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

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for

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and

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EXECUTIVE SUMMARY

INTRODUCTION

This document reports the major findings from a survey of oral rehydration therapy (ORT) practices in rural Honduras. This research represents a follow-up to a longitudinal evaluation of communication campaigns to introduce ORT as a response to infant diarrhea, and examines the long-range impact of those interventions.

Diarrheal dehydration constitutes the single greatest cause of death among children under five years of age in the developing world, claiming approximately four million lives each year. Until a decade ago, children dehydrating from diarrhea had to be transported to a medical clinic to undergo intravenous fluid replacement. With the discovery that the oral administration of a simple salt and sugar solution could replace lost fluids just as effectively, children today can be easily and inexpensively treated at home. The public health community therefore set out to reach mothers worldwide, teach them about ORT, and persuade them to use it.

As an early step in the international effort to promote ORT, the U.S. Agency for International Development (USAID) initiated the Mass Media and Health Practices (MMHP) project in pilot sites in Honduras¹ (Central America) from 1981-1983.² In Health Region 1 an intensive campaign, known locally as the *Proyecto de Comunicacion Masiva Aplicada a la Salud Infantil*, or *PROCOMSI*, was planned and implemented by the Ministry of Health with technical assistance from the Academy for Educational Development. Stanford University and Applied Communication Technology evaluated the project and found that, overall, it was successful in establishing the acceptance and practice of ORT principles to treat infant diarrhea. The achievements of the initial program resulted in a decision to expand the project to attain national coverage under USAID's HEALTHCOM (Communication for Child Survival) Project (1985-1990). One component of the HEALTHCOM contract was provision of a study to examine the long-term impact of the pilot and national efforts to disseminate the practice of

¹A sister campaign was conducted in The Gambia, West Africa.

²Actual implementation of the intervention began in March 1981; however, project planning activities began approximately a year prior to that time.

ORT in Honduras. This cycle of research, known as "the Resurvey," was carried out by Applied Communication Technology under subcontract from the Academy for Educational Development. The HEALTHCOM Resurvey was initiated in 1987 (four years after the intensive pilot campaign) and measures levels of ORT awareness, knowledge, and practice and compares them to previous levels found in the initial MMHP evaluation. It also compares findings from Region 1, the site of the initial intensive intervention, with those from sites outside of Region 1, which were reached by the subsequent national promotional effort under HEALTHCOM.

BACKGROUND TO THE MMHP PROJECT AND THE NATIONAL PROGRAM

The MMHP campaign in Honduras was implemented from 1981 to 1983 with the purpose of establishing widespread use of oral rehydration therapy (ORT) in the home to combat the dehydrating and life-threatening effects of diarrhea among children under five years of age. While the central feature of ORT is the administration of an oral rehydration solution (ORS), the therapy also encompasses nutritional and feeding behaviors such as continued breastfeeding and feeding, and augmentation of liquid intake.³ In Honduras the rehydration solution is called Litrosol and is mixed from locally-produced packets of salts containing the World Health Organization ORS formula.

Another purpose of the project was to assess the effectiveness of a large-scale health communication intervention planned according to social marketing principles and employing a mix of broadcast, print, and interpersonal communication channels to achieve its objectives. The social marketing approach entailed extensive planning research, specification of target audience and knowledge and behavioral objectives, systematic development of messages using formative research, and careful integration of communication channels. Complementary roles were allocated to radio, print, and interpersonal means of communication. Radio was employed to gain wide coverage, both in terms of audience reach and frequency of message. Printed materials (flyers, posters, packet instructions) provided more detailed (pictorial) and permanent instructions which could remain on hand as reference material. Direct interpersonal contact with health workers enhanced credibility of media messages and served as a means of packet distribution. Litrosol packets were distributed free of charge through

³ ORT and ORS have slightly different meanings. ORT stands for "oral rehydration therapy," of which one component is administration of ORS, the "oral rehydration solution." ORS is sometimes used to refer to "oral rehydration salts"; however, in this document, we are specifically referring to the mixed solution when we use the term "ORS."

community health workers and through a network of government health centers. The campaign got underway in March 1981, and by the time it had concluded in March 1983, over 500 health care workers had been trained, 40,000 radio spots and educational programs broadcast; 93,000 posters and 155,000 flyer disseminated; and 300,000 packets of Litrosol distributed.

In 1982, on the basis of early indications of success of the MMHP pilot project in Health Region 1, the Honduran Ministry of Health began the implementation of a national diarrheal disease program to serve all areas of the country. The national effort involved continued technical assistance from AED and funding from USAID and remains active to the present. National ORT promotion is based on the communication methodology developed during MMHP, integrating broadcast and print media with interpersonal communication to reach its audience. Under the national program, the heavy reliance on radio which was characteristic of MMHP has been modified to place more emphasis on promoting ORT via health workers.

EVALUATION OF THE MMHP PROJECT

A comprehensive evaluation was carried out concurrently with the campaign, following a panel of 750 mothers of children under five for two years in order to track the impact of the project. The central objective of the evaluation was to monitor changes in the proportion of mothers who had heard of Litrosol, and who knew about and practiced the set of behaviors which comprise oral rehydration therapy: administration of the oral rehydration solution, augmentation of liquids, continued breastfeeding, and continued feeding. The MMHP evaluation was composed of two measurement groups, both from Region 1:

- 1) "Multi-measure group": the panel of approximately 750 mothers who were interviewed in five data collection cycles during the course of the campaign as a means of documenting changes over time. The multi-measure communities were located in the counties of Yuscarán, Sabanagrande, and Danlí.
- 2) "Single-measure group": mothers interviewed only during the last (5th) data collection cycle as a "control" or comparison group to test for the effects of repeated measurements. The single-measure communities came from the county of Morocelí.

The evaluation was structured around a process model which postulated that before ORT behaviors could be adopted, a series of interim steps must be completed: the

target population must have access to the channels of communication utilized by the campaign; the messages must reach the intended audience; the content of the messages must be learned and retained, and the behaviors must be tried. The document *The Mass Media and Health Practices Evaluation in Honduras: A Report of the Major Findings*⁴ presents a full description of the MMHP campaign, evaluation design, and findings.

Overall, the initial project achieved its objective of fostering a high rate of ORS use in Honduras. Access to campaign channels was high, as was exposure to and learning of campaign messages. By the end of the campaign, about 60% of mothers had tried Litrosol, and about 1/3 of diarrhea cases were being treated with it. Four years after the termination of the original campaign and the initiation of the national effort, the Resurvey was conducted to determine to what extent these gains had been maintained.

RESURVEY DESIGN

The primary purpose of conducting a resurvey of mothers' awareness, knowledge, and practice related to ORT was to examine the long range impact of the MMHP campaign and the effectiveness of the subsequent national program. The intensive MMHP pilot in Health Region 1 terminated in 1983, and since that time ORT has been promoted nationally, employing many of the same strategies as the initial campaign. About half of the women sampled in the present HEALTHCOM Resurvey are from Health Region 1, and half from other Health Regions (4, 6, and 7). In this way, two fundamental kinds of comparisons can be made:

- (1) comparisons over time -- between past and current levels of knowledge and practice with regard to ORT within Region 1;
- (2) cross-sectional analysis -- comparing current results in Region 1, where the intensive MMHP pilot campaign was conducted prior to the national program, with sites outside of Region 1, where mothers were reached primarily via the expanded national program.

While the Resurvey sample was drawn from the same communities as those included in the MMHP longitudinal study (with the exception of Danlí), the respondents are not the same as those participating in the MMHP evaluation. Resurvey data is based on a new sample of mothers drawn by using identical sampling procedures employed to

⁴ This report is available through Applied Communication Technology.

select the original households (random selection of households within purpose selected counties) for the MMHP evaluation. The Resurvey was carried out in six sites (counties) in rural Honduras, three from Region 1 (Yuscarán, Sabanagrande, and Morocelí) and three from outside Region 1 (Nacaome, Salamá, San Francisco). Within each site, the county seat plus six to ten communities were selected to participate in the study. Mothers from the county seat (*cabecera*) comprise a relatively urbanized group.

Although the sample includes *cabecera* households, it is essentially rural, composed entirely of households outside the capital city. Over 2/3 (68%) of the homes consist of only one or two rooms, and nearly 3/4 (73%) have an earthen floor. About 56% have a water tap on the premises; 16% have electricity; and 5% have indoor toilet facilities. Almost all families are maintained by subsistence agriculture.

Because of its distinguishing features, the sample is not representative of Honduras as a whole, and data presented here will not necessarily correspond with those obtained from national random samples. The mothers interviewed in the Resurvey, as in the MMHP evaluation, reside in the rural areas of Honduras, and are certain to differ in some respects from mothers who come from the large urban areas of Honduras (Tegucigalpa or San Pedro Sula). Furthermore, mothers in this sample are concentrated in Region 1, which is atypical with regard to diarrhea treatment practices due to the presence of the intensive ORT campaign from 1981 to 1983.

Data collection for the Resurvey took place in May and June of 1987, when a total of 1403 women were interviewed, providing information on 2264 children under five years of age.

RESURVEY RESULTS

Awareness and trial use of Litrosol

The campaigns have been able to achieve nearly universal awareness of Litrosol nationwide and have fostered an exceptionally high rate of trial use. Virtually all mothers (99%) say they have heard of Litrosol, and the great majority (85%) indicated that they have used it at least once. These rates are consistent across regions. The

rate of trial use is significantly⁵ higher now than in 1983, when 62% of mothers in Region 1 indicated that they had used Litrosol.⁶

Case Treatment Rates

Thirty-six percent (36%) of children in the sample households had experienced a case of diarrhea within the two weeks prior to the Resurvey interview.⁷ Mothers of these children were asked a detailed set of questions regarding how the case was treated. Depending on the specific comparison being made, case treatment rates have been maintained or have risen since 1983.

Among diarrheal episodes occurring within two weeks prior to the interview, 45% nationwide were reportedly treated with an oral rehydration solution. Mothers administer ORS selectively and rationally, with the probability of treatment increasing with the severity of the case: among cases judged as serious by the mother, 54% received treatment with ORS. Rates of use by site vary considerably, ranging from a low of 31% in Salamá to a high of 55% in Nacaome.

Within Region 1 as a whole (Yuscarán, Sabanagrande, and Moroceli), case treatment rates have climbed from 34% to 49% since the end of the intensive campaign. ORS use is higher in Region 1 than in other sites (49% versus 40%), although the difference is moderate, suggesting that the national program is approaching the effectiveness of the Region 1 pilot project in promoting the use of ORS.

ORS is administered most frequently among children under two years old, and more often among rural children than those residing in the county seat. ORS use does not appear to be related to the sex of the child; neither are there large differences in age or schooling between mothers who treated with ORS and those who did not.

⁵ Use of the term "significance" in this report refers to statistical significance as measured by the appropriate statistical test. The conventional alpha level of .05 is used as the cutoff point.

⁶ Awareness of ORS cannot be compared to past levels, since mothers who participated in the MMHP evaluation received multiple interviews and thus were made aware by the fact of inclusion in the study. Because the Resurvey drew a new sample of mothers, the question "Have you heard of Litrosol?" could be asked as a measure of the extent to which the campaign had penetrated at the broadest level.

⁷ Unless otherwise noted, all case treatment rates cited in this report are based on a two week recall period.

Mothers who consulted with someone regarding their child's illness used ORS at much higher rates than women who did not (69% versus 28%). The highest treatment rates are found among women who consulted the *guardian* (community health worker), health center, or hospital, while lower rates are associated with women who consulted with a *sobador* (a traditional health provider who uses massage techniques) or a private physician.

Examination of case management practices shows that ORS has not replaced other treatments, but has supplemented them. Use of medications (which are often inappropriate and sometimes harmful) and purgatives (which are always detrimental) remains troublingly high, with medications given in 67% of cases, and purgatives administered in 24% of them.

Breastfeeding, liquids, and food during diarrhea

Nearly all breastfeeding children (98%) continued to receive breastmilk during their illness, while 56% of bottlefeeding infants continued to receive a bottle during illness. Among children over six months old (whether breastfeeding or not) who had a case of diarrhea within two weeks prior to the interview, 33% received increased amounts of usual liquids, but at the same time, 33% received less than normal amounts. These figures are offset by the fact that 46% received special liquids such as *horchata*, *agua de arroz*, and teas. Most (96%) ill children continued to eat some food during their illness, although the majority (69%) of those receiving food during their illness ate less than normal amounts.

Mixing Resources

Sources of learning: The *guardian* (village health worker), *alcalde auxiliar* (assistant mayor), radio, and packet instructions used to be more common sources of learning about ORS than they are at present. Declines in these sources have been dramatic, while the health center now functions as the primary disseminator of information about ORS.

Sources of packets: There are clear changes over time in mothers' sources of rehydration salts. While the Region 1 project initially emphasized community distribution sources, that emphasis decreased in the later stages of the pilot campaign and in the national expansion of the project. Consequently, the *guardian* does not currently play as prominent a role as s/he used to. Similarly, the town "Assistant Mayor" no longer functions as a distributor. The health center, always one of the major sources of packets, has now become by far the predominant source.

Packet availability: A fairly high proportion of mothers -- about 1/3 -- keep one or two packets at home. There are indications, however, that mothers who do not keep packets at home may experience some difficulty in obtaining them. All mothers were asked whether they had ever sought packets and been unable to obtain them. Twenty-one percent (21%) of mothers responded "yes." Among mothers who had a child with a recent case of diarrhea and did not treat with ORS, nearly half (47%) said they didn't use ORS because they didn't have packets.

Learning from the Campaign

The Resurvey included a series of questions to measure mothers' knowledge regarding dehydration, ORS mixing and administration, and breastfeeding. Most of these knowledge measures did rise modestly during MMHP, and have remained near prior levels. They do not differ much between regions.

Dehydration and ORT: With regard to proper administration of ORS, the Resurvey found that 56% of mothers who have used ORS knew to give a liter per day and 81% of users knew that a fresh solution should be prepared daily. Although these rates represent a significant achievement from the perspective of communication campaigns, they are cause for concern from the point of view of public health: administering less than a liter per day detracts from the rehydrating potential of ORS, and giving ORS which has been sitting more than 24 hours can introduce harmful bacteria. Prior rates on similar but not directly comparable questions are 58% and 34% respectively. Over half of all mothers in the Resurvey (56%) knew that ORS stops dehydration rather than stops the diarrhea itself. The mothers' ability to define dehydration declined, falling from 39% to 21% in communities which participated in the original longitudinal study.

Mixing knowledge and practice: A moderately high percentage of women could describe correct mixing procedures for the interviewer. Describing correct mixing entailed naming only the proper ingredients which make up the solution (water and packet) and the correct amounts of each (one liter, one whole packet), and answering "No" to the question, "Do you ever add anything else?" Eighty percent (80%) of women who had used ORS offered correct descriptions based on those criteria. Errors occurred in either the proportions cited or in adding extraneous ingredients. When asked to *demonstrate* how they mix, a very high proportion of mothers -- 45% -- made errors in measuring a liter of water. The rate of error in both knowledge and practice is cause for concern, given the potential consequences of an improperly mixed solution.

A mixture which is too dilute loses effectiveness, while a concentrated solution can dangerously hasten dehydration.

Ninety-four percent (94%) of all mothers perceive the mixing process to be easy. The simplicity of preparation is probably a factor which facilitates the adoption of ORS as a treatment for infant diarrhea.

Breastfeeding knowledge: Breastfeeding knowledge measures are also moderately high at levels comparable to MMHP, and are fairly consistent across regions. Seventy nine percent (79%) of mothers said that breastfeeding should be continued during an infant's diarrheal episode. Eighty-two percent (82%) of all mothers knew to give only breastmilk during an infant's first four months of life, and 87% of all interviewees knew that colostrum should be given to a newborn.

Relationship between knowledge measures and ORS use: As a means of determining whether certain kinds of knowledge was associated with ORS use, the proportion of mothers who treated a recent case with ORS was calculated for mothers who gave correct answers to knowledge questions and for those who did not. Skill-related knowledge (how to mix) and correct understanding of the function of ORS (to combat dehydration rather than diarrhea) was associated with ORS use. Of the two ORS administration questions, one was statistically related (knowing that a fresh solution should be prepared daily) and one was not (knowing to give a whole liter per day). Mothers who were able to define dehydration were not more likely to use ORS than mothers who could not. In some cases lack of knowledge may not affect treatment (for example, whether or not a woman who uses ORS can define dehydration), but in other cases it can (knowing to throw away leftover solution at the end of the day, or knowing to give the whole liter).

Communication

Exposure to the three channels of communication employed by the campaign (radio, print, interpersonal) was measured to determine the extent of access to information about ORT. Currently, campaign strategy stresses use of interpersonal and print communication over broadcast media.

Radio: Most Honduran families (57%) own a working radio and almost 1/3 of all mothers indicate that they listen to a radio frequently. These figures are roughly comparable to previous data. More households within Region 1 (61%) own functioning radios than households in other regions (54%).

The Resurvey measured recall of two jingles used during the original campaign. Recall of a breastfeeding jingle has been maintained (possibly because it was also made into a poster), while recall of a slogan to give liquids during diarrhea has dropped off markedly. Mothers were also asked if they had heard of Dr. Salustiano, a fictitious character created during the MMHP project who provided information about various facets of oral rehydration therapy. In Region 1, the site of the intensive intervention, about the same proportion of mothers -- about 70% -- reported having heard of Dr. Salustiano as during MMHP, while significantly fewer mothers residing outside Region 1 (53%) recognized his name. This is logical, given that the Dr. Salustiano character was discontinued in 1984, meaning that mothers outside Region 1 had heard his programs for a shorter period of time than Region 1 mothers had. Most mothers who had heard of Dr. Salustiano accurately cited the topics he addressed in his radio programs.

Print: A flyer which was created to accompany Litrosol packets and teach mothers how to mix ORS is not currently in wide circulation. Fifty-nine percent (59%) of respondents said they had ever seen the flyer. Among mothers who had used Litrosol within two weeks prior to the interview, 29% said that the flyer came with the packets. Although 31% of mothers had packets in the home, 5% could produce a flyer to show the interviewer. The low level of flyer availability probably does not present an important obstacle to use of ORS. The packet itself provides basic mixing instructions in both pictorial and written form. Moreover, at this stage of the project, the great majority of mothers already know how to mix ORS, and would not need to refer to any instructions in order to use it.

About the same percentage of mothers in each measurement group (73%) said that they were able to read. The same proportion of readers and non-readers were ORS users, suggesting that the project had successfully reached mothers across a range of educational levels.

Interpersonal: Honduran mothers have fairly frequent contact with some kind of health provider. Eighty percent (80%) had had at least one contact with a traditional, community, or professional health worker within the six months prior to the interview. Most of those contacts were with personnel at the health center.

Exposure to communication channels and use of ORS: Of the three channels of communication used to promote ORT knowledge and practice, only interpersonal channels now display any statistical association with ORS use. Mothers who have exposure to and access to radio and print channels measured in the Resurvey are not

more likely to use ORS than other mothers. This pattern of association is probably a reflection of the modified campaign strategy and stage of the campaign rather than the nature of the medium. Radio currently is given a less prominent role than during MMHP, so that having a radio and listening frequently do not ensure that a mother will encounter campaign messages. Print channels employed by the project consist primarily of an instructional flyer and a series of posters. The instructional flyer is probably more important during the earlier phases of the intervention, when mothers are first learning how to mix the rehydration solution. Exposure to posters was not measured in the Resurvey, and their effect on use of ORS cannot be evaluated. A higher proportion of mothers who had had contact with a health worker used ORS to treat a recent episode of diarrhea than did women who had had no contact.

CONCLUSIONS AND POLICY IMPLICATIONS

Overall, the Mass Media and Health Practices (MMHP) Project and its successor, Communication for Child Survival (HEALTHCOM), have achieved considerable success in fostering the use of oral rehydration therapy for treating diarrhea among infants and young children in Honduras. The high rates of use achieved under MMHP in Region 1 have been maintained in the intervening time since the close of the initial campaign. The HEALTHCOM project, which followed on the heels of MMHP and expanded ORT promotion to all areas of the country, has been able to attain levels of acceptance of ORS which approach those realized by the initial intensive pilot in Health Region 1. Although ORT-related knowledge and practice are consistently superior in Region 1, the differences are generally modest, indicating that the national program has been largely effective in its efforts to promote ORT.

Although use of ORS is high (45% of cases), the overall pattern of case management practices for diarrheal episodes among children under five years of age is far from optimal. The data suggest that ORS is often administered improperly, as 44% of mothers who have used ORS did not know that a liter of the solution should be given per day, and 19% of them did not know that a fresh solution should be prepared daily. Furthermore, there is evidence of improper preparation of ORS, which should be made by mixing the full packet with a liter of water, without the addition of other ingredients. Among mothers who have used ORS, 20% gave incorrect descriptions of the mixing process, either by citing wrong proportions of ingredients, or by failing to respond "no" to a question as to whether they ever add something to the mixture. Furthermore, almost half (45%) of mothers who demonstrated how they mix did not measure a liter of water with a sufficient degree of accuracy. Other inadequacies in case management concern improper treatments given, either in conjunction with or

exclusive of ORS. A disturbing proportion of cases is treated with medication (67%) or a purgative (24%).

An extremely positive finding is that almost all breastfeeding mothers continue to offer breast milk to their children during illness. However, recommendations to increase liquids and continue feeding for children who are weaned are less frequently followed. Only about one third of children over six months of age received increased amounts of liquid during diarrhea, and about the same proportion continued to take in normal amounts of food.

Taking into account the overall results of the Resurvey, several implications for program strategy emerge:

- 1) **Emphasize correct mixing and administration of ORS:** Although mothers frequently turn to ORS as a treatment for diarrhea, there are indications they often mix or administer the solution improperly. The consequences of incorrect mixing or administration range from rendering the solution ineffective, to making it harmful to the child. In particular, it is important to teach mothers how to measure a liter to stress that the entire packet is to be mixed in one liter of water, and emphasize that nothing is to be added to the solution. It is also important that mothers know that the entire mixture should be given to the child over the course of the day, but if any is left over, it must be thrown away.
- 2) **Continue to discourage use of medications and purgatives:** Use of medications and purgatives to treat infant diarrhea is widespread in Honduras. The most frequent first response to a diarrheal episode is to give medication, and administration of drugs is more common than administration of ORS. Although medical personnel are recommending medication for diarrheal episodes at unacceptably high rates, mothers who consult with no health provider are treating with drugs at even higher rates. Trained health providers are not recommending purgatives, but mothers are giving them on their own initiative. In many cases, treatment with medication is unnecessary, and sometimes it is harmful. Use of purgatives to treat diarrhea is always deleterious. The administration of improper and potentially harmful treatments undermines the beneficial effects of ORS and the overall recovery of the child, and needs to be vigorously discouraged.
- 3) **Emphasize the importance of increasing liquids and maintaining feeding during diarrhea:** Only about 1/3 of children received an increased quantity of liquids during their recent bout of diarrhea, and about 1/3 took in *less* liquid than usual during their illness. About 70% of children ate less food than normal during the diarrheal bout,

including 4% who ate nothing. Nearly all mothers let the child take the lead in this situation, letting her/him have the amount of liquid or food requested.

It is extremely important that mothers realize the critical importance of food and drink during illness, and that they be encouraged by the program to act more assertively in this regard.

4) Re-establish radio as one of the primary channels of communication about ORT and diarrheal management: Current project strategy de-emphasizes the role of radio in favor of interpersonal communication via health center personnel and print communication in the form of posters. While personal contact, in particular, is vital to the overall promotional effort, it will affect only those who visit the health center. A strength of radio is its ability to reach across geographical distances, and provide information to those who might otherwise be isolated from the campaign. For those who do have contact with the project through other channels, radio spots and special programming can serve as prompts for, reinforcers of, and reminders about proper care of the child suffering from diarrhea. It is plausible that the modest (but not unimportant) differences in cognitive and behavioral outcomes between Region 1 (where radio was utilized extensively) and other regions (where radio is now playing a diminished role) are at least in part attributable to the differing communication strategies employed in each region.

5) Assess and strengthen networks for distributing packets in order to ensure easy access in rural areas: The initial campaign employed a strategy of utilizing local contacts as a source of packets and information about ORS. The Resurvey found sharp declines in activity of community-based packet distributors and a much more prominent role assumed by health centers. Simultaneously, the Resurvey found indications of problems with access to ORS packets. Given that community-based distributors are inherently more convenient than centralized ones, it is likely that this shift to reliance on health centers is related to problems with packet availability. Mothers residing outside the *cabecera* (county seat) reported access problems more frequently than did women from the *cabeceras*, where health facilities are closer at hand.

**THE HEALTHCOM RESURVEY
OF ORAL REHYDRATION THERAPY PRACTICES
IN HONDURAS, 1987**

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CHAPTER I: BACKGROUND TO THE STUDY

INTRODUCTION

This document reports the major findings from a survey of oral rehydration therapy (ORT) practices in rural Honduras conducted in 1987. This research represents a follow-up to a longitudinal evaluation of communication campaigns to introduce ORT as a response to infant diarrhea, and examines the long-range impact of those interventions.

Diarrheal disease constitutes the leading cause of death among children under five years of age in the developing world, claiming approximately four million lives each year. Death results from dehydration -- the loss of water and electrolytes. Until a decade ago, children dehydrating from diarrhea had to be transported to a medical clinic to undergo intravenous fluid replacement. With the discovery that the oral administration of a simple salt and sugar solution could replace lost fluids just as effectively, children today can be easily and inexpensively treated at home. The public health community therefore set out to reach mothers worldwide, teach them about ORT, and persuade them to use it.

As an early step in the international effort to promote ORT, the U.S. Agency for International Development (USAID) initiated the Mass Media and Health Practices (MMHP) project in pilot sites in Honduras⁸ (Central America) from 1981-1983.⁹ In

⁸A sister campaign was conducted in The Gambia, West Africa.

⁹Actual implementation of the intervention began in March 1981; however, project planning activities began approximately a year prior to that time.

Health Region 1 an intensive campaign, known locally as the *Proyecto de Comunicacion Masiva Aplicada a la Salud Infantil*, or *PROCOMSI*, was planned and implemented by the Ministry of Health with technical assistance from the Academy for Educational Development. Stanford University and Applied Communication Technology evaluated the project and found that, overall, it was successful in establishing the acceptance and practice of ORT principles to treat infant diarrhea. The achievements of the initial program resulted in a decision to expand the project to attain national coverage under HEALTHCOM (Communication for Child Survival). One component of the HEALTHCOM contract was provision of a study to examine the long-term impact of the pilot and national efforts to disseminate the practice of ORT. This cycle of research, known as "the Resurvey," was carried out by Applied Communication Technology under subcontract from the Academy for Educational Development. The HEALTHCOM Resurvey was initiated in 1987 (four years after the intensive pilot campaign) and measures levels of ORT awareness, knowledge, and practice and compares them to previous levels found in the initial MMHP evaluation. It also compares findings from Region 1, the site of the initial intensive intervention, with those from sites outside of Region 1, which were reached by the subsequent national promotional effort under HEALTHCOM.

This report on the Resurvey research provides background information on the MMHP campaign and evaluation, describes the Resurvey research design, presents findings, and discusses them. The findings are grouped by subject area. They begin with descriptive information on the sample and on the prevalence of diarrhea. As a prelude to presenting statistics on ORS use, issues of measuring ORS are discussed, followed by the data which correspond to each measurement method. Findings concerning other aspects of treatment are then presented: use of medications, purges, and home remedies; liquids and foods given during diarrhea; and breastfeeding. Measures of exposure to and learning from the campaign are then presented, and their relationship to ORS use examined. In these topical chapters, relevant data are presented and described; the final section summarizes results and discusses some of the policy implications they raise.

THE MMHP CAMPAIGN

The primary purpose of the MMHP campaign initiated in Honduras in 1981 was to establish widespread use of oral rehydration therapy (ORT) in the home to combat the dehydrating and life-threatening effects of diarrhea among children under five years of age. While the central feature of ORT is the administration of a rehydration solution (ORS), the therapy also encompasses nutritional and feeding behaviors such as continued breastfeeding and feeding, and augmentation of liquid intake.¹⁰ In order to successfully promote the full range of behaviors associated with full implementation of ORT, the campaign needed to accomplish a wide array of tasks. Among other things, the campaign had to introduce the concept of dehydration to mothers and teach them to recognize its signs; teach the various facets of proper mixing and administration of the solution; encourage breastfeeding as a preventive measure and continued breastfeeding during episodes for nutritional benefits; and promote continued feeding and increased consumption of liquids during illness.

In Honduras the rehydration solution is called Litrosol and is mixed from packets containing the World Health Organization ORS formula of rehydration salts. The packets are manufactured in Honduras and are designed for mixing in one-liter volumes, the quantity which should be administered to a child in a given day. Initially Litrosol was the only available ORS solution. Today a variety of commercial ORS products in both packet and liquid form are available, not all of which use the WHO formula or the standard one-liter volume. Use of Litrosol, however, predominates over other "brands" of the rehydration solution.

The ORT campaign employed a social marketing approach, involving extensive planning research, specification of target audience and knowledge and behavioral

¹⁰ORT and ORS have slightly different meanings. ORT stands for "oral rehydration therapy," of which one component is the administration of ORS, or the "oral rehydration solution." Some researchers use ORS to refer to rehydration salts. In this document, ORS denotes the rehydration solution.

objectives, systematic development and testing of messages, careful integration of communication channels, and use of formative evaluation techniques during the course of the intervention in order to allow mid-course adjustments. A nine-month investigation preceded the intervention in order to determine then-current beliefs and practices regarding childhood diarrhea, investigate potential distribution systems for information and materials, identify media use and habits, and test understanding of concepts and messages to be promoted in the campaign. Various research methodologies were utilized: focus groups, interviews, observation, and use of archival data.

A distinguishing characteristic of the intervention was the considerable attention given to planning channels of communication for message dissemination and reinforcement. Complementary roles were allocated to radio, print, and interpersonal means of communication with the objective of designing an optimal mix of the three. Radio, the least expensive medium, is capable of wide coverage, both in terms of audience reach and frequency of message. Commercial-like radio spots and jingles were developed along with educational programs and broadcast with a high degree of air-time saturation. Printed materials provided more detailed (pictorial) and permanent instructions which could remain on hand as reference material. They included packet instructions, flyers, and posters. Direct interpersonal contact with health workers enhanced credibility of media messages and served as a means of packet distribution. Ministry of Health personnel were given special training in the treatment of diarrheal disease and they in turn provided rudimentary training to village health workers, called *guardianes*. The campaign got underway in March 1981, and by the time it had concluded in March 1983, over 500 professional and 1000 village health workers had been trained, 40,000 radio spots and educational programs broadcast; 93,000 posters and 155,000 flyers disseminated; and 300,000 packets of Litrosol distributed.

In 1982, on the basis of early indications of success of the MMHP pilot project in Health Region 1, the Honduran Ministry of Health began the implementation of a national diarrheal disease program to be extended to all areas of the country and to other health areas such as immunization and malaria and tuberculosis treatment. This

phase of the project, known as *PROCOMSI II*, involved continued technical assistance from AED and funding from USAID.

EVALUATION OF THE MMHP PILOT CAMPAIGN

Stanford University and Applied Communication Technology conducted a longitudinal evaluation throughout the course of the MMHP intervention, following a sample of 750 mothers for over two years. The sample was drawn from three "counties" (*municipios*) in Health Region 1 -- Sabanagrande, Yuscarán, and Danlí. Near the end of the intervention in 1983, a sample of mothers was selected from a fourth county -- Morocelí -- to act as a comparison group to test for possible bias in the main sample due to repeated interviews with mothers. The evaluation was a large-scale effort which, in addition to documenting overall campaign impact, tracked the process of change with the intention of explaining how and for whom knowledge and behavior were changing. The executive summary from the evaluation is included as Appendix A.

The evaluation was structured around a process model which postulated a sequence of steps leading to the adoption of ORT to treat a diarrheal episode. Those steps are as follows:

1. *Exposure to campaign:* In order to be affected by the campaign a mother would have to be in a position to receive its messages, either by listening to the radio, having contact with a health worker, or reading a poster or flyer.
2. *Change in knowledge:* Through exposure to the campaign a mother would learn about ORS and how to use it.
3. *Attitude change:* Messages would have to convince a mother that ORS was worth trying.
4. *Trial use of ORS:* Mother would have to have the requisite knowledge and access to packets of salts to try out mixing and administering ORS.

5. *Adoption of ORT*: Presuming satisfaction with ORS, a mother would continue to use it for diarrheal episodes among her children.
6. *Improvement in health status of children*: Use of the ORT approach would lead to improved health status among young children.

For each of these steps, variables were constructed and measured using the most appropriate methodology: structured interviews (surveys), ethnographic techniques (observation), or anthropometric measurements. Data on the greatest proportion of variables was gathered via survey, either for pre-post comparison, or for repeated measures to constitute a panel study. The Resurvey also measures each of these areas, with the exception of the final one addressing changes in health status of children. Inclusion of health status indicators requires anthropometric measures which were not possible to obtain due to time and financial constraints of the Resurvey.

THE HEALTHCOM NATIONAL CAMPAIGN

The success of the MMHP campaigns in Honduras as well as other pilot countries led to renewed and increased financial support from USAID under the Communication for Child Survival project. The Academy for Educational Development and associated subcontractors were awarded the HEALTHCOM contract to continue to provide technical assistance in the planning and implementation of sustained health promotion efforts. Under HEALTHCOM, the health communication methodology developed under MMHP was to be extended to additional countries and applied to other child survival interventions besides ORT (for example, breastfeeding, immunization, and acute respiratory infection). HEALTHCOM's primary purpose was to refine the use of modern communication techniques, social marketing, and behavior analysis to improve child care behaviors. Activity under this new five-year contract officially began in September of 1985. In Honduras, a new Resident Advisor, Dr. Patricio Barriga, arrived at that time.

Since one of the main objectives of the Honduras project was to institutionalize the health communication methodology within the Ministry of Public Health, training programs were carried out for health personnel working at the national, regional, and local level. In HEALTHCOM's first six months alone, approximately 830 persons involved in public health were trained in various aspects of public health communication.

Although the HEALTHCOM project represented an extension of MMHP, the promotion of child survival technologies under HEALTHCOM differed from the MMHP phase in the relative emphasis of the mix of communication channels. Whereas MMHP relied heavily on mass media (especially radio), during the HEALTHCOM phase, face-to-face communication via health workers was given greater importance. In particular, there was a significant increase in improving interpersonal communication skills of field staff; developing the ability of health personnel to use graphic materials in group settings; and in promoting production of alternative educational materials, such as puppets, theater, and murals.

CHAPTER II: RESURVEY RESEARCH DESIGN AND METHODOLOGY

OVERVIEW AND PURPOSE

The HEALTHCOM Resurvey in Honduras represents a follow-up to the evaluation of the initial ORT campaign conducted from 1981 to 1983. It is designed to determine the extent to which that campaign and the subsequent national ORT promotion has sustained the use of oral rehydration therapy as a response to infant diarrhea. The Resurvey questionnaire focuses on several substantive areas of inquiry: knowledge of diarrhea and CRT, case treatment practices, and communication access and use. In addition, demographic and socioeconomic data were collected. Two major comparisons form the focus of the Resurvey: (1) between past and current levels of knowledge and practice among mothers in Region 1, and (2) between Region 1 mothers (who learned about ORT from the initial intensive campaign) and mothers outside Region 1 (where ORT was promoted primarily by the expanded national program).

The Resurvey was carried out in conjunction with a number of other studies associated with this phase of the research. (The eight Resurvey sub-studies are briefly described in Appendix B.) Separate instruments for mixing trials, immunization and acute respiratory infection (ARI) were administered to mothers along with the ORT questionnaire. In addition, for each community included in the sample, a community characteristics form was completed and at least one health provider was interviewed.

At the core of this phase of the research is the main ORT survey of Honduran mothers, which is the subject of this report. In order to avoid inordinately long interviews, not all instruments were administered to each household. The ORT instrument required a large sample size; hence, every mother who was interviewed

was administered the main ORT survey. In addition, a random half of the sample was administered the immunization module, while the other half received the ARI survey. Furthermore, approximately every 14th mother was asked to demonstrate how she mixed the oral rehydration solution. Results of the immunization, ARI, and mixing modules are reported in separate documents.

Considerable effort was exerted to obtain as complete and reliable data as possible. Fieldworker candidates practiced questionnaire administration in training sessions and in supervised field trials. During data collection, team supervisors reviewed all questionnaires for completeness and coding accuracy. The data were entered in Honduras and submitted to verification process. Before analysis began, the data were carefully cleaned, and any out-of-range codes or inconsistencies were re-checked in Honduras by referral to the original questionnaires. This resulted in very little missing data and in results which reflect a high degree of internal consistency.

The Honduras Resurvey covered a total of 1403 households in 59 communities which were clustered in six sites. Fieldwork and data collection were completed in July, 1987.

RESEARCH DESIGN AND METHODS

The Resurvey design builds upon the structure of past evaluation efforts associated with the Mass Media and Health Practices project. The MMHP evaluation was based on a sample of mothers from Region 1, the where the MMHP intervention was conducted as a pilot project. The Resurvey sample is composed of women from Region 1 as well as women from three Regions outside of the pilot area.¹¹ Within Region 1, Resurvey respondents were drawn both from the communities participating

¹¹ While the Resurvey sample was drawn from the same communities as those included in the MMHP longitudinal study (with the exception of Danli), the respondents are not the same as those participating in the MMHP evaluation. See the section on sampling for an explanation of why a new sample was drawn and a description of the sampling procedure.

in the longitudinal study (multiple interviews) and the communities around Moroceli (post-only interview). While the overall design of the MMHP evaluation is longitudinal, involving a series of interviews with the same mothers over the course of the campaign, mothers in Moroceli were interviewed only during the final MMHP measurement sweep in order to learn whether the longitudinal data were influenced by the effect of multiple interviews (which potentially have the effect of encouraging pro-social responses as mothers guessed "what the interviewers wanted to hear," or of making the issues more salient, thus artificially enhancing the impact of the campaign messages.) In other words, Resurvey respondents fall into three measurement groups, depending on the site and its role in the evaluation. Figure II-1 delineates those measurement groups and their associated sites. Tables in this report which present longitudinal data separate results by these groups.

Figure II-1: Resurvey Measurement Groups

| GROUP | SITES ("Counties") |
|---|--------------------------------|
| (1) Region 1 mothers from MMHP "multi-measure" communities--those included in the longitudinal evaluation | Sabaniagrande & Yuscaran |
| (2) Region 1 mothers from MMHP "single-measure" (post-only) communities | Moroceli |
| (3) Mothers outside Region 1 (not interviewed in MMHP) | Nacaome, Salama, San Francisco |

Two major kinds of comparisons form the basis for the Resurvey analysis:

- (1) comparisons over time -- between past and current levels of knowledge and practice with regard to ORT within Region 1;
- (2) cross-sectional analysis -- comparing current results in Region 1, where the intensive MMHP pilot campaign was conducted prior to the national program, with sites outside of Region 1, where only the expanded national program was implemented.

Figure II-2. Evaluation of Sites Over Time

| SITE | MMHP | MMHP Post | Resurvey |
|---------------|------|-----------|----------|
| REGION 1: | | | |
| Yuscaran | X | X | X |
| Sabanagrande | X | X | X |
| Danli | X | X | |
| Moroceli | | X | X |
| REGION 4: | | | |
| Nacaome | | | X |
| REGION 6: | | | |
| San Francisco | | | X |
| REGION 7: | | | |
| Salama | | | X |

Figure II-2 presents a visual representation of the evaluation over time in each site. By returning to communities which participated in the MMHP longitudinal evaluation, pre and post comparisons with old sites can be made to assess over time changes. That is, long-range effects of the original campaign are determined by comparing MMHP with HEALTHCOM in Yuscarán and Sabanagrande.¹² By including new sites in the Resurvey, an assessment of the impact of the newer expanded ORT program can be made. New sites which were not part of the original intervention but were included in the national expansion of activity represent a post-only design, although their pre-intervention status may be assumed to be similar to that of Region 1.

¹² The "counties" included in the MMHP longitudinal evaluation were Danli, Sabanagrande, and Yuscaran. The county of Danli was not included in the Resurvey for logistical reasons.

This assumption cannot be verified, since we do not have baseline data for sites outside of Region 1. When the original longitudinal study was planned in 1980, it was anticipated that data would be collected only from Region 1 in order to monitor the effects of the intensive campaign over time. During planning meetings for the Resurvey in 1987, sites outside of Region 1 were added at the request of officials from the Ministry of Health, who were interested in obtaining an idea of how other parts of the country which were reached by the subsequent national diarrheal disease program compared with Region 1. It was agreed that the Resurvey presented an opportunity not only to look at the long-term effects of MMHP and the successor national program in Region 1, but to look at the impact of the national program outside of Region 1 and compare effects.

Although the pilot was implemented in Health Region 1 only, it is possible that some mothers outside of Region 1 came into contact with elements of the campaign. For example, even if radio spots were broadcast on local stations, there was undoubtedly some degree of "spillover" into non-campaign areas. We are assuming, however, that this level of contact was minimal, and that ORT-related knowledge and behavior documented outside of Region 1 is primarily attributable to the organized national ORT promotion which began in 1982. The fact that some mothers outside of Region 1 may have gotten a "jump" in their acquisition of knowledge about ORT in 1981 does not affect the general conclusions about the efficacy of the national intervention.

Appendix C contains a list of the communities included in the Resurvey.

THE RESURVEY INSTRUMENT

The core of the Resurvey effort is a large-scale survey administered to Honduran mothers to serve as a basis of comparison with survey data from previous evaluation phases. This document presents the findings from that (re)survey. Other components of the Resurvey examine the ORT campaign effects on other constituencies, such as health workers, or use other means to measure the health impact, such as archival data

searches to gather mortality information. The other components of the Resurvey are described in Appendix B. Results of these sub-studies are presented in separate reports.

Resurvey activities focus on the long-range effects of the ORT campaigns -- that is, the extent to which mothers are currently aware of, knowledgeable about, and practicing oral rehydration therapy in response to infant diarrhea. Current measurements in these areas are compared to pre-intervention measurements in communities which received the intensive campaign and in those which were exposed to the subsequent national program. In order to ensure comparability with previous data, the Resurvey questionnaire contains a body of questions taken directly from earlier instruments. In addition, the questionnaire includes new items to clarify or expand upon these topics. A subset of mothers was asked to demonstrate how they mix the solution.

The Resurvey represents a distillation of the most important topics covered in the initial evaluation. The initial evaluation was a comprehensive effort, requiring a local (Honduran) office base and involving four sets of instruments administered at regular intervals during the campaign, as well as a number of smaller sub-studies conducted over the two and a half year life of the project. In the Resurvey, on the other hand, data were collected in a single sweep over a period of roughly six weeks. The initial evaluation covered a broad array of topics related to ORT campaign impact: diarrhea prevalence; dehydration; awareness of, knowledge about, and use of Litrosol; exposure to and recall of messages; breastfeeding and feeding; hygiene; family health status; family demographics; socioeconomic status; mortality; and anthropometric data to measure growth and development. The Resurvey, in comparison, represents a condensation of the most essential topics into an instrument that could be administered within an hour's time. Anthropometric measures, which are costly and time consuming, were omitted from the Resurvey. Other topics less germane to the central question were also excluded: hygiene, family eating habits and health status.

The ORT Resurvey is composed of several sections: family demographics, case treatment, knowledge of diarrhea and treatment, communication access and use, and socioeconomic status. A brief description of each follows:

Family demographics: Every person who is considered by the family to be part of the household is listed in the family enumeration section. For each person over five years of age, the interviewer recorded the sex, age, and number of years of schooling completed. For children under five years, the interviewer recorded the child's sex, birth date, and number of months breastfed, and the person who is "in charge of" the child.

Treatment of diarrhea: In the next section on diarrhea treatment, the caregiver was asked to recall when each child under five experienced the last episode of diarrhea. A detailed set of questions on treatment was asked only if the child had had a case of diarrhea within the month previous to the interview, since recall beyond that time period would not be very reliable. A shorter set of treatment questions was asked if a child had had diarrhea within six months of the interview. Cases occurring more than six months prior to the interview were not asked about.

Knowledge of diarrhea and treatment: All respondents -- whether their child had had a recent episode of diarrhea or not -- were asked a set of questions to determine their general knowledge about diarrhea and dehydration, mixing and administration of Litrosol, and other ORT-related treatment behaviors.

Communication: This section was designed to ascertain exposure to and contact with the channels of communication employed in the campaign: radio, print, and interpersonal. Included in this section were questions about access to radio, amount of listening, and recall of radio messages from the MMHP campaign; literacy; and contact with health workers.

Socioeconomic status: This section includes several questions regarding occupation and land ownership, as well as a set of items concerning characteristics of the house, which

the fieldworker completed by observation, such as floor material, type of room dividers, and number of rooms in the house.

UNITS OF ANALYSIS

This study encompasses two distinct units of analysis; one is "mother-level" and the other is "child-level." The former represents the sampling unit (household) and yields information about household characteristics and behavior of the respondents, such as socioeconomic status, mother's knowledge about ORT, family demographic information. The latter is employed for examining specific child and case characteristics and their relation to case treatment practices. Each mother may respond about more than one child, depending on how many under-five children are in her care. Thus, the number of cases occurring in the "child-level" analysis do not correspond to the number of households involved in those analyses. A total of 1403 women were interviewed; they provided information about 2264 children. Of those children, 811 had a case of diarrhea in the two weeks prior to the interview, and form the sample base for case treatment analyses.

SAMPLING

The Resurvey sampling design reflects the two major purposes of the study, the first of which was to examine the long-term effects of the ORT campaigns in Region 1, the second of which was to make a comparison between Region 1 (the pilot site) and other Regions. Therefore, about half of the women interviewed resided in Region 1, and half came from other Regions. **This means that the Resurvey is not based on a national random sample, and the data obtained should not be interpreted as representative of the country as a whole.**

Six counties in rural Honduras were selected as Resurvey sites. Three had been surveyed previously as part of the initial evaluation -- Yuscarán, Sabanagrande, and

Morocelí -- thus enabling comparability with previous data. Three new sites -- Nacaome, Salamá and San Francisco -- were included in the Resurvey at the request of the Honduran Ministry of Health so that the study would become national in scope and a greater number of comparisons could be made. New sites were selected with the intention of adding regional diversity to the sample. The new sites are located in different Health Regions, permitting comparisons of campaign intensity, socioeconomic levels, and patterns of adoption among regional groups. Sites where a hospital was located or which hosted any special projects were considered atypical and excluded from consideration.

In the "old" sites the same communities were included as before (with a few minor exceptions), while in the new sites selection was conducted using purposive sampling to insure that a range in accessibility and size was represented among communities. Each site is called a "cluster" and includes the *cabecera* ("county seat") plus at least five smaller outlying communities, in order to have both rural and more "urban" areas represented. In this context, "urban" refers to communities that may have only a few thousand residents. A list of communities selected for participation is found in Appendix C.

The Resurvey, like its predecessor MMHP evaluation, required a large sample, principally in order to encounter a sufficient number of children having had a recent case of diarrhea to enable meaningful analysis of this subgroup. Moreover, a large sample was requisite to ensure that an effect of reasonable size would be statistically detectable. A total of 1403 mothers were interviewed for the Resurvey, and they provided information about their 2264 children under five years of age.

It may appear that the best strategy for achieving maximum comparability of the Resurvey with past research would have been to re-interview the same women from the initial evaluation, thus adding another data point to the longitudinal survey. This approach was rejected for several reasons:

- (1) Mothers in the original sample would be six years older than when they were first interviewed. This means that the Resurvey sample would be skewed toward older women and no longer be representative of Honduran mothers.
- (2) A portion of the mothers from the initial sample would no longer have children under five years of age, the age group which is of interest to this study.
- (3) Some of the mothers would have moved to other regions, or otherwise be difficult to locate, thus greatly reducing the sample size or potentially introducing a bias among the types of mothers remaining in the sample.

For these reasons, it was decided that a new, representative sample should be selected using the identical sampling procedure employed to select the original households. That procedure involved a multistage plan combining non-probability and probability sampling. Purposive sampling was used first to select sites ("counties"), and then communities within sites. Households within communities were selected randomly.

In order to make a random selection of individual households in a given community, sampling frames including the "universe" of all households needed to be obtained. In most cases the most useful sampling frames proved to be community maps available from the Regional health centers which had either come from Vector Control in the Ministry of Health or had been created for use for a health census (*Censo Familiar de Salud*) during the previous year. Lists of households were also available, but field assistants who checked the accuracy of the maps and lists found that the lists proved to be less complete than the maps. Neither lists nor maps were available for communities in the Salamá site, so field assistants visited each community to construct maps to serve as the basis for making a random selection of households from that site.

The target sample size per county was 240, with no more than 45 households selected from any one community. If a community consisted of fewer than 45 houses, all households were approached for an interview. In communities having more than 45 families, houses on each community map were numbered, and the sample along with

replacement houses was selected using a random number table. Replacement houses were needed if (1) there were no children under five years of age residing in the house, (2) no one was home, or (3) the mother refused to be interviewed. On the whole, very few refusals were encountered, although one community in Salamá refused to be interviewed on the second day the team was there. Other than that, only nine other mothers who were approached declined to be interviewed.

The only exception to the sampling procedure described above was the county seat of Nacaome, which is relatively heavily populated. Maps were obtained indicating "city" blocks with the number of houses on each. Blocks were assigned numbers and 45 were selected on a random basis. Within each block, the fieldworker was to start on the northwest corner, and visit the *n*th house, also selected randomly.

An interview was conducted in a household only if a child under five years of age resided in the house. The interviewee was to be the person who knew most about the care of the child -- in most cases the mother, but not infrequently, a grandmother or aunt. (In this document we refer to the interviewees as "mothers," even though the caregiver was not in all cases the mother.) On some occasions fieldworkers would encounter households which combined two or more mothers with children. In this event, all members of the household would be included on the family demographics information page, but only one mother would be interviewed, and she would be asked to provide detailed information only on the children about whom she had direct knowledge.

During the MMHP intervention, 750 rural Honduran mothers in Health Region 1 (the pilot area) were interviewed regularly over a two year period. The Resurvey sample was composed of a total of 1403 mothers, both from Region 1 and from outside Region 1, who were interviewed once during a single data collection period lasting about six weeks. Those mothers provided information on their 2264 children under five years of age. They came from 59 communities, distributed roughly evenly over the six counties which constituted Resurvey sites.

SUMMARY OF EVALUATION DESIGN AND TERMINOLOGY

The design of the overall MMHP/HEALTHCOM evaluation is complex, for it encompasses measurements across time as well as cross-sectional measurements among data collection sites. The purpose of this report is to compare HEALTHCOM Resurvey data with data from the MMHP longitudinal study in order to look at changes over time, and to compare current HEALTHCOM data among communities which differ with respect to what we are calling "campaign intensity" -- that is, whether a site is located in Health Region 1, which is the area which experienced the intensive pilot campaign from 1981 to 1983, or whether it falls outside of Region 1 and has learned about ORT principally from the expanded national program which followed on the heels of the pilot intervention.

An additional factor is introduced into the design by the fact that communities in one site within Region 1, Morocelí, were previously measured only once, at the end of the MMHP intervention, in order to act as a "control" for the effect of repeated measurements in the longitudinal communities.

To distinguish between these two MMHP groups, we have termed the communities participating in the longitudinal study as "multi-measure communities," while the communities in Morocelí which were interviewed only during the final data collection phase are called "single-measure communities." Both groups are included in the Resurvey, which means that there are two sets of comparisons to look at when examining change over time.

The third measurement group is comprised of communities outside Region 1. These communities were not part of the longitudinal evaluation, and are measured in the Resurvey for the first time. They are included in the Resurvey in order to compare data from areas which were the subject of the intensive campaign with Regions which were introduced to ORT in the subsequent national effort.

In summary, then, in this report we refer to three Resurvey *measurement groups*:

Multi-measure communities: those which were part of the longitudinal evaluation conducted during the course of the MMHP campaign, namely, Sabanagrande and Yuscarán. These communities are also termed "longitudinal" sites.

Single-measure communities: those which are located in Morocelí in Region 1 and which were interviewed only once, at the end of the MMHP intervention. These communities served as a "control" against the effects of repeated measurements. It should be noted that the use of the term "control" in this context is not the same as the conventional use to designate a group which was not part of an intervention and is measured to compare data between "treatment" and "non-treatment" groups. These communities "control" only against the possibility that the repeated visits in the longitudinal communities altered participants' responses or learning in some way.

Communities outside Health Region 1: those which were not part of the MMHP longitudinal study (because they were not located in the pilot Region), specifically Nacaome, Salamá, and San Francisco, each located in a different Health Region in Honduras. These areas were included in the Resurvey in order to compare regions which received the intensive MMHP intervention with those which learned about ORT in the nationwide program following the pilot intervention.

INTERPRETATION OF TABLES

In displaying the longitudinal data we have attempted to select an organizational format which most clearly highlights the appropriate comparisons among measurement groups. One major point of comparison is between MMHP data and Resurvey data, although each of these has been divided into subgroups comprised of multi- and single-measure communities. To facilitate reading the appropriate comparison, we have shaded data taken from communities participating in the longitudinal study.

A second point of comparison consists of Region 1 versus non Region 1 Resurvey data. Data from areas outside of Region 1 should be compared with data presented for the other two Resurvey groups (multi-measure and single-measure).

A different table format displays data available only from the Resurvey. In response to the interests of the community of people involved in ORT promotion and research, a number of questions are included in the HEALTHCOM Resurvey which were not addressed in the prior MMHP research. In these cases, the pertinent table presents figures only from the Resurvey, and the comparison of interest is between Region 1 communities and those outside Region 1. For this reason, data from all three sites in Region 1 are grouped together, rather than broken down into multi-measure and single-measure communities, breakdowns which are relevant only for making comparisons over time.

In the tables presenting longitudinal data on campaign outcomes, six sets of chi-squares are calculated to test for statistical significance between various sub-groups. (Statistical significance indicates that the observed difference between two figures is probably a true difference rather than one due to sampling.) Where a statistically significant difference is found, the table will include a footnote number corresponding to the comparison groups described below. Chi-squares were calculated to test for significant differences between:

- (1) **The MMHP "post-only" (single-measure) communities in Moroceli and the MMHP longitudinal (multi-measure) communities:** tests the effect of repeated measurements within the MMHP evaluation. This information is not new (it is reported in the MMHP Final Report) since it compares only MMHP sub-groups but it is reported here for purposes of completeness. A statistically significant difference here would suggest that the multi-measure figures are inflated due to the effect of frequent interviewer visits making the topics more salient.
- (2) **MMHP baseline measurements ("Wave 1") from multi-measure communities, and Resurvey multi-measure communities:** tests the long-range effect of the campaign

against initial levels. Significance would suggest that changes indicated by the Resurvey figures are attributable to the intervening campaign.

- (3) **Wave 5 (final MMHP data sweep) multi-measure and Resurvey multi-measure communities:** tests differences between levels at the end of MMHP and current levels in the longitudinal communities. A significant difference between these groups would indicate that the national follow-on campaign had an impact in the longitudinal communities over and above the MMHP pilot.
- (4) **MMHP single-measure communities and Resurvey single-measure communities:** tests differences between levels at the end of MMHP and current levels in the single-measure communities. A significant difference would indicate that the national ORT promotion in the single-measure communities has induced changes since the termination of the MMHP pilot.
- (5) **Resurvey multi-measure communities and Resurvey single-measure communities:** tests current differences between the two Region 1 subgroups. Statistical significance would suggest site differences due to unspecified causes. (We would expect few differences here.)
- (6) **Region 1 and non-Region 1 Resurvey data:** tests for differences between areas exposed to the pilot campaign plus the subsequent national campaign, and those reached only through the subsequent national diarrheal disease program. A significant difference here would indicate either that the pilot had accomplished something that the national campaign had not, or that the longer exposure for those experiencing the pilot had a larger accumulated impact.

The criterion level of significance for chi-square probabilities is .05, and Yates-corrected figures are used wherever appropriate.

CHAPTER III: DESCRIPTION OF THE RESURVEY SAMPLE

SAMPLE MOTHERS

A total of 1403 mothers from six sites in rural Honduras were interviewed for the Resurvey. Table III-1 provides descriptive statistics on sample mothers by site and type of community. Fifty-two percent (52%) of these women reside in Health Region 1 (which includes the counties of Yuscarán, Sabanagrande, and Morocelí) and 48% reside outside Region 1 (Nacaome, Salamá, San Francisco). Although the entire sample is essentially rural, about 1/5 of the mothers (19%) come from the county seat, comprising a somewhat more urbanized group.¹³ The average age of the respondent is 31.8 years old, and there are no statistically significant age differences by site. The mean level of schooling completed by the respondent is 3.3 years. As with age, there are no statistically significant differences between the sites. There are, however, schooling differences by type of community: mothers residing in a county seat average almost two more years of education than mothers in outlying areas: 4.8 years compared with 3.0 years of school completed.

SAMPLE CHILDREN

The 1403 households include 2264 children under five years of age, meaning that each mother has an average of 1.6 children under five. Half of the women have one child in this age range, while 40% have two and 10% have three.

¹³ Each site includes the *cabecera* plus several outlying communities.

Table III-1. Descriptive Statistics on Sample Mothers

Frequency, Age and Schooling of Sample Mothers, by Site

| | Frequency | % | Age | S.D. | Schooling | S.D. |
|----------------------|------------|-------------|-------------|-------------|------------|------------|
| REGION 1 | 724 | 51.6 | 32.1 | 10.4 | 3.1 | 2.7 |
| Yuscaran | 237 | 16.9 | 31.5 | 9.2 | 3.3 | 2.9 |
| Sabanagrande | 225 | 16.0 | 33.4 | 11.8 | 3.1 | 2.7 |
| Moroceli | 262 | 18.7 | 31.5 | 10.0 | 2.8 | 2.4 |
| OTHER REGIONS | 679 | 48.4 | 31.6 | 9.7 | 3.6 | 2.7 |
| Nacaome | 213 | 15.2 | 30.9 | 8.9 | 3.5 | 3.0 |
| Salama | 223 | 15.9 | 31.7 | 9.5 | 3.7 | 2.5 |
| San Francisco | 243 | 17.3 | 32.1 | 10.5 | 3.4 | 2.7 |

Frequency, Age, and Schooling of Sample Mothers, by Locale

| | | | | | | |
|-------------------|------|------|------|------|-----|-----|
| Rural Communities | 1133 | 80.8 | 31.8 | 9.9 | 3.0 | 2.4 |
| County Seats | 270 | 19.2 | 31.9 | 10.6 | 4.8 | 3.3 |

| | | | | | | |
|---------|------|-------|------|------|-----|-----|
| Total | 1403 | 100.0 | | | | |
| Average | | | 31.8 | 10.0 | 3.3 | 2.7 |

The average age of children in the sample is 29 months, with no difference in age by site. Table III-2 provides frequencies of sample children by age group. Fifty-three percent of the children are female, 47% male. Just over half (53%) come from Region 1, and about 4/5 of them (81%) reside in the rural areas.

Table III-2. Age of Children in Sample

| Age | Frequency | % |
|------------------------|-----------|-------|
| 0-11 months (< 1 year) | 439 | 19.4 |
| 12-23 months (1 year) | 479 | 21.2 |
| 24-35 months (2 years) | 471 | 20.8 |
| 36-47 months (3 years) | 466 | 20.6 |
| 48-59 months (4 years) | 409 | 18.1 |
| TOTAL | 2264 | 100.0 |

SAMPLE HOUSEHOLDS

The 1403 households in the sample are comprised of an average of 6.6 persons, and the mean maximum level of education completed by anyone in the family is 5.3 years.

Most households are supported by subsistence farming activities, although a small proportion is engaged in small commercial concerns or public sector work. Among households dependent on agriculture, 40% have access to only one *manzana* (1.23 acres) or less of land. Almost all mothers were housewives, with a tiny percentage working in home manufacture or as paid domestics or public employees.

Nearly 3/4 of the homes have an earthen floor, and about 2/3 of the houses have no more than two rooms. In 56% of the households, a water tap is located in the house or yard area. In the rest of the households, water is obtained from a public tap or a natural water source. Only 5% of families have a septic tank, and half have access to an outdoor latrine; nearly half have no formal waste disposal facilities. Sixteen percent (16%) of the households have electricity, 7% a refrigerator, and 2% own a car. Table III-3 summarizes these characteristics and also separates them by rural and urban

Table III-3. Characteristics of Sample Households, by Type of Community

| | HEALTHCOM Resurvey | | |
|--------------------------------------|--------------------|----------|----------------|
| | Rural | Cabecera | Resurvey Total |
| Source of Drinking Water | | | |
| Tap on premises | 49% | 85% | 56% |
| Public tap/neighbor's tap | 26 | 13 | 23 |
| Spring/river | 25 | 2 | 21 |
| Floor Material | | | |
| Earthen | 77 | 46 | 72 |
| Other | 21 | 54 | 28 |
| Number of Rooms with Permanent Walls | | | |
| One | 26 | 16 | 24 |
| Two | 46 | 32 | 43 |
| Three | 20 | 34 | 23 |
| Four or more | 7 | 19 | 10 |
| Waste facilities | | | |
| Septic tank | 1 | 19 | 5 |
| Latrine | 49 | 60 | 51 |
| None | 50 | 20 | 44 |
| Light source | | | |
| Electricity | 7 | 56 | 16 |
| Gas lamp/kerosene lamp | 5 | 5 | 5 |
| Candles or pitch | 88 | 39 | 79 |
| Own a refrigerator | 5 | 16 | 7 |
| Own a car or truck | 1 | 5 | 2 |
| N of cases | 1130 | 269 | 1399 |

locale. There are significant differences on all of these variables between homes located in the *cabecera* and those located in the outlying areas, with the former being favored with a higher standard of living.

THE REPRESENTATIVENESS OF THE SAMPLE

Because of its distinguishing features, the sample is not representative of Honduras as a whole, and data presented here will not necessarily correspond with those obtained from national random samples. The mothers interviewed in the Resurvey, as in the MMHP evaluation, reside in the rural areas of Honduras, and are certain to differ in some respects from mothers who come from the large urban areas of Honduras (Tegucigalpa or San Pedro Sula). Furthermore, mothers in this sample are concentrated in Region 1, which may be atypical with regard to diarrhea treatment practices due the presence of the intensive ORT campaign from 1981 to 1983.

CHAPTER IV: PREVALENCE OF DIARRHEA

Prevalence of diarrhea is high in developing countries, and is the leading cause of early childhood mortality in the Third World. Diarrheal disease is rapidly transmitted where sanitary conditions are poor, and food and water become contaminated with human waste. Prevalence fluctuates by season, generally peaking during the rainy season when bacteria multiply most quickly and are dispersed by the rain.

The Resurvey collected data on prevalence of diarrhea as a means of comparing current rates with those recorded in the early 1980s and with those found in other studies. In order to gather this data, the interviewer asked when each child under five years of age had last had a case of diarrhea. Each child was then categorized as to whether he/she had diarrhea on the day of the interview, within three days prior to the interview, within the prior two weeks, within the prior four weeks, or within the previous six months. The categories are exclusive, as they indicate the time period in which the *last* episode of diarrhea occurred. Therefore a child with a recent case of diarrhea could very well also have had a case five or six months in the past, but the more distal case(s) would not appear in the data. While the categories are exclusive, they can be aggregated to indicate the proportion of children having a case within a given time span (within the previous four weeks or six months, for example).

The categorization scheme was selected to enable comparisons both with prior MMHP data and with other major diarrheal disease studies. The MMHP evaluation categorized episodes by current, last two weeks, and last six months intervals. At the suggestion of the Honduras Ministry of Public Health, the category "last three days" was added to the Resurvey, as that is the recall period used by the Ministry in its national health surveys and can be used to compare results. The four-week category was added as a means of comparing data with those obtained by Annenberg researchers in their evaluations of other HEALTHCOM projects.

Categorization of first case was carried out with two purposes in mind: to gather data on prevalence of diarrheal disease, and to distinguish recent from distal cases in order to ask about recent cases in much greater detail than those in the more distant past. The MMHP questionnaire on case treatment practices was administered only when a child had had diarrhea within the two weeks prior to the interview. Selection of only very recent cases for examination was based on the premise that memory is less accurate and reliable the further back the event to be recalled occurs in time. In the Resurvey, rather than limiting the detailed morbidity questions to two-week cases, those questions were asked for any case occurring within four weeks before the interview. This was done not only to allow comparisons with Annenberg research, but, by providing an extended cut-off period for gathering detailed case treatment information, also to guarantee a sufficient number of recent cases to permit various kinds of multivariate and sub-analyses. As it turned out, there were sufficient number of cases within the two-week period for the desired analyses, and, except where otherwise indicated, the treatment data presented in this report are based on two-week recall for maximum comparability with MMHP figures. These are aggregated figures, so that "cases in the last two weeks" combines current, last three days, and last two weeks categories.

Prevalence refers to the frequency with which an illness exists at a particular time for a particular group. The term "point prevalence" indicates the number of cases on a given day. Table IV-1 displays point prevalence as well as prevalence figures for broader time intervals by wave and time interval. Waves 4 and 5 are omitted because a change in the way data were collected in those periods does not permit direct comparisons with other waves.

As Table IV-1 indicates, the point prevalence -- proportion of children having diarrhea on the day of the interview -- for all sites combined is 12%. This is comparable to previous data from the MMHP evaluation. In fact, the data for all time intervals are highly consistent over time, if one compares figures within the same season (i.e., compares rainy season to rainy season). The number of diarrhea cases varies by

Table IV-1. Prevalence by Elapsed Time: Cumulative % of All Children Having Had Diarrhea At Least Once in Time Interval

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|-----------------------------|--|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|---------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5 & 6/87 | | | | |
| Interval (Cumulative) | (rainy) | (dry) | (rainy) | | | | (rainy) | | | |
| Day of interview | 15% | 10 | 14 | * | * | * | 11 | 9 | 14 | 12 |
| Within 3 days | — | — | — | | | | 21 | 20 | 24 | 22 |
| Within 14 days (2 weeks) | 36 | 22 | 35 | | | | 36 | 34 | 36 | 36 |
| Within 28 days (4 weeks) | — | — | — | | | | 46 | 45 | 46 | 46 |
| Within 180 days (6 mos.) | 56 | 45 | 62 | | | | 59 | 57 | 64 | 61 |
| N of cases | (1059) | (977) | (731) | | | | (771) | (424) | (1069) | (2264) |
| | * The way that data were collected in Waves 4 and 5 does not permit computation of prevalence rates. | | | | | | | | | |

season, increasing from May through August, the months of greatest rainfall. On the basis of these data we would conclude that the prevalence of diarrheal disease in Honduras has not changed since 1981.

The figures are also consistent with those collected by the Honduran Ministry of Public Health for a three-day recall period. The 1984 *Maternal-Child Health and Family Planning Survey* cites a prevalence rate of 20% for that time interval, compared with the Resurvey figure of 22%.

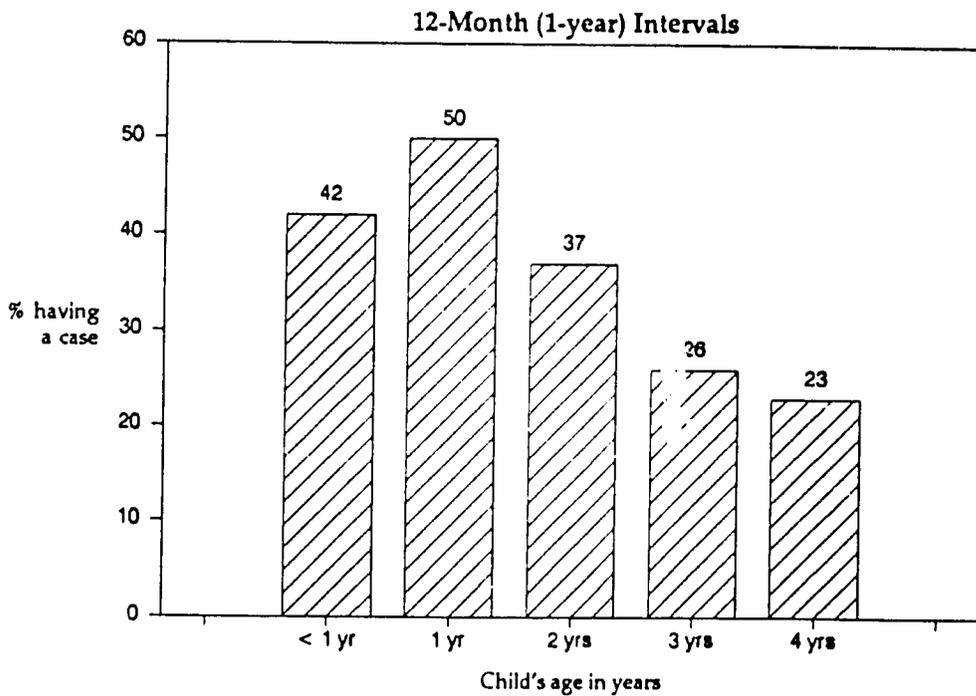
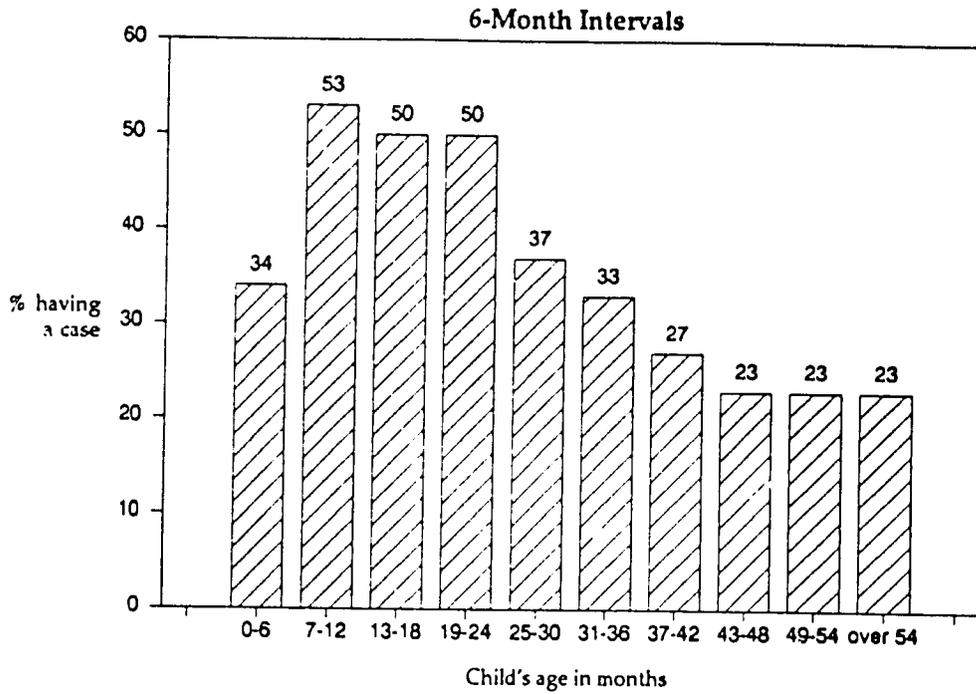
Overall, 36% of children had experienced a case of diarrhea within two weeks prior to the interview, and 61% within six months. However, the prevalence of diarrheal disease varies as a function of child's age, with children six to ninety-four months the most vulnerable. Figure IV-1 demonstrates that variability by examining two-week prevalence rates by six-month and one-year age categories.

We also investigated prevalence of diarrhea by locale -- that is, whether the child resided in the *cabecera* ("county seat") or outside, in the rural areas, as a kind of urban-rural comparison. It should be noted, however, that there are no true urban dwellers in this study, as Tegucigalpa and San Pedro Sula were not included in the sample. *Cabeceras* are only urban in comparison with more isolated areas in that they are more likely than smaller communities to have electricity and some other amenities. *Cabeceras* share more characteristics with rural areas than they do with areas typically considered urban.

The rates for the two-week interval for rural and *cabecera* residence are 40% and 36% respectively, a difference which is not statistically significant. Other studies do find urban/rural differentials in prevalence; however, in contrast to the Resurvey, those studies include highly urbanized areas in their sample. For example, using a three-day time interval, the 1984 Maternal-Child Health and Family Planning Survey for Honduras found rates of 16% for the urbanized areas of Tegucigalpa and San Pedro Sula, 21% for "other urban," and 21% for rural areas. The Resurvey sites are equivalent to the Ministry's "other urban" and "rural" categories, and the rates are essentially identical. For the three-day period Resurvey rates are 23% (*cabecera*) and 22% (rural).

In summary, the rate of morbidity from diarrheal disease has not changed since the early 1980s when the MMHP evaluation began collecting data. Prevalence of diarrhea is high, with 12% point prevalence, 36% two-week prevalence, and 61% six-month prevalence. These rates are consistent across time and consistent with prevalence rates found in other studies.

**Figure IV-1. Prevalence of Diarrhea by Age Group
% Having a Case Within Two Weeks Prior to Interview**



CHAPTER V: MEASURING ORS USE

In this section we examine some of the conceptual issues involved in measuring rates of ORS use. Each choice of measurement provides a different estimate of ORS use; interpretation of data associated with different definitions of use is made more precise by an understanding of the implications of a given definition. In this chapter we discuss some of the considerations involved in selecting a definition of ORS use. Specific statistics associated with different ways of looking at ORS use are then presented in the following chapter.

Several factors enter into consideration of how to measure the extent to which mothers turn to ORS as a response to diarrheal episodes in their children: the definition of what constitutes "use," the level of measurement, and the length of the recall period. In the Resurvey we use as the primary indicator of ORS use the percentage of cases occurring in the two weeks prior to the interview which have been treated with ORS. In the section below we examine the rationale for and ramifications of this measurement choice.

DEFINING ORS USE

What constitutes an ORS user? Is a user someone who has (ever) tried ORS? Someone who uses it to treat a certain percentage of episodes? Someone who has used it within a given period of time? Someone who used it for the last case of diarrhea? The statistic indicating number of users varies considerably depending on which definition one adopts.

The Resurvey contains four kinds of measures of ORS use:

- (1) a mother who had a child who had a case of diarrhea within six months of the interview was asked about treatment of that case to see if ORS was administered;
- (2) a mother who didn't use ORS to treat a case occurring within six months (either because she didn't treat her child's case with ORS or because she didn't have the opportunity to treat) was asked if she had ever used the packets in the past;
- (3) a mother who had ever used ORS was asked how many packets she had used in the past year; and
- (4) all mothers were asked to categorize themselves as someone who almost never uses, sometimes uses, or almost always uses ORS to treat diarrhea.

The combination of the four measures taps two dimensions of ORS use: one is cross-sectional, based on whether or not a child's last case of diarrhea was treated with ORS, and the other is an over time dimension based on frequency of use. As a cross-sectional study¹⁴ the Resurvey produces the most reliable information about current case-linked practice; behavior over time cannot be directly measured as it can in a longitudinal study. Nonetheless, the latter two measures -- (3) and (4) -- attempt to estimate frequency or consistency of use. Each individual measure provides a view of ORS use from a different "angle," and carries with it certain limitations and caveats for interpreting its associated data.

The first measure -- whether a particular case was treated with ORS -- is probably the most reliable indicator of current behavior, since it is linked to recent action undertaken in response to a given episode. However it applies to only a subset of mothers: only those whose child had a recent case of diarrhea. This means that for analyses of cases occurring within two weeks of the interview, we are dealing with 45%

¹⁴ Although the resurvey data will be compared with the MMHP longitudinal data, the mothers interviewed in the Resurvey are not the same as those who participated in the MMHP study. The Resurvey sample is, however, comparable to the MMHP sample in that the resurvey mothers were selected using the same procedures employed to obtain the MMHP group. See section on sampling for an explanation of procedures and rationale for selecting a new but comparable sample.

of the mothers, and 36% of the children. The analogous six month figures are 72% and 61% respectively. Furthermore, a mother who frequently uses ORS may not have done so for the most recent episode, for various reasons. For example, the child may have recovered spontaneously within a day or two without requiring special attention, or the mother may have tried to obtain packets and found that they were unavailable. Such mothers would be classified as non-users according to this case-based definition. In other words, with cross-sectional data we cannot look at a mother's "track record" of use in order to classify her as a user or non-user. Instead we base classification on her actions with regard to a specific case, which may not have received treatment with ORS even though the mother does in fact frequently use it.

The second indicator, whether a mother has *ever* used ORS, permits computation of the percent of all mothers in the sample who have ever tried ORS -- whether they used it just once or regularly. This measurement is the broadest indicator of diffusion and is most accurate as a measure of rate of trial usage rather than rate of active use.

The third and fourth measures -- number of packets used in the past year and frequency-of-use classification -- attempt to add the dimension of mother's *rate* of ORS use, although because these measures depend on subjective assessments their reliability might be questioned. We do not know how accurately a mother can recall the number of packets she has used in a year's time, and we do not know how many episodes she was required to attend to in that period. When mothers are asked to categorize themselves with regard to consistency of use, we do not know to what extent mothers have the same conception of what constitutes frequent or infrequent use. It is encouraging, however, that the correspondence between all ORS use measures is extremely high, suggesting that, in Honduras at least, subjective measures of use can be developed and used with a fair degree of confidence.

LEVEL OF MEASUREMENT

ORS use can be approached from the standpoint of the percentage of *mothers* who use ORS, or the percentage of diarrhea *cases* treated with the rehydration solution. A given mother may have had multiple opportunities to treat, and have responded differently to those opportunities. The former measure (mother-based) is most suited to analyses of factors associated with the mother and household which may influence ORS use. These might include socioeconomic status, distance from the health center, or mother's age or level of schooling. Measurement of case treatment rates, on the other hand, permits examination of the episode-specific factors (particularly severity indicators) which prompt a given treatment response. In the Resurvey, both mother-based and case-based measures are used, depending on the analysis. The mother-based definition indicates the percentage of mothers who, given the opportunity to treat a case in a given time period, administered ORS. If a mother had two youngsters with diarrhea and only one was treated with ORS, the mother is counted as a user in this definition. The case-based definition indicates the percentage of cases within a defined time period which were treated with ORS at any point during the episode.

LENGTH OF RECALL PERIOD

It is thought that the length of recall period used can affect reporting of ORS use, with higher rates tending to be associated with longer recall periods. The assumed explanation for this phenomenon is systematic error which results from mothers remembering the more severe cases, which, in turn, are those cases more likely to be treated with the rehydration solution.

The Resurvey data, however, do not display the expected recall bias. With the exception of the shortest recall period, the rates for different time periods are nearly constant. Table V-1 presents reported rates of ORS use for different time intervals. (The categories in the table are exclusive, not cumulative.) The percentages do not

follow the expected pattern of progressively increasing as the recall period becomes more distal. Note, for example, that the use rate for cases occurring 2-3 days prior to the interview is 55%, while it is 50% for cases 4 to 14 days in the past. This suggests that, with the exception of current case treatment rates, reported use is not much affected by the "distance" of the recall period.

Table V-1. Reported ORS Use by Recall Period

| Recall Period | % | N |
|--|-----|------|
| Current cases treated with ORS | 30% | 270 |
| Cases in last 3 days treated with ORS (excluding current cases) | 55 | 224 |
| Cases in last 2 weeks treated with ORS (excluding last 3 days) | 50 | 317 |
| Cases in last 4 weeks treated with ORS (excluding last 2 weeks) | 56 | 227 |
| Cases in last 6 months treated with ORS (excluding last 4 weeks) | 58 | 340 |
| N of cases | | 1338 |

It is not clear why there is such a big jump in reported ORS use between current episodes and those terminating within 3 days of the interview -- a leap from 30% to 55%. One potential explanation is that current episodes include a significant proportion of "truncated cases," which would result in an underestimate of ORS use. A truncated case is one which has not yet ended. Some of these cases *will* be treated with ORS before they end, but have not yet been treated. Cases which have not yet ended and may be treated with ORS in the days following the interview are counted in the data as untreated cases. The shorter the recall period, the greater the proportion of truncated cases it will include, and the more it will underestimate the true case treatment rate.

An investigation of the impact of truncated cases on the estimate of treatment rates for children sick on the day of the interview was conducted by excluding cases of less than three days' duration from the analysis. It finds that the effect of truncated cases only partially accounts for the treatment rate difference between ongoing episodes and those which terminated within three days of the interview. Excluding current cases of recent onset from the analysis still does not bring treatment rates for current cases up to anywhere near the levels reported for the other recall categories. Among current cases of three or more days' duration, ORS treatment rates are 36%, still far below the 55% reported for episodes which terminated within 3 days of the interview.

What, then, are the tradeoffs for different "cut off" periods? In the interest of validity, a given case about which detailed information is to be obtained should be recent enough to minimize being tainted by faulty recollection. On the other hand, a very short recall period may underestimate ORS use if it includes a number of truncated cases (which may receive ORS treatment at a later date). In other words, a recall period which is comprised of a significant proportion of current cases may be biased since it includes cases to which a mother has not yet been given a "chance" to respond by administering ORS. Using a short recall period as the basis for analysis also has the disadvantage that the size of the sample becomes small and makes it difficult to gain statistical power in multivariate analyses.

DEFINITIONS OF ORS USE EMPLOYED IN THIS REPORT

This Chapter reviewed several approaches to the measurement of ORS use. The standard definition of ORS use employed in this report is a case of diarrhea occurring in the two weeks before the interview receiving treatment with ORS. This definition reflects a degree of active and current ORS use through its limited time frame and case-specific behavioral reference. We employ this definition when examining the use of ORS by case- or child-related characteristics (such as severity, age of child, etc.) The second most-frequently used definition in this report is the mother-based definition -- whether a mother who had a child with a case in the two weeks prior to the

interview treated with ORS. It is derived from the first definition, and therefore carries the same characteristics and advantages as the first. However, mother-based use rates will be slightly higher than case-based rates, as some mothers will have had multiple opportunities to treat, and ORS use associated with any one of those opportunities classifies her as a user. The mother-based definition is most suitable when ORS use is examined in terms of characteristics of the mother or of the household, as when, for example, the association between ORS use and mother's exposure to the campaign or her knowledge is explored.

The two measures of *rates* of use (user self-classification and number of packets used in past year) will be used for descriptive purposes only, and are not employed in any bivariate analyses.

Although the standard recall period used in this report is two weeks, occasionally a recall period of six months will be employed for comparative purposes, especially in sections on prevalence and treatment rates, where prior data were reported for both time intervals.

It should be recognized that none of these definitions implies that the episode was fully and correctly treated with ORS. "Use" means simply that ORS was used at any point during the episode, and does not necessarily mean that the solution was given every day it was needed, or that the full amount was given, or that a properly-mixed solution was administered. These considerations are measured and reported on separately.

CHAPTER VI: RATES OF ORS USE

In the previous chapter, some of the conceptual issues involved in measuring ORS were discussed and a variety of ways that ORS use can be defined were delineated. This chapter cites the specific data associated with those measures, which can be thought of as a series of estimates of actual rates of use.

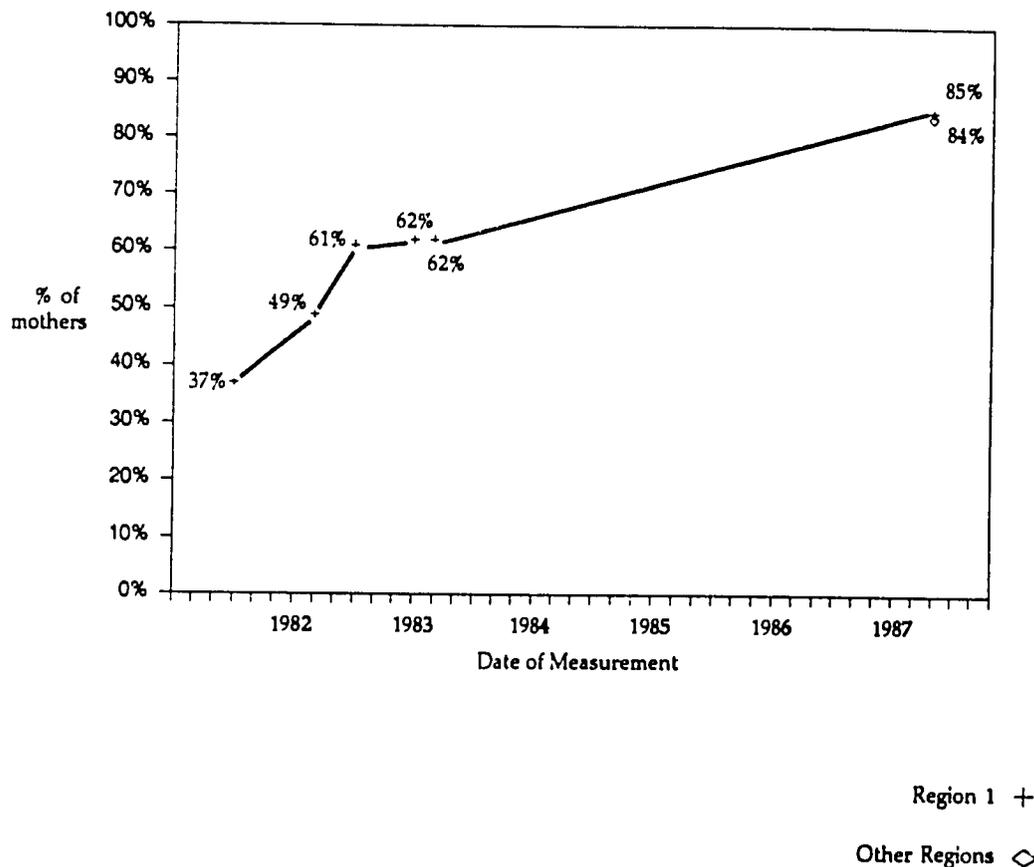
The picture with regard to ORS use in Honduras is positive. All ORS measures included in the Resurvey indicate high levels of awareness, trial usage, and acceptance as a treatment for infant diarrhea. Most measures of ORS use taken in mid-1987 are higher than at the end the MMHP intensive campaign in mid-1983. The statistics associated with various measures of use outlined in the previous section are presented below. For communities included in the original MMHP evaluation, comparisons with past data are made. Cross-sectional comparisons between Region 1 communities (where the MMHP pilot was implemented) and those outside Region 1 (where ORT was promoted by the subsequent national program) are also made.

RATE OF ORS TRIAL USAGE

The campaigns have been able to achieve nearly universal awareness of Litrosol nationwide and have fostered an exceptionally high rate of trial use. Virtually all mothers (99%) say they have heard of Litrosol, and the great majority (85%) indicated that they have used it at least once. There is no difference between Region 1 and other Regions in this regard: 85% of women in Region 1 and 84% in other Regions said that they had used ORS at some point in the past. Awareness of ORS cannot be compared to past levels, since mothers who participated in the MMHP evaluation received multiple interviews and were made aware by the fact of inclusion in the

sample. At 85% the rate of trial use is significantly¹⁵ higher than the 61% who had tried Litrosol in 1983 ($p < .0001$)¹⁶. Figure VI-1 and Table VI-1 show the increase over time in the proportion of mothers who have ever tried Litrosol.

*Figure VI-1. Honduran Mothers Trying Litrosol
(Percent of Mothers Who Have Ever Tried It)*



¹⁵ Throughout the data presentation, "significance" refers to statistical significance as measured by the appropriate statistical test, and uses an alpha of .05 as the criterion level.

¹⁶ This report cites actual p-values rather than probabilities below a given criterion level. The exceptions are cases where p remains at zero to the fourth decimal place ($p = .0000$); for the sake of accuracy we cite these values as $p < .0001$. The p-value refers to the probability of obtaining a difference as great as that observed if the true difference is actually zero, and is based on calculation of the chi-square statistic.

Table VI-1. Percentage of Mothers Who Have Ever Used ORS, by Wave

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|---|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|---------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| Ever used ORS | 37% | 49 | 61 | 62 | 62 | 47 ¹ | 83 ^{2,3} | 89 ⁴ | 84 | 85 |
| N | (309) | (286) | (290) | (282) | (361) | (218) | (462) | (262) | (679) | (1403) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

The graph shows that trial use of Litrosol rose sharply in the first year of MMHP, and has climbed at a slower rate since. The early measurements (1981-1983) are from Region 1 only, as they were taken during the longitudinal evaluation of the MMHP campaign, which was implemented as a pilot project only in Health Region 1. The Resurvey data points therefore distinguish between Region 1/non-Region 1 sites.

CASE-BASED RATES OF ORS USE

It may be recalled that 36% of children (811 out of 2264) in the sample households had experienced a case of diarrhea within the two weeks prior to the Resurvey

interview. Mothers of these children were asked a detailed set of questions regarding how the case was treated, including, of course, whether the case was treated with Litrosol or other oral rehydration solutions. During MMHP Litrosol was the only available rehydration solution, and the evaluation asked specifically about use of Litrosol. Currently other solutions are available commercially, both in packet and liquid form. In the Resurvey we counted use of any rehydration solution as "treating with ORS." As noted earlier, Litrosol is universally known, and it is certainly by far the most commonly used of all ORS solutions.

Depending on the specific comparison being made, rates of treatment with ORS have been maintained or have risen since 1983. The following sections give overall case treatment rates and rates by specific subgroups.

Since ORS use is of central interest in this study, and since case-based measures constitute our principal definition of use, a large number of tables are included in this chapter. They look at case treatment rates among the standard measurement groups and among individual sites. They also present breakdowns of ORS use by a number of background variables (eg., age and sex). Where prior data are available, over-time measurements are displayed. Otherwise, cross-sectional data based only on the Resurvey are presented. Unless otherwise noted, case treatment rates are based on a two-week recall period and indicate the percentage of cases of diarrhea occurring within that interval which were treated with an oral rehydration solution.

Overall case treatment rates

The Resurvey data indicate that in mid-1987, 45% of the diarrhea cases nationwide occurring in the two weeks before the interview were treated with the rehydration solution. The nationwide case treatment rate of 45% for the two-week recall period couches regional differences, however. Region 1, the site of the intensive MMHP campaign, shows a higher proportion of cases involving ORS use than other regions: 49% versus 40% ($p=.0152$). This means that although equal proportions of mothers

within and outside of Region 1 have tried ORS packets (as reported above), mothers in Region 1 are more active users. The difference is moderate, however; the national Diarrheal Disease Control Program through which mothers residing outside Region 1 learned about ORT has achieved considerable success in its promotion of Litrosol.

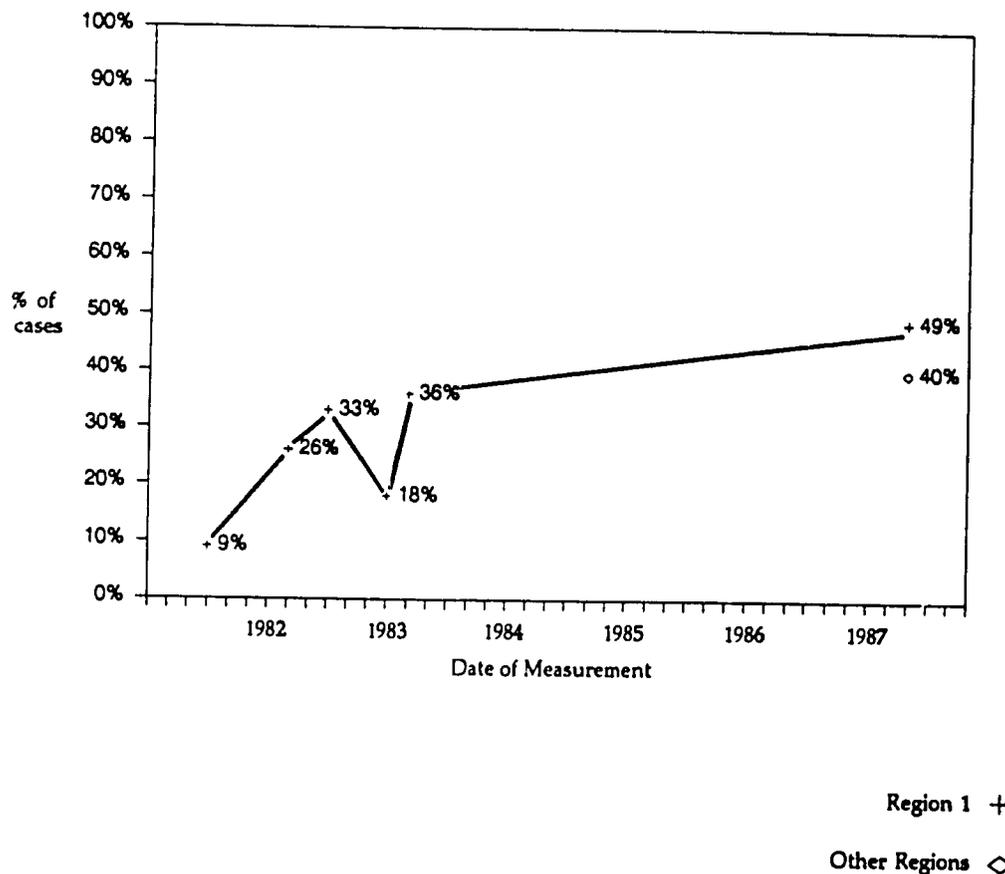
Table VI-2 shows treatment rates across time for all of the measurement groups using the two-week recall period as well as the six-month period. In the communities included in the original panel study (Yuscarán and Sabanagrande), the case treatment rate is 47%, which is at least as high as the 1983 level of 36% (difference is non-significant, $p=.0812$). In these multi-measure communities, rates of Litrosol use rose

Table VI-2. Percent of Cases of Diarrhea Treated With ORS by Wave

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---|-----------------|-----------------|----------------|-----------------|----------------------|------------------------------|------------------------------|------------------------------|------------------|
| | Region 1 | | | | | | | | | |
| | Multi-Measure Communities | | | | | Single-Measure Comm. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | | 5/87 | | | |
| Used Litrosol for any episode within last 2 weeks | 9% (35/381) | 26 (55/210) | 33 (84/252) | 18 (22/122) | 36 (35/98) | 26 (5/19) | 47 ² (129/277) | 53 ⁴ (78/146) | 40 ⁶ (156/388) | 45 (363/811) |
| Used Litrosol for any episode within last 6 months | 9 (51/591) | 36 (160/444) | 39 (175/453) | 30 (79/267) | 44 (119/268) | 38 (32/85) | 51 ² (232/451) | 54 ⁴ (132/243) | 47 (323/684) | 50 (687/1378) |
| | Key: The chi-square is significant at \leq the .05 level between: 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | |

rapidly during the first year of the campaign, and, with the exception of an anomalous dip in reported use in Wave 4, has been maintained, if not increased, in the intervening years. Figure VI-2 depicts this pattern by graphing case treatment rates over time. If we examine Region 1 as a whole (including the comparison community of Morocelí which was measured only once during MMHP at the end of the intensive campaign and then again in the Resurvey), current rates are significantly higher than in 1983 (49% vs. 34%, $p=.0063$).

*Figure VI-2. ORS Case Treatment Rates in Honduras
(Percent of Diarrhea Cases Within 2 Weeks Prior to Interview)*



Treatment rates for all cases up to six months prior to the interview (cumulative) reflect similar trends since 1983. (See Table VI-2.) In the multi-measure communities, mothers currently report using ORS in 51% of the cases, compared with 44% in 1983, a difference which is not statistically significant ($p=.0804$). In the single-measure communities clustered around Morocelí, six-month rates have risen significantly from 38% in 1983 to a current reported rate of 54% ($p=.0117$). Overall, mothers report using ORS for 50% of cases occurring in the six months before the interview. As discussed in Chapter V, higher rates of use associated with longer recall periods are probably due to mothers' recalling the more serious cases which, in turn, are more likely to receive treatment with ORS. In this study, the difference between the two week rate (45%) and the six-month rate (50%) is small.

Table VI-3 breaks down treatment rates by individual site for the standard two-week recall interval. The sites included in the MMHP evaluation of the original campaign are Danlí, Sabanagrande, and Yuscarán, and complete longitudinal data for the duration of the pilot campaign are available for these counties. Resurvey data are available for Sabanagrande and Yuscarán; Danlí is excluded from the Resurvey for logistical reasons. Morocelí was measured only once, at the end of MMHP as a "control" against the effect of repeated measurements (see MMHP evaluation design section). Nacaome, Salamá, and San Francisco were not included in the MMHP evaluation, as they are located outside of the pilot area, but are measured in the Resurvey as an indicator of the impact of the national ORT campaign.

As Table VI-3 indicates, Resurvey treatment rates for the two-week recall period vary considerably by site, ranging from a low of 31% in Salamá to a high of 55% in Nacaome ($p=.0001$). Both of these sites are located outside of Region 1 where ORS is promoted by the national campaign. The substantial variation in ORS use rates by site could reflect differential implementation of the national program such as uneven distribution of packets, training of health workers, or broadcast of radio spots. It could also be due to other factors such as variations in the cultural settings which impede or favor acceptance of ORT.

*Table VI-3. Percent of Cases Treated With ORS by Site by Wave
(Cases Within 2 Weeks Prior to Interview)*

| REGION 1 | MMHP | | | | | HEALTHCOM |
|----------------------|---|-------------|-------------|-------------|-------------|-------------|
| | W1 | W2 | W3 | W4 | W5 | Resurvey |
| Danli* | 15% (145) | 23 (79) | 26 (110) | 16 (44) | 30 (30) | — |
| Sabanagrande | 6 (97) | 39 (41) | 25 (40) | 12 (42) | 39 (31) | 47 (137) |
| Yuscaran | 6 (112) | 27 (71) | 43 (76) | 23 (22) | 46 (22) | 46 (140) |
| Moroceli** | | | | | 26 (19) | 53 (146) |
| OTHER REGIONS | | | | | | |
| Nacaome*** | | | | | | 55 (132) |
| Salama*** | Sites outside of Region 1 were not measured during the MMHP longitudinal evaluation | | | | | 31 (140) |
| San Francisco*** | | | | | | 34 (116) |
| TOTAL | 10 (354) | 28 (191) | 32 (276) | 16 (108) | 35 (105) | 45 (811) |

* Danli was not included in the Resurvey for logistical reasons.

** Moroceli was measured only at the end of the MMHP pilot as a "control" against the effect of repeated measures.

*** Nacaome, Salama and San Francisco were measured only in the Resurvey.

Behavioral validation of ORS use

Because of concern that use of self-report measures might overestimate the actual rate of treatment, an attempt was made in the Resurvey to verify mothers' claims of ORS use. For cases occurring on the day of the interview that were reportedly in treatment with ORS, the interviewer asked to see the solution being used. One would expect that for most cases in treatment, a container of ORS would be present. For some

cases that were actually in treatment the solution would not be available to show -- if, for example, a mother had mixed less than a liter's worth and already given it to the child.

It should also be noted that a current case could also have been treated with ORS during the previous day(s) -- meaning that the solution would not be available to show, even though the case would be counted as having been treated with ORS. Similarly, the case could receive treatment in the subsequent days, particularly if it worsens. The average diarrheal episode lasts five days, and we know that mothers most commonly administer ORS for only one or two days; therefore we would expect to find 20% to 40% (1 or 2 days out of 5) of current cases which have been treated with ORS actually in treatment on a given day. Thus, this behavioral verification measure will always underestimate the true level of treatment.

Table VI-4 gives the figures associated with the behavioral validation questions. Since their interpretation involves a number of considerations, we lead the reader through the figures one at a time:

- (1) Interviewers found a total of 270 children who had diarrhea on the day of the interview. Of those, 30% (82) had reportedly received ORS some time during the episode. Considering that current cases include some proportion of incipient illnesses (begun in the day or two before the interview) which are as yet mild and untreated, this is about the rate we would expect, given the overall treatment rate of 45% reported for the two-week recall period.
- (2) Of those cases which had been treated with ORS, 29% (24) were reportedly in treatment on the day of the interview. This is a reasonable figure, considering that we expect 20% to 40% of cases (one or two days out of a five day episode) which were actually treated to be in treatment on a given day.
- (3) The interviewer asked those 24 mothers to see the solution; half of them (12) showed the ORS solution to the interviewer. Even though we would expect some

mothers to be unable to show the solution for valid reasons, this is a low proportion of mothers providing verification of their claims, and suggests that mothers reports are producing over-estimates of actual use.

Table VI-4. Behavioral Verification of ORS Use

| Reported and verified use | N | % of previous category |
|--|-----|------------------------|
| Number of cases on day of interview (current cases) | 270 | (N.A.) |
| Number of current cases reportedly treated with ORS | 62 | 30% |
| Number reportedly giving ORS on day of interview | 24 | 29% |
| Number of mothers who showed solution to interviewer | 12 | 50% |

As noted above, behavioral verifications will always underestimate true use. Thus, while the percentage of cases that indisputably can be said to be in treatment is 4% (12 out of 270), this represents an underestimate by an unknown amount of the cases actually treated with ORS.

Case treatment rates by background variables

In an effort to begin to sort out some of the factors associated with ORS use, in this section we examine case treatment rates by a series of background variables, specifically: locale (rural or *cabecera* residence), sex of child, age of child, characteristics of the case, and perceived cause of diarrhea. Where available, over-time data from MMHP is presented in juxtaposition with Resurvey findings in order to look at any longitudinal trends which may emerge. These longitudinal data are presented in Tables VI-5 through VI-9. Then Table VI-10 presents a summary of Resurvey data alone showing ORS use by each of the background variables.

Table VI-5. Percent of Cases Treated With ORS by Type of Community by Wave
(Treatment of Cases in Past Two Weeks)

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|------------------------------|-----------------------------|------------------------------|-----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| County seat | 4% (3/70) | 0 (0/32) | 7 (2/27) | 8 (1/13) | 33 (5/15) | 0 (0/0) | 35 (25/72) | 46 ⁴ (12/26) | 34 (23/71) | 36 (60/169) |
| Rural | 10 (32/311) | 31 (55/178) | 36 (82/275) | 19 (21/109) | 36 (30/83) | 26 (5/19) | 51 (104/205) | 55 (66/120) | 42 ⁶ (133/317) | 47 (303/642) |
| TOTAL | 9 (35/381) | 26 (55/210) | 33 (84/252) | 18 (22/122) | 36 (35/98) | 26 (5/19) | 47 ² (129/277) | 53 ⁴ (78/146) | 40 ⁶ (156/388) | 45 (363/811) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

Urban/rural case treatment rates: Throughout MMHP a higher proportion of cases in the rural areas was treated with ORS than were cases in the *cabeceras*, or county seats. This trend continued in the Resurvey, with 47% of rural cases treated versus 36% in the *cabeceras* ($p=.0085$). (See Table VI-5 and Table VI-10.) We surmise that mothers in the *cabeceras* are more likely to have easy access to a health facility and therefore do not so readily administer what may be perceived as a "home remedy." Mothers in the more remote areas may have fewer treatment options and therefore may turn to ORT more frequently.

Case Treatment Rates by Child's Sex: As Table VI-6 shows, the MMHP data appears to indicate that the sex of the child does not influence whether a given case is treated with ORS. Overall Resurvey data also show independence of sex and ORS use, although, anomalously, in the multi-measure communities of Sabanagrande and Yuscarán, boys receive the rehydration solution more frequently than girls do, at comparative rates of 54% to 38% ($p=.0081$). We can offer no plausible explanation for this finding. Other sites do not exhibit preferential treatment for males.

Table VI-6. Percent of Episodes of Diarrhea Treated With ORS by Sex by Wave (Cases Within Two Weeks Prior to Interview)

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|-------------------------------|-----------------------------|------------------------------|-----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| Females | 10% (17/173) | 26 (20/77) | 28 (29/103) | 21 (8/28) | 46 (16/35) | 20 (2/10) | 38 ² (50/132) | 56 ⁵ (46/82) | 42 (83/200) | 43 (179/414) |
| Males | 10 (18/181) | 29 (33/114) | 35 (43/123) | 13 (9/70) | 31 (16/51) | 33 (3/9) | 54 ^{2,3} (79/145) | 50 (32/64) | 39 ⁶ (73/188) | 46 (184/397) |
| TOTAL* | 9 (35/381) | 26 (55/210) | 33 (84/252) | 18 (22/122) | 36 (35/98) | 26 (5/19) | 47 ² (129/277) | 53 ⁴ (78/146) | 40 ⁶ (156/388) | 45 (363/811) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

* Total includes cases for which gender information is missing.

Case Treatment Rates by Child's Age: ORS use by age of the child was examined in order to determine whether certain age groups are more likely to receive treatment

than others. Table VI-7 shows the percentage of children treated with ORS by age group (using one-year intervals) by data collection wave. With the exception of the final MMHP data collection cycle (wave 5), children under two years of age are consistently administered ORS more frequently than older children. The chi-square associated with ORS use broken down by one-year intervals does not quite reach significance ($p=.0632$); however, when age is dichotomized into "under-twos" and "over-twos," a significant difference emerges ($p=.0122$).

Table VI-7. Percent of Cases of Diarrhea Treated With ORS by Age and by Wave (Cases Within 2 Weeks Prior to Interview)

| Age in Months: | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|------------------------------|-----------------------|------------------------------|-----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| 0 - 11 | 4% (8/88) | 35 (14/40) | 35 (9/26) | 32 (7/22) | 32 (8/25) | * | 42 ² (27/64) | 46 (15/33) | 48 (42/87) | 46 (84/184) |
| 12 - 23 | 12 (11/93) | 27 (13/48) | 41 (20/49) | 17 (5/29) | 38 (9/24) | | 54 ² (45/84) | 64 (27/42) | 46 (52/114) | 52 (124/240) |
| 24 - 35 | 10 (6/62) | 27 (10/37) | 29 (15/52) | 8 (2/25) | 46 (6/13) | | 51 ² (28/55) | 50 (13/26) | 33 ⁶ (30/91) | 41 (71/172) |
| 36 - 47 | 8 (4/50) | 21 (5/24) | 31 (11/35) | 17 (2/12) | 50 (7/14) | | 39 ² (18/46) | 50 (11/22) | 40 (21/53) | 41 (50/121) |
| 48 | 10 (6/58) | 27 (11/41) | 27 (17/64) | 5 (1/20) | 20 (2/10) | | 39 ^{2,3} (11/28) | 52 (12/23) | 26 (11/43) | 36 (34/94) |
| TOTAL | 10 (35/351) | 29 (53/190) | 32 (72/226) | 16 (17/108) | 37 (32/86) | 38 (5/13) | 47 (129/277) | 53 (78/146) | 40 ⁶ (156/388) | 45 (363/811) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

* There are too few cases in this group to permit a meaningful breakdown into subgroups.

The association between age and ORS use is not surprising, as diarrheal illness among children under two years old is both more prevalent (see Chapter V) and more severe than for older children. This is particularly true for the subset of children of weaning age -- those from six months to two years old. Infants who are being fed breastmilk exclusively are not exposed to the food and water sources of contamination which are often the source of diarrheal agents for the child who has been weaned. This is one reason why breastfeeding promotion is an important component of oral rehydration therapy programs.

Case Treatment Rates by Characteristics of the Episode: Mothers who had a child with a recent case of diarrhea were asked about the characteristics of the episode in order to assess its severity. Mothers were asked how many days the diarrhea lasted, the number of stools on the worst day, whether the child had fever, vomited, lost appetite, and whether there was blood in the stool. In addition, mothers were asked whether they considered the episode to be light, moderate, or severe.

Table VI-8 displays the percentage of diarrheal episodes presenting a given characteristic in each data collection wave. The figures are fairly stable over time, and Resurvey figures for all of the characteristics fall within the MMHP ranges. There does appear to be a slight difference between MMHP and the Resurvey in the proportion of cases which mothers assess as light, moderate, or severe. In general, in MMHP, about 1/3 of the cases fell in each category. In the Resurvey, about 1/2 of the cases are judged as light, with only about 1/4 termed moderate and 1/4 severe.

Data were gathered on severity indicators in order to determine which case characteristics were associated with ORS use. While the MMHP evaluation found that case characteristics were only occasionally and sporadically related to ORS use, in the Resurvey all indicators are strongly associated with ORS treatment. (Lack of relationship in the MMHP study may be due, in part, to the smaller sample sizes.) Table VI-9 displays rates of ORS use by case characteristic over the course of the campaign. It should be noted that while duration of episode does not exhibit statistical significance when dichotomized into cases less than five days and cases five or more

*Table VI-8. Indicators of Case Severity by Wave
(Cases Within Two Weeks Prior to Interview)*

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|---------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| Lasted more than 5 days | 33% | 35 | 40 | 33 | 29 | 26 | 24 | 12 | 24 | 22 |
| More than 6 loose stools on worst day | 29 | 26 | 30 | 29 | 1 | 59 | 30 | 22 | 26 | 27 |
| Fever | 29 | 30 | 46 | 35 | 32 | 32 | 37 | 32 | 33 | 34 |
| Blood in stools | 15 | 18 | 21 | 16 | 22 | 21 | 13 | 16 | 13 | 14 |
| Vomiting | 26 | 23 | 20 | 26 | 25 | 26 | 27 | 25 | 24 | 25 |
| Appetite: | | | | | | | | | | |
| No change | 37 | 45 | 37 | 48 | 40 | 47 | 34 | 38 | 34 | 35 |
| Diminished | 31 | 28 | 27 | 30 | 43 | 53 | 33 | 25 | 33 | 32 |
| No appetite | 32 | 28 | 36 | 21 | 18 | 0 | 33 | 37 | 33 | 34 |
| Mother's perception of severity of bout: | | | | | | | | | | |
| Light | 39 | 33 | 29 | 47 | 30 | 62 | 50 | 47 | 53 | 51 |
| Moderate | 32 | 27 | 32 | 29 | 32 | 13 | 20 | 22 | 26 | 23 |
| Severe | 30 | 40 | 39 | 24 | 38 | 25 | 30 | 31 | 21 | 26 |
| N of cases | (380) | (210) | (248) | (122) | (98) | (19) | (277) | (146) | (388) | (811) |

days, there is nonetheless a strong relationship between length of episode and ORS use in the Resurvey data. The relationship is not borne out in the chi-square based on the five-day dichotomy because the relationship is not linear: neither very short nor very long cases are as likely to be treated with ORS as cases which last three to seven days. The probable explanation for this is that a mother does not deem treatment necessary for a self-limiting bout which terminates in only a day or two, but is prompted to treat a case which continues into the third day. On the other hand, if a mother has not

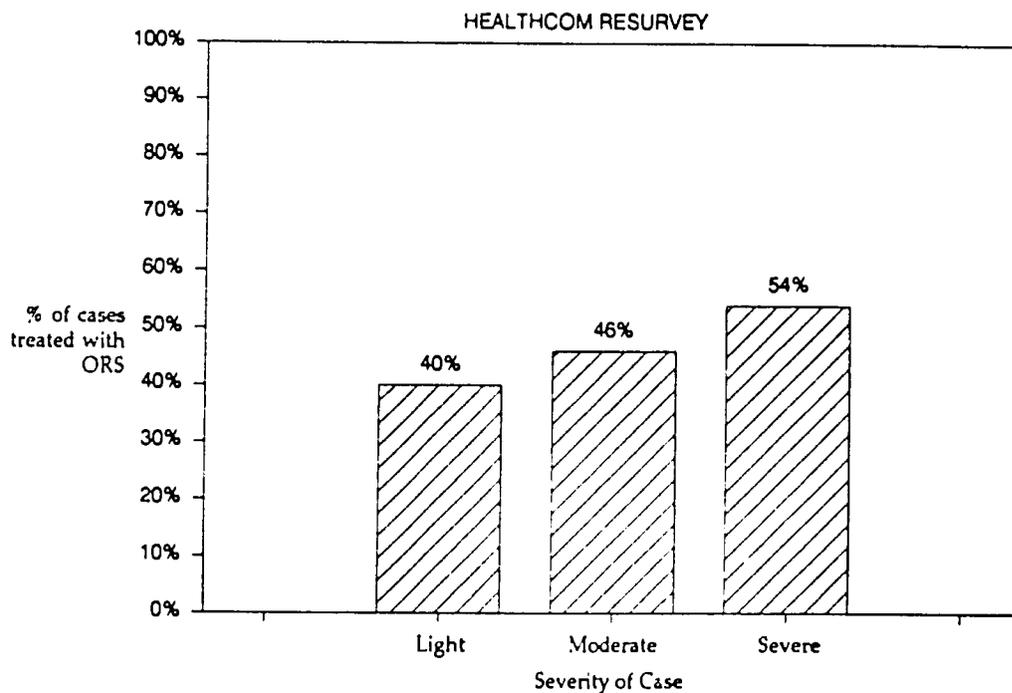
Table VI-9. Percent Given ORS, by Case Characteristic, by Wave
(Cases Within 2 Weeks Prior to the Interview)

| | MMHP Longitudinal | | | | | | | | | | Resurvey | | | |
|--|---------------------------|-----|----------------|-----------|----------------|-----------|----------------|-----------|-----------------------|----|-----------|-----|-----------|-----|
| | Region 1 | | | | | | | | | | | | | |
| | Multi-Measure Communities | | | | | | | | Single-Measure Comms. | | | | | |
| | Wave 1 8/81 | | Wave 2 4/82 | | Wave 3 8/82 | | Wave 4 2/83 | | Wave 5 5/83 | | | % N | | |
| | % | N | % | N | % | N | % | N | % | N | | | | |
| Duration of episode: | | | | | | | | | | | | | | |
| Short (≤ 5 days) | 8% | 259 | 20% | 128 | 30% | 148 | 18% | 82 | 39% | 70 | 7% | 14 | 44% | 631 |
| Long (> 5 days) | 12% | 119 | 33% | 69 | 39% | 100 | 18% | 40 | 29% | 28 | 80% | 5 | 49% | 177 |
| | (N.S.) | | (p=.0652) | (N.S.) | | (N.S.) | | (N.S.) | (N.S.) | | (p=.0061) | | (N.S.) | |
| Fever: | | | | | | | | | | | | | | |
| No | 9% | 268 | 24% | 148 | 33% | 133 | 17% | 79 | 34% | 67 | 15% | 13 | 40% | 534 |
| Yes | 9% | 111 | 32% | 62 | 35% | 115 | 21% | 43 | 39% | 31 | 50% | 6 | 55% | 277 |
| | (N.S.) | | (N.S.) | (N.S.) | | (N.S.) | | (N.S.) | (N.S.) | | (N.S.) | | (p=.0000) | |
| Blood in stools: | | | | | | | | | | | | | | |
| No | 8% | 324 | 26% | 171 | 34% | 197 | 17% | 103 | 33% | 76 | 27% | 15 | 43% | 698 |
| Yes | 15% | 55 | 26% | 38 | 20% | 51 | 26% | 19 | 46% | 22 | 25% | 4 | 56% | 112 |
| | (N.S.) | | (N.S.) | (N.S.) | | (N.S.) | | (N.S.) | (N.S.) | | (N.S.) | | (p=.0118) | |
| Child vomited: | | | | | | | | | | | | | | |
| No | 7% | 282 | 25% | 162 | 31% | 201 | 19% | 90 | 32% | 74 | 21% | 14 | 41% | 606 |
| Yes | 14% | 99 | 31% | 49 | 42% | 50 | 16% | 32 | 46% | 24 | 25% | 4 | 56% | 205 |
| | (N.S.) | | (N.S.) | (N.S.) | | (N.S.) | | (N.S.) | (N.S.) | | (N.S.) | | (p=.0004) | |
| Number of stools: | | | | | | | | | | | | | | |
| Few (≤ 6/day) | 6% | 271 | 25% | 156 | 31% | 175 | 10% | 87 | 36% | 97 | 13% | 8 | 41% | 594 |
| Many (> 6/day) | 18% | 110 | 28% | 53 | 39% | 75 | 37% | 35 | 0% | 1 | 36% | 11 | 54% | 215 |
| | (p=.0002) | | (N.S.) | (N.S.) | | (N.S.) | (p=.0013) | | (N.S.) | | (N.S.) | | (p=.0012) | |
| Appetite: | | | | | | | | | | | | | | |
| Same | 4% | 136 | 25% | 94 | 31% | 91 | 12% | 59 | 40% | 38 | 13% | 8 | 34% | 281 |
| Diminished | 9% | 117 | 24% | 58 | 37% | 67 | 24% | 37 | 29% | 41 | 44% | 9 | 47% | 256 |
| No appetite | 16% | 121 | 31% | 58 | 32% | 88 | 23% | 26 | 47% | 17 | — | 0 | 54% | 274 |
| | (p=.0076) | | (N.S.) | (N.S.) | | (N.S.) | (N.S.) | | (N.S.) | | (N.S.) | | (p=.0000) | |
| Mother's perception of severity of bout: | | | | | | | | | | | | | | |
| Light | 6% | 140 | 16% | 68 | 25% | 67 | 10% | 52 | 27% | 26 | 20% | 10 | 40% | 410 |
| Moderate | 10% | 115 | 29% | 55 | 26% | 76 | 22% | 32 | 25% | 28 | 50% | 2 | 46% | 190 |
| Severe | 11% | 107 | 33% | 91 | 45% | 92 | 30% | 27 | 52% | 33 | 25% | 4 | 54% | 206 |
| | (N.S.) | | (p=.0535) | (p=.0121) | | (p=.0716) | | (p=.0531) | | | (N.S.) | | (p=.0021) | |

given ORS within a week of the onset of diarrhea, she is probably not a user and is unlikely to give ORS, even if the diarrhea persists. In other words, the typical user will administer ORS three to seven days into the episode.

The mother's subjective assessment of the episode -- whether she considered it to be mild, moderate, or severe -- is directly related to the probability that she will treat with ORS. Cases she perceives as mild are the least likely to be treated, whereas cases she judges as severe are most likely to receive treatment with ORS. As Figure VI-3 shows, a rehydration solution was given in 40% of cases mother judged as mild, 46% of cases judged as moderate, and 54% of cases she considered severe. This is a positive finding, as it indicates selective treatment for more critical cases.

*Figure VI-3. Relationship of ORS Use and Case Severity
(Percent of Cases Treated With ORS)*



The mothers assessment appears to be a rather accurate evaluation of the severity of the case. An analysis of the relationship between the objective indicators (case characteristics) and the mother's subjective assessment shows a high degree of

correspondence. If the objective indicators are combined into a seven-point additive scale, with a "point" for the presence of each case characteristic (fever, vomiting, mucus in the stools, listlessness, duration more than three days, five or more stools on worst day), and that scale is correlated with the maternal assessment variable, the resulting correlation coefficient is strong at $r=.53$ ($p<.001$).

Case treatment rates by cause of diarrhea: Diarrheal agents are transmitted primarily by food or water in areas where environmental conditions make it difficult to maintain personal hygiene. In the Resurvey, mothers were asked what was the cause of the case of diarrhea under discussion. Mothers attribute diarrhea to a range of causes which include both scientific and folk explanations. Two of the most common folk etiologies are *empacho*, a kind of indigestion thought to be caused by eating the wrong kinds or combinations of foods or foods that have been improperly cooked; and *ojo*, or evil eye, which results from malicious visual rays penetrating the victim. The hypothesis has been advanced that diarrhea attributed to some causes -- particularly *empacho* -- not be treated with ORS.¹⁷

We investigated ORS use by perceived cause of diarrhea, and found no significant association between attribution of cause and treatment with ORS ($p=.2135$). Table VI-11 shows the percentage of cases treated with ORS by cause. It should be noted that there are very few cases thought to be caused by *empacho* or *ojo*, so it is difficult to draw firm conclusions from these data about treatment patterns for these folk illnesses.

Summary of Case Treatment Rates by Selected Background Variables: The following table summarizes, for Resurvey data, ORS use by the background variables examined in this section of the report (with the exception of "cause", which is shown in the prior table).

¹⁷ See *The Mass Media and Health Practices Evaluation in Honduras: A Report of the Process Evaluation*, by Carl Kendali, available through Applied Communication Technology.

**Table VI-10. Percent of Cases Treated with ORS, by Cause of Diarrhea
(Cases Within 2 Weeks Prior to Interview)**

| HEALTHCOM Resurvey | | |
|--------------------|-----------------|-------|
| Cause of diarrhea | % treated w/ORS | Row N |
| Food | 37% | 145 |
| Water | 67% | 12 |
| Worms | 45% | 158 |
| Microbes | 63% | 8 |
| Teething | 46% | 84 |
| Empacho | 46% | 11 |
| Mal de ojo | 100% | 3 |
| Other | 51% | 61 |
| Don't Know | 44% | 325 |
| | (p=.2135) | |

**Table VI-11. Case Treatment Rates by Selected Background Variables
(Cases Within Two Weeks Prior to Interview)**

| HEALTHCOM Resurvey | | | |
|---------------------------|-------------|-----------------|-------|
| Group | | % treated w/ORS | Row N |
| Region (p=.015') | Region 1 | 49% | 423 |
| | outside R1 | 40 | 388 |
| Locale (p=.0085) | rural | 47 | 642 |
| | county seat | 36 | 169 |
| Sex (p=.4122) | female | 43 | 414 |
| | male | 46 | 397 |
| Age in years (p=.0632) | < 1 | 46 | 184 |
| | 1 | 52 | 240 |
| | 2 | 41 | 172 |
| | 3 | 41 | 121 |
| | 4 | 36 | 94 |
| Severity (p=.0021) | mild | 40 | 410 |
| | moderate | 46 | 190 |
| | severe | 54 | 206 |
| Total | | 45 | 811 |

Number of days ORS is given

The campaign advised mothers to give ORS each day until the diarrhea stops. If ORS has been given for three days and the diarrhea continues, the mother is advised to take the child to the health center.

Mothers tend to give ORS for a much shorter period than the duration of the episode. (The average length of an episode is 4.7 days; the median is 3 days). For cases occurring within two weeks prior to the interview which were treated with ORS, mothers were asked for how many days they gave the solution. (See Table VI-12.) In about 1/3 of the cases children were given ORS for one day, and about 1/3 were treated for two days. Twenty two percent (22%) received ORS for three days. Only 10% of cases were treated for more than three days. These percentages are fairly consistent across time. The mean number of days for which ORS was reported to be administered was 2.3 days, with a standard deviation of 1.5 days.

Table VI-12. Number of Days ORS Was Given

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|----------------|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|---------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| 1 day | 41% | 27 | 43 | 35 | 45 | 25 | 37 | 21 | 38 | 34 |
| 2 days | 33 | 35 | 31 | 38 | 23 | 34 | 33 | 46 | 29 | 34 |
| 3 days | 14 | 23 | 19 | 17 | 19 | 23 | 19 | 26 | 22 | 22 |
| 4 days | 5 | 4 | 2 | 3 | 6 | 5 | 4 | 4 | 5 | 4 |
| 5 or more days | 7 | 10 | 6 | 7 | 7 | 13 | 7 | 4 | 6 | 6 |
| TOTAL % | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| N of cases | 112 | 139 | 173 | 175 | 220 | 100 | 128 | 78 | 155 | 361 |

The Resurvey also asked women how many packets they used for the episode in an effort to gauge whether they were treating at the proper rate of one packet per day. The numbers of packets used closely corresponds to the number of days women reported giving ORS. As noted above, mothers reported giving ORS for an average of 2.3 days (standard deviation 1.5); they also reported using an average of 2.3 packets per illness (standard deviation 1.4). The correlation between the two variables is also high at .71 ($p < .001$). These data indicate that the great majority of women are giving the recommended one packet per day.

MOTHER-BASED RATES OF ORS USE

The previous sections reported case treatment rates, which were based on the 2264 children in the sample, 811 of whom had had a bout of diarrhea within the two weeks prior to the interview. This section reports mother-based rates of use, and looks at the 629 (out of 1403) mothers who had a child who had experienced diarrhea within two weeks of the interview. As a comparative figure we also look at the 1015 mothers who had a child with diarrhea in the previous six months. In other words, the prior section looked at the proportion of cases treated, while this section reports on the proportion of mothers treating with ORS. The data presented are from the Resurvey only, as prior reports examined only the proportion of cases treated rather than proportion of mothers treating with ORS.

As Table VI-13 shows, the mother-based measure of ORS use is somewhat higher than the case-based measure since some mothers had multiple opportunities to treat, and use of ORS for any one of those opportunities classifies her as a user. Forty-five percent (45%) of the mothers had a child with diarrhea in the previous two weeks. Of those mothers, fully half said that they treated at least one case with ORS in that period. In this measure, as in the case-based measures, we find a moderately small but statistically significant regional difference: 54% of Region 1 mothers had used ORS in the previous two weeks, versus 46% of mothers from other areas ($p = .0506$).

*Table VI-13. Mother-Based Measures of ORS Use, by Recall Period
(Among Mothers Who Had a Child With Diarrhea During the Time Period)*

| | HEALTHCOM Resurvey | | | |
|--|--------------------|-------|---------|-------|
| | Region 1 | Other | Total % | Row N |
| Treated with ORS within 2 weeks | 54% | 46%* | 50% | 629 |
| Treated with ORS within 6 months (cumulative) | 57 | 53 | 55 | 1015 |
| Ever used ORS | 85 | 84 | 85 | 1403 |
| * The chi-square is significant at $p \leq .05$ between Region 1 communities and those outside Region 1. | | | | |

Seventy-two percent (72%) of mothers had a child with a case in the six months prior to the interview, and 55% of them said they had used ORS. There were no significant differences between regions for six-month treatment rates: 57% of mothers in Region 1 reported treating with ORS, compared with 53% outside Region 1 ($p=.1800$).

Mothers who treated their child's last case with ORS were just slightly younger than mothers who didn't treat with ORS: users, on average, were 30.4 years old, while non-users were 32.0 years old. There was no difference between users and non-users in the number of years of schooling completed (average 3.2 years). Mothers who used ORS for a recent case tended to have slightly larger families: 7.0 persons in user households, compared with 6.6 persons in non-user households. A greater proportion of rural than *cabecera* mothers were users, at comparative rates of 52% and 42%.

INDICATORS OF USE OVER TIME

The measures of ORS use examined so far -- proportion of recent cases treated and proportion of mothers treating -- are cross-sectional measure and do not describe frequency of use. Since the Resurvey yields cross-sectional data, we cannot obtain accurate estimates of frequency of use in the way that longitudinal studies can. We did attempt to obtain an estimate by asking mothers who said that they had ever tried

ORS two questions: how many packets they had used in the past year, and how frequently they used ORS to treat cases of diarrhea.

The median number of packets used per mother per year was three. It should be noted that among mothers who had ever used ORS, 19% said they had not used any packets in the past year. If these mothers are removed from the sample and only mothers who had used ORS within the past year are included in the analysis, the median number of packets used per mother is six.

An ordinal variable was constructed which categorized mothers into those who used no packets in the past year, those who were low users (1-2 packets), moderate users (3-6 packets) and high users (7 packets or more). As Table VI-14 shows, classification of usage rate on this basis is consistent across measurement groups, with about 23% of mothers saying that they used seven or more packets during the year prior to the interview.

*Table VI-14. Number of Packets Used in the Past Year
(Among Mothers Who Have Ever Used ORS)*

| | HEALTHCOM Resurvey | | | |
|-------------|--------------------|-------|-------|--------|
| | Region 1 | Other | Total | |
| None | 19% | 19% | 19% | (220) |
| 1-2 packets | 20 | 22 | 21 | (241) |
| 3-6 packets | 40 | 34 | 37 | (419) |
| 7 or more | 20 | 25 | 23 | (255) |
| TOTAL | (587) | (548) | 100% | (1135) |

Mothers who had tried ORS were asked to classify themselves according to frequency of ORS use. They were asked, "Some women have decided not to use these packets when their children have diarrhea, while other women use them sometimes, and other women almost always use them when one of their children has diarrhea. Are you someone who rarely uses these packets, sometimes uses them, or almost always uses

them?" According to this self-classification scheme, most mothers (54%) see themselves as frequent ("almost always") users. Thirty percent (30%) say that they sometimes use ORS, and 16% say that they almost never use ORS when treating diarrhea. There was no difference between Region 1 and non-Region 1 mothers in this regard. (See Table VI-15.)

*Table VI-15. User Self-Classification
(Among Mothers Who Have Ever Used ORS)*

| | HEALTHCOM Resurvey | | | |
|-------------------|--------------------|-------|-------|--------|
| | Region 1 | Other | Total | |
| Almost never use | 18% | 15% | 16% | (190) |
| Sometimes use | 30 | 29 | 30 | (349) |
| Almost always use | 52 | 57 | 54 | (641) |
| TOTAL | (617) | (563) | 100% | (1180) |

There is a high degree of correspondence between mothers' reports of the number of packets used in the past year and their self-classification, suggesting that the measures carry an acceptable level of validity. These measures seem to indicate that mothers who do use ORS are "heavy users" -- that is, they do so rather consistently when the need arises.

SUMMARY OF ESTIMATES OF ORS USE

This chapter presented ORS treatment rates associated with different ways of defining use. Each of these rates constitutes an estimate of the true frequency of use. (See Chapter V for a discussion of the strengths and limitations of various definitions of use.) Table VI-16 summarizes the various estimates of ORS use covered in this chapter. We cannot tell which of them is closest to the "true" rate, but most of them are encouragingly high.

Table VI-16. Summary of Estimates of ORS Use

| HEALTHCOM Resurvey | | |
|---|----|-------|
| | % | Row N |
| % of mothers who have heard of Litrosol | 99 | 1403 |
| % of mothers who have ever used ORS | 85 | 1403 |
| % of cases in prior 6 months treated with ORS | 56 | 1378 |
| % of cases in prior 2 weeks treated with ORS | 45 | 811 |
| % of cases in prior 3 days treated with ORS | 42 | 494 |
| % of current cases treated with ORS | 30 | 270 |
| % of current cases where solution is shown | 4 | 270 |
| % of mothers who treated case in prior 2 weeks with ORS | 50 | 629 |
| % of mothers who called themselves frequent users | 46 | 1403 |
| % of mothers who used over 6 packets in past year | 18 | 1403 |

NON-USERS

In addition to finding out who is using ORS and some of the factors associated with use, we were interested in knowing why mothers did *not* use ORS in treating a given case. We therefore asked mothers who did not use ORS for their child's last case why they did not do so. As Table VI-17 indicates, by far the most common reason cited for not treating with ORS was lack of packets. Almost half (47%) of the mothers said that they didn't treat a given case for lack of packets, although we do not know whether this means that they did not happen to have Litrosol in the house at the moment, or whether they tried to get a packet and found none available. The

responses in this category probably represent some combination of actual supply problems as well as the mother's perception that the effort it would take to obtain packets made them effectively "unavailable" -- as would be the case, for example, if getting them entailed an hour's trip to the health center. While there is probably some tendency for mothers to over-report access problems (since it is a socially acceptable reason for not treating), the proportion of women citing packet availability problems is disturbingly high.

*Table VI-17. Reasons Mothers Gave for not Treating a Case with ORS
(Cases Within Two Weeks Prior to Interview Not Treated with ORS)*

| | HEALTHCOM Resurvey | | |
|------------------------|--------------------|---------------|----------------|
| | Region 1 | Other Regions | Resurvey Total |
| Didn't have packets | 46% | 49 | 47 |
| Didn't need ORS | 13 | 12 | 12 |
| Packets expired | 7 | 9 | 8 |
| ORS doesn't cure | 2 | 0 | 1 |
| Other reason | 33 | 30 | 31 |
| Don't know/no response | 1 | 3 | 2 |
| N of cases | 187 | 188 | 375 |

We can shed some light on interpreting the extent of access problems by looking at another question which was asked of all mothers -- not just those who had the opportunity to treat a case. A general question not tied to a specific case simply asked all mothers whether they had ever tried to get a packet and found none available. Twenty-one percent (21%) responded that they had, with more mothers in Region 1

reporting problems (25%) than in other Regions (17%) ($p < .0001$). This is a high proportion, given that the base of mothers from which this is calculated includes some fraction of mothers who never even tried to procure packets. This means that if we were to limit the group only to mothers who had tried to obtain packets, the proportion of unsuccessful attempts would be even higher. This suggests that problems in packet supply are common enough to warrant attention from program implementors.

A related reason given for not treating with ORS is that the packets the mother had available had expired. The granules turn orange and begin to clump together with age or moisture, so an expired packet is in most cases evident to the user. The proportion of women claiming expired packets -- 8% -- is surprisingly high. This may mean either that some women keep packets at home for a long time and use them infrequently, or it may signal a packaging problem in keeping moisture from the salts.

The second most common reason cited for not treating a given case with ORS was that ORS was not needed: 13% felt that the case did not warrant the use of the rehydration solution. About 3/4 of these women judged their child's case of diarrhea to be light, so this response appears to be reasonable.

Very few mothers (1%) said that they didn't use ORS because it doesn't work or doesn't cure diarrhea. This low figure is another tribute to the success of the program, as the reasons cited above for not using ORS for a given case indicate basic acceptance of ORS as a treatment. They are based on temporary conditions rather than rejection of the idea of ORS *per se*.

COMPARING FINDINGS OF THIS STUDY WITH THOSE OF OTHER STUDIES

Case treatment rates found in this study are higher than rates reported in other studies of ORS use in Honduras. For example, a national health survey conducted in 1987,

the *Epidemiology and Family Health Survey*¹⁸, found ORS treatment rates on the order of 18% for a three-day recall period. In comparison, Resurvey case treatment rates for the three-day recall period are 42%.¹⁹

A number of factors contribute to the differences in rates of ORS use found in the national study and the HEALTHCOM Resurvey. Much of the discrepancy can be accounted for by differences in the characteristics of the sample.

1) *The Resurvey sample is not a national sample.* The primary purpose of the Resurvey is to measure the long-range impact of ORT campaigns conducted in Health Region 1 in Honduras. The initial MMHP campaign which was implemented only in Region 1 from 1981 to 1983 was a highly intensive effort, and makes that region atypical with regard to ORT knowledge and behaviors. Case treatment rates are higher in Health Region 1 than in the other Health Regions measured in the Resurvey. By design, half of the Resurvey sample was drawn from Region 1; this compares with only 9% of the mothers participating in the National Survey sample who reside in Region 1. Since we know that Region 1 mothers use ORS more frequently than other mothers, and since Region 1 mothers comprise half of our sample, treatment rates in this study will be higher than rates drawn from a national random sample.

2) *The Resurvey sample is essentially rural.* Rates of ORS use are higher among rural populations, and the Resurvey is based on a rural sample. Although the Resurvey sample includes 20% of households from *cabeceras* (county seats), *cabecera* communities are not truly urban in the conventional sense of the word. They share more characteristics with rural settings than with urban ones. The national study, on

¹⁸*Epidemiology and Family Health Survey, Honduras, 1987*, conducted by the Honduran Ministry of Public Health, Management Sciences for Health, Association for Family Planning in Honduras (ASHONPLAFA), and Family Health International, May 1989.

¹⁹The standard recall period used in the Resurvey document is two weeks. The national survey used a three-day recall period, and in order to compare our rates with the national survey we cite Resurvey treatment rates which obtain for the three-day recall period.

the other hand, takes 21% of its respondents from the urban sites of Tegucigalpa and San Pedro Sula. This difference would produce higher rates for our rural sample.

3) *All Resurvey data were collected during the rainy season.* During the rains, diarrheal episodes tend to be more severe, and we know that severe cases are more frequently treated with ORS than are mild and moderate cases. The national data collection effort spanned a five month period, at least half of which took place during the dry season. It is plausible that the Resurvey sample includes a higher proportion of severe cases than other samples and therefore shows higher rates of ORS use.

The difference in treatment rates found in the Resurvey and other studies is further accentuated by differences in recall period used. The standard recall period employed in the Resurvey is two weeks; that is, mothers were asked to give details of treatment only for cases occurring within two weeks prior to the interview. In comparison, the national study uses a three-day recall period. Recall periods may underestimate treatment rates to the extent that they include "truncated cases" -- cases which have not yet ended. For those cases, the full range of treatment is unknown. For example, a mother may not have given any treatment to a case started the day before the interview. If it continues, however, and particularly if it worsens, it becomes more likely that she *will* give some form of treatment. Nonetheless, during data collection this case would be classified as "untreated" since treatment occurred after the interview. The shorter the recall period, the greater the proportion of truncated cases it includes, and the greater the potential for underestimating treatment behaviors.

Every reasonable effort was made to prevent the introduction of bias as data were collected on treatment practices. In structuring the interview, attempts were made not to draw attention to the focal point of the study, ORS use, until questions about treatment of a recent case had been answered. Fieldworkers were instructed not to announce that the study was about oral rehydration therapy, but about children's health. In the case treatment section, the first major section of the questionnaire, the question "Did you use Litrosol?" was embedded in a series of other treatment questions, such as whether medicine or purgatives were given for the episode.

Questions concerning ORT knowledge were asked *after* the treatment questions so as not to signal a focus on ORT and make a mother more likely to report using Litrosol or other packets as part of treatment.

Fieldworker team members were instructed to all work in one community at a time to minimize discussion of the interviews among mothers. In most cases interviews within a community were completed within two days. Tests for interviewer bias revealed only one fieldworker among fifteen whose recorded rates of ORS use were significantly higher than those recorded by other fieldworkers. Thus, so far we have not detected specific sources of bias within the instrument or the structure of fieldwork.

SUMMARY

ORS use in Honduras is high by any measure. Almost all mothers (99%) have heard of Litrosol, and the great majority (85%) have tried it at least once. Mothers report using ORS for 45% of all diarrheal episodes occurring within two weeks of the interview, and among cases the mother considers serious, 54% are treated with the rehydration solution.

In the communities included in the original panel study ("multi-measure communities"), the case treatment rate is 47%, which is at least as high as the 1983 level of 36% (difference is non-significant). In Region 1 as a whole, (including the "single measure communities" in Morocelí), rates are significantly higher than in 1983 (34% vs. 49%).

ORS is administered more frequently in Region 1 than in other Regions (49% compared with 40%), but the difference is moderate, indicating that the national promotion of ORT beyond the Region 1 pilot campaign has achieved a considerable degree of success.

Use of ORS is more common in rural areas than in the county seats (47% versus 36%). ORS use varies by county: the highest case treatment rates were found in Nacaome (55%), while the lowest were reported in Salamá (31%). Children under two years of age are more likely to be treated with ORS than older children. Each individual severity indicator is strongly associated with ORS use, and rates of use increase with the mother's perception of the severity of the case. Differences in perceived cause of the diarrhea apparently do not prompt differential treatment responses. The child's sex does not appear to be related to use of ORS.

Mothers who had used ORS in the year prior to their interview reported using a median of six packets in that time period. Among women who had ever used ORS (85% of the sample), over half see themselves as frequent users, 30% as occasional users, and 16% as infrequent users. It appears that mothers who do use ORS do so fairly regularly.

The most frequent reasons a mother cited for not giving ORS for a particular case were that she did not have the packets, or that the case was mild and did not warrant treatment with ORS.

CHAPTER VII: TREATMENT PATTERNS

In Honduras there are a number of common responses to infant diarrhea. In addition to the recently-introduced practice of administering a rehydration solution, a mother may give her child medication, a purgative, or she may prepare a home remedy such as rice water or tea. She may consult with a traditional health provider or a community health worker or a clinic-based health provider. She may also decide that no attention is necessary.

The recommended treatment for diarrhea is ORS alone, without supplemental medications unless the specific etiological agent of the illness is known. The common practice of administering purgatives is dangerous, as it exacerbates dehydration, contributes to nutrient loss, and irritates the colon. In the Resurvey questionnaire section on case treatment, for cases occurring in the two weeks prior to the interview, mothers were asked where they sought help and whether they administered purgatives, gave medication, treated with ORS, or gave any home remedies. The responses to these questions are described in this section of the report. First we report on the frequency with which various treatments are given. Subsequently we examine where mothers turn for help for their child's illness, and look at the relationship between where mothers sought help and the particular treatment(s) associated with an episode.

TREATMENTS GIVEN

As Table VII-1 documents, in the great majority of cases (91%), the child's diarrhea received some form of attention: ORS, medicine, purgative, or home fluid. In the previous chapter, we reported that use of ORS to treat diarrheal episodes is common, with rates of use approximating 45% (49% in Region 1; 40% in other Regions). Use

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of medications to treat diarrhea in Honduras is even more common, with about 2/3 of the cases involving some form of medication. This rate is approximately equal within and outside of Region 1. Use of purgatives is also high, particularly given their deleterious effect: mothers respond to about 1/4 of diarrhea cases by giving a purgative. This figure is constant across sites. A medicine and/or purgative was administered in almost 3/4 (74%) of the episodes we examined. These very high rates of improper treatment are cause for concern. In only 13% of the cases did mothers give ORS without additionally administering purges or medication.

*Table VII-1. Treatments Given for Diarrhea
(Cases Within Two Weeks Prior to the Interview)*

| | HEALTHCOM Resurvey | | |
|--|--------------------|---------------|----------------|
| | Region 1 | Other Regions | Resurvey Total |
| Gave ORS | 49% | 40%* | 45% |
| Gave medication | 64 | 69 | 67% |
| Gave purgative | 24 | 24 | 24% |
| Gave medicine and/or purgative | 72 | 76 | 74% |
| Gave ORS w/o medicine or purge | 14 | 13 | 13% |
| Gave home fluids | 51 | 41* | 46% |
| No treatment (none of above) | 10 | 9 | 9% |
| N of cases | (423) | (388) | (811) |
| * The chi-square is significant at \leq the .05 level between Region 1 communities and those outside Region 1. | | | |

Honduran mothers prepare a variety of special liquids for their soothing or curative effect, such as *agua de arroz* (rice water), *horchata* (a corn drink), or teas. Unlike

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purgatives and unsuitable medications, these home remedies can be beneficial in countering the loss of fluids caused by diarrhea. Forty six percent (46%) of cases were treated with some kind of home fluid. Table VII-2 shows the proportion of cases receiving each kind. Tea (37%) and rice water (22%) are the most common home fluids, while only a small proportion (4%) of ill children received *horchata*. Mothers in Health Region 1 gave various kinds of liquid home remedies more often than did their counterparts in other Regions, at comparative rates of 51% to 41%.

Table VII-2. Home Remedies (Cases Within 2 Weeks Prior to the Interview)

| | HEALTHCOM Resurvey | | |
|--|--------------------|---------------|----------------|
| | Region 1 | Other Regions | Resurvey Total |
| Gave home fluids | 51% | 41* | 46 |
| Gave tea | 41 | 32* | 37 |
| Gave rice water | 25 | 18* | 22 |
| Gave horchata | 6 | 3* | 4 |
| Applied unguents | 2 | 1 | 2 |
| Applied plasters | 3 | 1 | 2 |
| N of cases | (423) | (388) | (811) |
| * The chi-square is significant at \leq the .05 level between Region 1 communities and those outside Region 1. | | | |

The developmental research which was carried out prior to the campaigns found that some mothers also apply unguents or plasters to the child suffering from diarrheal illness. Neither practice is harmful, although neither is known to be medically beneficial. In the Resurvey we asked whether either of these treatments was administered, and found that only about 2% apply plasters and 2% apply unguents.

WHERE MOTHER SEEKS HELP

There are a number of potential sources of assistance for the mother who wishes to solicit help with her child's case of diarrhea. Three general kinds of assistance can be distinguished: traditional, community, and institutional. The Resurvey asks about those health providers in each category who are most relevant to diarrhea treatment. A traditional source of assistance in Honduras is the *sobador*, or masseuse, who has no formal training in health. At the community level, the community health worker, or *guardian*, has received some rudimentary training in ORT and is a designated supplier for ORS packets. At the community level there are also *parteras*, or midwives who receive some basic training in health, mostly having to do with pregnancy and delivery. In some communities the *partera* and *guardian* are the same person. Institution-based health providers include anyone who works in a fixed facility and has undergone formal training in health, such as a doctor, nurse, or auxiliary nurse.

In 41% of cases, the mother sought the aid of a health provider to deal with the illness. The vast majority of cases seen by a health provider involved some form of treatment, and the nature of that treatment varied considerably depending on which health provider was consulted. We first present data on sources of medical assistance across Regions and over time, and subsequently investigate the relationship between assistance sought and treatments given.

Consultation with someone outside the home was sought in connection with 41% of the cases occurring within two weeks prior to the interview. (See Table VII-3.) The health center is by far the most common single source of assistance for diarrheal episodes (26%), with none of the other sources attending to more than 9% of the cases. While about 1/4 of diarrheal episodes across Regions are treated at the health center, more mothers in Region 1 turn to other sources of assistance as well, particularly those at the traditional and community level, and a greater number of them consult with more than one health provider. Overall, in 13% of the cases, more than one health provider was consulted.

*Table VII-3. Sources of Assistance
(Cases Within Two Weeks Prior to Interview)*

| | HEALTHCOM Resurvey | | |
|--|--------------------|---------------|----------------|
| | Region 1 | Other Regions | Resurvey Total |
| Mother consulted someone | 45% | 37* | 41 |
| Consulted traditional provider (<i>sobadora</i>) | 12 | 6* | 9 |
| Consulted community provider (<i>guardia:</i>) | 10 | 5* | 8 |
| Consulted institutional provider | 33 | 30 | 31 |
| Health Center | 26 | 26 | 26 |
| Private doctor or clinic | 4 | 3 | 4 |
| Hospital | 8 | 3* | 6 |
| Consulted a pharmacist | 6 | 5 | 5 |
| Consulted more than 1 source | 16 | 9* | 13 |
| N of cases | (423) | (388) | (811) |
| * The chi-square is significant at $\leq .05$ between Region 1 communities and those outside Region 1. | | | |

We compared current data on sources of assistance with MMHP data from the original campaign to see if changes have taken place over time. (See Table VII-4.) It appears that there has been little change in where mothers turn for help, although the data suggest that the number of visits to the *sobador* declined during the MMHP campaign but has now resumed to pre-campaign levels.

*Table VII-4. Help Sought for Diarrheal Episodes
(Cases Within 2 Weeks Prior to Interview)*

| | MMHP Longitudinal | | | | | | HEALTHCOM Resurvey | | | |
|--|---------------------------|-----------|-----------|-----------|-----------|-----------------------|----------------------|-----------------------|----------------|----------------|
| | Region 1 | | | | | | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | Single-Measure Comms. | | | | |
| | Wave 1 | Wave 2 | Wave 3 | Wave 4 | Wave 5 | | 5/87 | | | |
| Child taken to sobadora | 8.81 10% | 4.82 3 | 8.82 4 | 2.83 1 | 5.83 3 | 0 | 11 ³ | 14 ⁵ | 6 ⁶ | 9 |
| Child taken to guardian | 12 | 9 | 14 | 11 | 10 | 21 | 9 | 11 | 5 ⁶ | 8 |
| Child taken to health center | 20 | 19 | 17 | 19 | 20 | 21 | 20 | 36 ⁵ | 26 | 26 |
| N of cases | (379) | (210) | (245) | (122) | (96) | (19) | (277) | (146) | (388) | (811) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

One of the factors which determines whether or not a mother will seek help for a case is her perception of the severity of the episode, with the likelihood of consultation increasing with the seriousness of the case. Consultation was sought in 30% of light cases, 44% of moderate cases, and 61% of severe cases ($p < .0001$). The source of help selected by a mother is also related to her assessment of the severity of the case. The more serious the case, the more likely that a mother will take the child to a fixed facility (either public or private) for help. Almost half of the cases the mother judged as severe were treated by professional health providers, compared with 35% of the moderate cases and 22% of the mild cases.

RELATIONSHIP BETWEEN HELP SOUGHT AND TREATMENT GIVEN

We were interested in finding out whether certain treatments are associated with the type of health provider consulted. In particular, we wished to know whether use of ORS is more common among women who consulted with certain types of health workers, and also whether use of medications and purgatives differs by type of health worker consulted. Table VII-5 reports the percentage of women consulting a given provider who gave a specific treatment: ORS, a medication, or a purgative. For cases in which the *guardian*, health center, or a private clinic were consulted, we asked what treatment that provider recommended. Therefore, for those classes of health provider, two figures are given. The first, in the main column, shows the percentage of cases seen by a given health provider which were also treated with ORS, medicine, or a purgative. The figure in parentheses indicates the percentage of cases for which a given health provider specifically recommended a particular treatment. For example, no health center personnel advised giving a purgative for a case, but 27% of cases brought to the health center were treated with a purgative.

The Resurvey data shows that a mother who seeks any kind of assistance for a case is much more likely to treat that case with ORS than otherwise: 69% of mothers who sought help with a case used ORS, versus 28% of mothers who did not ($p < .0001$). The nature of the relationship between contact with a health worker and giving ORS is open to two interpretations: a health worker may recommend ORS when a mother brings in her child for treatment, or a mother may decide to give ORS and visit the *guardian* or health center to obtain packets. It is likely that some combination of the two accounts for the high degree of association between ORS use and contact with a health worker.

As may be expected, the percentage of cases treated with ORS is highest among women who consulted with the *guardian* (95%). Since *guardianes* are local packet distributors, and are accessible even when the health center is closed, it is likely that a woman who sought out a *guardian* did so specifically to obtain ORS packets. A fair proportion of *guardianes* (22%) are recommending medicines; they should not be, as

Table VII-5. Relationship between Help Sought and Treatment Given
(Cases Within Two Weeks Prior to Interview)

| | Gave ORS (%) | (*) | Gave medicine (%) | (*) | Gave purgative (%) | (*) | Row N |
|---|--------------|-------|-------------------|------|--------------------|-----|-------|
| Consulted someone | 69% | | 59% | | 32% | | (330) |
| Consulted no one | 28 | | 72 | | 19 | | (481) |
| Consulted traditional provider (sobadora) | 59 | | 64 | | 70 | | (73) |
| Consulted community provider (guardian) | 95 | (81%) | 50 | (22) | 41 | (2) | (62) |
| Consulted institutional provider | | | | | | | |
| Health center | 77 | (62) | 52 | (67) | 27 | (0) | (210) |
| Private doctor or clinic | 46 | (21) | 61 | (89) | 32 | (0) | (28) |
| Hospital | 78 | | 62 | | 22 | | (45) |
| Consulted a pharmacist | 61 | | 79 | | 37 | | (43) |
| TOTAL | 45 | | 67 | | 24 | | (811) |

* If the child was taken to the sobadora, guardian, health center or clinic, the mother was asked specifically, "What did the (sobadora) recommend?" The percentage of health providers specifically recommending a given treatment is indicated in parentheses. The other figures represent the percentage of children taken to a given health provider who were also administered ORS (or medication or a purgative).

they do not have the training or equipment to make informed decisions about whether drugs are appropriate for the illness. Only 2% of *guardianes* specifically recommended a purgative, but a high proportion (41%) of mothers who contacted a *guardian* about their child's illness gave a purgative.

ORS use is high among women who consulted with a health center; 77% of them gave ORS. However, only 62% were specifically recommended to use ORS by health center personnel. Given that clinic staff are supposed to recommend ORS in all cases, the percentage of them advocating treatment with ORS is rather low. Furthermore, they recommended that medication be given for 67% of cases they treated. This is a

disturbingly high figure, since it is unlikely that the laboratory work necessary for making a correct diagnosis and choice of medication decision was carried out. It is probable that many of the medications prescribed were antibiotics, which can debilitate the child if they are not necessary and can contribute to creating drug-resistant strains of bacteria.

Fortunately, virtually none of the clinic staff, *guardianes*, or private doctors recommended giving a purgative. Apparently the high rates of purgative use (overall 24% of cases) are initiated by the mother herself, or possibly encouraged by the *sobador*. We did not ask about specific recommendations of *sobadors*, but an extremely high proportion of women (70%) consulting this traditional healer administered a purgative.

Overall, mothers who consulted a *sobador* exhibited the poorest case management practices. Their use of ORT is relatively low (59%), while their tendency to treat with a purgative (70%) or medication (64%) is very high.

Private physicians, too, are also encouraging poor case management practices. Although they are not advocating purgatives, they are pushing medication at a very high rate (89%) and ORS at a very low rate (21%). We surmise that private doctors may view ORS more as a home remedy than a treatment recommendation befitting someone trained in modern medicine.

Very high rates of treating with medication (79%) are also associated with mothers who consulted with a pharmacist. This is not surprising, as the pharmacist's livelihood depends on selling medicine.

The discrepancies between the treatments recommended to mothers and treatments that mothers actually use (Table VII-5) reveal interesting information about who advocates which remedy. For example, virtually none of the trained health providers recommended that a mother give a purgative to treat a case. Yet a purgative was administered in 24% of the cases, suggesting that mothers are deciding to use ORS on

their own and need to be taught that purgatives are harmful. Mothers are also taking the initiative with regard to use of ORS; more mothers use ORS on their own than are prompted to do so by a health provider. All the figures for ORS use in the table in parentheses are lower than their counterpart column figures. With regard to medications, the picture is mixed. Fewer mothers give medication than receive recommendations to do so by the *guardian*, but more mothers medicate for diarrheal episodes than are recommended to do so by someone in the formal health sector.

Overall, it is discouraging that use of medication is much more prevalent than use of ORS solutions (at comparative rates of 67% and 45%) and that use of purgatives is so common: (24% of cases).

MULTIPLE TREATMENTS

As the preceding sections have noted, mothers can respond to a diarrheal episode in a child with a variety of treatment options, including administering ORS, giving medication or purgatives, and giving home fluids. In 70% of cases occurring within two weeks prior to the interview, mothers indicated that they responded with more than one treatment. For those cases where multiple treatments were given, mothers asked to indicate what they did first, what they did second, etc. Ideally, a first response would be to give home fluids and ORS, followed by medications if recommended by a physician. Unfortunately, the data indicate (Table VII-6) that the most common first response (among multiply-treated cases) is to give medication (42%). In 29% of the cases receiving multiple treatments, ORS constituted the initial response. Purgatives were the first remedy tried in 12% of the multiple treatment cases, while home fluids were given as first treatments in about 11% of the cases. Use of ORS as a first treatment is as common within and outside of Region 1, while purgatives appear to be more common as a treatment of first resort in Region 1, and medicines appear to be more often given first in other Regions.

Table VII-6. First Treatment Given, Among Cases Given Multiple Treatments

| First Treatment Given | HEALTHCOM Resurvey | | |
|-----------------------|--------------------|---------------|----------------|
| | Region 1 | Other Regions | Resurvey Total |
| ORS | 29% | 28% | 29% |
| Medicine | 38 | 47 | 42 |
| Purgative | 14 | 10 | 12 |
| Home Fluids | 13 | 6 | 11 |
| Other | 5 | 7 | 6 |
| N of cases | 307 | 259 | 566 |

SUMMARY

The vast majority of cases of diarrhea receive some form of treatment, some of which are medically sound, some not. The recommended practice is to give ORS and supplemental liquids. Medication is beneficial only if the specific etiologic agent of the diarrhea is known to respond to it. Purgatives are never advised.

While ORS use is high (45% of cases), so is use of medications (67%) and purgatives (24%). Home fluids (such as teas or rice water) were reportedly given in 46% of cases. Apparently the campaigns have been successful in promoting ORS use, but have been less successful in discouraging counterproductive treatment practices.

Consultation with a health provider was sought in connection with 41% of cases, and treatment patterns varied depending on the type of provider consulted. The single most common source of assistance was the health center, which treated 26% of cases.

The *guardian* and *sobador* were consulted in 8% and 9% of cases respectively. Assistance was less commonly sought from the hospital (6%), a private doctor (4%), or a pharmacist (5%). Overall case management practices are poorest among mothers who seek no advice or who consult with a private doctor; they exhibit the lowest use of ORS and the highest use of medications. Care is also poor for children taken to a *sobador*; they are most frequently given purgatives. Mothers who consult with Ministry of Health facilities have higher rates of ORS use and the lower use of medications and purgatives, although rates for the latter are still unacceptably high.

Seventy percent (70%) of cases received more than one treatment. Ideally, mothers would turn to ORT and home fluids as a first response at the onset of diarrhea. The data indicates, however, that the most common first response is the administration of medication (42% of multiply-treated cases), followed by ORS (29%), purgatives (12%) and home fluids (11%). Mothers in Region 1 engaged in more treatment behaviors and more frequently sought assistance than did mothers in other regions. It is possible that the ORT campaign in Region 1 made the problem of diarrhea more salient, although we cannot verify this hypothesis since we do not have prior data on sites outside of Region 1.

While the data show encouragingly high levels of ORS use, the overall picture regarding case management practices is less positive. The widespread use of medications and purgatives is a troubling finding, and will need to be addressed more emphatically in future educational efforts.

CHAPTER VIII: LIQUIDS AND FOODS DURING DIARRHEA

Although the primary focus of the promotional effort has been on encouraging mothers to administer Litrosol or other rehydration solutions, the public health community has increasingly recognized the role of proper dietary management of cases as a critical factor in mitigating the adverse nutritional consequences of diarrhea. Although use of oral rehydration solutions has been shown to lower mortality rates in a number of countries, diarrhea-induced malnutrition has not decreased. Nutritional damage occurs both from decreased food consumption resulting from poor appetite and from loss of nutrients through watery stools. A cycle of deterioration can be created whereby inadequate dietary practices render the child more vulnerable to infection and renewed bouts of diarrhea, which, in turn lead to more severe malnutrition and diarrheal episodes. Appropriate feeding during and after diarrheal episodes can break this cycle. Proper feeding can also shorten the duration of the episode and reduce stool output.

What is appropriate feeding? Above all, for the breastfed child, it is continued breastfeeding. For children receiving supplementary food and for those who are weaned, increased amounts of liquids should be given to replace lost water, nutrients, and electrolytes. In addition, customary foods, especially those of non-animal origin, need to be offered throughout the day. Consequently, one of the objectives of the MMHP campaign was to teach mothers to continue breastfeeding and feeding and to increase liquids.

LIQUIDS GIVEN DURING DIARRHEA

Baseline data collected prior to the MMHP campaign found that most mothers give some kind of liquid (in addition to breastmilk) during a diarrhea bout. In the first

measurement wave 91% of cases were given liquids. The Resurvey found similarly high proportions of children experiencing diarrhea being given liquid: 96% were given some kind of liquid, with no difference between Regions. All mothers of infants six months and older were asked specifically if they gave water, juice, soda, and coffee. Water was most commonly given (84%), followed by coffee (54%), soda (43%), and juice (41%). Breastfeeding during diarrhea is covered in the following chapter.

Of particular interest is whether the message to give a child with diarrhea *more* liquids had any effect on practice. Mothers report that about one-third of children ill with diarrhea were given increased amounts of liquid, one-third given the same amount of liquid, and one-third given less than usual. There are differences between Region 1 and other Regions in this regard, with mothers in the pilot region giving increased amounts of liquids (37%) more often than other mothers (27%) ($p=.0142$).

While in 32% of the cases increased amounts of usual liquids (water, juice, soda, coffee) were given, this rather low figure is offset by the common practice of giving special liquids, such as *horchata* (a corn drink), *agua de arroz* (rice water), or teas, which were given in 46% of all cases.

If the amount of usual liquids a child ingested was different from the normal amount (either more or less), the interviewer asked if that was because the mother thought she should give more/less, or because the child wanted more/less. In virtually all cases (96%) it was reported to be the child's will; about half of the time the child was reported to have wanted more (48%) and half the time less liquid than usual. In the few cases where the mother made the decision, the mother usually (62%) decided that the child should have more liquid.

It is not possible to make a direct comparison with prior data on liquid intake during diarrheal episodes because of differences in the way this topic was investigated in MMHP and the Resurvey. The MMHP questionnaire asked, for each liquid individually, whether the child was given more, less, or the same amount. Due to time constraints in Resurvey implementation, the question was asked whether overall the

child was given more, less, or the same amount of liquid. Therefore, in the MMHP evaluation, a mother had more "chances" to indicate that she gave more of a particular liquid. In the last measurement sweep in the longitudinal study, 79% of children who had cases in the two weeks before the interview reportedly received more of some kind of liquid than usual. In the single-measure control group, mothers reported that 68% of children received more of some kind of liquid.

Patterns of breastfeeding during diarrheal episodes are addressed in the following chapter.

FEEDING DURING DIARRHEA

The Resurvey asked several questions regarding food intake during diarrheal episodes. The primary concern here is with the amount of food consumed during diarrhea to the amount the amount one child normally eats. For each case occurring within two weeks of the interview, the mother was asked whether a child ate more, less, or the same amount of food as usual. In most cases (70%) the child ate less food, including about 4% of the cases where a child ate no food at all while ill. Differences between Regions were not statistically significant. In almost all of the cases (97%) the mother reported that it was the child's rather than the mother's will to eat little or no food.

SUMMARY

The great majority of Honduran mothers give their child some kind of liquid during their diarrheal illness. The most commonly given liquid is water, but frequently coffee, soda, and juice are given. This was a common practice before MMHP (91%) and has remained so (96% now report giving liquids). About 1/3 of the mothers report giving

more liquids than usual (as promoted by the campaign); however, 1/3 also report giving less liquids. Forty-six percent (46%) of children received a special liquid such as tea or *horchata*. About 70% of the children ate little or no food during their illness. Mothers appear to let the child take the lead in determining its intake of food and liquid.

CHAPTER IX: BREASTFEEDING AND BOTTLEFEEDING

BREASTFEEDING PATTERNS

Breastfeeding is an important component of the ORT approach to the prevention and management of infant dehydration due to diarrhea. Nursing infants are exposed to fewer sources of contamination than bottlefed children, and receive the nutritional and immunological benefits of breastmilk. MMHP campaign messages stressed that breastmilk is more nourishing and safer than formula. In addition, a special breastfeeding promotional effort was implemented near the end of the campaign, from December 1982 to March 1983. The AMA MAS ("Love More") radio course provided intensive information on correct breastfeeding practice and its advantages over bottlefeeding. Mothers were urged to breastfeed exclusively for the infant's first four months of life and thereafter gradually add supplemental weaning foods. Breastfeeding was promoted as modern, hygienic, and healthful. Bottlefeeding, on the other hand, was discouraged as a potential source of germs and cause of diarrhea.

The MMHP evaluation collected longitudinal data on breastfeeding of children 18 months of age and younger. In the Resurvey we also examined this subgroup in order to compare past and current levels of breastfeeding. (See Table IX-1.) Over the course of the MMHP project there was an apparent increase in breastfeeding²⁰: initially (October 1981), 65% of children less than 19 months old were being breastfed, while at the last measurement point (May 1983) 81% of that age group was reportedly being breastfed. The comparable Resurvey figure (for Region 1 multi-measure communities)

²⁰ Although the percentage of children 18 months of age and younger who were reported to be breastfeeding increased over the MMHP measurement period, it is not certain whether these increases are statistically significant. The sample sizes for this subgroup are not readily available, and therefore significance levels cannot be calculated.

is 77%, suggesting that any increases in breastfeeding occurring during MMHP have been maintained. Outside Region 1, 73% of the children 18 months and under are being breastfed. The difference between Region 1 and other regions is not statistically significant.

Table IX-1. Percent of Children 18 Months of Age and Younger Being Breastfed, by Wave

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|---|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|---------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| | % being breastfed | 65% | 74 | 75 | 81 | 80 | 77 | 79 | 73 | 76 |
| N of cases | (not available) | | | | | (243) | (135) | (329) | (707) | |
| <p>Note: Since sample sizes were not available for MMHP data, chi-squares could be calculated only for within-Resurvey comparisons. None of the differences was statistically significant.</p> | | | | | | | | | | |

Resurvey data show that almost all Honduran infants (93%) are breastfed as neonates. However, many are taken off the breast or given supplementary bottlefeeds at a very early age. As Table IX-2 shows, nationwide, among children three years of age and younger who were initially breastfed, 23% were no longer breastfeeding by the age of six months; 52% by twelve months; and 83% by 18 months of age. (We use as the

Table IX-2. Age of Child When Breastfeeding was Stopped and Mean Duration of Breastfeeding, Among Breastfed Children Under 3 Years of Age, by Wave

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|-------------------|----------------|
| | Region 1 | | | | | | | | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| Percent of children who had stopped breastfeeding: | | | | | | | | | | |
| by six months | 23% | 24 | 23 | 27 | * | 18 | 21 | 19 | 25 | 23 |
| by 12 months | 52 | 48 | 51 | 50 | * | 58 | 49 | 43 | 57 ⁶ | 52 |
| by 18 months | 82 | 80 | 85 | 84 | * | 80 | 83 | 73 ⁵ | 86 ⁶ | 83 |
| Average number of months breastfed: | 12.8 mo. | 13.1 | 12.7 | 12.8 | * | 13.3 | 13.1 | 14.4 | 12.1 ⁶ | 13 |
| N of cases: | (266) | (168) | (172) | (176) | * | (50) | (237) | (120) | (352) | (709) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

* Data for Wave 5 is not available.

base group children under three because MMHP data were calculated on the basis of this group.) These percentages are equivalent to MMHP final measurement levels (27% by six months, 50% by twelve months, and 84% by eighteen months). Thus, these data concur with the previous analysis that suggested that from the end of MMHP to the present, there has been no decrease in overall breastfeeding levels.

During MMHP, mothers who breastfed their children did so for an average of 13 months, a figure which stayed consistent throughout the campaign to the present. It appears that duration of breastfeeding in Region 1 tends to be slightly longer than in

other Regions, the comparative figures being 13.5 months for mothers from all communities in Region 1, and 12.1 months for mothers residing outside of Region 1. This difference is statistically significant.

The Resurvey asked about bottlefeeding only in connection with diarrheal episodes. Therefore bottlefeeding data are reported in the following section.

BREASTFEEDING AND BOTTLEFEEDING DURING DIARRHEA

A child who is breastfeeding should continue to receive breastmilk during any bouts of diarrhea. Some mothers believed that breastmilk exacerbates diarrhea, and the MMHP intervention was designed to correct this belief.

Table IX-3 shows the proportion of children eighteen months of age or younger who had a case of diarrhea within the two weeks prior to the interview who were breastfed or bottlefed during their illness. The MMHP data on breastfeeding and bottlefeeding during diarrhea uses as its base all children eighteen months of age or less, whether or not they were still breastfeeding or bottlefeeding at the time. Therefore, these figures are conservative estimates, since the denominator includes some children who were not being given the breast or bottle when the bout of diarrhea began. For comparative purposes, we use this same age group for the Resurvey figures, but also calculate continued breastfeeding just for those children who were breastfeeding at the time the diarrheal bout began.

Over the course of the campaign, reported levels of breastfeeding during diarrhea among children up to eighteen months of age fluctuated between 66% and 85%. It should be noted, however, that low subsample sizes may account for some of the fluctuation, and the differences are not statistically significant. It should also be noted that the wave 4 levels are unrealistically high -- higher, in fact, than the percentage of children breastfeeding. Overall Resurvey levels of continued breastfeeding among children eighteen months or younger are comparable to the highest MMHP levels at

Table IX-3. Breastfeeding and Bottlefeeding of Children 18 Months and Under During Diarrheal Episodes, by Wave (Cases Within 2 Weeks Prior to Interview)

| | MMHP Longitudinal | | | | | | HEALTHCOM Resurvey | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|---------------|----------------|
| | Region 1 | | | | | | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | Single-Measure Comms. | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | | | 5/87 | | |
| Percent breastfed during bout | 66% | 69 | 65 | 85 | 72 | 68 | 71 | 81 | 71 | 73 |
| Percent bottlefed during bout | 44 | 37 | 45 | 60 | 32 | 40 | 28 ¹ | 26 | 31 | 28 |
| N of cases | (147) | (70) | (51) | (47) | (44) | (5) | (108) | (57) | (154) | (319) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

73%. In the Resurvey we have information about which children were breastfeeding at the onset of diarrhea; almost all breastfeeding children (98%) continued to be breastfed during the bout of illness. We may conclude that cessation of breastfeeding due to a child having diarrhea is not a problem in Honduras.

Among children under 18 months of age who had diarrhea in the two weeks preceding the interview, 28% were bottlefed during the episode. This figure is lower than reported percentages during MMHP, which fluctuated between 32% and 60%. The 28% of children given the bottle during their illness represents 56% of children who were being bottlefed at the onset of diarrhea.

The data show, therefore, that almost all mothers do continue to nurse during their child's diarrheal illness, although many withdraw the bottle. Specifically, 98% of breastfeeding children continued to receive breastmilk during diarrhea, while 56% of children being bottlefed continued to receive a bottle while they were ill. The practice of continuing breastfeeding but withholding the bottle during diarrhea is a positive one as long as it does not represent a decrease in the child's total liquid intake. If fluids normally given in a bottle were given by cup instead, the child would be less likely to ingest contaminants associated with bottlefeeding. (The bottle and nipple are difficult to get clean and keep clean.) If, however, withdrawal of the bottle meant that the child were receiving a decreased volume of liquid, the practice would be detrimental.

SUMMARY

The resurvey found that almost all Honduran mothers (93%) breastfeed their neonates, but begin weaning them at an early age. By six months of age, nearly 1/4 of infants are no longer breastfeeding. This represents a continuation of the pattern documented during the MMHP evaluation in the early 1980s. The average number of months a Honduran child breastfeeds (13) is also constant throughout MMHP and the Resurvey. The percentage of children 18 months of age and younger who are breastfeeding (77% of Region 1 children) remains near the higher levels reported during MMHP.

Almost all mothers (98%) continue to breastfeed during their infant's bouts of diarrhea, although 44% discontinue giving the child a bottle.

CHAPTER X: EXPOSURE TO COMMUNICATION CHANNELS

The MMHP campaign utilized three channels of communication to introduce ORT to mothers in rural areas: electronic (radio), interpersonal (health workers), and print (flyers and posters). Each channel has its characteristic strengths and limitations. Radio is capable of reaching a wide and dispersed population at relatively low cost, and is thought to be particularly effective in creating awareness of new practices and reinforcing established ones. Print material, because of its permanent nature, can convey more complex information, such as a set of instructions, at the time when the information is needed -- as, for example, when a mother needs to mix ORS. Personal interaction is expensive and limited in reach; however, it provides a means of modeling new behaviors, it permits tailoring instructions to suit individual needs, and can supply the persuasive element or motivating force to convert awareness or knowledge into action. Together these channels carried a coordinated set of messages which are mutually reinforcing and move the individual through the process from awareness to knowledge and behavior change.

Since the end of the pilot phase, radio has been de-emphasized in favor of print and interpersonal communication. Current strategy concentrates on health workers and the use of educational materials, including posters, flip charts, and interpretation of data in this section takes into account this change in program design.

In this chapter we report on mothers' exposure to each of the channels of communication utilized by the campaign. Subsequently, we look at the relationship between mothers' exposure and their use of ORT.

RADIO

Ownership and Listening

Radio has the potential to reach a large number of mothers; however, in order for a mother to be exposed to the campaign messages, she has to have access to a radio and listen to it with some degree of regularity. The initial MMHP evaluation, therefore, measured radio ownership and listening patterns. The Resurvey also measured them in order to assess whether levels of ownership and listening had changed since the final MMHP measurement sweep in 1983.

The MMHP evaluation found that the majority of households own a working radio, and Resurvey data shows that this is still true. (See Table X-1.) Currently, an average of 57% of households in the total sample possess a functioning radio, while over the course of the campaign, estimates on this variable for Region 1 households ranged from 57% to 77%. A greater proportion of families in the multi-measure communities own a working radio than in other measurement groups: 64% compared with 55% in the single-measure communities and 54% in the communities outside Region 1 ($p=.0013$).

As Table X-2 indicates, rates of radio listening appear to remain stable both across time and among communities. Mothers were asked both to categorize their listening frequency (continuous, frequent, sometimes, rare) and to give an average number of hours per day they listen to the radio. Rates of listening among measurement groups are equivalent on both measures. Approximately 1/3 of Resurvey respondents described their radio listening as "continuous" or "frequent" -- about the same proportion as during MMHP. Among those who listen to the radio (83%), the average number of listening hours per day is about 3 1/2 hours in all three measurement groups. The modal number of hours for each group is one, with about 25% of listeners in each group turning on their radios for approximately one hour each day.

Table X-1. Radio Ownership Among Households by Wave

| | MMHP Longitudinal | | | | | | HEALTHCOM Resurvey | | | |
|---|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|-----------------|----------------|
| | Region 1 | | | | | | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | Single-Measure Comms. | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | | 5/87 | | | |
| Percent of families owning one or more radios | 80% | 85 | 83 | 79 | 73 | 70 | 71 ² | 60 ^{4,5} | 61 ⁶ | 64 |
| Percent of families owning one or more working radios | 65 | 77 | 69 | 65 | 57 | 65 | 64 ³ | 55 ^{4,5} | 54 ⁶ | 57 |
| N of cases | (325) | (285) | (281) | (285) | (322) | (244) | (462) | (262) | (679) | (1403) |

Table X-2. Radio Listening Habits by Wave

| | MMHP Longitudinal | | | | | | HEALTHCOM Resurvey | | | |
|----------------------------|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|---------------|----------------|
| | Region 1 | | | | | | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | Single-Measure Comms. | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | | 5/87 | | | |
| Continuously or frequently | 44 | 32 | 28 | 31 | 32 | 33 | 34 ² | 32 | 29 | 31 |
| Occasionally or never | 56 | 68 | 72 | 69 | 69 | 67 | 66 | 68 | 71 | 69 |
| N of cases | (293) | (272) | (272) | (263) | (292) | (213) | (462) | (262) | (678) | (1402) |

Key: The chi-square is significant at \leq the .05 level between:

1. MMHP: Wave 5 and single measure communities
2. Wave 1 and Resurvey multi-measure communities
3. Wave 5 and Resurvey multi-measure communities
4. MMHP single-measure communities and Resurvey single-measure communities
5. Resurvey: multi-measure communities and single-measure communities
6. Resurvey: Region 1 and outside Region 1

Message Recall

As part of the MMHP intervention, a series of jingles was created to assist listeners in remembering messages. The Resurvey examined recall of two such jingles by beginning the phrase and stopping to let mothers fill in the last word. One jingle says, "*Cuando el niño tiene obradera, dele liquido para que no...se muera*" (When a child has diarrhea, give him liquids so he doesn't die). The other says, "*La madre que pecho da es madre de...verdad*" (A mother who breastfeeds is a true mother). The latter jingle was also made into a poster.²¹

Often a respondent gave a word which was correct in terms of content but was not the precise word used in the jingle. Because the intent of this question was to measure a jingle's "staying power" and not to measure knowledge *per se*, such answers were coded as incorrect; only mothers completing the sentence with the exact word were counted as correct. Table X-3 shows the proportion of mothers correctly completing each jingle, by measurement wave.

We attempted to obtain data on the specific amount of exposure each jingle received on the radio each year of the project. Figures are available only through 1985, so that the most recent exposure rates are missing. Figure X-1 graphs the number of airings for each slogan as well as the number of Dr. Salustiano programs, by year. Initially the breastfeeding jingle received more air play than "give liquids", but during 1983 and 1984 they were equally aired. In 1985, however, the breastfeeding jingle was taken off the air and the "give liquids" jingle given even more play. Unfortunately, we do not know what exposure levels were during 1986 and 1987 -- the period most relevant to recall, since the data were collected in 1987.

²¹ It was learned after collecting the Resurvey data that the breastfeeding slogan also appeared on a poster. The fact that this slogan received exposure via two different media makes it impossible to separate the individual effects of each medium on mothers' recall. In other words, we do not know whether mothers recall the slogan because they heard it on the radio, because they saw it on a poster, or because the two media were mutually reinforcing.

Table X-3. Percentage of Mothers Able to Correctly Complete Jingles Used in the Campaign by Wave

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|-----------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| Knows "give liquids during diarrhea" jingle | 70% | 71 | 76 | 74 | 57 | 49 | 27 ^{2,3} | 24 ^{4,5} | 5 ⁶ | 16 |
| Knows "'true' mothers breastfeed" jingle | 65 | 70 | 74 | 83 | 83 | 72 ¹ | 79 ² | 81 ⁴ | 37 ⁶ | 59 |
| N of cases | (327) | (285) | (294) | (284) | (357) | (229) | (455) | (262) | (648) | (1365) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

We do know that radio is currently playing only a small role in the effort to promote ORT, and therefore we would expect its impact to be strongest among mothers in Region 1, the site of the intensive campaign, which used radio extensively as a promotional vehicle from 1981 to 1983. The data comparing Region 1 with other regions conform to our expectations: a considerably greater proportion of mothers residing in Health Region 1 than other regions was able to complete the jingles correctly. Eighty percent (80%) of mothers in Region 1 (including both multi-measure and single-measure communities) knew the breastfeeding jingle, compared with 37% outside Region 1. For the "give liquids" jingle the figures are 26% in Region 1 and

Figure X-1: Number of Radio Spot Broadcasts by Year

| | 1981 | 1982 | 1983 | 1984 | 1985 |
|-------------------------|------|------|------|------|------|
| Madre de verdad spots | 4586 | 4230 | 4350 | 5598 | 0 |
| Dele liquidos spots | 3200 | 2825 | 4350 | 5598 | 8541 |
| Dr. Salustiano programs | 100 | 100 | 100 | 0 | 0 |

Source: Academy for Educational Development, Honduras

5% outside of Region 1. The higher level of recall associated with the breastfeeding slogan both within and outside of Region 1 probably reflects its exposure in print as a poster.

What are recall trends over time? In Region 1 (where prior data are available), recall on the breastfeeding slogan remained at previous levels achieved during MMHP. This is not the case for the "give liquids" slogan, for which recall has sharply declined since 1983. Again, recall of the breastfeeding slogan is undoubtedly enhanced by being displayed as a poster.

As another measure of exposure, the MMHP and Resurvey questionnaires asked mothers if they had heard of Dr. Salustiano, a fictitious character who was created to serve as a credible source for providing information about diarrhea prevention and treatment. Programs featuring Dr. Salustiano received heavy air play (about 100 per

year) during MMHP. However, as Figure X-1 shows, in 1984 it was decided to discontinue his programs. This means that mothers in Region 1 heard his programs for three years, while other mothers heard them for about one year. The data reflect this difference. As Table X-4 indicates, more mothers in Region 1 have heard of Dr. Salustiano than other mothers: 69% of the pooled multi-measure and single-measure respondents in Region 1 versus 53% in other regions ($p < .0001$). What is surprising is that the proportion of mothers who had heard of Dr. Salustiano has experienced little or no decline in Region 1, in spite of the fact that his programs had not been aired for three years prior to the survey.

Table X-4. Percentage of Mothers Who Say They Have Heard a Radio Spot Featuring Dr. Salustiano

| | MMHP Longitudinal | | | | | | HEALTHCOM Resurvey | | | |
|--|---------------------------|----------------|----------------|----------------|-----------------|-----------------------|----------------------|-----------------------|-----------------|----------------|
| | Region 1 | | | | | | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | Single-Measure Comms. | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | | 5/87 | | | |
| Has heard of Dr. Salustiano | 59% | 64 | 79 | 84 | 78 ¹ | 69 | 71 ^{2,3} | 65 | 53 ⁶ | 61 |
| N of cases | 327 | 285 | 294 | 284 | 357 | 229 | 461 | 262 | 678 | 1401 |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

In an unaided recall question, mothers who said they had heard of Dr. Salustiano were asked what he talked about, and were permitted to give multiple answers. In fact, the doctor addressed a range of subjects having to do with diarrheal management: Litrosol, dehydration, breastfeeding. In Region 1, 18% of mothers who said they had heard of Dr. Salustiano "did not know" what he talked about; in other Regions, 24% of mothers did not know ($p=.0351$). These are moderately low rates of forgetting, given that his programs have not been on the radio since 1983. Among mothers who thought they knew what the doctor talked about, the most common topic cited was "Litrosol" (52%), followed by "diarrhea/dehydration" (40%), "child care" (17%), and "breastfeeding" (9%) -- with no significant differences between Region 1 and other Regions. The frequencies of these responses in fact generally reflect the relative emphasis among the topics addressed by Dr. Salustiano, and provide evidence of accuracy of recall among mothers who said they remembered what the doctor talked about.

LITERACY AND PRINT MATERIALS

Print materials in the form of a series of posters and an instructional mixing flyer supported the ORT promotional effort. Posters were displayed primarily in the health centers, and were meant to reinforce basic campaign messages. The mixing flyer which accompanies the ORS packets provides a pictorial as well as written explanation of correct mixing procedures.

The Resurvey asked mothers about the instructional flyer as well as about literacy, and those results are presented in this section of the report. Time considerations precluded inclusion of poster recognition and recall questions in the Resurvey. (Even before asking about recall, such questions involve mothers' descriptions of posters they have seen and a judgment on the part of the interviewer as to whether the poster described is a particular one produced by the campaign -- a very time-consuming process.)

Literacy

Respondents were asked whether they could read, in order to investigate the relationship between reading and ORS use. It should be noted that Resurvey data on literacy is not directly comparable to MMHP data. Respondents in MMHP were actually given a simple reading test; due to time constraints, Resurvey respondents were simply asked, "Do you know how to read?" Presumably, more mothers would respond affirmatively to the Resurvey question than would pass the reading test.

About the same proportion of mothers in each measurement group (73%) said that they were able to read. A high proportion of respondents said that someone else in the household was also able to read: 90% of Region 1 households and 86% outside Region 1 ($p=.0226$). This results in a high overall household literacy rate of 94%. That is, in 94% of households at least one person -- the mother or someone else -- is capable of reading. The literacy rate in the early 1980s, based on the actual reading test administered as part of the MMHP evaluation, was 57% of mothers and 75% of households. It is possible that, in point of fact, more mothers are now literate than were in 1981, although it is also probable that the current figure is somewhat inflated since it is not verified by a test.

Instructional flyer

The rehydration salts produced in Honduras are supposed to be packaged in sets of three and accompanied by a flyer which shows how to mix the solution. The flyer was designed to be understood by readers and non-readers alike, since it included a pictorial explanation of how to use the packet in addition to simple written instructions. Overall, 59% of respondents said that they had seen the flyer, with a greater proportion of mothers in Region 1 having seen it than other mothers (65% compared with 53%, $p<.0001$). Mothers were asked if they had a flyer in the house and, if so, to show it to the interviewer. Five percent (5%) of all mothers produced the flyer to show to the interviewer.

These data indicate that a large portion of packets are distributed without the instructional flyer. Fifty-six percent (56%) of mothers said they had seen the flyer, even though 85% of mothers indicated that they had tried ORS. Furthermore, the proportion of mothers who had a flyer in the home (5%) is small, particularly when compared with the percentage of mothers who had packets in the home: 31%. Undoubtedly, some mothers who had actually seen the flyer forgot that they had, and some of the flyers that had originally come with packets were thrown away. However, the large discrepancy in the percentages strongly suggests that packets are not systematically accompanied by flyers. This conclusion is corroborated by a question in the treatment section which asks (of mothers who treated with ORS) whether the packet they had used in the previous two weeks came with a flyer; only 29% of mothers said that it did.

The low level of flyers in circulation is probably not a significant impediment to ORS use at this stage of the project. Flyers are most useful as a reference when a mother is first learning to mix the solution. Since the mixing process is simple, it is likely that once a mother has prepared the solution, she will no longer need instructions to do so in the future. Since 85% of mothers have tried ORS (see Chapter VI on ORS use) and 75% of mothers can correctly describe mixing procedures (see Chapter XII on mixing), most will not need a flyer in order to treat an ill child with ORS. Further, if a reminder how to mix is needed, the packet itself has basic instructions on it. Unavailability of a flyer presents a problem when a new mother wishes to learn to mix, or when a mother is unsure if she remembers the correct proportions of ingredients.

HEALTH WORKER CONTACT

During MMHP a great deal of emphasis was placed on training health workers in proper case management of diarrhea -- not only so they could provide optimum treatment for cases under their care, but also so that they could serve as a reliable information resource on home care for mothers with whom they had contact. Thus, interpersonal sources were considered a very important communication channel, and

the MMHP evaluation monitored mothers' frequency of contact with various kinds of health providers.

We distinguish between three categories of health providers in Honduras: traditional, community, and institutional. Traditional healers have no formal training in health, and include *sobadors* (masseuse), *curanderos* (healers), and *espiritistas* (spiritualists). Community health workers usually have had some brief, specialized training relevant to their clientele, and include *guardianes* (village health worker), *parteras* (midwives), and *representantes de salud* (health representatives who perform specific health assistant tasks). The third kind of health worker has undergone formal training in health and is based in a health institution in a fixed location, such as a regional health center or clinic or doctor's office. Included in this category are nurses, auxiliary nurses, and doctors.

As in the MMHP evaluation, the Resurvey asked how many contacts a mother had had with various health providers in the six months prior to the interview. It should be noted, however, that the MMHP study collected data on all of the above providers, while in the Resurvey only the health providers most relevant to care of infants with diarrhea were asked about: the *sobador*, *guardian*, *partera*, health center personnel, and hospital staff. Two types of traditional health providers and two kinds of community workers were omitted from the Resurvey and should be taken into account when comparing MMHP and HEALTHCOM data.²²

Twenty percent of mothers report having had no contact with any kind of health provider in the six months prior to their interview. Over half (52%) had one contact, about 20% two contacts, and the remaining 8% had three or more contacts. By far the greatest number of contacts were made with a health worker in a fixed facility: among women who had had any contact with a health provider, 81% of the total

²² It should also be noted that this is a different series of questions from those reported on in the treatment section in Chapter 7. Those questions ask if consultation with a health worker was sought for a specific case of diarrhea. This series is more general, asking simply, "In the past six months, have you taken your child to the *guardian*? To the health center?" etc. This set of questions was asked of all mothers, not just those who had a child with a recent bout of diarrhea.

number of contacts were with a trained health provider, compared with 12% with community workers, and 7% with traditional healers. There appears to be an increase in percentage of institutional contacts since MMHP; however the data are difficult to interpret since not all kinds of health providers were asked about in the Resurvey. There were no regional differences in these data.

RELATIONSHIP BETWEEN COMMUNICATION CHANNELS AND ORS USE

The previous sections of this chapter described mothers' contact with the campaign via electronic, print, and interpersonal communication channels. We now investigate the current relationship between a mother's exposure to each of the channels and her use of ORS. Initially, in planning the Resurvey, we assumed that the Honduras HEALTHCOM project continued the MMHP approach of relying heavily on mass media, in addition to interpersonal channels, to promote ORT. We intended, therefore, to look at issues of relative effectiveness of channels at this stage of the project, investigating such questions as, "Is a mother who listens to the radio frequently more likely to use ORS than an infrequent listener?" "Is exposure to a given channel more strongly related to ORS use than exposure to another?" We have since learned that campaign strategy has shifted to emphasize face-to-face communications by health workers, and that radio support now plays a minor role in ORT promotion. Thus, data regarding the association of channels of communication with ORS use cannot be interpreted as shedding light on channel effectiveness, but rather on whether ORS use now reflects this change in strategy.

In order to examine this relationship, we looked at the group of mothers who had had a child with a case of diarrhea occurring within the two weeks prior to the interview (N=629).²³ Table X-5 shows the percentage of mothers who gave ORS for a case of

²³ In other words, we are using here the mother-based measure of ORS use, and not the case-based measure. A mother may have had more than one child ill with diarrhea within the two-week recall period. We classified her as a user if she had treated *any* of those cases with ORS. For a full explanation of the difference between mother-based and case-based measures, see Chapter V on "Measuring ORS Use."

diarrhea within the prior two weeks, by her exposure to electronic, print, and interpersonal channels.

Radio exposure and ORS use

We first looked at various measures of exposure to electronic channels of communication -- namely, having a radio, having a working radio, frequency of listening, slogan recall, and recognition of the name "Dr. Salustiano." We found that none exhibits statistical association with use of ORS. Because only Region 1 mothers had participated in the intensive campaign when radio played a more prominent role than at present, we explored the same relationships for this subgroup only; no association among this group was found.

For the most part, these results are to be expected. One reason is that most of the exposure measures indicate *potential* rather than *actual* contact with the campaign, and there are a number of intervening factors which would produce variation in the amount of contact an individual mother had with a given message. For example, a mother may have a working radio and listen two hours per day, and consider herself a frequent listener. Her actual exposure to campaign messages would depend on the amount and kinds of spots and programs broadcast in her particular region, what stations she listens to, and what times she has the radio on. Thus, we do not know the extent to which a given mother has had direct contact with the campaign. Another factor contributing to the lack of association is radio's presently diminished role in promoting ORT. Thus, variables representing a mother's current contact with radio (having a radio, having a working radio, frequency of listening) are now largely irrelevant and should be unrelated to whether or not she uses ORS. Other variables which evidence past exposure (jingle recall, remembering Dr. Salustiano) might reasonably be expected to have some association with ORS use. The fact that they do not suggests that radio messages are most effective as reminders, prompters, or reinforcers close to the time of decision, but that once they are withdrawn, their impact over future decisions

**Table X-5. Exposure/Communication and ORS Use
% Giving ORS, by Response to Communication Questions
(Among Women Who Had a Child With Diarrhea Within 2 Weeks of Interview)**

| | | % Gave ORS | Row N |
|--|-----------------|--------------------|-------|
| ELECTRONIC CHANNELS | | | |
| Has 1 or more radios | no | 49% | 247 |
| | yes | 51 (p* =.8451) | 382 |
| Has 1 or more working radios | no | 52 | 292 |
| | yes | 48 (p =.3162) | 337 |
| Listening frequency | always/often | 50 | 192 |
| | sometimes/never | 50 (p=1.0000) | 437 |
| Knows "give liquids" jingle | no | 49 | 485 |
| | yes | 54 (p =.1117) | 103 |
| Knows "true mothers" jingle | no | 47 | 218 |
| | yes | 52 (p =.3663) | 374 |
| Has heard of Dr. Salustiano | no | 49 | 245 |
| | yes | 50 (p =.5980) | 381 |
| PRINT CHANNELS | | | |
| Knows how to read | no | 52 | 170 |
| | yes | 50 (p =.6711) | 459 |
| Has seen instructional flyer | no | 47 | 257 |
| | yes | 55 (p =.0686) | 358 |
| Has instructional flyer | no | 50 | 600 |
| | yes | 52 (p = 1.0000) | 29 |
| INTERPERSONAL CHANNELS | | | |
| In past 6 months: | | | |
| Has visited a traditional Health Worker | no | 47 | 534 |
| | yes | 65 (p =.0019) | 95 |
| Has visited a community Health Worker | no | 46 | 502 |
| | yes | 67 (p =.0000) | 127 |
| Has visited a health facility | no | 43 | 111 |
| | yes | 52 (p =.1381) | 518 |
| TOTAL. | | 45% | 629 |
| * p values are cited with Yates correction | | | |

dwindles. More immediate factors, such as severity of the episode and access to packets, exert greater influence over the decision to use ORS than the more distal exposure measures do.

Print Channels and ORS use

The data were analyzed to determine whether there was any relationship between use of ORS and three variables related to print materials: whether or not the mother could read, whether or not she had ever seen an instructional flyer, and whether or not she had a flyer in the home. None was significantly associated with ORS use.

Resurvey data show that a mother's literacy is not associated with ORS use: 73% of both the user and non-user group can read. This finding probably reflects the strategy of emphasizing ORT promotion through health workers, with a relatively small role assigned to print media. It also suggests that the campaign achieved its objective of reaching mothers across a range of educational levels.

We might expect some association between having seen an instructional flyer and ORS use. While this association approached statistical significance ($p=.0686$), it did not meet the standard criterion probability of $<.05$. It should be noted, however, that even a significant relationship between seeing a flyer and using ORS could be spurious, since the only way to obtain a flyer is by acquiring packets. Generally, a mother obtains the packets before she sees the flyer rather than vice versa. It is therefore more likely that a mother is familiar with the flyer because she decided to use ORS than it is likely that she used ORS because she saw a flyer.

Having the flyer at home was unrelated to whether or not a mother had used ORS to treat a recent bout of diarrhea. We might have expected some association here -- even if spurious -- since the flyers came with the ORS packets and their presence suggests that ORS had been used in the past. As noted earlier, only 5% of mothers possessed a flyer, even though 31% had packets in the home -- meaning that packets are no longer routinely accompanied by instructional flyers. The data suggest that this

small number of flyers in circulation is not presenting a major barrier to ORS use -- most probably because 87% of mothers already know how to mix the ORS solution.

Interpersonal Channels and ORS use

In contrast to the lack of association between mothers' use of ORS and their exposure to print and electronic channels, contact with a health worker is related to use of ORS. Mothers who had visited a *sobador* or *guardian* in the six months prior to the interview (for any reason -- not just diarrheal illness) were much more likely to have used ORS than other mothers. For example, 46% of mothers who had not had contact with the *guardian* during the prior six months used ORS for a recent diarrheal episode, compared with 67% of mothers who had visited the *guardian* treating with ORS. However, whether or not a mother had visited the health center within the prior six months was not significantly associated with treatment with ORS. It is likely that this lack of association has to do with the fact that there are many reasons to visit clinic: immunization, mother's health, accident, other illness. The Resurvey data do show that consultation with the health center specifically for diarrhea is strongly related to treatment with ORS. (See Chapter VII on treatment patterns.)

The association between contact with a health provider (*sobador* or *guardian*) and ORS use is an expected one, as contact could be made either as a "cause" or an "effect" of the decision to use ORS. Interpersonal contact could prompt use of ORS if a mother seeks treatment advice and the health worker recommends giving ORS. On the other hand, the contact could result from a mother's decision to give ORS, since most packets are obtained from health workers. (See Chapter XII.) Therefore, association with a health worker is in some sense a "requirement" of ORS use.

SUMMARY

The Resurvey examined exposure to the three major channels of communication employed by the campaign and their relation to use of ORS: electronic (radio), print

(packet and flyer) and interpersonal (health worker contact). Current project strategy emphasizes dissemination of information regarding ORS via health workers, so that electronic and print media are taking a smaller role than during the initial MMHP campaign.

As during MMHP, the majority of Honduran families owns a working radio (57%), and listening frequency has remained constant over time. Eighty-three percent (83%) of mothers listen to the radio, and the average listener is tuned in for about 3.5 hours per day. As expected, recall of jingles developed as part of the MMHP intervention was considerably higher in Region 1 (the site of the MMHP intensive pilot campaign) than in other regions. Recall of a jingle on breastfeeding was maintained at prior levels (around 80%), while it declined for a jingle about giving liquids for diarrhea (from about 57% to 27%). The difference in recall may be due to differential levels of exposure (although recent data is not available to verify this hypothesis) or to the use of the breastfeeding slogan in a poster. Neither radio ownership, nor frequent listening, nor jingle recall was associated with use of ORS. The lack of association is probably explained by several factors: the nature of the variables measured (they indicate potential rather than actual exposure), the less active role radio is taking in the current ORT promotional strategy, and radio's strength in creating awareness, which is most pertinent in the early stages of a diffusion project.

Fifty-nine percent (59%) of mothers had seen the instructional flyer which is to accompany ORS packets, and 5% could produce one to show the interviewer. (Exposure to posters was not measured in the Resurvey.) Use of ORS was not statistically associated with having seen a flyer or possessing a flyer. The lack of association of ORS use with possessing or having seen an instructional flyer is most likely attributable to the flyer's decreased importance after a mother has learned how to prepare ORS, and the fact that she can refer to basic instructions on the back of the ORS packet.

The majority (74%) of mothers say that they know how to read. Being literate was not associated with use of ORS, indicating that the campaigns have been successful at reaching women representing a range of educational levels.

Mothers have fairly frequent contact with some kind of health worker, be it a traditional, community, or professional health provider. Eighty percent (80%) of mothers had had at least one contact with a health worker in the six months prior to the interview, with most of those contacts being with someone who worked in a fixed health facility. Mothers who had visited a health worker were more likely to have used ORS to treat a recent case of diarrhea than mothers who had not.

The data conform to what we know about the relative emphasis among channel options in the present project strategy. Radio and print now assume a minor role, and variables related to them show no statistical relationship to use of ORS for a child's recent case of diarrhea. ORT promotion through health workers has taken a primary role, and contact with a health workers does display a significant association with use of ORS to treat a recent case.

CHAPTER XI: LEARNING FROM THE CAMPAIGN

The MMHP ORT campaigns aimed to teach mothers basic information about dehydration, ORS mixing and administration, and breastfeeding. In this study, as in the MMHP evaluation, we distinguish between knowledge about and practice of a given behavior. In the process model, knowledge is positioned as a mediating variable; specifically, it is seen as a result of campaign exposure and a prerequisite for making changes in related behavior. Thus, certain kinds of knowledge are seen as necessary but not sufficient for inducing the desired changes in practice.

While the ultimate objective of the campaigns was to promote health-enhancing behavior²⁴, improving knowledge about ORT is desirable in and of itself, and it is useful to track changes in knowledge as a measure of proximal effects. We now report on the effect of the campaigns on ORT-related knowledge. Subsequently we report on the relationship between knowledge and use of ORT.

In the Resurvey, a series of knowledge questions was asked in order to make a comparison with previous knowledge levels achieved during MMHP, and in order to compare Region 1 levels with those outside of Region 1. Additionally, we were interested in learning what kinds of knowledge is associated with ORS use. The knowledge questions included in the Resurvey were the following:

²⁴ Behavioral measures of Litrosol use, breastfeeding, and recuperative feeding practice were reported in prior chapters.

ORT AND DIARRHEA

- What is dehydration? (definition)
- What does Litrosol do for a child with diarrhea?
- How often should a fresh solution be prepared?
- How much solution should a child ingest in a day?
- Should a child with diarrhea be breastfed?

BREASTFEEDING

- What should a 0-4 month old child be fed?
- Should a child be given the first milk (colostrum)?
(Should a child with diarrhea be breastfed?)

ORS MIXING

- How would you mix ORS?

Other questions which might be considered "knowledge" which test recall of campaign jingles were covered in the communication section of this report (Chapter X). A report on knowledge of how to mix Litrosol is found in the following chapter.

DIARRHEA AND ORT KNOWLEDGE

Defining dehydration

Litrosol and other oral rehydration solutions combat the life-threatening effects of dehydration rather than diarrhea *per se*. Therefore, the MMHP project attempted to teach mothers the basic concept of dehydration as the loss of water. Table XI-1 shows the proportion of mothers in each measurement cycle who were able to define dehydration. Although the concept of dehydration is somewhat abstract, approximately 1/3 of the mothers were able to give a rudimentary definition of it (some idea of water loss or dryness) during the MMHP campaign. That number has declined in the intervening years, to a current overall figure of 20%. Somewhat more mothers in

Region 1 than those outside Region 1 were able to provide a correct definition of the term.

Table XI-1. Percentage of All Mothers Who Correctly Answer the Question "What is Dehydration?", by Wave

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|-------------------------------|--|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|-----------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| Defines dehydration correctly | 38% | 32 | 36 | 32 | 39 | 37 | 21 ^{2,3} | 23 ⁴ | 18 ⁶ | 20 |
| N of cases | (327) | (285) | (294) | (284) | (357) | (229) | (455) | (258) | (663) | (1376) |
| | <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | |

Knowing ORS combats dehydration

ORS does not stop diarrhea; it remedies dehydration. It may be important for a mother to have a realistic idea of what ORS will do for her child in order not to be discouraged by inaccurate expectations. In an effort to assess how many mothers understood the function of ORS, the Resurvey asked, "What does Litrosol do?" As Table XI-2 shows, 23% of mothers said that it cures diarrhea, while 56% said that it prevents dehydration, with roughly equal proportions of Region 1 mothers and non-

Region 1 mothers giving those responses. A small percentage said that it fortifies the child or gives it appetite, and 9% said they didn't know. (Prior data are not available on these questions.) Given the rather abstract nature of the concept of dehydration, a surprisingly large proportion of mothers associate it with the function of Litrosol.

Table XI-2. Mothers' Perception of the Function of ORS

Answers to the question, "What is Litrosol for?"

| | HEALTHCOM Resurvey | | |
|------------------------|--|---------------|----------|
| | Region 1 | Other Regions | Total*** |
| For Diarrhea** | 33% | 53%* | 43% |
| Cures diarrhea | 22 | 24 | 23 |
| Prevents dehydration | 58 | 54 | 56 |
| Fortifies | 9 | 7 | 8 |
| Gives appetite | 3 | 2 | 3 |
| Other | 10 | 11 | 10 |
| Don't know/no response | 7 | 13 | 10 |
| N of cases | 724 | 679 | 1403 |
| | <p>* The chi-square is significant at \leq the .05 level between Region 1 communities and those outside Region 1.</p> <p>** Mothers who responded that Litrosol is "for diarrhea" were then asked "what does it do for diarrhea?"</p> | | |

ORS administration knowledge

Two questions included in the Resurvey dealt with knowledge of how ORS should be administered. One asked how often a fresh solution should be prepared (every day) and the other asked how much solution a child should ingest in one day (a liter). Table XI-3 shows the proportion of mothers giving correct responses to these questions. Fifty-six percent (56%) of mothers participating in the Resurvey correctly responded that a child should be given a liter of the rehydration solution per day, with roughly the same proportion of mothers inside and outside of Region 1 giving the correct response. If we infer that mothers who gave an incorrect answer are giving less than a liter per day, this level of knowledge is cause for concern, given that effective rehydration usually requires ingestion of a full liter of solution. We hesitate to draw firm conclusions regarding over-time trends based on comparisons with MMHP data, since the Resurvey question differed slightly from that used during MMHP, and since the subsample used for MMHP is small. (MMHP questions on ORS administration were asked only of mothers who had used ORS, whereas the Resurvey asked knowledge questions of all mothers.) It does appear, however, that there is little difference in current and prior knowledge about the quantity of ORS to give a child with diarrhea.

The other ORS administration question asked how often a fresh solution should be prepared. Each ORS packet is to be mixed with one liter of water, and, as noted above, the entire liter should be given to the child in one day. If any solution is left over, however, it should be thrown away, since it provides a potential growth medium for bacteria. It is therefore critical that a mother know that she should not save any solution remaining at the end of the day.

As Table XI-3 indicates, about 3/4 of all mothers correctly responded that a fresh batch of ORS should be prepared daily. Somewhat fewer mothers outside Region 1 than inside knew to prepare a fresh solution every day (73% versus 78%, $p=.0230$). Among mothers who have used ORS, 81% correctly answered this question. This means that about 20% of mothers using ORS may be keeping the solution overnight,

Table XI-3. Percentage of Mothers Who Know to Give a Liter of ORS Per Day, and Know to Prepare a Fresh Solution Daily

Among Mothers Who Have Used ORS

| | MMHP Longitudinal | | | | | | HEALTHCOM Resurvey | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|---------------|----------------|
| | Region 1 | | | | | | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | Single-Measure Comms. | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | | | 5/87 | | |
| Knows to give 1 liter/day ¹ | 54 | 60 | 81 | 88 | 58 | 71 | 57 | 54 | 56 | 56 |
| Knows to prepare fresh solution daily ² | 35 | 32 | 28 | 51 | 34 | 65 | 83 | 85 | 78** | 81 |
| N of cases | 116 | 139 | 176 | 176 | 222 | 102 | 382 | 232 | 563 | 1173 |

Among All Mothers

| | | | | | | | |
|--|--|--|-----|-----|-----|------|----|
| Knows to give 1 liter/day ¹ | | | 56% | 52 | 54 | 54 | |
| Knows to prepare fresh solution daily ² | Note: MMHP evaluation did not ask these questions of all mothers | | | 77 | 81 | 73** | 76 |
| N of cases | | | 459 | 260 | 672 | 1391 | |

1. The MMHP question was, "Do you use all the solution in one day?" The Resurvey question asked, "How much ORS should a child take in 1 day?"
2. The MMHP question on this topic differed from the Resurvey question, and is therefore not directly comparable. MMHP asked, "Do you throw it (ORS) away after a day?" The Resurvey question asked, "How often should a fresh solution be prepared?"

NOTE:

Since the MMHP & Resurvey questions are not identical, chi-squares are computed only for within-Resurvey comparisons. A single asterisk indicates a significant difference ($p \leq .05$) between multi-measure and single-measure communities. A double asterisk indicates a significant difference between Region 1 communities (multi-measure and single-measure combined) and other Regions.

thus possibly prolonging or worsening their child's diarrheal episode. Given the importance of keeping the solution fresh, these figures are cause for concern.

Knowledge about breastfeeding during diarrhea

One objective of the campaign was to promote the continuation of breastfeeding during diarrheal episodes. Breastmilk is valuable because of its rehydrating capacity, nutritive value, and hygienic properties. Unfortunately, some women believe that breastmilk encourages diarrhea, and thus they deprive their infant of fluids and nutrients which counter the debilitating effects of diarrhea.

As Table XI-4 shows, most mothers (79%) agreed that breastfeeding should be continued during diarrhea, with a higher proportion of mothers in Region 1 than other regions (82% versus 75%, $p=.0060$) giving the correct answer. This is a moderately high percentage, but, because of lack of prior data, we do not know if it represents a change since the end of MMHP. Interestingly, reports of actual behavior (questions related to actions taken in regard to a specific case) indicate that in fact almost all breastfeeding mothers do continue to nurse when their infants are ill. (See Chapter IX.)

BREASTFEEDING KNOWLEDGE

Throughout MMHP and again in the Resurvey mothers were asked questions regarding their knowledge of proper breastfeeding practice. The campaign encouraged mothers to give the newborn colostrum ("first milk") which is rich in protein and carries crucial immunological properties. Because its color and consistency differs from mature breastmilk, some mothers believe that it should not be given to the infant. As Table XI-5 shows, during MMHP the number of mothers who agreed that colostrum should be given the newborn ranged from 65% to 80%. The Resurvey found that approximately the same proportion of mothers (87%) said that a mother should give colostrum to her newborn.

Table XI-4. Percentage of Mothers Who Say that a Child with Diarrhea Should be Breastfed

| | HEALTHCOM Resurvey | | |
|--|--------------------|---------------|----------------|
| | Region 1 | Other Regions | Resurvey Total |
| Percentage saying "yes" | 82% | 75%* | 79% |
| N of cases | 724 | 679 | 1403 |
| * The chi-square is significant at \leq the .05 level between Region 1 communities and those outside Region 1. | | | |

Breastmilk supplies all of the nutritional needs for an infant up to the age of four to six months. The advantages of breastfeeding over bottlefeeding are substantial. It provides nutritional benefits and immunological protection not available from prepared formulas, is more economical, and more hygienic. During MMHP the number of mothers saying that an infant should be fed breastmilk exclusively for its first four months fluctuated considerably, ranging from a low of 29% to a high of 85%. It is not known why these fluctuations took place. Resurvey data shows that current knowledge levels correspond to the high MMHP levels: 82% of all mothers knew that an infant should be fed breastmilk exclusively for the first four months of life.

KNOWLEDGE AND ORS USE

We were interested in exploring the relationship between knowledge about ORT and its use. What kinds of knowledge are associated with treatment with ORS? In order to investigate this question, we took as our data base the 629 mothers who had had an opportunity to treat a case of diarrhea within the two weeks prior to the interview.

Table XI-5. Percentage of Women Who Say a Child Should be Fed Only Breastmilk in its First Few Months of Life, and Say Colostrum Should be Given to a Newborn

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--------------------------------------|--|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|-----------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| Breastmilk only in first few months* | 55% | 43 | 29 | 57 | 85 | 88 | 84 ² | 86 | 79 ⁶ | 82 |
| Give colostrum to infant | 72 | 65 | 72 | 72 | 80 | 79 | 86 ³ | 89 ⁴ | 87 | 87 |
| N | (327) | (285) | (294) | (284) | (357) | (229) | (462) | (262) | (679) | (1403) |
| | <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Post and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | |

- * The MMHP question differed from the Resurvey question, so the items are not directly comparable. MMHP asked women whether or not they agreed with a statement that only breastmilk should be fed an infant in its first few months of life. The Resurvey asked what an infant should be fed during its first few months of life.

If a mother treated any case with ORS (more than one child may have been ill in that time period), she was classified as a user. Table XI-6 presents the percentage of mothers who used ORS classified by their response on each knowledge question. Although mixing knowledge is covered in the following chapter rather than this one, we include the mixing variables in the table in order to compare its association with ORS with that of other knowledge variables.

As Table XI-6 indicates, there is no consistent pattern with regard to various measures of knowledge and use of ORS. Knowledge about dehydration appears to be linked to

*Table XI-6. Knowledge and ORS Use
% Giving ORS, by Incorrect and Correct Response to Knowledge Questions
(Among Women Who Had a Child With Diarrhea Within 2 Weeks of Interview)*

| ORT & DIARRHEA KNOWLEDGE | | % Gave ORS | Row N |
|---|-------------------|--------------------|-------|
| Can define dehydration | no | 48% | 483 |
| | yes | 57 (p* = .0711) | 133 |
| Knows ORS combats dehydration | no | 45 | 267 |
| | yes | 54 (p = .0218) | 362 |
| Knows fresh solution should be prepared daily | no | 41 | 138 |
| | yes | 52 (p = .0188) | 483 |
| Knows to give 1 liter per day | no | 47 | 278 |
| | yes | 52 (p = .2276) | 348 |
| Knows breastfeeding should continue during diarrhea | no | 46 | 110 |
| | yes | 51 (p = .3355) | 519 |
| BREASTFEEDING | | | |
| Knows to breastfeed exclusively first 4 months | no | 45 | 122 |
| | yes | 51 (p = .2590) | 507 |
| Knows to give colostrum | no | 39 | 75 |
| | yes | 52 (p = .0441) | 552 |
| MIXING KNOWLEDGE | | | |
| Correctly describes ORS preparation | no | 34 | 74 |
| | yes | 52 (p = .0042) | 555 |
| Says doesn't know how to prepare ORS | no | 52 | 605 |
| | says doesn't know | 8 (p = .0001) | 24 |
| TOTAL | | 45% | 629 |
| * p values are cited with Yates correction | | | |

use of ORS. For example, knowing that ORS addresses dehydration rather than diarrhea is significantly associated with ORS use: 54% of mothers who had a correct idea of the function of Litrosol used ORS to treat a recent case, versus 45% of

mothers who did not name dehydration as the function of Litrosol ($p=.0218$). The ability to define dehydration approached significance, with differential treatment rates of 48% and 57% ($p=.0711$).

Of the two questions regarding administration of ORS, one is related to use of ORS and one is not. Mothers who knew that a fresh solution should be prepared every 24 hours were more likely to treat with ORS than mothers who did not. On the other hand, mothers who knew that a liter per day should be administered were not more likely to use ORS than other mothers.

Knowing that breastfeeding should be continued during an episode of diarrhea was not associated with use of ORS.

Two questions regarding mixing knowledge were asked: "Do you know how to mix ORS?" and "Can you tell me how you prepare the solution?" Both mixing measures - believing one knows how to mix, and correctly describing how to mix -- are associated with ORS use. Mothers who responded that they didn't know how to mix were much less likely than others to treat diarrhea with ORS: 8% of them treated with ORS versus 52% of mothers who believed they knew how to prepare the solution ($p=.0001$). Similarly, mothers who were able to give a correct description of how to prepare ORS were more likely to use it as a treatment for diarrhea than mothers who did not, at comparative rates of 52% and 34% ($p=.0042$). A more detailed analysis of mixing knowledge is given in the following chapter.

The data suggest that mothers who have appropriate expectations about using ORS (knowing ORS is for dehydration) and those who have the requisite mixing skills are more likely to use ORS than other mothers. These relationships are logical; a mother is more likely to take a particular action if she has a realistic idea of the outcome and possesses the skills to perform it. If a mother expects Litrosol to stop her child's diarrhea, she may become discouraged and discontinue use. If she does not believe that she can mix the solution, she is likely to turn to another remedy which is familiar to her.

Knowledge regarding the administration of ORS is not a necessary prior condition for use; that is, it is possible to use ORS but do so incorrectly. We therefore do not necessarily expect an association between administration knowledge and use of ORS. It is plausible, however, that an association would emerge as an *outcome* of use since it is likely that a mother who has experience with ORS knows more about the correct way to use it. She may, for example, be given information regarding how to administer ORS from a health worker who gives her packets, or she may prepare the solution and then seek information about how much she should give. The two variables related to administration of ORS -- how often to prepare a new batch of ORS and amount to give in one day -- present a mixed picture. It is not clear why the first is related to use, while the second is not.

SUMMARY

The Resurvey measured ORT-related knowledge, including knowledge about dehydration, administration of ORS, and mixing. For most measures for which prior data are available, knowledge related to ORT has been maintained at MMHP peak levels. The exception is ability to define dehydration, which has declined somewhat since 1983. For most knowledge measures there are statistically significant but rather small differences between Region 1 and other regions, meaning that mothers who have been reached primarily through the national ORT program have almost attained the knowledge levels of mothers who reside in the intensive pilot area.

ORT and breastfeeding knowledge variables are inconsistent in their relationship to actual use of ORS. Mixing knowledge, however, is highly related. A significantly greater proportion of mothers who know correct mixing procedures use ORS than mother who do not.

CHAPTER XII: ORS MIXING

What proportion of mothers knows how to prepare the oral rehydration solution correctly? Where did they learn to prepare it? Are mothers able to obtain packets when they need them? Where do they get them? In this chapter we examine matters related to the preparation of ORS: mothers' knowledge of how to mix ORS, where they learned to do so, and their access to packets for mixing.

KNOWLEDGE OF HOW TO MIX ORS

Preparing the oral rehydration solution is a relatively straightforward task: the pre-measured packet of salts is mixed with a liter of water. Yet mixing ORS is not as easy as, for example, giving a pill to a child. It may not be immediately clear to a mother what she is to do with the packet of salts -- that she is to mix it with water, that she should use the whole packet, and that the liquid volume should equal a liter. And the dangers of altering the solution, by adding sugar for example, will not be apparent. All of these things had to be taught by the campaign.

In the Resurvey, mixing knowledge was examined in two ways. All mothers were asked to describe how to mix, and a subset of mothers was asked to demonstrate how they prepare the solution. A separate report fully describes the mixing trials, but we use data from the demonstrations to explore the extent to which the verbal explanations correspond to actual behavior. In this section, we will use the term "mixing knowledge" to refer to verbal descriptions of mixing, and the term "mixing behavior" to refer to what mothers actually do when they prepare the rehydration solution.

All mothers, whether they had ever used ORS or not, were asked the question, "Could you tell me how you would prepare the solution? What would you put in it?" Each ingredient mentioned was noted, and for each mentioned, the interviewer asked, "How much (ingredient)?" The correct answer is to mention only the packet and water -- no other ingredients -- and to indicate that the amounts are one whole packet and a liter of water. Some mothers believe that adding something to the solution, such as sugar or salt, makes it more appealing or effective. As a check on whether mothers know they should not add anything to the solution, mothers were asked, after describing the mixing procedure, "Do you ever add anything else?" The correct answer is "no."

A mixing procedure knowledge variable was calculated with a dichotomous outcome (mixes correctly or not). A mother was said to know how to mix if she:

- 1) knows to use the entire packet
- 2) knows the packet is to be mixed with water
- 3) knows that the amount of water is 1 liter
- 4) says she never adds anything else to the mixture.

This calculation indicates how many mothers can accurately cite the ORS "recipe," but it does not tell us how many mothers actually mix ORS accurately. We first look at mothers' descriptions of how to mix, and then compare them with their actual mixing behavior.

Table XII-1 shows the percentage of mothers meeting all of the above four criteria, by region. Three-fourths (75%) of all mothers in the sample correctly described how to mix, while among mothers who had ever used ORS, 80% gave correct descriptions. In comparison, among mothers who said they have never used ORS, 47% correctly described the mixing procedure ($p < .0001$). A greater proportion of mothers in Region 1 knew how to mix than did mothers residing outside Region 1 at comparative rates of 79% and 71% ($p = 0.0004$). From the standpoint of successful education via public communication, these percentages might be considered high; however, given the

potentially deleterious consequences of improper mixing, these percentages could be targeted for improvement.

Table XII-1. Percentage of Mothers Giving Correct Mixing Descriptions

| | HEALTHCOM Resurvey | | | |
|---|--|-------|---------|-------|
| | Region 1 | Other | Total % | Row N |
| Among all mothers | 79% | 71%* | 75% | 1403 |
| Among mothers who have EVER used ORS | 83 | 77 | 80 | 1188 |
| Among mothers who have NEVER used ORS | 59 | 36* | 47 | 215 |
| <p>Correct mixing =</p> <ul style="list-style-type: none"> - Knows to use entire packet - Knows packet is to be mixed w/water - Knows amount of water is 1 liter - Says never adds anything to the mixture | <p>* The chi-square is significant at $p \leq .05$ between Region 1 communities and those outside Region 1.</p> | | | |

Errors in mixing knowledge occurred in either the proportions cited or in adding extraneous ingredients. The great majority of mothers who have used ORS knew that one packet of rehydration salts should be mixed in a liter of water: 93% cited the correct proportions of water and (packet) salts. This means, however, that the other 7% may be mixing either too dilute or too concentrated a solution. A dilute solution loses effectiveness, while a concentrated solution can dangerously worsen dehydration. Even more important is whether a mother who knows the ORS recipe can accurately execute that recipe. Among mothers who correctly described the ingredients and proportions, only 55% actually measured a liter of water with an acceptable degree of accuracy. We gave a hundred milliliter leeway on this measurement, and counted as "accurate" any volume of water between 900 and 1100 milliliters inclusive.

The other common error in mixing descriptions occurred in the addition of extraneous ingredients. Among mothers who had ever used ORS, approximately 13% did not say "no" when asked if they ever added something (besides water) to the mixture. This is likely to be an overestimation of the proportion of mothers who actually do add something to the mixture. The only acceptable answer to the question "Do you ever add anything else" was "No." Some mothers responded "I don't know," and may in fact never put additional ingredients into the mixture, yet their response would be coded as incorrect. We find, in fact, that only 3% of mothers who participated in the mixing trials did add something to the solution they prepared while being observed by the interviewer. The figure of 3% derived from the mixing trials is almost certain to be a closer estimate of the true number of mothers who add something to the mixture than the 13% who did not respond "no" to the question as to whether they ever add anything to the mixture.

These estimates of the proportion of mothers who add extraneous ingredients to the mixture may or may not be cause for alarm, depending on what, and how much, is added. Adding sugar or salt can be harmful to the young child, though adding fruit juice would not jeopardize the therapeutic quality of the solution. We can make some inferences about what is added from the results of the mixing trials. Three percent (3%) of mothers who participated in the mixing trials added sugar and/or salt, and none added juice. It is likely, therefore, that most mothers who said they sometimes add something to the solution are adding undesirable ingredients to it.

How difficult did mothers perceive the process of mixing to be? All women, whether or not they had ever prepared an ORS solution, were asked whether they thought mixing Litrosol was difficult, a little difficult, or easy. The great majority of women (94%) considered mixing to be easy. The perception that mixing ORS is a simple procedure is likely to be a factor which facilitates adoption of ORS as a remedy for diarrhea.

SOURCES OF LEARNING ABOUT MIXING

A mother could have learned how to mix ORS from a variety of sources. Indeed, it was a deliberate strategy of the MMHP campaign to provide multiple opportunities for mothers to learn about oral rehydration therapy. Both media (radio and print) and interpersonal sources were used. Interpersonal sources included traditional, community, and professional health workers. In the initial stages of MMHP, the *alcalde auxiliar*, or "mayor's assistant," was deemed to be a potential opinion leader who could facilitate promotion of ORT use, although he was not included in later project strategies.

In order to monitor changes in sources of information about mixing procedures, Resurvey interviewers asked mothers where they learned to prepare the ORS solution. (Mothers who had previously indicated they didn't know how to mix were not asked this question.) Table XII-2 documents that currently the most common means by far of learning how to mix ORS is through health center personnel, who taught 53% of the mothers in the multi-measure communities, 74% in the single-measure communities, and 76% of mothers outside Region 1 ($p < .0001$). There is considerable variation by site with regard to role of the health center in providing mixing knowledge, from a low of 45% in Yuscarán to a high of 78% of mothers in San Francisco learning to mix at the health center.

A distant second source of learning is the *guardian* (community health worker with special training in ORT), especially in Region 1 where *guardianes* played a central role in the pilot intervention's teaching and packet distribution strategy. According to Resurvey data, the *guardianes* taught mixing procedures to 12% of the mothers in Region 1 and 5% of mothers outside Region 1 ($p < .0001$). Examination of source of learning by site reveals even greater differences, with 18% of mothers in Yuscarán attributing mixing knowledge to the *guardian*, compared with only 1% of mothers doing so in Salamá. In Yuscarán, both community and institutional health workers play major roles in teaching mothers about the preparation of ORS, whereas in Salamá the health center has almost entirely assumed the role of teaching mothers mixing procedures. These data reflect variations in program implementation as well as in

**Table XII-2. Where Mothers Learned About the Preparation of ORS
(As % of Mothers Who Believed They Knew How to Mix)**

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|-----------------|----------------|
| | Region 1 | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | | | | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | 5/87 | | | | |
| Packet/flyer* | 40% | 58 | 55 | 51 | 49 | 62 | 6 ^{2,3} | 5 ⁴ | 3 ⁶ | 4 |
| Guardian | 21 | 19 | 16 | 27 | 29 | 31 | 14 ³ | 10 ⁴ | 5 ⁶ | 9 |
| Alcalde auxiliar | 10 | 10 | 4 | 8 | 7 | 6 | 0 | 1 | 0 | 0 |
| Health Center | 22 | 15 | 14 | 16 | 40 | 37 | 53 ^{2,3} | 74 ^{4,5} | 76 ⁶ | 68 |
| Poster | 1 | 1 | 0 | 1 | 5 | 1 | 1 | 0 | 0 | 11 |
| Radio | 11 | 14 | 14 | 23 | 27 | 23 | 9 ³ | 24 ⁵ | 2 ⁶ | 4 |
| Friend/neighbor** | | | | | | | 9 | 4 ⁵ | 9 | 8 |
| TOTAL %*** | 105 | 116 | 102 | 126 | 156 | 161 | 100 | 100 | 100 | 100 |
| N of cases | (114) | (138) | (173) | (176) | (118) | (99) | (494) | (255) | (630) | (1329) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

* Since the MMHP question did not include a category for "instructional flyer", mothers who gave that response may have been included in the "packet" category. The Resurvey figures combine both responses in this category.

** Not included as a category in the MMHP question.

*** MMHP respondents were permitted to name more than one source, so the total percent adds up to more than 100 for MMHP.

availability of *guardianes*. For example, Salamá recently lost its only *guardian*, while there are ten *guardianes* in the sample communities around Nacaome.

Resurvey data also suggest that ORS use is becoming "institutionalized" in the community in the sense that diffusion of information about it is taking place among personal networks. Eight percent (8%) of mothers who learned to mix did so from their friends and neighbors, meaning that personal networks now account for approximately as much dissemination of mixing information as the *guardianes*. It is difficult to draw conclusions on trends in the role of personal contacts, however, since the MMHP question did not ask about them as a source of mixing information.

It is clear from a comparison of MMHP data with HEALTHCOM Resurvey data that there has been a shift in where mothers are learning about preparation of the ORS solution, although in making comparisons it should be noted that the longitudinal MMHP and Resurvey data are not strictly comparable. In some of the MMHP data collection waves, mothers were permitted to name multiple sources of learning and may have been asked about each possible source separately, since in some of the waves the percentages add up to more than 100%. In the Resurvey, mothers were simply asked where they first learned to mix the solution with the expectation that one source would be named.

In spite of this caveat in interpreting the data, it is safe to conclude that several changes have taken place: the *guardian*, *alcalde auxiliar*, radio, and packet instructions used to be more common sources of learning about ORS than they are at present. Declines in these sources have been dramatic, while the health center now functions as the primary source of information about ORS. MMHP data show that the *guardianes* played a more prominent role during the intensive campaign, with about 30% of mothers indicating they had learned to mix Litrosol through these community health workers, compared with a current figure of 9% of mothers nationally who learned from *guardianes*. While the *alcalde auxiliar* was never a major source of mixing information -- MMHP percentages ranged from 6% to 10% -- Resurvey figures for this source approach zero. This change is to be expected, since current promotional strategy does not include the *alcaldes auxiliares*. The role of radio has also decreased.

MMHP figures fluctuated from 11% to 27%, whereas now nationally only 4% of women say they learned to mix ORS from the radio.

At each data collection point in the MMHP evaluation, the most frequently mentioned source of instruction on mixing was the Litrosol packet itself. Responses counted in this category may include mothers who mentioned the instructional flyer which was supposed to accompany the packet, as the MMHP question does not include a "flyer" category. The percentage of mothers who named the packet (and possibly the flyer) as their source of learning how to mix varied from 40% to 62% during the campaign. According to Resurvey data, the packet is now one of the least common sources of mixing information, even when responses of "packet" and "flyer" are combined, and account for only 4% of the mothers.

The clear conclusion from the data on sources of learning to mix is that the health center has become the focal point for dissemination of information about mixing ORS. Other sources of information which were common during MMHP -- the *guardian*, assistant mayor, the ORS packet, and the radio -- now play a minor role.

AVAILABILITY OF ORS PACKETS

Availability of ORS packets is critical to the success of the project. Once a mother decides to use ORS, she must be able to obtain a packet without undue difficulty in order to act on her intentions. We asked several questions related to packet availability in the Resurvey. All mothers in the sample were asked if they had ORS packets in the house. Those who said they did were asked how many, and were asked to show them to the interviewer. Thus we have a validated measure of the number of packets Honduran mothers in the sample have in their homes. All mothers were also asked if they had ever unsuccessfully tried to obtain a packet. Furthermore, mothers who had treated a case of diarrhea with Litrosol within the two weeks prior to the interview were asked where they had acquired the packet they used for

treatment. This section reports data related to these questions regarding availability and source of packets.

All women, whether they had treated a case with ORS or not, were asked if they had packets in the house. About 1/3 of the women said that they did (and showed the packets), with a higher proportion in Region 1 than in other Regions having packets (38% versus 31%, $p=.0045$). Of those who had packets, most (78%) had one or two. This is a high proportion of women who keep packets on hand, and lends credence to the high rates of ORS use reported by the women in this sample. If packets are produced in sufficient quantities in Honduras, keeping packets is a desirable practice, particularly for women who live in the more remote areas. A mother is much more likely to administer ORS if packets are conveniently at hand when the need arises.

ORS packets are distributed free of charge by the health centers established by the Honduran Ministry of Health. Not all communities have health facilities, and mothers from the more remote areas must travel considerable distances to reach the health center. For mothers who live outside the county seat ("urban" area), the average traveling time to the health center is 66 minutes -- over an hour. In an effort to make ORS readily available to mothers when they need it, campaign planners devised the idea of establishing packet distribution points within the community. Initially, the Assistant Mayors and the village *guardian* were selected to serve this purpose.

As a means of identifying current packet distribution channels, the Resurvey asked mothers who had treated a recent case with ORS where they had obtained the packet they used. In Region 1, about half the mothers (52%) acquired the packets from the health center and about 1/4 (24%) got them from the *guardian*. In other Regions, the health center is an even more common source of packets (71%), while the *guardian* is a much less common source (12%). The immunization campaign supplied packets used for 12% of the cases in Region 1 and 7% in other Regions.

The MMHP evaluation tracked mothers' source of packets over the course of the campaign. There are clear changes over time in mothers' sources of rehydration salts.

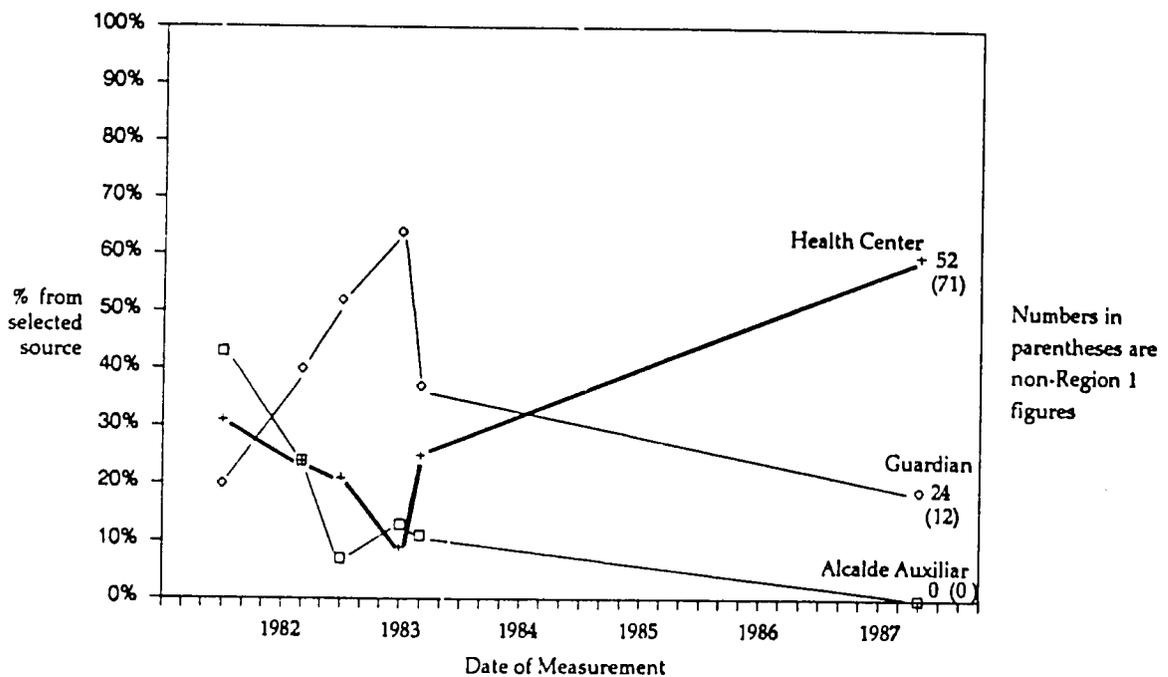
While the Region 1 project initially emphasized community distribution sources, that emphasis decreased in the later stages of the pilot campaign and in the national expansion of the project. Consequently, the *guardian* does not currently play as prominent a role as s/he used to. Similarly, the town "Assistant Mayor" no longer functions as a distributor. The health center, always one of the major sources of packets, has now become by far the predominant source. Table XII-3 and Figure XII-1 depict these trends.

Table XII-3. Changes in Source of Litrosol Used to Treat Episodes in Past Two Weeks

| | MMHP Longitudinal | | | | | HEALTHCOM Resurvey | | | | |
|--|---------------------------|----------------|----------------|----------------|----------------|-----------------------|----------------------|-----------------------|-----------------|----------------|
| | Region 1 | | | | | | | | Other Regions | Resurvey Total |
| | Multi-Measure Communities | | | | | Single-Measure Comms. | Multi-Measure Comms. | Single-Measure Comms. | | |
| | Wave 1 8/81 | Wave 2 4/82 | Wave 3 8/82 | Wave 4 2/83 | Wave 5 5/83 | | | | 5/87 | |
| Guardian | 20% | 40 | 52 | 64 | 37 | 60 | 25 | 23 | 12 ⁶ | 19 |
| Alcalde auxiliar | 43 | 24 | 7 | 14 | 11 | 0 | 0 ² | 0 | 0 | 0 |
| Health Center | 31 | 24 | 21 | 9 | 26 | 20 | 45 ³ | 64 ⁴ | 71 ⁶ | 60 |
| Hospital | 3 | 2 | 1 | 0 | 9 | 0 | 8 | 0 | 3 | 4 |
| Other | 3 | 11 | 18 | 14 | 17 | 20 | 22 | 13 | 15 | 17 |
| N of cases | (35) | (55) | (84) | (22) | (35) | (5) | (129) | (78) | (153) | (360) |
| <p>Key: The chi-square is significant at \leq the .05 level between:</p> <ol style="list-style-type: none"> 1. MMHP: Wave 5 and single-measure communities 2. Wave 1 and Resurvey multi-measure communities 3. Wave 5 and Resurvey multi-measure communities 4. MMHP single-measure communities and Resurvey single-measure communities 5. Resurvey: multi-measure communities and single-measure communities 6. Resurvey: Region 1 and outside Region 1 | | | | | | | | | | |

All mothers were also asked whether they had ever sought packets and been unable to obtain them. One quarter of women in Region 1 responded yes to this question, while 17% of women outside Region 1 did so ($p < .0001$). These rather high rates of inaccessibility are corroborated by the responses to a related question: mothers who did not treat their child's recent case with ORS were asked why they did not do so. Nearly half responded that they "didn't have packets." (See Chapter 6.) While this figure is likely to be inflated, it is of sufficient magnitude to indicate that it is likely to be a limiting factor in the use of ORS.

Figure XII-1. Sources of ORS Packets Used For Last Case (Among Cases Occurring Within 2 Weeks Prior to Interview)



It is possible that the decreased reliance on community-based distribution networks is related to the problem of access to packets reported by mothers in the Resurvey sample. Generally, a community distributor will be more accessible than a health center. A health center is open a limited number of hours, while a community contact could presumably respond to a request for packets at almost any time. For most mothers, a community health worker is more conveniently located than a health facility. When mothers say that they did not treat because they did not have Litrosol, they are probably not saying that all potential sources had run out of supplies. It is more likely they are saying, "It would have been too much time and trouble to obtain the packets."

SUMMARY

Correct mixing is essential in order for ORS to perform its rehydrating role; improper mixing can be dangerous to the child. Seventy-five percent (75%) of all mothers and 80% of those who have ever used ORS correctly described how to mix ORS. Seven percent (7%) of mothers who had used ORS did not name the correct proportions of water and packet. Thirteen percent (13%) did not respond "No" when asked if they ever added something to the solution.

Although knowledge levels are reasonably high, performance levels are low. A much smaller percentage of mothers (55%) who participated in a mixing trials substudy was actually able to measure a liter of water with an acceptable degree of accuracy.

There have been notable changes since MMHP in where women learn to mix ORS. The *guardian*, *alcalde auxiliar*, radio, and packet instructions used to be more common sources of learning about ORS than they are at present. Health workers at fixed facilities have now largely displaced almost all other sources as providers of information about mixing the ORS solution.

Parallel changes have taken place in where mothers obtain Litrosol packets. Data gathered over the course of the MMHP campaign and again in the Resurvey indicate

a marked trend away from community distribution sources and toward more centralized distribution via health centers. At the same time, there are indications that problems in obtaining packets may be limiting the frequency with which ORS is used. It is plausible that the decreased role of the village *guardianes* as packet distributors in favor of the health center is limiting the accessibility of packets.

SUMMARY AND POLICY IMPLICATIONS

BACKGROUND

From 1981 to 1983 the Ministry of Public Health in Honduras implemented the Mass Media and Health Practices (MMHP) project, an intensive campaign to promote the use of oral rehydration therapy (ORT) for the treatment of diarrhea among children under five years of age. A longitudinal evaluation was conducted simultaneously with the campaign to track gains in knowledge about and practice of ORT over the course of the intervention. The success of that pilot project, which was carried out in Health Region 1 in Honduras, led to the implementation of a national program, known as HEALTHCOM (Communication for Child Survival) to promulgate the use of ORT and other child survival technologies in other health regions of the country. In 1987, four years after the completion of the intensive pilot campaign and its evaluation, a follow-up survey was conducted to assess the long-range impact of MMHP and the effectiveness of the national program. The present document reports the major findings from that study, known as "the Resurvey."

Both the MMHP pilot and the subsequent expanded national project under HEALTHCOM received sustained technical support from the Academy for Educational Development (AED) and funding from the United States Agency for International Development (USAID). The MMHP longitudinal evaluation was conducted by Stanford University and Applied Communication Technology (ACT) under contract with USAID. The HEALTHCOM Resurvey was carried out by Applied Communication Technology under subcontract from AED.

The MMHP evaluation as well as the Resurvey focused on the primary elements of oral rehydration therapy (ORT) for the treatment of infant diarrhea: administration of the rehydration solution, augmentation of liquid intake, and continued breastfeeding

and feeding during episodes of diarrheal illness. As part of the MMHP evaluation, a panel of approximately 750 mothers in three sites in Health Region 1 was interviewed periodically over the course of the campaign. Data for the follow-up Resurvey under HEALTHCOM were collected from 1403 mothers who provided information about 2264 children under the age of five. They came from six sites, three of which were located in Region 1 (the pilot site), and three in other regions where ORT was promoted in the later expanded project. The Resurvey documents current ORT-related knowledge and practice and focuses the findings around two major kinds of comparisons:

- (1) Change over time: within Region 1 (the site of the intensive pilot project), current levels are compared with prior levels found during the MMHP evaluation to investigate over-time trends and
- (2) Pilot area versus national effects: Region 1 data are compared with data from outside Region 1 in order to look at the relative effects of the initial intensive campaign and the subsequent national effort.²⁵

RESULTS

The results of the Resurvey are highly promising. It is clear that use of the oral rehydration solution (ORS) is widely accepted as a treatment for early childhood diarrhea in rural Honduras. The high levels of ORS use which were achieved in Region 1 under the MMHP project have continued or climbed (depending on the specific measure and comparison group) under the auspices of the national diarrheal disease program. Furthermore, use of ORS follows a rational pattern, with higher treatment rates associated with more serious diarrheal episodes and with the younger,

²⁵ It is probable that some mothers outside Region 1 were exposed to radio messages about ORT before the national campaign was initiated, and thus did not start from a knowledge or practice base of "0". However, we make the assumption that mothers outside Region 1 learned about ORT primarily from the national ORT promotional effort.

more vulnerable child. Moreover, most measures of ORT knowledge and practice display only moderate differences between Region 1 and other regions, indicating that the expanded national intervention is approaching the effectiveness of the initial campaign.

ORS Use

Almost all mothers (99%) have heard of Litrosol, the ORS packets produced in Honduras, and the proportion of mothers who have ever tried ORS has reached 85%. The rate of trial use is significantly higher now than in 1983, when 62% of mothers in Region 1 indicated that they had used Litrosol. Mothers report using the rehydration solution for 45% of diarrheal episodes²⁶ among their children under five years of age, with treatment rates rising to 54% for cases mothers judge as serious. These figures indicate an extremely high degree of awareness of ORS and acceptance of it as a treatment for infant diarrhea.

Within Region 1 as a whole (Yuscarán, Sabanagrande, and Morocelí combined), case treatment rates have climbed from 34% to 49% since the end of the intensive campaign. ORS use is higher in Region 1 than in other sites (49% versus 40%), although the difference is modest, meaning that the national project has achieved considerable success in its promotion of ORT.

ORS is administered most frequently among children under two years old, and more often among rural children than those residing in the county seat. (This study did not include any truly urban areas.) ORS use does not appear to be related to the sex of the child; neither are there large differences in age or schooling between mothers who treated with ORS and those who did not.

²⁶All case-based rates refer to cases of diarrhea occurring within two weeks prior to the interview.

Mothers who consulted with someone were much more likely to use ORS than mothers who did not (69% versus 28%). The highest rates of treatment with ORS are associated with women who took their child to the *guardian*, the health center, or hospital for help, while the lowest rates are found among women who consulted with a *sobador* or private physician. The *guardian*, health center and hospital also represent sources of packets, so their association with use of ORS is a natural one.

Case management practices

While use of ORS is high, the overall pattern of case management practices is far from optimal. The data suggest that ORS may often be administered improperly, as 44% of mothers who have used ORS did not know that a liter of the solution should be given per day, and 19% of them did not know that a fresh solution should be prepared daily. In most cases, the solution is given for only one or two days during an illness, rather than throughout, as recommended. Furthermore, there is evidence of inadequate knowledge associated with the preparation of ORS, which should be made by mixing the full packet with a liter of water, without the addition of other ingredients. Among mothers who have used ORS, 20% gave incorrect descriptions of the mixing process, either by citing wrong proportions of ingredients, or by failing to respond "no" to a question as to whether they ever add something to the mixture. In observations of mixing procedures carried out on a subset of mothers, 45% did not correctly measure a liter of water. Other problems in case management concern the administration of improper treatments, either in conjunction with or exclusive of ORS. A disturbing proportion of cases is treated with medication (67%) or a purgative (24%).

It is encouraging, however, that almost all women who are breastfeeding continue to do so during their infant's illness. On the other hand, a rather low percentage (32%) of children over six months of age is given increased amounts of usual liquids such as water or soda, although 46% are given special home fluids such as teas or rice water. Most children (96%) do continue to receive food during the illness, although

the majority (69%) of children who do eat something receive less than normal amounts, most frequently because of the child's diminished appetite.

Packet availability

There are clear changes over time in mothers' sources of rehydration salts. While the Region 1 project initially emphasized community distribution sources, that emphasis decreased in the later stages of the pilot campaign and in the national expansion of the project. Consequently, the *guardian* does not currently play as prominent a role as she used to. Similarly, the town "Assistant Mayor" no longer functions as a distributor. The health center, always one of the major sources of packets, has now become by far the predominant source.

A fairly high proportion of mothers -- about 1/3 -- keep one or two packets at home. There are indications that mothers who do not keep packets at home may experience some difficulty in obtaining them. All mothers were asked whether they had ever sought packets and been unable to obtain them. Twenty-one percent (21%) of all mothers responded "yes." Among mothers who had a child with a recent case of diarrhea and did not treat with ORS, nearly half (47%) said they didn't use ORS because they didn't have packets.

Learning from the Campaign

The Resurvey included a series of questions to measure mothers' knowledge regarding dehydration, ORS mixing and administration, and breastfeeding. Most of these knowledge measures have remained near prior levels and do not differ much between regions.

Diarrhea and ORT: Knowledge about the proper administration of ORS is, given its importance, rather low: 56% of mothers who have used ORS knew to give a liter per day and 81% knew that a fresh solution should be prepared daily. Prior rates on similar but not directly comparable questions are 58% and 34% respectively. Over half

of all mothers in the Resurvey (56%) knew that ORS stops dehydration rather than stops the diarrhea itself. The mothers' ability to define dehydration declined, falling from 39% to 21% in communities which participated in the original longitudinal study.

Mixing knowledge: A moderately high percentage of women could describe correct mixing procedures for the interviewer. Describing correct mixing entailed naming only the proper ingredients which make up the solution (water and packet) and the correct amounts of each (one liter, one whole packet), and answering "No" to the question, "Do you ever add anything else?" Eighty percent (80%) of women who had ever used ORS offered correct descriptions based on those criteria. Most errors occurred in either the proportions cited or in adding extraneous ingredients. When asked to *demonstrate* how they mix, a very high proportion of mothers -- 45% -- made errors in measuring a liter of water. The rate of error in both mixing knowledge and practices is cause for concern, given the potential consequences of an improperly mixed solution. A mixture which is too dilute loses effectiveness, while a concentrated solution can dangerously hasten dehydration.

Ninety-four percent (94%) of all mothers perceive the mixing process to be easy. The simplicity of preparation is probably a factor which facilitates the adoption of ORS as a treatment for infant diarrhea.

There have been considerable changes in where mothers learn how to mix ORS, shifting from community and mass media sources to the health center. The *guardian*, *alcalde auxiliar*, radio, and packet instructions used to be more common sources of learning about ORS than they are at present. Declines in these sources have been sizeable, so that the health center now functions as the primary disseminator of information about ORS.

Relationship between knowledge measures and ORS use: The proportion of mothers who treated a recent case with ORS was calculated for mothers who gave correct answers to knowledge questions and for those who did not as a means of determining whether certain kinds of knowledge was associated with ORS use. Skill-related

knowledge (how to mix) and correct understanding of the function of ORS (to combat dehydration rather than diarrhea) were associated with ORS use. With regard to knowledge of how to administer ORS, knowing that a fresh solution should be prepared daily was associated, although knowing to give a whole liter per day was not. Mothers who were able to define dehydration were not more likely to use ORS than mothers who could not. In some cases lack of knowledge may not affect treatment (for example, whether or not a woman who uses ORS can define dehydration), but in other cases it can (knowing to throw away left over solution at the end of the day, or knowing to give the whole liter).

Breastfeeding knowledge and practice

Breastfeeding knowledge measures are moderately high at levels comparable to MMHP, and are fairly consistent across regions. Seventy-nine percent (79%) of mothers in the Resurvey said that breastfeeding should be continued during an infant's diarrheal episode. Eighty-two percent (82%) of all mothers knew to give only breastmilk during an infant's first four months of life, and 87% of all interviewees knew that colostrum should be given to a newborn. Although 79% of all mothers said that breastfeeding should be continued during diarrhea, examination of actual case management practices shows that 98% of infants who were breastfeeding at the onset of diarrhea did continue to receive breastmilk during their illness.

Communication

Exposure to the three channels of communication employed by the campaign (radio, print, interpersonal) was measured to determine the extent of access to information about ORT. Current campaign strategy stresses use of interpersonal and print communication over broadcast media, but historically, broadcast media played a much larger role.

Radio: Most Honduran families (57%) own a working radio and almost 1/3 of all mothers indicate that they listen to a radio frequently. These figures are roughly comparable to previous data. More households within Region 1 (61%) own functioning radios than households in other regions (54%).

The Resurvey measured recall of two jingles used during the original campaign. Recall of a slogan to give liquids during diarrhea has dropped off markedly, while recall of a breastfeeding jingle has been maintained (possibly because the latter has also been used on a poster). Mothers were also asked if they had heard of Dr. Salustiano, a fictitious character created during the MMHP project who provided information about various facets of oral rehydration therapy. In Region 1, the site of the intensive intervention, about the same proportion of mothers -- 2/3 -- reported having heard of Dr. Salustiano as during MMHP, while significantly fewer mothers residing outside Region 1 (53%) recognized his name. (The Dr. Salustiano character was discontinued after 1983 and therefore was not used much in the national program.) Most mothers who had heard of Dr. Salustiano accurately cited the topics he addressed in his radio programs.

Print: A flyer which was created to accompany Litrosol packets and teach mothers how to mix is not currently in wide circulation. Fifty-nine percent (59%) of respondents said they had seen the flyer at some point in the past. Among mothers who had used Litrosol within two weeks prior to the interview, 29% said that the flyer came with the packets. Although 31% of mothers had packets in the home, only 5% could produce a flyer to show the interviewer. The low level of flyer availability probably does not present an important obstacle to use of ORS at this stage of the project, when the great majority of mothers already know how to mix.

About the same percentage of mothers in each measurement group (73%) said that they were able to read. The same proportion of readers and non-readers were ORS users, suggesting that the project had successfully reached mothers across a range of educational levels.

Interpersonal: Honduran mothers have fairly frequent contact with a health provider. Eighty percent (80%) of Resurvey mothers had had at least one contact with a traditional, community, or professional health worker within the six months prior to the interview. Most of those contacts were with personnel at the health center.

Exposure to communication channels and use of ORS: Of the three channels of communication used to promote ORT knowledge and practice, only interpersonal channels now display any direct association with ORS use. Mothers who have exposure to and access to radio and print channels as measured in the Resurvey are not more likely to use ORS than other mothers. This pattern of association is probably a reflection of the modified campaign strategy and stage of the campaign rather than of the effectiveness of the medium. Radio currently plays a less prominent role than during MMHP, so that having a radio and listening frequently do not ensure that a mother will come into contact with campaign messages. Print channels employed by the project consist primarily of an instructional flyer and a series of posters. The instructional flyer is probably more important during the earlier phases of the intervention, when mothers are first learning how to mix the rehydration solution. Exposure to posters was not measured in the Resurvey, and their effect on use of ORS cannot be evaluated. A higher proportion of mothers who had had contact with a health worker used ORS to treat a recent episode of diarrhea than did women who had had no contact. This association is likely due at least in part to the fact that health workers were the major source of packets to mothers when they needed them.

Communication about all aspects of CRT now takes place primarily through interpersonal contact, rather than through the mass media. Only contact with health workers, rather than exposure to broadcast or print media, shows a relationship to use of ORS.

CONCLUSIONS AND POLICY IMPLICATIONS

Comparing the pilot and national ORT programs

Throughout this document the data generally show only small to moderate differences between levels of ORT-related knowledge and behavior in Region 1 and levels in other Regions. We have claimed that this suggests that the national program has achieved gains which approach those of the pilot effort. For example, the case treatment rate in Region 1 is 49%, compared with a rate of 40% outside of Region 1. Although the data suggest that the national program has enjoyed a substantial degree of success, this claim must be tempered by several considerations.

We have no baseline data for Regions outside of Region 1, and we have made the assumption that measurements in those areas were near zero before the intervention was extended nationally. It is probable, however, that some mothers outside Region 1 did have some contact with the pilot campaign before the national campaign was initiated. For example, some radio spots were broadcast on national stations and would therefore reach mothers residing outside of Region 1. Thus it is possible that some of the changes we attribute to the national program which were actually induced by the pilot intervention.

What is especially striking about comparisons between "pilot" (Region 1) and "national" (other) data is the consistency with which the pilot levels outpace national levels. On all measures -- from trial use to case treatment rates, from knowledge about administration of ORS to mixing knowledge -- Region 1 mothers surpass their counterparts in other Regions. Sometimes the difference is small and sometimes it is statistically non-significant. The consistency of the overall pattern strongly suggests, however, that the differences are real (even when statistically non-significant) and areas reached by the national campaign have not caught up to the achievements in Region 1. This means that in spite of the fact that the national program has been going on for nearly as long as the pilot project, there was something about the intensive pilot

campaign which continues to exert a positive effect on knowledge and practice in Region 1 today, and that makes Region 1 different from other sites studied.

There are several possible explanations for the superior results obtained in Region 1: time (the extra year of ORT promotion in Region 1 makes a difference), intensity (a greater concentration of activities took place under the pilot), and strategy (the interventions are different due to a change in strategy). We review each in turn.

The first explanation centers on the extra amount of time that ORT promotion has been carried out in Region 1. The campaign was implemented in Region 1 in 1981, while it began in other Regions in 1982. It is possible that the extra year or so of promotion may account for the difference between Regions. This explanation assumes that the rate of change per year is fairly constant; in fact, however, the trajectory of change in knowledge and practice over time is likely *not* to be constant. If, for example, changes in ORS use are tracked over time, the graph depicting those changes roughly conforms to a diffusion of innovations curve or a learning curve. (See Figure VI-2.) Those curves are characterized by an initial steep rise followed by a gradual leveling off as smaller increments of change are achieved as time goes by. In other words, the differences between year 1 and 2 of a project will probably be much more dramatic than differences between year 5 and 6. If ORT use is conforming to this pattern, we would expect -- all other things being equal -- relatively minor improvements in case treatment rates in a year at this stage of the project. The data suggest that Region 1 is reaching a plateau in campaign effects at a higher level than in other parts of the country examined in the Resurvey. Therefore, the "time" explanation is not as plausible as those having to do with differences in the intensity or nature of the intervention, to which we now turn.

The second kind of explanation for the brighter ORT picture in Region 1 has to do with the intensive level of effort associated with the pilot project. This concentrated effort may have resulted in a critical mass of health workers being trained and a certain level of ORT adoption achieved which enabled ORT to be more fully integrated into the social system. Once ORT practices are institutionalized in the

community, it is possible that a less intensive level of effort is sufficient to maintain them. Although we feel this is a plausible explanation for outcome differences by Health Region, no policy recommendation is implied, as it is not practical to sustain the level of activity of the pilot project in a larger geographical region over a long period of time.

A third kind of explanation has to do with differences in the nature of the pilot and national interventions. Although the national program drew on the experience of the pilot, it employed a different strategy for reaching mothers. The pilot project relied heavily on mass communication to support ORT information transmitted by health workers; the current strategy relies principally on health workers, and small-scale alternative media (puppet shows, flip charts, murals) with much reduced use of radio. It is possible that the original mix of communication channels is a more effective strategy than the current emphasis on interpersonal channels.

We cannot state with certainty which of the explanations best accounts for the superior results achieved in Region 1. It is most likely that each of the three factors contributes, to some degree or another, to produce the Regional differences documented in the Resurvey.

Policy implications

Taking into account the overall results of the Resurvey, several implications for future program strategy emerge:

- 1) **Emphasize correct mixing and administration of ORS.**

Although mothers frequently turn to ORS as a treatment for diarrhea, there are indications they often mix or administer the solution improperly.

Among mothers who had used ORS, 80% described correct mixing procedures, saying that they prepared ORS by mixing the full packet in a liter of water, without ever adding anything else. Therefore 20% of mothers were inadequately informed about mixing procedures, making it likely that they are administering solutions which are too dilute or too concentrated. Indications are that even 20% is an underestimate of the extent of improper mixing practices; in observations of 97 mothers who demonstrated mixing, 43 mothers (45%) did not measure within 100 milliliters of a liter. Knowing that a full liter should be used, and having the skill to measure a liter are extremely important. A weak solution will not reach its therapeutic potential, while a concentrated mixture can be unsafe. Project managers have already taken steps to address the problem of inaccurate measuring by devising a special apparatus for measuring a liter of liquid. It will be important to monitor the impact of the *litro-bolsa* on mother's ability to mix ORS accurately.

Even if a mother initially uses the correct amount of water, the addition of sugar or salt afterwards will cause it to become too concentrated. Nothing should be added to the mixture since the addition of salt can exacerbate dehydration and the addition of sugar can interfere with intestinal absorption. Eight percent (8%) of mothers did not answer "no" when asked if they ever added anything else to the mixture, and three of the 97 mothers who demonstrated mixing added sugar and/or salt to their solutions. The campaign should stress that nothing else (except possibly a squirt of citrus) should be added; perhaps the message "Never add sugar or salt" should be stated specifically.

With regard to administration of ORS, a large proportion (44%) of mothers who had used ORS did not know the correct quantity of solution to give a child (a liter per day). Consequently, many children who are given ORS may not be receiving the full rehydrating benefit of the treatment. Nearly 1/5 of mothers who had used ORS did not know that a fresh batch of solution should be prepared every day. This is cause for concern, as solution which stands overnight in a warm and humid environment is prone to bacterial contamination. Planners will want to emphasize that the entire

mixture should be given to the child over the course of the day, but if any is left over, it must be thrown away.

2) Continue to discourage use of medications and purgatives.

Use of medications and purgatives to treat infant diarrhea is widespread in Honduras. It can also be dangerous, and needs to be vigorously discouraged.

Giving medicine is the most common first response to the onset of diarrhea, and its rates of use far exceed those for any other treatment. It is given whether the mother consults a health provider or not; in fact, a mother who consults no one is more likely to treat with medication than a mother who does seek medical advice. Fifty-nine percent (59%) of those who consulted with a health provider treated with medication, while 72% of mothers who did not consult gave medication. Nonetheless, trained health providers are recommending medications at very high rates. Private doctors appear to be the worst offenders in this regard; 89% of them recommended medication for a diarrheal episode.

Depending on the etiologic agent of the diarrhea, treatment with drugs can be appropriate. Thus some proportion of cases receiving drugs are being correctly handled. Their extremely high rate of use suggests, however, that they are often administered when the characteristics of the episode do not warrant it. Of course, mothers who treat without benefit of medical advice cannot verify the cause of the diarrhea, and are always taking a gamble when they give medications, particularly antibiotics. Even when antibiotics are used on the advice of a doctor, one cannot be certain of their suitability. Given limited medical facilities in Honduras, it is likely that many drugs are recommended without prior appropriate diagnostic procedures, so that many are unnecessary or harmful.

Fortunately, trained health providers are not recommending purgatives when mothers seek advice about diarrhea. However, mothers are administering purgatives on their

own initiative, probably with the idea of "cleaning out" the stomach or intestines. Almost a quarter of all cases were treated with a purgative. This practice is dangerous, as it contributes to dehydration, robs the child of nutrients, and further irritates the colon. Furthermore, it mitigates the benefits of using CRS.

Consequently, it is extremely important to strongly discourage the use of both medications and purgatives for a child suffering from diarrhea. This effort needs to be directed toward educating both mothers and health providers.

3) Emphasize the importance of increasing liquids and maintaining feeding during diarrhea.

Appropriate feeding during and after diarrhea has gained increasing recognition as a critical component of treatment. Proper dietary management of cases can shorten the duration of the episode, reduce stool output, and, most importantly, mitigate nutritional deterioration which leaves the child vulnerable to a continued cycle of diarrhea and infection.

Only about 1/3 of children received an increased quantity of liquids during their recent bout of diarrhea, and about 1/3 took in *less* liquid than usual during their illness. About 70% of children ate less food than normal during the diarrheal bout, including 4% who ate nothing. Nearly all mothers let the child take the lead in this situation, letting her/him have the amount of liquid or food requested.

Some mothers may still believe in "resting the gut" by withholding food during diarrhea. Others who do offer food may believe that there is that little can be done if the ill child resists eating. Public messages emphasizing the importance of feeding can counter mistaken ideas about resting the gut and encourage mothers inclined to feed to act more assertively in this regard. A skill-oriented approach which advocates small but frequent feedings may help mothers coax their children to eat. Since ORS should

be administered throughout the course of the day, it may be efficacious to advocate ORS accompanied by food.

Promotion of increased liquids and continued feeding is a desirable objective on the basis of its therapeutic effects alone. It is possible, however, that the resulting decrease in stool volume and the shortened duration of diarrhea may further encourage caretakers to follow the prescribed regimen of ORS, increased liquids, and continued feeding. The more visible the benefits of a promoted behavior, the more likely it is that that behavior will be practiced.

4) Re-establish radio as a major channel of communication about ORT and diarrheal management.

Current project strategy de-emphasizes the role of radio in favor of interpersonal communication via health center personnel and print communication in the form of posters. While personal contact, in particular, is vital to the overall promotional effort, it will affect only those who visit the health center. A strength of radio is its ability to reach across geographical distances, and provide information to those who might otherwise be isolated from the campaign. For those who do have contact with the project through other channels, radio spots and special programming can serve as prompts for, reinforcers of, and reminders about proper care of the child suffering from diarrhea.

There is evidence that it is some of the more isolated mothers who would most benefit from sound information on proper case management practices. For example, among mothers who brought their child to the *sobador* for treatment, 70% also administered a purgative. This is a considerably higher use of purgatives than among those who brought the child to the health center for treatment, 27% of whom administered a purgative. The rate of ORS use is 59% among mothers who also consulted a *sobador*; it is 77% among mothers who consulted the health center. This suggests that poorer case management practices are associated with the more traditional and probably more

isolated mothers, and that special effort will have to be expended in order to reach them. The present reliance on health center personnel to provide information about diarrhea management means that many of these mothers may be bypassed by the project.

Another case can be made for radio based on differences in project outcomes between Region 1 and the other regions measured in the Resurvey. Region 1 is the site of the pilot intervention which relied extensively on radio to promote ORT. In other health regions of the country ORT was promoted by the expanded national project, which now emphasizes communication through the health centers. While differences in cognitive and behavioral outcomes between regions are modest, they nonetheless represent a margin for improvement. For example, ORS treatment rates are 49% for cases in Region 1, and 40% for other regions. The 9% difference is small, but not unimportant. In many other outcome measures, for example in knowledge items and mixing skill, there are commensurate differences. While we cannot verify that these differences are due to divergent communication strategies, it is not unlikely that the diminished presence of radio accounts for some of the regional disparities documented by the data.

5) Assess and strengthen networks for distributing packets in order to ensure easy access in rural areas.

The Resurvey found sharp declines in activity of community-based packet distributors: *guardianes* and *alcaldes auxiliares* (Assistant Mayors). The initial campaign employed a strategy of utilizing local contacts as a source of packets and information about ORS. *Guardianes* used to be primary suppliers of Litrosol, at one time (1983) accounting for 64% percent of packets dispensed. Assistant Mayors initially supplied about 43% of packets to mothers.

By 1987, at the time of the Resurvey, Assistant Mayors had ceased altogether to be formally involved in the project, and *guardianes* were named as the source for only

19% of packets used. In contrast, health centers had become the source for 60% of packets used for recent cases. At the same time, mothers were reporting difficulty in securing packets when they needed them. According to Resurvey data, 21% said they had at some point tried to obtain Litrosol, but had not been able to do so. Nearly half of the mothers who did not give ORS for a recent case attributed their failure to do so to packet unavailability.

This response probably inflates the actual degree of packet access problems, since it offers a socially acceptable reason for failure to treat. Furthermore, "not having packets" covers a range of situations. It could mean that a mother was unable to take the time required to get to the health center, or that she needed Litrosol at a time when the health center is closed, or that the *guardian* was out of supplies -- all of which constitute some form of packet unavailability. The proportion of mothers citing lack of packets is large enough to conclude that it is limiting the degree to which ORS is used.

It is plausible that the problem of access to packets is related to the shift away from community distributors toward reliance on health centers. This relationship cannot be verified, as we do not have MMHP measures of access problems to compare changes over time. But several factors lend credence to this conclusion. One is the more restricted access accorded by the health center compared with a community distributor. The average time it takes for a mother residing outside the county seat to reach the health center is over an hour, representing a considerable investment in time, and possibly money. A community contact is much more convenient. And when the clinic is closed, the source of packets is likewise closed off.

Furthermore, if the decreased use of community distributors were related to access problems, we would expect the more rural and isolated mothers to experience more access problems than mothers residing close to the health center, in the *cabeceras* (county seats). This is in fact the case. In the Resurvey, among mothers who had a child with diarrhea within the two weeks prior to the interview, 49% of mothers residing outside the county seat said that they didn't treat a recent case with ORS

because they didn't have a packet, compared with 34% who live in the *cabeceras* ($p=.0026$). Similarly, when asked if they had ever tried but been unable to obtain a packet, 23% of all rural mothers responded yes, compared with 13% of *cabecera* mothers ($p=.0015$).

Given that community-based distributors are inherently more convenient than centralized ones, it is likely that the shift to reliance on health centers is related to problems with packet availability. These data suggest that locally-available packets would remove an obstacle to ORS use created by the inconvenience of having to make a trip to the health center.

APPENDICES

A. MMHP PROJECT AND EVALUATION

B. RESURVEY SUB-STUDIES

C. COMMUNITIES INCLUDED IN THE RESURVEY

APPENDIX A: MMHP PROJECT AND EVALUATION**EXECUTIVE SUMMARY****THE MASS MEDIA AND HEALTH PRACTICES
EVALUATION IN HONDURAS:
A REPORT OF THE MAJOR FINDINGS²⁷**

This is a report of the major findings from the evaluation of the Mass Media and Health Practices Project in Honduras. The project was an undertaking of the Ministry of Public Health, with technical assistance from the Academy for Educational Development. It was known in Honduras as the *Proyecto de Comunicacion Masiva Aplicada a la Salud Infantil (PROCOMSI)*. The project and the evaluation were funded by the Office of Education and the Office of Health of the Bureau for Science and Technology, United States Agency for International Development (USAID), with additional support from the USAID Mission in Honduras and the Ministry of Public Health. The evaluation was performed by the Institute for Communication Research and the Food Research Institute of Stanford University and by Applied Communication Technology.

The purpose of the PROCOMSI project was to introduce oral rehydration therapy (ORT) and other behaviors related to the treatment and prevention of infant diarrhea in rural Honduras. The target behaviors included treatment of acute cases, preventive actions that mothers could perform, and related nutritional and breastfeeding activities. The treatment behaviors involved the administration of an oral rehydration solution mixed from packets of salts containing the World Health Organization ORT formula.

²⁷This report is available from Applied Communication Technology.

The packets were manufactured in Honduras and distributed at clinic and community levels by the Ministry of Health.

The project and the evaluation were also designed to test the efficacy of an intervention strategy that tied elements of several different approaches into an integrated campaign. The PROCOMSI intervention used broadcast, print, and interpersonal communication channels to deliver a coordinated set of messages about a fairly narrow set of issues - - responses to infant diarrhea. The knowledge and behavioral objectives and the strategies for behavioral change were developed using intensive planning research and the principles of behavioral analysis. The campaign incorporated elements of social marketing and systematic development of messages using formative evaluation.

The evaluation tracked the process of the intervention's effects, as well as measured the impact of the entire effort. It used a model of the program effects that stipulated that, in order for a final outcome to be achieved, a series of interim steps must be successfully completed. These steps included determining: that the population had access to the channels of communication used by the campaign; that the messages actually reached the population through those channels; that the content of the messages was learned and retained by the audience; that members of the target audience actually changed their behaviors in response to the campaign; and that the health status of children was improved as a result of these changes in behavior.

The reporting of findings about these different levels is organized into three major categories, which correspond to the second, third, and fourth chapters of this report. Following an introductory chapter describing the context and the research and measurement plans of the evaluation, the remaining chapters take up, in turn: the access and exposure to campaign elements and cognitive changes resulting from that exposure; behavioral changes related to infant diarrhea; and health status changes. This summary will report the findings in the same order.

The context in which the project took place is typical of many parts of Central America. The area is in South-Central Honduras, with terrain ranging from rolling hills and valleys to steep mountains. It is populated primarily by subsistence farmers, although some parts support large-scale commercial agriculture. Half of the subsistence farmers own land, and their major crops are corn and beans. Communities are small (seldom larger than 1000 people), and houses are often widely separated from one another. The county seats have service infrastructure (roads, bus service, a health center, and telephone service), but services in the other communities are usually limited to a primary school.

The evaluation design included a number of studies with different methodologies, but relied primarily on large-scale survey data from repeated visits to a panel of mothers of small children. A sample of roughly 750 mothers was selected from among 20 communities; these mothers were visited monthly for interviews about various aspects of the campaign. To control for the influence of repeated measurements on the sample mothers' knowledge and behaviors, comparison groups were also measured in additional communities that received all the elements of the campaign but not of the evaluation. The experimental and control samples were structured to yield quasi-equivalent groups of women of child-rearing age that were representative of the full range of differences found in Honduras. Examples of the other study approaches include anthropometric measurement, behavioral observations, community mortality, and health professional interviews.

Access to the channels used by the campaign was high. Radio carried the largest portion of the campaign's messages. On the average, two thirds (67.4 percent) of the families had a radio that worked on any given day. Radio ownership was higher (79.5 percent of families) but radios went in and out of service, usually due to dead batteries. Radio listening peaked in the early morning and at noon, and tapered off fairly abruptly after eight to nine in the evening. An average of 60.0 percent of mothers listened to the radio on any day. These levels represent strong evidence that access to the population through radio is a feasible strategy.

Access through interpersonal and print channels was also confirmed. Interpersonal contacts with health care workers and traditional healers were measured. In general, families reported about one contact every six months with some type of care worker, with the majority of contacts taking place at fixed facilities. When contacts with traditional sources of care were included, the cosmopolitan health care workers at both community and fixed facility levels accounted for four out of five contacts (80.5 percent). Traditional healers accounted for the rest. There was clearly enough contact with the health care system for it to function as an instructional channel. Print access was conditioned by literacy. Over half of the mothers in the sample (56.8 percent) could read well by themselves; the household literacy rate was 86.8 percent, so there was almost always at least someone in a household who could read print materials.

Exposure to campaign messages through the different channels was the second link in the chain. Radio coverage with PROCOMSI spots or programs was extremely high, as might be expected given the saturation of the airwaves with campaign messages. For mothers actually listening to the radio in a given hour, the odds of hearing a spot were two out of three (66.7 percent). When mothers who were not listening at that time were included, the total population coverage was 11.4 percent of the mothers reporting hearing a PROCOMSI message each hour from four a.m. to nine p.m. Reaching roughly ten percent of the population every hour of the day with a campaign message was an extraordinarily high rate of coverage. Over the course of an entire day, nearly three-quarters (73.2 percent) of women who listened to the radio at all during the day reported hearing at least one spot. Even if women who did not listen to the radio were included, coverage was still 43.9 percent of all women hearing a PROCOMSI spot every day. Obviously, women who listen to the radio were getting high exposure, and enough women were listening for messages to be very well diffused in the population.

Print media exposure consisted primarily of seeing posters printed for the campaign or the instructional materials in which the salts were usually packaged. When mothers in the experimental group were asked to describe health posters they had seen, an average of over 40 percent could describe a poster thoroughly enough that it could

be identified as a PROCOMSI poster. Most of the posters were seen during visits to the health center.

Learning changes resulting from exposure to campaign messages were investigated. The content of some messages was known long enough in advance to permit collection of baseline information prior to the first broadcasts. In general, these measures showed an extremely rapid rise in knowledge within a short time after broadcasts start, with the rate of gain gradually diminishing over time. For those messages which were not identified far enough in advance to permit the gathering of pre-broadcast baseline information, the learning curves showed a truncated version of the general pattern. These variables show a pattern of starting at a moderately high level and continuing a gradual rise to a still higher plateau. A separate analysis of the effect of withdrawal of some messages (as in the seasonal phasing of message content) shows clear evidence of "forgetting" of information at a slow rate, beginning as soon as the messages are discontinued. It appeared that the relationship between exposure and learning was consistent and stable across item-types and content areas. It followed a pattern of extremely rapid initial rise, followed by slow arrival at a high plateau. A gradual decline in knowledge level about specific topics began as soon as messages on that topic were stopped, but reintroduction of those messages recovered the lost ground very quickly.

Learning results on specific items or topic areas are reported in detail in the main body of the report. Two examples of measurement of learning in major areas are knowledge about Litrosol (the name given to the oral rehydration salts), and knowledge about breastfeeding. Litrosol awareness was not measured prior to the broadcasts because it had never existed before. Within six months after broadcasts began, however, half the mothers (49.5 percent) could name it as the medicine being promoted. By the end of the period, this figure seemed to have leveled off at about three-fourths of all mothers able to remember the name of the medicine. A composite index of breastfeeding knowledge rose from 9.2 percent before any significant broadcasting about breastfeeding began to 41.1 percent at the end of the project. An index of the ability of mothers to complete the jingles used in the campaign, which is

obviously zero before the campaign, had jumped to 50.5 percent within six months and continued to rise to 56.0 percent by the end of the study period.

Thus the evidence is clear that a great deal of learning of the specific content of campaign messages took place. The pattern of acquisition and retention of the knowledge, plus evidence from various control groups, indicated that the measured changes reflected real learning, and not merely the effects of repeated measurement of the population.

Health-related behavior change is the next step in a successful path to overall project impact. The evaluation focused its analysis in three major categories - - diarrheal disease and the use of Litrosol, feeding behaviors, and observation of the preparation and administration of Litrosol. Prevalence of diarrhea was high and showed seasonal fluctuations. Point prevalence among children five years or less in age averaged 14.3 percent in the rainy season and 9.9 percent in the dry season. The distribution of cases by age shows the expected concentration of cases among younger children, with a peak roughly between 12 and 24 months. There was a slight tendency for male children to be reported sick more than females - - males accounted for 55 percent of the total reported episodes.

Litrosol use was measured both as a percentage of mothers who had ever tried it and as a percentage of episodes being treated. Within six months of the start of broadcasting, over a third of the mothers (36.7 percent) said they had tried Litrosol. This percentage rose to 62.4 percent by the end of the intensive campaign. This is a very high level of trial usage by any standards. When calculated as a percentage of episodes occurring in the two weeks prior to the interview (the most reliable reporting period used) the proportion of episodes treated rose from none before the start of the project to a maximum of 35.7 percent, with an average of roughly 28 percent of episodes over the final 18 months of the campaign. For cases recalled from the last six months, mothers reported much higher usage rates, averaging 45 percent of episodes over the final 18 months of the campaign. The most likely interpretation of

this discrepancy was that mothers tended to forget milder cases and hence unconsciously selected the more severe episodes in recalling past behavior.

Younger children were more likely to be treated than older ones (33.6 percent of episodes in children under 12 months were treated, while only 23 percent of episodes for children older than 48 months received Litrosol). There were no consistent differences in treatment probability by sex. One *municipio* (Yuscarán) was consistently better than the rest, and cases occurring in villages were much more likely to be treated than those occurring in the county seats, but there was no clear explanation for the difference. More serious cases were slightly more likely to be treated, but no single indicator of severity was a consistent predictor of high treatment probability.

Mothers received their Litrosol from a variety of sources. Although the distribution of particular sources changed over time, sources in the community accounted for over half of the distribution, with clinics accounting for most of the rest. The single most useful source of information for learning about how to mix and administer Litrosol was the packet itself, which came in an envelope printed with instructions. However, interpersonal instruction (from health care workers) and learning from the radio also were significant information sources. Mothers who had used Litrosol were generally using it according to campaign instructions. They reported correct mixing behaviors in using a liter of water and using the whole packet of salts over 90 percent of the time. However, they did much less well at behaviors such as throwing away unused liquid after one day (an average of 36 percent of mothers) and knowing that they should seek help if three days of Litrosol use did not improve the situation (an average of 10 percent).

Use of other medicines concurrently with Litrosol was common - - an average of 43 percent of Litrosol-treated cases were also reported to be treated with other medicines. About 20 percent of all episodes were taken to the clinic for treatment. Slightly over ten percent of cases were seen by village health workers. Both these numbers remained stable over time. Reported treatment by *sobadors* or other traditional healers averaged four percent of episodes, but fluctuated more over time.

The relationship between Litrosol use and the seeking of care from those sources for diarrhea episodes occurring in the last two weeks and in the last six months was tested for significance; clinic contact was significantly more likely to result in Litrosol treatment in eight out of twelve comparisons, while village health worker contact was significantly related to Litrosol treatment in ten out of twelve comparisons. Village health workers clearly played an important role in providing Litrosol, probably because they were easily available and because they had few available responses other than offering Litrosol. Clinics were also important sources, but they may have made more flexible responses than village health workers. Interestingly, use of traditional care sources had no effect on the likelihood of Litrosol use - - people who sought help from healers were just as likely to use Litrosol as those who did not.

Feeding behaviors, particularly breastfeeding and feeding during episodes of diarrhea were also targets of the campaign. Breastfeeding prevalence and duration were high in rural Honduras and appeared to have been increased by the campaign. Early in the intervention, 65 percent of children under 18 months were breastfeeding; by the end of the campaign, the number had risen to 81 percent of children under 18 months. Similarly, bottlefeeding of the young children dropped from 64 percent to 50 percent over the same time period. Continuation of breastfeeding and bottlefeeding during episodes of diarrhea was at about the same levels (i.e., virtually all mothers who were breastfeeding or bottlefeeding reported that they continued to do so during episodes of diarrhea). There was a slight rise in the giving of other liquids during episodes, and the rise was slightly sharper for younger children than for older ones.

An observational study was conducted for a small number of mothers to measure treatment behaviors directly. The mothers were selected when they brought their children to clinics complaining of diarrhea and observed afterwards in their homes. A total of 50 percent of these cases were treated with Litrosol, either before coming to the clinic or during the observation period at home. Mothers who did treat during the observation period gave Litrosol at a rate that would, if sustained, result in the consumption of a liter in 10 to 15 hours. Mothers were tested on their mixing skills after the observation period and performed quite well. The average mixing volume

was 926 cubic centimeters, with a standard deviation of 218. Only one mother in five had a bottle of exactly a liter volume. They used all the salts (94 percent) and surprisingly, used boiled water (97 percent) even though the instructions did not require it. Thus, mothers were observed to mix accurately and to administer in amounts that would be clinically effective, if they gave Litrosol at all.

Health status change was the ultimate objective of the campaign effort. Health status was measured with a variety of anthropometric measurements as well as mortality rates. There was evidence that the overall nutritional and growth status declined during the campaign period. The percent of stunting went from 27.8 percent to 33.4 percent for boys and from 31.1 percent to 38.3 percent for girls. The percent "normal" under the Gomez categories fell from 43.4 percent to 36.7 percent for boys and from 40.9 percent to 33.3 percent for girls. However, wasting was essentially zero throughout, and there may even have been a slight improvement in arm circumference measures over time. The decline in nutritional or growth status seemed to be a secular trend toward increased growth retardation. It was consistent across sex, age, municipio, and type of village. However, there was no evidence of acute wasting.

Mortality data were collected from the official Death Registries kept in the county seats. An analysis of mortality for children less than five using the cause of death reported by the mother showed marked declines in deaths involving diarrhea in any way. In the two years prior to the campaign, death of children under five involved diarrhea in 39.8 percent of the cases. In the two years after the start of the campaign, deaths involving diarrhea fell to 24.4 percent of all mortality, a statistically significant drop. Total mortality dropped, although by a slightly smaller amount. Virtually identical reductions in the percentages of cases involving diarrhea before and after the campaign are found when the analysis is restricted to children less than two years and to children less than one year, but the drop in total mortality is smaller. The changes are also consistent when analyzed by time relative to the start of the intervention. There may be multiple causes for these reductions in reported diarrheal mortality, but it does appear that there has been a reduction in diarrheal deaths that can be attributed to the oral rehydration intervention.

In sum, the evaluation has found that the campaign environment and impacts were as follows:

- there was good access to all the communication channels used by the campaign;
- the target audience was heavily exposed to campaign messages through those channels;
- the exposure resulted in learning gains across virtually all the topics covered in campaign messages;
- the audience adopted the promoted behaviors at high rates and sustained the behavior changes over time at high enough rates and with sufficient accuracy that an impact on health status could be expected;
- the nutritional status of children worsened over time in ways that suggest a secular trend related to Honduras' difficult economic situation;
- and mortality involving diarrhea has declined sharply, with a corresponding, though smaller, drop in total mortality.

The pattern of the findings is consistent and provides strong support for the conclusion that the approach used by the campaign can be a very effective tool for accomplishing change in health behaviors in rural populations. It also suggests strongly that when the behavioral change being advocated is adoption of home-based oral rehydration therapy, the complex behaviors involved can be taught to a sufficient degree of accuracy that impact on aggregate health status can be detected.

APPENDIX B: RESURVEY SUB-STUDIES

The phase of the research called "the resurvey" is comprised of a set of eight studies pertaining to ORT, immunization, and acute respiratory infection. The component studies are as follows:

- (1) The "main" survey of mothers' awareness, knowledge, attitudes, and practice related to oral rehydration therapy for the treatment of infant diarrhea. This component addresses the long-term effects of MMHP by interviewing mothers from communities studied in previous research phases;
- (2) A mixing trial module, which asks a sub-sample of mothers to demonstrate how they prepare the oral rehydration solution;
- (3) An immunization module, which focuses on mothers' awareness of and participation in Ministry immunization campaigns, and measures inoculation coverage for children under five years of age;
- (4) A health provider questionnaire, which surveys ORT packet availability as well as knowledge, attitudes, and practice among community health workers and those in the formal health system;
- (5) A community characteristics form, which serves primarily to gather background information on each of the communities included in the study;

- (6) A mortality study employing archival data to ascertain the number of early childhood deaths attributable to diarrhea;
- (7) An institutionalization study to determine the extent to which the Ministry of Public Health has implemented the HEALTHCOM methodology in its campaign efforts;
- (8) A study of knowledge and practice related to acute respiratory infection which gathers baseline evaluation data in anticipation of a campaign to teach mothers proper care of children with colds, cough, influenza, and pneumonia.

APPENDIX C: COMMUNITIES INCLUDED IN THE RESURVEY
YUSCARÁN*

Yuscarán (*cabecera*)
 Robledal
 Ocotal
 Tenidero
 Cordoncillo
 Las Crucitas
 Lainez

SALAMÁ

Salamá (*cabecera*)
 Talgua
 Mendez
 Cofradia
 Jutiapa
 Pozo Zarco
 Sabanagrande

MOROCELÍ**

Morocelí (*cabecera*)
 El Plan
 El Retiro
 Los Limones
 El Suyate
 Valle Arriba
 Ojo de Agua
 El Campo
 Llano del Tigre

SABANAGRANDE*

Sabanagrande (*cabecera*)
 Dulce Nombre
 La Mina
 Carbonera
 El Tigre
 Monte Grande Arriba
 Los Infiernitos
 El Tule
 Portillo
 Limones
 Pozo de Banco

NACAOME

Nacaome (*cabecera*)
 Guacuco
 Lagartillo
 Moraicito
 El Transito
 El Refugio
 La Baraja

SAN FRANCISCO

San Francisco (*cabecera*)
 Santa Ana
 La Frutera
 Saldito
 Las Camelias
 Frisco No. 1
 Rio Arriba/Santiago Arriba

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- * Communities from this site included in the initial MMHP longitudinal evaluation
 ** Communities from this site included in the post-only interviews for the MMHP evaluation