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# LINKING WATER SUPPLY AND SANITATION TO ORAL REHYDRATION THERAPY IN THE CONTROL OF DIARRHEAL DISEASES

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## WASH TECHNICAL REPORT No. 31

### JULY 1985

Prepared for  
Office of Health  
Bureau for Science and Technology  
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LINKING WATER SUPPLY AND SANITATION TO ORAL REHYDRATION THERAPY  
IN THE CONTROL OF DIARRHEAL DISEASES

Prepared for the Office of Health, Bureau for Science and Technology  
Agency for International Development  
under WASH Activity No. 142

by

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## EXECUTIVE SUMMARY

The control of diarrheal diseases requires the prevention of the complications of diarrhea (dehydration and death), of the nutritional consequences of repeated and/or prolonged diarrhea, and of the incidence of diarrhea itself. Oral rehydration therapy is effective in preventing dehydration and death, and to a certain degree, in diminishing the weight loss associated with diarrhea. Other measures, however, including water in sufficient quantity and of sufficient quality, and personal and domestic hygiene are needed to reduce the incidence of diarrhea itself.

The primary source of pathogens causing diarrhea is human fecal matter contaminating food, water, hands, and objects in the house and mothers and other caretakers of young children are at the center of this cycle of contamination. A complete program of diarrhea control, therefore, includes educating mothers and other caretakers of small children in the means not only to treat, but also to prevent infection. Health personnel in the field, while working to promote oral rehydration therapy, can also work with populations, and if possible with women's groups, to promote personal, domestic, and food hygiene as well. Because hygiene is not possible without a sufficient quantity of water, improving water supplies becomes an additional part of preventing diarrhea.

To perform these tasks, health workers must be trained and supervised. Obstacles encountered include overloaded workers and supervisors and a lack of funds for fuel and vehicle maintenance.

It is logical therefore to introduce these program elements slowly as workers and communities are able to absorb them. In the case of an oral rehydration program, water supply and sanitation would be introduced only as the program achieves a certain stability, and a water supply and sanitation program would need to be well established before oral rehydration therapy is introduced. A complete program of diarrhea control, however, should eventually incorporate all three elements; water supply, sanitation, and oral rehydration therapy.

Planning programs in which water supply and sanitation are linked with oral rehydration therapy requires coordination at three levels:

1. Within the health ministry, where oral rehydration is often administered by one division, and sanitation by another;
2. Between the health ministry and the water supply agency: the latter to plan water supplies that are convenient and reliable for the populations served so that optimal use of water for hand washing, bathing, food washing and other forms of domestic hygiene is possible;
3. Within AID itself sanitation needs to be seen as a central issue linked to oral rehydration therapy and to water supply for the control not only of dehydration but also of diarrhea itself.

Joint planning of programs must take account of four factors:

1. Women, as the primary implementers of oral rehydration therapy and sanitation programs, are also the primary transmitters of diarrheal pathogens.
2. The ministry of health in nearly every country has a legal responsibility for both oral rehydration therapy and sanitation.
3. Because water in sufficient quantity is needed to make sanitation possible, low-cost water supply schemes in which community participation is maximized should be planned as part of the overall effort to control diarrhea and its consequences.
4. In the end, because of the shortage of both sanitarians and rural water supply technicians in most countries, the same peripheral health workers deliver both oral rehydration therapy and sanitation services.

## Chapter 1

### INTRODUCTION

Oral rehydration therapy and water supply and sanitation are both components of an overall control strategy for diarrheal disease control. The former, focused on the prevention of dehydration and mortality, and the latter on diarrhea prevention, are frequently operated as independent programs in the same country. To the extent possible, however, program planners and administrators should attempt to forge links between these programs so that oral rehydration therapy can benefit from complementary inputs of water supply and sanitation, and vice versa.

To implement joint programs, issues such as financing, training, supervision, and field-worker workloads must be dealt with. Nevertheless, where the incidence of diarrheal disease is high and both kinds of programs are planned or are in operation in a country, every effort should be made to assure complementarity. Where only one kind of program is operated, plans should be made to eventually incorporate elements of the other.

How can these links be forged? How can such complementarity be assured? To answer these questions, this paper will first examine the transmission of diarrheal diseases, showing how fecal pollution of hands and food is the major transmission route. Then the specific linkages of water supply and sanitation to oral rehydration therapy will be examined in more detail. Finally, practical ways to implement programs in the field will be discussed at length.

## Chapter 2

### TRANSMISSION OF DIARRHEAL DISEASES

#### 2.1 Causative Agents

A conceptual framework for the transmission of diarrheal diseases is illustrated in Figure 1. As one can see on the right side of the diagram, there are basically two types of diarrheas in terms of transmission: those diarrheas transmitted primarily through contaminated water (cholera, typhoid fever, and giardiasis) and those transmitted through contamination of food and hands (E. coli diarrhea, shigellosis, diarrheas caused by species of Salmonella paratyphi, or by Campylobacter or Yersinia, Entamoeba histolytica, and Rotavirus infection). This classification, while somewhat arbitrary, takes account of primary transmission routes. There is also a residuum of diarrheas of unknown etiology which accounts for from 20 to 50 percent of the total, depending on the seriousness of the illness. Some are related to measles and others to malnutrition.

The diarrheas of the second group (notably those caused by E. coli of various pathogenic strains, by Shigella, and by Rotavirus) present the greatest threat to child survival in most developing countries, except in Bangladesh and areas of India where cholera remains endemic.

Thus, with the latter exception in mind, when a child requires oral rehydration therapy, the causative agent is likely to be Rotavirus, E. coli, or Shigella in that order of frequency, although the order of frequency varies from country to country.

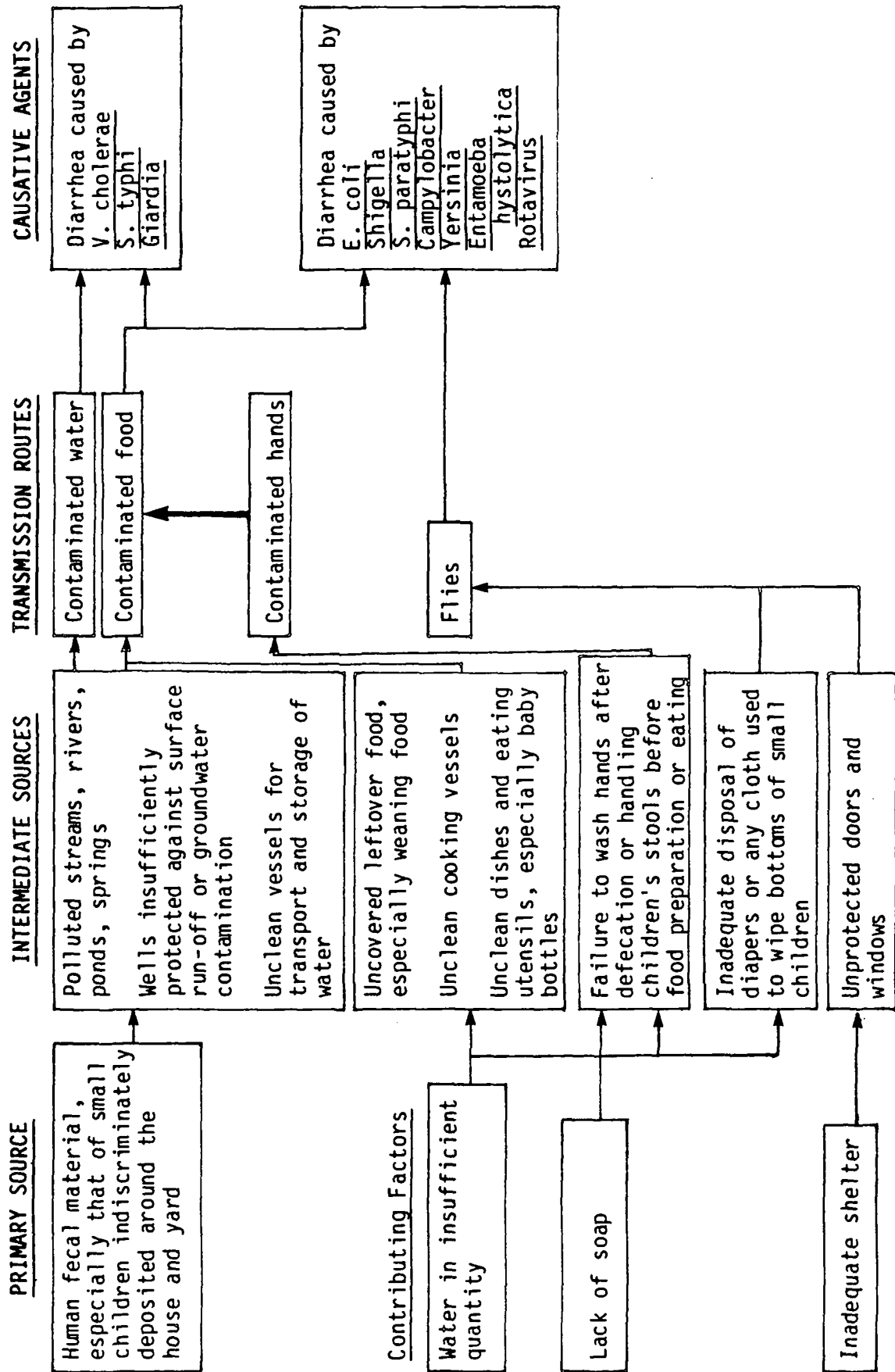
#### 2.2 Transmission Routes

The transmission of these two groups of causative agents, moving from right to left in Figure 1, is through four principal routes: contaminated water or food, dirty hands, and passive vectors. For the first group of agents, contaminated food is the principal transmission mechanism. For the second group, transmission is primarily through contaminated food as well, with contaminated water playing a secondary role. Food is contaminated mainly by women and older girls who prepare meals without washing their hands after defecation, or clean babies' bottoms without washing their hands afterward. For shigellosis, hand-to-hand and hand-to-object-to hand transmission play important roles. Some controversy still surrounds the question of whether cholera is transmitted through contaminated food, and whether shigellosis is transmitted through contaminated water.

Flies may play a less important role in the transmission of organisms, principally Shigella, Entamoeba coli, and E. coli, than previously supposed. Rahaman, et al in Bangladesh studied Shigella transmission on an offshore island with a heavy fly population and found no increase in transmission attributable to the flies.

Figure 1

Water Supply and Sanitation in Relation to Diarrheal Diseases





### 2.3 Intermediate Sources of Infection

The third column from the right in Figure 1 illustrates intermediate sources of these causative organisms. Major sources in this category include polluted water sources, contaminated food supplies, poor personal hygiene, children's stools, and invasion of the house by passive insect vectors.

Water can be polluted in several ways. Surface water can be contaminated either indirectly, through run-off from surrounding areas, or directly if, for example, someone defecates into the water or if a baby's diaper or a cloth used to wipe the baby's bottom are washed in it. Well water, the only source for most people in dry areas of the world, can be contaminated through surface run-off if the well is not sufficiently sealed, if cracks occur in the cement slab atop the well, if there is no apron, or if the apron is too narrow or not slanted enough toward the periphery. Surface contamination can also occur if receptacles are put on the ground and then plunged into the well. Well water may be contaminated if the groundwater on which it depends is infiltrated by bacteria and viruses from nearby latrines or other sites of defecation. Water can also be contaminated during transport and storage at home, largely through inadequate and infrequent cleansing of storage vessels or by plunging contaminated hands or cups into the water.

The ways of contaminating food are multiple (uncovered leftover food, unclean vessels, and unclean dishes and eating utensils), but as demonstrated by the arrow passing directly from contaminated hands to contaminated food in Figure 1, the chief mode of contaminating food is by means of dirty hands, principally those of the women who prepare the food. In fact, a study in Central America showed that housewives had nine times as many enteric pathogens on their hands as did nurses working in the pediatric ward of a hospital (Mata et al, 1969), and another study in Guatemala (Capparelli and Mata, 1975) showed that contamination of tortillas was the chief mode of transmitting diarrhea.

The following scenario graphically illustrates this point. A woman rises early, perhaps before dawn. She first takes care of her small child who has diarrhea, cleaning up after a bowel movement. She throws the dirty cloth on the garbage heap and proceeds to prepare the morning meal without washing her hands. Twelve hours afterward, another child a year older has diarrhea as well. The examples can be multiplied over and over again, but the point is that it is dirty hands that contaminate food, cooking vessels, dishes, utensils, baby bottles, and a variety of other things related to food preparation. Weaning foods appear to be particularly susceptible to contamination. Rowland et al (1978) showed that contaminated weaning porridge was the main vehicle of gastrointestinal infections among infants and small children in the Gambia. A study in Bangladesh confirms this finding (Black et al, 1982).

The remaining intermediate sources of infection include failure to wash hands after defecation and before food preparation, inadequate disposal of the stools of infants and small children, and lack of protection of doors and windows. Soiled hands have already been implicated in the contamination of food, and widespread deposition of children's stools is a frequent source of mothers' soiled hands. Although of lesser importance, unprotected doors and windows obviously provide entry to passive vectors of pollution.

#### 2.4 Primary Sources of Infection and Factors Favoring the Spread of Organisms

On the extreme left of Figure 1 a single primary source of infection is given: human fecal matter. Human fecal material is deposited indiscriminately by small children or discriminately by adults. Minute quantities washed into a stream or a well, or deposited on the hands or on the breasts, or in some instances carried by flies, can contaminate water, food, cooking vessels, dishes, utensils, doorknobs, towels, etc.

A contributing factor of major importance in the etiology of diarrhea is simply the lack of enough water and soap for people to wash their hands, bathe, or wash their cooking vessels and dishes. Washing with soap, was demonstrated by Kahn (1982), to be essential for the prevention of the secondary spread of shigellosis. Lastly, inadequately constructed shelters may permit the entry of disease-carrying insects.

## Chapter 3

### LINKS BETWEEN WATER SUPPLY AND SANITATION (PERSONAL HYGIENE) AND ORAL REHYDRATION THERAPY

As stated at the outset, this report deals with two different forms of prevention. Oral rehydration therapy is essentially a form of secondary prevention, designed to combat dehydration and death, but it does not prevent diarrhea itself. There is no doubt, however, as to its efficacy as a secondary preventive measure. In Bangladesh 50 percent diminutions in mortality due to diarrhea and dehydration have been reported for children treated with oral rehydration solution (Rahaman et al, 1979). Because of the efficacy, relative simplicity, and low cost of oral rehydration programs major agencies such as UNICEF, WHO, and USAID have emphasized them and have funded the manufacture and distribution of oral rehydration salts.

There may be another secondary benefit of oral rehydration -- the prevention of the nutritional effects of diarrhea. Loss of fluid, electrolytes, and nutrients are caused by diarrhea and vomiting and -- more importantly -- by anorexia as Rohde (1978) and Beisel (1972) report, and to some degree by catabolism of body tissues if there is fever. Hirschhorn and Denney (1975) have shown that Apache children who are rehydrated early enough regain their appetites sooner and have less weight loss per episode of diarrhea than children whose oral rehydration starts later. The long-term effects on nutritional status may be further mitigated by using oral rehydration solutions made with rice, maize, or millet powder instead of sugar. Such complex carbohydrates provide not only glucose as they are broken down, but starches for storage, which also help to reduce stool volume.

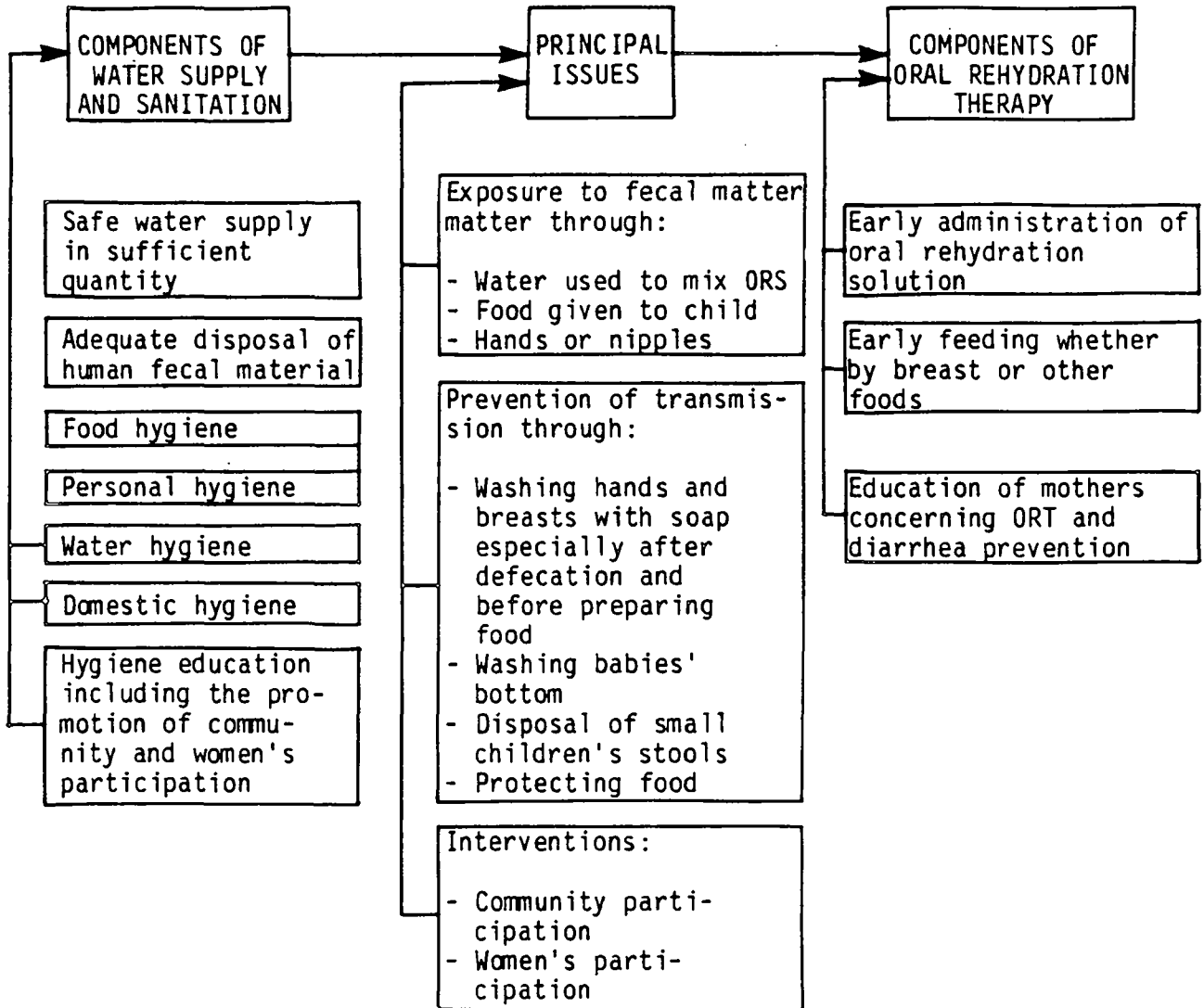
Oral rehydration therapy entails not simply the administration of oral rehydration solutions (ORS) but also the proper nutrition of the child during rehydration and the education of the child's caretakers in how to mix and administer solutions and in how to prevent diarrhea (Parker et al, 1984). There are a number of linkages between water supply and sanitation, particularly personal hygiene, and oral rehydration. These links can best be elucidated through examining certain issues affecting both oral rehydration programs and programs to prevent diarrheal disease. In the discussion of each issue, implications for each type of program emerge. Figure 2 presents the issues graphically.

#### 3.1 Quality of Water Used to Make ORS

Guidelines given by the World Health Organization (WHO) (1976 and 1978) recommend simply the use of the safest water available for mixing the solution, whether the solution contains the full complement of salts and glucose or simply contains salt and sugar. Since the safest water supply available may be quite polluted, some have questioned whether ORS packages should not also contain a disinfectant. Thus far, however, no disinfectant has been found that does not interact with the salts of ORS. The use of solar energy to disinfect ORS may show some promise if the proper vessels can be obtained and if the turbidity of the solution is low, as reported by Acra et al, (1984). Watkinson et al (1980), however, showed that children in the

Figure 2

Issues Linking Water Supply and Sanitation  
with Oral Rehydration Therapy



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Gambia treated with ORS mixed with contaminated well water recovered from dehydration just as well as those treated with a solution made with clean water. It is nonetheless recommended generally that a solution not be kept longer than 12 hours because of the rapid multiplication of bacteria in the sugar-rich solution. The best standard of water used to mix ORS still remains that recommended by WHO, the cleanest locally available.

### 3.2 Bacterial Quality of the Food and Given During ORT

The major links between oral rehydration therapy and water supply and sanitation have to do with the education of the mother in diarrhea prevention as well as in oral rehydration therapy (WHO, 1979). The mother, having been instructed in the practice of oral rehydration therapy and seeing her child on the road to recovery, can also explore questions surrounding her own personal hygiene. Does she wash her hands after her own defecation and before handling food? If she is breastfeeding, does she wash her nipples as well? Does she have enough water and soap to do so?

Food given to children as they recuperate from dehydration should be as free from intestinal pathogens as possible. Dishes must be kept clean and hands washed before preparing food.

Supplemental and weaning foods form excellent culture media for bacterial proliferation. The longer these foods stand around, the greater the bacterial pollution. Beyond 12 hours they can be considered polluted. These issues are of particular importance because during the weaning period children are both in a precarious state of nutrition and especially susceptible to diarrhea because they are actively walking about and exploring their surroundings.

The same principles apply to bottle feeding. It seems that the earlier one starts supplemental bottle feedings, particularly if they are not given by the mother but by another caretaker while the mother is working in the fields, the greater the chance for diarrhea to occur. Vis et al (1981) provides evidence from a study in eastern Zaire (Kivu Province) that children of women who must be away in the fields all day have a higher rate of diarrhea and a higher mortality.

### 3.3 Disposal of Stools of Small Children

As for the disposal of the stools of small children, there are a variety of practices, but generally the mother or other caretaker holds the child over the floor while he defecates, and then wipes his anus with either a separate cloth or a section of her wrap-around dress. The important point is that fecal matter should be disposed of promptly and adequately. Washing clothing well in soap and water and burying fecal matter or throwing it in a latrine if one is available will help prevent contamination.

Toddlers who are no longer carried by their mothers pose an even greater problem, for they tend to defecate indiscriminately in and around the house. Some of the fecal material is eaten by pigs or dogs but some contaminates the hands, feet, and clothing of other people, particularly children. In Sri Lanka the Sarvodaya movement has developed a special child-size pour flush latrine

with a hole small enough to prevent the fear of falling in, that can be placed in the courtyard of the house in full view of the mother. Since there is no superstructure, the fear of a dark enclosed space is also eliminated. The mother is taught to clean the latrine with at least a litre of water after each use. Groups of mothers learn how to construct and use these latrines and how to train their two to three year-old children to use them. Many have also been installed in nursery schools run by Sarvodaya.

### 3.4 Community and Women's Participation

Community-level organizations that can organize and promote participation in primary health care projects, including water supply and sanitation and oral rehydration, are needed to assure long-term maintenance of facilities, and permanent changes in group and individual behavior. Participation by various groups of a population helps to provide an organized support network for changes in health-related behavior.

The participation of women in such organizations appears extremely important not only for their education in matters of hygiene and in the use of oral rehydration therapy, but also for soliciting their opinions on water supply and sanitation improvements (Green 1984). In Togo, for example, there are three to four women among the ten members on most of the health committees. Their primary responsibility is to look after the pump installed on the bore holes drilled by the project. Interestingly, one of the supplemental interests raised by many committees has been oral rehydration. For women struggling to understand and practice the prevention of diarrhea and dehydration, participation in such organizations provides an essential support structure without which most behavioral change is not possible.

## Chapter 4

### IMPLICATIONS FOR PROGRAMS

#### 4.1 Basic Facts

What are the programmatic implications of all the linkages discussed in Chapter 3? There are several, and they will be discussed in this chapter. But key to all the programmatic implications are a number of basic facts. The first is that it is the mother who is at the very center of both the administration of oral rehydration therapy and the prevention of diarrhea. Rohde (1983) has in fact emphasized this central role of mothers as front-line health care workers.

Another basic fact is that most often the same ministry administers both oral rehydration and sanitation programs, although these programs may be housed in different divisions of the ministry, between which there may be no relations. A corollary is that the same primary health care worker is often responsible for implementing both aspects of this joint program.

##### 4.1.1 The Essential Role of Women

Women's primary role as caretakers of infants and children, carriers of water, and preparers of food, places them in a position to determine in large part the success of programs.

As we have seen in the previous sections, both oral rehydration and sanitation programs depend on women for their implementation. It is women who mix and administer oral rehydration solutions, breastfeed or administer other feedings to children with diarrhea, and are the focus of associated educational programs. Women are charged with carrying and storing water, cleaning the latrines, and training toddlers in defecation habits. By virtue of their role in food preparation, women are the chief transmitters of intestinal pathogens. For these reasons it makes sense to find ways to coordinate both programs, the final focus being the mother.

##### 4.1.2 The Same Ministry Administers Both Programs

Almost without exception, oral rehydration and sanitation programs are under the same ministry, the ministry of health. It should be noted here that water supply has been separated from sanitation in this discussion, because in most countries water supply is the responsibility of one of a number of different ministries. The role of whatever ministry or ministries are responsible for rural water supply will be discussed in Section 4.4.

The responsibility of the ministry of health with respect to water supply is usually limited to disinfection of wells and other sources. Practically speaking, however, health personnel, although they may not have the necessary expertise, are often faced with the maintenance and repair of water supply installations because of their availability and proximity to rural populations. Maintenance and repair of water supply facilities in fact are

often neglected because the water supply agency is not able to serve rural populations. In Togo during the evaluation of a rural water supply project, it was discovered that for an entire region with over 300 wells there was only one water supply technician.

The association of oral rehydration and sanitation programs in the same ministry has both positive and negative aspects. Oral rehydration programs are usually vested in either the health services division of the ministry of health or in a special diarrheal disease control program set up under the guidance of the WHO, UNICEF, or bilateral agencies. Sanitation, on the other hand, is usually housed in a separate division with its own hierarchy and corps of personnel. Furthermore, sanitation personnel in the field may often be insufficient to cover the population. The sanitation unit of the Ministry of Health in Malawi has attempted to remedy this problem by appointing a group of personnel, originally recruited to work in a cholera control program, as health surveillance assistants, with direct responsibility under the sanitation division of the Ministry of Health.

Relations between the health services division and the sanitation division vary from country to country. In some countries the divisions are completely separate, with sanitation personnel providing technical assistance only as requested. In other countries, sanitation personnel are given clinical roles to play such as in Senegal, where they are expected to substitute for health center chief nurses when the latter are absent from their posts.

#### 4.1.3 The Same People Administer Both Programs in the Field

In almost every developing country responsibility in the field for implementing programs in both oral rehydration therapy (if such a program exists) and sanitation fall upon the same health personnel: nurses, auxiliaries, community health workers, itinerant health agents, and other "front-line" workers. They are responsible for hygiene education, for promoting the construction of latrines, for treating diarrhea, and for a host of other activities.

Sanitarians per se are frequently in short supply. In some countries one sanitarian can be found for a district, and in others whole provinces may be without a sanitarian. Even one sanitarian per district is not enough to carry on all the needed activities. In Sri Lanka, a district sanitarian may have to inspect meat, supervise street cleaning crews, and participate in maternal and child health clinics, leaving only one to two days a week for sanitation work in 150 to 200 villages. It falls then to health personnel at the local level to carry on these activities, whether at a health center or health post, or through visits to villages.

Even if there is enough time for community sanitation activities, the orientation and attitude of sanitarians may be more toward collecting fines for poor hygiene and simply telling people what to do rather than working with people to solve their perceived problems. Training aimed at changing this attitude as well as training in the techniques of mixing and administering ORS may often be necessary for sanitarians to work effectively with communities. The ability to offer some curative service such as oral rehydration may be essential. If sanitarians can teach mothers to mix oral rehydration solutions



-- a highly felt need -- they may find their credibility significantly increased.

## 4.2 Practical Suggestions for Coordinated Programs

### 4.2.1 Techniques for Linking ORT and Sanitation

A comprehensive oral rehydration therapy program, educates women not only on how to mix and use oral rehydration solution and how to maintain the nutrition of the child being rehydrated but also on how to prevent diarrhea. Therefore, it makes good sense for the workers who are responsible for oral rehydration therapy programs to be trained in techniques they can employ to communicate effectively with community members -- especially women. Among these techniques are the following:

- Use well-designed visual materials (flannelgraphs, flipcharts, and poster series) to stimulate discussion of personal hygiene, as was done in Niger (Belloncle and Fournier, 1975), and teach mothers the principles and techniques of oral rehydration therapy. In Niger visual aids were designed using local scenes and people that were familiar to women. After showing the flipchart or flannelgraph, several questions were asked to provide discussion:

What did you see in the visual aids?  
Why do you think we showed it to you?  
What did it say to you?

- Conduct follow-up of rehydrated infants to see whether homes are furnished with latrines and water and soap for handwashing and to investigate the handling of the stools of infants and toddlers. Oral rehydration therapy techniques taught could be reviewed. Latrine construction, usually a local household responsibility, might become a community project. Community private enterprises might be started to produce slabs, vent pipes, and vent screens. Water supply improvements and soap-making or cooperative purchase of soap could be undertaken as community projects.
- During the same visit, survey water sources and water uses with special attention to quantities consumed by households, how water is stored, and its accessibility in the kitchen and the latrine.
- During this or a subsequent visit, try to discover how women are involved in community-wide activities, either through a women's organization in the community or through active participation in a health committee. Attempt to meet leaders in order to arrange a series of meetings about home-based oral rehydration and various hygienic measures needed to prevent diarrhea. Arranging these meetings may involve a confrontation with traditional beliefs. In some areas women may participate only indirectly and it may be customary for them to stay at home or at the periphery of village meetings. Sometimes in such meetings, as was the case of a village in Burkina-Faso (formerly Upper Volta) during the evaluation of a

rural water supply project, women may be permitted to speak only if asked a question directly.

- ⊙ If no open participation of women is evident, then speak to village leaders about how women in the community can become involved in diarrhea treatment and prevention. Traditional women leaders may be contacted. Satge et al (1970), for example, reports how traditional birth attendants in Senegalese villages were trained to counsel the younger women in their families about supplemental feedings and weaning. If health workers found an undernourished child, one not receiving supplements or one being weaned too abruptly, they contacted the trained midwife in that family who immediately began dealing with the young mother. The latter paid heed to the midwife whose opinion she respected.
- If no forum for discussing health problems exists already it may be possible to form a health committee. In many cases, however, where a village is composed of multiple castes, socio-economic classes, or ethnic groups, a village-wide health committee may not be possible; rather one may find it necessary to work with several committees or groups.
- If there is a problem with the availability of soap for handwashing, or salt or sugar for mixing the oral rehydration solution, work through the women's or another community organization to arrange to buy these products cooperatively.
- If water supply or technical aspects of sanitation are a problem, act as intermediary with the water supply agency.
- Continue meeting with the groups, using visual aids to teach, but most importantly, to stimulate discussion and to give moral and organizational support.

Given the heavy load of responsibility already weighing upon field workers and their supervisors, one cannot expect the immediate implementation of all these techniques. Each program must be examined carefully to determine just what measures are appropriate and potentially useful.

#### 4.2.2 The Need for Training

Training of existing health personnel is greatly needed not only to show health workers how oral rehydration therapy and sanitation are linked, but also to assure maximum coverage of rural populations with both services. At present neither oral rehydration therapy nor sanitation have reached more than a fraction of the rural populations of most developing countries. In Togo, rural health workers have been trained in a stepwise fashion to form over 400 village health committees, train their members, and help them plan village-level projects. Among the tasks that health committees took on were handpump maintenance, latrine building, education in hygiene, oral rehydration, and malaria control measures. A technique known as success analysis was used to help villages realize their strengths, learn from their achievements, and go

on to other efforts. No problem was identified without a suggested way to solve it.

Where possible, it would be a desirable feature of program planning to include as many women as possible in training programs in order to promote women's participation effectively through woman-to-woman contact.

Training is not all that is needed. Transport, fuel, a supply of visual aids, and release from duties in the hospital or health center are also required. These requirements should be discussed before a training program is begun. It is certainly worthwhile to invest in training, however, since greater coverage of rural populations with oral rehydration and hygiene services can result in significant reductions in morbidity and mortality from diarrhea. In India, McCord and Kielmann (1978) report no significant reduction in diarrheal morbidity and mortality until village-level workers were trained to administer treatment at home.

#### 4.3 Practical Issues Faced in Focusing Programs on Women

##### 4.3.1 Women's Roles

The first issue to be considered is the ratio of public versus private roles played by women from one society to another. Women's roles vary, and that variation should influence the design and implementation of diarrhea control programs. In traditional Islamic societies, for example, women's roles may be entirely private, necessitating individualized visits by female health workers. In other societies, even those where Islam is the dominant religion (as in sub-Saharan Africa), women may have more public roles and can participate in either women's or community-wide organizations. In Swaziland, Green (1984) found that women's organizations were more numerous and the most active of any surveyed among 150 communities. There is little chance that success can be achieved without a great deal of women's participation, whether in public or entirely in private.

##### 4.3.2 Women's Time

Another issue is the amount of time women have for meetings and associated activities. Programs must be planned to fit women's work schedules, especially with regard to the demands of seasonal agricultural work.

##### 4.3.3 Women's Autonomy

Finally, an issue that must be addressed is the attitude of husbands and other relatives and community members to women's involvement in programs. In most areas this issue will not pose any problem but in others must be dealt with beforehand. Where women do not participate in community-wide organizations, such as health committees, their opinions may still influence decisions that affect them, as men have a tendency to discuss such issues with their wives (Bay, 1982).

#### 4.4 Program Coordination Issues

Coordination needs to take place both within and between ministries.

##### 4.4.1 Coordination within the Ministry of Health

In order for the division responsible for oral rehydration therapy and the sanitation division to begin collaborative training of personnel for joint operations, a decision at a policy-making level in the ministry of health will probably be necessary. Such a decision will probably come about only if agencies like the Agency for International Development (AID) exert some outside pressure. Of course, successful implementation of such joint field efforts in the context of an AID-funded primary health care project would serve to augment the pressure on top ministry officials.

##### 4.4.2. Coordination with the Rural Water Supply Agency

Most rural water supply agencies (whether part of the ministry of rural development, agriculture, or public works, or existing as a separate water supply ministry) do not have enough personnel to cover rural populations. As a result, the only way health personnel can assist rural communities with water supply problems is to make special appeals to technicians for help. If the technician works in a large-scale water supply and sanitation project, one can appeal to him by virtue of his position in the project.

##### 4.4.3 Joint Planning of Projects

Why not plan rural water supply projects in consultation with health ministries, combining sanitation, health education, and oral rehydration in a coordinated way in areas of the country with the highest incidence of diarrheal disease? How could a ministry of health and a water supply agency plan such a joint project?

- First of all the water supply should be planned so as to provide water in sufficient quantity (20 to 30 liters a day per person) to have an effect on health.
- Secondly the health ministry should begin the process of organizing community groups to work on sanitation, water supply maintenance, and other diarrhea control measures before the water supply is installed.
- Where possible women's concerns for convenience, taste, and reliability of water should be given serious consideration in installing water supply systems, and women should play key roles in whatever community-level organization is established.
- In communities where oral rehydration therapy has not been introduced as a diarrhea control measure it should be as soon as possible.

The interministerial coordination needed to assure a successful program is difficult to achieve. Coordinating the activities of the ministry of health with those of the agency responsible for rural water supply is particularly difficult. In Togo, it was two years before the Ministry of Public Works openly admitted the value of the contributions made by the Health Ministry in organizing local communities to maintain and repair wells and pumps. In Burkina-Faso such coordination has hardly begun, although both ministries recognize its desirability. In Sri Lanka, where a new water supply project is being planned, an effective link between the Ministry of Health and the water supply agency has been established in project plans. Only time will tell, however, how well such pre-planned coordination will function.

In summary, coordination of oral rehydration therapy with sanitation and with water supply can take place in a pilot fashion in the field, but such coordination will not be widespread in the country unless top level decision-makers in the ministry of health and in other ministries establish effective links.

#### 4.4.4 Coordination within AID

Although some water supply installations are costly in terms of capital inputs, most rural installations are of moderate cost given community contributions of labor and materials and in some cases partial or total financing of operations and maintenance. Sanitation has an intimate relation to diarrheal disease control and thus to oral rehydration, but most sanitation measures (handwashing, bathing, and food preparation) depend quite simply on the availability of a safe, reliable, and convenient source of water. Combining water supply and sanitation and oral rehydration therapy programs results in both primary and secondary measures to prevent diarrhea and dehydration. Thus, one can argue forcefully for a close association of these programs in the agenda of AID Missions.

In one country, for example, where a water supply and sanitation project was being planned, the health officer urged project planners to give priority to areas of the country with high morbidity and mortality from diarrheal disease. Later mission efforts to promote oral rehydration in the same areas would multiply the beneficial effects. In other areas where oral rehydration programs are already in progress, water supply and sanitation projects, whether funded from health or other accounts, could be planned.

Effecting this coordination within a mission often requires close collaboration between health, engineering, and rural development officers, often not possible without the support of the mission director. It is, in fact, possible for a health officer to be promoting oral rehydration, while the engineering officer is planning a rural water supply and sanitation program, without one knowing about the program of the other. These programs should be developed together so that water supplies are installed in communities where health personnel can be trained to promote both oral rehydration therapy and sanitation.

## Chapter 5

### SUMMARY AND CONCLUSIONS

Diarrhea incidence is closely related to both the quality and quantity of water available. Etiologically, the primary source of diarrhea is human fecal matter. Intermediate sources are contaminated water supplies, hands, nipples, household items, and particularly food.

A complete program of diarrhea control therefore includes education of the mother in diarrhea prevention. While promoting oral rehydration therapy, health personnel can work effectively with populations (if possible with women's groups), in the promotion of home-based oral rehydration therapy and personal, food, and domestic hygiene. Training health workers to carry out these tasks, of course, requires careful planning, sound implementation by experienced trainers, and follow-up to assure transport and supervisory support. In order to be implemented nationally, there must be coordination at three levels:

- Within the ministry of health involving the sanitation unit and the unit responsible for diarrheal disease control
- Between the ministry of health and the water supply agency (or agencies) of the country.
- Within AID, where programs for oral rehydration and water supply and sanitation are usually managed separately.

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