homes through the efforts of village health workers.

The efforts remained incomplete, however, due to the lack of a national program that could concentrate specifically on ORS. Systematic progress began when a national control of diarrheal disease (CDD) program was established in late 1983.

With the establishment of the national program, ORT activity has taken a variety of forms. The basic emphasis has been on a tiered training for all levels of health workers. In addition, two new efforts have begun: ORT centers at 26 hospitals (1 regional, 3 zonal, and 16 district), and ORT

corners in 25 health posts. These centers and corners are different from the traditional service centers in that they are intended to provide training to mothers rather than simply providing the oral rehydration treatment. The health workers who provide these services include physicians, nurses, and auxiliary health workers in hospitals; and health assistants, auxiliary health workers, and assistant nurse midwives at health posts. In addition, there are village health workers (VHWs) assigned to health posts who also provide health education to families and basic health care at the home level. In addition to the VHWs, there are nearly 3,000 community health volunteers (CHVs), one for every 6 to 800 people in the country. The number of CHVs is expected to reach 40,000 within the next 3 years. ORT training is incorporated at all levels.

Training

Types of ORT Training Conducted

No single effort seemed adequate to meet the needs of the rural population. Efforts were therefore made to make ORS use successful by training people at various levels. Physicians, paramedical workers, teachers, scouts, volunteer workers, and civic leaders were included in training so that knowledge of ORT would ultimately be passed down to mothers.

Physicians and nurses working in various hospitals are brought to the capital city, Kathmandu, and trained for 6 days in the only children's hospital in the country. The training is conducted by senior pediatricians who work in this busy facility. In addition, selected physicians and nurses are sent to the International Centre for Diarrhoeal Disease Research, Bangladesh for a 2-week training course. The purpose of this more extensive training is to expose the physicians and nurses to a more practical situation where they can learn ORT in greater depth. Those completing this extensive training are expected to initiate such services in their own hospitals. Unfortunately, this has infrequently happened. Participants often initiate the service, but fail to maintain or sustain the effort.

The staff assigned to the ORT centers and corners are trained specifically in the management of those centers. For hospital centers, physicians are trained to supervise the center and to provide training to the personnel needed to staff the center. For health posts, the situation is different, because health posts in Nepal do not have beds. They are open for 5 to 6 hours per day, and provide outpatient care. To establish health post corners, the health post worker receives training in basic ORT and in educational techniques for mothers.

There are nearly 33 ORT centers and 25 ORT corners currently in Nepal, however, less than 25 percent of them are functioning. At the hospital level, ORS is used by mothers, but not correctly. Invariably the mothers will mix 1 or 2 teaspoons of the solution in a glass of water, and give it to the thirsty child. At the health posts, the success seems to depend on: 1) the personal interest of the health post in-charge; 2) the supervision and support from the district and region; and 3) the availability of the physical facility (some health posts do not have a permanent building). Although the present situation is discouraging, the importance of these centers and corners is such that the CDD Division will continue to attempt to make improvements by making more frequent supervisory visits. District level supervision is equally important, but at present most of the districts do not possess this capability, mainly due to lack of quality manpower.

Peripheral health facility workers, including those not involved with health corner activities, form a large group of workers who are in closer contact with communities and mothers than are hospital physicians. Thus, these workers must be prepared not only to provide ORT, but must also be able to train mothers in ORS and ORT use. These workers receive intense training, which includes instruction on the use of intravenous therapy for severely dehydrated children.

Initially, it was felt that the health post in-charge needed more extensive training than his subordinates. Training was done at the district headquarters where active cases could be seen. After this district-level training, the in-charge was expected to train the other workers in his institution. This type of training at the health post level was found to be ineffective. The in-charges were not felt to be adequately competent to carry out such trainings. Therefore, for the past 3 years, all the health post staff are now trained at the district level for 3 days. This has been found to be more effective.

Community-level training is also done through the training of community health volunteers, who have been part of the health system in Nepal for the past 10 years. Originally, the workers were called community health leaders, but the program has recently been redesigned. The new

community health volunteers (CHVs) will be women only. Community health volunteer staffing is planned for 27 districts this year, and within 2 years all 75 districts are to be fully staffed with CHVs. The CHV program is yet to be launched seriously. Whatever the ultimate outcome of the program, it is certain to improve the CDD program in that at least 40,000 mothers will be trained in ORT usage as part of the CHV training. Even if the mothers do not do anything, they will certainly carry the knowledge of ORS usage with them.

Training Methods and Followup

The training methods used make a big difference in the effectiveness of the training. Audiovisual aids are undoubtedly the best training device, but in Nepal they cannot be used at many of the training sessions. Each training session also tries to incorporate bedside teaching. Diarrhea cases are used as training modules, and participants are able to discuss ORT with the family member. In some seasons, cases may not be readily available. WHO teaching aids are used in many, but not all, trainings. Simple lectures with no simple practice sessions on ORS preparation or educational role plays are useless and should be abandoned.

Follow-up training has not been possible for all trainings. This area of training remains neglected. In areas where intensive ORS training campaigns have been conducted, there also have been some follow-up mini-surveys. These have been designed to see if mothers were taught correct ORS preparation and usage. Designed simply, with minimal questions, these surveys have provided useful information.

An evaluation of the ORS training of primary school teachers was performed in one district to determine the effect of that training. Both the trained teachers and the students they trained appeared to have more knowledge about ORS than untrained teachers and students.

Continuing Education and Quality Control

The primary-level trainings are to be completed in 3 years. Currently, small groups are given refresher training, and these refresher trainings are to continue for 10 years. Some of the approaches to develop and sustain the quality of ORT services are:

- collecting information on successes of various other institutions and incorporating those techniques;
- providing fellowships on the basis of the best performance of an institution or individual;
- offering awards of appreciation;
- providing information to health workers on recent advances in ORT in other parts of the world; and
- strengthening and sustaining the district supervision mechanisms.

Difficulties in the Training Program

One of the major difficulties in the training program is the lack of good trainers. It is possible to get good people and make them good trainers. However, there are difficulties with the decisionmaking process. This issue should be dealt with at a higher governmental level, with greater involvement of donor and assisting agencies. The lack of training facilities and modern audiovisual equipment are other major problems.

The Involvement of Traditional Healers in CDD Programs

Chief Sola Olalekan Atanda
The Asiwaju Awo of Lagos
Association of Therapists of African Medicine
Lagos, Nigeria

Inadequacy of Western Medicine in *Health for All by the Year 2000*

It is a known fact that western medicine alone cannot deliver *Health for All by the Year 2000*. This has necessitated the recognition of the contribution of the traditional healers in health care delivery programs. To make this involvement safe, the Federal government of Nigeria directed that a Board of Traditional Medicine be established in each state under the state Ministry of Health. Each board has linkages with the traditional healers practicing in the state, and at various times, each board organizes courses for the healers. The Board of Traditional Medicine, with the cooperation of the traditional healers, appoints a traditional medicine supervisor for each local government area to supervise the training and to report monthly to the board.

Also, some foreign agencies have always been organizing useful courses. The Pathfinder Fund of USA, for example, through the Ministry of Health and the Board of Traditional Medicine, has organized courses on traditional birth attendance and family planning. During these courses, which emphasize good hygienic practices, there has been considerable cooperation between the traditional healers and the western medicine practitioners. Traditional healers who have participated in these courses have contributed significantly toward improving the practice of traditional medicine in a more hygienic manner.

Traditional Healers' Support for ORT

As was revealed during the family planning course for the traditional healers in Nigeria, one of the major reasons why people in underdeveloped countries have several children is the fear of their children dying. The lack of a healthy environment, clean personal habits, and pure drinking water resulted in children under 5 years of age being attacked by diarrhea. Before any effort to improve their condition could be made, the children were overcome by dehydration and subsequently died. Their poor standard of living prevented access to expensive medicine. The nonchalant attitude of parents prevented them from consulting the traditional healers for early treatment.

The introduction of oral rehydration therapy (ORT), especially the salt-sugar solution (SSS), was a fantastic remedy. The therapeutic healing effect of salt is an age-old remedy recognized by traditional healers. Also, since salt is common in every home and sugar is available in most homes, SSS becomes an alternative to death. Several traditional healers that had family planning training, counseled various individual patients on ORT in an attempt to achieve sustainability of ORT for the 1990's.

Special Contributions of Traditional Healers to CDD Programs

The Traditional Healing Center can be described as a healing temple guided by strict laws. These laws can be termed as "Ifa" or "Cabbala," meaning oral sacred citation based on science of numbers. The laws contained the principles of traditional healing. The teaching of mothers and the general public about the control of diarrheal diseases (CDD) and better living programs involves the use of the aspect of traditional healing laws that teach cleanliness and condemn unplanned families. For example, the first pillar of Ifa Corpus—Ejiogbe—forbids dirtiness and unplanned pregnancies. It states that good luck does not move near dirtiness, and unplanned pregnancies attract death. This teaching is consistent with the control of diarrheal diseases.

The normal improved system of preparing traditional medicine, which makes it void of viruses and bacteria, involves the following steps:

1. Cleansing of sufficient roots and herbs for a round of intake.
2. Boiling the hot concoction to make sure that all germs are totally killed.
3. Cooling the medicine. While cooling, the medicine must be well-covered and well-sifted.
4. Taking the medicine with a clean cup. The dosage must not be exceeded.
5. Adding alligator pepper to the toasted concoction for total disinfection.
6. Using a well-cleaned (often transparent) container for the concoction.
7. Preparing and carefully labelling items for storage.
8. Sterilizing the instruments in use, i.e., the mortar and pestle, knife, and blade.

Cooperation of Other Traditional Healers in CDD Programs

Apart from the motivation through the teaching of Ifa and the activities of the Board of Traditional Medicine, my activities as an important traditional chief—the Asiwaju Awo of Lagos, a learned Ifa priest—as a supervisor of other traditional healers in one of the local government areas, and as the secretary of the Association of Therapists of African Medicine coupled with the cooperation of several other traditional healers, has resulted in CDD programs that are rapidly gaining ground. As expressed above, birth control devices were regarded as negative medicine. Since most patients go to traditional healers in order to have children, birth control medicine is regarded as taboo. Some Ifa references that forbid unplanned pregnancies were preached to my colleagues, and, during my supervisory work, I always provided sound reasoning for condemning reckless birth. Also, discussions during the Pathfinder courses and training programs have contributed significantly in gaining the support of several traditional healers. The use of ORT was finally accepted by a majority of the healers after we made them realize that they lose nothing by adding knowledge to their own knowledge and experience. The results of the test use of SSS was adequate proof of the efficacy of ORT.

Finally, my founding of a new healing temple called the Healing and Teaching Temple of African Faith (HATTAF), which exhibits all the aspects taught during the traditional birth attendant and family planning courses with special emphasis on hygiene, birth control, and ORT, is a living example that has been created for emulation. The HATTAF, which is the agency for the development of African traditional affairs, a trado-medical center, and the international temple for better living programs, now serves in enlisting the support of other healers to follow useful national and international medical programs. A type of center like HATTAF has direct communication with all rural dwellers and a vast majority of people with a traditional inclination. Such a temple, if provided sufficient funds to maintain enough staff and mobility, is an unparalleled strategy for further support from traditional healers and helps ensure the sustainability of ORT and the like in the 1990's.

Recommendations

- Traditional healers should be encouraged to establish an ORT branch in their clinics where only their training should be provided.
- CDD program clubs should be encouraged, as ideas gain popularity very quickly through clubs and societies.

- Different classes of the community should be trained so as to make the CDD program more popular. For example, if rural places are approached through the traditional healers, more common people will accept the ORT treatment.
- Adequate remuneration for traditional healers and supervisors is a vital ingredient for better sustainability of ORT because social insecurity does not allow an average African to embark on non-pecuniary, profitable ventures.

Summary

In conclusion, since the Nigerian government recognizes the usefulness of traditional healers in health care delivery and organizes them in such a way that makes them useful and safe, it is recommended that other countries organize their traditional healers to be under one umbrella through which programs like CDD can flow well to the masses. If the government organizes in such a way, the trained health worker can train other important persons in the society, such as chiefs and traditional rulers, and this facilitates the linkages between orthodox and traditional medicine.

Panel 3

**Communication
Strategies**

Opening Remarks

Mr. Mario M. Taguiwalo
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Department of Health
Manila, Philippines

Welcome to the panel session on communication strategies. The descriptive subtitle of this session is, "Communication and Sustaining ORT Use in National Control of Diarrheal Disease (CDD) Programs." In other words, this panel is devoted to discussing how the purposeful provision of information to people plays a role in sustained oral rehydration therapy (ORT) use within the context of national efforts to control diarrheal morbidity and mortality. At this time, it is useful to remind ourselves that this panel is one among seven panels focusing on various aspects of ORT and CDD. All of these seven aspects are inherently—one may even say organically—related to each other. Thus, it is expected that our discussions will link with the subject matter of the other panels. It is also recognized, however, that communication strategies in CDD are an important and specialized enough subject to merit separate attention. Thus, it is also expected that we shall have sufficient ground to cover independently. This character of being separate but interrelated should guide us in our discussions, just as it has guided us in our actual experiences in applying communication in the field.

The Role of Communication in Health Programs

To begin, it may be instructive to review the generic role of communication in health before discussing its role in ORT and CDD. Health interventions basically consist of three thrusts: the provision of health services; the reduction of health risks; and the creation of a climate favorable to health goals. Within these three broad areas of action, one can find the various specific initiatives being pursued by health authorities internationally and nationally.

Viewed this way, one can readily see that communication can be a tool to be used in the following ways:

- to influence the use of health services and the action of health providers;
- to modify health-related behaviors of individuals, households, and communities; and
- to influence other sectors in society with an impact on health concerns.

In CDD, these communication roles have been specified accordingly as follows:

- creating demand for ORT and improving educational skills of health providers;
- teaching home management of diarrhea and prevention of diarrhea at home; and
- advocating CDD-supporting actions such as wider, safe water coverage; improved nutrition; and better education.

Cast in these terms, communication can then be seen not merely as an add-on or a nice-to-have feature, but as an inherent and vital element in CDD and other health interventions. It is readily apparent that communication is a technology that effectively and efficiently transmits health messages (knowledge, attitudes, and skills). What is not readily recognized is communication's capacity to reshape the way we think and plan health programs. Communication is easily seen as a way for structuring the flow of information from providers to beneficiaries, but it can as easily be seen as a way for structuring the flow of information from beneficiaries to providers. Communication is a way to answer some of our questions, but it is also a way to raise new questions that provide valuable insights to our problems.

Examples of Experience

Today's panelists provide some of the insights and lessons gained from experience in several countries.

- Mr. Waliur Rahman, Director of Marketing of the Social Marketing Project in Bangladesh, will present a paper on promoting the sale of ORS in Bangladesh;
- Mrs. A. M. Rakhella, a health educator from Lesotho, will discuss building a communication capacity to support CDD in Africa;
- Dr. Patricio Barriga, a communication specialist and rural nonformal educator serving as HEALTHCOM resident adviser in Honduras, will present a paper on folk media as an alternative mode to health education; and
- Dr. Farag Elkamel, Director of the Center for Development Communication from Egypt, will make a presentation on using communication to sustain program impact.

These presentations are meant to be illustrative, not exhaustive. The scope, scale, and diversity of communication efforts in CDD have expanded so tremendously that our accumulated experience has outstripped our capacity to contemplate them exhaustively. Thus, it is hoped that the discussions immediately after each presentation, as well as the general discussions after all the presentations, will serve as forums for contemplating the more important and urgent issues of our subject.

Assessing and Assuring Sustainability

While this session is devoted generally to communication in CDD, it is also expected to raise and consider the issues of sustainability. I think the questions we seek to answer are: How sustainable are communication efforts in the context of national CDD programs? and How do we improve or assure its prospects for sustainability?

The assumption that we shall not consider further beyond raising it to our awareness, is that as long as diarrhea remains a major public health problem, efforts to control it will be sustained by individual countries. It is in the context of a sustained response to the diarrhea problem that we raise the following issues related to sustaining communication efforts in ORT and CDD.

The first issue concerns the proper place of communication in national CDD programs. Between the two undesirable extremes of a program overly dominated by communication on one hand and a program that treats communication merely as an afterthought on the other, there is a world where communication closely interacts with other program elements, sometimes supporting and sometimes leading other program initiatives, and where communication is utilized by health administrators as part of their armamentarium for intervention and problem solving. The key factor that can shape how communication is sustained over the long term is the proper definition of its place in the national program, as this program evolves in response to changes in national conditions and perceptions.

The second issue concerns technical sustainability. How much real value in ideas and inputs does communication add to program outcomes and impact? Does communication push CDD forward? Thus far, the situation is very dynamic and there is plenty to appreciate. Good ideas abound, and fresh approaches are enlivening national health programs. But it seems that not enough opportunities provide productive sharing about what works and what doesn't work; what works over long periods and what works only for the moment. Communication does contribute to progress in ORT and CDD, but the various elements of this contribution require constant reexamination.

The third issue can be called political sustainability. How much political support does communication in CDD have, relative to other competing concerns—within the broad CDD effort, within the broader health concerns, and beyond health concerns? Health services provision has

always been high in the national political agenda, and health services to respond to diarrhoea has also been important. Thus communication supportive of better utilization of health services is an obvious priority. In this sense, ORT is secure. But clearly, communication can play an important role in diarrhoea prevention and advocacy related to diarrheal control. It remains to be seen if this can move forward given the traditionally low priority given to prevention versus cure.

The fourth issue concerns economic sustainability. How does communication's impact in CDD sustain the cost of achieving such an impact? In general, the issues here concern how countries can set up "pay-as-they-go" communication efforts similar to how private businesses sustain their market-oriented communication, how countries transform foreign-assisted efforts into nationally supported programs, and how foreign assistance can be encouraged to rationalize, expand, and extend their support. The national health systems are only now grappling with the cost-benefit considerations of communication in health.

The final issue is organizational sustainability. How can we assure the continued development of communication professionals within national health programs like CDD? This issue seems to be the most critical because it shapes how the other issues will unfold. Health administrators need to be comfortable with communication, just as communication specialists need to be familiar with the culture of health services. Mass media people have to work closely with face-to-face communication practitioners. The creative people should dialogue constantly with the technical people. And communication projects have to be managed with the discipline of the bottom line, in terms of reduced morbidity or mortality or in terms of increased practice of desirable behavior.

Each of these five issues relates to each other, and these are merely some of the many issues that relate to this subject. I hope that the papers that follow and your valuable contributions in the discussions will make our presence here today a valuable experience.

Promoting the Sale of ORS Through Pharmacists

Mr. Waliur Rahman
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Social Marketing Project
Dhaka, Bangladesh

Introduction

The Social Marketing Project (SMP) of Bangladesh was established in 1975 under a contractual agreement between the government of Bangladesh, Population Services International USA, and the Agency for International Development (A.I.D.), which provides funding for the project. The project's primary objective was to supplement the Bangladesh government's efforts to reduce the fertility rate. In its 13 years of operation, SMP has significantly contributed to the national family planning program through extensive distribution of its products and the utilization of effective communication and research strategies.

SMP's oral rehydration therapy (ORT) program began in 1985. The program had two objectives:

- to increase consumer access to oral rehydration salts (ORS) by marketing its own brand, *ORSaline*, through existing commercial distribution channels utilizing its own field force; and
- to increase treatment rate and effective use of oral rehydration products, including home solutions, through an extensive educational campaign directed both at the consumer and provider levels.

This paper focuses on only one aspect of SMP's ORT program—the aspect which is educational-cum-motivational in nature and directed at the provider level.

Definition of Pharmacists

Before we elaborate on the approach, we need to define the term "pharmacist" in the context of our program. Graduate pharmacists employed at the pharmaceutical outlets are almost nonexistent in Bangladesh. For our program, we define a pharmacist as any nonmedical graduate involved in prescription and/or dispensing of medicines from a pharmaceutical outlet.

By far, the largest group in this category is the rural medical practitioners (RMPs) who provide medical services to more than 75 percent of Bangladeshi people. Pharmaceutical outlet salesmen/owners, although fewer in number, also constitute an important influencer group, particularly for people living in semi-urban areas. Much of SMP's resources allocated to educating influencers is thus targeted to these two groups of providers.

Creating and Sustaining Interest in ORS Among Pharmacists

Since SMP markets its own brand, *ORSaline*, much of its efforts in terms of brand support is directed at convincing pharmacists to "push" this brand. The primary incentive for traders to push a product is of course the trade margin offered. Although *ORSaline* sachets may not bring much of an income, the return on investment is relatively high (18.4 percent). In addition, extensive mass media communication support has resulted in increased ORS sales through pharmacists. High volume sales induced by mass advertising have therefore been vital in increasing and sustaining interest in ORS among pharmacists.

Educating Pharmacists

The SMP staff are well aware that increasing the treatment rate with ORT does not ensure continued usage unless there is a clear understanding among both parents and providers of the importance of rehydration and of diarrheal disease management. The project's mass educational campaign, which accounts for nearly 70 percent of the ORT budget, is aimed at making parents informed users of ORT. At the same time, SMP has been actively involved in educational programs directed at the provider level. Training is provided through two primary methods:

- the educational seminar; and
- mailings to pharmacists and RMPs.

The Pharmacist Educational Program

The SMP has been conducting 1-day, educational seminars for pharmacists all over the country since October 1986. The initial phase of the program was targeted to salesmen/owners of pharmaceutical outlets located at the district/town level. To date, about 7,000 of such pharmacists have been trained, and the phase is near completion.

Each seminar is divided into two sessions: a pre-lunch session, which deals with issues relating to ORT and diarrheal disease management; and a post-lunch session, which focuses on contraceptives.

Although the program broadly covers the basic issues relating to ORT and diarrheal disease management, special emphasis is given to the following aspects:

- The objective of ORT is to replenish the loss of salt and water from the body and *not* to stop loose motion.
- Adequate volume and persistence is essential for achieving the treatment objective with ORT.

- Continued breastfeeding for infants and proper nutrition are essential during and after diarrheal episodes.
- Antibiotics and antidiarrheals are of no use in normal episodes and may have adverse effects on health.
- Homemade fluids are as effective as ORS, particularly at the initial stages of dehydration.
- Severe dehydration requires immediate referral to a qualified health practitioner.

The pharmacist educational program is conducted by a training team employed by SMP. This team consists of a training specialist who conducts the program and two training coordinators who make all necessary arrangements. The seminar is participative in nature. A 20-minute film on diarrheal disease management is also shown.

As an incentive to attend the program, each pharmacist is given a transportation allowance, lunch, and snacks. Each pharmacist also receives a folder containing a booklet on ORT, *ORSaline* prescription pads, a product sample, an *ORSaline* glass measuring 250cc, and small gifts like pens, key chains, etc. A certificate for attending the seminar is given to each participant.

At the early stage of the program, a study was conducted to measure the impact of this intervention on knowledge and attitude towards ORT and diarrheal disease management. Findings from the study showed very positive results and also led to the final development of the curriculum. In fiscal year 1989, SMP will undertake an observational study to evaluate the impact in actual practice of the pharmacists.

Although a half-day program on ORT can only be expected to cover the "tip of the iceberg," its impact on morale is significant. By providing much needed recognition to this group of people, we have increased their enthusiasm. With proper reinforcement, we believe that it will be possible to sustain this excitement and thus benefit from it.

Mailings to Pharmacists and Rural Medical Practitioners

Since 1986, SMP has been using mailings as a tool for creating interest and providing information on both contraceptives and ORT among hard to reach RMPs. This year, mailings are also being used as a reinforcement tool for pharmacists trained in the 1-day educational programs.

About 75 percent of rural Bangladeshis rely on the RMPs for their medical services. Although there is no organized list of RMPs in the country, it is estimated that there are about 100,000 currently practicing. Through contacts with various organizations and societies, SMP has been compiling a list since 1985. The listed RMPs are periodically mailed a packet containing a product sample (*ORSaline*), a booklet on ORT, and some gift items. So far, the approach has motivated RMPs, acknowledged the RMPs' role, and provided basic information on ORT and diarrheal disease management. Future mailings will address more specific areas of concern and recommend specific actions.

In early 1987, for the first time in Bangladesh, SMP undertook a mail survey to evaluate the impact of the mailing on RMPs' knowledge and reported practices. Responses were tabulated against those that were not mailed. Among the experimental group, the survey showed an increased awareness of ORS, the need for continuous breastfeeding and proper nutrition during and after diarrheal episodes; and the need for hospitalization for episodes with serious dehydration symptoms. Two areas where the mailings showed little or no effect were in correcting the misconception that ORT stops loose motion and the use of antidiarrheals for general episodes of diarrhea. These areas have thus received greater attention in programs directed at the provider level.

Mailings thus seem to be an effective, low-cost medium for creating and sustaining interest among a large pool of health providers that significantly shape rural health practices.

Conclusions

Increased demand for *ORSaline* and increased enthusiasm among pharmacists and RMPs are the two major direct benefits that resulted from these programs. There is evidence to suggest that the sale of other ORS brands also improved. However, little is known of SMP's impact on the dissemination of correct and useful information to the clients. The first follow-up study of diarrheal morbidity and a treatment survey will provide valid indications of the contribution of such programs to the goal of achieving the effective use of ORT.

The following were significant lessons:

- With proper planning and incentives, both intrinsic and extrinsic, it is possible to implement a well-organized program among a widely-dispersed group of providers.
- "Making them feel important" has been one of the most significant outcomes of these programs. Recognition paves the way for greater acceptance and internalization of a new concept such as ORT.
- There is an increased need for periodic evaluations to measure changes in practice resulting from these programs. This has been a major weakness of our program, and efforts are currently being directed towards that aspect.

I offer the following recommendations to other CDD programs:

- Make a packaged program. Emphasize periodic evaluations to monitor changes in practice. Modify the program accordingly.
- Appeal to the target population's ethical responsibility. Recognize the group's important role in improving the health of the masses.
- Use cost-effective media such as periodic mailings to create and sustain interest. Provide small gift items for added interest.

Building a Communication Capacity to Support CDD in Africa: The Lesotho Experience

Mrs. A. M. Rakhethla
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Maseru, Lesotho

The Lesotho Control of Diarrheal Diseases (CDD) Program is encouraging mothers and grannies to change the ways they treat diarrhea in their young children. The program, in its 5-year plan, sets out a series of measurable, behavioral targets with a specific time frame.

Adopting the HEALTHCOM Methodology

The Health Education Unit (HEU) is working in partnership with the CDD Program to promote more effective diarrhea management behaviors. To give the best support to the CDD Program, the HEU has taken up the HEALTHCOM communication methodology. The HEU has been impressed by the behavior changes achieved in other developing countries using the HEALTHCOM techniques.

With assistance from the HEALTHCOM project, the HEU has been working over the last two years to build its capacity to promote sustained behavior change in target populations. As it has embraced the HEALTHCOM methodology, the HEU has realized and acted upon many initiatives needed in the HEU and the Ministry in order to build this kind of capacity.

Program Initiatives

One of the earliest initiatives was to conduct a literature search for research reports, evaluations, papers, and articles related to diarrhea, oral rehydration, and the cultural and traditional ways diarrhea is viewed and treated. This was followed by a knowledge, attitudes, and practices (KAP) study which took an in-depth look into the current practices of mothers, grannies, and health workers. The study indicated that the following steps are among the most essential for better diarrhea management:

- Promote, as the treatment of choice and as a supplement to less effective home fluids, a solution made from oral rehydration salts (ORS), to be used to rehydrate a child. This should be promoted instead of the withholding of fluids.
- Improve mothers' mixing accuracy of homemade, sugar-salt solutions where ORS is not yet available.
- Encourage mothers to continue breastfeeding during diarrheal episodes instead of stopping.
- Encourage rehydration at home instead of visits to traditional healers.

One of the most surprising findings was that mothers recognize eight different kinds of diarrhea, ascribe different causes, and have different treatment regimes for each kind. This was not common knowledge in the nursing or medical communities in Lesotho. Mothers had more elaborate knowledge of diarrhea than the medical people or the health educators!

Qualitative KAP studies are very important for the success of the HEALTHCOM methodology, and such studies are now a regular part of the HEU's approach to message design.

The KAP study also revealed that while a very large percentage of mothers was aware of oral rehydration therapy (ORT), there were wide differences in mothers' practices. Much of this was subsequently traced to health education activities carried out by different organizations over time, each with different formulas for rehydration solutions. To bring greater congruence in knowledge and practice, the HEU, together with the CDD manager and several medical experts, carefully prepared, pre-tested, and disseminated a set of standard health education messages about ORT to be used by *all* health educators in the country. Every ORT promotion activity—basic training, continuing education, school curricular materials, face-to-face teaching of mothers by health workers, teaching aids, radio programs, and graphic and printed materials—is based on the standard messages. The HEU is making a concerted effort to ensure that mothers and grannies are hearing the same information from every source.

One of the most important keys to the success of the HEALTHCOM methodology is face-to-face teaching and motivation of mothers and grannies by health workers. What the health workers teach *must* be congruent with messages disseminated by the mass media. Therefore, one of the HEU's primary initiatives has been to participate vigorously in the Ministry's continuing education program for all persons in the health care delivery system. Medical doctors, nurses of all grades, pharmacy technicians, village health workers, and traditional birth attendants have been included. The greatest attention has been given to a group of 70 health service area trainers who, in turn, train clinic and hospital staff and village health workers throughout the country. Improving their knowledge and teaching skills builds the capacity to sustain communication support for CDD.

Simple tests of health workers' knowledge and skill in ORT revealed specific deficiencies. The emphasis in training has been on skills, but it has also included teaching techniques. The HEU knows that these health workers are the backbone of the communication strategy.

To reinforce the face-to-face teaching and motivation, the HEALTHCOM methodology calls for print and graphic materials as well as radio programs. The health education materials

developed to date include a pamphlet for illiterate mothers, teaching aids for health workers to use, and supporting radio programs.

Another feature of the HEALTHCOM methodology is frequent, simple tests of the communication effectiveness of materials under development. This is part of a set of ongoing monitoring activities. The CDD materials were extensively pre-tested on mothers and grannies as well as on the health workers who were going to use them. The HEU staff were rather surprised by the communication mistakes they would have made had they not pre-tested the materials. Pre-testing is now a standard step in the HEU's method of developing materials.

Because of added steps such as qualitative research and pre-testing of materials, the HEU has discovered that the HEALTHCOM methodology is more labor-intensive than what was used before. Therefore, the HEU has increased its professional staff in order to be able to sustain its communication capability. Several techniques were used. Two "borrowed" positions were brought back. Cases for five new staff positions were made and argued successfully. One intra-ministerial transfer of a trained health educator who was working elsewhere was made. The HEU stayed away from using donor-funded positions, except in two cases. Two U.S. Peace Corps Volunteers with specialties in graphic design and advertising/marketing were brought in to train staff and to cover positions while Lesotho staff were being trained. Second, a position for a new kind of function in the HEU—social mobilization or community participation—is being funded by UNICEF for four years so that the HEU staff can be trained on the job. Not counting the Volunteers, the size of the HEU professional staff nearly doubled.

Future Efforts

It is becoming clear that an improvement in the organizational structure of the HEU is necessary. The previous structure, where everyone reported to the chief health educator, has two serious constraints. There are now too many staff for any manager to adequately supervise and support. Even more importantly, the success of the HEALTHCOM methodology to promote behavior change is based on the coordinated use of several communication media. In the old structure, the chief health educator would have had to provide the coordination function, not only for CDD, but for 14 other health topics. The chief probably would be a bottleneck in the flow of work.

The HEU needs a different organizational structure and management system which, among other things, provides an environment in which the HEALTHCOM methodology can thrive. This is essential to the HEU's ability to provide sustained communication support to the CDD Program. The new structure toward which the HEU is working delegates defined responsibility and authority to a team of mid-level managers. The team includes information, education, and communication (IEC) coordinators for logically grouped public health problems, the print and graphics supervisor, a radio production coordinator, and the social mobilization coordinator. Joining this team of HEU staff are the CDD manager, the heads of the Ministry's programs for continuing education and village health workers, and a representative of the Private Health Association of Lesotho. The team designs, implements, and monitors annual *programs* based on mutually reinforcing health communication support activities. The programs include communication "campaigns," but they are components of long-term communication support strategies.

In order to build communication support capacity, the HEU is in the process of training the staff in all of the elements of the HEALTHCOM methodology. Training to date has included:

- social marketing of the Ministry's health programs;
- development of communication with an emphasis on radio;
- qualitative research techniques (e.g., KAP studies);
- materials pre-testing and refinement;
- simple evaluation methods; and

- survey research procedures to establish initial behavior and knowledge baselines and, eventually, to measure communication impact on knowledge and behavior.

Additional training is planned to cover:

- instructional materials development for the Ministry's basic and continuing education of health workers at all levels;
- organizational development and management techniques;
- use of computers and laser printers for graphic design; and
- radio production skills, especially radio "spot" production and production of "magazine" format programs.

To develop the HEU's capability to provide sustained communication support (and to respond to the growing amount of work it is being asked to do), the unit is investing in staff productivity. Training and work management systems are two kinds of investments, but the unit is investing in the following equipment as well:

- a computer, a laser printer, and desk-top publishing software;
- more sophisticated audio recording and editing machines;
- production-grade photocopying equipment;
- an in-house off-set press and
- duplication equipment.

A final set of initiatives is being taken to make communication support for the CDD program sustainable. The HEU is working to develop, strengthen, and maintain functional and organizational relationships with the parts of the health care delivery system that are important for the success of the CDD Program. Reference has already been made to the partnerships with the CDD manager and her program and the Ministry's Continuing Education Program for all health workers, including doctors. In addition, the HEU has taken the following actions:

- assisted the Ministry in developing and disseminating an ORT policy which, among other things, clarified what the HEU should promote;
- worked with the local ORS manufacturing plant to plan increased production, design new ORS packet labels, and set production targets based on HEU communication strategies to rapidly boost demand for the ORS product;
- worked with the drug distribution system to train staff in estimating needs for packets in a rapidly rising demand situation;
- maintained a cooperative working relationship with the Private Health Association of Lesotho, which operates half of the health care facilities in the country; and
- developed teaching materials with the National Curriculum Development Centre.

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Folk Media: An Alternative for Health Education

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 Resident Advisor
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 Academy for Educational Development
 Tegucigalpa, Honduras

There is nothing that can be taught to a man; all we can do is to help him discover it within himself.

Chinese Saying

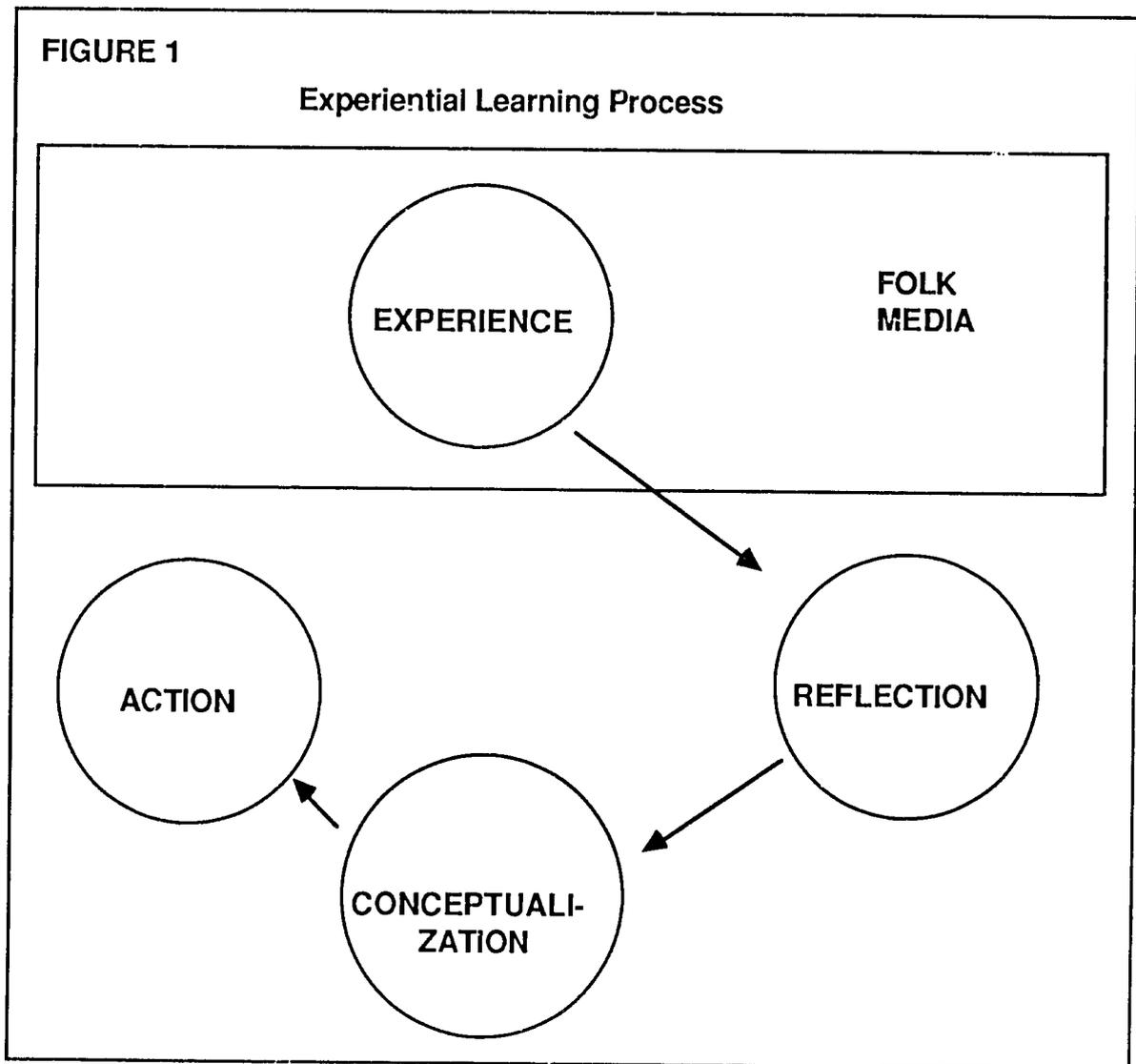
The HEALTHCOM project in Honduras has continued to explore one of the oldest ways of communication: that which we now call "folk media." Folk media is the authentic, common, face-to-face means of interaction, which not only facilitates a more horizontal relationship, but more importantly, enables the community to create and recreate their reality.

Two years ago the Metropolitan Health Region in Tegucigalpa, Honduras initiated an effort aimed at developing the expressive potential of mothers in slum areas. There, heroic women, who are raising their children against all odds, are now learning to solve their health-related problems through organization and participation. This is possible thanks to a series of material-developing activities sponsored by community midwives, health volunteers, and promoters.

- *Community Newspaper.* Newspapers and small posters printed on a handsome mimeograph serve as an important communication medium that provides relevant and timely information. The mimeograph costs between US \$1.50 and \$2.00 to make. The newspapers also provide new readers the opportunity to practice recently acquired literacy skills and stimulate interpersonal communication, which is important for health education.
- *Puppet Theater.* Puppets are animated objects that open new possibilities for communicating ideas that sometimes embarrass mothers. Puppet theater also has been shown to be very useful in providing feedback to mothers, especially when they fear criticism. Mothers create their own puppets and scripts. The puppet shows serve as "learning experiences" that stimulate reflection and conceptualization.
- *Cardboard Television.* A cardboard box with an opening simulating a television set and a roll of paper that is pulled through the opening, shows a sequence of drawings that tell a story or describe a process. Audiences appear captivated, and eagerly await what is going to appear next on the screen.

All of these learning resources and many others, like drama, games, simulations, legends, anecdotes, and storytelling, serve as learning experiences in the context of what we call

"experiential learning," an inductive approach to education (see Figure 1). Once the group has participated in the learning experience, the reflection phase takes place. This is when the group identifies and clarifies perceptions and feelings. Then, the "conceptualization phase" provides the opportunity to define, interrelate, and generalize. The ideas presented are then processed and new ideas emerge.



The last stage is the action stage, which is the application of the new ideas and concepts. It includes new trials and the practice of particular skills and behaviors.

The question is: Why folk media now, when mass media has proven to be so effective? The answer is that mass media, while being very efficient, is not *complete* communication. It needs to be complemented by person-to-person communication in the community. Folk media plays a particularly revitalizing role in the "institutional" stage of HEALTHCOM. It allows the community as well as health personnel to express their thoughts, feelings, and desires in relation to action. This will help insure that community members will better understand and be more committed to new ideas and practices for the long term.

Communication Strategies to Sustain ORT Program Impact

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It must be stated at the outset that the most important factor in helping to sustain the impact of an oral rehydration therapy (ORT) program is the fact that we are dealing here with a good product—oral rehydration salts (ORS). This product saves lives, is easy to prepare and use, and its very few side effects result primarily from misuse.

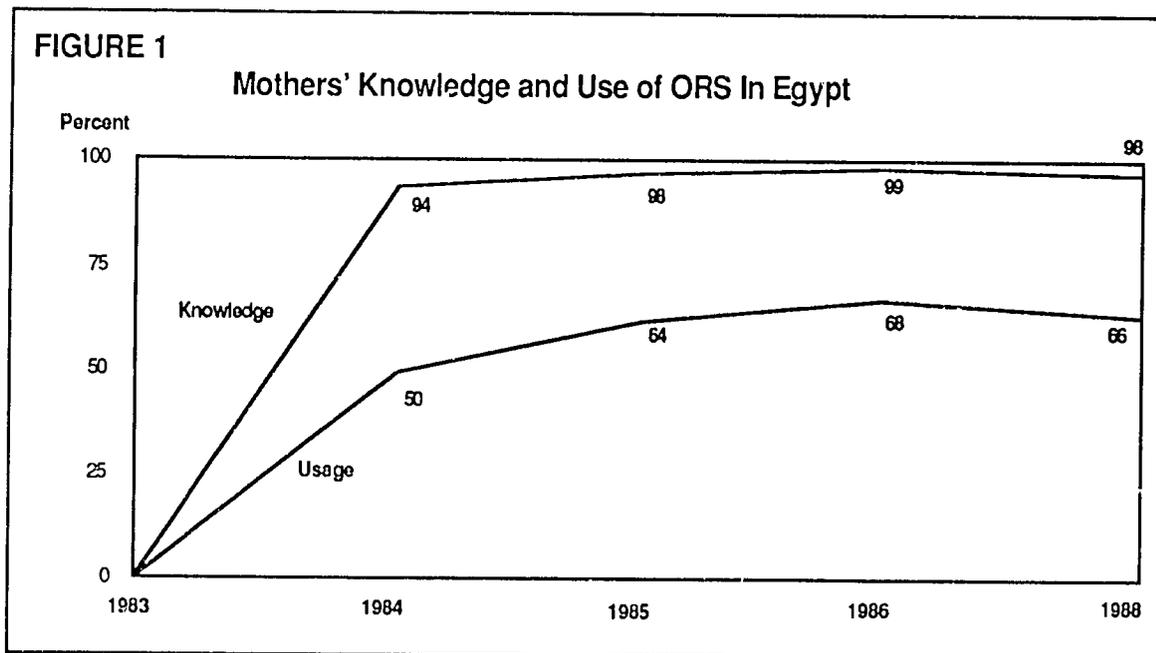
The second important fact to keep in mind is that the factors that help promote ORT successfully are, more or less, the same factors that help sustain the impact of an ORT program.

The following three conditions have to be satisfied in order to help the successful introduction and sustained use of ORT. First, the concept of ORT has to be institutionalized in mothers' hearts and minds. They have to know about ORS, how it is used, and how it works (i.e., why it is good). Second, health providers have to accept, support, and promote ORS. Third, ORS itself has to be made conveniently available to consumers at an affordable cost.

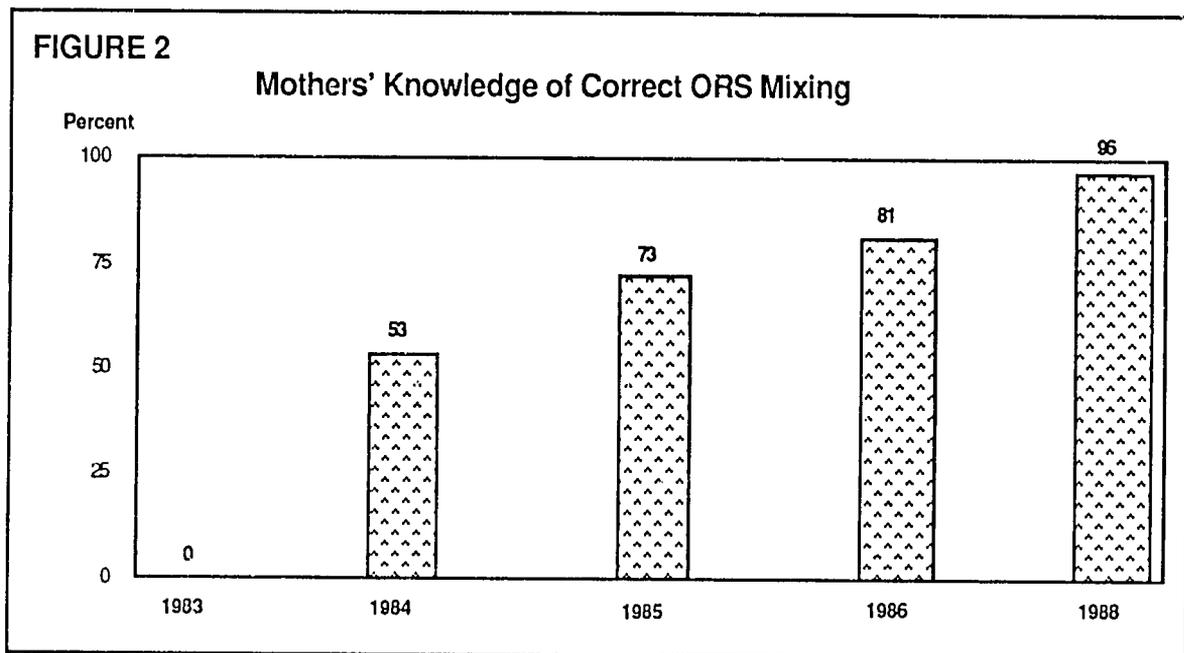
I am not aware of any ORT program that succeeded or was sustained in the absence of one of these three main factors. Imagine, for example, a program where: (a) ORS is conveniently available, mothers are persuaded to use it, but health providers are against it; (b) ORS is conveniently available, health providers advocate it, but mothers are not convinced to use it; or (c) both mothers and health providers are convinced, but ORS itself is not available, too expensive, or difficult to find. Taking the Egyptian ORT program as an example, we can see how these three factors have worked together to introduce and sustain ORT.

Mothers' Knowledge and Use of ORS

Knowledge and use of ORS have dramatically increased through promotion, which utilized communication research and creative arts in planning, developing, and evaluating a continuously evolving, multi-media campaign between 1983 and 1988 (see Figure 1).



Knowledge of ORS has increased from 3 percent of mothers before the program started in 1983 to 98 percent today. Use of ORS has also increased from 1.5 percent in 1983 to 66 percent in 1988. On the other hand, knowledge of correct mixing of ORS was, of course, almost nonexistent before 1983, since knowledge of ORS itself was negligible. Primarily through mass media, and particularly television, knowledge of correct ORS mixing has increased, as indicated in Figure 2.



This is particularly important because mass media were thought in the past to be influential only in raising awareness, but not in teaching skills or causing behavioral change. The Egypt ORT communication campaign, which relied heavily on mass media, has proved that mass media could indeed teach skills and change behaviors. Table 1 is quite interesting, because it shows that mass media not only teach skills and change behaviors, but also help person-to-person communication develop over time as a rather permanent source of knowledge.

TABLE 1
Sources of Egyptian Mothers' Knowledge of ORS

	1983	1984	1985	1986	1988
Television	—	50	79	80	92
Health Providers	—	40	66	59	83
Informal Contact	—	3	11	11	26

Notice that all three main sources of information on ORS keep getting stronger over time. The source that witnessed the greatest increase over the life of the campaign was person-to-person informal contact, since it increased from being a source of information for only 3 percent of mothers in 1984 to becoming a source of information for 26 percent of mothers in 1988—almost a nine-fold increase. The point here is that no program effort was planned in this aspect of communication. Thus such an impressive increase can be interpreted to mean that as mothers were convinced, primarily through mass media and secondarily through contacts with health providers, and as more and more women learned and used ORS successfully, they began to advise others to use it.

Persuading Health Providers

Back in 1983, before the media campaign and before thousands and thousands of health providers were trained, there were a few pioneer physicians who were trying to promote ORS. One of these physicians prescribed ORS to a moderately dehydrated child. When the child's father was asked by the pharmacist to pay only 45 piasters (equivalent of 20 cents) for a box of ten ORS packets, he suspected something was wrong with the doctor's prescription, and took his child to another well-known physician who charged him 15 pounds and prescribed a list of expensive drugs for which the father paid another 15 pounds in the pharmacy. Before he even went back home, the father rushed into the first physician's office to show him what "real doctors" wrote in their prescriptions.

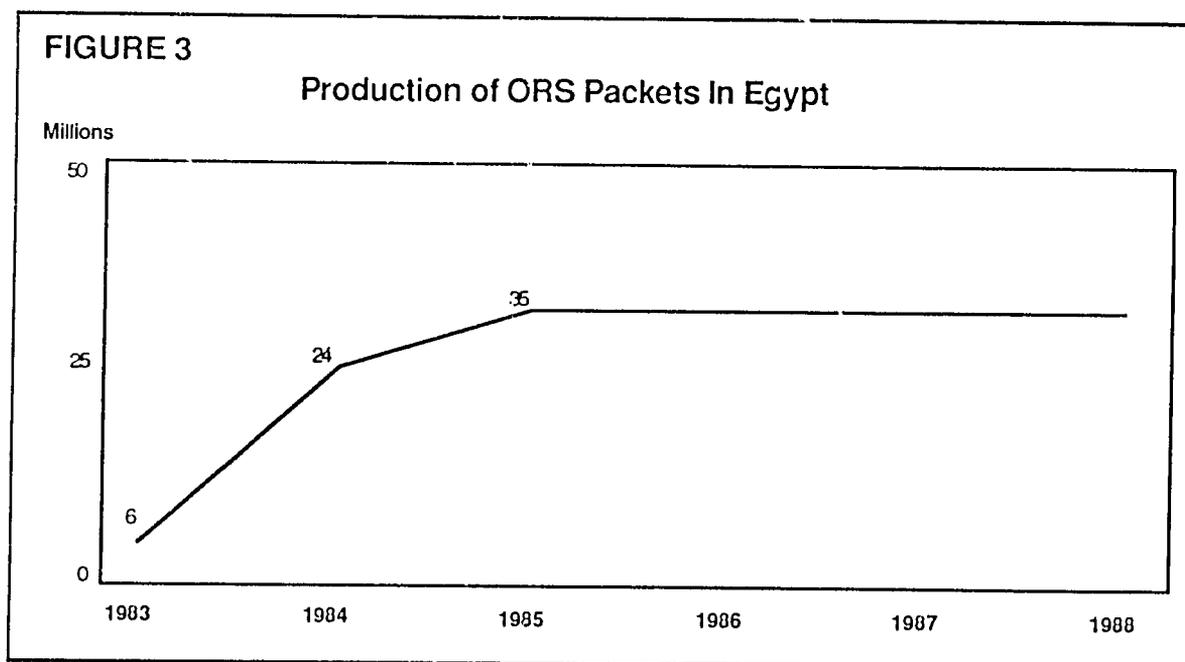
In the beginning of the Egyptian ORT program, two main problems faced the adoption of the drug by physicians. The first was lack of knowledge of ORS among the vast majority of physicians. The second was the continuous pressure by parents to be given a drug to stop diarrhea, since this was the mothers' only concern.

The successful adoption of ORS by Egyptian physicians came as a result of tackling these two problems. A major campaign—including seminars, booklets, pamphlets, slides, and educational videos—was launched to reach physicians, nurses, and pharmacists. On the other hand, pressure on physicians to prescribe something to stop diarrhea was eased considerably when the media campaign targeted at mothers convinced them to worry more about dehydration than merely stopping diarrhea. Doctors can't be ridiculed for prescribing ORS anymore, even if it were the only drug they wrote in their prescriptions.

A comprehensive training and promotion effort was organized between 1983 and 1988, resulting in the training of 24,788 physicians and 17,433 nurses all over the country. Several national conferences on ORT were sponsored by the physicians' union and by major universities. The curricula in pediatrics departments all over the country were revised to include ORT. Many physicians, however, still prescribe antibiotics and antidiarrheal drugs, because, even though mothers know to use ORS to prevent dehydration, many of them still demand a drug to cure or stop diarrhea. I guess you can hardly blame mothers for that. We hope that one day ORS will also help stop diarrhea.

ORS Availability

Quantities of ORS produced in Egypt have increased steadily since the campaign began in 1983 (see Figure 3).



Twenty-five percent of this production are distributed free of charge at over 3,000 Ministry of Health clinics all over the country, and the remaining 75 percent are distributed through private sector pharmacies, of which there are more than 5,000 in the country. The price of one ORS packet is about the price of one tomato when tomatoes are in season! Just about any and every household in Egypt can afford to purchase ORS. Even if the currently subsidized prices increased to reflect the actual cost of production and distribution, the product would continue to be affordable.

Summary

To sum up, these three factors—mothers' persuasion, health providers' support, and product's convenient availability—are most essential in causing and sustaining an ORT program's impact. In order for these three conditions to be achieved, certain guidelines need to be followed. I will conclude with ten communication strategy guidelines for creating and sustaining ORT program impact:

1. Use a systematic approach in developing communication programs.
2. Observe differences between commercial products and ORS.
3. Position ORS correctly.
4. Utilize evaluation results in developing the program.
5. Always pretest.
6. Know the target audience's media habits.
7. Do not raise false expectations about ORS.
8. Coordinate with training, production, and distribution.
9. Use creative messages.
10. Respect the culture and preferences of the target audience.

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Panel 4

**ORS Production,
Supply, and
Distribution**

Opening Remarks

Dr. Miguel Eduardo Chumpitasi
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Laboratorios Unidos S.A.
Lima, Peru

Introduction

I wish to welcome you all, friends from the world over. Our four panelists today—from Sri Lanka, Ghana, Indonesia, and Thailand—will be focusing on different aspects of local supply and production:

- local, in-country production;
- public and private sector collaboration/coordination in the local production and distribution of oral rehydration salts (ORS);
- quality assurance and quality control of locally-produced ORS; and
- distribution.

Also, the speakers will be touching on the following overarching issues and their influence in local production and distribution:

- government policies toward local production;
- access to and availability of foreign currency needed to purchase raw materials; and
- the attitudes and practices of key caregivers, such as clinicians, nurses, doctors, pharmacists, and mothers, as they relate to the purchase and effective use of ORS.

These issues either contribute to or hinder the success of projects in local production and distribution.

General Comments

Before our panelists begin, let me make a few general comments about the topic to be discussed today.

- Production and supply are often taken for granted. For example, people assume that ORS will be of high quality and can be easily produced. However, reality has shown all of us working in this field that the situation is somewhat different.
- We know, for example, as a result of the tragedy in my country (Peru), that ORS must be manufactured in compliance with good manufacturing practices (GMPs).
- We know that the blending of dry powders might seem simple; actually, it is a relatively straightforward procedure. The process to ensure that proper blending is done thoroughly and consistently is easy to achieve. Unfortunately, compliance is not always in effect.

- We also know the critical role that distribution can play in affecting oral rehydration therapy (ORT) programs. You may have a beautiful product, but if it doesn't reach the consumer, you have nothing.
- Over the years it has become apparent that there is no standard size container that is appropriate for all countries or programs. For example, on our panel today we have representatives from Indonesia where 200 ml packets are used; from Sri Lanka, currently using 1 liter packets but might soon be adopting a 500 ml size; from Ghana where 600 ml packets are used; and from Thailand where 750 ml packets are used.
- Finally, we know the difficulty of estimating demand. There are great discrepancies between population-derived demand and demand based on actual use. The difficulties posed for planning and executing local production efforts are considerable at the very least.

Introduction of the Panelists

Before I introduce the speakers, let me note that there will be some overlap among the presentations. Still, each speaker will emphasize a particular aspect of local production, quality assurance, and distribution.

Let me begin by introducing myself. I am Eduardo Chumpitasi, currently managing Laboratorios Unidos in Peru, South America. Before joining Laboratorios Unidos, I worked for many years in the private sector. I used to be plant manager for Warner Lambert and I also worked as a manager for Merck, with responsibilities in many areas of South America.

Our first speaker is Dr. Hiranthi Wijemanne, a primary health care program officer from UNICEF in Sri Lanka. She will speak on local ORS production, supply, and distribution in her country.

Our second speaker is Dr. Joseph Adamafio, the Deputy Director of Health Services of the Ministry of Health of the government of Ghana. Dr. Adamafio will speak on public and private sector collaboration in the local production and distribution of ORS.

Our third speaker is Dr. Eddie Lambong, a pharmacist as well as founder and president of P.T. Pharos, a private sector pharmaceutical manufacturer in Indonesia. He will speak on quality assurance for locally-produced ORS.

Our final speaker will be Dr. Sawat Ramaboot, Manager of the National Control of Diarrheal Diseases Program in Thailand. Dr. Ramaboot will comment on the distribution of ORS in Thailand.

Local ORS Production, Supply, and Distribution: The Sri Lankan Experience

Dr. Hiranthi Wijemanne
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United Nations Children's Fund - Colombo
Colombo, Sri Lanka

Background

The focus of my presentation will be the Sri Lankan experience connected with the local production of oral rehydration salts (ORS). I will also be touching on distribution, supply, promotion, and marketing because I think all these are closely linked.

First, I would like to give you a brief description of Sri Lanka. Sri Lanka is a developing country with a population of 16.4 million people. The country's 2.3 million children under the age of 5 are the main target group for the National Program to Control Diarrheal Diseases.

Sri Lanka is one of the poorest countries in the developing world, with a per capita income of US \$360. As you know, intestinal diseases have their root causes in poverty. So, diarrhea is a major problem. In 1984, when the government of Sri Lanka decided to embark on a National Diarrheal Diseases Control Program in collaboration with UNICEF and WHO, 50 to 60 percent of the children who entered hospitals with dehydration caused by diarrhea received intravenous infusion. At that time, a major policy decision was made to produce ORS locally, although there was a limited supply of ORS that was brought into the country through UNICEF.

Local Production

A search began to determine who could produce the ORS locally. The State Pharmaceutical Corporation, a semi-autonomous government body which, at that time provided all drugs to the Government of Sri Lanka, was selected. This organization, which had been importing essential drugs, had been considering local production. The Government therefore decided to authorize the State Pharmaceutical Corporation to embark on producing the local ORS. At the same time, a brand name was given to the local product. *Jevanee*, which means life giving, was chosen because very few people could even pronounce the direct translation of ORS in the local languages.

The State Pharmaceutical Corporation agreed to import all the raw materials needed for ORS. The corporation was also willing to provide local packing materials, buildings, staff, and maintenance and recurrent costs. UNICEF provided supplies and equipment, and WHO provided the necessary technical guidance. Also, since the State Pharmaceutical Corporation enjoyed a certain amount of autonomy, it had a flexible and well-trained management style; the ability to recruit qualified staff; and the ability to set up the ORS plant as an independent unit.

Production began in 1984 and was designed to provide two million packets annually. The original packet was designed for dissolution in one liter of water because people were used to the ORS packet provided by UNICEF, which had been available on a limited basis. The decision was made to have glucose monohydrate and bicarbonate split-packing to separate the bicarbonate from the rest of the ingredients. Polyethylene was used as the packaging material because it was cheap and easily available locally. The packet had instructions in local languages. This was one positive aspect of local production. We also found that the polyethylene provided a good shelf life—two years—in spite of Sri Lanka's tropical climate.

Table 1 reflects the cost of production for one million packets. The costs for packaging material and a locally printed label are very reasonable. I should also mention that all the raw materials had to be imported into the country.

TABLE 1

Costs of Materials For ORS In Sri Lanka

PRICE STRUCTURE ON THE BASIS OF 1 MILLION PACKETS PER YEAR:

Raw Material	Rp. 799,575	26.6%
Packaging Material	Rp. 400,000	13.3%
Fixed Assets and Depreciations	Rp. 478,000	16.0%
Labour Cost	Rp. 567,000	18.9%
Administration, Energy, Insurance	Rp. 230,000	7.7%
Contingencies/Profit	Rp. 525,425	17.5%
Total	Rp. 3,000,000	(100.0%)

Price per Packet, Supplied to the Central Medical Store/MOH
for the National CDD Program

Rp. 3.= US\$0.092

32.5 Rp. = 1 US \$

The final price per packet (Rp.3), based on the production of one million packets per year, is the amount the Ministry of Health actually pays to the State Pharmaceutical Corporation.

These salts are available through the health infrastructure. *Jevanee*, along with a 200 ml cup, is also distributed through the commercial system. The cup is included because we were very concerned that mothers might have difficulty measuring a liter. We felt that the 200 ml cup might be one way to ensure that mothers understood proper measuring.

Distribution

Distribution starts from the State Pharmaceutical Corporation. Pharmacists are supplied with packets and midwives are also points of distribution. These health workers reach the home level and actually speak to mothers about dehydration, about ORT, and about the proper mixing and administration of *Jevanee*.

In August 1988 a novel distribution program began. Over the years we discovered that although we had a projected demand of two million packets of *Jevanee* per year, actual utilization was only 500,000 through the public health sector and 200,000 in the commercial sector, figures which were far short of our original projected demand. Since consumption fell far short of the projected demand, we felt that product availability might have been a factor. We asked the following questions: Was *Jevanee* widely available to mothers or were they just relying on the health sector? and Did the poorest mothers, who were living in remote areas, have access to clinics or pharmacies? Reviewing our data we decided to make cooperatives part of our distribution network. These cooperatives were set up during the post-World War II period to provide food to the poorest of the people; currently, 50 percent of the population receive food stamps, which are exchanged for essential food, such as rice, sugar, pulses, etc. There are 8,000 cooperatives in Sri Lanka and last August *Jevanee* became available through these distribution sources.

We still have to evaluate this project, but we see it as a new phase, an important effort to reach the unreached.

In addition to our distribution efforts, we found it very important to reach and educate health professionals because many were promoting antidiarrheals and antimotility drugs. This has been a difficult group to reach, but I think we are succeeding, particularly among the younger members of the profession. I was very happy to hear the other day from some of the people importing pharmaceuticals that there is a marked decline in the importation of antidiarrheal drugs in Sri Lanka. This is an indirect indicator that perhaps we are succeeding.

Key Issues

While progress is evident, key issues have to be addressed: How do we really estimate *Jevanee* demand? How do we ensure quality of production, distribution and marketing? How do we keep costs reasonable? How do we ensure accurate measuring and administration? and How do we ensure that our program is sustainable? On this issue I would like to comment because it is the theme of this conference. We have found that an affordable price per packet, high-level government commitment, and motivated providers and consumers of ORS are essential. In addition, it has become apparent that consumers must accept a portion of the cost of the program. When first started, *Jevanee* was free through the health sector. Through the pharmacies and the cooperatives we are trying to transfer the cost of *Jevanee* purchase to mothers. If the therapy is affordable and life-saving as the name of our product suggests, we believe that consumers will purchase the product, practice the therapy, and sustain the program.

Finally, I want to show you a picture of a nice healthy baby who in spite of poverty and in spite of living in an unhygienic environment did not succumb to the evils of the scourge of diarrhea. This baby really did get diarrhea dehydration, and a packet of *Jevanee* saved her life. I think that is what makes it all worthwhile.

Collaboration Between the Public and Private Sectors in ORS Production, Supply, and Distribution

Dr. Joseph A. Adamafio
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Introduction

Ghana's oral rehydration therapy (ORT) program started in 1980 when UNICEF imported and donated about 43,000 sachets of oral rehydration salts (ORS) to the Ministry of Health (MOH) for distribution through the health care delivery system. Training of health personnel was provided, but on a very limited scale. Minimal promotional activities accompanied the program.

As might be expected, most of the ORS sachets ended up in regional and institutional warehouses and on the shelves of health facility stores. They were not utilized. By mid-1985, the MOH facilities held millions of sachets of ORS donated by UNICEF. The MOH was ill-equipped to provide adequate promotion and distribution. Furthermore, even under the best circumstances, the MOH could at most reach 350 outlets with ORS, countrywide.

Considering the importance of diarrhea as a public health problem in the country, it was considered necessary to find appropriate ways to promote the nationwide availability of ORS and to create a demand for it. During September 1985, discussions were held between the MOH and the Agency for International Development (A.I.D.) about the possibility of distributing ORS through the retail network of the Ghana Social Marketing Program (GSMP), which had been set up for family planning commodities under an A.I.D.-Government of Ghana (GOG) bilateral project. It was thought that this type of mechanism could expand the ORS distribution outlets from 350 to over 3,000 in little more than a year. In tune with the GOG policy to promote the local production of essential drugs and A.I.D.'s goal to help in the development of sustainable health programs in Ghana, it was decided that the most feasible approach to achieving such a high level of distribution was to develop a local ORS production capability. A feasibility study was conducted, and a private pharmaceutical company, DANAFCO Limited, was selected to produce the salts.

Partners in ORS Production and their Concerns

There were four partners in the effort: the MOH, UNICEF, A.I.D., and a private producer. Each partner in the venture had a unique objective but all shared a common desire to improve health conditions in Ghana.

- **MOH:** Its main concern was to ensure the wide availability of good-quality, affordable ORS for use in its CDD program. It favored local production but wanted UNICEF to continue supplying its needs at least for the near future.
- **UNICEF:** Concerns were similar to those of the MOH. In addition, UNICEF was wary of dealing directly with the private sector.
- **A.I.D.:** A.I.D. basically wanted to help establish a viable health program, but insisted on private sector participation as a means of ensuring efficiency.
- **Private Producer:** The private company wanted assurances of receiving adequate returns on its investments. It was also concerned about the continuous supply of raw materials.

Potential Constraints to Local Production

In discussions among A.I.D., UNICEF, the MOH, and the private producer (later identified as DANAFCO Limited), a number of constraints to the establishment of local production were identified.

- There was no private sector commercial market in Ghana for ORS.
- There was no effective promotion of ORS in the country.
- There was limited foreign exchange available, especially for the importation of raw materials.
- There were no data on which to base a communications strategy.
- UNICEF was reluctant to support any arrangement for local production if the price of packets was deemed to be too high.

Establishment of Local Production and Commercial Distribution

Key Decisions

Each constraint was discussed and negotiated among all parties until satisfactory solutions and/or compromises were reached. Some of the key decisions were as follows:

- UNICEF agreed to provide the MOH with raw materials in lieu of ORS furnished by UNIPAC for at least three years to ensure no disruption in supply and to alleviate the foreign exchange constraint, until a commercial market could be developed for ORS.
- The MOH agreed to barter raw materials to the private producer in exchange for finished packets equal to the value of the raw materials.
- PATH, A.I.D.'s contractor, agreed to loan the local producer funds for equipment on favorable terms, and to advance some funds for renovating the space to be used for ORS production. In addition, PATH agreed to provide technical assistance in local production, quality control, and production promotion.
- An ex-factory price for the packets was calculated based on real costs and the use of local packaging materials. The cost data were acceptable to UNICEF and the local firm.
- The Agency for International Development, through an A.I.D.-Washington project, provided anthropological research, the results of which were used to develop a communications strategy for the program and effective information, education, and communication (IEC) messages.

Establishing the Local Production Facility

After key decisions were made, the following steps were taken to establish a local production facility. An assessment was conducted of all pharmaceutical manufacturers in Ghana to determine which had the capability and interest in manufacturing ORS. Foremost among the selection criteria was the ability of the local producer to distribute ORS throughout Ghana. There were basically two firms which had the capability and interest; only one of these, DANAFCO, had a nationwide distribution system. Moreover, this system was being expanded and strengthened under an A.I.D.-supported family planning project. DANAFCO was therefore selected.

DANAFCO used a loan from PATH to purchase production and quality control equipment, and relied on technical assistance to upgrade the skills of DANAFCO staff.

Development of Pack Size, Design, and Instructions

UNICEF, working with the MOH, developed a logo for the national ORT program that was to appear on everything produced for the program. A.I.D. and UNICEF asked the U.S. Peace Corps to conduct a survey in various parts of Ghana to determine the most commonly available container and its size. The 600 ml beer bottle was identified. A.I.D. provided technical assistance to DANAFCO and the MOH to develop and field-test a package design and use instructions for the product. DANAFCO and the MOH negotiated and agreed to use the same package design and mixing and use instructions for both public and private sector programs.

Communications and Promotions

A.I.D., the MOH, UNICEF, and DANAFCO formed an ORT Promotion Committee to formulate an overall plan for promoting ORT and ORS use. PATH provided some initial technical assistance for this effort. Through the PRITECH Project, A.I.D. provided technical assistance to develop a combined public-private sector communications strategy which would maximize the use of the limited resources available for ORT promotion.

The DANAFCO loan repayments were allocated to promote ORT and ORS throughout the private sector. The funds were to be used to buy advertising and to produce and distribute promotional materials.

A.I.D. provided P.L. 480 counterpart funds for the MOH's Health Education Division to develop educational materials and promote ORT through the MOH and media channels.

A.I.D., through one of its projects, provided assistance to develop a training manual for retailers and to provide training on ORT and ORS for up to 400 retail chemists, pharmacists, private physicians, and midwives throughout Ghana.

Data on ORT and ORS use and diarrhea were collected in a nationwide demographic health survey, funded by A.I.D., with assistance from UNFPA and UNICEF. These data were used to define the strategy for the national ORT promotion campaign.

Distribution

The public sector determines its needs and provides a schedule to DANAFCO to guide production. ORS for the public sector is delivered to the MOH central warehouse and then distributed through the MOH system. DANAFCO distributes ORS through its nationwide network of depots in Accra and the provincial capitals. This network is being expanded to the 22 major towns of Ghana this year (1989). By the end of 1989 DANAFCO will be retailing ORS, as well as other essential health products, to 700 retail shops within a 20-mile radius of each of the 22 sub-depots. ORS is currently being distributed through private midwives who own maternity houses throughout the country.

The social marketing network of DANAFCO is being expanded to private physicians, market women, and traditional birth attendants under other A.I.D. projects. ORT training, ORT, and ORS packets are expected to be provided to and through these channels.

The Canadian International Development Agency (CIDA) is providing ORT training to community health workers in 2,000 villages in the northern third of Ghana. CIDA will be distributing ORS and informing villagers of where they can obtain future supplies.

DANAFCO expects to begin marketing ORS through other distribution companies that currently buy pharmaceuticals wholesale from DANAFCO. These include department stores and supermarkets. DANAFCO is expanding ORS distribution in line with the training of retailers.

All of the above channels currently are and will be distributing relevant ORT educational materials.

Current Program Status

Key current program activities are as follows:

- The program was officially launched in April 1988 with production, distribution, and promotion.

- ORS is being distributed to all DANAFCO depots. A first consignment has been provided to the MOH.
- The coordinated public and private sector promotion campaign has commenced. This campaign consists of posters, pamphlets, car stickers, billboards, radio, television and newspaper advertisements, calendars, traveling drama groups, the MOH health worker training, and district level ORT program kick-offs.
- Retailer training (a 1-day training using an ORT training manual developed in Ghana) is underway throughout the country.
- DANAFCO is running two production lines, producing 6,000 packets a day per line.

Current Concerns

The program is experiencing the following concerns:

- Limited funding is available for the ORT Information Education and Communication Program.
- As local costs increase, the price of the locally produced ORS may become problematic, since DANAFCO will almost surely have to raise prices to cover costs. The price of the packet might not be acceptable to UNICEF and the MOH.
- Since the program has just started and data are not readily available, it is difficult to gauge demand trends and the quantity of ORS packets and raw materials needed.
- The MOH has established a revolving fund that is to be used to purchase ORS over and above the quantity provided to the MOH in exchange for the UNICEF-provided raw materials. The collection and use of these funds is uncertain presently. If adequate funds are not available, the MOH may have difficulty purchasing supplies of ORS that exceed the UNICEF allotment.
- The Ghana Pharmacy Board placed a ban on ORS advertising shortly after the product was introduced because ORS is a pharmaceutical and pharmaceuticals may not be promoted publicly in Ghana. While the ban has now been lifted, it adversely affected demand and sales.
- ORS use must increase to make the program commercially viable from the standpoint of DANAFCO.

Additional Information and Observations

- The Ghana ORT program is now largely based on local production of ORS and the public-private sector promotion of the product and ORT. If local production does not become commercially viable, the national program might be in jeopardy.
- The donors—especially A.I.D. and UNICEF—need to continue playing an active role for the near future. Both donors need to provide support until a solid foundation can be built for the Ghana program. This should be achieved within 3 to 4 years.
- The demographic health survey found that:

- Fifty percent of the population are now aware of ORT.
 - Thirty-three percent use ORS for diarrheal episodes of children under 5 years of age.
 - During any given two week period, 19 percent of children under 5 years of age have an episode of diarrhea.
 - In the under-five population of Ghana there are approximately 300,000 diarrheal episodes each year.
- The MOH CDD policy states that "ORS is best." The national program does not promote sugar-salt solutions but endorses the use of home available fluids at the onset of diarrhea until ORS packets can be obtained.

Main Issues in Public-Private Sector Collaboration

Regular and effective communication among the partners in ORT production is essential for the success of the collaboration. A multi-sector committee that is comprised of the partners and that meets regularly to discuss issues is a useful arrangement.

Some agreement has to be reached regarding the design of the package, packaging materials, instructions for use, etc. The design of these materials may be the same, as in Ghana, or may differ, as in Sri Lanka.

Package size should be defined to use the most commonly available measure in the country. For example: Sri Lanka has 1 liter packs, Thailand 750 ml, Ghana 600 ml., and Indonesia 200 ml. sachets. In Ghana, the identified container is the 600 ml beer bottle

Government policies on ORS should be framed in light of their implications for the local manufacture and promotion of ORS.

As a private company, the manufacturer is interested in a financial return and would like to charge market rates for the product. The MOH, on the other hand, is anxious to ensure the wide availability of ORS by making the packet available at the lowest possible price. A delicate balance has to be struck between the two.

Issues of Quality Control in Local ORS Production: The P.T. Pharos Indonesia Experience

Mr. Eddie Lembong
President and Director
P.T. Pharos Indonesia (Ltd.)
Jakarta, Indonesia

Introduction and Background

P.T. Pharos Indonesia (Ltd.) is a privately-owned, well-equipped, modern, pharmaceutical manufacturing company committed to good manufacturing practices (GMPs). Founded and opened in 1975, it now employs some 550 people and is presently valued at roughly US \$10 million. As a leading manufacturer of high quality pharmaceuticals in Indonesia, Pharos produces many prestigious, well-known products under license; these include *Tagamet* for Smith, Kline, and French, and *Zovirax* for Burroughs Wellcome. P.T. Pharos has also developed its own products and manufactures these formulations as tablets, capsules, liquids, powders, and creams. Pharos enjoys a reputation for sophisticated product development, quality consciousness, and a staff of highly motivated scientists.

It was on one hot, humid afternoon in August 1978 that the then-Director General for Drug and Food Control, Dr. Soenarto, came to P.T. Pharos and challenged the company to develop an oral rehydration salts (ORS) formula in which all the ingredients would be mixed and packed into a single sachet. He explained that the packets made until that time for the national oral rehydration therapy (ORT) program had been produced by the state-owned pharmaceutical company and were not satisfactory. The state-produced ORS was presented as three small packets each containing separate ingredients that were then overpacked into a larger packet. This packaging created misunderstandings among patients who sometimes consumed each of the smaller packs separately, rather than mixing them together. The incorrect mixtures resulted in solutions that not only lacked therapeutic value, but were also potentially dangerous.

Although P.T. Pharos recognized at the outset that ORS was a "social product" and unlikely to generate significant profits, the company still decided to accept the challenge. It felt that adding ORS to the product line was in keeping with P.T. Pharos' corporate philosophy which clearly states that the company has a commitment to address five groups:

1. the investors, to reward their risk-taking investments and to ensure a proper level of return required for further development of the company;
2. the employees, in the form of ever-improving rewards and basic development;
3. the consumers, in the form of good service through reasonably priced, high-quality products that are widely available;
4. the public, in general; and
5. the country and the government.

Within a year of the Director General's first visit, P.T. Pharos succeeded in placing on the Indonesian market the first ORS product that had all the ingredients mixed and packed into one single sachet. A few years later, the World Health Organization (WHO) published a set of guidelines for ORS production that very closely matched and served to validate the methods developed by Pharos.

In accordance with government policy, P.T. Pharos manufactures packets that are 200 ml. in size. The company supplied UNICEF with about 1.2 million sachets in 1985, 1.8 million sachets in 1987, and 6.4 million sachets in 1988. Since 1985, P.T. Pharos has also supported public sector ORT efforts through participation in WHO's "Survey on Global Productions of ORS Powder in Developing Countries," by providing the requested data on annual production levels.

In 1986, P.T. Pharos participated in a UNICEF/Ministry of Health promotional campaign for ORT in West Java that included local radio broadcasts, banners, posters, and a calibrated tumbler for mixing single packets of ORS.

Quality Control Aspects of Production

During our involvement in ORS production, we have identified the following elements that influence the quality of ORS:

- Before any product can be manufactured and marketed in Indonesia, it must be registered and approved by Food and Drug Control registration authorities within the MOH. The registration process requires extensive documentation on the formula, specifications, pharmacology, and toxicology of the product, and procedures for production and quality control.
- At any time during the manufacture of the product, the Drug Inspector can visit and inspect any aspect of GMP implementation.

- After the product has been marketed, the central or provincial quality control officer is permitted to take samples from the marketplace for analysis (post-marketing surveillance). If found to be out of specification, the product can be recalled.
- While regulatory authorities retain the powers described to audit the quality of the product, it is the strict adherence to GMPs, used throughout a factory, that is most important in ensuring that the product is of acceptable quality.

Formula

From 1977 to April 1987, P.T. Pharos produced ORS according to the WHO bicarbonate formula. The salt was packed in a heavy (15 micron) aluminum foil laminate. In May 1987, P.T. Pharos adopted the WHO citrate formula, which has better stability and permits the use of a thinner (7 micron), less expensive foil laminate. The specifications for these two packaging materials are compared in Table 1.

MATERIAL	15 MICRON LAMINATE	7 MICRON LAMINATE
Cellophane MST	20 microns	—
Polyester	—	12 microns
Polyethylene	15 microns	15 microns
Aluminum	12 microns	7 microns
Polyethylene	30 microns	40 microns

In addition to the improved stability and lower overall production cost, the citrate formula is generally recognized as being more palatable than the bicarbonate formula-ORS.

Production Room

Processing and packaging activities are conducted in separate rooms, apart from other products, with the temperature maintained at 22 to 24 degrees centigrade and the relative humidity at 50 to 55 percent. Floors, walls, and ceilings have smooth surfaces that are washable to allow easy cleaning. Both inlet and outlet air is filtered.

Process and Quality Control

All raw materials that have already been sampled, analyzed, and accepted are labelled accordingly. These data are entered into the computer. Since production orders are issued by computer, this practice ensures that only released materials will be weighed for production.

Only anhydrous glucose is used in ORS production, and the moisture content is always rechecked right before use. If the moisture content is higher than specified, it has to be dried. (In fact, this has rarely happened at Pharos.)

The sodium citrate used is ground and sieved through a 0.6 mm sieve. (It is not always easy to obtain glucose and sodium citrate of the right quality. Sometime Pharos has received glucose which is too fine and sodium citrate which is too coarse.) Other ingredients are also sieved through a 0.6 mm sieve. (These steps ensure homogeneity of the mix.)

Processing, packaging, and quality control procedures are conducted in accordance with the written master procedures, including:

- the bulk production order,
- the packaging order, and
- analytical procedures.

Weighing is done in a separate, central dispensing room consisting of three compartments:

- transit area before entering the weighing area,
- weighing compartment, and
- storage for the weighed materials before processing.

Weighing is done with a pilot/copilot system (double-checked), and each material is weighed individually, so that only one material is in the weighing compartment at a time.

Mixing is done in a whirling and hurling Lodige mixer, with a special compressed air seal, capable of producing a uniform mixture (1:100,000) within three minutes. The mixer is also equipped with a chopper. A uniformity test of the mixture processed in a single day is verified for every 10 batches. Samples are taken from five different places in the mixer: the top, bottom, right, left, and center parts of the mixer.

Dosing, filling, and sealing are done both manually and automatically.

- *Manually.* A plastic cup representing the volume of the required weight is used. Ready-made sachets are filled and sealed by hand.
- *Automatically.* Dosing, filling, and sealing is done by a single, fully-automatic machine.

Pharos still uses the manual procedure for dosing, filling, and sealing because of problems with raw materials, including inconsistent quality of supplies of aluminum reels from the local market.

Weight and dosage control testing is done by weighing ten random samples at 15-minute intervals. Testing is done alternately by quality control and production staff. A package leak test is carried out on five random samples at 15-minute intervals. A moisture test is performed twice daily.

Assays for active ingredients are carried out on the ORS blend before filling, as follows:

- sodium and potassium (by flame photometry);
- chloride (by argentometric titration);
- citrate (by spectrophotometry); and
- glucose a (by iodometric titration).

Content uniformity is also checked from filled sachets. Ten sachets from each batch are sampled randomly during filling.

Distribution of ORS: A Case Study in Thailand

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Bangkok, Thailand

Program Overview

Although the Control of Diarrheal Diseases Program (CDD) in Thailand was launched in 1981, the WHO formula ORS has been produced by the Government Pharmaceutical Organization (GPO) since 1979. The WHO formula ORS was first produced in a packet designed to be dissolved in one liter of water. Since 1981, the GPO has produced the packets to be dissolved in 750 ml of water, a volume that is matched to a commonly available container (fish sauce bottle). Until January 1988, GPO produced the ORS bicarbonate formula. Over the last 11 months, ORS citrate has been produced.

With assistance from UNICEF, GPO received an automatic packaging machine in 1983 that enabled production to increase from 3 million packets during that year to 5 million packets in 1985. In addition, other organizations produce the packets. Approximately 400,000 packets are produced annually by the Infectious Disease Hospital. At least 10 provincial and 50 district hospitals have semi-automatic mixers and heat-sealing machines, which they use to make ORS. Two private companies produce WHO formula ORS in packets for dissolution in 750 ml of water. Each firm has the capacity to produce between 300,000 and 500,000 packets annually.

ORS is sold in pharmacies, drug stores, and village drug cooperatives for 4.50 baht (US \$0.18) per packet. The CDD program pays GPO 3 baht (US \$0.12) per packet. About 86 percent of GPO's production is purchased by the Department of Communicable Disease Control (DCDC), stocked in air-conditioned central stores, and distributed through the same channels as the ones used by the expanded program on immunization: by vaccine trucks and public transport (see Figure 1).

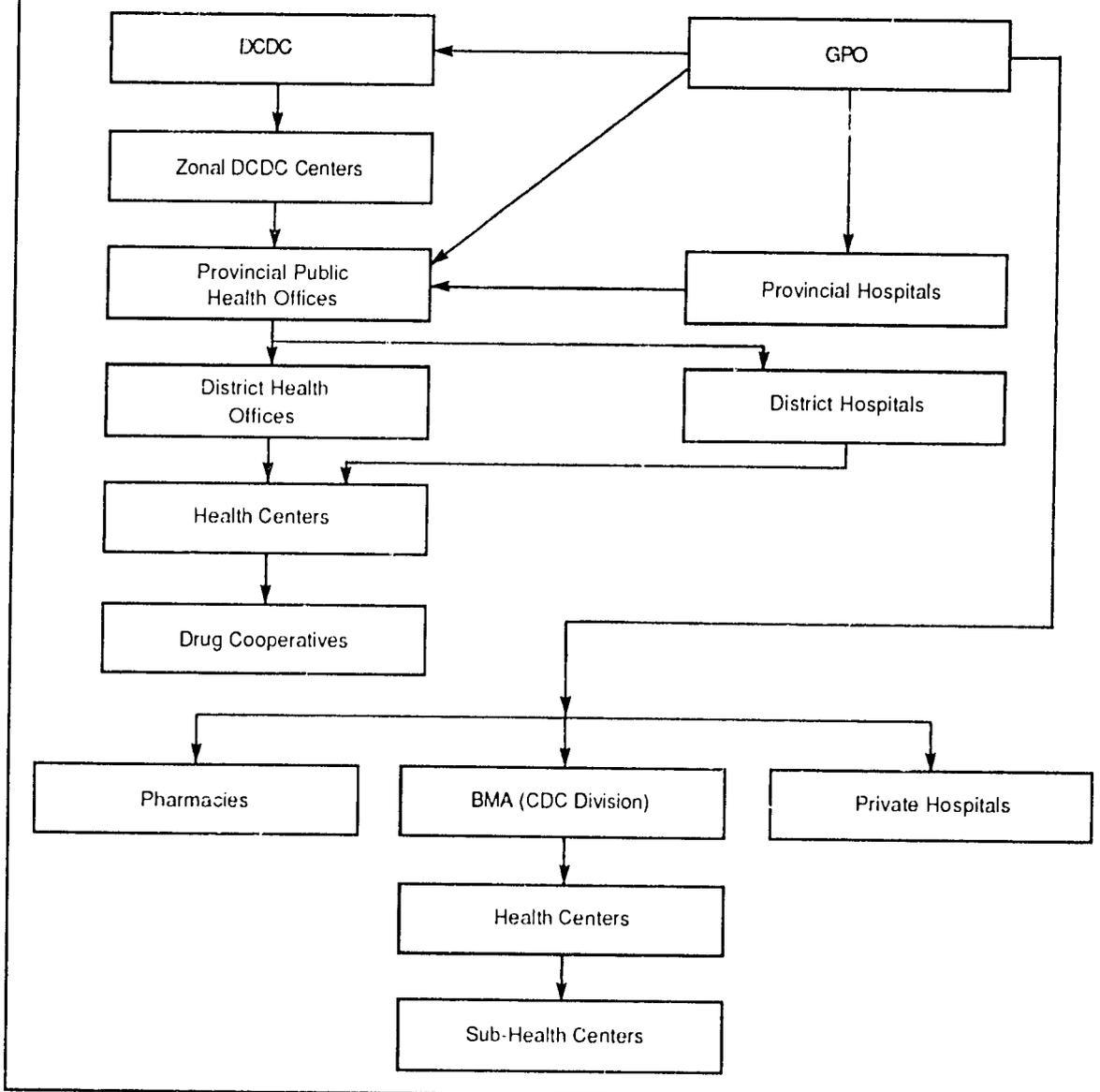
A full-time technician for quality control work is assigned in the ORS production unit. Quality testing is carried out in a well-equipped, analytical laboratory. A WHO/UNICEF industrial engineer regularly visits the GPO to observe the overall production process and to help ensure quality control.

Lessons Learned

During the first three years of the CDD program, the national policy on diarrhea case management was to start administering ORS to all cases of diarrhea whether or not there was dehydration. To estimate each province's ORS requirement, the same national target use rate was used. ORS was distributed from the central store downward, by quota, through the primary health care infrastructure without considering the real need. On review, it was found that, although more than 70 percent of the population had access to ORS—provided at health facilities or by community health workers—distribution of ORS in many provinces was not consistent. In many cases, either understocking or overstocking of ORS at health facilities was common.

One common reason for maldistribution was the inadequate logistical training for health workers. Another specific reason for understocking was national level staff's underestimation of usage. Reasons for overstocking were overestimates of usage targets and inadequate training and motivation for health workers.

Since 1987, the national CDD policy has emphasized the use of home fluids for the prevention of dehydration at the onset of diarrhea at home and use of ORS only for actual cases of dehydration. The use rate, estimation targets, and estimation methodology have been changed. Annual ORS requirements are calculated for each province based on current use rate information. Proportion of ORS use over the last five years, use by age group, and reserved stock for epidemics are also taken into account.

FIGURE 1**ORS Distribution In Thailand**

Distribution is more flexible and depends on orders from the peripheral level. Both GPO and commercial WHO formula packets are also available in pharmacies, drug retailers, dispensaries, and groceries which combined serve about 10 percent of the users. The national ORS use rate for 1987 was 30 percent and the ORT use rate was about 40 percent. The major ORS providers are health centers and district hospitals, instead of drug cooperatives or community health workers who are based in most villages.

Record/report and reorder forms to be used for monitoring ORS use and supply have been developed since the program started. Reports were incomplete during the first 2 to 3 years, however, and only provide ORS use rates in health facilities. The diarrheal morbidity and treatment surveys are regularly conducted in about 10 percent of all provinces. The median value of the survey results is used to estimate annual ORS requirements.

Summary: Ensuring a Sustained Distribution of ORS

There are many factors involved in achieving a sustained, effective ORS distribution.

Policy

Promoting the use of home fluids for non-dehydrated diarrhea and keeping ORS only for actual cases of dehydration, if effectively implemented, would save at least 30 percent of ORS consumption.

The decision to provide ORS free or for some charge is an important one. Free delivery of ORS may be good during an early or promotional stage of the program, but cannot continue forever. To charge patients an acceptable price for ORS will make them see ORS as a product of value and quality, and is sensible for sustaining the program.

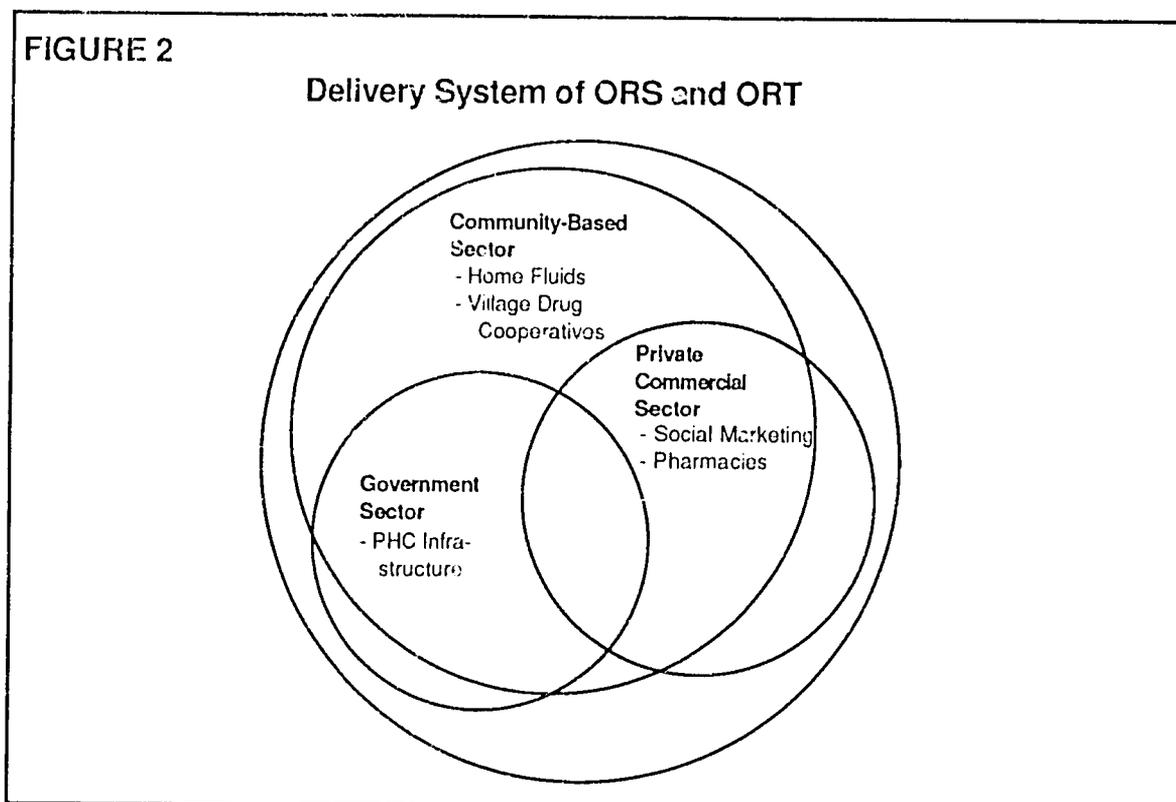
The private sector can produce and distribute ORS through channels not available to the public sector. The government should endorse and allow private sector marketing but ensure that the firms produce a uniform WHO formula and packet size. Profit margin for selling should be reasonable and sufficient to encourage local production.

Estimation of ORS Requirement

Governments can make estimates based on the current use rate of each locality, if possible, by using information from records/reports or survey results. The producer should also be informed of the total ORS requirement each year.

Delivery Network

Three sectors of a delivery network should be developed to ensure that the population has complete access to ORS: the government sector, that uses the primary health care infrastructure; the private sector, that supplements the government sector; and the household or community-based sector, that promotes the use of home fluids (see Figure 2).



Records and Reports

Governments can design simple-to-use consumption reporting and reordering mechanisms to monitor ORS distribution and estimate ORS requirements.

Training and Motivation

Successful training in diarrhea case management and program management, including logistics, will effectively reduce problems of ORS maldistribution. Poor case management training and motivation will result in low use rate, and might result in overstocking and waste of ORS.

Health Education and Dissemination of Information

Teaching the public about ORT and ORS and encouraging the public to accept the therapy is as important as training. The public has to be informed and induced to use the services from the nearest ORS providers

Monitoring and Evaluation

Indicators for monitoring and evaluation should be built in at the stage of program planning. These may include the amount of ORS received and used, the amount of ORS in stock, the number of months out of stock of ORS, etc. Morbidity and treatment surveys in some selected areas are also necessary. The CDD program managers may consider correcting or improving all or some of the above-mentioned factors according to local situations. This will help to sustain effective ORS distribution.

Panel 5

**Policy,
Program Planning,
and Financing**

Opening Remarks

Dr. Thomas A. Ogada
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Welcome to the panel on policy, program planning, and financing. Our first presenter, Dr. Kadri Tankari, Secretary General, Ministry of Public Health of Niger, will speak about oral rehydration therapy (ORT) policy within primary health care. Dr. Nyoman Rai, Chief of the Bureau of Planning in the Ministry of Health of Indonesia, will talk about financing of a diarrheal diseases control (CDD) program. Dr. Michael Mbvundula, the Technical Advisor to the Minister of Health in Malawi, will discuss an important subject: cost savings in hospitals resulting from the use of ORT. The last speaker, Dr. Reginald Boulos, the Executive Director of the Center for Health Development in the Republic of Haiti, will address the role of private voluntary organizations in CDD programs.

The ultimate success of the sustainability of health programs in any country is dependent, in part, upon the mode of service delivery to the target population. Success also depends on the government's clear policy statement on what has to be done and how well the program activities are planned and implemented. It depends also on the reception of the services by the target population. And lastly, success depends on the outcome in terms of reduction in mortality and morbidity in the target population. Frequently, policies and programs aimed at improving the delivery of health services fail due to one or more management shortcomings. One shortcoming is over-optimism about the capacity of the infrastructure to carry out the plans. The policies we are going to discuss are: Do we have the infrastructure to carry out these plans? and What about health worker and other manpower development and the availability of resources or equipment? Because of this, training must be considered.

Another important factor is regular reviews of the budgetary cycles as they affect planning and implementation. This underlines the fact that the health services should ideally be planned and operated within the context of broad socioeconomic development. With regard to ORT, governments should set policy guidelines that clearly state issues that might appear obvious. These guidelines could include:

- guidance with respect to oral rehydration salts (ORS), the use of home fluids, and the feeding of children during and after diarrhea;
- specific activities to be undertaken in this area;
- the definition and targets for ORT accessibility and use;
- the patient and referral system;
- the indicators leading to the recommended use of drugs; and
- resource mobilization and operational research.

A clear policy statement will pave the way for sound ORT program planning.

We must bear in mind, however, that things cannot be done overnight. The ORT program needs to be planned and implemented in realistic phases, with the knowledge that each subsequent phase depends on the success of the previous one. Monitoring and evaluation will of necessity be a feature of a well-planned ORT program. Last but not least, a budget, which ultimately will be sustained by the accounting section, must be proposed.

Needless to say, during a special analysis exercise, the intersectoral collaboration between private voluntary organizations (PVOs) and the community has to be taken into account during budgetary estimates. This brings me to the last item that I want to touch upon: financing ORT to ensure sustainability. Most countries have adopted the UNICEF recommendation that effective

case management initiated both at home and at the health facility level will be the mainstay of the country programs. Therefore, the local production and distribution of oral rehydration salts (ORS) and the identification of available, suitable, and affordable home fluids will be a crucial aspect of sustainable financing of current ORT programs. Of course, ORT programs should be augmented by the promotion of preventive measures, much of which will be provided by nonhealth sectors such as the ministries and departments of water, agriculture, information, education, etc. This intersectoral cost-sharing will enhance the future stability not only of the ORT component but of the whole country's CDD program as well. The widespread, effective use of ORT will make countries realize savings in terms of nonpurchasing of antidiarrheal drugs, less use of intravenous fluids, fewer hospital bed occupants, and less use of laboratory services for unnecessary patient investigations. These savings will be put back into the program for important tasks such as diarrheal diseases surveillance—laboratory surveillance of epidemic diarrheal diseases such as typhoid, cholera, and measles. Health education and environmental sanitation will be advanced also.

Finally, the challenge facing us in the 1990's is to build on the success of ORT and CDD programs. Proceeding carefully from sound policies and cost-effective approaches, we should expand the education of the mothers, the community, and the health professionals, and also expand the production and availability of ORS. With its broad scope, ICORT III focuses on the above approaches and the sustainability of ORT and related programs.

Oral Rehydration Policies in Primary Health Care

Dr. Kadri Tankari
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Niamey, Niger

Introduction

I will focus on the following aspects of Niger's experience in the field of oral rehydration therapy (ORT):

- program planning and management mechanisms;
- efforts to integrate ORT into the existing health care services and activities;
- program financing; and
- future prospects—how to ensure the program's sustainability.

The National Context

Niger is a landlocked, Sahelian country covering 1,267,000 km in the heart of Africa. It is divided into seven regions, which are in turn subdivided into 38 districts and communes and 8,615 villages. It has a population of 7,250,000 inhabitants. Niger's main activities are in the areas of agriculture, livestock, and mining. Its per capita gross national product is US \$260 (1986).

The great majority of the health services provided in Niger are public and are organized on the basis of the country's administrative structure. Concomitant with the health authorities' early commitment to a policy of fairness and equity, their primary concern was to bring the health services in line with the local reality and to achieve their decentralization. Thus, particular emphasis has been placed on the development of basic services, and special efforts have been

made to establish specific priority programs (self-managing health care services, nutrition, health education, and control programs for tuberculosis, malaria, and diarrheal diseases).

The National Diarrheal Disease Control Program (PNLMD)

General Characteristics

After being recommended during a national seminar in 1982, the National Diarrheal Disease Control Program (PNLMD) was developed and officially adopted in 1984. The PNLMD is a national program established to reduce morbidity and mortality rates among children under 5 years of age. The program uses the following strategies:

- treatment of cases (systematic use of ORT in the home or in medical facilities);
- public information and education (maternal and child care activities, e.g., nutrition, vaccination, and curative care); and
- surveillance and control of epidemics.

Program Planning and Management

During the first phase of the program (1984-1987 Plan of Action), most planning and management activities took place at the central level. A national committee, consisting of representatives of key departments within the Ministry of Health and other collaborating departments, was in charge of managing the program. A national coordinator, a deputy coordinator, and a PRITECH representative were assigned exclusively to the program.

The regional level has been more involved in the preparation of the second Plan of Action (1988-1992). Regional plans were developed by committees set up at the regional level.

The maternal and child health department coordinators also act as coordinators for the PNLMD. Thus, after an initial, centralized phase that was needed to establish the program, a policy of gradual decentralization was pursued reflecting the spirit of the Société de Développement (Society for Development). This policy promotes the involvement of populations at each administrative level more directly in the management of their own affairs.

One of the major obstacles to decentralization is that in order for it to be real and effective, decentralization requires both a concomitant decentralization of resources and the involvement of other sectors.

Integration of the Program's Activities

Major efforts have been made to integrate program activities with those of existing departments.

Health Care Services. A PNLMD Office was created as part of the primary health care division in the Direction des Établissements de Soins (Health Care Institutions Department). All units (hospitals, maternal/child health clinics, obstetrics, and other clinics) carry out diarrheal diseases control activities using the same human, material, and financial resources.

The program's training and supervision activities are carried out in conjunction with those of other programs. Training is provided at health personnel training schools. The program's information system is integrated with the national system and uses the same channels as other programs.

Villages. The following activities are being conducted at the village level:

- training, supervision, and retraining of village health workers (ASVs) in ORT;
- education of the population on the use of ORT for the prevention and treatment of diarrheal disease; and
- distribution of ORS packets by village health workers and pharmaceutical dispensaries.

Obstacles to the Integration of ORT. The following obstacles have been experienced in the integration of ORT:

- Untrained workers either do not apply the strategies or use the strategies improperly.
- Because village health workers and others are being trained, health care personnel often feel that they are no longer responsible for the application of ORT
- Major efforts are required to harmonize programs which, in spite of having the same objectives, must compete for their share of the scarce resources available.

Program Financing

The aim of the financing policy is to sustain and improve the results achieved thus far while reducing dependence on donor funds. Financing is addressed at the national and village levels.

Problems Encountered. The following problems have been encountered in financing the program:

- inadequate budgets allocated to health care units leading to frequent stock shortages;
- limited coverage of the commercial system;
- high cost of the oral rehydration packets;
- not-for-profit sale of oral rehydration packets by the ASV; and
- unreliability of the ASV resupplying system.

In Search of Solutions. The following studies might provide possible solutions to the problems encountered:

- a study on the reduction of the cost of essential drugs, including oral rehydration packets (JES DOSSO, 1988);
- a study on the sale and distribution of oral rehydration packets (1987);
- a study on cost recovery in health care facilities (ongoing);
- a planned study on extending the commercial system (ONPPC);
- a study on the modalities of community participation (JES 1988); and
- a search for markets for the locally-produced oral rehydration packets.

Future Prospects

The following are required for sustained control of diarrheal diseases:

- a clear policy which is widely known and applied;
- adequately trained personnel;
- decentralized planning and management systems;
- a reliable system for the supply and distribution of oral rehydration packets;

- oral rehydration packets at a price families can afford;
- prescription of ORT use when required and active promotion of disease prevention by the health care services;
- a significant change in the behavior of mothers;
- effective collaboration among the institutions involved (the public and private sectors, national and international institutions, and donor agencies); and
- the abatement of related problems (water supply and environmental health).

The following recommendations are offered:

- Efforts to integrate ORT with other health care activities and programs should be continued.
- Solutions to the identified problems (price and availability of oral rehydration packets, training and motivation of medical personnel and village health workers, and education of mothers), should be sought.
- Sociopolitical structures should be sensitized regarding the need for financing for local programs.
- The support of international organizations and donors should be obtained in the form of direct technical and financial assistance and, perhaps particularly, in the form of aid to fledgling national economies (national ORS production units).

Financing a CDD Program: The Indonesian Experience

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Introduction

The issue of health care financing in Indonesia has received much attention during the last five years. This is triggered partly by the reduction in the health budget as a result of the country's economic recession. Consequently, cost recovery and the sustainability of health care delivery deserve particular emphasis. In addition, community financing potential, revealed by several surveys initiated by the Department of Health, must be escalated.

At the present time, more efficient use of the allocated resources is considered the best strategy for addressing the budget shortage. This can be achieved by giving health development a higher priority and by more rational implementation of special programs.

In the fifth 5-year development plan due to begin in April 1989, high infant mortality rate (62 per 1000 live births) and maternal mortality rate (4.5 per 1,000 live births) will receive special emphasis. Diarrheal diseases accounted for 24 percent of the infant deaths, followed by acute respiratory infections (23 percent) and neonatal tetanus (22 percent).

This short paper elucidates the financing of the control of diarrheal diseases (CDD) program in Indonesia as part of general health care financing. Of particular importance is the fact that the substantial costs could be averted if more rational case management is implemented.

Health Care Financing and Expenditure

Expenditure patterns and financing trends in Indonesia's health care sector reflect its complex character. Funds flow into the sector from a variety of sources, including government allocations, household payments, employer and employee contributions to health care, and foreign loans and grants. The existing pattern of government finance is very complex.

The national expenditure on health from 1987 to 1988 was around Rp. 12,615.9 billion. This was equivalent to US \$9.50 per capita/per year. This figure has grown by 42.6 percent in nominal terms over the past five years. When this figure was adjusted to the 1983 constant price, however, it was evident that there had been a decline of 10 percent. When the amount of expenditure was converted into US dollars by the exchange rate in each year, it was obvious that there had been quite a drastic decline from US \$17.20 in 1982-1983 to US \$9.50 in 1986-1987.

About 33 percent of the health expenditures came from government sources, while 65 percent came from nongovernment sources, including the organized private sector (employer and insurance) and out-of-pocket expenditures.

Expenditures for curative medical care account for 76 percent of all health care spending, of which 43 percent is spent on drugs. At least 45 percent of the public expenditures and 92 percent of the private spending are for curative services. The communicable diseases control (CDC) program, which is included in the public health program budget, receives only 4 percent of the total health sector budget.

Financing the Communicable Disease Control (CDC) Program

Funds for CDC programs, including environmental health activities such as the provision of clean water and family latrines, come primarily from the government. The control of diarrheal diseases, malaria, and the expanded program on immunization (EPI) are given a high priority.

The two main sources identified for CDD programs were the government and foreign assistance. Almost all expenditures of the CDD Program were made by the central government allocated through different channels with some support from local governments (provincial and district).

The government budget, excluding external assistance, declined dramatically between 1984-85 and 1987-88. The data show a 75 percent decrease during those four years and only a slight increase in 1988-89. However, the foreign assistance component of the budget grew sharply (around six times) to partially compensate for these changes. Of the whole government health budget, 9.3 percent in 1984-85, and 6.2 percent in 1986-87 was allocated to CDC.

The average CDC program expenditure per capita was estimated at Rp. 410, or US \$0.40 in 1986-87 and around Rp. 281.60 or US \$0.20 in 1988-89.

Financing the CDD Program

The declining trend of CDC budgeting in the past 5 years necessitates better priority setting within the CDC program, if we are to achieve one of the national health development objectives, which is to lower the infant mortality rate. CDD program expenditures accounted for only 1.7 to 3.2 percent of the total CDC program. However, the environmental health program, which is closely related to CDD, accounted for substantial sums. Expenditures for the three priority programs (CDD, malaria, and EPI) increased from around 28 percent in 1984-85, 1985-86, and 1986-87 to around 50 percent in 1987-88 and 1988-89.

With reference to the main sources of financing for the CDD program, the data show a shift from government sources to foreign assistance. In 1984-85 about 88.8 percent came from the government, and 11.4 percent came from foreign assistance. In 1987-88, 36.7 percent came from the government, and 63.3 percent came from foreign assistance.

¹ Rp. is rupiah, the Indonesian currency

Over the next 5 years, the country's economic situation is not expected to improve. Other alternatives should be developed to cope with the situation.

Cost Efficiency of Diarrheal Disease Treatment Through Rational Use of Drugs

The studies conducted by MOH, with the sponsorship of A.I.D., regarding the child survival pharmaceuticals in the Indonesian public health system revealed that most of the treatment provided in the public facilities including the treatment for diarrheal diseases was still irrational. Although the use of antibiotics in the treatment of diarrheal diseases is not rational, purchasing antibiotics accounts for 40.9 percent of the total drug budget.

In West Java, an ORT campaign is now underway. This campaign promotes the rational use of drugs, oral rehydration salts (ORS), and particularly home fluids for diarrheal treatment. The campaign also seeks ways to improve private sector involvement in providing ORS down to the grass roots level so that anyone in need can easily purchase them.

The unit cost of treating one patient was reduced by 28.4 percent (Rp. 746 to Rp. 534) as a result of the decreased use of various antibiotic treatments and an increase in the use of *Oralit* to 68.1 percent of the patients after the campaign was started. Ideally, if all of the patients were treated, with only 20 percent receiving antibiotics and 100 percent receiving *Oralit*, the cost would decline 61 percent.

If it is converted to a larger scale, taking into account that the population served by a health center is 30,000 with approximately 4,200 children under five (14 percent), the savings accrued by a more rational use of drugs become more evident. It is assumed that each child has two episodes of diarrhea per year; therefore, there would be 8,400 cases in each health center. At a cost per treatment of Rp. 748 before the campaign, the total expenditure amounts to Rp. 5.3 million. It is expected that after the campaign, the referral system will function better, that only 30 percent of the cases (2,520) will be sent to the health centers, because the rest can be treated at home or at the community level. Assuming that the cases in the health center are rationally treated, the cost will be only 2,520 x Rp. 368, or Rp. 922,320. The whole savings can be around 35 percent per health center.

If these numbers are extrapolated to the total Indonesian population—185 million—the cost savings are even more evident. The number of children under 5 years is about 23 million (14 percent of the total population), with around 48 million episodes of diarrhea per year. The estimated cost for irrationally treated disease is around Rp. 34.3 billion (46 million episodes x Rp. 748) while the cost for rationally treated disease is only Rp. 5 billion (30 percent x 46 million episodes x Rp. 366). The savings can be up to Rp. 29.3 billion per year, or US \$17.2 million (US \$1 = Rp. 1700).

Integrated CDD and ARI

Efforts are now underway to integrate the control of diarrheal diseases and acute respiratory infection (ARI) which account for around 67 percent of infant deaths. In ARI control, as in CDD, irrational use of antibiotics and antimicrobics was observed.

As a first step, an integrated manual for case management has been distributed to all health centers and hospitals, while integrated training courses are being planned.

Issues in Financing CDD

The following issues are important:

- *Educating the Community.* Health education plays a key role in CDD. Better knowledge, attitudes, and practices are indispensable if the community is requested to increase its share in CDD financing. The current community action, where people are spending more on antidiarrheal drugs than ORS, should change in the near future.

- *Attracting the Private Sector.* The private sector is willing to participate in the distribution of ORS down to the grassroots level because there is sufficient demand. If this could be achieved, the burden to the government would be eased considerably. The main concern is how to generate proper ORS demand. It is believed that the government should initiate it through social marketing.
- *Training Medical and Paramedical Professionals.* Irrational case management can only be reduced by reorienting medical as well as paramedical personnel. Efforts in this regard are showing encouraging results in some institutions. It is anticipated, however, that the field results can only be seen within the next 5 to 10 years.
- *Purchasing Drugs for the Health Centers and Hospitals.* In this case, commitment from the responsible officials, particularly in drug procurement, is very important. Drug procurement should be strictly in accordance with disease patterns and rational case management.

Cost Savings in Hospitals from the Use of ORT

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Introduction

Diarrheal disease is a serious problem in Malawi, ranking third after malaria and acute respiratory infections (ARI) as a cause of outpatient visits for children from birth to 4-years of age. It accounts for 9 percent of hospital admissions for children and is one of the top five causes of death in this age group.

The National Control of Diarrheal Diseases (CDD) Program became fully operational throughout Malawi in 1985 when oral rehydration units were established in all hospital outpatient departments and integrated into the activities of health facilities. Donated UNICEF/WHO oral rehydration salts (ORS) packets are used for oral rehydration therapy (ORT).

Kamuzu Central Hospital ORT Unit

Kamuzu Central Hospital (KCH) is one of the two regional referral hospitals in Malawi. It was one of the first hospitals in the country to begin pediatric outpatient ORT activities by the establishment of an ORT unit in July 1984. Prior to that time, pediatric staff members underwent practical, hands-on training in ORT. Staff members in turn, provided ORT training to mothers in the pediatric outpatient department. The mothers administered the ORS solution to their children under the supervision of health workers.

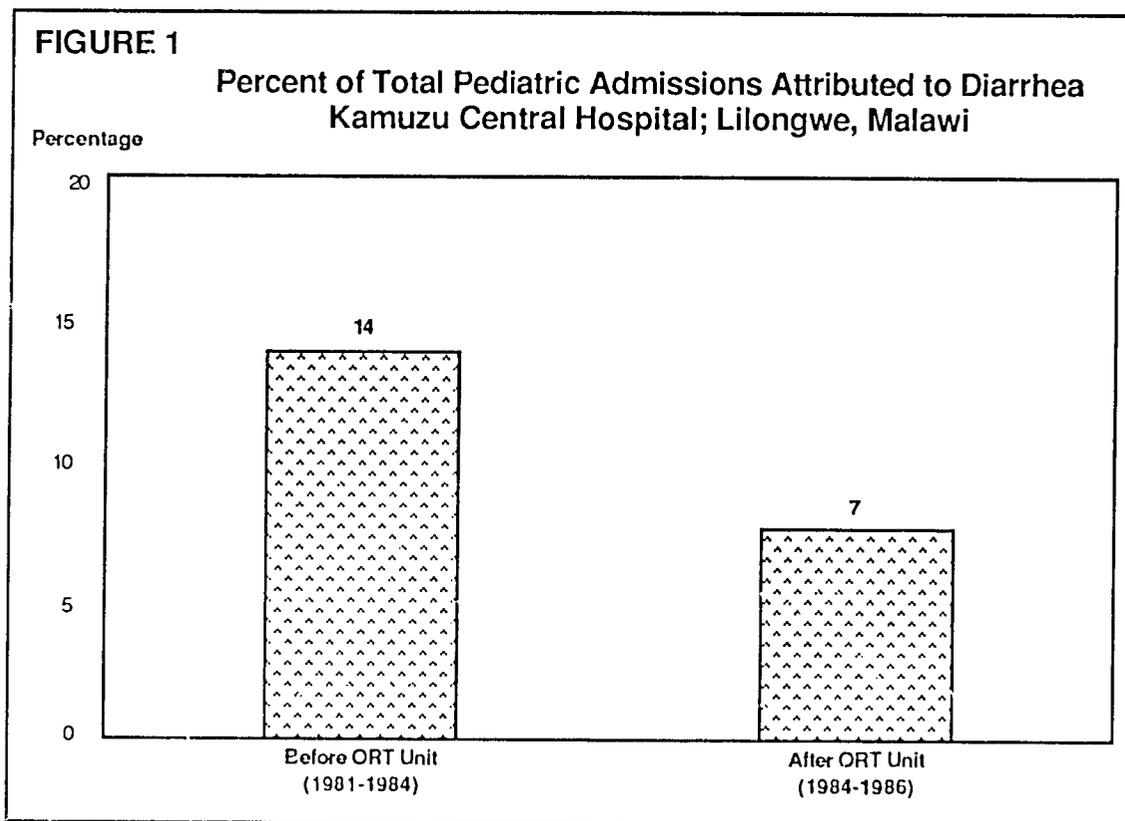
Evaluation of ORT at KCH

In October 1986, hospital inpatient records for the 5-year period from July 1, 1981 to June 30, 1986 were reviewed to evaluate several things: the impact of the ORT unit on hospital pediatric admissions for diarrhea; the impact of the refresher training on the diarrheal disease death rate and on treatment practices for acute diarrheal disease in the pediatric ward; and the impact on current costs attributable to pediatric diarrheal disease admissions.

Impact on Hospital Admissions

During the 3-year, pre-ORT unit period ending June 30, 1984, 2,548 (14 percent) of the 18,027 pediatric admissions had diarrheal disease. During the 2-year, post-ORT unit period

beginning July 1, 1984, 947 (7 percent) of the 14,131 pediatric admissions had diarrheal disease. These data show a 50 percent decrease in admissions (see Figure 1).



Impact on Hospital Practices

During the 3-year, pre-ORT unit period, 2,873 liters (1.13 liters per child) of 1/2 strength Darrow's solution were used in the pediatric ward for children with diarrheal disease. During the 2-year, post-ORT unit period, 454 liters (0.5 liters per child) were used. These data show a 56 percent reduction in the use of intravenous solution for diarrheal disease (see Figure 2).

A total of 1,479 children were admitted with mild to moderate dehydration during the pre-ORT period. Three hundred and seventeen (21 percent) were treated with ORS and no intravenous fluid, and 1,147 (78 percent) were treated with intravenous fluid as one of the treatments. A total of 638 children with mild to moderate dehydration were admitted during the post-ORT period. Four hundred and forty-one (69 percent) were treated with ORS solution alone, and 163 (25 percent), were treated with intravenous fluid as one of the treatments. The difference in percentages of children treated exclusively with ORS represents an increase of 70 percent. The difference in percentages of children treated with intravenous fluid as one of the treatments represents a 67 percent decrease (see Figure 3).

Impact on Diarrheal Disease Mortality Rate

There were 234 diarrheal disease-associated deaths during the pre-ORT unit period, representing a rate of 12.9 deaths per 1,000 pediatric admissions. During the Post-ORT unit period, there were 113 diarrheal disease-associated deaths, representing a rate of 7.9 deaths per 1,000 pediatric admissions. This represents a 39 percent decrease (see Figure 4).

Impact on Recurrent Costs Attributable to Pediatric Diarrheal Disease Admissions

The annual recurrent costs associated with inpatient treatment of diarrheal disease at KCH decreased by 32 percent from a yearly average of US \$52,162 during the pre-ORT unit period to US \$35,564 during the post-ORT unit period. This cost savings was mainly due to the marked reduction in the use of intravenous fluid (see Figure 5).

FIGURE 2

**IV Fluid Use per Diarrhea Case
Kamuzu Central Hospital; Lilongwe, Malawi**

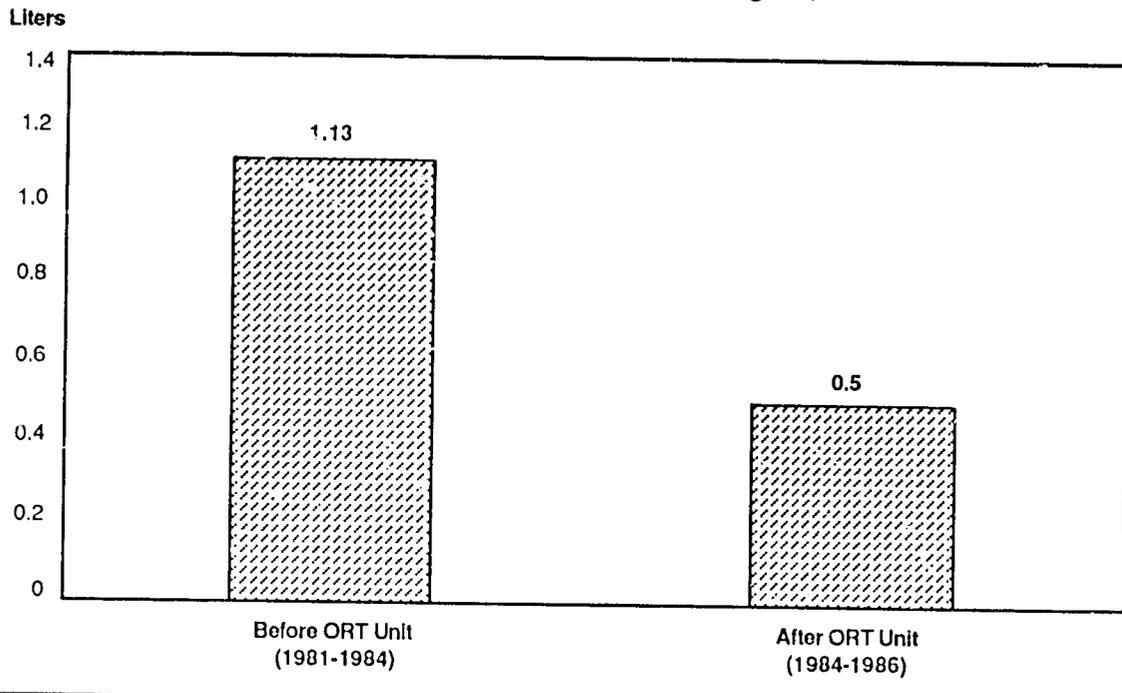


FIGURE 3

**Treatment Given To Diarrhea Cases With Dehydration
Kamuzu Central Hospital; Lilongwe, Malawi**

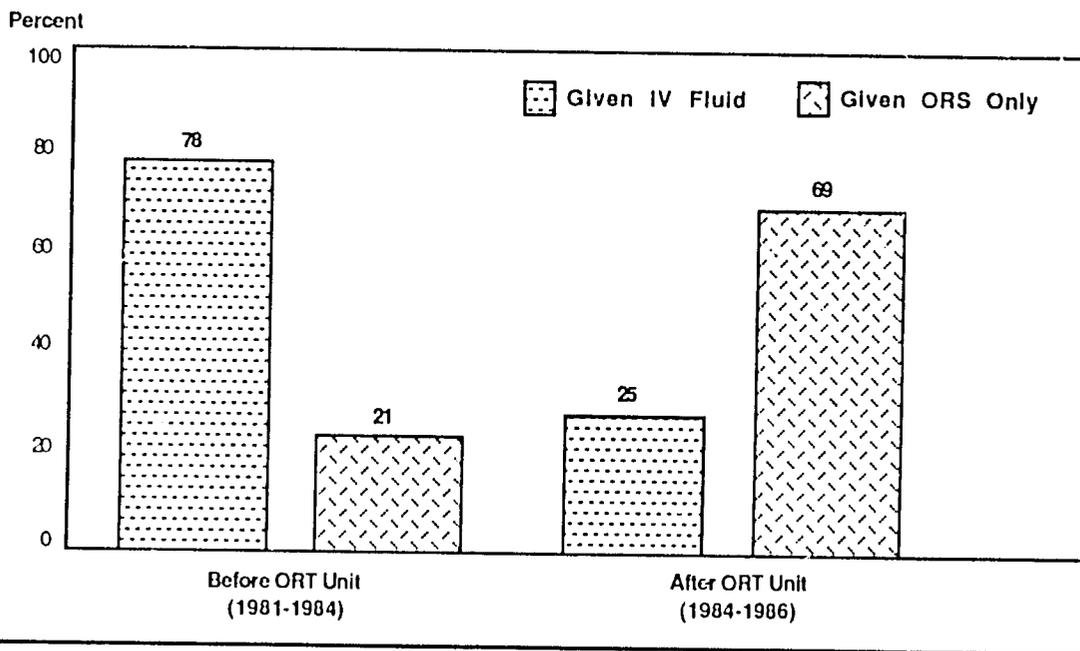


FIGURE 4

**Pediatric Diarrheal Disease Mortality Rate
Per 1,000 Pediatric Admissions**

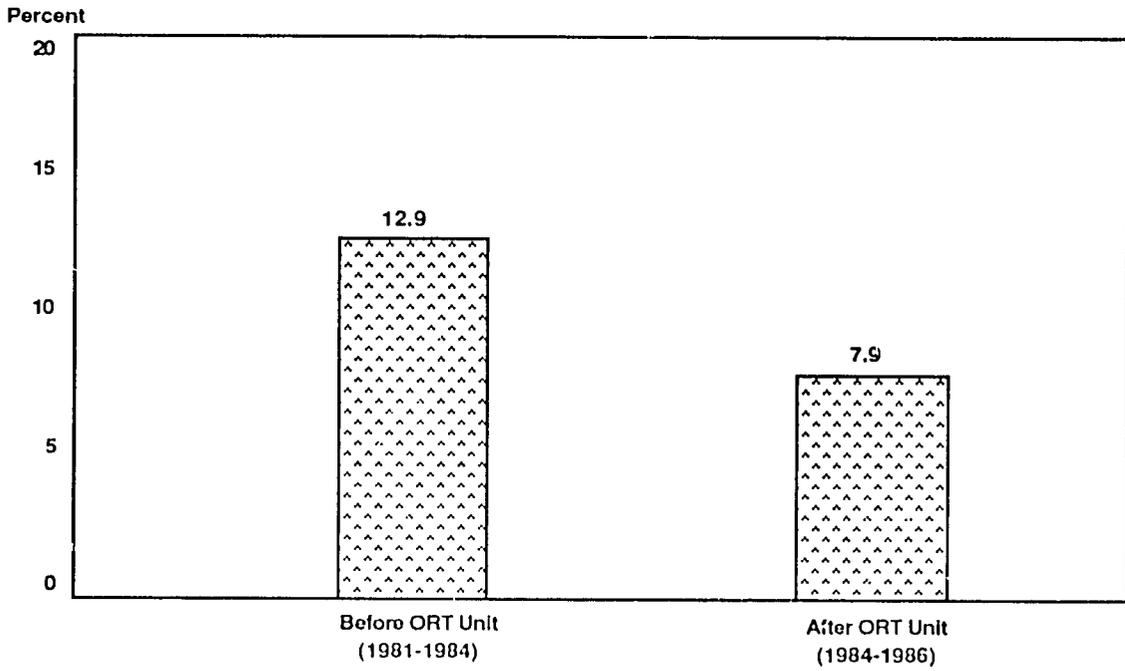
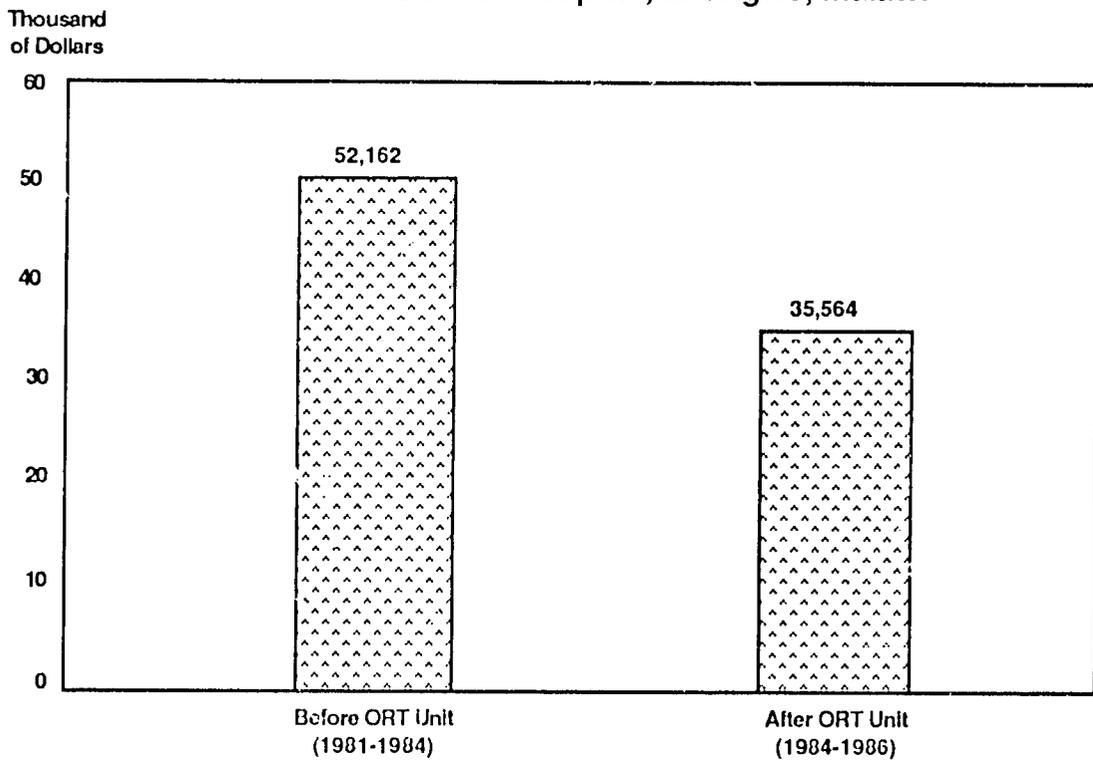


FIGURE 5

**Impact On Annual Recurrent Costs Attributable To
Pediatric Diarrheal Disease Admissions
Kamuzu Central Hospital; Lilongwe, Malawi**



Summary

During the first 2 years after the pediatric staff received refresher training in ORT and an oral rehydration unit was established at the Kamuzu Central Hospital in Lilongwe, Malawi, we saw the following results:

- a 50 percent decrease in the number of children hospitalized for diarrhea;
- a 70 percent increase in the use of ORS exclusively to rehydrate children with mild to moderate dehydration;
- a 56 percent decrease in the use of intravenous fluid for rehydration of children hospitalized with diarrheal disease;
- a 39 percent decrease in the number of pediatric deaths associated with diarrheal disease; and
- a 32 percent decrease in hospital recurrent costs attributable to pediatric diarrheal disease.

The Role of Private Voluntary Organizations in ORT/CDD Programs: The Cite Soleil Experience

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Introduction

Oral rehydration therapy (ORT) is now commonly recognized as the most cost-effective intervention for reducing deaths due to diarrheal disease. Over the past ten years, programs designed to increase the knowledge and use of ORT have proliferated throughout the developing world. Because the approaches used to achieve these objectives vary greatly and because the implementation of these programs has involved so many different players, there is a need to evaluate past achievements in order to build on what works.

In many developing countries, private voluntary organizations (PVOs) play an important role in implementing ORT and control of diarrheal diseases (CDD) programs. In most instances, these programs complement national ORT programs, but in some cases they have evolved separately. It is therefore necessary to examine both the successes and the failures of PVO participation in CDD programs.

During this presentation, I will briefly examine the oral rehydration program in Cite Soleil, an urban slum of Haiti.

The Setting: Cite Soleil

Cite Soleil is a large, urban slum on the outskirts of Port-au-Prince. The approximately 150,000 inhabitants are largely poor rural migrants who have been coming to the city since the 1960's in search of various economic opportunities. They occupy a landfill area of less than 5 square kilometers bordering the bay of Port-au-Prince, the capital of Haiti. Living conditions are characterized by crowding, lack of sanitation, and malnutrition.

As in the rest of Haiti, the incidence of diarrheal disease in Cite Soleil is high. On the average, every child has one episode of diarrhea per month. The combination of severe malnutrition and

diarrhea has led to extremely high mortality. While 3 percent of the children living in Cite Soleil are severely malnourished, 67 percent of the children under 1 year old who are dying from diarrhea are suffering from third-degree malnutrition.

Since 1975, a Haitian PVO, the Center for Health Development (CDS), has attempted to address the difficult health problems facing this community through the implementation of a number of innovative health interventions. Although the CDS program is implemented in collaboration with the Ministry of Health (MOH), in many instances, specific local interventions have preceded the national program. For the past 10 years, CDS has implemented a comprehensive health program. This program includes preventive and curative primary health care services consisting of immunization; health education; prenatal and postnatal surveillance; malaria and tuberculosis control; nutritional surveillance; ORT promotion; and hospitalization services, including major surgery.

One of the most important elements of the Cite Soleil program is the existence of a health surveillance system in which the community health workers play a key role in identifying, registering, motivating, and monitoring families living in their assigned areas. Each worker is responsible for 100-150 families and is expected to visit each household about once every two weeks to fulfill the following responsibilities:

- registration and data collection;
- promotion of maternal and child health; and
- control of endemic diseases.

During a home visit, the worker identifies cases of malnutrition, dehydration, diarrhea, etc. and refers cases to the clinic for proper care.

ORT in Cite Soleil

ORT Program Activities

ORT was introduced to Cite Soleil in a pilot project started in July 1980. An oral rehydration salts (ORS) product, *Oralyte*, was first used in an existing rehydration center located in one of Cite Soleil's CDS clinics. All mothers whose children had diarrhea were referred to the rehydration center from the different preventive and curative clinics in Cite Soleil.

Until 1980, all cases at the rehydration center were treated with intravenous glucose electrolyte rehydration therapy. In July 1980, a new policy was instituted under which mothers with children suffering from diarrhea were invited to spend the day at the rehydration center. During this time, they were instructed in the proper mixing and administration of ORS and received first-hand experience, under the supervision of a nurse, in its use. All cases with mild to moderate dehydration were treated with oral therapy, and those with moderate to severe dehydration were treated intravenously or referred to the CDS hospital, St. Catherine's Hospital. At the same time, educating mothers on the home use of ORT was initiated in the two preventive clinics of Cite Soleil and in the ten demonstration centers, the small preventive units providing health and home economics education to mothers.

From 1980 to 1983, the rehydration center was visited by over 7,500 mothers of children with diarrhea. In July 1984, however, the rehydration center was closed for the following reasons:

- Only a small percentage of the mothers being referred to the center actually went, and the total number of admissions had fallen sharply.
- By 1984, knowledge of ORT was becoming widespread and overall use rates of ORT in the community were estimated to be high.
- In 1982, oral rehydration packets had become readily available in the CDS pharmacies and community boutiques.

Although the Cite Soleil program was started in 1980, the national ORT program was not launched until early 1983. In 1982, the government of Haiti began to recognize diarrheal disease as one of the major health problems in Haiti. It was estimated that diarrhea prevalence during the preceding week was 44 percent among children birth to 5 years old resulting in an estimated 23 episodes per child per year. A review of hospital records showed that over 70 percent of all pediatric admissions were due to diarrhea and that diarrhea accounted for 80 percent of all infant deaths at the University Hospital in Port-au-Prince from 1979 to 1980. On a nationwide basis, it was estimated that diarrhea accounted for 60 percent of all infant deaths and 40 percent of all childhood deaths, resulting in over 25,000 children dying per year due to diarrhea.

The national ORT program used a decentralized, multisectoral approach. Activities planned or initiated included:

- the training of health personnel in the management of diarrhea;
- a major mass media campaign to promote ORT through radio, television, and the press; and
- a social marketing approach to support commercial retail sales of ORS packets. The ORS packets are produced locally by the Pharval Pharmaceutical Company and marketed through pharmacies and thousands of small shops, including boutiques and groceries.

Results

While the national program showed mixed and somewhat deceptive results, the Cite Soleil program resulted in a dramatic increase in both knowledge and use of ORT. National ORT sales figures for the beginning of 1984 indicated a decline in sales after a peak in the fourth quarter of 1983. However, a sample survey of the number of packets sold by vendors in Cite Soleil showed that ORS packets sold in Cite Soleil comprised 8 to 10 percent of the national sales in Haiti.

Although the Cite Soleil rehydration center was closed in 1984, the ORT promotion effort in Cite Soleil continued through the other preventive and curative centers in the city. At the national level, in the meantime, a new promotion effort was launched in 1985, after studies were made to determine the factors contributing to the decline in sales.

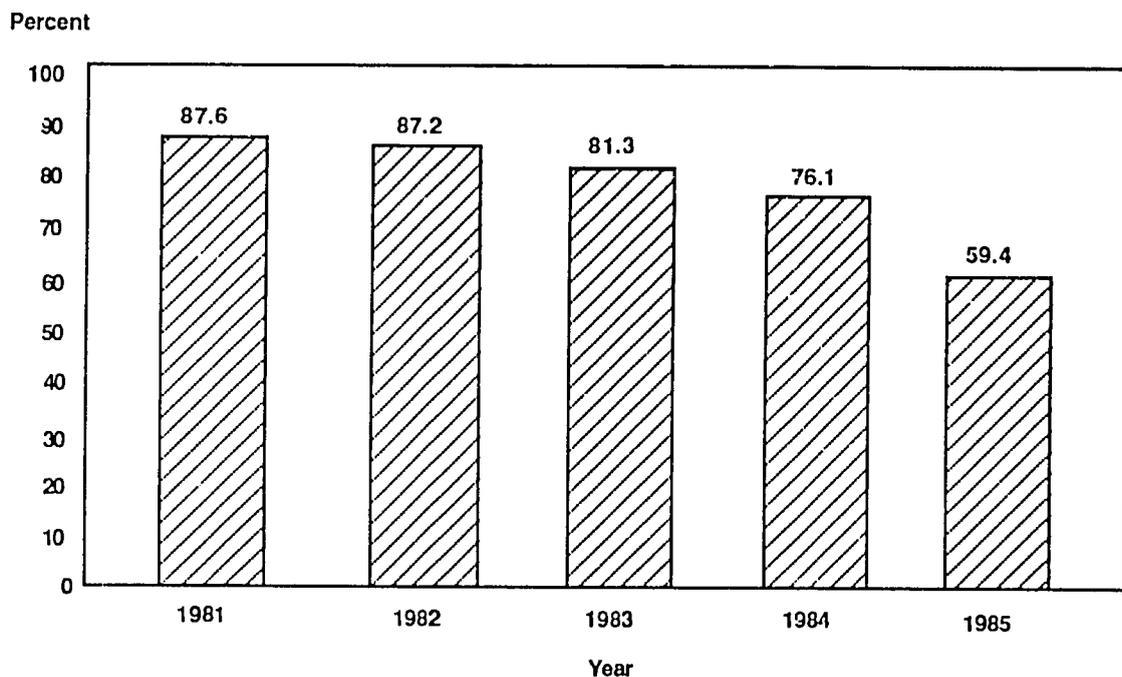
Surveys conducted in Cite Soleil, with the assistance of The Johns Hopkins and Tulane Universities, revealed that by 1985, awareness of ORT was widespread. Nearly 80 percent of the 15,627 mothers interviewed in the survey spontaneously mentioned ORT as a means of treating diarrhea. This level is high compared to the rest of the country, where mothers' knowledge of ORT in 1985 was estimated at 60 percent. Use rates were also calculated from these surveys. Seventy-four percent of all women interviewed indicated that they had used ORT. Among women, whose children had diarrhea within the past week, 93.4 percent said they had treated the children with ORT. These rates were significantly higher than the rest of the country, where the ORT use rate in 1985 was around 20 percent. A more recent national survey has shown that the ORT use rate is around 16 percent for the country and 26 percent for the urban areas.

More importantly, there was a dramatic decline in the proportion of admissions of infants (ages birth to 12 months) to St. Catherine's Hospital in Cite Soleil with gastroenteritis and/or dehydration during the five-year period, 1981 to 1985. The decline from 87.6 percent in 1981 to 59.4 percent in 1985 represents a 32 percent reduction. This decline was gradual between 1982 and 1984, with an annual decrease of about 6 percent. Between 1984 and 1985, however, the proportion of diarrheal admissions dropped sharply by 22 percent (see Figure 1). We believe that the renewed national program was having an added effect on the Cite Soleil ORT program. This decrease in diarrheal admissions to the hospital is logical since we would expect that with increased knowledge and use of ORT in the community, treatment for dehydration would begin earlier at home resulting in fewer hospital admissions.

Within the hospital itself, changes in the proportion of cases treated with ORT were observed. Nearly 90 percent of those who are admitted to the hospital are moderately to severely dehydrated. Since the hospital is a referral center, it receives only the most severe cases. Others

FIGURE 1

**Percent of Total Infant Admissions
Attributed To Gastroenteritis and/or Dehydration
St. Catherines Hospital**



are treated at the preventive clinics or at home. Despite these facts, the use of ORT has increased twofold since the hospital opened in 1981. Most of the changes occurred within the first 2 years of its operation and reflect a growing acceptance of ORT by the hospital physician. In 1981, 8.6 percent of patients with diarrhea were initially treated with ORT. The proportion of cases initially treated with ORT increased to around 19 percent in 1983 and stayed at that level through 1985.

Finally, the proportion of infant deaths due to gastroenteritis and/or dehydration at the hospital declined by 43 percent between 1982 and 1985 (see Figure 2), and case fatality rates from diarrhea dropped from 18 to 11 percent over the 5-year period.

Despite these positive results, a 1985 mortality survey failed to show a statistically significant impact of ORT on community-level and diarrhea-specific infant mortality trends. The first relates to the widespread malnutrition, infection, and unsanitary conditions prevailing in this community which may inherently limit the mortality impact of ORT as an intervention by itself. The high prevalence rate for HIV infection found in this community also remains an important factor.

The second major element involves behavioral factors that affect the proper use of ORT. Analysis of oral death histories point to several behavioral factors in mothers' management of infant diarrhea. There still appears to be a lack of understanding of how ORT works. There also appears to be an extensive use of traditional remedies, a delay in seeking medical advice, improper feeding practices, and lack of compliance with prescribed medication. All of these factors can limit the impact of ORT on the outcome of a diarrheal episode.

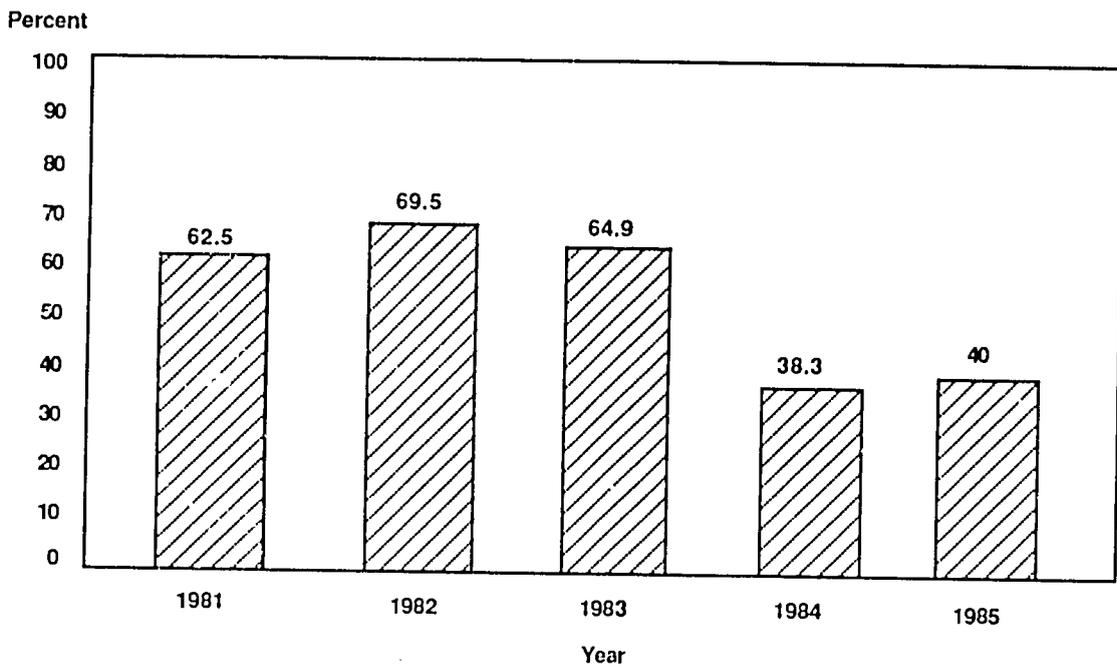
Conclusions

The Cite Soleil experience has shown that PVOs and the private health sector as a whole have an important role to play in a successful ORT program.

For these efforts to be maximized, a coordinated approach must be taken. We should avoid giving mothers in a community different sets of messages coming from various groups. While a national program at the MOH level plays a more global role, the private sector should concentrate

FIGURE 2

**Percent of Total Infant Deaths
Attributed To Gastroenteritis and/or Dehydration
St. Catherines Hospital**



on more local and individualized activities: face-to-face education, establishment of ORT centers, training of health personnel, and behavioral changes in mothers and health personnel.

Private hospitals and physicians must be convinced to change their usual course of diarrhea management in order to give a growing place to ORT. If physicians and hospitals do not use ORT, it is hard to ask mothers to do so. (The Tylenol advertising, "the pain reliever hospitals use most," comes to mind.)

Finally, the private sector can help ORT and CDD programs reach an acceptable level of sustainability through the following means:

- local production of ORT;
- establishment of a retail sales post; and
- financial support of the ORT promotion effort at the national and community levels.

Panel 6

**Evaluation,
Monitoring, and
Research**

Opening Remarks

Dr. Antoine Augustin
Director
Child Health Institute
Port-au-Prince, Haiti

As a result of the worldwide campaign to promote and disseminate oral rehydration therapy (ORT), various program and case management approaches have been developed. Some of these approaches are successful; others should be discontinued. One of the major purposes of the monitoring and evaluation process is to distinguish between what does and does not work.

The issues involved may well be illustrated using a clinical model. Let's consider, for example, a very sick patient in an intensive care unit who is hooked up to monitors that track several variables. In such a setting, monitoring is a continuous process. It is frequently computer-assisted and produces a variety of objective data that can be put to many uses and utilized at many levels. This type of monitoring also might be costly. Evaluation in the same setting implies an intermittent, subjective process that depends heavily on the quality of data produced through the monitoring process and the use of additional data obtained on a more intermittent basis.

This brief analogy illustrates some of the issues that pertain to monitoring and evaluation in general and to monitoring and evaluation of ORT programs in particular. Basically, the issues pertain to what, who, and how monitoring and evaluation should be carried out.

First is the question of *what* data need to be collected. The answer to this question tends to divide program managers into two camps: those who believe that evaluation should rely solely or principally on data produced through routine monitoring; and those who believe that evaluation should rely more on ad hoc data collected specifically for that purpose. It is evident that the data needs for the monitoring process will change as programs evolve. The types of data required when workers are being trained differ from the data needed when logistics and supply networks are being established or when ORT is used extensively and the goal is to assess the program's impact on child mortality.

Presumably, all data required for evaluation could come solely from the monitoring process. In fact, it may be argued that special data collection activities implemented during periodic evaluations are necessary only because the regular monitoring process is weak. Answering this first question therefore depends on whether collecting routine information continuously or relying on intermittent surveys strengthens the routine monitoring process.

Determining the effectiveness of an approach also depends on *who* will use the available data. At the donor and policymaker levels, decisions tend to be made on a periodic basis. Policies may be set for years to come. Policy decisions may pertain to whether mothers should pay for packets, how much reliance should be placed on mass media versus face-to-face communication, and what emphasis should be placed on packets versus homemade solutions, etc. Professor Dang Duc Trach, Manager of the Control of Diarrheal Diseases (CDD) Program in Vietnam, will present a repertoire of techniques used in Vietnam to assess program effectiveness in deciding policy.

At the program manager, service provider, and service recipient levels, however, the concern for day-to-day performance issues may lead to a greater emphasis on better routine monitoring. The closer one gets to the community—to the individual health worker, the individual mother, and the individual child—the more the monitoring and evaluation processes coincide. The mother, for example, needs to know what signs to look for in her sick child, i.e., she needs to monitor and to be able to determine whether or not her intervention is effective. Yet at the country or local level, the infrastructure that would be required to provide adequate evaluation data solely through the process of monitoring is probably beyond the reach of most governments. It would mean creating an extensive surveillance system capable of keeping records, not only of inputs but also of various outputs and outcome measures that relate to access, utilization, mobility, and mortality. The task is more complex for CDD programs because what is seen at health centers is not necessarily an accurate reflection of what occurs in the community. This is why countries also rely on special surveys.

Yet, there are some issues on which surveys cannot easily focus. Among those is the assessment of correct and effective use of ORT. This is a problem broached in a paper by Ms. Enriqueta O. Sullesia, Coordinator of the National CDD Program in the Philippines.

An even more complex problem has to do with what has been called "the frailty factor." Dr. Henry Moseley of The Johns Hopkins University has produced an interesting model—a mathematical model—that seeks to assess the impact of a given intervention in the face of competitive risks of child mortality. It may be interesting to explore how this factor can be accounted for in future survey designs. During his presentation, Dr. Ahmed Nagaty M. Adel Moneum, Executive Director of the CDD Project in Egypt, will present data from Egypt that illustrate ways that available data can be utilized to identify the independent affect of ORT on child mortality.

The third major issue is *how* monitoring and evaluation should be carried out. Anyone interested in working with the mathematical formula for assessing frailty factors or in estimating the independent affect of ORT on child mortality may well be advised to use a computer. Computers are being used at the field level for on-site data entry and editing and have proven to be an excellent tool for supervision. However, the computer is a faithful servant. If garbage is fed in, garbage will come out. It may be useful to assess the pros and cons of computer utilization in CDD programs, particularly at the field level. The appropriate use of available data may help decisionmakers identify problem areas. At times, the problems are quite obvious, even when the solutions may not be. At other times, more exhaustive techniques may be needed for proper problem analysis. The need for various operations research tools may need to be assessed.

One such tool that has proven quite useful in Haiti is a thesaurus (an inventory of program development and implementation elements, any one of which might pose problems). This thesaurus was developed by PRICOR to be used in the system analysis of child survival interventions. Problem identification is merely the first step in a process designed to lead to the development of effective solutions. Some of these solutions can be tested by sensitivity analysis; others require operations research field techniques to assess efficiency.

Behavioral epidemiology as applied to ORT has become a fertile research field. Unfortunately, some of this research has focused primarily on what in operations research might be properly called "constraints," i.e., the factors over which a decisionmaker has no control (literacy, socio-economic status, parody, etc.) rather than on variables that can be manipulated and could lead to meaningful solutions. Dr. Mutombo Wa Mutombo, Coordinator of the CDD Program in Zaire, will present data from Zaire that illustrate various ways that data can provide immediate feedback so that health workers can assess the effectiveness of their own community service work.

Returning to our mythical intensive care unit patient, we know that, regardless of its level of sophistication, a monitoring process alone cannot guarantee patient survival. A well-monitored ORT program may only lead to a well-documented failure. Yet, the converse is not equally true. A poorly monitored program may lead to an inappropriate or even catastrophic decision that might hasten the demise of a given program. Are there ways to insure that the monitoring and evaluation process itself is sustainable? This is another issue that this panel will seek to explore. One way, of course, is to make tools and methods simple and reliable enough for use. Dr. Claudio F. Lanata, General Director of the Institute for Nutritional Research in Peru illustrates how this can be done in the area of child mortality.

I will close with one final word about monitoring, evaluation, and research. We now have more than a decade of collective evidence that ORT works. Yet, hidden costs often preclude mothers from making effective use of this intervention. The monitoring process inherently favors the user. Tools are urgently needed to monitor the nonuser as well, so that we can gain a better understanding of the obstacles they face to adopting such a lifesaving intervention.

Monitoring and Evaluation in the CDD Program Implementation: The Vietnam Experience

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Vietnam's control of diarrheal diseases (CDD) program was begun in 1982 with a pilot program in four provinces. The program gradually expanded and is now operational in 35 of the country's 40 provinces, covering approximately 50 percent of the target population. The program is expected to cover 80 percent of the population by 1990.

Since the program began, considerable attention has been given to developing a monitoring and evaluation system. As a result, three national and nine regional review meetings have been held, and CDD profiles have been developed and reported. A national, comprehensive program review was also held. In addition, 43 morbidity, mortality, and treatment surveys and two case management household surveys were conducted. Briefly, the national monitoring scheme consists of passive reporting (routine and sentinel); active monitoring (through supervisory visits and surveys); and an annual comprehensive program review.

The Reporting System

The CDD reporting system includes both routine and sentinel reporting by five communes and two hospitals in each CDD province. The system is based on a standard collection form that is used in its entirety by the hospitals and in part by the peripheral health services—commune health centers, including oral rehydration salts (ORS) distribution points—to collect basic data. Monthly reports are made to the district, provincial, and regional levels. Quarterly reports are made to the national level, where the data are computerized.

This reporting system has proven to be useful for program management but has some constraints. For example, only those diarrheal episodes for which treatment has been provided are recorded. There are delays in reporting, and data collected in some communes and districts are inconsistent. Moreover, at the commune level, reporting may become a considerable burden when all the primary health care programs are considered. In some places, health workers spend nearly half their time completing forms. Another problem is that some sentinel posts have been selected largely on the basis of accessibility and thus are not necessarily representative.

Active Monitoring

Supervisory visits are very important. They help the manager better understand local conditions. They also encourage the health workers and can help workers address problems on the spot.

The Diarrheal Morbidity, Mortality, and Treatment Surveys

The diarrheal morbidity, mortality, and treatment (MMT) surveys provide useful baseline information for the program. From 1983 to 1986 there were 43 surveys conducted throughout the country, including the most remote areas. The surveys showed the incidence of diarrhea to be an average of 2.2 episodes per child per year, with the specific incidence of six episodes per child per year in children 6 to 11 months of age. The diarrhea-associated mortality was found overall to be 0.6 per 1000 and 0.9 per 1000 for 6 to 11 month olds. The diarrheal disease death ratio was found to be 14.2 percent and 22.1 percent respectively. ORS use rates are 37 percent and 1 percent in CDD areas and in non-CDD areas, respectively.

The mortality data obtained from these surveys, however, should be considered as indicators, rather than as exact rates, of diarrheal mortality for several reasons: (a) the interview measures only the diarrhea-associated mortality; (b) the sample size in the surveys was sufficient to measure

the morbidity rates but not large enough to estimate the statistically comparable mortality rates; and (c) the mothers usually do not wish to declare deaths of their children, especially the youngest ones, who have not yet been registered (birth registration is often delayed in the rural areas).

The diarrheal morbidity found during these surveys was similar to the rates found in most countries of the region. Health facilities surveys are useful in assessing the skills of the community health workers and the quality of their training.

The Diarrhea Case Management Household Surveys

Household case management surveys are useful for assessing the effects of the CDD program. Diarrhea case management household surveys were conducted in two of the densely populated provinces of the Red River Delta: Thai Binh in September 1988 and Ha Nam Ninh in November 1988. Survey results are as follows:

- The majority of interviewed mothers increased the amount of breast milk given during the diarrheal episode.
- Behavior with regard to intake of solid/semi-solid foods was less beneficial, with 36 to 54 percent of the mothers stating that they had given less food than usual to the child.
- ORS was given to 70 to 75 percent of the children, and 91 to 95 percent of the mothers who had used ORS could prepare the solution correctly. In addition to ORS, mothers gave several other homemade fluids, with rice water being the most popular among them. This reflects the increased public awareness of ORT resulting from education of the commune health center staff and the health workers in the production brigades, and the effective participation of the women's organization in the promotional activities.

During the surveys, the scores for preparing the sugar-salt solution (SSS) were low, mainly due to problems with different sizes of teaspoons in households. It is suggested that much less emphasis be placed on SSS use and that mothers be encouraged to use rice water, which is available in every household.

The National Comprehensive Program Review

A comprehensive review of the national CDD program was conducted in October 1987 by a joint government/WHO team in collaboration with UNICEF. Health facilities in three randomly selected provinces (one province for each of the three regions) were surveyed.

The review team recommended that the acceleration of geographic expansion be explored because the program had already established strong, managerial components at the central, regional, and provincial levels and acquired experience in extension activities through the country's well-developed health infrastructure.

In regard to program monitoring and evaluation, the following recommendations were made:

- Provincial profiles currently used should be revised in order to include such updated CDD program indicators as ORS and ORT use rates and the target population for CDD case management and program management training.
- The cost-effectiveness of the present data collection system should be evaluated.
- Simple diarrhea treatment surveys at both household and health facility levels should be conducted widely to monitor CDD operations at various levels.

- Since the annual review meeting methodology proved to be an efficient way to evaluate program progress and to revise workplans, the health facilities surveys should always precede such meetings.
- Problem-solving activities should be carried out on the major problem issues identified during the review meetings.

The experience of the past 6 years has shown that the successful implementation of the national CDD program was greatly facilitated by the political support of the central and provincial authorities as well as by the assistance of the United Nations agencies.

The national CDD program is seen by the Ministry of Health as an important component in the integrated primary health care activities. At the provincial level, the CDD Committee is chaired by the Vice-President of the People's Committee (the Administrative Authority of the Province), who is responsible for education, health, and social affairs and who can mobilize mass organizations such as the Women's Union, the teachers, and Red Cross volunteers in the promotion of hygiene.

UNICEF and WHO are making special efforts to support the national CDD program in providing technical guidance and material support. The national program's ORS needs are being covered by UNICEF.

As a result, the national CDD program is now becoming more sophisticated and has shown encouraging results. We are looking forward to more significant impacts as we improve the implementation quality by means of better monitoring and more practical solutions to problems that may emerge during the program's nationwide expansion. The expansion goal is to reach 80 percent of the target population by the end of the decade.

Effective Use Surveys in ORT Programs: The Philippine Experience

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In the Philippines, we conducted two surveys to obtain information on how diarrhea cases are managed in the homes by mothers and at the health facilities by the health staff. These two surveys were the Household Case Management Survey and the Health Facility Case Management Survey.

Household Case Management Survey

In the homes, we were interested in knowing whether mothers were doing something to prevent dehydration, and if so, what. Three indicators for effective case management in the home were considered: (1) increased fluid intake; (2) continued feeding; and (3) the proportion of households in which a mother was able to prepare oral rehydration salts (ORS) correctly.

Approach/Methodology

The survey was conducted using a standard cluster sample selection technique (WHO protocol). Forty clusters were selected at random from 229 barangays (villages). A cluster was covered by one surveyor who had a daily case load of 60-75 children below 5 years of age.

Forty midwives and nurses selected as surveyors were given an intensive, 1-week training in interviewing techniques. This included role playing and field practice. They also practiced assessing dehydration at a diarrheal training unit (DTU). In addition, the nine supervisors were trained in survey methodology.

The questionnaire was translated into the local language and field-tested twice. Results of the interviews were reviewed daily by the supervisors and entered onto a computer spreadsheet.

Households were canvassed, and mothers whose children had diarrhea (three or more loose, watery stools in 24 hours) within the last 2 weeks were asked about the treatment given. Those with diarrhea in the last 24 hours were asked about breastfeeding practices, types and quantities of food intake, and feeding practices before and during diarrhea. To determine the quantity of fluid intake, mothers were also asked to show the containers used to give the fluids, and to tell how much they usually give and how many times fluids were given. Mothers who used ORS were asked to demonstrate its preparation. During the survey week, health centers and public hospitals were checked for diarrhea cases coming from the survey areas.

Results

The survey found that mothers do give fluids to their children during diarrhea. However, less desirable fluids were used more often than they should have been, indicating that the program should give priority and emphasis to promoting more desirable fluids like rice water and other cereal-based fluids. Among those mothers who gave ORS, a good proportion prepared it correctly.

We are focusing particularly on the issue of ORS preparation because some mothers did not understand fully what they were supposed to do. For example, one mother used beer itself for mixing ORS after having been told to use the beer bottle as a measuring vessel. This mother was quoted as follows: "...and the child slept almost the whole day."

For feeding practices, caretakers generally did not reduce the amount of food and fluids given to the child during diarrhea.

Recommendations

From our experience, there are several points to remember if we should conduct this survey again:

- Plan carefully and thoroughly for the survey.
- Prepare a map of the area identifying the clusters with the corresponding populations for the Household Case Management Survey, which uses a cluster sampling of households.
- Gather information on target household accessibility, transportation, and the peace and order situation in the area. If central-level staff plan the survey, they should make a preliminary visit to the local health offices to lay the groundwork for the activity. Among the things to be considered are the field-testing of questionnaires, arrangements for computer use (if needed), criteria for the selection of interviewers and supervisors, communications to health and local officials, and transportation arrangements.
- Select and train surveyors and supervisors carefully because the validity of the survey depends heavily on their skill. A surveyor should be dedicated and well-motivated, "trainable," pleasant, and physically fit. Repeated practice through role plays and actual experiences at health facilities and homes, followed by analysis and discussions are valuable training components.
- Conduct tests to make sure that the surveyors can conduct the interview and complete the forms correctly. Once the surveyors are out in the field, they work relatively independently, as it is almost impossible to supervise all of them simultaneously. Field supervisors are relied upon heavily, so it is important that they know their jobs as well.

- Make sure that local health staff who act as surveyors do not survey their own catchment areas. Assignment areas should be given at least a day before the survey.
- Provide vehicles for the survey, if possible. It is more efficient if surveyors are dropped off at their areas in the morning and picked up in the afternoon; supervisors could use the vehicle during the day.
- Pay courtesy calls on, and discuss the survey with, local officials (the regional health director, provincial health officers, chiefs of hospitals, etc. as well as the mayors) in order to gain their cooperation and support. At the end of the survey, the results and the implications should also be reported to them.
- Have adequate funds to cover supplies, staff per diem, and transportation, and make them available on time. Because it is highly disruptive to the survey and demoralizing to staff to have supplies run out, program needs should be anticipated. It is important to take into account both government and donor agency policies and procedures that make it difficult to transfer funds.
- Obtain administrative and technical support, which are crucial in conducting these surveys.

Health Facility Case Management Survey

This survey was conducted in the same region where the Household Case Management Survey had been conducted a year earlier. Indicators used were correct assessment and treatment of cases in the facility, correct advice on treatment at home, and use of appropriate antibiotics.

Approach/Methodology

Ten surveyors were recruited for this survey. All were physicians who had undergone training in the clinical management of diarrhea (this was listed as a requirement for all surveyors).

The 4-day, intensive training session for these recruits included a thorough review of the questionnaires and extensive practice in using them. Practices were conducted first in classroom sessions using role plays and then in real situations at health facilities. Group discussions were held following the practice sessions to critique the results.

To gather the information, surveyors observed the actual management by the health staff where there were cases, or interviewed the staff to assess their knowledge where there were no cases. Caretakers were also interviewed to assess advice that had been given to them. In addition, clinical records were reviewed for more information on case management. The facility and supplies were also checked.

Results

This survey showed that only in about half of the interviews did the health staff have adequate knowledge of the signs and symptoms of dehydration. The signs and symptoms commonly mentioned were sunken eyes, dry mouth, decreased skin turgor, and sunken fontanelle.

For cases without dehydration, the majority of the health workers did give advice on the use of home fluids, program diet, and the importance of continuing breastfeeding. Advice on extra feeding during diarrhea, however, was not provided often. Prevention was not well emphasized.

In most cases, the health staff correctly computed the right amount of ORS. The WHO treatment chart was often used, even in hospitals by physicians. Interim intervention intended to avoid delays in treatment for severe dehydration, however, was usually overlooked. Intravenous therapy (IVT) was overused.

The majority of the caretakers were able to repeat advice on breastfeeding, home fluids, weaning practices, and the indicators for when to bring their children back for treatment.

However, less than half repeated some advice on prevention. Correct advice on diet was given but many did not receive the advice on extra food during convalescence.

The findings from the review of clinical records and interviews with health caretakers showed that the antibiotics use rate is relatively low (7 percent) and that antidiarrheals and other drugs are still prescribed or given to 10 percent of the cases.

Department of Health procedures now call for facilities to maintain a highly visible display of ORS packets and information—a so-called ORT corner. The majority (90 percent) of the health facilities had ORT corners, most of them functional, with ORS packets stored properly and the diarrhea treatment chart and some education materials displayed. However, almost half of the facilities reported that they sometimes run out of ORS. There were occasional shortages of IVT supplies. Most health facilities used logbooks to record the flow of ORS packets.

Conclusion

The results from both surveys are useful for program planning and evaluation. For instance, in our survey, we discovered that many mothers were giving inappropriate fluid therapy. Training and communication therefore should give emphasis to these aspects. At health facilities, IVT is still overused. Training again should emphasize this. By repeating these surveys, we shall also see the impact of program activities, in this case, training.

We found both the Household Case Management and Health Facility Case Management Surveys useful and would recommend these in assessing diarrhea care management in homes and at health facilities.

The Impact of CDD Program Activities in Egypt on Infant and Child Mortality

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Introduction

The control of diarrheal diseases has long been a concern of the Ministry of Health (MOH) of Egypt. One major step was taken in 1976 when the MOH began to distribute oral rehydration salts (ORS) to all of its health units. Another was taken in 1982 with the establishment of the National Control of Diarrheal Diseases Project (NCDDP), which began pilot activities in the Alexandria Governorate in 1983 and full national activities in March 1984. These national activities are being continued at this present time.

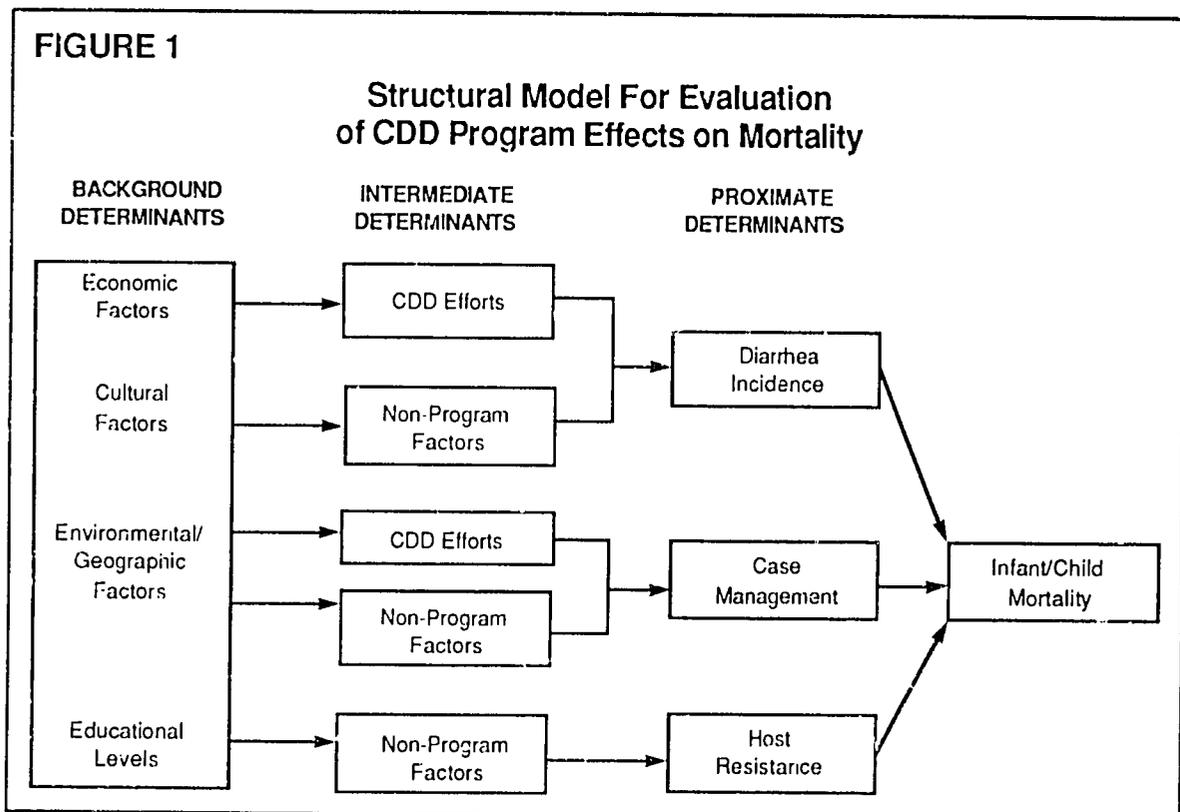
Throughout this period, the emphasis of the NCDDP has been on improving the case management of diarrheal disease, through improved feeding during episodes, proper use of ORS, and improved treatment in case of severe dehydration. Although some aspects of prevention have been included, prevention has never been a major priority of the Egyptian program. The program has operated primarily through widespread distribution of ORS, training of both public and private physicians, and aggressive use of mass media for public education and ORS promotion.

By developing country standards, Egypt over the past decade has had a well-articulated public and private health system operating in a densely settled population. Infant mortality in 1978 was estimated at slightly over 100 per thousand live births. Many of the most lethal communicable diseases had been brought under control, but the malnutrition-infection syndrome was highly prevalent. Both from official statistics and research studies, at least half of all infant and childhood mortality was caused directly by diarrheal disease. Finally, during the 1980's, there was a rapid

increase in the availability of television, so that well over 90 percent of the population now has frequent access to this medium. In sum, by 1983 Egypt had a health and communications infrastructure well suited to the introduction of a new technology such as ORS.

Methodology

To demonstrate the impact of control of diarrheal diseases (CDD) activities in Egypt, we use a *determinants model* for mortality from diarrheal disease (see Figure 1). In this model, whether a child dies of diarrheal disease is affected directly by three immediate, or proximate, determinants: incidence of diarrheal disease, host resistance, and curative care. These, in turn, are affected by various intermediate determinants, such as environmental sanitation, prevalence of disease vectors, and accessibility of health services. Underlying the system are the background determinants, including economic factors, educational levels, cultural levels, climate, etc. The Egyptian CDD program has attempted to influence curative care by health care system improvements and public education.



Program success requires an appropriate answer to the following questions:

- Was ORS made widely accessible, and has it been widely used?
- Has mortality declined, particularly:
 - during the period of greatest program activity?
 - for diarrheal disease?
 - within the most vulnerable age groups?
 - during summer, when diarrheal mortality is highest?
 - in the geographic areas where the program is strongest?

- Could other factors possibly account for the changes observed?

Program Accomplishments

The program's success in making ORS acceptable and widely used has been extensively documented, including during a presentation at ICORT II. The efforts to promote ORS since 1978 gave ORS a place among the possible therapies for diarrheal disease, and beginning in 1984 NCDDP made ORS universally available and known to all. In particular:

- Since 1978, ORS has been distributed to all government health centers.
- Since national implementation of NCDDP in 1984, ORS has been distributed to all pharmacies in Egypt and is available without prescription.
- Since 1985, there have been functioning rehydration units in over 85 percent of government health units.
- Since 1984, a program of frequent and varied television messages has been broadcast continuously.
- During the 1980's, television has become nearly universal in Egypt, so that probably well over 90 percent of the mothers have seen the messages.

National scale data from 1978 to 1983 on knowledge and use of ORS are not available. A few local studies, however, suggest that by 1983, perhaps half of all mothers had heard of ORS, and that ORS was being used in about 10 to 20 percent of diarrheal episodes. Most mothers to some extent withheld breast milk or other fluids during episodes of diarrheal disease.

By 1985, knowledge of ORS was universal, use per episode was well over 50 percent, fewer mothers were withholding breast milk during episodes, and nearly three-quarters of the mothers could mix ORS. Clearly, ORS was widely accessible and widely used.

By several measures, 1985 was the peak year for the project in terms of ORS distribution and use. Since 1986, a relative plateau has been reached, and performance has been fairly constant. ORS has become an established part of the health care system.

Mortality

Mortality in Egypt has been declining since the 1940's. In 1970, the infant mortality was approximately 110 per thousand; by 1986, it was approximately 45 per thousand. In 1970, the mortality rate for children aged 1 through 4 years was approximately 30 per thousand; by 1986, it was approximately 5 per thousand. Demographers estimate that infant mortality is underregistered by at least 25 percent, but that childhood mortality is considerably more complete. Still, the fact remains that there has been a sustained substantial decline in infant and childhood mortality both before and after the initiation of CDD activities. The greatest single-year decline in percentage terms, was in infant mortality in 1985. From 1970 to 1983 the average annual decline in registered infant mortality was 4.5 percent; from 1983 to 1986 it was 10.5 percent. For child deaths, the average decline was 9.0 percent for 1970 to 1983, and from 1983 to 1986, there was an 8.3 percent decline (see Table 1).

Causes of Death

Until recently, official data on causes of death for 1984 to 1986 were not available, but recent tabulations have provided new evidence on changes in the causes of death structure. Thus, it is now possible to separate deaths attributable to diarrhea from all other causes of infant deaths. Between 1970 and 1978 (the year when ORS first became widely available in health units), the two categories declined at about the same rate. After 1978, there was no further decline in nondiarrheal mortality, while diarrheal mortality continued to decline at the same pace. Between 1983 and 1985, infant mortality from diarrheal disease dropped from 29.1 per thousand to 15.3

per thousand, or nearly half. Nondiarrheal deaths appear to have stabilized between 1977 and 1984 at about 35 to 40 per thousand.

TABLE 1

**Infant Mortality Rates and Childhood
Death Rates, Ages 1 to 4**

YEAR	IMR	CDR 1-4
1970	116.3	32.2
1971	103.6	27.0
1972	116.0	30.8
1973	98.0	23.6
1974	101.3	21.8
1975	89.2	21.5
1976	87.5	18.1
1977	85.3	18.8
1978	73.5	13.0
1979	76.4	17.1
1980	76.0	11.3
1981	70.3	11.3
1982	70.5	13.6
1983	64.6	10.0
1984	62.0	10.4
1985	49.2	9.7
1986	47.1	7.8

Although precisely comparable figures for child deaths have not yet been calculated for the period 1970 to 1982, the same general trends seem to hold for that period. Data are available for deaths in children ages 1 to 4 for 1983 through 1986 (see Table 2). These data show that

TABLE 2

**Age-Specific Death Rates for Children Ages 1 to 4,
Diarrheal and Nondiarrheal
1983-1986**

YEAR	CAUSE	
	Diarrheal	Nondiarrheal
1983	4.03	6.00
1984	4.01	6.38
1985	2.72	6.93
1986	2.65	5.15

Source: Central Agency for Public Mobilization and Statistics.

mortality from diarrhea dropped sharply in 1985, while deaths from other causes increased somewhat between 1983 and 1985. When both infant and child deaths are aggregated, diarrhea was clearly the leading cause in 1983, accounting for approximately 40 percent of the deaths. By

1986, however, the rate of diarrheal deaths declined to the low-thirties, about the same level as respiratory infections.

I will acknowledge that cause of death is inaccurately coded in Egypt. Moreover, as the registrars are local health officials, it is conceivable that there could be a downward bias in reporting diarrheal deaths correlated with program activity, if some local registrars were trying to make their CDD activities appear successful.

To test this, we can look at seasonality of death. Diarrhea is the most highly seasonal of major causes of death. For example, in 1983, 56 percent of the registered diarrheal deaths occurred in the four summer months from May to August. If diarrheal mortality declined, the degree of seasonality of mortality should also have declined. Moreover, month of death is more accurately coded than cause, and it is highly unlikely that registrars would deliberately miscode month of death. Hence, trends in seasonality are an alternative indicator of trends in cause of death without the same potential for classification error.

Data for the summer months from May to August, between 1970 and 1986, show that the proportion of deaths due to diarrhea during those months remains more or less constant in the high forties through 1983, after which it declines sharply. Bearing in mind that 33 percent in a 4-month period represents no seasonality, it is evident that about half of the seasonality observed in 1983 disappeared by 1986.

These recently released data confirm previous impressions from mortality surveys and local area studies. For example, a double-round survey (DRS) was conducted in eight governorates each year from 1984 through 1986. Large samples of children were enumerated in the first round each year, and the same children under 2 years old were followed up 6 months later to determine survival. Mortality declined substantially between 1984 and 1985, primarily due to reduction in diarrhea-associated mortality, and there was little further change between 1985 and 1986 (see Table 3).

TABLE 3

**Mortality After 6 Months to Initial Cohorts
of Children Ages 0 to 2
(Double-Round Surveys, 1984-1986)**

VARIABLE	YEAR			PERCENT DECLINE 1984-86
	1984	1985	1986	
Number of children	10,739	10,738	8,704	—
Deaths	188	124	95	—
Rate per 1000	17.5	11.5	10.9	37.7
Diarrhea-related deaths	117	73	48	—
Rate per 1000	10.9	6.8	5.5	49.4
Nondiarrheal deaths	71	51	47	—
Rate per 1000	6.6	4.7	5.4	18.3

Source: Sinai Consultation Group, DRS reports from 1985-1988.

Several criticisms have been made of this study. There were important flaws in both design and execution, and the absence of a preproject baseline is unfortunate. However, the study has a large sample and a fairly robust design, and its results are consistent with the civil registration figures cited above.

An important local area mortality evaluation was conducted in the Dakahlia Governorate. In 1980, 29 villages were randomly allocated to experimental or control treatments. In experimental areas, ORS use during the last diarrheal episode was 53 percent, compared with 21 percent in the control areas, and diarrheal mortality to children aged 1 to 59 months, measured by verbal autopsy, was substantially lower. In a partial replication of the experiment in 1986, there was no significant difference between the two areas in either ORS use or mortality. In both areas, however, ORS use was higher, and diarrheal mortality lower, than in either area in 1980.

Examination of the civil register for the 29 villages showed that the decline in mortality was concentrated during 1983-85. Civil registration data for the whole governorate showed that the proportion of deaths occurring during the four summer months declined from 49.1 in 1980 to 36.7 in 1986, with nearly half the decline occurring in 1984.

Very recently, results have been obtained from a partially comparable situation in the Menoufia Governorate. Preliminary data from this study have already been presented in this conference. In brief, the data appear to show increased use of ORS and substantially decreased mortality, especially from diarrheal disease, between 1979 and 1988. Analysis of civil registration data from efforts to promote community-based distribution of ORS by NCDDP also appears to show a substantial decline in mortality.

Other Factors

According to the proximate determinants discussed earlier (see Figure 1) factors influencing diarrheal mortality must operate through one of three channels: incidence, host resistance, or curative care.

The incidence of diarrheal disease has been measured repeatedly between 1983 and 1988 (see Table 4). Given the different locations and methodologies, however, it is difficult to detect a clear trend; nevertheless, it seems clear that no major decline has occurred in incidence or prevalence since 1983.

STUDY AND LOCATION	MONTH AND YEAR	SEASONALLY ADJUSTED DIARRHEA PREVALENCE IN LAST WEEK
Alexandria Media Study	5/83	19.7
Double-Round Survey, 8 governorates	6/84	30.2
Double-Round Survey, 8 governorates	6/85	29.3
NCDDP KAP Study, national	11/85	39.0
Double-Round Survey, 8 governorates	6/86	26.2
NCDDP KAP Study, national	11/86	37.7
NCDDP KAP Study, national	1/88	30.7

The strongest available indicator of host resistance is nutritional status, which was measured nationally in 1978 and in some of the same sample areas in 1986. These studies show no important improvement in the nutritional status of infants and children during this period; in fact, there appeared to be some increase in severe malnutrition.

Measles vaccination has increased from 41 percent of children aged 12 to 23 months in 1983 to 76 percent in 1987. Since measles immunization begins at age 9 months, this could not have significantly affected infant mortality. Improvement in measles vaccination probably had some effect on childhood mortality, but not of the magnitude observed.

Summary

We can now provide fairly definitive answers to the questions posed in the methodology section.

- ORS has become widely accessible and widely used.

- Mortality has declined among infants and young children concomitant with the increase in the availability and use of ORS. That decline has been most overwhelming in diarrheal disease. The summer seasonality of child mortality has been greatly reduced. Geographic variability in these changes will be analyzed in the near future.
- The key proximate determinants through which potential factors other than ORS would influence mortality have not changed substantially. In terms of the proximate determinant model, it appears that incidence of diarrhea and host resistance did not contribute to the mortality decline, whereas a clear path can be established from CDD efforts through improved case management to reduced infant and child mortality.

We are unable to specify precisely the improvements in case management which have led to decreased mortality. Improved feeding of infants and children, early use of ORS, early referral for severe dehydration, and improved medical management of severe cases have probably all contributed, but their relative shares are not known.

This is the evidence presently available. New data and analyses are expected in the near future, and the evidence will be presented with greater precision and detail in the coming months. As of now, we feel that the case is clear that CDD efforts in Egypt have had a substantial impact on diarrheal mortality.

Solutions to the Problems Encountered in CDD Programs: The Zairian Model

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The Importance of Data Collection

A program's ability to demonstrate its own effectiveness plays a key role in ensuring its longevity. Thus, continuous and frequent collection of program implementation data is important. In Zaire, information is collected by two means: continuous and periodic data collection.

Continuous Data Collection Methods

There are two types of continuous data collection methods: routine monitoring and sentinel monitoring. For routine monitoring, all operating health centers (CS) are required to collect program data, which are then transmitted to the zone medical officer (MCZ) to be compiled. They are next sent to the field office and then on to the central level for microcomputer analysis.

For sentinel monitoring, 37 hospitals and 73 health centers selected to serve as sentinel posts for the program collect data on hospitalized and outpatient cases. These data are used to identify trends.

Periodic Data Collection Methods

There are three types of periodic data collection methods. First, the program's field offices and central-level staff use a supervision form, allowing them to monitor a series of indicators. Feedback is provided immediately at the site and at a later time through the supervisors' written site visit reports. Second, the field offices and MCZs conduct surveys, particularly the KAP/100 (knowledge, attitudes, and practices) home surveys and morbidity surveys, using cluster sampling techniques. Finally, external teams perform evaluations at fairly regular intervals. The last external evaluation was conducted in September 1988.

What problems were encountered? How were they solved? Which solutions were effective? Which were not? Which problems remain unsolved? How is the program dealing with them? The rest of this discussion addresses these data collection questions as they relate to four major subject headings: the information/monitoring system; supervision; packet production; and treatment of cases.

The Information/Monitoring System

- The data received by the central level was not utilized sufficiently at the local level.
- It was difficult for the central level to determine the percentage of questionnaires filled out each month at the peripheral levels.
- Several different information systems coexisted within a given health zone.
- The quality and quantity of the data were inadequate.

Remedial Actions

- The program was integrated into the national health information system (the SNIS).
- Feedback was expanded to include on-site feedback during supervision visits, written reports, and a feedback bulletin.

Supervision

Problems

- At the central level, there was a relatively limited number of supervisors.
- At the intermediate level (heads of field offices and regional medical officers):
 - the budget allocated for supervision was inadequate,
 - vehicles were antiquated, and
 - supervision was considered a routine activity that involved filling out the supervision form without providing feedback or ensuring that remedial action was taken.
- At the peripheral level (MCZs), supervision was irregular due to the officers' lack of required skills and a lack of resources (primarily for transportation).

Remedial Actions

- The team of central level supervisors was expanded.
- A multidisciplinary supervisory team (consisting of representatives of various specialized programs) was established at the level of the Fondation Nationale Medico Sanitaire (FONAMES).
- A supervision tool to be used by the different levels (heads of field offices, and regional and subregional medical inspectors) was designed and distributed.

- A training session on supervision techniques was organized for staff at both the central (the multidisciplinary team) and intermediate (regional and subregional medical inspectors) levels.
- MCZs were provided motorcycles to facilitate supervisory activities.

Production of Oral Rehydration Packets

Problems

- Local production of packets by Laboratoire Pharmaceutique de Kinshasa (LAPHAKI) was insufficient, given the program's needs (100,000 750 ml packets/month).
- Quality control for the potassium and sodium content in locally produced packets was lacking due to the unavailability of appropriate equipment (i.e., flame spectrophotometer).
- Consumers were confused with regard to the different preparation methods, due to the wide variety of suppliers and packaging for the numerous oral rehydration salts available on the market.

Remedial Actions

- Recommendations made by a consultant specializing in the production of oral rehydration packets (i.e., use of a semi-automatic machine given the local hygrometric conditions and the voltage drops in the electrical system) were implemented.
- A special packaging unit within LAPHAKI for ORS packets was constructed.
- The program adopted a requirement that LAPHAKI perform quality control procedures for each ingredient and each batch produced, with the program being informed of the test results. The program also obtained and now utilizes a flame spectrophotometer. The program is considering the possibility of having another laboratory cross-check each procedure.
- Instructions for the utilization of the different types of ORT packets on the market were prepared and disseminated to health care facilities, pharmacies, and the population.
- A self-financing system was established for the replenishment of a revolving fund to purchase ORS packets for restocking purposes and to finance given program activities.

Treatment of Cases

Problems

- Initially, there was no national formula for the preparation of the salt-sugar solution.
- The ingredients required to prepare the solution (particularly sugar in the rural areas) were not available in all areas.

- Mothers and health professionals did not know the amount of fluids (SSS and ORS) to be administered to the child.
- Antidiarrheal and antibiotic drugs were routinely administered in health care facilities.

Remedial Actions

- Using an anthropologic approach, a national formula was developed for the preparation of the salt-sugar solution using commonly available measuring devices.
- The utilization of other home preparations (rice water, sorghum, or corn gruel) was promoted.
- A practical training program on ORT for MCZ and nursing supervisors was developed. Because of the country's size, this program was decentralized through the establishment of ORT training centers in the different regions.

Summary

All these, and many other, problems are encountered by CDD programs. In order for these programs to succeed, they need competent, energetic, enthusiastic, and dedicated human beings who must be empowered with the necessary means—financial and political—to overcome these numerous obstacles.

New Approaches to Evaluate the Impact of CDD Programs on Mortality

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Previous Evaluation Strategies

Health surveys have frequently been used to evaluate the impact of the control of diarrheal diseases (CDD) programs on mortality. Before conducting a survey to evaluate a CDD program, however, indicators should be established that show that the program has been implemented as designed and that an impact on mortality is a reasonable expectation. We also need to recognize that the program will not be implemented in isolation and that all changes seen are not necessarily the result of the program. A decline in mortality might well be due to factors other than the CDD program. This creates serious methodological limitations in generating data that prove that an impact on mortality has occurred as a result of the CDD program. Thus, while impact on mortality is the most needed indicator of the CDD program's success, it is also the hardest to document.

WHO has accumulated many years of experience while conducting 267 surveys where mortality levels were estimated. The general feeling has been that the quality of the data has been unreliable because of inadequate training and supervision, cultural taboos on talking about death, suspicion and fear of unknown surveyors inquiring about deaths of children, and time pressures. (Because of the need to cover a large sample size in a short period, there is not sufficient time for adequate questioning on such a sensitive issue.)

Also, some WHO survey results have not been usable, either because the mortality data were inconsistent or because results were hard to interpret, as they were different from common sense expectations. Some surveys had limitations because small sample sizes made it impossible to document a statistically significant decline in mortality. Moreover, imprecise survey results indicating a low mortality level are sometimes used for political reasons when this has been convenient.

Many of these problems can be corrected if surveys are conducted properly, i.e., under close supervision and in areas where cultural factors may not affect the survey results. More importantly, mortality surveys should have follow-up surveys in the same places, in order to rectify deficiencies in data quality and to measure trends in mortality. Unfortunately, because of cost and time limitations, follow-up surveys are rarely conducted.

There is a need to develop simplified survey methods that can be easily taught to surveyors and that carry a minimum risk of being affected by respondent misstatements. Traditional survey methods used to estimate childhood mortality include full maternity history; the indirect Brass technique (asking mother's age, the total number of ever-born children, and how many are alive); the truncated maternity history (regarded as the most reliable and economic method), where only births and deaths that occurred up to 5 years prior to the survey are considered; and another maternity history method where births and deaths of children within the 12 months prior to the survey are recorded (considered the least reliable method). All these methods have the risk of reporting errors because of omission of deaths of very young infants, and/or misstatements of age or timing of events. The indirect method assumes that the decline in mortality does not change over time. Finally, all of the methods are hard to teach.

Preceding Birth Technique

A promising new method is the *preceding birth technique* (originally described by Macrae in 1979 and reported by Brass and Macrae in 1985). It consists of asking women giving birth for at least a second time if their previous live-born child is still alive. This provides data to be used in estimating the probability of children dying up to age 2. The preceding birth technique is based on the assumption that the mean birth interval is fairly constant in developing countries (the constant is around 30 months). With this estimate and a standard life table, infant mortality can be estimated.

Advantages and Disadvantages

The preceding birth technique is more advantageous than traditional survey methods in that it asks about survival instead of deaths. Field staff are easily trained, and the information is easy to obtain, making this an inexpensive venture. Dates of events are not required, thereby reducing the risk of misstatements of timing. Data already collected in hospital records can be used, and with repeated use, mortality trends can be easily obtained.

The preceding birth technique does have limitations, however. It provides *average* mortality estimates over a variable period preceding the interview, limiting the ability to detect current trends. Changes in fertility or the prevalence of contraceptive practices can affect mortality estimates and distort mortality trends. Also, because of the need to use mothers with at least one previous birth, it selectively eliminates mothers with only one delivery. Many of these may be very young women whose children could have higher mortality rates than those of other women with more than one delivery. Finally, if the method is applied in a hospital or similar setting as originally intended, it introduces a selection bias by interviewing only mothers with access to health services. This selection bias could be based on socioeconomic factors, level of education, parity, rural-urban locations, and age of mother, all of which are also determinants of child mortality.

Field-test Results

To test the feasibility of using the preceding birth technique in health surveys and thereby eliminate the selection bias introduced when the method is applied in a hospital setting, three doctors—Drs. Allan Hill and Alejandro Aguirre, from the Center for Population Studies, London School of Hygiene and Tropical Medicine and Dr. Roberto Del Aguila, from the Instituto de Investigación Nutricional—conducted a survey in the peri-urban area of Lima, Peru. They

compared mortality estimates obtained using traditional survey methods (the indirect Brass technique and the truncated maternity history mentioned earlier) with estimates obtained from the preceding birth technique. Also, an attempt was made to collect cause-specific information on deaths detected in order to estimate diarrheal mortality. Since the preceding birth technique was developed to be used in women who had just given birth, the method was modified in the survey by interviewing women with more than one live birth in the 24-month period prior to the survey. The survival of the child prior to that last delivery was obtained. This added the need to obtain the time since the last delivery, in order to correct for the period since the last birth.

The survey, which was conducted by two teams of eight surveyors and one supervisor each, took 3 weeks to complete. A two-stage cluster technique was used, with 30 clusters selected by systematic sampling. A total of 7,542 women aged 15 to 49 were interviewed. The sample size was adjusted to reach the needed 1000 preceding births. Analysis of the data concerning the distribution of the women's ages, the ratio of boys to girls, the monthly distribution of births, and the monthly distribution of deaths detected, confirmed the findings of the Lima study. Only some omission of dead children born near the time of the survey as well as those born further back in time was seen.

Results obtained by each method were adjusted using a standard life table. Estimates of childhood mortality at age 2 were very similar among the different methods used. It is important to point out that the use of the preceding birth technique in surveys like this will provide estimates on deaths that occurred a mean of 3 years prior to the survey time.

In relation to cause-specific mortality, of the 200 deaths detected in the last 5 years, 30 percent of the women mentioned that diarrhea had been present at the time of the child's death. This rose to 39 percent after probing. However, mothers thought that diarrhea was the cause of death in only 17 percent of the cases, while the surveyors thought that 29 percent of the deaths were diarrhea-related. These variances show some of the problems faced when obtaining cause-specific mortality in health surveys using verbal autopsies. Obtaining good estimates on overall mortality can be an adequate achievement.

Summary

Despite its large sample size requirements, the preceding birth technique, which takes only a little more time than expanded programs on immunization surveys seems to be a feasible method for conducting health surveys. Its results correlate reasonably well with those of standard methods of measuring mortality. These results need to be confirmed by additional trials, ideally in countries where mortality has been recently estimated. It should be used primarily to monitor mortality trends identified in repeat surveys. If the technique is to be adapted to household surveying, however, the need to obtain the date of birth of the last-born child should be noted. Nevertheless, the preceding birth technique does appear to be a promising addition to our array of methods for estimating child mortality, even though cause-specificity is still a significant problem.

Panel 7

**Linkages with
Related Programs**

Opening Remarks

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This session will examine several fundamental issues that will greatly influence the development of control of diarrheal diseases (CDD) programs in the 1990's. The first concerns the advisability of establishing linkages between CDD programs and other programs and activities. The second looks at when in the implementation process a particular linkage should be established. The third examines how a linkage can best be effected at minimal cost.

These three issues will be discussed today from the point of view of CDD programs that emphasize oral rehydration therapy (ORT) and diarrhea case management but are seeking to establish linkages with other program and management activities. These program and management activities might include those involved with the prevention of diarrhea, such as breastfeeding and water and sanitation programs; those involved with nutrition and growth monitoring; those involved with the integration of institutional procedures, such as a drug distribution system or a health information system; and finally, those activities, such as inservice training and health education, that are being carried out by other primary health care programs. The resources required for establishing such linkages vary for each of these program areas and each of these management activity types as does the potential for their either contributing to or interfering with diarrheal control efforts.

Breastfeeding, for example, should probably be given high priority in diarrhea prevention, as the incidence of diarrhea in infants breastfed exclusively is 25 times less than the incidence of diarrhea in those who are not. However, consideration must be given to the feasibility of CDD program personnel conducting a breastfeeding campaign since it could involve changing hospital policy, training midwives, and teaching mothers. Other issues to be addressed are the methods for promoting breastfeeding through diarrhea public education activities. Will diarrhea case management messages be made less effective by adding breastfeeding messages? What are the options to CDD program personnel conducting a breastfeeding campaign? Should a separate vertical program be established, thereby creating additional layers of management responsibility that will stretch from the national to the peripheral levels? These represent just a few of the issues that require discussion prior to making final decisions as to if, when, and how to become involved with breastfeeding interventions thought to be effective in reducing the incidence of diarrhea.

Water and sanitation programs present a different set of issues than those of breastfeeding. With water and sanitation, the major issue is one of structure. These programs are often managed outside the ministry, and the thrust is usually one of construction rather than education. How then should CDD and water and sanitation programs be linked? Perhaps establishing steering committees, using epidemiologic studies by CDD programs to target priority drilling areas, or simply ensuring the consistency of educational messages could achieve such a linkage. At a higher level, decisions must be reached on how to best distribute resources between CDD and water and sanitation programs, with due consideration given to such issues as the potential for reductions in morbidity and mortality, cost effectiveness, and sustainability. Finally, the probability of a particular intervention working in a specific environment must be weighed in context of both its cultural and bureaucratic settings.

Some areas of potential CDD linkages are more easily addressed than others. For example, given the important interactions between diarrhea and nutrition, the underlying issues become not whether to develop linkages but rather how and when to do so. Of course, the questions that remain are not all that easy to answer. Such questions include: Should supervisory and training activities for CDD and nutrition be combined? and Should health education activities be the first common activity to be integrated?

Sometimes success in controlling diarrhea depends on activities that fall outside a CDD program's control. The distribution of ORS packets could depend on the expanded program on immunization (EPI) vaccine distribution system; disease monitoring might depend on an

integrated health information system; and preservice education could depend on teaching institutions outside the public sector. The important issue regarding these types of linkages is to what extent should CDD programs assume responsibility for improving these elements of the infrastructure.

Finally, in order to lessen the demands of supervision and management, reduce costs, and increase efficiency, CDD programs have frequently been integrated with other primary health care efforts such as EPI. A major advantage of this approach is the increased potential for sustainability as donor support wanes. A possible disadvantage is the decreased effectiveness of CDD programs as they are overshadowed by larger and better funded programs.

In conclusion, few question the need to move beyond training in ORT and diarrhea case management in order to consider the range of linkages that could exist with other programs and activities. As these linkages are being considered, however, it is important to examine each as to its potential for decreasing program effectiveness, complicating the management process, and increasing the cost. The issues of whether or not to establish active linkages, when to establish these linkages, and how to establish these linkages remain as major challenges to the development of CDD programs in the 1990's.

Today's speakers are: Dr. Carlos A. Monteiro, Adjunct Professor in the School of Public Health at Sao Paulo University, who will discuss the reduction of infant mortality through breastfeeding programs; Dr. Ruth Engo, Consultant to the United Nations Development Programme, who will speak on how water and sanitation programs contribute to the prevention of diarrhea; Dr. Gao Shufen, Director of Maternal and Child Health of the Ministry of Public Health, People's Republic of China, who will discuss how prevention affects CDD programs; Dr. Sutoto, Chief of the Subdirectorate DDC in the Indonesian Ministry of Health, who will present the mutual benefits of linking CDD and nutrition programs; and Dr. Vijay Kumar, Associate Professor of Community Medicine at Chandigarh Post Graduate Institute in New Delhi, India, who will discuss the experiences of primary health care programs in management of diarrhea, respiratory infections, and immunization delivery.

Is It Possible to Reduce Infant Mortality Through Breastfeeding Programs? The Case of Sao Paulo City

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The influence that the pattern of infant feeding has on the health of the child is well established in the literature.² Although breastfeeding has been the natural and unique method for nourishing newborns for millions of years, the practice lost a great deal of its momentum in this century.^{3,4} Nevertheless, from the mid-70's and throughout the 1980's, we have noticed clear tendencies toward a return to breastfeeding in developed societies.^{5,6,7,8} Although the impact of this phenomenon has not yet been clearly assessed, various beneficial consequences may be foreseen, mainly in relation to child development and the prevention of allergic and metabolic diseases. Very recently, tendencies towards a return to breastfeeding in Third World countries have been documented.^{9,10} In light of the more severe problems that accompany early weaning in Third World countries, it is legitimate to hope that even more significant benefits for infant health may be obtained, including large reductions in morbidity and mortality from diarrhea.¹¹

In this presentation I will seek to answer the question: Can infant mortality be reduced through a program to improve breastfeeding? The discussion will be based on Brazil's experiences with a large national breastfeeding promotion program.

A far-reaching national program for the promotion of breastfeeding was launched in Brazil in March 1981. It was large, complex, and essentially vertical and autonomous. It included a number of components. First, it emphasized use of mass media approaches to promote breastfeeding,

the first time that public health workers had taken advantage of modern approaches to health promotion.

Second, the program trained health personnel in the practical aspects of breastfeeding. This training went beyond just presenting the advantages and modern knowledge of breastfeeding, and taught health workers practical ways to deal with sore nipples, how to advise a working mother to deal with breastfeeding, how to maintain exclusive breastfeeding for four to six months, and so forth.

Third, the program worked to change practical routines of the health services to encourage practices that would support breastfeeding. This included seeking to avoid the separation of mother and infant in maternity hospitals after delivery (rooming-in), and avoiding the free distribution of infant formula samples in health centers.

Other components of the national program included controlling advertising of the infant formula industry according to the WHO codes, and assisting the formation of mother's groups.¹²

The evaluation of the national program was carried out in Sao Paulo and Recife, two large Brazilian cities. The data which will be presented was gathered only in Sao Paulo. The evaluation was carried out using two surveys, one in March 1981 before the program began, and the other in 1987, using the same methodology.

The knowledge and attitudes of pediatricians before the program were not supportive of breastfeeding. Few pediatricians recommended breastfeeding in maternity hospitals after delivery, and almost none recommended exclusive breastfeeding through 6 months of age. Only a small percentage recommended exclusive breastfeeding for even one month! The repeat survey after the program showed substantial changes in these behaviors by physicians. Physicians had begun to actively support breastfeeding. Surveys in the biggest metropolitan area of the country—Greater Sao Paulo—before (1981) and after the implementation of the national program (1987) revealed a considerable improvement in breastfeeding indices.¹³ Table 1 shows that full or exclusive breastfeeding was extended from 6 weeks to nearly 10 weeks, while breastfeeding of any sort was extended from 3 months to 4 months. While these increases are certainly modest, the analysis which follows shows that even these rather small increases can lead to important changes in infant mortality and diarrheal mortality. Taking into account estimates of the risk of infant deaths according to the type of feeding, I will attempt to calculate the impact that the Brazilian breastfeeding program has had on the infant mortality rates in Greater Sao Paulo.

TABLE 1

**Average Duration* (in days) of Breastfeeding Before and After
The National Breastfeeding Program
(Greater Sao Paulo, Brazil, 1981-1987)**

YEAR	SAMPLE	FULL BREASTFEEDING	FULL OR PARTIAL BREASTFEEDING
1981	300	43.2	89.4
1987	380	66.6	127.5

* Estimated by the "current status" method (19) in random samples of zero to eight-month infants attending health services in the metropolitan area of Sao Paulo (Source: Rea and Berquo [15]).

Estimates of the risk of infant death by infectious disease in accordance with the type of milk fed to the child are provided in Table 2. These estimates were established on the basis of a case control study conducted in two Brazilian cities with characteristics similar to those of Sao Paulo. Particularly high risks were observed with regard to diarrheal and respiratory infections, especially during the first two months of life. The data show that, for these diseases, full breastfeeding gives greater protection than partial breastfeeding.

Table 3 provides estimates related to the isolated effect that the favorable advance of breastfeeding in Sao Paulo could have on the rates of infant mortality from infectious diseases. These estimates are calculated on the basis of two elements: the distribution of the methods of

feeding (full breastfeeding, partial breastfeeding, and artificial feeding) observed in 1981 and 1987; and the risks of death associated with them. Seeing that these risks were differentiated in accordance with age, the anticipated reductions for the age groups from zero to two months and from two to twelve months were calculated separately. The greatest potential impact relates to mortality from diarrhea in the first two months of life, which, theoretically, could be reduced by almost 50 percent. Considerable reductions (slightly above 20 percent) also can be estimated for later deaths from diarrhea and for deaths from respiratory infections at all ages. Smaller reductions (of between 15 and 20 percent) can be estimated for other infections.

TABLE 2

Relative Risk* For Infant Mortality Due To Infectious Diseases at Different Ages According To The Use of Human Milk (HM) and/or Cow's Milk (CM). (Southern Brazil, 1985)

CAUSE OF DEATH	FIRST 2 MONTHS			2 TO 12 MONTHS		
	HM	HM + CM	CM	HM	HM + CM	CM
	Diarrhea	1.0	5.3	23.3	1.0	2.2
Respiratory Infection	1.0	2.2	4.1	1.0	1.3	3.4
Other Infectious Diseases	1.0	1.0	1.9	1.0	1.0	2.0

* Estimated by case-control study taking into account as confounding variables social status, birth weight, maternal education, family income, type of housing, availability of piped water, birth interval and whether or not non-milk supplements were given (Source: Victora et al. [13]).

TABLE 3

Expected Reduction In Infant Mortality Due To Infectious Diseases According To The Increase of Breastfeeding (Greater Sao Paulo, Brazil, 1980 to 1987)

CAUSE OF DEATH	PERCENT REDUCTION	
	FIRST 2 MONTHS	2 TO 12 MONTHS
Diarrhea	46.5	22.8
Respiratory Infection	23.1	21.6
Other Infectious Diseases	16.5	18.3

The percentage reduction expected for mortality from diarrhea, from respiratory infections and from other infections is given by the general formula:

$$\frac{M1 - M0}{M0} \cdot 100$$

where:

$$M0 = a0 \cdot rx + b0 \cdot ry + c0 \cdot rz$$

$$M1 = a1 \cdot rx + b1 \cdot ry + c1 \cdot rz$$

and a_0 , b_0 , and c_0 are the frequencies of the three modalities of feeding at the starting point (1981); a_1 , b_1 , and c_1 are the same frequencies at the final point (1987); and rx , ry , and rz are the risks of infant death (by diarrhea, respiratory infection, and other infections) associated with the three modalities of feeding, respectively. For the two first months, the feeding distribution found at the age of 30 days was taken as the basis for calculation ($a_0 = 36.8$ percent; $b_0 = 22.5$ percent; $c_0 = 40.7$ percent; $a_1 = 47.7$ percent; $b_1 = 36.6$ percent; $c_1 = 15.7$ percent). Between 2 and 12 months the feeding distribution found at the age of 7 months was taken as the basis ($a_0 = 10.0$ percent; $b_0 = 15.0$ percent; $c_0 = 75.0$ percent; $a_1 = 14.0$ percent; $b_1 = 17.0$ percent; $c_1 = 59.0$ percent).

There were also considerable reductions in infant mortality from infectious diseases in Greater Sao Paulo between 1980 and 1987 (see Table 4). The decline in diarrhea cases (72.8 percent) was particularly noteworthy. Taking into account the estimated reductions based on the isolated effect produced by the improvement in the feeding patterns (given in Table 4), it may be seen that about half of the real fall in mortality from diarrhea could be credited to breastfeeding. Breastfeeding must have made a similar contribution to the reduction of mortality by respiratory infections and other infectious diseases.

TABLE 4

**Infant Mortality Rates (IMR), Global Reduction, and
Reduction Attributable To Positive Breastfeeding Trends
(Sao Paulo City, Brazil)**

CAUSE OF DEATH	IMR*		GLOBAL REDUCTION (A)	REDUCTION ATTRIBUTABLE TO BF TRENDS (B)	(B/A)
	1980	1987			
Diarrhea	10.67	2.90	72.8%	32.3%	0.44
Respiratory Infection	12.22	6.45	47.2%	22.3%	0.47
Other Infectious Diseases	2.94	1.94	34.0%	17.7%	0.52
Other Causes	29.34	25.63	14.5%	0.0%	0.00
All Causes	55.17	36.92	49.4%	11.8%	0.24

* Deaths per thousand live births (Source: Fundacao SEADE).

When the overall evolution of infant mortality in Sao Paulo is considered, it can be said that at least a quarter of the considerable fall in mortality observed between 1980 and 1987 (49.4 percent) must have been brought about by the improvement in the patterns of breastfeeding (considering, in this case, that breastfeeding has no protective effect as regards mortality arising from noninfectious diseases).

It is important to recognize that the estimates calculated in this study are based on statistics subject to some lack of accuracy. Even though it cannot be declared a priori that this lack of accuracy has produced over- or under-estimates of effects, it is clear that the figures calculated should be taken as simple approximations to the potential impact that the encouragement of breastfeeding must be causing on the mortality rates.¹⁴

It is equally certain that the favorable results observed in Sao Paulo cannot be directly extrapolated to other Brazilian contexts and, still less, to those of other countries. The impact on infant mortality on a program promoting breastfeeding would depend both on the existing pattern of breastfeeding in the population, and also on the pattern of infant mortality, particularly the role of diarrhea and other infectious diseases as causes of death and the distribution of deaths by age. In a situation where, as in Sao Paulo, the practice of early weaning was prevalent and diarrhea was an important cause of death, one might expect that a successful breastfeeding promotion program would have an impact on infant mortality similar to that seen in Sao Paulo.

An additional aspect to consider is the possibility of promoting breastfeeding successfully and reversing the trend toward abandoning breastfeeding. The possibility of success would depend on the factors contributing to the decline in breastfeeding and on the resources made available to the breastfeeding program.

One last consideration arising from the Sao Paulo experiment reinforces the importance of the encouragement of breastfeeding as an effective measure in the fight against infant mortality. This consideration concerns the fact that the favorable results registered were obtained with only modest progress in the frequency of breastfeeding. The average duration of full breastfeeding did not even reach three months. In fact, an assessment of the Sao Paulo program revealed that

several components had not been satisfactorily implemented. Noteworthy was the still inadequate guidance given to mothers about breastfeeding by the antenatal services, and the small proportion of maternity hospitals that adopted the system of rooming-in.¹⁵ Despite these program deficiencies, changes in breastfeeding practices did occur, which had the impact on mortality that you have seen. This allows one to suppose that the potential benefits of the encouragement of breastfeeding in terms of mortality could in fact be still greater than was originally estimated. These findings lead me to conclude that breastfeeding promotion should be an important component of national efforts to control diarrheal diseases.

Footnotes

1. The paper was co-authored by Marina Ferreira Rea and César Gomes Victoria. These co-authors did not attend ICORT III.
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The Role of Water and Sanitation Programs in the Prevention of Diarrhea

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First of all, I would like to emphasize that diarrhea is a symptom of underdevelopment and an indicator of hygiene-related problems. Its incidence demonstrates a lack of knowledge, which leads to poor sanitation practices. Therefore, the solutions to the elimination of diarrhea should

be intersectoral—they should involve not only the medical field, but more importantly the community, because prevention really demands people's participation.

Should there be a quarrel between ORT and water and sanitation programs? I think not. ORT is curative, and when a mother takes a child to a pediatrician, she expects the child to be treated. Therefore, it is not an imposition. Water and sanitation programs, on the other hand, are preventive, and the important aspect of this prevention is that it eliminates a cause of diarrhea. These preventive measures, therefore, cannot be postponed.

Returning to the role of a water and sanitation program, the question to be answered is: Would a water and sanitation program prevent the spread of the causes of diarrhea? To answer this question, three points need to be stated:

1. Water and sanitation will prevent diarrhea if water is available and if hygiene education is available in the community.
2. Water and sanitation do prevent diarrhea when they lessen the burden of women watercarriers and give them more time to engage in productive activities that will indirectly affect the incidence of diarrhea.
3. Water and sanitation prevent diarrhea by helping the community to sustain the equipment. In so doing, community members participate in a longer-term strategy for diarrhea prevention.

Prevention is Influenced by Water Availability and Hygiene Education

The first point again is that water and sanitation prevent diarrhea only if water is available. This means that you cannot ask people to wash their hands and drink clear water if there is no water. The community's hygiene education, based on sanitary practices existing in the community, is certainly one of the biggest issues in this matter. We will take the case of the Dhaka Slum Project, which had two phases. Dhaka, the capital of Bangladesh, has over 4 million inhabitants and almost two million people living in slums. The project was started in 1981 in recognition of the fact that the majority of the 100,000 patients treated each year at the International Centre for Diarrhoeal Disease Research in Dhaka were from the slums.

Ten slum communities in Dhaka were selected, each with 40 or 50 families with a high incidence of diarrhea. Each community selected a volunteer (the volunteers were women). The objectives of the program were to reduce the number of outpatients and to bring the costs of treatment down. Volunteers attended a 5-day training session to learn to recognize and treat diarrhea. After completing the training, the volunteers returned to the community to dispense packets of ORS. The result after 4 years was clear: in 1980 there were 100,000 outpatients; in 1984 there were 70,000 outpatients. The important result is that there was a reduction of patients and disease. Unfortunately, we are sure that these people will return because the treatment does not prevent diarrhea.

From 1983 to 1984, additional primary health care activities were initiated. Of these, one of the foremost activities included a hygiene education program that was sponsored by PROWESS, a UNDP program. This intervention engaged 100 volunteers who were given \$5 a month as assistance. (This raises the question of overburdened women doing the work of volunteers too, which is one aspect that could be studied later.) The objective was to begin research to identify health practices of slum families that led to diarrhea. The first task was to design a pilot educational program aimed at influencing those health behaviors and reducing diarrhea. The second task was to monitor communities with and without the education program to weigh the program's effectiveness. Over 24 months 10,176 people reached 2,123 children. An update was made every three months.

Various behavioral causes of diarrhea were detected, but the pilot program selected only three—the three that the community could internalize and practice very easily:

1. Wash hands with soap after defecation and before preparing and consuming food.
2. Do not allow small children to defecate in living areas; take them to a latrine or a specially designated spot.
3. Do not keep exposed piles of garbage in living areas.

The result was that in 1986 there were changes only in communities where educational programs had taken place. A year after the end of the intervention, the number of cases of diarrhea had dropped by 27 percent. In Kenya, where the same type of project was being implemented there was a 50 percent decline of diarrhea in one district from 1985 to 1987.

Water and Sanitation Lessen the Burden of Women Watercarriers

The second point is that women who save time could use that time to produce food and to do other activities that would help to prevent diarrhea. The use of water, of course, is restricted when women have to cover several miles to get water. Therefore, there is a need to have an adequate amount of safe water in or near the home to free women to do more productive work. The direct and immediate effect on the family is that local food is produced, which contributes to improved nutrition. At the Farako Village in Mali, for example, vegetable gardens were planted around the wells. These gardens added tomato, okra, and many other important nutrients to the villagers' diets in a more permanent way. Another example of women using their free time in the cities was women who sold vegetables and used the money from the vegetables to sustain the equipment, which is a very important way for people to participate. The indirect benefits for women are that they learn skills and management. Also, because of the women's visible participation in the economics of the community, their status is enhanced.

Water and Sanitation Contribute to Sustaining Equipment

The last point is that through the implementation of a water committee, water and sanitation can increase community participation on a more long-term basis. With a water committee, ...e community plans, constructs, maintains, and eventually finances the equipment. Thus, water becomes a community problem not just a women's problem. Therefore, water could enter into the micro-planning of the development of the village. The benefit to the community is prevention of all water-and sanitation-related diseases, which means financial savings. The health of the village population is improved, allowing economic advancement. Also, problems of the community were perceived more globally. Through involvement people of the community gained self-esteem, which is important for their development.

My recommendations are first that the cost of water and sanitation, which is always the biggest problem, be shared by various sectors because water and sanitation do not solve problems related only to health. The second recommendation is that prevention should really be the motto of our diarrhea-related activities, because prevention goes beyond health and addresses the quality of life.

The Key to CDD Lies in Prevention

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In China, diarrhea mainly occurs in children. This is evidenced by the fact that diarrhea is responsible for over 70 percent of morbidity of all diseases affecting the 100 million children under the age of five. According to statistics, among the 100 million children, it is estimated that

annual morbidity is 170 million person/episodes, with the mortality 4 percent. Cholera is rare, which is different from other developing countries, but rotavirus and E. coli are major pathogenic agents. About 40,000 deaths due to diarrhea occur each year, with half of the deaths caused by chronic or severe cases and the remainder caused by dysentery, necrotic enterocolitis, and salmonella.

Although diarrheal mortality is lower than that of other developing countries, diarrhea seriously hinders the normal development of young children due to its high incidences and nutritional impact. The Ministry of Public Health has listed diarrhea as one of the four most important diseases affecting children that must be controlled. According to the principle of prevention first and the advice from UNICEF and WHO, our control of diarrheal diseases (CDD) program focuses primarily on prevention. Bearing in mind that children under the age of 24 months are extremely vulnerable to this disease, we have adopted six measures, in addition to education about ORT, that take into consideration the characteristics prevailing among this age group.

- promotion of breastfeeding;
- promotion of proper nutrition to improve nutritional status;
- promotion of the expanded program on immunization (EPI);
- popularization of the child growth chart;
- improvement of the water supply and clean water usage; and
- dissemination of health knowledge.

Each one will be discussed briefly.

Promotion of Breastfeeding

It has been reported that the morbidity among the breastfed children is 25 times lower than those of the artificially fed children and 4 times lower than the morbidity for children who are given mixed feedings. Various approaches have been adopted to explain the significance of breastfeeding in preventing diarrhea. Rooming-in has been introduced in hospitals where facilities are available, and breastfeeding is started as early as possible after the mother has given birth (within 6 hours). An investigation in 20 provinces and municipalities found that the breastfeeding rate is 49.3 percent in urban areas and 75.09 percent in the rural areas. It can be seen that the majority of the children are breastfed. The correlations between breastfeeding and diarrhea and between hospital practice and diarrhea have been studied and the findings have been used to further promote breastfeeding.

The Promotion of Proper Nutrition to Improve Nutritional Status

Clinical data confirm that undernourished children are very vulnerable to diarrhea and other diseases while chronic diarrhea sufferers are more likely to become malnourished. The two are feeding a vicious cycle. Therefore, improving the nutritional status of children is one of the approaches to preventing diarrhea. The results of a 1985 survey on child development indicate that the weight of a Chinese child at 6 months can reach the 50th percentile of the growth curve developed by the United States National Center for Health Statistics. After six months, however, the weight of the child starts to be lower than the 50th percentile. This is particularly true in the rural areas. Analyses by experts indicate that it is due to the irrational weaning food and deficiency of nutrients which occurs during the peak of diarrheal diseases. In order to improve the nutritional status of our children, while carrying out extensive health education on scientific rearing, we have recently developed a number of weaning foods. In this connection, our emphasis has been placed on developing inexpensive and simple homemade weaning foods with readily available local ingredients. These weaning foods are gradually accepted by the masses and have played an important role in improving the nutritional status of the children and in preventing diarrhea.

Promotion of the Expanded Program on Immunization (EPI)

Measles immunization is another important measure in preventing diarrhea. During the past years, an ambitious EPI program has been carried out in China that has involved people from the State President to the "rank-and-files." It has been targeted that by the end of 1990, the average coverage of the four vaccines (BCG, measles, DPT, and polio) would reach 85 percent at the county level. According to the 1987 statistics, coverage for measles has already reached 77 percent. This achievement has contributed significantly to the marked reduction in diarrheal morbidity.

Popularization of the Child Growth Chart

A visible body weight loss will occur in a child suffering from diarrhea, especially in cases of chronic diarrhea. Therefore, timely identification of weight loss plays an important part in controlling diarrhea. Since 1985, the growth chart has been introduced to many parts of China. It is reported that nonincrease or loss of body weight is usually caused by acute or chronic diarrhea. Before the growth chart was introduced, little attention was paid to reasons causing mild undernutrition, and no treatment was given to patients. With the introduction of the child growth chart, however, regular checkups of body weight now facilitate timely detection of changes in body weight. This will lead to an exploration of causes for nonincrease or loss of body weight, thus making timely intervention possible. Because of its simplicity, the growth chart is increasingly accepted in China, and it will serve as a simple and feasible measure in the control of diarrheal diseases.

Improvement of the Water Supply and Clean Water Usage

The use of unclean water is another important factor causing diarrhea. Each year our government invests a large amount of money to improve the water supply. In 1987, for example, 5.078 billion RMB Yuan (US \$1.367 billion) were spent for this purpose. The World Bank also joined this effort by granting a loan. At the end of 1987, 509,937,000 persons had benefitted. This has resulted in a marked reduction of diarrheal incidence and incidence of other water-borne diseases. We are soberly aware that there is still a large population that has not yet been reached by our clean water supply efforts. While the government is investing more money for improving the water supply, the whole society has also been mobilized to make a contribution for their own well-being. At the same time, some simple and feasible water treatment methods have been popularized to enable the people to drink improved water.

Dissemination of Health Knowledge

For years, China has been implementing activities to promote hygienic behaviors. "To pay attention to hygiene is a glory, while failure to do so is a shame," has become very popular. It is prohibited for both adults and children to defecate everywhere. If a child is unable to defecate in a toilet, the feces must be carried to a toilet, so that the environment will not be polluted, thus, cutting the route of diarrhea transmission. Washing hands before meals and washing fruits and vegetables before eating are also encouraged. Screens are used to cover food and water to keep away flies. In China, there are also patriotic health campaign committees from the central down to the grass-root levels that have played an important role in improving personal hygiene and environmental sanitation. Statistics show that the committee's performance has led to a marked reduction of diarrhea. The change of personal hygienic habits played a big part.

Training has also received much attention. For this purpose, some training courses have been conducted in many places. In addition, television, broadcasting, newspapers, and journals have been used to disseminate diarrhea control information. Many localities are able to produce ORS. In our rural areas, we have introduced rice-salt fluids with satisfactory results. While ORS has been emphasized, continuous feeding is also stressed in the treatment of diarrhea. (The concept of continuous feeding states that whenever a sick child has an appetite, the amount of food should be increased to make up for the loss of nutrients.)

The key in the control of diarrheal diseases lies in prevention. The implementation of comprehensive measures needs close cooperation from many sectors. China's CDD program is being implemented by following this process. As a result, various localities have seen reductions in morbidity in varying degrees. Thanks to the comprehensive measures, the counties where China and UNICEF are cooperating together have recorded marked monthly reductions in morbidity from January to June of 1987 as opposed to the reductions in the corresponding period in 1986.

Conclusion

China is the most populous country in the world. A better CDD program would have a significant impact on the global program. WHO's CDD program in 1978 served as good guidance for our national program. We will continue to adopt comprehensive measures, with a view for making significant reductions in morbidity and mortality. In this connection, we sincerely welcome international cooperation and advice so that we will be able to make an even greater contribution to the global program.

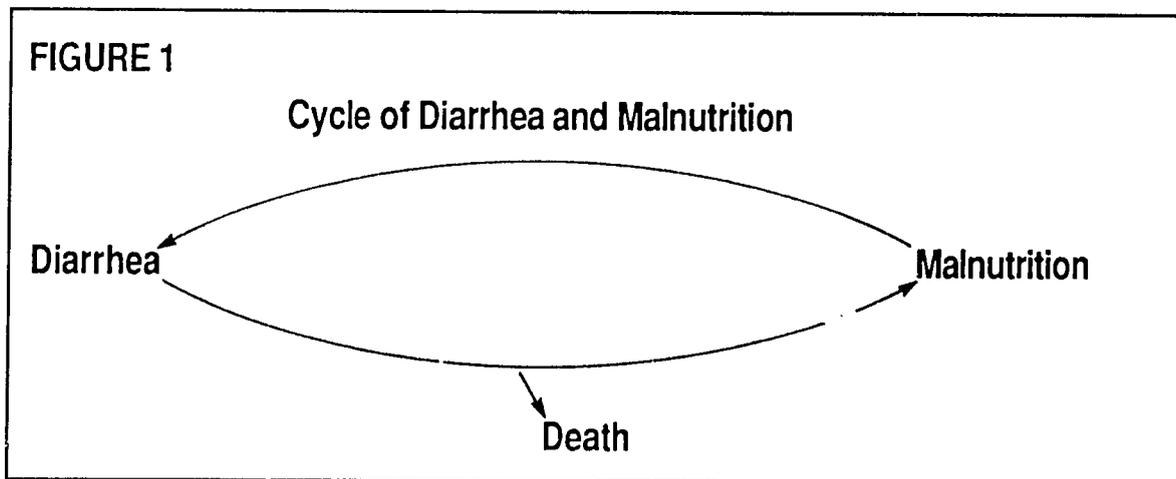
Mutual Benefits of Linking CDD and Nutrition Programs

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Background

Diarrhea is one of the leading causes of illness and death in infants and children under 5 years of age in developing countries. An estimated 1 billion diarrheal episodes occur each year in children. Incidence rates are highest in the 6 to 11 month age group, the period during which weaning foods are introduced into the child's diet. Diarrhea causes an estimated 5 million deaths in children under 5 years of age per year. Diarrhea is a major contributor to malnutrition as well.

Undernutrition is also recognized as one of the most important single factors affecting child survival and development. Undernutrition contributes to high morbidity and mortality of children under 5 years of age. Diarrhea and malnutrition interact in a vicious cycle: diarrhea leads to malnutrition, which then aggravates the diarrhea (see Figure 1). But nutritional therapy is a vital component of both the clinical and home management of diarrhea.



The effect of diarrhea on growth can be seen in the growth curve of a child with recurrent diarrhea attacks, each of which causes acute weight loss and leads to overall flattening of the curve, thus showing the child's failure to grow.

The reasons for this growth failure or weight loss include:

- decreased food intake because of loss of appetite, vomiting, food withholding by mother, and the giving of diluted food and milk for protracted diarrhea;
- a decreased absorption of food; and
- an increased need for food.

This introduction indicates the interconnection between diarrhea and nutrition problems. Because of this connection, the control of diarrheal diseases (CDD) and nutrition programs should be linked, particularly in the areas of training, supervision, and growth monitoring activities.

CDD and Nutrition Programs

The CDD program focuses on the proper use of home fluids in the prevention of dehydrated diarrhea cases and on the effective use of oral rehydration therapy (ORT) in the treatment of diarrhea with dehydration. ORT combines the administration of home fluid or oral rehydration salts (ORS) with continued and increased feeding, including breastfeeding. The national CDD Program attempts to ensure the distribution of ORS to all community health centers; to educate mothers and health workers in the techniques and benefits of home fluids and/or ORS; and to disseminate information to the public about the values of ORT. The Nutrition Program provides community-based growth monitoring and nutritional first aid activities, along with health and nutritional counseling.

What CDD Programs Can Do in Nutrition

The CDD programs can be linked to nutrition programs in several ways. Malnutrition in children with diarrhea can be identified by weighing them and determining weight for age using a growth chart. This information can be used for nutritional management during and after the episode.

In Indonesia, the Family Nutrition Improvement Program (UPGK) has been using a weighing post at the village level for more than 10 years. Efforts have been made to stimulate community awareness and participation through the establishment of community-based, integrated services posts at the village level. This is the Integrated Family Health Package, or Integrated Health and Family Planning Approach (posyandu). Family health care services such as weighing, vaccination, and family planning are provided at the community-based post. In doing so, the posyandu reduces the service delivery overlap in the village, which used to have separate "posts" for child weighing, family planning, and immunization. It renders a family health care package consisting of family planning, maternal and child health, nutrition, immunization, and diarrheal diseases control in order to expedite the reduction of infant and under-5 mortality.

This program is a major breakthrough in primary health care, and a major means of expanding access and coverage of key child survival and development services. By the end of March 1988, there were approximately 200,000 posyandu to serve about 81 percent of all under-5s. The ultimate objective is to have one integrated services post (posyandu) for every 100 under-5s in the country, with every child weighed monthly and his weight recorded on a growth chart (or Indonesian's KMS). Fluid loss during diarrhea, as well as failure to grow, cause loss of weight. Training and supervision play an important role in implementing this growth-monitoring program. Assessing weight loss is useful. If a child has been weighed recently, his weight loss will give some idea about how much fluid he has lost. Weighing the child again later can help to assess his progress. However, it is more useful to rely on clinical signs than on weight loss determination to make a judgment about dehydration. Growth monitoring activities form a necessary infrastructure for CDD activities; linking them also helps to achieve the nutritional goals of the growth monitoring effort.

The improvement of feeding during and after diarrhea can be a part of diarrhea case management. Nutrition deficits caused by the diarrhea must be repaired. No physiological basis exists for "resting the gut." Poor nutrition is associated with more severe, more long-lasting, and more frequently fatal diarrhea. The feeding component of effective diarrhea case management also includes the improvement of the basic weaning diet of the child.

Special follow-up procedures for children with diarrhea who are malnourished (nutritional screening) can be established. An example of this would be referring patients falling below a certain level of nutritional status to a growth monitoring program, to follow up and ensure that subsequent growth is satisfactory. Well-defined referral criteria and open channels of referral between providers of treatment of diarrhea and nutritional rehabilitation programs can ensure that intensive nutritional management and education are available when needed.

Program policies and practices can be developed through research or study on:

- pre-diarrheal and post-diarrheal feeding practices;
- current feeding practices during diarrhea as the basis for developing more effective recommendations and messages; and
- special foods to be given during diarrhea and convalescence.

The promotion of breastfeeding and proper weaning practices can be incorporated into information, education, and communication (IEC).

Hospitals or diarrhea training units can receive support to establish mechanisms to provide special food for diarrhea inpatients.

What Nutrition Programs Can Do

Nutrition programs can help diarrhea case management and prevention in several ways. First they can teach good diarrhea case management. Diarrhea case management can be taught to mothers of children whose weight has failed to increase (growth failure) because of an episode of diarrhea in the past month, as detected by growth monitoring. In Indonesia, UPGK has provided ORT and other proper diarrhea case management components as part of the nutrition improvement package to all previous weighing posts (now posyandu).

ORT can be distributed through weighing posts. The nutrition cadre training includes the preparation and use of ORT (home-available fluids and/or ORS) and explanations on the dangers of dehydration due to diarrhea. In Indonesia, pre-packaged ORS is provided annually to every weighing post for distribution by the community health worker. Apart from that, sources of ORS include the CDD program, Instruction of the President (INPRES), health insurance, and local budget funds.

Diarrhea patients can receive care through special educational efforts and follow-up visits conducted by the community health worker.

Special training on diarrhea treatment should be given to all mothers of children who are malnourished, because they are more likely to have severe diarrhea. Again, growth-monitoring can be used to follow-up such patients.

Nutrition programs can continue focusing on activities that are important to the prevention of diarrhea. This includes activities such as breastfeeding promotion and the improvement of weaning diets. Successful promotion of breastfeeding in Indonesia includes:

- Changing hospital policies regarding nurseries and rooming in.
- Working with midwives and obstetricians and establishing a "Breastfeeding Promotion Organization."
- Reducing unnecessary physician recommendations to give formula and educating physicians regarding breastfeeding techniques and support.

Nutrition programs should be encouraged to disseminate messages on proper food preparation and storage, and hand-washing before eating.

Linking CDD and Nutrition Programs

There have always been linkages between CDD and nutrition programs in the implementation of intervention activities. The nutrition program training course for health personnel and community health workers covered ORT. The provision of ORS may also be included in the nutrition packages. The CDD also taught the importance of continued and increased nutritional feedings (including breastfeeding) during and after diarrheal episodes. In posyandu, a mother can receive instructions in home fluid use, ORS mixing, or the need for continuous breastfeeding. A mother at this same post can also have her baby weighed, the growth chart updated, and vitamin A and iron tablets dispensed to her. The quality of services can be enhanced by improving cadres' performance through more appropriate training and by improving the supportive and supervisory skills of professional health center workers. ORT corners at health centers can be used for feeding programs or nutritional rehabilitation for malnourished children with diarrhea who need special attention or special intervention. In some countries, where women's organizations are very strong (for example, PKK in Indonesia) diarrhea and nutrition information usually constitutes only a part of the information system. Indonesia has established an integrated recording and reporting system, but many countries do not wish to develop such a system.

CDD and nutrition must also depend on the preservice educational institutions to teach new doctors, nurses, or pharmacists how to manage diarrhea and nutritional problems. Indonesia has pioneered in the development of a special medical education program on the diarrheal diseases control program.

At the national level, the CDD program began as a relatively autonomous unit under the general communicable diseases control program. Efforts to coordinate with other programs and sectors have been implemented, however. Indonesian experiences show the effectiveness of this. For example, the CDD working group consists of inter-programs under the Ministry of Health, the Secretariat for the Integrated Health and Family Planning Package, and the Child Survival Center Team. The CDD is also a member of a working group in the Nutrition Program. The ROVITA Project (ORT and Vitamin A Project) is one example.

Recommendations for Improving Linkages

CDD and nutrition activities should be integrated with other child survival or primary health care efforts, in order to reduce the cost and the service delivery overlap at the village level. This would accomplish multiple objectives with minimal additional efforts. (It is a major breakthrough in primary health care, and a primary means of expanding access and coverage of key child survival and development services.) CDD and nutrition training also can be integrated with other child survival and development efforts, i.e., EPI or ARI.

The relationship between growth chart monitoring and ORT services can be improved at weighing posts. Under such systems, CDD and nutrition activities would become more interactive.

The delivery of educational messages by both the CDD and nutrition activities can be improved at the village level, for example at the weighing post. Information about breastfeeding, weaning practices, ORT, etc. is common in messages delivered by both activities. Cadres can put as much emphasis on feeding during and after diarrhea as they presently do with the ORT technique. Health workers or cadres need to clarify the meaning of the rather complicated growth card in very practical terms for the mothers. Also, there is a need to improve the exchange of information between volunteers weighing babies and marking growth charts and volunteers dispensing ORS and information about ORT.

Government and donor country cooperation in the CDD program should be continued as part of a child survival and development program. In addition, for some countries, the provision of ORS sachets through direct distribution at service points or through the nutrition improvement package program should be continued.

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Experiences in Management of Diarrhea, Respiratory Infections, and Immunization Delivery in Primary Health Care Programs

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Diarrhea, pneumonia, and diseases preventable by immunizations are a major threat to child survival in most developing countries. Nearly 70-75 percent of all deaths under the age of 5 years are attributable to these diseases. During the past decade, programs to control diarrheal disease (CDD programs) and an expanded program on immunization (EPI) have been firmly established. Acute respiratory infections (ARI) control is a recent addition.

Country Overview

Today I will be discussing an operational experience in a district in northern India. The population there is 1.6 million. People are poor, female illiteracy is high, agriculture is the main occupation, and people live in mud houses with thatched roofs.

The district has a three-tiered health infrastructure. The health care delivery system provides medical doctors at the first peripheral level, the primary health center level. At the sub-center level or the health outpost or first fixed-health facility, multi-purpose health workers are available for every 5,000 people. These multi-purpose health workers have had two years of training. Third, at the village level, part-time health workers volunteer as community health guides (CHGs) and traditional birth attendants (TBAs), and provide nutrition support as available.

A Coordinated Approach

The following approaches relate to controlling the three types of diseases. For diarrhea, the approach involves the diagnosis of dehydration in children with diarrheal disease; use of home-available fluids when dehydration is not present; the use of ORS if dehydration is present; and referral of sick children to the hospital. With reference to pneumonia, the approach comprises a diagnosis of pneumonia by two simple signs: rapid respiratory rate, and the presence of chest indrawing. If these are present, the child is given cotrimoxazole in an easy to administer dose twice a day. Cases of pneumonia where children are severely ill (that is, those who have chest

indrawing), are referred to the hospital. Measles immunization and other immunizations are supported to integrate the CDD, ARI control, and immunization efforts. All three efforts encourage weaning with semi-solid foods and promote breastfeeding exclusively for the first four months and as long as the mother can feed later on supported by proper weaning.

Coordinated Training

Our training has been coordinated to involve all district functionaries, to include 2,000 doctors, nurse midwives, health volunteers, and part-time workers. The doctors, nurse midwives, and volunteers are trained once a month in their administrative meetings so that their normal work is not affected. Because these meetings are held close to their place of work, travel time is not lost and excess money is not spent. To coordinate the effort, the same subject is covered for all functionaries in one month, that is, the same subject is covered at each of the 60 sites in the district where this training program is provided. For example, during one month the subject would be the management of acute diarrheal disease; the next month it would be acute respiratory infections; the third month it would be EPI; and the fourth month it might be care of low-birth-weight babies. During this training, the efforts are designed to integrate the previous session.

The most important aspect of the training is the training of the trainers which stresses communication methods as well as technical content. Training material has been developed in the form of trainer guidelines which are an integral part of the ongoing training. Talking points have been developed for primary health care workers and for the village volunteers and part-time health workers. Posters and flipcharts are also available. The talking points as well as the diarrhea management posters stress not only ORT but also the need for food and the need for breastfeeding. A similar emphasis is made in the talking points for ARI, where again breastfeeding is promoted as a preventive effort and the administration of semi-solid foods and fluids is promoted to maintain nutrition during and after recovery from ARI. These talking points have been integrated into a pamphlet entitled, "*You and Your Baby*." This pamphlet, which also identifies the nutrition support needed and the care of women during pregnancy and at the time of delivery, integrates maternal and child health into the pamphlet as well. These same items were included in a flip book having 30 essential messages. For each message, the person who is training addresses three issues: "What the picture shows" "discussion points," and "always remember". The health worker or volunteer discusses only two or three messages at a time so that he/she is not overloaded with training material.

Program Evaluation Results

Evaluation has been a combined effort for the three components. In the control area, the under-5-year-old mortality and infant mortality rates showed a very slow decline. In comparison to this, where interventions were available, there was a sharp decline over a 2-year period. This decline is attributable to a very sharp decline in mortality related to ARI, particularly pneumonia—18.8 versus 7.6 in mortality. There were also declines due to diarrhea and measles. In contrast to these, the mortality related to congenital abnormalities, and birth asphyxia, and low birth rate did not show any decline.

ARI and diarrhea-related mortality was significantly reduced, and this was in an intensive area where 5,000 children were followed every week for detection, registration, and mortality investigations. These findings are supported by the utilization rates for the district as a whole. ORT utilization was 35 percent, and in certain intensive areas it went up to 70 percent of all cases of diarrhea. The usage rate for cotrimoxazole in the cases of pneumonia went up to 45 percent as was reviewed from six different surveys in the district. Again, in intensive areas where monitoring was more intense, up to 70-75 percent cotrimoxazole utilization rates were recorded.

Concerning measles vaccination coverage, a steady vaccination coverage of 60-65 percent for children 2 to 3 and 3 to 4 years could be maintained. When the district as a whole is reviewed, the surveys showed that the infant mortality rate declined from 89.9 per thousand in 1984 down to 65.1 in 1986 and 53 per thousand in 1987. The 0 to 4-year-old mortality rate declined from 24.7 to 17.2 in 1986 and around 15 in 1987.

Conclusions

In conclusion, as a result of developing linkages between CDD, ARI, and EPI, it has been possible to reinforce training, particularly stressing feeding, fluids, and growth monitoring. The linkages have had an additive effect on mortality reduction, overcoming the problem of shifting mortality. It has meant increased credibility for the primary health care worker; the worker is no longer regarded as someone who treats only diarrhea or only immunizations but as someone who provides a range of services. It has meant cost savings both for training and for evaluation. It has also meant avoiding overlaps.

Not all problems are sorted out, however. There are still serious problems that relate to how to expand this effort to many districts in the country and to many countries around the world. It has also opened up issues concerning financial support, monitoring, and psychological barriers that might be related to overlapping job descriptions.