Diarrhea: A Leading Killer of Children

CHAPTER 6

The only 'immunization' against diarrhea is for us to find a way out of poverty and underdevelopment.[2]

–Dr. Fernando Silva, Nicaragua

Introduction

Diarrhea, known medically as *gastroenteritis*, is a major cause of children's death in the world–second only to acute respiratory infections (ARI). One out of every four childhood deaths is from diarrhea,[3] which drains the life out of at least 3 million infants and young children every year.[4] Of these deaths, 99.6% occur in the Third World,[5] where one in ten children dies of diarrhea before the age five.[6]

During the last few decades a major international effort has been made to reduce the high death rate from diarrhea among Third World children. *Diarrheal Disease Control* has become a high priority of the World Health Organization (WHO) and is a key component of UNICEF's Child Survival Revolution. The primary strategy for reducing child mortality from diarrhea has been–and remains–Oral Rehydration Therapy (ORT). But, as we shall see, the definition of what ORT is, and consequently the methods by which it is implemented, remain questions of intense debate.

Distribution of 12.9 million deaths among children less than 5 years old in all developing countries, 1990

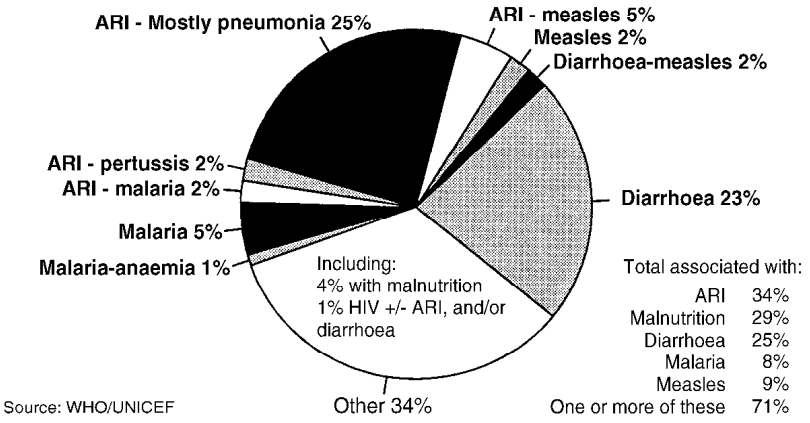


Fig. 2-1

In poor countries and communities most diarrhea–frequent, watery stools (runny bowel movements)–is caused by infectious agents (viruses or bacteria, or less often, intestinal parasites). It is especially common and dangerous in young children, whose developing bodies often lack resistance to effectively combat these infections. Babies who are undernourished or bottle-fed (or not exclusively breast-fed) are at a higher risk of death from diarrhea.

Most children who die from diarrhea die because too much liquid drains out of their bodies, a process called *dehydration*. A child who loses large volumes of liquid through frequent watery stools can become dehydrated very quickly; the smaller and thinner the child, the more quickly she is likely to dehydrate and die. Life can drain from a baby within hours.

It has long been recognized that fluid replacement–or *rehydration*–in a child with watery diarrhea can prevent or correct dehydration, and can often be life-saving. While this simple concept is at least two thousand years old, Western medicine has in the past century increasingly brought to light the *scientific* principles underlying dehydration and rehydration. This knowledge, however, has not in and of itself always led to effective treatment, as is evidenced by the 12,500 children who continue to die from diarrhea each day.

The history of medicine is replete with examples of the medical establishment's resistance to change and reluctance to admit mistakes. For the management of diarrhea, as with other disease entities, stubborn concern for scientific proof has often been a pretext for rejecting an approach that would bring greater benefits to the sick and fewer benefits to the doctor. Fluid replacement therapy, in particular, has been characterized by these types of obstacles, where professional resistance has repeatedly delayed transitions to safer, more effective therapies.

This child is severely dehydrated

The same dehydrated child after oral rehydration therapy

Diarrhea management has traveled a varied and convoluted path since the early 20th century. Early methods of using calomel, purgatives, and therapeutic bleeding were phased out of use as intravenous (IV) drips became the accepted method of treatment. The next shift was from these drips to similarly formulated oral rehydration salts (ORS) in the 1960s and 1970s. Considered unnecessarily medicalized and costly, the next move was to more simple and accessible home solutions. Currently, and still in a struggle for acceptance, is a transition from sugar-based drinks to safer home-made cereal drinks and gruels. The shift from a precisely standardized formula to the promotion of "increased fluids and foods" has been fraught with difficulties and it is this area that we will now explore.

The Evolution of Diarrhea Management: Old Wine in New Bottles

As a home remedy for diarrhea, "the return of liquid lost" has been a standard part of traditional healing in many cultures for centuries. One of the earliest references–prescribing "profuse quantities" of water with molasses and salt–can be found in a document of the Ayurvedic healer Sushruta from about 1500 B.C. in India. Since that time, special drinks, herbal teas, soups, and broths are found to be part of the traditional treatment of diarrhea in many parts of the world.

References to this form of home therapy can be traced through the Western tradition as well. In 1793 Benjamin Franklin printed an edition of William Park's book, *Everyman His Own Doctor: Or the Poor Planter's Physician.* The book recommends that a person with "Purging [diarrhea] ... forthwith make two Gallons of thin Broth [of chicken cooked in water] and drink it all within the Space of two Hours." It warns that "... Some of this will come up, Some go down, and cleanse Your Stomach in such a Manner, as to make You well before You expect it."

In the nineteenth century, Western medicine introduced a new approach to replacing lost fluids: intravenous (IV) therapy. One of the first recorded uses of fluid replacement directly into the bloodstream was in the 1830s in Moscow when, during a worldwide cholera pandemic, scientists at the *Institute for Artificial Waters* tried to treat dehydrated cholera victims through intravenous therapy.[7]

However, it was not until 1908, in Calcutta, India, that a British doctor, Sir Leonard Rogers, demonstrated that the death rate from cholera could be cut in half through the use of an IV saline (salt) solution. Despite initial problems caused by the solution–such as toxically high salt levels and blood acidity–over the next few decades physicians tinkered with the salt composition of these IVsolutions in ways that increased their effectiveness in lowering death rates due to cholera. However, it was not until the 1940s–following the inclusion of potassium in these solutions which resulted in dramatic reductions in hospital death rates–that IVfluid replacement became routine treatment for severe diarrhea and dehydration.[8]

> [Diarrhea victims are to be] given to drink a profuse quantity of tepid water in which rock salt and molasses have been dissolved; or clarified water combined with rice gruel.
>
> –*Sushruta Samhita III,* verse II
> 1500 B.C.

> The discovery that sodium transport and glucose transport are coupled in the small intestine so that glucose accelerates the absorption of solute and water was potentially the most important medical advance of this century.
>
> –Lancet
> A.D. 1978

Today IVtreatment is still standard therapy, despite serious limitations to its use. Studies have clearly demonstrated that oral rehydration combined with early feeding, is at least as effective and often safer than IV fluids in treating mild to moderate dehydration.[9] Even into the 1960s there were difficulties in keeping the rubber delivery tubes sterile, and if boiled, they often accumulated endotoxic pyrogens which regularly caused rigors and high fever.[10] Also, there is a danger of giving too much IVfluid. For example, following the 1993 cholera outbreak in Zimbabwe, in one location (Nyangombe) one out of three deaths in young children was caused by over-hydration (administering too much IV solution).[11] None of these concerns arises with oral rehydration.

However, the biggest drawback to IV therapy is logistical. The relatively high cost and level of skill required to administer it makes it simply inaccessible to most of the 1 billion cases of diarrhea occurring annually among children.

Nonetheless, into the 1970s, Western medical professionals continued to advocate IV therapy as the best way to prevent death from diarrhea. Oral rehydration therapy was at last "discovered" by health professionals during the late 1970s. Although oral rehydration actually represented a rediscovery of ancient traditional practices, the introduction of this concept into the modern medical world was to have revolutionary implications. Within a few years, ORT was internationally proclaimed as the "simple solution" to the high child death rate due to diarrhea, and as we saw in Chapter 4, was soon promoted as one of the "twin engines" of UNICEF's Child Survival Revolution.

Discovery of ORT

ORT, simply put, means making sure a person drinks enough fluids, and eats enough foods to replace the water, salts, and nutrients which are lost through diarrhea. The first scientific reports of using oral sugar/salt solutions to treat cholera were published in the early 1950s and an ensuing series of events precipitated a gradual breakthrough in their use. Researchers at Western academic institutions began to understand the cellular mechanisms of water and salt absorption in the intestines. Perhaps the most important finding was that the simple sugar (monosaccharide) glucose is a critical ingredient in transporting salt and water across the cells that line the gut and into the bloodstream. The addition of glucose (or another more complex sugar or starch which can be broken down into glucose) to ORT can greatly speed up the rehydration process. Dr. Norbert Hirschhorn, who facilitated this landmark research on ORT, remarked on the phenomenon:

> Even while bacteria [that cause diarrhea] can block sodium chloride absorption, the sugar glucose continues to stimulate sodium absorption. Water and other salts follow along ... at a rate 3 to 10 times greater than normal salt absorption without glucose.[12]

Thus the addition of glucose (or a more complex sugar or starch that gut enzymes break down into glucose) to the solution can greatly speed up rehydration.

This research was followed in the 1960s by clinical work applying these findings to save lives. Much of this was done at the Cholera Research Laboratories in Dhaka, Bangladesh, the Johns Hopkins University International Centers for Medical Research and Training in Baltimore, Maryland, USA, and the All India Institute for Tropical Medicine and Hygiene in Calcutta, India.[13]

Also, by 1955 the "barefoot doctors" throughout China were already treating diarrhea with a sugar and salt ORT drink, or with herbal teas to which mothers traditionally added sugar.[14] According to Carl Taylor, emeritus Professor of International Health at Johns Hopkins School of Public Health and subsequently a former senior advisor to UNICEF, the successful use of a home-brewed form of oral rehydration continues up to the present in rural China.[15]

Despite such reports, it was not until the huge cholera epidemic which hit East Pakistan (now Bangladesh) in 1962 that ORT got wider recognition for its potential. The limited use of IV therapy for just a fraction of the epidemic's victims led desperate doctors in one hospital to begin administering the same solutions that were in the drip by mouth. In this way they were able to rehydrate a far greater number of people, with spectacular results. They reported a death rate of near zero, compared to 27% and 47% in other hospitals.[16]

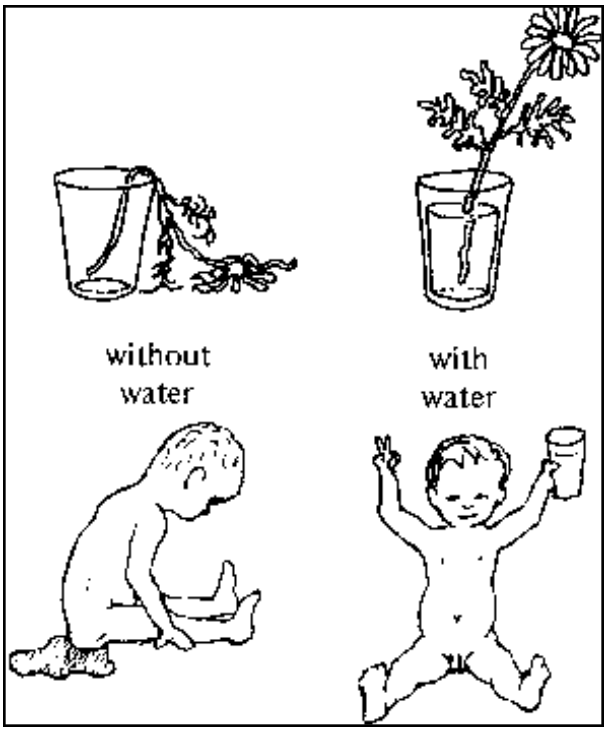
Physiological studies of how oral rehydration works were carried out in the late 1960s, which led to WHO's declaration of its official approval of the therapy in 1969.[17] Soon after, in 1971, the Bangladeshi war for Independence led to an influx of refugees from East Pakistan into India. Diarrhea was rampant, with a mortality rate of over 30%. In desperation, relief doctors from the US began to package table salt, baking soda, and sugar into plastic bags, to be dissolved in water in the camps. As a result, the death rate from diarrhea dropped to under 3%, and the rate in some camps fell to as low as 1%.[18] Thus, oral rehydration finally established itself as the primary therapy for cholera and acute diarrhea. These hand-packaged plastic bags used in the refugee camps were the forerunners of the ORS packets that are now in worldwide use.

In 1978 the British medical journal *The Lancet* put the final seal of approval on ORT, declaring it to be "potentially the most important medical advance of this century."[19] But the big "breakthrough" heralded by the *Lancet* was not the discovery of ORT, which had happened long before. Rather, it was the grand event of partially breaking through professional resistance to the use of a simpler, more practical alternative.

Despite decades of mounting evidence, it took nearly 30 years to prove the effectiveness of oral rehydration to the medical establishment. Finally, with growing support from the international public health community, in the early 1980s ORT was promoted on a large scale.[20] Nevertheless, the medical establishment in the West (where trends tend to be set) has been slow to fully accept the concept of ORT. For example, a recent article in a US medical journal ill-advisedly recommends no ORT for children under three months old, and *gradual* refeeding in young children.[21] But the main problem is that US physicians prescribe clear, sugary solutions with little or no salt (sodium).[22] Their training in diarrhea management needs updating.

ORT–The Magic Bullet for Child Survival

Once the resistance of the medical establishment had been at least partly overcome, oral rehydration became widely accepted by health policy-makers as the mainstay of treatment for diarrhea. With major international promotion and economic support, by the late 1980s national ORT programs had been launched in 90 countries.[23] WHO's Diarrheal Disease Control Programme took the lead in coordinating the worldwide ORT effort, with UNICEF and USAID playing key roles.[24]



Suddenly, ORT's potential seemed limitless. UNICEF, in its 1986 *The State of the World's Children* report, called ORT technology "an incredibly cheap, simple, safe, and effective method by which parents themselves, however poor, can protect the lives and growth of their children against one of the most common causes of child malnutrition and child death in the modern world."[25] USAID estimated that ORT could save the lives of 4 million children who die every year from diarrheal dehydration.[26] Yet with all the high powered and costly promotion, it is unclear to what extent ORT has realized its much-touted potential.

ORT proponents herald its efficacy in reducing diarrhea-induced child mortality. At the Third International conference on ORT in 1988, representatives from UNICEF and USAID focused on ORT's success; they estimated that it was saving as many as 2 million children's lives per year, thereby reducing the estimated annual child mortality from 5 to 3 million. Recently these estimates have been more conservative: since 1993 UNICEF has reported that ORT is saving 1 million lives per year,[27] resulting in the demotion of diarrheal disease to second place [after pneumonia] among the causes of child death.[28]

There is no question that ORT has contributed substantially to reducing child deaths from dehydration. However, it is becoming increasingly clear that despite its significant impact, it has not lived up to its predicted potential.[29] ORT's performance has been disappointing on two counts: its usage rate and its impact on child mortality.

Access rates, use rates, and effective use of ORT

Several different indicators have been used in trying to determine the progress made in programs promoting ORT. These include "access rates," "use rates," and estimates of "effective use." Unfortunately, the definitions of these indicators are vague, and–apart from the difficulties in getting actual counts or even reliable estimates–allow a wide range of interpretation.

Access rates. Access rates are defined as "the proportion of the population with reasonable access to a provider of ORS."[30] The rate is one of the principal indicators which WHO uses to monitor ORS progress,[31] and applies only to manufactured oral rehydration salts and not to home solutions. In the past few years the figures on access rates have been contradictory. Although accessibility to ORS in the Third World was reported to have increased to 72% by 1992 and nearly 80% by

1994,[32] production of ORS packets has reportedly dropped. From 1991 to 1992, production fell from 410 million to 390 million packets. And in several countries–Afghanistan, Albania, Somalia,, and Sudan–packet production has been suspended. (This apparent discrepancy may be due to faulty data; WHO describes the estimates of ORS access rates through 1993 as "based on reports, many invalidated ... or extrapolated from ORS production figures." In describing its new, more reliable 1994 figures WHO states that, although its "surveys cannot support a global estimate" that "access to ORS is approaching, if not exceeding, ... 80%."[33]) But as prices of commercial ORS products steadily climb, in some countries the ORS use rate has dropped, in some cases to less than half its peak rates. (See discussion of ORS in Egypt, page 49.)

Use rates. "ORT use rates" currently refer to use of ORS and/ or Recommended Home Fluids (ORS/RHF), and are defined as the "proportion of children under five years with diarrhoea who receive increased fluids and continued feeding." At the 1990 Global Summit on the Rights of Children, a goal was set that 80% of families "should be empowered to use ORT by 1995." The 1995 *State of the World's Children Report* states that "the most recent figures (1993) on progress toward this goal suggest that the ORT use rate was at that time approximately 44% for the developing world as a whole."[34] A still more recent table provided by UNICEF–also using 1993 data–indicates the "global ORT use rate" at 57%.[35] (See figure 2–2, page 38.)

The estimates in Figure 2-3 look fairly good: a global ORS access rate of 75%, a global ORS/RHF use rate of 51%, and an ORS use rate of 25%.[36] All estimates show a modest rise since 1989. However, these figures cannot be taken at face value. First, the global estimates exclude China, and if China were included, they would be considerably lower. In 1993, China, where more than a quarter of the world's children live,[37] reportedly had an ORS+RHF use rate of 22%, and an ORS use rate of only 3%.

The biggest problem with interpreting "ORS/RHF Use Rates," however, is the possibly misleading nature of the figures. The apparent increase in use rates may be due, at least in part, to a redefinition of recommended home fluids (RHF). Around 1989 the definition of RHF was expanded to include everything from unsweetened tea to plain water.

Some country reports show a wide gap between knowledge and use. For example, a 1989–1990 survey in the Philippines found that while 73% of mothers surveyed could demonstrate how to prepare ORS correctly, only 14% used ORS for treating diarrhea in their children under age 5. (By contrast, 30.3% of the cases involved use of drugs.)[38]

Over the last several years, there has been growing concern about the validity and implications of reported ORT use rates. In 1990, the WHO Programme for Control of Diarrhoeal Disease (PCDD) reported that when more reliable data sources were used, the estimates of ORT use rates in India, Bangladesh, Indonesia, and a number of other countries dropped.[39] UNICEF, in its 1994 *State of the World's Children Report*, acknowledged that "in some parts of the world ORT utilization rate is slipping."[40] In February, 1994, UNICEF and the International Centre for Diarrhoeal Disease Research in Dhaka, Bangladesh, acknowledged concern about declining use rates in proclaiming the need "to refocus attention on the continued underutilization of ORT throughout the world."[41]

Low effectiveness of ORT use

If the "ORT use rate" is difficult to assess, the "effective use rate" is even more problematic. It is widely recognized that ineffective use of ORT–whether packets, home mix, or home fluids–is a major stumbling block. Norbert Hirschhorn, a leading pioneer in ORT, agrees that "... it is abundantly clear that many [children] do not receive what they need even when packets and home fluids are known and available."[42] Estimates of effective use vary greatly, but on the average it is thought that only about one third of current usage is done correctly.

Correct use of ORT involves at least 3 aspects: (1) correctly prepared or balanced drink(s), (2) increased fluid intake, and (3) continuation of feeding. In a WHO sponsored meta-study of 76 surveys in 36 countries, conducted between 1990 and 1993, it was found that 58% of households used ORS and/or Recommended Home Fluids.[43] However, only 32% of households increased the amount of fluid given to the child, and only 20.5% both increased fluids and continued feeding. Thus, fully effective use of ORT occurred, at the most, for only one of five children.

The problem of error in preparation of rehydration drinks is quite prevalent. Studies carried out in six countries showed that between 23% and 73% of mothers prepared sugar and salt solution (SSS) drinks with "dangerously high salt solutions."[44] This led to WHO discouraging the use of home-made SSS rehydration drinks on the grounds that they are often not safely and correctly prepared. However, high rates of incorrect use also occur in preparing the ORS packets, often as a result of adding insufficient water. For example, in studies in Brazil[45] and Kenya,[46] many children's caretakers were unable to prepare ORS correctly (39% and 50% respectively).

Global ORT Use Rates 1994

Region	Population < 5 Yrs (thousands)	Under 5 Deaths (thousands)	Total Episodes (thousands)	Diarrhoeal Deaths (thousands)	ORT Use 1993 (percent)
East Asia and Pacific	185500	2530	481650	281	79
Middle East and North Africa	54000	997	188400	283	61
Eastern and Southern Africa	48585	1970	216770	578	60
Americas and the Caribbean	54300	590	192425	153	58
South Asia Region	161040	4955	507320	1309	44
West and Central Africa	51494	2335	267927	658	36
GLOBAL	**554919**	**13377**	**1854492**	**3262**	**57**

Fig. 2-2. The ORT use rate is defined as proportion of children under five years with diarrhea who receive ORS/RHF. Source: Fax sent to the authors from UNICEF, May 1995.

WHO's Programme for the Control of Diarrhoeal Disease (PCDD) most recent ORS/RHF use rate–*at 51%*–falls midway between those of UNICEF. The PCDD's *Ninth Programme Report 1992–1993* (the latest report available at the time of this writing) presents its calculations of both ORS access rates and ORS/ RHF use rates.[47] (See Figure 2-3)

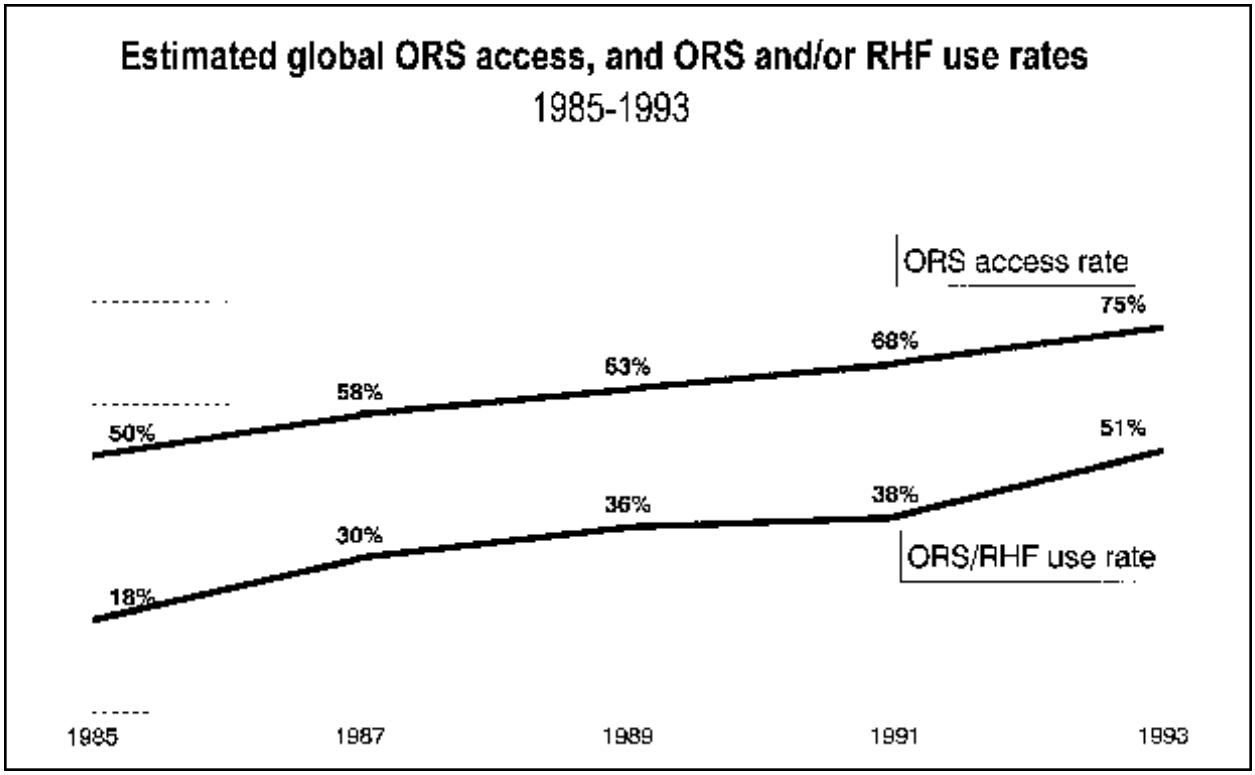


Fig. 2-3. Programme for the Control of Diarrhoeal Disease: Ninth Programme Report 1992-1993, World Health Organization, 1994 p. 36. As explained in the text, this global estimate excludes China, which pulls true global estimates down considerably (the ORS and RHF use rate in China for 1993 was estimated at 22%).

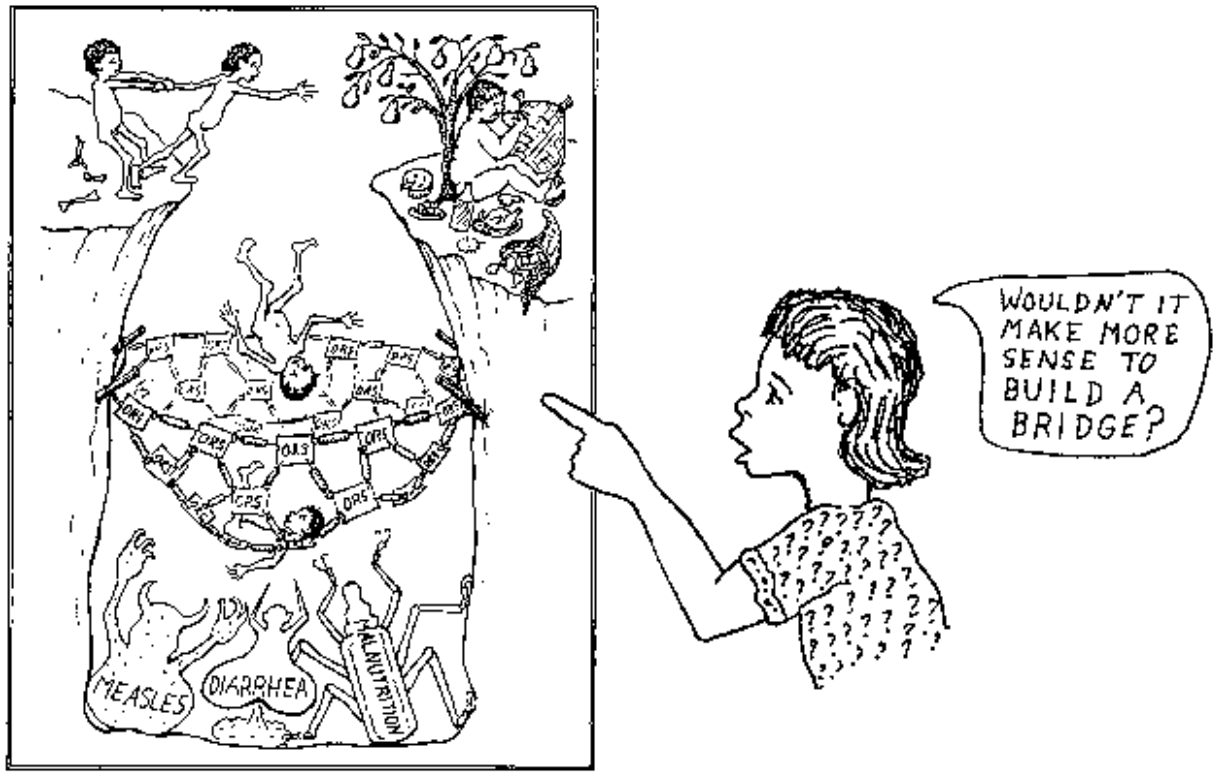
One of the most common reasons for failure of ORT to adequately combat dehydration is that too little fluid is given. A child with severe watery diarrhea (especially cholera) can sometimes lose a liter or more of liquid a day. With vomiting the loss can be still greater. To prevent death, all the volume of fluid that is lost must be replaced. Caretakers need to understand why such large quantities of liquids are required, and learn to give the drink often–sometimes every few minutes–day and night. Even if the child vomits, some of the liquid stays down, particularly if small quantities are given frequently. WHO and UNICEF, with good reason, have put increasingly strong emphasis on *increased fluid intake*. But the problem of giving too little persists.

In the whole of the Third World, how many children are effectively reached with ORT? If we accept the average estimate that the global use rate for all forms of ORT (ORS and RHF) is around 50%, and estimate that one third of ORT use is effective, then ORT effectively reaches around 17% of the children who need it. Even this figure may be an overestimate.

"Resting the Gut"–A Harmful Practice Introduced Mainly By Western Doctors

In the early days of the big push for ORT, many health authorities criticized traditional remedies, asserting that mothers frequently withheld food and drink when their children had diarrhea. They were said to do this based on the belief that to stop what goes in would slow down what comes out. However, assessments in Bangladesh, Saudi Arabia, India, Peru, Mexico, Kenya, Swaziland, and Lesotho have shown that *traditionally most mothers continue to feed their children during diarrhea, and that nearly all continue breastfeeding*.[48]

In fact, the idea of "resting the gut" seems to have been promoted mainly by qualified (Western-style) doctors. In several countries, mothers who withheld food and milk during their children's diarrheal episodes often said they did so because "My doctor told me not to feed my child when he has diarrhea."[49] Although food and milk, especially breast milk, are now considered an essential part of ORT, many physicians (in both the North and the South) still tell mothers not to give food, or at least not milk, when their children have diarrhea. Such advice can, and often does, prove fatal, especially for undernourished children.[50]



Does ORT Prevent Child Death?

Toward the end of the 1980s it was becoming clear that the impact of ORT on child survival, while substantial, was less than had been euphorically predicted. In 1988, USAID, while still extolling ORT as a "major breakthrough," conceded (rather oxymoronically), that a "continuing breakthrough" is needed.[51]

Robert Moy–a well-known researcher on diarrheal disease–in response to a draft copy of this book wrote:

> I agree that the effect of ORT on mortality is disappointing. The claims of UNICEF about millions of lives being saved each year by ORT ... are of course a load of wishful thinking and only mathematical models that bear little reality to the real world. Maybe fewer children die of acute dehydration these days ...but they still will die later of persistent diarrhoea, malnutrition, bloody diarrhoea or now diarrhoea associated with HIV for which ORT alone would be ineffective. It is of course highly misleading for UNICEF/WHO/USAID to peddle the notion to the general public that all the world's problems will be solved by a consignment of packets of ORS ...[52]

Moy and others have raised the question as to whether ORT–when introduced in isolation from efforts to combat poverty and unhealthy living conditions–actually prevents child death or merely postpones it. In analyzing the situation, we must be careful not to confuse the impact of rehydration on an individual child who has diarrhea–a proven therapy for an acute illness–with overall child mortality in a population.

In many countries, figures on mortality from diarrhea are sketchy and often misleading, largely because many children's deaths are never recorded. As Carl Taylor and William Greenough, III–two highly respected ORT experts–point out, original estimates of deaths caused by diarrhea came from extrapolations from local field studies in areas of high prevalence, and deaths averted are calculated by projecting results from some of the best programs. In both instances there are questions about whether the numbers are representative of global reality.[53]

Some critics argue that, even though an ORT program permits a certain number of children to survive one bout of diarrhea, there is a good chance that many of them will die of a subsequent diarrheal episode or another of the diseases of poverty.[54] Data suggest that, in some circumstances, ORT programs that have been judged successful according to reported access or use rates have failed to significantly reduce overall child mortality.[55]

One study from Honduras found that although diarrhea death rates declined as a result of an ORT campaign, no change in overall death rates could be detected. Even more disturbingly, perhaps, a 1992 study in a rural community in Bangladesh found that *infant* mortality from acute watery diarrhea actually increased significantly during the implementation of an ORT program.[56] This is of special note because ORT has been strongly and (according to many reports) effectively promoted throughout Bangladesh. The study blamed the program's disappointing results on inadequate education of families about correct use of ORT.[57] However, the Bangladesh Rural Advancement Committee has conducted one of the world's most extensive and well monitored ORT education campaigns, reaching virtually every mother in the country.[58] Therefore, it seems more likely that the study's results showing no decline in children's deaths with the introduction of ORT may stem from worsening poverty, related in turn to deteriorating social policies, foreign debt, and structural adjustment programs. Even the best ORT initiative cannot offset the harmful effects of these macro-economic trends.*[59]

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In the final analysis, UNICEF's official "guesstimate" of one million children's lives saved annually by ORT must be seriously questioned. Such questioning, however, is by no means intended to denigrate the accomplishments of ORT initiatives or the commitment of those who have worked so hard to make them a success. On balance, it is safe to say that in the face of difficult circumstances ORT is saving the lives of large numbers of children–at least temporarily. The fact remains, however, that of the 3 million or so who die from diarrhea every year, roughly 2 million children still die from dehydration.

By comparing Third World diarrheal death rates with those of children growing up in better living conditions, we know that nearly all deaths from diarrhea and dehydration are preventable. Clearly, the current Child Survival interventions are not enough. Too often, as we discussed in Part 1, ORT has been promoted and funded as a vertical intervention, separate from the basic needs

*Hirschhorn points out that this study in Bangladesh was done in an area where most of the diarrhea mortality is from dysenteric or persistent diarrhea for which ORT is not the primary therapeutic need. However, if over-emphasis on ORT led to uderuse of more urgently needed forms of treatment, in a paradoxical way this could have contributed to the recorded increase in mortality.

and rights of children, and consistent with the child survival strategy of selective primary health care. Might not more children's lives be saved if ORT were integrated into a broad primary health care approach?

Part of the problem of low effectiveness may relate to the fact that promotion of ORT has been more product–than process–oriented. It has been based more on convincing people to buy and use packets than on helping them to acquire conceptual understanding and basic problem-solving skills concerning the child's food and fluid needs and overall well-being. Information-sharing has been weak. Health facility surveys in several countries show that "the proportion of mothers correctly advised by health workers ranges from 1% to 10%."[60] Much more emphasis needs to be placed on education and enablement, especially of women and girls. WHO is now giving this higher priority.[61]