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**The HEALTHCOM Resurvey
of Oral Rehydration Therapy
Practices in The Gambia**

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EXECUTIVE SUMMARY

This document is a report of the findings from a follow-up survey of the impact of the Mass Media and Health Practices (MMHP) Project in The Gambia. The follow-up survey was funded by USAID's HEALTHCOM Program in order to determine the extent to which changes in knowledge and practices resulting from the MMHP Project (1982-1984) have persisted over time.

The follow-up survey was conducted in the summer of 1987, three years after the end of the MMHP Project in 1984. Applied Communication Technology (ACT) worked with the Gambian Department of Medical and Health to carry out the follow-up survey of the MMHP Project.

The MMHP Project used an innovative methodology drawn from social marketing to promote health behavior change. The project used radio broadcasts, interpersonal communication, and print materials to teach mothers about infant diarrhea and to motivate them to change related behaviors.

One prime behavioral target of the MMHP Project was the adoption of a home-mixed water-sugar-salt (WSS) oral rehydration solution as a treatment for diarrhea. Since the MMHP Project concluded in 1984, it is doubtful that any level promotion of WSS took place.

Virtually none of the mothers sampled could mix WSS correctly prior to the start of the MMHP Project, although about half of the mothers reported that they knew about WSS. By the time the project concluded, more than two-thirds of all mothers (not repeatedly interviewed) knew about WSS, and about 43% of all mothers could mix WSS exactly as recommended. Of the mothers who knew about WSS, about 63% knew how to mix WSS by the time the project ended.

Results From the HealthCom Follow-up Survey in The Gambia

During the course of the MMHP Project, the percentage of episodes of diarrhea treated at home with WSS increased from 4.1% to 73.8%. The percentage of episodes treated with WSS by mothers who knew how to mix WSS increased from 0% to 49.5%. These are impressive gains by any standards.

Overall, the MMHP Project was an unqualified success, although it worked to improve some areas of knowledge and practices more than others. Not surprisingly, the project demonstrated its best performance with respect to teaching mothers how to mix WSS and encouraging mothers to use WSS as a home treatment for diarrhea, since these objectives were given emphasis during the project.

At the time of the HEALTHCOM follow-up study, many of the impressive gains registered during the MMHP Project had diminished, although gains did not erode completely. In areas where project gains were most impressive, absolute declines were most pronounced. In areas where project gains were modest, there was less room for subsequent retreat after the MMHP Project concluded.

Prior to the MMHP Project, only one mother knew how to mix WSS correctly. By the end of the project, about 43% of the mothers knew how to mix WSS correctly, although this number was cut in half, to 21% of the mothers, three years after the project had ended. Mothers' knowledge about how to administer WSS correctly (that is, how often to make a fresh batch of the solution, and how much to give a child each day) also deteriorated after the MMHP Project ended. However, knowledge at the time of the HEALTHCOM study remained at higher levels than prior to the MMHP Project.

The percentage of diarrhea episodes treated at home with WSS, and the percentage of episodes treated at home with WSS by mothers who knew how to mix WSS, fell off more sharply than levels of knowledge did. However, the percentage of episodes treated at home with WSS remained higher than it was prior to the MMHP Project (10.8% versus 4.1%). Only 3.9% of the episodes, at

the time of the HEALTHCOM study, were treated at home with WSS by mothers who knew how to mix WSS correctly.

Overall, the findings indicate that knowledge gains (i.e., knowledge about how to mix and administer WSS) made during the MMHP Project were somewhat more sustainable than behavior gains (i.e., the practice of using WSS at home to treat diarrhea). At the time of the HEALTHCOM study, the use WSS as a treatment for diarrhea seems to have been precluded by sharply reduced access to mixing materials (i.e., a Julpearl bottle and bottle cap).

After the MMHP Project ended, it appears that the resources needed to continue promoting WSS were not available to local institutions. It became impossible to undertake the continued research that may have given attention to the fact that mothers no longer had widespread access to the materials needed to mix WSS as recommended (that is, a Julpearl bottle and bottle cap).

The lesson learned from The Gambia is that use of WSS, once adopted by a large percentage of the population, will not automatically become self-propagating. While WSS may continue to be common knowledge in The Gambia, widespread use of WSS probably will not be sustainable unless local program management continues to be supported, at some level, through the commitment of financial and/or technical resources.

TABLE OF CONTENTS

EXECUTIVE SUMMARY ii

CHAPTER I. INTRODUCTION 1

 A. Background to the MMHP Project in The Gambia 2

 B. Description of the MMHP Project 4

 C. Evaluation Design 8

 (1) Variables measured 9

 (2) Measurement method and organization 10

 (3) MMHP and HEALTHCOM samples 11

 a. The socio-cultural context in
 The Gambia 11

 b. Sampling plan 13

 c. Characteristics of the samples 17

 (4) Measurement strategy 17

 (5) Control groups 21

 (6) Field worker training and
 data handling logistics 23

 D. Comparison of MMHP and HEALTHCOM findings 24

CHAPTER II. ACCESS AND EXPOSURE TO MMHP INTERVENTIONS . 28

A. Access and Exposure to Messages	28
(1) Radio broadcasts	29
(2) Printed materials	34
(3) Interpersonal channels	37
B. Access to WSS Mixing Ingredients and Materials	38
C. Summary	40
CHAPTER III. AWARENESS, KNOWLEDGE, AND MIXING OF WSS ..	42
A. Awareness of WSS	43
B. Ability to Mix WSS	46
C. Knowledge About WSS and its Administration	49
D. Summary	51
CHAPTER IV. PATTERNS OF TREATMENT FOR DIARRHEA	53
A. Prevalence and Severity of Diarrhea	54
B. Treatment of Diarrhea	58
(1) Home Treatment	59
(2) Treatment at Health Centers	62
C. Summary	64

CHAPTER V. FEEDING PATTERNS DURING AND AFTER DIARRHEA	66
A. Beliefs About the Role of Feeding	67
B. Patterns of Feeding During Diarrhea	69
C. Patterns of Feeding After Diarrhea	71
D. Summary	72
CHAPTER VI. SUMMARY AND CONCLUSIONS	75

LIST OF FIGURES AND TABLES

Figure I-1	Map of Sample Villages	15
Table I-1	Summary of Characteristics of Villages in The Gambia Sample .	18
Figure I-2	Timing of Administration of Evaluation Survey Instruments	20
Table I-2	Summary of Characteristics of Villages in the Control Sample . .	22
Table II-1	Radio Availability and Frequency of Listening to Radio Gambia, Each Week	31
Table II-2	Percent of Mothers Who Reported Hearing Radio Spots About Diarrhea, Feeding, and the Happy Baby Lottery	33
Table II-3	Mothers' Exposure to Flyers About Mixing WSS and Feeding During Diarrhea	36
Table II-4	Mothers' Access to WSS Mixing Materials: Sugar, Salt a Julpearl Bottle, and a Bottle Cap	39
Table III-1	Mothers' Awareness of WSS and Sources of Knowledge	44
Table III-2	Mothers' Knowledge of WSS Mixing	47
Table III-3	Mothers' Knowledge of the Role of WSS and How to Administer WSS	50
Table IV-1	Prevalence of Diarrhea	55
Table IV-2	Severity of Diarrhea Cases During Last Two Weeks	57
Table IV-3	Home Treatment for Previous Case of Diarrhea	60
Table IV-4	Health Center Treatment for Previous Case of Diarrhea	63
Table V-1	Mothers' Beliefs about the Role of Feeding	68
Table V-2	Mothers' Pattern of Feeding for Children With Diarrhea	70
Table V-3	Mothers' Pattern of Feeding for Children Recovering from Diarrhea	73

Chapter I: INTRODUCTION

This document is a report of the findings from a follow-up survey of the impact of the Mass Media and Health Practices (MMHP) Project in The Gambia. The follow-up survey was conducted in the summer of 1987, three years after the end of the MMHP Project in 1984. Applied Communication Technology (ACT) worked with the Gambian Department of Medical and Health to carry out the follow-up survey of the MMHP Project. The survey was undertaken in accordance with ACT's subcontract with the Academy for Educational Development (AED) under the USAID-funded HEALTHCOM Project.

The MMHP Project used an innovative methodology drawn heavily from social marketing to promote health behavior change. The key components in the methodology were: village-level research on practices, cultural concepts and vocabulary for planning and message development; behavioral analysis for defining desired behaviors and planning paths for arriving at them; and use of a highly integrated multi-channel communication strategy.

The project used radio broadcasts, interpersonal communication, and print materials to teach mothers about infant diarrhea and to motivate them to change related behaviors. One prime behavioral target was the adoption of a home-mixed water-sugar-salt (WSS) oral rehydration solution as a treatment for diarrhea.

The particular health communications strategy developed by AED for the MMHP Project is part of a growing genre of health education activities referred to generally as social marketing or public health communication. The approach

attempts, in a pre-defined period of time, to change a particular set of behaviors (related to a specific problem) in a large-scale target audience. In The Gambia, the goal was to get a substantially large number of mothers to adopt oral rehydration therapy (ORT) as a treatment for diarrhea, use the treatment repeatedly, accurately, and effectively, and ultimately to reduce mortality from diarrheal dehydration.

Successful applications of the health communication methodology by AED in The Gambia and Honduras led to renewed applications of the strategy in up to 15 additional countries under USAID's Communication for Child Survival (HEALTHCOM) Project. The follow-up survey in The Gambia was funded by HEALTHCOM in order to determine the extent to which changes in knowledge and practices resulting from the MMHP Project have persisted after the conclusion of project activities three years earlier. A similar follow-up survey has been undertaken by ACT in Honduras, the findings from which are reported in a separate document.

The data on ORT behaviors and practices are presented juxtaposing the 1987 HEALTHCOM data with several waves of MMHP data collected between 1982 (prior to the onset of project activities) and 1984 (at the conclusion of the project).

A. Background to the MMHP Project in The Gambia

Diarrhea is a leading cause of infant and early childhood mortality in many developing countries. Research conducted by the British Medical Research Council staff and a preliminary investigation done by the Academy for Educational Development (AED, 1982) in The Gambia indicated that there are probably two

major causes of death from diarrhea: dehydration, and a general wasting from the interaction of disease, diarrhea, and poor nutrition.

In the dry season, from October to May, children tend to contract a type of diarrhea that can rapidly dehydrate them and lead to death from loss of water and electrolytes before the child's immune system can work to fight the illness. During the rainy season, from June through October, children tend to have relatively mild, but chronic bouts of diarrhea. Occurring at the time of year when food supplies are decreasing and mothers are busy in the fields, this type of diarrhea often works with malnutrition to weaken the child gradually, leading to wasting and possibly to death.

Fortunately, much of the mortality associated with dehydration (a particular problem during the dry season) can be avoided if fluids and electrolytes are replaced while the child fights the cause of the diarrhea. An effective and inexpensive way of replacing the lost fluids -- oral rehydration solution (ORS) -- is now available. It consists of water in which sugar and salts have been mixed in certain fixed proportions. The World Health Organization (WHO) has established a standard formula that includes glucose, sodium chloride, potassium chloride, and sodium bicarbonate. The WHO formula, while inexpensive in terms of the cost of ingredients, is somewhat more expensive to package and distribute.

A less complex version of the solution containing ordinary sugar and salt can be mixed in the home. The home-mix solution provides families with a minimum-cost oral rehydration solution that is maximally available and affordable. The Gambia adopted the home-mix formula for promotion by the MMHP Project. As one of its primary objectives, the MMHP Project sought to teach mothers how to

mix and administer water-sugar-salt (WSS) solution using ingredients and materials that are routinely available in homes.

A treatment for the debilitating effects of diarrhea (a particular problem during the rainy season) is to emphasize a diet that includes WSS, solid foods, and/or continued breastfeeding. This therapeutic regimen is commonly referred to as oral rehydration therapy (ORT). While one element of ORT includes the administration of oral rehydration solution (ORS), ORT is a more comprehensive treatment than ORS alone since it emphasizes continued feeding and/or breastfeeding in addition to the use of ORS.

Once ORT had been identified as the remedy for dehydration and the weakening effects of diarrhea, efforts in The Gambia turned to determining how best to inform mothers about ORT and other health issues. Additional efforts were directed to encouraging mothers to turn the new information into health practices that would improve rates of child survival.

B. Description of the MMHP Project

The MMHP Project used an integrated program of radio, print materials, and health worker training to teach or reinforce changes in a variety of skills and beliefs surrounding infant diarrhea. The salient characteristics of the methodology were:

- intensive use of village-level research on practices, cultural constraints, and vocabulary for planning;
- adoption of a social marketing perspective;

- intensive use of pretesting and formative evaluation in message and project design;
- use of an integrated campaign format through multiple channels;
- use of behavioral analysis in project design and implementation; and
- concentration on a focused set of objectives.

During the first year, the program focused on the promotion of WSS solution that mothers could mix and administer at home when their children were ill. In the second year, messages about WSS were continued, but the focus of the interventions shifted towards messages about the importance of feeding and/or breastfeeding during and after diarrhea. Throughout the two years, messages about sanitation in and around living quarters were also disseminated. Radio messages, training programs for health workers, and pictorial print materials which were mutually reinforcing, were developed using pretesting and formative evaluation techniques.

The timing of the introduction of the components of the media campaign was planned to coordinate with the peak seasons of diarrhea. The radio messages of the campaign were grouped into five phases:

Results From the HealthCom Follow-up Survey in The Gambia

PHASE 1 (May to June, 1982): dehydration, diarrhea and malnutrition, "diet for diarrhea" (WSS, breastmilk, solid foods), training of rural health workers in WSS mixing and administration;

PHASE 2 (Rainy season, July to October, 1982): "Happy Baby" Lottery, mixing and administration of WSS, feeding during diarrhea, proper disposal of feces;

PHASE 3 (Dry season, November 1982 to March, 1983): reinforcement of WSS mixing instructions, the need for immediate administration of WSS, feces disposal;

PHASE 4 (Rainy season, July to October, 1983): feeding during and after diarrhea, reminders about breastfeeding and WSS, feeding messages, methods for teaching mothers; and

PHASE 5 (Dry season, February to April, 1984): mini-campaign on protection of community wells, personal hygiene, and the educational role of Village Development Committees.

Before the start of the campaign, AED worked with the Gambian Medical and Health Department to develop a definitive manual for health workers to standardize the treatment of acute diarrhea. The manual covered methods for assessing dehydration status, determining a treatment plan, treating different types of diarrhea, and educating mothers in prevention and treatment of diarrhea.

At the start of the campaign (April to June, 1982), a series of five-day training workshops was held for rural health workers. These workshops included all community health nurses and health inspectors, the two groups who were the most mobile and who were already involved in health education. Key curative personnel (dresser-dispensers and nurse-midwives) from each health center were also included. Shorter workshops were held for leprosy inspectors, Peace Corps volunteers, and community health nurse trainees. A total of 182 health personnel attended these workshops.

The workshops focused on diarrheal management, teaching rural health workers to: assess a child's hydration status, treat different levels of dehydration, mix WSS correctly, and teach mothers and other health workers about WSS and the "Diet for Diarrhea". Each trainee was given a set of printed materials: a poster detailing treatments, a "Diet for Diarrhea" poster, and a copy of the Health Worker's Manual for the Management of Acute Diarrhoea in The Gambia.

A second objective, after teaching health workers directly, was to prepare health inspectors and community health nurses to train village volunteers to be local sources of support and information. After the workshops, the inspectors and nurses returned to their posting areas, identified a volunteer in each of ten villages, and trained these volunteers in the mixing and administration of WSS. The volunteers were given a red flag to fly above their compound and were known as "Red Flag Volunteers." A total of 840 volunteers were trained.

The main campaign activity during Phase 2 (July to October 1982) was to publicize and teach WSS to as many mothers as possible. To support this effort, a lottery (the "Happy Baby Lottery") was held during September and October. An

important component of the lottery was a pictorial flyer detailing mixing proportions and instructions. These flyers were distributed to rural health centers throughout the country during the month of August. From there they were distributed to rural dispensaries, sub-dispensaries, and Red Flag Volunteers. Before the lottery, radio spots gave mothers step-by-step instructions on how to read the flyer.

The lottery was designed to motivate mothers to obtain the flyer and listen to the radio spots. The flyer was an entry ticket to participate in the lottery. For four weeks, 18 villages were randomly selected each week to be lottery villages (a total of 72 villages participated). Distribution of the flyers (approximately 150,000) and participation in the lottery were widespread.

In the second year of the campaign, two other topics received wide coverage: feeding during and after diarrhea and sanitation. New print materials were designed for each of these phases and workshops were held for rural health workers.

C. Evaluation Design

During MMHP, Stanford University developed a "process model" for evaluating a range of complex outcomes that would help answer questions posed by different constituencies. The model was designed to monitor the process of change over time and to link specific intervention activities with changes in individuals. The variables implicit in the process model were divided into four general categories:

- treatment variables: those related to project activities and access and exposure to messages;

- cognitive and attitudinal variables: those related to voluntary exposure to, learning of, and acceptance of campaign content;
- behavioral outcomes: those related to changes in the practices of the target audience; and
- health status outcomes: variables related to the health of children in the target audience.

Specific variables were chosen within each category and measurement techniques were developed.

(1) Variables measured

At each step in the process model, specific variables were selected corresponding to the issues investigated. They included: access and exposure to intervention components; knowledge and behavior related to management of diarrheal disease, child nutrition and feeding practices, sanitation and personal hygiene; and nutritional status, morbidity, and mortality. A large group of background variables, measuring demographic information, socioeconomic status, literacy, wealth, etc., were used to assess the impact of the project for different demographic and socioeconomic groups.

(2) Measurement method and organization

Given the diversity and complexity of all the variables measured during MMHP, data collection was divided between several discrete studies. The largest of these was the longitudinal study, which measures knowledge and practices over the course of the original intervention (1982-1984). This report examines the extent to which changes in knowledge and practices resulting from the MMHP Project have persisted since its conclusion three years earlier.

During the course of the MMHP Project, variables were measured through repeated interviews using several research instruments. Each wave of interviewing employed a sub-sample of approximately 800 women drawn from the same cohort of 1029 women. The baseline measures included a great deal of demographic and socioeconomic information that was not repeated.

Variables in the HEALTHCOM follow-up survey were measured at a single point of time, during the summer of 1987. For reasons explained in the following section, the 688 women interviewed in the HEALTHCOM study were not selected from the same cohort as in the MMHP surveys, 3-5 years ago. However, the overall sampling plan remained the same in order to achieve as much equivalence as possible between the MMHP and HEALTHCOM samples.

Throughout the survey design stage, an attempt was made to match the HEALTHCOM follow-up questions as much as possible to those asked during the MMHP evaluation. Nevertheless, in some instances the order of questions was changed or minor differences in wording were incorporated. Also, new questions were asked in the follow-up survey to provide more detail about certain health behaviors. Where there are deviations between MMHP and HEALTHCOM

questions, the report identifies the differences in a footnote. Where results are presented for questions asked in the HEALTHCOM survey but not in the MMHP surveys, missing data has been indicated by dashes in the tables of this report.

(3) MMHP and HEALTHCOM samples

The organization of the Gambian social structure, family life, and access to health care and radio reception influenced the sampling process.

a. The socio-cultural context in The Gambia

The organization of households in The Gambia is typical of many parts of Africa. The basic physical organization is the compound, which typically is much larger than a nuclear family household. A compound is likely to have more than one married male in it, and may have unrelated people living in it also. Married males are frequently polygamous; their wives may come from different tribal or linguistic backgrounds and probably retain greater variability in diet, home remedies, and child-raising practices than otherwise would be expected.

The cultural and linguistic situation in The Gambia is quite diverse. The tribal groups present include the Mandinkas, Wolofs, Fulas, Jolas, Serahules, and others, including immigrants from Mauritania, Senegal, and Guinea-Bissau. The primary languages of these groups differ, although most people have some degree of fluency in Wolof and/or Mandinka, the common languages used for local trade and commerce. English, the official language, is spoken only by a small proportion of the population.

The health care structure in The Gambia consists of several overlapping systems, some of which are more active than others. The main system is a hierarchical one, descending from the hospital in Banjul (the capital city) to the health centers, dispensaries, and sub-dispensaries in other towns. Some communities are served by maternal-child health (MCH) workers who visit communities on a fixed schedule to provide clinic services. The relationship between fixed health care centers and communities served by MCH workers is not constant.

During the course of the MMHP Project, a new system of village health workers (VHWs) was being implemented on a region by region basis. These workers were intended to fill gaps in the existing system. They were assigned to communities of more than 400 people which did not have a fixed facility.

A separate system of health inspectors carry out public health inspection and education tasks on an itinerant basis. Also, there is a Peace Corps program in health that places volunteers in some rural government facilities. Finally, there are non-governmental sources of health care -- various Islamic and Christian missionary clinics, clinics run by the British Medical Research Council (MRC), and private health care sources.

The Gambia has two radio stations, one operated by the government and one operated privately. The government station, Radio Gambia, covers most of the country with a transmitter near the coast; a relay transmitter upriver at Basse offers unreliable service in the easternmost section of the country. All project broadcasts were transmitted on the government station.

b. Sampling plan

The units of analysis in the MMHP longitudinal study were women with responsibility for the care of children. To be selected into the sample, a woman had to be between 15 and 45 years of age, or had to have primary responsibility for one or more children between 0 and 60 months (5 years) of age. The sampling plan used a multi-stage design incorporating purposive, stratified, and random sampling at various stages. The objective of the sampling frame was to be able to generalize to the full range of conditions that are present in The Gambia, rather than to be able to make precise statements about conditions aggregated on a national scale. The goal reflects a desire to generalize to conditions that might prevail in other developing countries.

A precise sampling frame was developed using a list of "stratification variables" that were expected to be related in important ways to the outcome variables. The major stratification categories included availability of health care services, tribal identity, primary language group, radio coverage, location relative to river and main roads, administrative division (which captures variation in health services), type of livelihood, types of non-health community services available, and size of community.

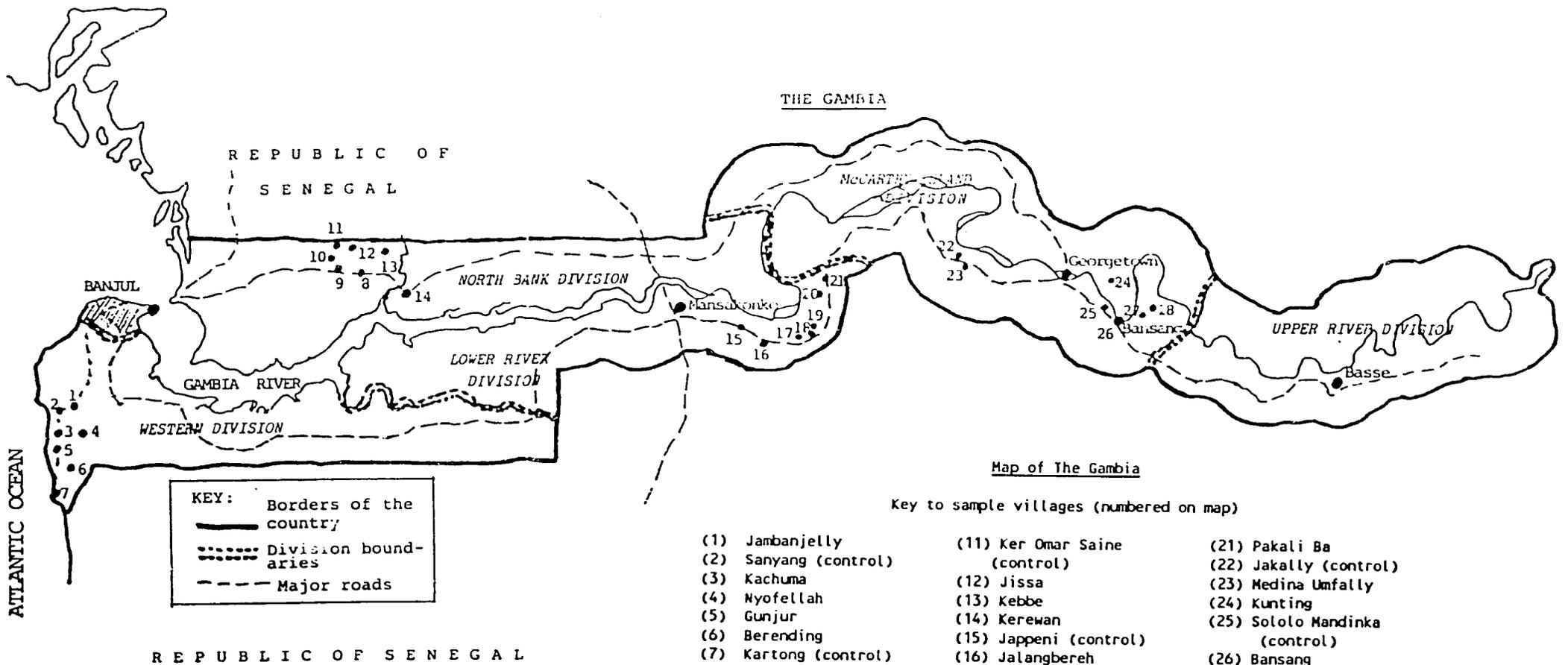
Given the difficulty of adequately representing each of the many combinations of factors, communities were selected which encompassed the full range of salient characteristics. A major constraint was to ensure that research communities were grouped geographically to enable a single interviewer to live in one of the communities and to travel easily to nearby communities in the same enumeration group.

Based on information available through a variety of sources (including the national Census Bureau), twenty villages were selected according to the sampling frame, five villages in each of four administrative divisions (see Figure I-1 for a map indicating the location of the sample villages).¹

Decisions about how to sample particular compounds and mothers were made difficult by the organization and structure of household units in The Gambia. Compounds vary widely in size within a community and a randomly sampled compound that happened to be very large could easily dominate village estimates. Given the desire to maintain a roughly equal likelihood of every eligible woman in a village being selected into the cohort, several conditions were set for sampling at the intermediate level. A primary objective was to sample individuals from as many different compounds in a village as possible, up to a maximum of 30 compounds per village. A secondary objective was to sample at least 40 women per village (or as many as possible if the villages had fewer than 40 women of fertile age).

After preparing lists of compounds for each village, compounds were sampled randomly without replacement until the list was exhausted, or 30 compounds had been selected. The entire population of a sampled compound was enumerated, including information required for identifying women eligible for sampling. Within a compound, the sampling frame for individuals was the list of eligible women. From each compound, one-half of the eligible women were sampled, with a minimum sample of two (or one if there was only one eligible woman).

¹Kombo St. Mary Division was not included because it is primarily urban, including the capital city and its suburbs. Upper River Division also was not sampled because of poor reception of Radio Gambia.



Map of The Gambia

Key to sample villages (numbered on map)

- | | | |
|------------------------|-------------------------------|--------------------------------|
| (1) Jambanjelly | (11) Ker Omar Saine (control) | (21) Pakali Ba |
| (2) Sanyang (control) | (12) Jissa | (22) Jakally (control) |
| (3) Kachuma | (13) Kebbe | (23) Medina Umfally |
| (4) Nyofellah | (14) Kerewan | (24) Kunting |
| (5) Gunjur | (15) Jappeni (control) | (25) Sololo Mandinka (control) |
| (6) Berending | (16) Jalangberek | (26) Bansang |
| (7) Kartong (control) | (17) Jassong | (27) Ndikiri Kunda |
| (8) Munyagen (control) | (18) Budayell | (28) Nibras |
| (9) Kuntair | (19) Bureng | |
| (10) Ker Nyor | (20) Baro Kunda | |

To summarize, sampling was conducted using a multi-stage plan with different sampling rules applied at each stage. This combination of criteria produced a total sample of 1029 women, averaging 50 women in each of 20 villages. The sampling frame produced a sample of women representing a wide range of characteristics found in The Gambia, while at the same time being unbiased and representative of the particular characteristics. Approximately 800 women were interviewed in each wave of data collection.

The HEALTHCOM follow-up survey was carried out in the same villages as the MMHP survey. The same sampling frame was used to select compounds and to select mothers within those compounds. However, a new sample of mothers was selected since the 1029 mothers in the MMHP cohort were not necessarily eligible (i.e., between 15 and 45 years of age, or having responsibility for one or more children between 0 and 60 months of age) at the time of the HEALTHCOM survey. In all, 546 women were interviewed for the HEALTHCOM follow-up survey, at a single point in time.

While some of the mothers in the HEALTHCOM sample had been interviewed during the MMHP Project (about 27% of the sample), they were included in the HEALTHCOM sample by chance through systematic re-application of the MMHP sampling procedure. Comparisons between successive MMHP waves relate to the same cohort of mothers, while comparisons between MMHP and HEALTHCOM mothers include some of the same mothers but mostly different mothers selected using the same sampling procedures.

c. Characteristics of the samples

The most important characteristics of the sample villages are summarized in Table I-1. A limited number of characteristics of the sample are reported here. The characteristics reported come from analysis of the data collected in the MMHP survey.

The population of rural Gambia is poor. Housing is in earthen-floor mud or mud-brick houses. The majority of houses (55 percent) have two or fewer rooms. Houses are organized into compounds, usually occupied by an extended family. We encountered some compounds with more than 100 residents, but typical sizes are one-tenth of that.

About three out of four compounds (77 percent) have latrines, and 80 percent of adults say they use them. All families say they cook over an open fire. Almost all water comes from wells (99 percent), but many of the individual wells go dry seasonally or daily.

Families tend to depend on farming, and most earnings come from the sale of farm and garden produce. More than half of the families grow peanuts, rice, and millet, and more than half also have chickens, goats, and sheep.

(4) Measurement strategy

Once specific mothers were sampled within compounds, a baseline measure of the full range of variables was taken in March/April of 1982, immediately prior to the start of the MMHP interventions. The baseline measures covered the

Table I-1 Summary of Characteristics of Villages in The Gambia Sample

Division and Village	Number of Compounds	Number of Mothers in Base Sample	Number of children < 5 yrs. in sample over time	Main Tribe	Type of Health Facility	Type of School	Distance from Main Road	Agriculture
Western Division:								
Gunjur	732	46	80	Mandinka	Full-time center	Primary, Catholic primary, secondary, technical Arabic	on main road	Gardens, citrus rice, millet groundnuts
Berending	72	47	81	Jola	Part-time clinic	Catholic primary	6 km.	Groundnuts, gardens, citrus rice
Kachuma	12	17	26	Manjago	None*	Catholic primary	3 km.	Palm wine, oil
Nyofelleh	85	51	86	Mandinka/Jola	None	Arabic	5 km.	Citrus, groundnuts, millet, gardens
Jambanjelly	238	66	120	Mandinka/Jola	Part-time clinic	Primary, Arabic	on main road	Citrus, millet, gardens, groundnuts
North Bank:								
Kuntair	43	46	74	Fula/Bambara	Part-time clinic	Primary, Arabic	on main road	Groundnuts, rice, millet
Ker Njor	23	40	77	Serere/Mandinka	None*	None	5 km.	Groundnuts, millet
Kebbeh	17	32	56	Wolof/Bambara	None	None	5 km.	Groundnut, millet
Jissa	37	72	119	Toucouleur/Fula	None	Primary	7 km.	Groundnuts, millet
Kerewan	275	56	97	Mandinka	Full-time center	Primary, secondary, technical, Arabic	on main road, ferry stop	Groundnut, rice, millet
Lower River:								
Bureng	47	72	105	Mandinka	Part-time clinic	Primary, Arabic	4.5 km	Groundnuts, rice
Jolangbereh	39	54	104	Serahule	None*	Arabic	1 km.	Groundnuts, millet
Jassong	38	94	127	Mandinka	None	Arabic	4 km.	Groundnuts, rice
Budayell	11	16	30	Fula	None*	Arabic	1 km.	Groundnuts, millet
Baro Kunda	40	64	122	Mandinka	None	Primary, Arabic	5 km.	Groundnuts, rice
McCarthy Island:								
Bansang	442	50	85	Mandinka/Fula/Wolof	Hospital/clinic	Primary, secondary	on main road, ferry stop	Groundnuts, rice
Medina Umfally	85	44	77	Serahula	None	Arabic	on main road	Groundnuts, rice
Nibras	15	49	89	Jakanka/Mandinka	None	Arabic	10 km.	Groundnuts, millet, rice
Ndikiri Kunda	44	56	80	Fula/Mandinka	None	Primary, Arabic	8 km.	Groundnuts, millet, rice
Kunting	65	55	95	Mandinka	Part-time clinic	Primary, Arabic	15 km. from ferry	Groundnuts, millet

* Not a red flag village.

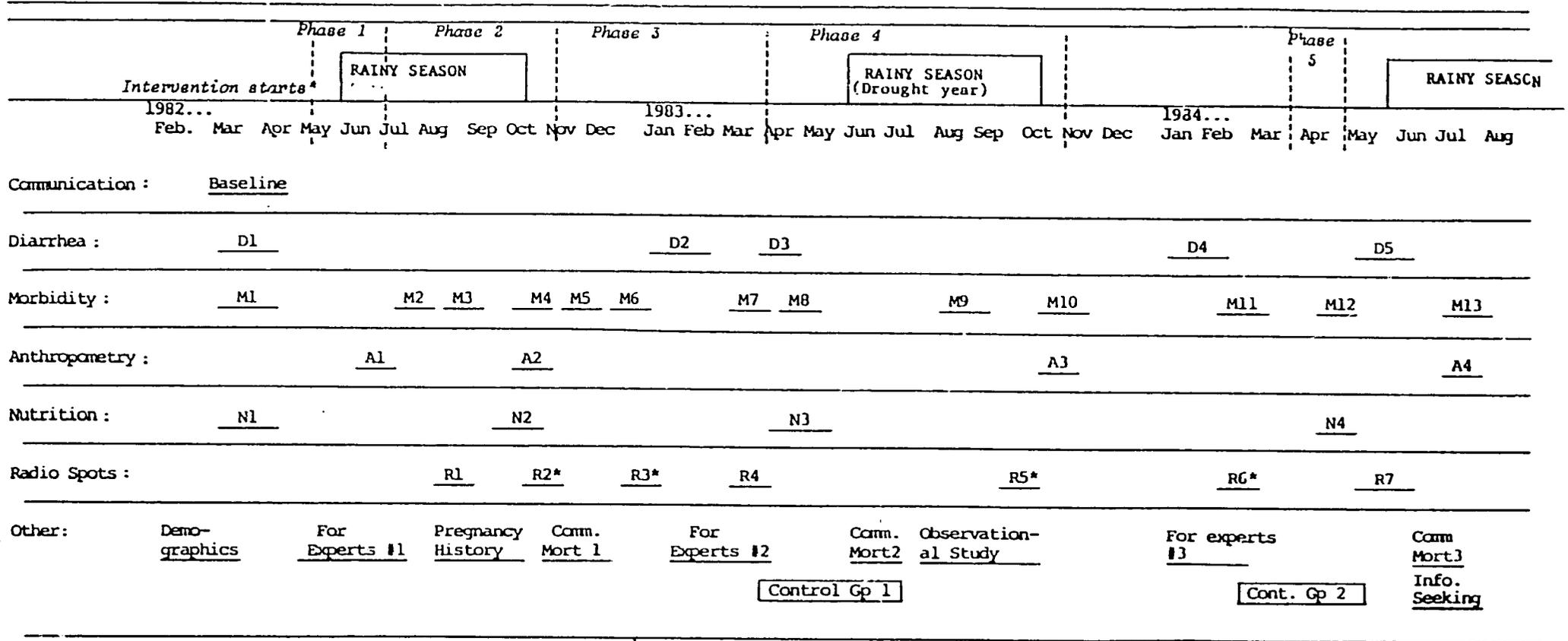
breadth of topics addressed in the study, but not the full depth. More detailed measures were obtained using separate instruments to cover specific areas of interest.

The major MMHP measurement items were grouped into four questionnaires covering nutrition and feeding behaviors, exposure to and learning from campaign messages, morbidity from and treatment of diarrhea, and anthropometry. Questionnaires were given one at a time, and each took approximately one month to administer to the entire cohort. When all four instruments were completed, the cycle began again. Within this general structure, a number of smaller studies were interspersed, such as measurement of exposure, learning, and attitude change in response to the different radio spots, community mortality, testing of samples of oral rehydration fluids, behavioral observation, and pregnancy histories.

Figure I-2 shows the correspondence between administration dates of the MMHP instruments and the five phases of the campaign that were described earlier. The successive administrations of the instruments are referred to in this document as "waves."

The HEALTHCOM follow-up survey was conducted at a single point in time, during the summer of 1987. Since the HEALTHCOM survey could not cover each area of interest in the same detail as the repeated MMHP surveys, measurement tends to focus more narrowly on knowledge and behavior surrounding the treatment of infant and early childhood diarrhea. Other areas of inquiry (concerning Maternal/Child Health clinics, oral rehydration packets, AIDS, and malaria) were also addressed to a limited extent, though they are not the focus of this report.

Figure I- 2 Timing of administration of evaluation survey instruments in The Gambia



* Exposure to campaign measured.

- Phase Topics:
- Phase 1: Dryness, diarrhea, malnutrition can be prevented through diet
 - Phase 2: Emphasis on water-sugar-salt solution (WSS); proper mixing and administration, feeding, Happy Baby lottery, sanitation
 - Phase 3: Reinforcement of mixing behaviors, diarrhea prevention through feces removal, dry season diarrhea - give WSS immediate.
 - Phase 4: Feeding of children, reminder of breastfeeding and WSS, training methods,
 - Phase 5: "Minicampaign" on prevention - wells, hygiene, VDC's

36

(5) Control groups

In The Gambia, the MMHP intervention covered the entire country. This made the question of external, non-treatment comparison (control) groups moot. However, it was possible to compare groups of women interviewed only once, with the groups of women interviewed repeatedly in successive waves, to try to assess the effect of repeated measurement itself on the longitudinal cohort's behavior.

Two quasi-equivalent control groups were selected using the same sampling plan in eight other communities. The 226 mothers in the first control group were interviewed after a full year of interventions. A second quasi-equivalent control group of 208 mothers were interviewed near the end of the project. In this report, data for the first MMHP control group is not reported since the report concentrates on changes in knowledge and practices since the end of the MMHP Project (when mothers in the second control group were interviewed).

Measurement of control groups was conducted using a combined instrument similar to the MMHP baseline instrument, but updated to include communication measures and other items developed since the baseline. Some characteristics of the control villages are summarized in Table I-2. The location of the villages can be seen on the map of The Gambia (Figure I-1).

The HEALTHCOM sample includes both mothers who had been repeatedly interviewed during the MMHP Project as well as mothers who were participating in the study for the first time. This second group of mothers, interviewed only once, serve as an appropriate control group to study the lingering effects of repeated measurement on mothers who had participated in the MMHP study. In the HEALTHCOM sample, 398 mothers were participating in the study for the first

Table I-2: Summary of characteristics of villages in control samples

Division and Village	Number of mothers in sample		Main tribes	Type of health facility	Type of school	Distance from main road
	Control 1	Control 2				
WESTERN DIVISION:						
Sanyang	27	26	Mandinka/Jola/Fula	Part-time clinic	Primary	5 km.
Kartong	29	25	Mandinka/Jola	Part-time clinic	Primary	13 km.
NORTH BANK DIVISION:						
Munyagen	29	27	Wolof	None	Primary, Arabic	On main road
Ker Omar Saine	27	26	Wolof	Part-time clinic	None	8 km.
LOWER RIVER DIVISION:						
Jappeni	29	25	Mandinka	Part-time clinic	Primary	On main road
Pakali Ba	26	26	Mandinka	Part-time clinic	Primary	On main road
MCCARTHY ISLAND DIV.:						
Jakally	29	28	Serahule	None	Arabic	On main road
Sololo Mandinka	30	25	Mandinka	None	Arabic	1/2 km.

22

time, while 148 mothers reported having participated earlier in the MMHP study.²

(6) Field worker training and data handling logistics

For the MMHP study, four permanent field workers were selected from 130 applicants after a long process of screening and training. Eighteen people participated in an initial two-week training course, from which eight final candidates were selected. These eight persons worked on baseline data collection and on the basis of their performance in that role, four were selected, all of them women. They then took up residence in one of a cluster of five geographically-proximate villages. The interviewers were given small motorbikes to permit them to travel from their home village to the other four sample villages in their cluster, and to nearby control villages.

The MMHP field workers interviewed approximately 200 mothers a month, using formal questionnaires and answer sheets. At the end of each wave of interviewing, they brought data to the project office in Banjul, at which time they received re-training on the administration of the next questionnaire. The four field workers were supervised by a full-time supervisor, based in Banjul. His responsibilities included coordination and field support, reliability checking, and continuing training.

When the field workers delivered each month's data, data were checked for correct coding and then transcribed onto coding sheets. The coding sheets were

²Data was also collected from 119 mothers located in 4 of the 8 control villages used in the MMHP evaluation. That data is not included in this report since mothers interviewed only once in the 20 sample villages serve as a suitable control group for mothers repeatedly interviewed.

sent to Stanford University where they were entered into machine-readable form and verified. Analysis was conducted on Stanford's IBM mainframe computer.

The HEALTHCOM follow-up study used a new team of interviewers. Since the follow-up survey occurred at a single point in time, it was not necessary to assign single interviewers to clusters of villages. Instead, the whole team travelled successively to each of the MMHP sample villages. The team of HEALTHCOM interviewers had to be trained in all areas of field work since they had not participated in the MMHP study.

D. Organization and Presentation of Data

Knowledge and practices related to the treatment of diarrhea are reported in three chapters of this report. Chapter III compares levels of awareness of and knowledge about WSS during the MMHP Project with levels at the time of the HEALTHCOM survey, three years later. Chapter IV compares patterns of treatment for infant and early childhood diarrhea, and Chapter V compares feeding patterns during and after diarrhea. However, before examining these outcomes, it is helpful to review levels of mothers' exposure to MMHP messages, the focus of the next chapter.

A detailed account of outcomes attributable to the MMHP Project in The Gambia has been the focus of previous reports.³ Findings from the MMHP

³ See, for example:

The Mass Media and Health Practices Evaluation in The Gambia: The Final Report of the Major Findings. A Report from Stanford University to the United States Agency for International Development. Prepared by Applied Communication Technology. Menlo Park, CA: August 1985.

The Mass Media and Health Practices Evaluation in Honduras and The Gambia: Summary Report of the Major Findings. A Report from Stanford University to the United States Agency for International Development. Prepared by Applied Communication Technology. Menlo Park, CA: September 1985.

evaluation which are reported in this document are drawn from tables appearing in these final reports.

Data from the MMHP morbidity instruments (identified in the tables with the prefix "M" before the wave number) has been abridged to show 5 waves of MMHP morbidity data rather than all 13 waves covered in the MMHP final report. The waves reported include the first and last waves, as well as several evenly spaced waves in between, where possible. Data from the MMHP diarrhea instruments (appearing with the prefix "D" before each wave number) were collected in five waves only and are reported in their entirety from the final report. In other cases, the MMHP data reported are as complete as possible, based upon earlier reports. Figure I-2 (presented earlier) provides complete information about the dates when each of the various instruments was administered.

Although data from the HEALTHCOM follow-up survey was collected in a single "wave", it is prudent to report data separately for two groups of mothers: those interviewed for the HEALTHCOM study only and those who were repeatedly interviewed during the MMHP longitudinal study as well. Since "repeat interviewees" were questioned about diarrhea and ORT up to 30 times during the MMHP Project, they can no longer be considered representative of the majority of mothers in The Gambia. Some mothers interviewed only for the HEALTHCOM study would have been ineligible for selection during the MMHP study (because they were too young or did not yet care for young children).

Data for these two groups are presented separately because they differ somewhat with respect to demographic characteristics. For example, "repeat interviewees" tend to be slightly older on average than "novice interviewees" (31 years old versus 27 years old, $p < 0.001$). They are more likely than novice interviewees to be farmers (77% versus 67%, $p < 0.02$). Also, more repeat interviewees than novice interviewees tend to have more children (2.0 versus 1.8, $p < 0.001$). That repeat interviewees are much more likely than novice interviewees to own at least one horse (23% versus 10%, $p < 0.002$) may be a sign that their incomes are higher, although there is no difference in house construction (another indicator of socioeconomic status) between the two groups.

In comparing findings from the HEALTHCOM study with those from the MMHP study, it is important to exercise caution because the characteristics of different sub-samples are not necessarily equivalent. It is sometimes prudent to compare repeat interviewees with novice interviewees in the HEALTHCOM study in order to examine the effects of repeated measurement on the maintenance of knowledge and behavior over time. It is important to bear in mind, that comparisons between sub-samples can be misleading because repeat interviewees are different from novice interviewees, not only because of their exposure to repeated measurement, but also because they are older, have more children, and are more likely to have husbands' who are farmers than novice interviewees.

In comparing MMHP and HEALTHCOM samples, we are not making comparisons between strictly equivalent groups. For example, if mothers from the final wave of the MMHP study are compared with all mothers in the HEALTHCOM sample, the groups are not equivalent since all mothers from the final MMHP wave were exposed to repeated measurement while most HEALTHCOM mothers were not. However, if we compare MMHP mothers with

only those HEALTHCOM mothers who participated earlier in the MMHP study, the samples will not be strictly equivalent since HEALTHCOM mothers (who participated in the MMHP study) will be three years older, on average.

The solution to these problems of non-equivalence between samples is to make comparisons cautiously. Observed differences between MMHP and HEALTHCOM samples may reflect (1) socioeconomic and/or demographic differences between comparison groups, (2) the impact of repeated measurement on certain groups but not others, or (3) "true" differences in the general population over time. For these reasons, observed differences should be treated with some skepticism even though tests of statistical significance indicate that they are not the result of chance. In drawing inferences, the report will attempt to highlight competing explanations for the trends that are observed.

Given the multiple comparisons that are possible between various waves of MMHP data and different sub-samples of HEALTHCOM data, tests of statistical significance would become unwieldy if reported rigorously. Properties affecting whether or not observed differences are statistically significant include sample sizes as well as the variance of measures. While these properties do not remain constant in the comparisons that are made, as a general rule we find that differences less than 10% tend not to be statistically significant, while differences in excess of 15% do tend to be statistically significant. Since the major findings of this report generally deal with large differences, tests of statistical significance generally have not been reported.

Chapter II: ACCESS AND EXPOSURE TO MMHP INTERVENTIONS

In order to understand the process of improving health outcomes, and in order to understand why outcomes have or have not persisted, it is helpful to describe mothers' levels of access and exposure to MMHP interventions. In particular, this chapter addresses the extent to which mothers had access to radio, print, and interpersonal sources of information, and the extent to which mothers were exposed to messages disseminated by those sources of MMHP information. Also, the chapter examines whether mothers had access to the materials necessary to mix WSS: sugar, salt, a Julpearl⁴ bottle and a bottle cap to mix the ingredients properly with water.

A. Access and Exposure to Messages

In order to have been exposed to messages about recommended health practices, mothers first must have had access to sources of MMHP information. The project used multiple channels -- radio, print (pictorial flyers and posters), and interpersonal (health workers and Red Flag⁵ volunteers). Overall, findings from the MMHP final report show that high levels of exposure to MMHP messages could be expected given mothers' ample access to all available channels

⁴Julpearl is the trademark of the company in The Gambia which produces and distributes beverages nationwide. Given the widespread availability of Julpearl bottles, this particular bottle was selected as the standard measurement container for mixing WSS. Three Julpearl bottles of water are approximately equivalent to one liter of water, the quantity of water recommended for mixing WSS.

⁵Red Flag volunteers were mothers in the community who received special training in oral rehydration therapy and who served the local community by developing mothers' ability to administer ORT correctly.

(interpersonal, radio, and printed materials), each disseminating reinforcing and overlapping messages:

- 80 percent of the mothers had been to a health facility in the previous three months;
- 75 percent of the mothers lived in a village served by a Red Flag Volunteer;
- 60 percent of the mothers could show the interviewer a working radio in her compound and actual radio listening was higher due to access to working radios in other compounds; and
- 36 percent of the mothers lived in compounds where at least one person could read a single sentence.

(1) Radio broadcasts

Throughout the project, radio messages were broadcast over the national radio station, Radio Gambia. Findings from the MMHP final report showed that 89 percent of the respondents reported clear reception of Radio Gambia always, 6 percent reported clear reception sometimes, and only 2 percent reported never having clear reception.⁶

⁶The developmental investigation carried out by AED prior to the campaign found that Radio Gambia frequently could not be received in the far-eastern part of the country. For this reason, women in the Upper River Division were not included in the evaluation study.

Table II-1 shows that 68.3% of the mothers interviewed during the MMHP project reported that there was a radio in the compound where they resided. This percentage is about the same for mothers interviewed for the HEALTHCOM study (66.8%), although there seems to be a slight tendency for mothers who also participated in the MMHP study to report higher levels of access than mothers who only participated in the HEALTHCOM study (72.5% versus 64.7%). Given differences in composition between HEALTHCOM sub-samples (e.g., differences in age, husband's occupation, number of children, and other differences described in the previous chapter), these apparent differences in radio access could be expected.

To measure levels of their exposure to Radio Gambia, mothers were asked how often they listened to that station. Table II-1 indicates that mothers from compounds where a radio is available report frequent listening. Over 80% of the mothers in both the MMHP and HEALTHCOM samples report listening several times during the week or daily.

For mothers without a radio in the compound, the frequency of listening to Radio Gambia is much lower. However, since the majority of mothers live in compounds with access to a radio, it appears that exposure to MMHP radio messages would have been quite high in the population at-large.

Radio broadcasts about diarrhea, dryness, and WSS started in May, 1982. In September of 1982, January of 1983, and September of 1983, mothers were asked whether they had heard radio messages about caring for a child with diarrhea in recent months. After the message phase on feeding, mothers were asked whether they had heard feeding messages. Also, mothers were asked whether they had heard about the Happy Baby Lottery in January of 1983. These measures,

TABLE II-1

Radio Availability and Frequency of Listening
to Radio Gambia, Each Week

	MMHP SURVEY MARCH/82	HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	TOTAL (N=773)	TOTAL (N=546)	a.Repeat (N=148)	b.Novice (N=398)
Radio in Compound	68.3 %	66.8 %	72.5 %	64.7 %
No Radio	31.7	33.2	27.5	35.3
RADIO AVAILABLE IN COMPOUND				
Never Listen	7.8	8.2	4.6	9.7
Once or Less Per Week	6.1	7.4	7.4	7.4
Several Times or Daily	86.1	84.4	88.0	82.9
RADIO NOT AVAILABLE				
Never Listen	63.1	53.1	40.0	56.8
Once or Less Per Week	10.7	10.1	7.5	10.8
Several Times or Daily	26.2	36.9	52.5	32.4

reported in Table II-2, provide additional evidence of high levels of radio exposure to some, but not all, campaign messages.

Table II-2 indicates that 68.5% of the mothers interviewed in September of 1983 indicated that they had heard radio messages about caring for a child with diarrhea in recent months. Percentages in the control group (May 1983) indicate similar levels of exposure, suggesting that self-exposure to radio messages is not a function of mothers being repeatedly interviewed.

At the time of the HEALTHCOM survey, 76% of the mothers report having ever heard messages about diarrhea. Although the questions asked by the MMHP and HEALTHCOM surveys are not identical, the findings point to high levels of radio exposure to information about treating diarrhea. Presumably, most of these radio messages were products of the MMHP Project.

Table II-2 indicates relatively low levels of radio exposure to feeding messages during the MMHP Project; one-third or fewer mothers report having heard feeding messages during the project. In contrast, 70% of the mothers interviewed during the HEALTHCOM study report having ever heard messages about giving foods to children recovering from diarrhea. It is possible that feeding messages continued to be broadcast after the conclusion of the MMHP Project. However, during the MMHP Project, radio exposure to feeding messages seems to have been quite limited.

Almost half of the mothers recall hearing radio messages about the Happy Baby Lottery, judging from information reported in both the MMHP and HEALTHCOM studies. According to information reported in the MMHP final

TABLE II-2

Percent of Mothers Who Reported Hearing Radio Spots About
Diarrhea, Feeding, and the Happy Baby Lottery

	MMHP SURVEY					HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	SEP/82 (N=819)	JAN/83 (N=871)	SEP/83 (N=785)	FEB/84 (N=830)	CONTROL MAY/83 (N=222)	TOTAL (N=549)	a.Repeat (N=150)	b.Novice (N=399)
Heard Diarrhea Messages	58.4 %	42.0 %	68.5 %	—	68.5 %	76.0 %	81.2 %	74.1 %
Heard Feeding Messages	—	—	33.5	21.3	—	70.0	79.2	66.5
Heard About Happy Baby Lottery	—	48.9	—	—	—	46.7	61.3	41.2

report, most of the mothers who reported hearing about the lottery could remember specific details. The findings indicate that the lottery may have played an important role in calling mothers' attention to the messages about diarrhea.

Overall, Table II-2 indicates that radio was an important means of reaching mothers with MMHP messages. Presumably due to the prominent attention given to messages about diarrhea, mothers interviewed during the MMHP Project were more than twice as likely to report having heard messages about diarrhea than messages about feeding. Even after more than three years from the time of the Happy Baby Lottery (i.e., at the time of the HEALTHCOM study), almost half of the mothers interviewed could remember having heard messages about the lottery.

(2) Printed materials

Mothers had access to printed materials in the form of flyers that were distributed by health personnel. Thirty-six percent of the mothers lived in compounds where at least one person could read a single sentence. Although very few women themselves could read a single sentence, a majority of the mothers could understand basic line drawings, which was the key to understanding the content of flyers. Radio messages were used to help mothers interpret the drawings in the flyers.

Two flyers were given to mothers in rural areas of The Gambia: one detailing WSS mixing instructions and the other showing recommended foods to give children with diarrhea. The mixing flyer was an important component of the Happy Baby Lottery. A mother needed a flyer as an entry ticket for the lottery. Mothers were asked about the mixing flyer in January 83, May 83, and August 83.

Mothers were asked about exposure to the feeding flyer at the end of message phase concentrating on feeding, September/83.

Table II-3 indicates that by August of 1983, almost all of the mothers in the MMHP sample report having seen the mixing flyer. However, comparable measures from a control group of women not subjected to repeated interviews indicates that exposure to the flyer in the population at-large may have been somewhat lower; about three-quarters of the mothers in the MMHP control group reported having seen the flyer.

In March of 1984, about 30% of the mothers in the MMHP control group could actually show a mixing flyer to the interviewer, versus about 37% of the mothers who could show a flyer at the time of the HEALTHCOM survey. Mothers in the HEALTHCOM sample who had been repeatedly interviewed were much more likely to be able to show a flyer than other mothers.

The findings indicate that although exposure to the mixing flyer was high (for each of the sub-samples examined), possession of the flyer was much lower, especially for mothers not repeatedly interviewed. Surprisingly, even more than three years after the conclusion of the MMHP Project, almost one-third of the mothers (not repeatedly interviewed) still possessed the mixing flyer. Of the mothers who saw a flyer, the overwhelming majority were able to describe what the mixing flyer teaches.

At the time of the MMHP study, only about one-quarter of the mothers reported having seen the feeding flyer (Table II-3). Surprisingly, the percentage rises to 86% of all mothers at the time of the HEALTHCOM survey. Less than one-quarter of the mothers, in both MMHP and HEALTHCOM studies, report

TABLE II-3

Mothers' Exposure to Flyers About Mixing WSS
and Feeding During Diarrhea

	MMHP SURVEY				HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	JAN/83 (N=801)	AUG/83 (N=862)	SEP/83 (N=785)	CONTROL MAR/84 (N=208)	TOTAL (N=549)	a.Repeat (N=150)	b.NoVICE (N=399)
Reports Having Seen Mixing Flyer	79.0 %	96.5 %	—	76.2 %	90.1 %	96.7 %	87.7 %
Able to Show Mixing Flyer	71.5	77.0	—	30.6	36.7	56.5	28.7
Knows What Mixing Flyer Teaches (BASE: <u>Only Mothers Who Saw Flyer</u>)	—	88.0	—	—	81.7	89.7	78.4
Reports Having Seen Feeding Flyer	—	—	26.5	—	86.1	93.3	83.4
Has Had a Feeding Flyer	—	—	23.9	—	23.2	35.5	18.3
Knows What Feeding Flyer Teaches (BASE: <u>Only Mothers Who Saw Flyer</u>)	—	—	94.0	—	72.9	76.4	71.4

actual possession of a feeding flyer. Of the mothers who reported having seen the feeding flyer, the majority could identify what the flyer taught.

The apparent increase in exposure to the feeding flyer (from the time of the MMHP study to the time of the HEALTHCOM study) parallels the increase in exposure to radio messages about feeding, reported earlier. Together, the findings indicate that mothers continued to be reached by radio and printed materials with messages about feeding after the MMHP Project formally concluded. One can only speculate whether mothers interviewed during the HEALTHCOM study were reporting about MMHP messages or messages distributed through other projects.

Overall, Table II-3 indicates that mothers received more exposure to the mixing flyer than to the feeding flyer. While the majority of mothers were exposed to the mixing flyer, only about one-third of the mothers (in the population at-large) seem to have possessed the flyer. Although fewer mothers seem to have been exposed to the feeding flyer, about one-quarter of all mothers were able to show a copy of the flyer to the interviewer. The findings indicate that printed materials, while not reaching all mothers, were an important channel of information during the MMHP Project.

(3) Interpersonal channels

Mothers were expected to hear campaign messages from health workers, Red Flag volunteers, and other women in their compound. In September of 1983, women in the MMHP sample were asked if they had visited a health worker during the previous three months. About 80% of the mothers reported that they had seen a health worker during the previous three months. At the time of the HEALTHCOM study, approximately the same percentage of mothers (78%)

reported visiting a clinic during the previous three months, and 38% had visited a village health worker.

Information from the MMHP final report indicates that 83% of the mothers lived in villages with a Red Flag volunteer. Exposure to information from other women in the compound was difficult to assess.

Overall, available information suggests that mothers had reasonably good access to interpersonal sources of information. Unfortunately, very little information is available about the frequency and quality of information circulated through interpersonal channels. Anecdotal information from Peace Corps volunteers suggests that health workers tended to tell mothers to use WSS (although some health workers were more informative than others). An additional indication of exposure to interpersonal channels, whether mothers report having learned about WSS from interpersonal sources, is examined in the next chapter.

B. Access to WSS Mixing Ingredients and Materials

In order to mix WSS properly, mothers needed to have access to salt, sugar, a Julpearl bottle, and a bottle cap. Table II-4 indicates that sugar was available to three-quarters (or more) of the mothers in the MMHP study, while salt was available to well over 90% of the mothers. At the time of the HEALTHCOM study, sugar was available to about 70% of the mothers, and salt remained available to almost all mothers.⁷

⁷Some care must be taken in interpreting the data about access to a Julpearl bottle and bottle cap. These measures are more strict than measures of access to sugar and salt; mothers were asked if they had sugar or salt or could get it, but they were required to actually show the interviewer a bottle and bottle cap. If the interview was conducted away from the mother's compound, she may not have been able to produce her bottle/bottle cap even though the materials were available. Also, it is probable that some mothers would go to another compound to borrow a bottle or cap in order to mix WSS, although it is less likely that they would go to another compound in order to show the materials to the interviewer.

TABLE II-4

Mothers' Access to WSS Mixing Materials:
Sugar, Salt, a Julpearl Bottle, and a Bottle Cap

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave D1 MAR/82 (N=758)	Wave D2 JAN/83 (N=801)	Wave D3 APR/83 (N=785)	Wave D4 JAN/84 (N=802)	Wave D5 MAY/84 (N=827)	CONTROL MAR/84 (N=208)	TOTAL (N=549)	a.Repeat (N=150)	b.Novice (N=399)
Has Sugar or Able to Get	76.4 %	76.0 %	85.5 %	98.6 %	84.7 %	80.1 %	68.6 %	70.0 %	68.0 %
Salt or Able to Get	98.3	99.0	99.2	96.1	97.2	94.2	94.5	94.0	94.7
Shows Julpearl Bottle	63.8	55.8	83.4	58.4	58.1	58.5	8.0	10.0	7.3
Shows Bottle Cap	54.3	51.9	78.9	49.5	53.8	—	11.5	17.3	9.3

Table II-4 indicates that over half of the mothers in the MMHP study could show a Julpearl bottle and bottle cap. At the time of the HEALTHCOM study, access to a bottle and bottle cap had decreased sharply. It is unclear what combination of circumstances would produce such a dramatic decrease in access. Clearly, economic conditions have worsened in The Gambia since the MMHP study, but it is hard to imagine they account for the large decrease in reported access to soda bottles. It is possible that interviewers during the HEALTHCOM study were less aggressive in getting mothers to show their mixing materials, or it is possible that a higher percentage of interviews were conducted away from mothers' compounds.

While various factors may have contributed to the observed decline in access to mixing materials, it is reasonable to suppose that much of this decline is genuine. Assuming this to be so, it seems that at the time of the MMHP study, community access to mixing materials was quite good; if a mother did not have a bottle or bottle cap of her own, she could easily borrow the materials from someone else in her community. At the time of the HEALTHCOM study, community access to mixing materials appears to be quite poor, although sugar and salt remain accessible.

C. Summary

While levels of access and exposure to MMHP messages were apparently high enough to achieve desired outcomes, sharply reduced access to mixing materials at the time of the HEALTHCOM study represent an impediment to maintaining recommended health practices. The limited availability of Julpearl bottles and bottle caps would seem to be a serious threat to the continued use of

WSS as a treatment for diarrhea; the threat is particularly salient since the program exclusively relied on these materials for teaching mothers to mix WSS.

In subsequent chapters, we shall see that although much of the knowledge gained during the MMHP Project was maintained, adherence to recommended practices declined sharply. Reduced access to the materials required to maintain behaviors might have been an important factor explaining why behavior gains eroded more quickly than knowledge gains.

Chapter III: AWARENESS, KNOWLEDGE, AND MIXING OF WSS

Treatment of diarrheal episodes with water-sugar-salt solution was the central focus of the MMHP Project. Before examining the extent to which mothers report treating episodes with WSS (the topic of the next chapter), it is important to examine levels of awareness and knowledge of WSS. Awareness of WSS, knowledge about what it does, how it should be mixed, and how it should be given to a child all underlie a mother's potential for treating diarrhea, and treating it correctly, with WSS.

To measure knowledge about WSS, mothers were first asked if they were aware of WSS. Mothers who said they knew about WSS were asked more specific questions about mixing and administration. The MMHP messages broadcast on the radio, given to health workers in training sessions, and portrayed in the flyers gave detailed instructions about the mixing and administration of WSS.

Mothers were told to mix WSS in a clean basin using 3 Julpearl bottles of clean water, 8 Julpearl bottle caps of sugar, and 1 bottle cap of salt. Administration messages were: make a fresh batch every day; give the mixture slowly using a clean cup and spoon; give the mixture regularly even if the baby vomits (if the baby vomits, stop for awhile, then start again); give WSS as soon as the diarrhea starts; give WSS until the diarrhea stops; and give the correct amount of WSS for each age group (1 Julpearl bottle in 24 hours for a child under 6

months old, 2 bottles for a child 6-18 months old, and 3 bottles for a child over 18 months old).⁸

A. Awareness of WSS

Mothers were asked before the campaign and at various points during the campaign if they knew about a medicine for diarrhea made at home from water, sugar, and salt. Table III-1 indicates that there was a steady rise in awareness of WSS as the campaign progressed. Many mothers (55.3%) knew about WSS before the campaign (March/1982) from previous health education efforts by the Gambian Department of Medical and Health. By January of 1983, after the Happy Baby Lottery and after the start of dry-season messages about WSS, the percentage of mothers who were aware of WSS jumped to 78.3%. Awareness continued to increase even after these months of heaviest exposure, but at a slower rate. yB mid-1984, 89% of the mothers in the longitudinal cohort reported knowing about WSS. However, comparison with mothers in a control group (March/84) indicates that awareness may have been influenced by mothers being interviewed repeatedly. In the control group, awareness of WSS reached 68%, which is probably a reasonable estimate of awareness in the population at-large.

Awareness of WSS for mothers in the HEALTHCOM sample is considerably higher than for mothers in the MMHP control group. About 95% of the "repeat interviewees" in the HEALTHCOM sample and about 85.5% of the "novice interviewees" were aware of WSS. Again, repeated interviewing seems to have had some influence on awareness of WSS.

⁸Given limitations on the scope of the HEALTHCOM study (i.e., since the data were collected at a single point in time rather than successively in many waves over a two-year period of time), the HEALTHCOM study re-measured a very limited number of these variables.

TABLE III-1

Mothers' Awareness of WSS and Sources of Knowledge

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave D1 MAR/82 (N=758)	Wave D2 JAN/83 (N=801)	Wave D3 APR/83 (N=785)	Wave D4 JAN/84 (N=802)	Wave D5 MAY/84 (N=827)	CONTROL MAR/84 (N=208)	TOTAL (N=549)	a.Repeat (N=150)	b.Novice (N=399)
KNOW ABOUT WSS	55.3 %	78.3 %	82.0 %	85.5 %	89.3 %	68.3 %	88.2 %	95.3 %	85.5 %
WHERE LEARNED ¹ (BASE: <u>Only Mothers Who Know About WSS</u>)									
-Radio	1.9	22.2	23.2	39.1	35.5	—	4.3	4.9	4.1
-Interpersonal ²	94.5	82.9	80.5	78.0	89.0	—	92.1	95.8	90.5
-Print ³	0.0	5.0	14.8	27.0	22.6	—	0.2	0.0	0.3

¹Categories are NOT mutually exclusive.

²Includes health worker, clinic worker, village health worker (VHW), and traditional birth attendant (TBA).

³Includes mixing flyer and posters.

A reasonable estimate of WSS awareness in the population at-large again comes from data about mothers not interviewed repeatedly. The data indicate that awareness of WSS has continued to rise (from 68% to 85.5%) since the conclusion of the MMHP Project.

That awareness of WSS has continued to grow suggests that the MMHP Project was successful in giving ORS a foothold in The Gambia. At the conclusion of the MMHP Project, a majority of mothers and health workers were aware of WSS; apparently, this body of individuals continued to transfer awareness of WSS, after the project concluded, to others who were not exposed to MMHP messages directly.

Mothers who knew about WSS were asked where they learned about this treatment for diarrhea. Table III-1 indicates that just prior to the MMHP Project (May/82), the overwhelming majority of mothers reported learning about WSS from interpersonal sources, that is, various types of health workers. As the MMHP Project took shape, mothers still reported learning about WSS from interpersonal sources, but there is a clear trend towards reporting additional sources of information (i.e., radio and printed materials) as well.⁹

At the time of the HEALTHCOM study, very few mothers report having learned about WSS from the radio or from printed materials. This is not surprising since radio messages and printed materials produced by the MMHP Project were no longer being disseminated actively. Having been aware of WSS for several years already, HEALTHCOM mothers may have been more successful in recalling health

⁹Mothers were allowed to name multiple channels. Since the categories are not mutually exclusive, percentages do not sum to 100 percent.

workers as a source of information, even though they also learned about WSS several years earlier from radio and printed materials.

B. Ability to Mix WSS

Mothers who knew about WSS were asked how to mix the solution. Table III-2 reports information about mothers' ability to mention the correct proportions of water, sugar, and salt. If mothers did not know about WSS, it was assumed they did not know the mixing formula.

Prior to the MMHP Project (March/82), about 55% of all mothers knew about WSS; however, less than 1% of all mothers could recite the correct formula (Table III-2). Shortly after the project began (January/83), 52% of all mothers could recite the correct formula, an increase of 51 percent. By the end of the MMHP project (May/84), 69.7% of all mothers (in the longitudinal sample) could recite the correct formula. That only about 43% of all mothers in the MMHP control group could recite the correct formula indicates that repeated interviews influenced learning of the correct formula.

In the HEALTHCOM sample, mothers who were repeatedly interviewed were also more likely to know the correct formula than mothers who were not interviewed during the MMHP study (39.5% of repeat interviewees know the correct formula versus about 21% of the novice interviewees). However, the most important observation is to notice how substantially mixing knowledge has deteriorated since the end of the MMHP Project, from 42.9% of all mothers (in the MMHP control group) to about half that level at the time of the HEALTHCOM study (for mothers not interviewed repeatedly).

TABLE III-2

Mothers' Knowledge of WSS Mixing

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave D1 MAR/82 (N=758)	Wave D2 JAN/83 (N=801)	Wave D3 APR/83 (N=785)	Wave D4 JAN/84 (N=802)	Wave D5 MAY/84 (N=827)	CONTROL MAR/84 (N=208)	TOTAL (N=549)	a.Repeat (N=150)	b.Novice (N=399)
CORRECT MIXING: (BASE: <u>All Mothers</u>)									
-All Ingredients	0.4 %	41.1 %	54.1 %	62.1 %	69.7 %	42.9 %	26.1 %	39.5 %	21.1 %
-Water	4.5	52.4	63.4	77.1	84.0	55.2	46.1	60.8	40.6
-Sugar	0.8	53.1	64.9	73.4	80.1	49.8	45.7	57.1	41.5
-Salt	2.0	57.2	68.5	72.7	77.4	48.2	55.7	70.5	50.1

Detailed knowledge about WSS (i.e., how to mix it correctly) deteriorated sharply, even while awareness of WSS continued to grow. It is possible that mothers have forgotten the formula because they have stopped using WSS, or because they have not been reminded of the correct formula for several years.

Table III-2 examines mixing knowledge for each of the three ingredients separately (water, sugar, and salt) to determine whether the deterioration in mixing knowledge is specific to certain ingredients or general for all ingredients. If we examine MMHP and HEALTHCOM mothers who were not interviewed repeatedly, it appears that the percentage of mothers who know the correct quantity of water has decreased most sharply, from 55% to 40.6%. The percentage of mothers knowing how much sugar to mix has decreased modestly, from 49.8% to 41.5%. The percentage of mothers knowing how much salt to mix has remained about the same, roughly half the mothers. Not knowing the correct volume of water seems to contribute most to the deterioration in mixing abilities.

By the end of the MMHP Project, less than half of all mothers in the March/84 control group had learned the correct formula for WSS. Admittedly, many mothers were classified as not knowing the correct formula because they were not aware of WSS. Of the mothers in the March/84 control group who knew about WSS, 62.8% could recite the formula correctly. There has been a pronounced deterioration in mixing abilities since that time; however, mixing abilities are still much higher than before the MMHP Project when virtually none of the mothers knew how to mix WSS correctly.

C. Knowledge About WSS and its Administration

Mothers who reported knowing about WSS were asked many questions about what WSS does and how it should be administered. Many of the questions about what WSS does and how it should be administered, which were asked during the MMHP study, were not asked again during the HEALTHCOM study given natural limitations on the scope of questioning that could be advanced in a single study. This section reports information about several key areas of knowledge for which data are available from both studies.

Table III-3 indicates that throughout the MMHP Project, 80% or more of mothers believed, incorrectly, that WSS stops diarrhea. At the time of the HEALTHCOM study, the percentage of mothers with this incorrect belief had declined to just over 50%.

It is difficult to explain this apparent improvement since the MMHP Project. However, if mothers had stopped using WSS at the time of the HEALTHCOM study (examined in the next chapter), it might explain why their beliefs about WSS had also changed, for better or for worse. Table III-3 indicates that the correct belief, that WSS replaces fluids (i.e., water or water-sugar-salt), was mentioned by the same percentage of mothers (about one-third) at the end of the MMHP Project as well as at the time of the HEALTHCOM study.

Table III-3 indicates that as the MMHP Project progressed, an increasing proportion of the mothers who knew about WSS learned how to administer it correctly. Before the project, less than 1/3 of the mothers who knew about WSS, knew that it should be made fresh everyday. Also, slightly over 1/3 of these mothers knew the correct quantity to give (i.e., one litre/several bottles per day, or

TABLE III-3

Mothers' Knowledge of the Role of WSS
and How to Administer WSS

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave D1 MAR/82 (N=758)	Wave D2 JAN/83 (N=801)	Wave D3 APR/83 (N=785)	Wave D4 JAN/84 (N=802)	Wave D5 MAY/84 (N=827)	CONTROL MAR/84 (N=208)	TOTAL (N=549)	a.Repeat (N=150)	b.Novice (N=399)
WHAT WSS DOES: (BASE: <u>Only Mothers Who Know About WSS</u>)									
- Stops Diarrhea	80.0 %	85.6 %	87.2 %	95.4 %	84.6 %	81.3 %	52.6 %	53.8 %	52.1 %
- Replaces Water or Water, Sugar, and Salt	36.0	18.7	12.5	28.3	31.3	33.8	32.2	33.6	31.7
ADMINISTRATION: (BASE: <u>Only Mothers Who Know About WSS</u>)									
- Make Fresh Everyday	32.2	32.5	64.0	58.9	61.6	—	48.2	50.3	47.4
- Give Litre, Several Bottles, or As Much As Child Will Drink	37.0	64.3	55.3	60.9	75.8	—	67.2	69.2	66.4

as much as the child will drink). By the end of the project, almost two-thirds (61.6%) of these mothers learned that WSS should be made fresh everyday, and three-fourths of the mothers (75.8%) knew how much WSS should be given.

We do not have information from mothers in the MMHP control group (mothers who were not repeatedly interviewed) concerning WSS administration. Instead, we can compare levels of knowledge for mothers repeatedly interviewed during the MMHP Project with levels of knowledge for HEALTHCOM mothers who were also repeatedly interviewed. The comparison suggests that although knowledge about administration may have worsened by the time of the HEALTHCOM study, the deterioration in knowledge about WSS administration is very slight.

D. Summary

Overall, the evidence presented in this chapter indicates that while awareness of WSS has continued to grow since the end of the MMHP Project, knowledge about how to mix WSS has been cut in half and knowledge about how to administer WSS may have worsened slightly. While the incorrect belief that WSS stops diarrhea seems to have faded somewhat since the end of the project, still about one-third or less of the mothers know that WSS replaces fluids (i.e., water or water-sugar-salt).

It is encouraging to see that some aspects of knowledge -- those concerning the administration of WSS -- have been maintained at high levels even three years after the conclusion of the MMHP Project. However, the fact that mixing knowledge has been cut in half raises important concerns, especially if the mothers using WSS are not mixing it correctly. The next chapter examines the extent to

which mothers have continued to choose WSS as a treatment for diarrhea, and whether those mothers are mixing WSS correctly.

Chapter IV: PATTERNS OF TREATMENT FOR DIARRHEA

This chapter examines information about mothers' reports of episodes of their children's diarrhea which had occurred during the previous two weeks. In particular it looks at patterns of treatment selected by mothers. Mothers were asked about treatment patterns for each of their children who suffered from diarrhea during the previous two weeks, so the data reported will sometimes include multiple reports from the same mother (if more than one child suffered from diarrhea during that period).

Patterns of treatment are derived from mothers' self-reports about actions taken, at home and elsewhere, to treat episodes of diarrhea occurring within the previous two weeks. Self-reports, in this context, can be influenced by a variety of distorting factors: mothers may forget some of the actions taken; mothers may under-report actions that they think the interviewers would interpret as undesirable (such as going to see a traditional healer) or over-report actions that may be desirable (such as treating the child with WSS); or mothers may have better success recalling some actions (such as going to a health center) as opposed to others (such as giving tea or other liquids).

While each of these threats to the validity of inferences about treatment patterns could be problematic, evidence from an observational study (examined in the MMHP final report) is consistent with mothers' self-reports. Certainly, the observation of mothers' treatment of children with diarrhea is an obtrusive measurement technique that can influence patterns of behavior, but the

convergence of findings from the observational study and mothers' self-reports is encouraging.

A. Prevalence and Severity of Diarrhea

Infant and childhood diarrhea is a common occurrence in The Gambia. Table IV-1 indicates that during the MMHP Project, between 0.8% and 6.2% of all children suffered from diarrhea on a given day (the day of the interview). Combining this with the number of children suffering from diarrhea during the two weeks preceding that day, we find that between 14.3% (March/83) and 32.1% (October/82) of all children suffered from diarrhea during a two-week period.

Information from the HEALTHCOM survey (reported in Table IV-1) indicates that 13% of all children suffered from diarrhea on the day of the interview. This point estimate of the prevalence of diarrhea appears to be high by any standards, including information obtained from the MMHP surveys indicating a range between 0.8% and 6.2%. It does not seem plausible that the prevalence of diarrhea would have increased so sharply between the two studies.

If, in fact, the prevalence of diarrhea was much higher during the HEALTHCOM study, we would expect the percentage of cases occurring between 1 and 15 days ago to be high as well. Instead, we find that there are about as many cases reported on the day of the interview as there are for this entire 14-day period.

TABLE IV-1
Prevalence of Diarrhea

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave M1 MAR/82 (N=1004)	Wave M4 OCT/82 (N=956)	Wave M7 MAR/83 (N=1027)	CONTROL JUN/83 (N=250)	Wave M10 OCT/83 (N=936)	Wave M13 JUL/84 (N=972)	TOTAL (N=707)	a.Repeat (N=197)	b.Novice (N=510)
PERCENTAGE OF CHILDREN WITH DIARRHEA:									
-On Day Of Interview	5.0 %	6.2 %	1.6 %	0.8 %	3.5 %	2.0 %	13.0 %	12.2 %	13.4 %
-During Past 1-15 Days ¹	19.5	25.9	12.7	16.8	14.7	17.7	16.3	14.3	17.1

¹ Excludes cases of diarrhea on day of interview.

Possibly, the high percentage of children with diarrhea on the day of the interview reflects differences in the way measures were calibrated for the HEALTHCOM study. Since a new group of interviewers were trained for the HEALTHCOM study, it may be that questions were asked differently, or responses were coded in a different way. As we shall see next, indicators of severity for episodes also point to differences between MMHP and HEALTHCOM measures.

Table IV-2 examines various indicators of severity for cases of diarrhea occurring during the previous two weeks. In examining data from the MMHP study, we find that most indicators (i.e., percentage of episodes lasting more than 4 days, percentage of episodes perceived as "severe" by mothers, percentage of episodes with blood in the stools, and percentage of episodes with mucus in the stools) exhibit sizeable fluctuations over time, undoubtedly partly due to the small sample sizes. Only one indicator, mean duration of episode, remains relatively constant at 3-4 days. For all these measures, data from the HEALTHCOM study indicate that episodes of diarrhea are substantially more severe than episodes during the MMHP study. Only the indicator of mean duration is within ranges reported by the MMHP study.

That 54% of the HEALTHCOM episodes included mucus in the stools and 30% included blood indicate a level of severity that is unlikely to have existed. Since the calibration of measures may influence interpretations about MMHP and HEALTHCOM treatment patterns, comparisons between the two studies must be made with some caution.

TABLE IV-2

Severity of Diarrhea Cases During Last Two Weeks

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave M1 MAR/82 (N=196)	Wave M4 OCT/82 (N=248)	Wave M7 MAR/83 (N=130)	CONTROL JUN/83 (N=42)	Wave M10 OCT/83 (N=138)	Wave M13 JUL/84 (N=172)	TOTAL (N=207)	a.Repeat (N=52)	b.Novice (N=155)
Mean Duration of Episode in Days	3.9	4.0	3.1	3.6	3.6	3.3	5.1	4.7	5.2
% of Episodes Lasting More Than 4 Days	21.1	31.6	8.5	23.8	28.1	13.6	33.8	34.6	33.5
% of Episodes Perceived as "SEVERE" by Mother	47.7	7.7	4.7	0.4	12.3	1.2	49.8	53.8	48.4
% of Episodes with Blood in Stools	25.5	4.0	3.1	2.4	8.8	0.6	30.1	34.6	28.6
% of Episodes with Mucus in Stools	39.8	35.1	17.7	14.3	39.1	33.1	54.1	57.7	52.9

B. Treatment of Diarrhea

When a rural Gambian mother discovers that her child suffers from diarrhea, she has several treatment alternatives. If she feels that the illness is curable by traditional means the mother may take her child to a local healer, such as an herbalist or Islamic marabout. Alternatively, the mother might seek assistance from a health center, dispensary, or clinic. If she treats the episode herself, she may give teas, pharmaceutical drugs, purges, or WSS, among other treatments. Or she may do nothing.

Successful promotion of WSS as a home treatment may have multiple consequences. The successful introduction of WSS might lead to an increase in the proportion of mothers who treated diarrhea at home. This might lead to a decrease in the percentage of mothers who treat diarrhea at health centers or other locations. Consequently, a decrease in the proportion of mothers seeking care at health centers might be an indirect measure of success for the program, providing mothers are also treating at home with WSS. If, however, total health seeking behavior were increased as a result of the campaign, the actual number of visits to clinics may not decline. Finding that other home treatments are replaced by WSS would be a direct measure of success.

The majority of episodes of diarrhea were treated at home, at health centers, or both. Less than 7% of the mothers reported going to traditional healers for assistance at any point in time (during the MMHP and HEALTHCOM studies), and few mothers report going elsewhere for assistance. For this reason, the following sections concentrate on treatments for diarrhea practiced at home and those sought at health centers.

(1) Home treatment

Table IV-3 examines the pattern of home treatment for episodes of diarrhea occurring during the previous two weeks.¹⁰ During the course of the MMHP Project, the percentage of episodes treated with WSS at home increased from 4.1% to 73.8%. This finding provides direct evidence that the MMHP Project succeeded in meeting its main objective.

In examining data from the morbidity instrument, the June/83 control group is not useful for estimating final project impact (in the population at-large) since the data were gathered more than one year prior to the end of the MMHP Project. More recent information from a quasi-equivalent control group is not available. Therefore, the data from mothers in the longitudinal cohort (indicating that WSS use increased from 4.1% to 73.8%) are probably an inflated estimate of net project impact, although even if the real gain were substantially smaller, it would still reflect an enormous success.

It is not clear why the percentage of episodes treated at home with tea declined at first and then increased, but given the value of tea as an extra fluid to combat dehydration, it is encouraging that the percentages are increasing towards the end of the project. The percentage of episodes that were treated at home with medicine from a pharmacy remained low (less than 4%) throughout the MMHP Project. We do not have information from the MMHP study about the use of ORS packets, or the introduction of special foods into the diet.

¹⁰Mothers were asked to report about multiple treatments; categories are not mutually exclusive and do not sum to 100 percent.

TABLE IV-3

Home Treatment for Previous Case of Diarrhea (Within the Last Two Weeks)

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave M1 MAR/82 (N=196)	Wave M4 OCT/82 (N=248)	Wave M7 MAR/83 (N=130)	CONTROL JUN/83 (N=42)	Wave M10 OCT/83 (N=138)	Wave M13 JUL/84 (N=172)	TOTAL (N=207)	a.Repeat (N=52)	b.Novice (N=155)
HOME TREATMENT:									
-WSS	4.1	33.1	54.6	45.2	43.5	73.8	10.8	9.8	11.2
-Tea	18.9	10.5	6.9	4.8	8.7	16.9	5.9	9.8	4.6
-Pharmaceutical	2.6	1.6	0.0	2.4	3.6	2.3	7.9	5.9	8.6
-ORS Packet	—	—	—	—	—	—	1.0	0.0	1.3
-Special Foods	—	—	—	—	—	—	0.5	2.0	0.0
-Treated with WSS by Mothers Who Know How to Mix WSS Correctly	0.0	38.7	34.2	35.7	46.9	49.5	3.9	2.0	4.6

The percentage of episodes treated at home with WSS could be a deceptive measure of success if the mothers using WSS were not mixing it correctly. At the bottom of Table IV-3, data are reported about the percentage of episodes treated with WSS by mothers who know the correct formula for mixing WSS. Prior to the start of the MMHP Project, 4.1% of all episodes were treated with WSS, and none of the episodes were treated with WSS by mothers who knew the correct formula. By the end of the MMHP Project, 73.8% of all episodes were treated with WSS, and more importantly, 49.5% of all episodes were treated with WSS by mothers who knew the correct formula.

The findings (even if deflated somewhat for lack of a recent control group) indicate that the project made an impressive impact. They also raise concern about the 24.3% of all episodes (73.8% WSS use minus 49.5% correct WSS use) that were treated with WSS by mothers who did not know the correct formula. However, it must be emphasized that mothers needed to know the exact quantities of all three mixing ingredients to be credited with knowing the correct formula. If the formula reported by the mother deviated by a single capful, or if the mother recited the formula using such metrics as "a pinch", "a little", "a glassful", or "a handful", she was classified as not knowing the correct formula. This definition of correct mixing is very conservative; it is possible that many mothers classified as not knowing the standardized formula were nonetheless mixing efficacious solutions, or at the very least, solutions that were not dangerous.

Data from the HEALTHCOM study indicate that the high rate of WSS use during the MMHP Project began to deteriorate after the project concluded. The percentage of all episodes treated at home with WSS declined from 73.8% to 10.8%, and the percentage of episodes treated with WSS by mothers knowing the correct formula decreased from 49.5% to 3.9%. While comparable data are not

available from the MMHP study, data from the HEALTHCOM study indicate that almost none of the episodes was treated with ORS packets or with the introduction of special foods.

HEALTHCOM data appear to indicate that there has been a slight decrease in the percentage of episodes treated at home with tea, and a slight increase in the percentage of episodes treated at home with pharmaceutical medicines. Either of these patterns would represent a deteriorating environment for the treatment of diarrhea: tea might be considered an extra fluid that is helpful in combatting dehydration (but there was a decrease in this home remedy), while pharmaceutical medicines, especially anti-diarrheals, are more likely to exacerbate rather than remedy a child's condition (and there was an apparent increase in the use of this remedy).

(2) Treatment at health centers

During the course of the MMHP Project, the percentage of episodes treated at health centers decreased from 75.5% to 27.3% (Table IV-4). The findings provide indirect evidence of an improved environment for treating diarrhea: treatment at home with WSS has apparently offset more expensive and inconvenient treatments at health centers.

Table IV-4 indicates that at the time of the HEALTHCOM study, the percentage of episodes treated at health centers nearly doubled since 1984, from 27.3% at the end of the MMHP Project to 51.2%. Taken together with evidence about the trend in home treatments, we find that after the MMHP Project concluded, mothers tended to abandon home treatment of diarrhea with WSS in favor of treatment at health centers, a more costly and inconvenient solution.

TABLE IV-4

Health Center Treatment for Previous Case of Diarrhea (Within the Last Two Weeks)

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave M1 MAR/82 (N=196)	Wave M4 OCT/82 (N=248)	Wave M7 MAR/83 (N=130)	CONTROL JUN/83 (N=42)	Wave M10 OCT/83 (N=138)	Wave M13 JUL/84 (N=172)	TOTAL (N=207)	a.Repeat (N=52)	b.Novice (N=155)
HEALTH CENTER:									
Overall	75.5 %	71.4 %	50.8 %	59.5 %	65.2 %	27.3 %	51.2 %	44.2 %	53.6 %
-Tablet/Pill	—	—	—	—	—	—	29.5	28.8	29.7
-Liquid	—	—	—	—	—	—	11.1	11.5	11.0
-WSS	—	—	—	—	—	—	11.6	9.6	12.3
-ORS Packet	—	—	—	—	—	—	6.3	1.9	7.7
-Injection	—	—	—	—	—	—	4.3	3.8	4.5

Table IV-4 also examines the types of treatment that mothers report were given to children at the health centers at the time of the HEALTHCOM study. The findings indicate that tablets, pills, liquid medicines, and WSS are common treatments given at health centers. ORS packets and injections are given less frequently.

That 11.6% of all episodes were treated with WSS at health centers indicates that treatment of diarrhea with WSS is underestimated by information about home treatments alone. At the time of the HEALTHCOM study, 10.8% of all episodes were treated with WSS at home, and 11.6% of all episodes were treated with WSS at health centers (categories not mutually exclusive). Unfortunately, information about treatments given at health centers is not available for the MMHP study, making it impossible to examine any trend. One might speculate, however, that while home use of WSS fell off sharply after the MMHP Project concluded, some of this decline was offset by treatment with WSS and ORS packets at health centers.

C. Summary

Overall, the evidence examined indicates that treatment patterns deteriorated markedly after the conclusion of the MMHP Project. However, the patterns of treatment at the time of the HEALTHCOM study remained favorable compared to patterns prior to the start of the MMHP Project. Although the momentum gained during the MMHP Project was lost, the residual gains at the time of the HEALTHCOM study offer an entry point for re-building prior accomplishments.

The previous chapter indicated that there was a sharp decline in mixing knowledge after the MMHP Project. However, given the sharp decline in WSS use at home, there is somewhat less cause for alarm that mothers are using WSS but mixing it incorrectly. The decline in WSS use far outweighs the deterioration in mixing knowledge.

That mothers' access to a Julpearl bottle and bottle cap deteriorated markedly between the times of the MMHP and HEALTHCOM studies (reported in Chapter II) may have contributed substantially to the decline in WSS use at home. Some of the decline in WSS use at home may have been offset by treatment with WSS and ORS packets at health centers, although the data necessary to examine this trend is lacking.

One can only speculate about what the outcome would have been if the MMHP Project had continued to promote ORT, perhaps at very low levels, over a longer period of time. When the full burden of promoting ORT was placed upon local institutions in The Gambia, it is apparent that they were unable to sustain the required level of activities necessary to maintain earlier accomplishments. The findings seem to indicate that, in the context of The Gambia, there is a need for continued assistance (possibly at low levels) from donor agencies to ensure that short-term improvements in health outcomes are not erased, but rather built upon, in the long-term.

Chapter V: FEEDING PATTERNS DURING AND AFTER DIARRHEA

Diarrhea interacts with poor nutrition leading to weakness and possibly death. Prior to the MMHP interventions, AED found that most mothers felt that a child with diarrhea should continue to be breastfed and/or receive other foods. At the same time, some mothers reported that breastfeeding can cause diarrhea, suggesting that they might discontinue breastfeeding in certain instances. When asked about what they would feed a child with diarrhea, mothers most frequently mentioned coos pap, a watery millet porridge, which is bland and low in nutrition.

The first year of the MMHP Project promoted a "diet for dryness", concentrating on WSS, but also including messages about continued breastfeeding and giving solid foods during diarrhea to increase the strength of the child. Mothers were also encouraged to give fluids, such as teas and juices.

In 1983, after noting low behavioral responses to feeding messages, AED reformulated the messages. Starting in July of 1983, the focus of feeding messages was to get children to eat something during diarrhea (when they have little appetite), and to get them to eat solid and high-protein foods after diarrhea to restore their weight and strength. Nutritious local foods were promoted, as were energy-rich foods (such as milk, sugar, peanuts, etc.) that could be added to paps and other meals.

A. Beliefs About the Role of Feeding

Several times during the MMHP study, mothers were asked a true-false question about whether breastmilk causes diarrhea. Table V-1 indicates that prior to the MMHP Project 27% of the mothers reported that breastmilk causes diarrhea. Although the percentage of mothers with this response actually increased at one point during the project, the percentage of mothers with this incorrect belief returned to pre-project levels (25%) by the time the MMHP Project concluded in June, 1984.

Data from the HEALTHCOM study indicate that three years after the MMHP Project concluded, about the same percentage of mothers (21%) believed that breastmilk causes diarrhea. The MMHP Project was not very successful in dispelling the notion that breastmilk causes diarrhea, a notion held by roughly one-fourth of the mothers. Nor did much happen since the time of the MMHP Project to dispel or increase this persistent belief.

With respect to solid foods, mothers were asked a true-false question about whether solid foods are not good for a child with diarrhea. Table V-1 indicates that a majority of mothers, in the MMHP study, responded that solid foods are not good, before and after the feeding intervention. It seems that a smaller percentage of HEALTHCOM mothers (42.6%) incorrectly believed that solid foods are not good for children suffering from diarrhea, compared with MMHP mothers (61-79%). However, it is important to note that we do not have data about mothers' beliefs in this area at the end of the MMHP Project. It is possible that the MMHP Project was in fact responsible for the improvement, but that the improvement was not recorded, as indicated by the missing data in Table V-1.

the Role of Feeding

during the MMHP study, mothers were asked a true-false question about whether breastmilk causes diarrhea. Table V-1 indicates that prior to the MMHP study, 27% of the mothers reported that breastmilk causes diarrhea. The percentage of mothers with this incorrect belief actually increased to 40.5% during the project, the percentage of mothers with this incorrect belief actually increased to 40.5% by the time the MMHP Project concluded in 1991.

HEALTHCOM study indicate that three years after the MMHP study, about the same percentage of mothers (21%) believed that breastmilk causes diarrhea. The MMHP Project was not very successful in changing this persistent belief, a notion held by roughly one-third of the mothers. The MMHP Project did not do much since the time of the MMHP Project.

During the MMHP study, mothers were asked a true-false question about whether solid foods are good for a child with diarrhea. Table V-1 indicates that 61.3% of the mothers responded that solid foods are not good for a child with diarrhea. It seems that a smaller percentage of mothers (42.6%) incorrectly believed that solid foods are not good for a child with diarrhea, compared with MMHP mothers (61.3%). It is possible that the MMHP project had an impact on the improvement, but that the improvement was not significant. It is possible that the MMHP project had an impact on the improvement, but that the improvement was not significant. It is possible that the MMHP project had an impact on the improvement, but that the improvement was not significant.

Solid Foods Not Good For Child With Diarrhea	61.3	78.0	40.5	45.3	38.7
CORRECT BELIEFS:					
Solid Foods Give More Power Than Paps	—	—	42.7	41.5	—

Apparently, the feeding messages were not successful in persuading mothers to change their idea that paps are the best foods for children sick with diarrhea. This is further confirmed in Table V-1, which indicates that only about 42-43% of MMHP mothers believed that solid foods give more strength than paps. When data from the HEALTHCOM study are examined, Table V-1 indicates that about the same percentage of mothers (40.5%) believed that solid foods give more power than paps. Overall, the findings indicate that the MMHP Project was not very successful in changing beliefs about feeding, and mothers' beliefs had not changed substantially by the time of the HEALTHCOM study.

B. Patterns of Feeding During Diarrhea

Breastfeeding of infants during diarrhea and other beneficial feeding practices for ill children were strongly encouraged by the MMHP Project. As background, it is necessary to understand that feeding practices in The Gambia fluctuated due to seasonal food availability, worsening economic conditions, and drought-related shortages, among other factors.

Most mothers in The Gambia breastfeed their infants, and Table V-2 indicates that during the MMHP Project, the overwhelming majority of mothers continued to breastfeed their children when they had diarrhea. The somewhat large percentage of mothers (19%) who reportedly stopped breastfeeding during diarrhea in July of 1984 appears to be an aberration in the overall pattern, perhaps due to a drought in 1984.

Since only 8.8% of the mothers reported that they stopped breastfeeding a child with diarrhea before the MMHP Project began, there was little room for improvement. The percentage of mothers who stopped breastfeeding during

TABLE V-2

Mothers' Pattern of Feeding for Children with Diarrhea¹

	MMHP SURVEY						HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	Wave M1 MAR/82 (N=971)	Wave M4 OCT/82 (N=956)	Wave M7 MAR/83 (N=1027)	CONTROL JUN/83 (N=250)	Wave M10 OCT/83 (N=936)	Wave M13 JUL/84 (N=972)	TOTAL (N=207)	a.Repeat (N=52)	b.Novice (N=155)
Stopped Breastfeeding	8.8 %	0.4 %	0.8 %	0.0 %	0.0 %	19.0 %	2.5 %	3.8 %	2.1 %
Stopped Other Foods	31.5	16.5	27.3	8.0	3.5	14.6	10.7	7.0	12.1
Tried to Give Extra Food During Diarrhea	—	—	—	—	—	—	65.8	63.3	66.7
Child Ate Less Food or None	—	—	—	—	—	—	66.5	77.1	62.9

¹ MMHP and HEALTHCOM measures are not strictly comparable. MMHP asked all mothers about patterns of feeding. HEALTHCOM asked about the feeding of each child sick in the last two weeks.

diarrhea remained very low (2.5%) at the time of the HEALTHCOM study.

Mothers were also asked whether they stopped giving solid foods to children suffering from diarrhea. Although Table V-2 indicates that there is much fluctuation over time, it seems that the MMHP Project was able to encourage mothers to continue giving solid foods. Before the intervention, 31.5% of the mothers reported that they stopped giving solid foods. This percentage decreased to only 3.5% of the mothers (who said they stopped giving solid foods) at one point during the project, and then rose again to 14.6% of the mothers. Data from the HEALTHCOM study indicate that solid food was withheld for 10.7% of the episodes occurring during the previous two weeks, indicating that there was not much change since the end of the MMHP Project.

During the MMHP Project, mothers were not asked whether they tried to give extra food to a child suffering from diarrhea, and they were not asked whether the child ate more or less. However, information collected by the HEALTHCOM study indicates that for two-thirds of the episodes within the previous two weeks, mothers report trying to give extra food to children (Table V-2). Apparently, their efforts were not successful; in two-thirds or more of the cases, children ate less food or not at all.

C. Patterns of Feeding After Diarrhea

During the MMHP Project, mothers were asked about the amount of food eaten by children recovering from diarrhea, that is, during the period of convalescence after the diarrhea had ceased. This is a time when feeding practices are especially important for helping children to regain their strength and return to normal patterns of growth. Starting in July of 1983, feeding messages encouraged

mothers to give special foods like rice and groundnuts, and "power" foods like fish and meat to children recovering from diarrhea.

Table V-3 indicates that shortly after these messages began, only about 16% of the mothers reported that children recovering from diarrhea were eating less food than usual. By February of 1984, the percentage of mothers reporting that children were eating less food was slightly higher, indicating that mothers may have given less attention to feeding patterns after feeding messages ceased.

At the time of the HEALTHCOM study, about 16% of the children with diarrhea during the previous two weeks were given less food, about the same level as during the MMHP Project. Mothers who were repeatedly interviewed during the MMHP Project seem to have adopted better feeding practices than mothers in the population at-large, but overall there had not been much change from the time the MMHP Project concluded. Since we do not have data prior to the introduction of MMHP feeding messages in July of 1983, it is difficult to assess the impact of the MMHP Project. However, whatever impact there was seems to have persisted until the time of the HEALTHCOM study.

D. Summary

Overall, the findings examined in this chapter indicate that the MMHP Project met with only moderate success in changing mothers' beliefs about the role of feeding. Most notably, the MMHP Project seems to have encouraged mothers to continue giving solid foods to children suffering from diarrhea. Data from the HEALTHCOM study indicate that these modest gains did not erode over time.

TABLE V-3

Mothers' Pattern of Feeding for Children Recovering From Diarrhea¹

	MMHP SURVEY		HEALTHCOM FOLLOW-UP SURVEY JULY/87		
	SEP/83 (N=689)	FEB/84 (N=813)	TOTAL (N=207)	a.Repeat (N=52)	b.Novice (N=155)
AMOUNT OF FOOD EATEN AFTER DIARRHEA:					
- More	57.9	44.2	52.1	69.0	46.4
- Same	25.7	33.1	32.3	23.8	35.2
- Less	16.4	22.8	15.6	7.1	18.4

¹MMHP and HEALTHCOM measures are not strictly comparable. MMHP asked all mothers about patterns of feeding. HEALTHCOM asked about the feeding of each child sick in the last two weeks.

The findings examined in this chapter are in sharp contrast to the findings examined earlier with respect to knowledge about, and use of, WSS. Not surprisingly, in areas where project gains were the most impressive, the achievements of the MMHP Project experienced the sharpest declines, whereas in areas where little headway was made, there seems to have been less room for subsequent retreat.

Chapter VI: SUMMARY AND CONCLUSIONS

The MMHP Project used an innovative methodology drawn from social marketing to promote health behavior change. The key components in the methodology were: village-level research on practices, cultural concepts and vocabulary for planning and message development; behavioral analysis for defining desired behaviors and planning paths for arriving at them; and use of a highly integrated multi-channel communication strategy.

The project used radio broadcasts, interpersonal communication, and print materials to teach mothers about infant diarrhea and to motivate them to change related behaviors. One prime behavioral target was the adoption of a home-mixed water-sugar-salt (WSS) oral rehydration solution as a treatment for diarrhea.

The MMHP Project lasted from July, 1982 until June, 1984, during which time the project showed impressive gains in teaching mothers to mix WSS correctly, and to use WSS as the primary home treatment for infant and early childhood diarrhea. Virtually none of the mothers sampled could mix WSS correctly prior to the start of the MMHP Project, although about half of the mothers reported that they knew about WSS. By the time the project concluded, more than two-thirds of all mothers (not repeatedly interviewed) knew about WSS, and about 43% of all mothers could mix WSS exactly as recommended. Of the mothers who knew about WSS, about 63% knew how to mix WSS by the time the project ended.

During the course of the MMHP Project, the percentage of episodes of diarrhea treated at home with WSS increased from 4.1% to 73.8%. The percentage of episodes treated with WSS by mothers who knew how to mix WSS increased from 0% to 49.5%. These are impressive gains by any standards.

The MMHP Project was not successful in teaching mothers that WSS does not stop diarrhea, nor was it successful in teaching mothers that WSS replaces fluids (that is, water or water-sugar-salt). Information from mothers in the longitudinal cohort (who were repeatedly interviewed) suggests that, of those mothers who already knew about WSS, the MMHP Project doubled the percentage of mothers who knew that WSS should be made fresh everyday, and the project doubled the percentage of mothers who knew how much WSS to give (one litre, several Julpearl bottles, or as much as the child will drink).

The MMHP Project was not successful in changing mothers' incorrect beliefs that breastmilk causes diarrhea (maintained by 1/4 of all mothers), and that solid foods are not good for a child with diarrhea (maintained by well over half of all mothers). It is unclear to what extent the project improved feeding practices during diarrhea since feeding practices in The Gambia fluctuated or completely changed in response to seasonal food availability, worsening economic conditions, and drought-related shortages. However, there is evidence to suggest that the MMHP Project increased the practice of continuing to give solid foods to a child with diarrhea.

Overall, the MMHP Project was a success, although it worked to improve some areas of knowledge and practices more than others. Not surprisingly, the project demonstrated its best performance with respect to teaching mothers how

to mix WSS and encouraging mothers to use WSS as a home treatment for diarrhea, since these objectives were given emphasis during the project.

The success of the MMHP Project appears to have resulted from its multi-channel approach to disseminate messages, its use of developmental investigation to guide program planning, and its use of periodic monitoring and evaluation to identify problem areas and propose solutions. High levels of exposure to MMHP messages resulted from good access to all available channels (interpersonal, radio, and printed materials), each disseminating reinforcing and overlapping messages.

At the time of the HEALTHCOM study, many of the impressive gains registered during the MMHP Project had diminished, although gains did not erode completely. In areas where project gains were most impressive, absolute declines were most pronounced. In areas where project gains were modest, there was less room for subsequent retreat after the MMHP Project concluded.

Prior to the MMHP Project, only one mother knew how to mix WSS correctly. By the end of the project, about 43% of the mothers knew how to mix WSS correctly, although this number was cut in half, to 21% of the mothers, three years after the project had ended. Mothers' knowledge about how to administer WSS correctly (that is, how often to make a fresh batch of the solution, and how much to give a child each day) also deteriorated after the MMHP Project ended. However, knowledge at the time of the HEALTHCOM study remained at higher levels than prior to the MMHP Project.

The percentage of diarrhea episodes treated at home with WSS, and the percentage of episodes treated at home with WSS by mothers who knew how to mix WSS, fell off more sharply than levels of knowledge did. However, the

percentage of episodes treated at home with WSS remained higher than it was prior to the MMHP Project (10.8% versus 4.1%). Only 3.9% of the episodes, at the time of the HEALTHCOM study, were treated at home with WSS by mothers who knew how to mix WSS correctly.

Overall, the findings indicate that knowledge gains (i.e., knowledge about how to mix and administer WSS) made during the MMHP Project were somewhat more sustainable than behavior gains (i.e., the practice of using WSS at home to treat diarrhea). It may be that knowledge, once gained, requires less reinforcement than is required for the maintenance of new health practices. Health practices are more difficult to maintain since they require the effort and active involvement of mothers. Also, there are competing influences in a mother's environment recommending alternatives such as the use of anti-diarrheals and other medicines. With respect to continuing to use WSS as a treatment for diarrhea, one must also consider the extent to which sharply reduced access to mixing materials (i.e., a Julpearl bottle and bottle cap) precluded mothers from maintaining recommended practices.

One might argue that in order to maintain high levels of use, WSS needs to be promoted continuously, the way that many commercial products are promoted. Promotion of WSS at levels reached during the MMHP Project could not have been maintained in The Gambia without continued donor support. The limitations of the institutional environment in The Gambia are reported in the process evaluation:

Despite widespread knowledge of the MMHP educational techniques, little had been done in the way of planning new large-scale coordinated outreach programs by the time the Stanford evaluation team finished in The Gambia. Most of the HEU activities concentrated on training programs and poster

production in the capital city. The unit was still responsible for coordinating health programs on the radio, but the careful research for development and pre-testing was not being done. While the interest in using project methodologies was keen, difficult logistics and resource limitations were impediments to undertaking new campaigns.¹¹

Apparently, after the MMHP Project ended, the resources needed to continue promoting WSS were not available. It became impossible to undertake the continued research that may have given attention to the fact that mothers no longer had widespread access to a Julpearl bottle and bottle cap. It has been suggested elsewhere that:

An SSS-based strategy can be appropriate if (and only if!) the program manager routinely does the early monitoring, later evaluation and consequent changes in educational content (messages) and process which the data demands. In short, an SSS-based strategy can work if it is supported by responsive, active program management.¹²

But clearly responsive program management is not easy. It demands aggressive data collection and interpretation, and creative revision of the techniques used. How many programs using SSS are capable of that, or are actively doing it?

The findings from the MMHP evaluation indicate that at one time there was a responsive management, capable of aggressive data collection and interpretation, and creative revision of the techniques used. However, responsive management requires both expertise and the commitment of resources. As a result of the

¹¹The Mass Media and Health Practices Evaluation in The Gambia: A Report of the Process Evaluation. A Report from Stanford University to the United States Agency for International Development. Prepared by Applied Communication Technology. Menlo Park, CA: August 1985.

¹²Technical Literature Update: A Monthly Report of Current Literature on Diarrheal Diseases & Related Health Issues. Prepared by Technologies for Primary Health Care (PRITECH), vol. III, no. 7 (August, 1988).

MMHP Project, it appears that some level of social marketing expertise may have become institutionalized in The Gambia, but without a long-term commitment of resources, it was difficult to continue to apply what had been learned.

The gains made during the MMHP Project have not disappeared completely, nor has the donor eliminated all of its support. The evaluation activity represented by this report is an indication of the donor's continuing commitment to provide the capabilities for responsive management. The next step for improving child survival efforts in The Gambia may be to assess whether a WSS-based strategy should be continued given the level of resources available for continued promotion, and given mothers ability to gain access to the required mixing materials.

The lesson learned from The Gambia is that use of WSS, once adopted by a large percentage of the population, will not automatically become self-propagating. While WSS may continue to be common knowledge in The Gambia, widespread use of WSS probably will not be sustainable unless local program management continues to be supported, at some level, through the commitment of financial and/or technical resources.