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**Nothing To  
Sneeze At:**

***Integrating  
Research  
Into the  
Honduran ARI  
Communication  
Program***

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*A publication of*

the HEALTHCOM Project

*in collaboration with*

The Ministry of Public Health, Honduras  
Division of Health Education  
and Division of Maternal/Child Health

December 1991

This paper documents an important effort in the control of acute respiratory infections. It was made possible through the dedication and commitment of the many members of the Divisions of Health Education and Maternal and Child Health of the Ministry of Public Health, Honduras. The research described in this document was funded by the HEALTHCOM, or Communication and Marketing for Child Survival Project. HEALTHCOM is a project of the Office of Health, Bureau for Research and Development, of the U.S. Agency for International Development (A.I.D.) It is conducted by the Academy for Educational Development (contract no. DPE-5984-Z-00-9018-00) and its subcontractors: the CIHDC of the Annenberg School for Communication at the University of Pennsylvania, Applied Communication Technology, Birch & Davis International, The Futures Group, The Johns Hopkins University, and Porter/Novelli. This document does not represent the views or opinions of the Agency for International Development. It may be reproduced if credit is properly given.

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## EXECUTIVE SUMMARY

Acute respiratory infections (ARI) rank as one of the greatest causes of childhood mortality throughout the developing world, and ARI morbidity is extremely high. This problem is not simply a matter of the incidence or occurrence of ARI, as incidence rates for ARI in children in the "developed" world are roughly equivalent to those in developing nations. In the developing world, however, we see a higher incidence of pneumonia, the severest of respiratory infections, and a markedly higher case fatality rate. The difference in life or death from ARI lies primarily in the appropriate and timely recognition and treatment of pneumonia and other severe infections. It has been estimated that as much as 98% of child deaths attributable to ARI could be prevented by effectively managing the illness once infection occurs.

If appropriate referral and treatment are the key to reducing the devastating impact of acute respiratory infections through effective case management, then community education efforts and health worker training are critical elements of any control program.

This issue paper follows one country's communication efforts to reduce the damaging impact of respiratory infections on child survival. The paper is written for those developing and implementing communication components of ARI programs such as national ministry officials, international organizations providing technical assistance, behavioral researchers, USAID project managers, and monitors. It is organized to be "user-friendly," with the main text providing an overall description of the development of the ARI communication strategies and detailed appendices reviewing research methodology and findings for those who are involved in ARI control in the field. We have tried to include insight into the challenges faced by program planners, so that the experience will contribute realistically to international efforts now underway. In particular, we will follow the development of the Honduras Ministry of Health's ARI communication program to demonstrate the role of systematic communication initiatives in strengthening a national ARI control program.

### The Honduras ARI Program

The project was assisted by AED's HEALTHCOM project, which worked with the Honduras Ministry of Health to conduct several investigative research activities for the design of the ARI communication strategy. They included: (1) qualitative research (ethnographic research—both in-depth interviews and observations—focus groups, and health worker interviews); (2) quantitative survey (mothers and health personnel); and (3) a study of mothers' current practices.

Utilizing data from these studies, the program designers then compared behaviors observed among mothers and health workers with the lists of ideal ARI-related behaviors as specified by pediatricians and by the ARI norms of the Pan American Health Organization (PAHO). This helped identify which current behaviors to support, which ones to try to modify, and which new ones to introduce in order to improve home treatment of mild and timely referral of severe cases of ARI. This identification of behaviors became the basis for the communication

plan and for designing graphic materials, radio spots, and training courses. The thrust of messages to parents was to teach symptom recognition and a simple, appropriate response: when to treat at home and when to seek help from the clinic or a private physician.

The project's communication strategy combined face-to-face interaction between mothers and health workers with print materials and radio spots. The materials were designed to support health worker communication with mothers, to provide caretakers directly with information about ARI treatment, and to reinforce appropriate behaviors. Among these materials were flipcharts, printed handkerchiefs, brochures for mothers, and radio spots.

The communication strategy was largely focused upon teaching and motivating mothers to bring sick children to the health center in a timely manner. Training of health personnel to respond appropriately, and also to be part of this teaching and motivating process, was an important part of the intervention. The health workers learned to use a "skills" approach as opposed to the usual didactic approach to health education. They encouraged mothers to practice answering questions and demonstrate new practices. Radio programs were also targeted at health workers to reinforce their involvement.

The pilot project culminated in a simple motivational event to encourage mothers to learn the ARI messages and practices. On a specified day, which was announced over the radio in some regions and via trucks equipped with megaphones in others, the health centers held a special contest to reinforce mothers' new knowledge and skills. The contest was an educational quiz game at which everyone responding correctly received a small prize. Thus what was basically a clinically-oriented health education issue also became a community activity that attracted the attention of the general public and of parents who might not otherwise have visited the clinic.

## Conclusions

A pilot intervention to test the communication strategy demonstrated the effectiveness of the integrated training and media approach to ARI control. Measurements of about 15 teaching techniques showed marked increases in health communication skills as a result of training. In addition, results of pre- and post-tests with 452 mothers suggested that the new health talks were delivering more information on ARI in a more interactive way than had previous sessions at the clinics. Overall community awareness of ARI symptoms and management, even among mothers not directly receiving clinic educational sessions, showed an increasing trend during the observation period, which was maintained six months later.

Overall lessons learned from this research effort are as follows:

- We need to recognize that appropriate adult behavior is critical to saving lives of children with ARI. Therefore, the behaviors of health personnel and parents need to be addressed directly in the design of public health interventions.

- How behavior change can be maintained over time and generalized to other previously untrained individuals is an important aspect of the evaluation of communication programs.
- The behavioral and social sciences define the broader context and provide the technology for initial qualitative and quantitative research preceding a communication campaign. Such research must ultimately lead to the specification of appropriate target behaviors and methods for changing them.
- It is particularly important in ARI communication programs that messages to health personnel and parents represent a simple and clear call for action, yet address the complexity of symptoms and behaviors necessary to combat ARI.
- There is a methodology that can help identify those adult behaviors that need to be encouraged, changed or trained. This methodology allows us to look at the "soft" area of health practices in a scientific fashion, to measure the changes produced by interventions, and to modify communication programs to enhance desired changes.

## I. INTRODUCTION

Acute respiratory infections (ARI) rank as one of the greatest causes of childhood mortality throughout the developing world, and ARI morbidity is also extremely high. This problem is not simply a matter of the incidence or occurrence of ARI, as incidence rates for ARI in children in the "developed" world are roughly equivalent to those in developing nations. In the developing world, however, we see a higher incidence of pneumonia, the severest of respiratory infections, and a markedly higher case fatality rate due to pneumonia. The difference in life or death from ARI lies primarily in the appropriate and timely recognition and treatment of severe infections.<sup>1</sup> It has been estimated that as much as 98% of child deaths attributable to ARI could be prevented by managing the illness once infection occurs.

If appropriate referral and treatment are the key to reducing the devastating impact of acute respiratory infections, then community education efforts and health worker training are critical elements of any control program.

This issue paper will focus on one country's efforts to reduce the damaging impact of respiratory infections on child survival. In particular, we will follow the development of the Honduras Ministry of Health's ARI communication program to demonstrate the role of systematic communication initiatives in strengthening a national ARI control program.

The paper is written for national ministry officials, international organizations providing technical assistance, behavioral researchers, USAID project managers and monitors. It is organized to be "user-friendly", with the main text providing an overall description of the development of the ARI communication strategies, and detailed appendices reviewing research methodology and findings for those who are involved in ARI prevention in the field. We have tried to include insight into the challenges faced by program planners, so that the experience will contribute realistically to international efforts now underway.

## II. BACKGROUND

In Honduras, respiratory infections have been a leading childhood killer, responsible for around one third of total deaths of children under five. In 1987, national statistics revealed that ARI surpassed diarrhea as the major cause of death in children under five.<sup>2</sup> A Honduran child suffers an average of five to seven ARI episodes per year, and 30% of all cases treated at hospitals are related to ARI. Over the past decade or so, the international community has begun

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<sup>1</sup> Nutrition and environmental factors more prevalent in the developing world are related to high incidence rates. This paper will not attempt to discuss the epidemiology of acute respiratory infections. For technical information on ARI, we refer you to the reference section at the end of this document.

<sup>2</sup> This change reflects a slight decrease in diarrheal mortality, which followed aggressive ORS promotion activities in Honduras. There was no significant increase in ARI deaths, but rather the decrease in deaths to diarrhea shifted the overall mortality profile.

developing policies for ARI control, and programs have followed. In 1979, the World Health Organization (WHO) recommended that the formulation of programs for the control of acute respiratory infections in children under five years of age be integrated with primary care efforts in order to reduce the high rates of morbidity and mortality in this age group.

The Honduras Ministry of Health recognized the seriousness of this problem and, in 1983, developed plans for an acute respiratory infection evaluation and control program. Initial steps included the training of staff and provision of medicines and equipment to hospitals and other health care institutions. The next step was to launch a community education component. In 1986, the Ministry of Health asked the HEALTHCOM Project to assist in developing an ARI communication strategy to train health personnel and educate mothers.

Responsible parties for carrying out the plan were the Divisions of Epidemiology and Health Education of the Ministry of Health and the General Directorate of Health. Other participants in this effort were the MOH Divisions of Human Resources, Maternal and Child Nutrition, the Science and Technology Research Unit, and programs for vaccination and control of diarrheal diseases.

The overall goals of the communication intervention, developed with the collaboration of the various MOH divisions, were as follows:

- to enhance the ability of mothers to recognize the onset of ARI and that it is a serious disease, and then attend to it appropriately,
- to improve mothers' recognition of the benefits and potential harmfulness of certain practices,
- to increase professional involvement in decisions on what medications to give the child who has mild ARI,
- to improve mothers' ability to recognize signs of pneumonia and seek professional help immediately, and
- to control the indiscriminate use of medications by providers, and that providers generally reach an agreement on which medications are appropriate for controlling severe ARI.

Even these general goals were not easily agreed upon by the various divisions of the Ministry of Health. The above strategy is dependent upon largely illiterate rural women recognizing the various types of respiratory infections and choosing appropriate treatment--home care or seeking clinical help. There was some debate as to the wisdom of developing a strategy that assumed mothers and community volunteers could do the first round of triage with a potentially fatal illness like pneumonia. How this debate was resolved jumps ahead of our story.

Suffice it to say that even the development of general communication objectives questioned the accepted treatment protocol of the day.

### III. APPLYING A SYSTEMATIC COMMUNICATION METHODOLOGY

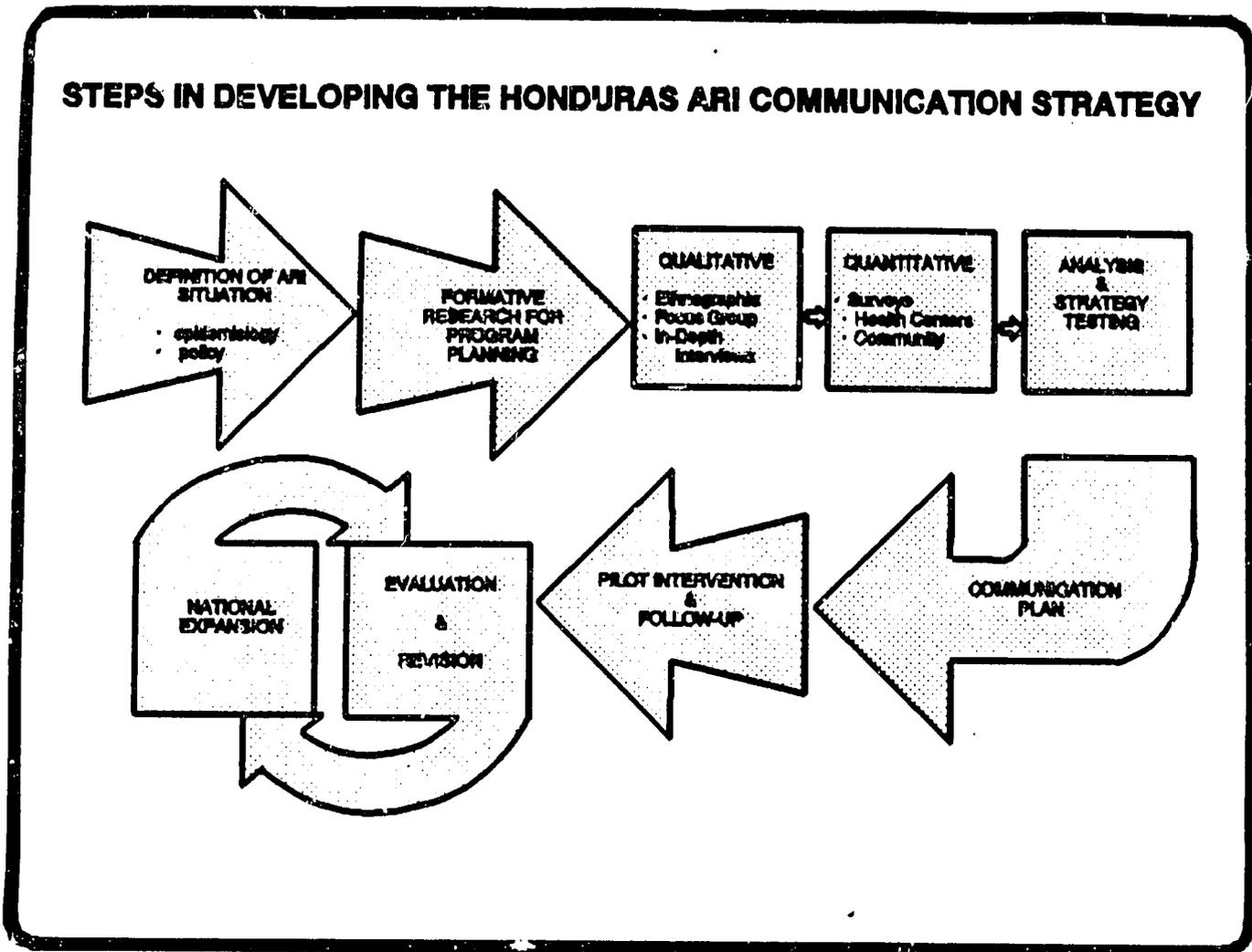
HEALTHCOM, when assisting the MOH strategy development, applied a modification of the social marketing/communication model used in our technical assistance worldwide. This approach consists of six basic steps which incorporate assessments of target audience needs and perceptions at several points in the process. The steps create in a circular process, in which each step feeds into the next. The basic steps include:

- Assessment
- Planning
- Materials Development and Pretesting
- Revision and Production
- Training and Implementation
- Monitoring, Evaluation and Revision

The skeleton of the Honduras process of developing an ARI communication strategy is depicted below. The role of research is clear in formulating an effective strategy and in measuring its effectiveness when applied. In this issue paper, we will refer back to this model to orient the reader to each component's place in the overall communication process. (See Figure 1)

The first step in developing any communication plan is the overall definition of the country situation vis à vis respiratory infections. This begins with defining the "ideal" ARI treatment behaviors through an inventory of international and national policy and treatment protocols. When HEALTHCOM began working with the MOH in 1986, WHO and its Pan American regional bureau, PAHO, had fairly recently adopted a new algorithm for ARI, switching from a three stage diagnosis of "mild", "moderate" and "severe" respiratory infection to a pneumonia/no pneumonia classification and treatment protocol. Therefore, "ideal" behaviors as identified by international authorities were not clearly related to diagnostic categories currently applied in Honduras. This situation made it impossible for communicators to identify behavioral objectives clearly for the education campaign. The communicators had first to recognize this unsettled policy, and then work with international and national officials to resolve the issue. The research presented in this report was designed and carried out using the "old" algorithm, and later re-analyzed with the newly adapted protocol as represented in Figure 2.

Figure 1



Following overall definition of the country situation, the next vital step in communication planning is the assessment of actual behaviors related to a particular health outcome. What is striking about any work in child survival is that although the primary objective is improving the health of children, children themselves are not responsible for their own prevention and care. Therefore, the primary target of child survival programs must be the adults responsible for children: parents, community health workers, physicians and nurses. Specifically, health communication must focus on improving the health-related behavior of these adults if we truly hope to have an impact on child survival. Increasing knowledge or awareness levels of adults will have no effect on children if it does not lead to changes in the care or treatment of children. We assess the behaviors of both health workers and mothers because we are interested in maintaining appropriate practices in both groups. In the present study, for example, we observed health workers providing training to mothers for ARI management and mothers actually engaged in caring for a child with ARI.

Figure 2

<b>WHO TERMINOLOGY USED IN STUDY</b>	<b>SEVERE ARI</b>	<b>MODERATE ARI</b>	<b>MILD ARI</b>
<b>ARI Signs</b>	Severe wheezing  Danger signs of very severe disease:  . Not able to drink; . Convulsions; . Abnormally sleepy or difficult to wake; . Stridor in calm child; or . Severe undernutrition	Wheezing with possible pneumonia  Acute ear infection (acute otitis media)  Suspect streptococcal sore throat	Wheezing  Chronic ear infection (chronic otitis media)  Sore throat (without suspected streptococcal sore throat)
<b>NEW TERMINOLOGY</b>	<b>SEVERE PNEUMONIA</b>	<b>PNEUMONIA</b>	<b>COUGH OR COLD (WITH NO PNEUMONIA)</b>
<b>Management Plans for First-level facilities</b>	Urgent referral to hospital after first dose of antibiotic	Antibiotic and home care  (+ salbutamol)	Home care  (+ salbutamol)

WHO Programme for the Control of ARI.

At that time a long-term plan was developed for investigation of actual ARI behaviors. The Honduras ARI communication program developed a model for all aspects of its investigation, intervention planning and implementation, basing the model on behavioral research derived from medical anthropology, health systems analysis, behavioral psychology and communications research.

Behavioral research provides a systematic way of documenting the complexity and prevalence of critical behaviors of both health worker and mother alike. Findings from this research can then help build a communication strategy. Specifically, behavioral research helps identify appropriate behaviors already being practiced. These practices we attempt to reinforce.

For example, if we found that most women continue to breastfeed during diarrhea, we would design a communication strategy that encourages that practice. Behavioral research can also identify important skills that are missing, such as effective teaching methods used by health workers. In this case, we would design training opportunities to teach these skills. This type of research can also identify inappropriate practices in a target group. These behaviors should be replaced by training new behaviors or encouraging existing appropriate practices.

Behavioral research also focuses on the larger context in which these behaviors occur; it identifies factors that act as antecedents, in other words, those events which trigger current practices. In the case of ARI, we are attempting to identify the symptoms in a child that trigger current practices (appropriate and inappropriate) in mothers. Lastly, behavioral research identifies factors that act as consequences. Consequences are positive or negative events following a behavior that increase or decrease the likelihood that the behavior will be repeated. The real and perceived consequences to appropriate health practices influence, to a great degree, the extent to which they will be maintained in a population. For example, a mother's positive or negative experiences with clinic staff can influence her decision to return to the clinic on a regular basis.

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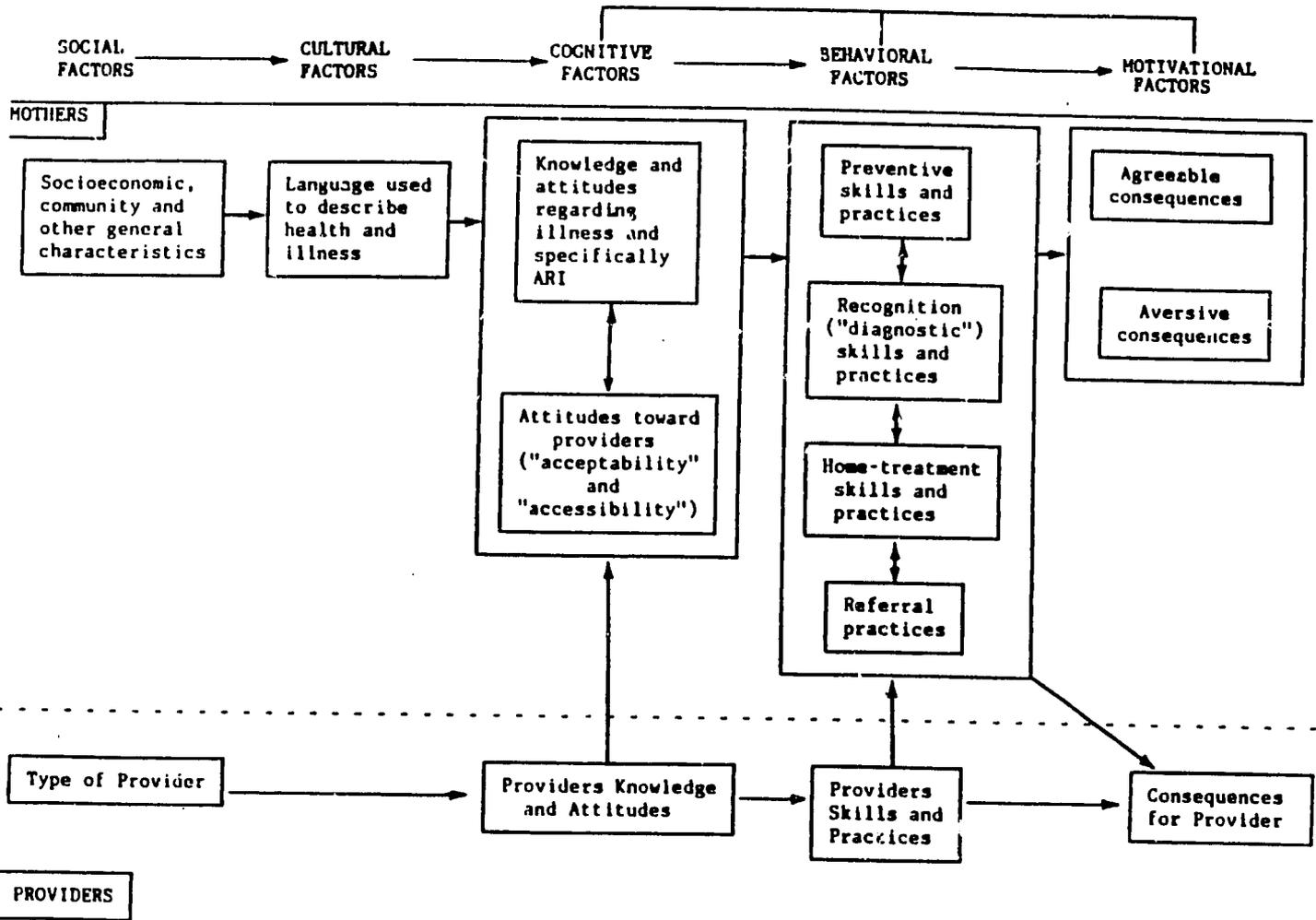
### Assessment of Behaviors

#### Conduct Research to Identify:

- Existing Appropriate Behaviors
  - Missing Skills
  - Existing Inappropriate Behaviors
  - Antecedents: What Triggers Practices?
  - Consequences: What Maintains Practices?
- 

The model, illustrated in Figure 3, contains five fundamental categories for investigation and intervention planning. These categories include social factors, cultural factors, cognitive factors, behavioral factors, and motivational factors, which can be applied to studying the behaviors of mothers and health workers alike. This blueprint has proven invaluable for determining which of hundreds of potential variables to address in qualitative and quantitative research, and how to proceed with intervention planning stemming from this investigation.

Figure 3  
The Honduras ARI Investigation and Intervention Model



As can be seen, the factors start with issues which are relatively distant from the mother's day-to-day experience (or, for that matter, that of the health providers) and proceed to specific cultural and cognitive factors which influence behavior more immediately. We then look at specific practices which include the prevention, recognition, and treatment of ARI. Mothers experience either success or failure and therefore are more or less motivated to take similar actions again in the future. Among the most important individuals external to the mother and the immediate family in the case of the health and illness of children are community- or clinic-

based health care workers. Therefore, we can see that mother's behavior may be partially influenced by actions and skills of the health workers, who in turn may be influenced by the degree of respect mothers and other individuals in the community hold for them.

Various quantitative and qualitative research techniques are particularly relevant for obtaining data on the various factors. The ethnographic research conducted during the qualitative phase of our efforts addressed all factors depicted in the model, while focus groups with mothers in turn looked at specific cultural, cognitive, behavioral, and reinforcement factors. Following this, a survey of mothers (designed from findings of the previous two qualitative investigations) gave the specific data on cognitive, behavioral, and motivational factors affecting mothers and the health of their children, while interviews with providers addressed their knowledge, skills, and practices, depicted at the bottom of the model. (Appendix A presents a detailed summary of the focus group results.)

#### **IV. QUALITATIVE RESEARCH**

Prior to designing the communication plan, important questions about mothers' knowledge and practices needed to be answered such as:

- How do mothers perceive infant ARI?
- What kind of signs and symptoms do they recognize?
- Which signs of severity do mothers recognize?
- What do they do after noticing these signs?
- How do they feed infants with ARI?
- Whom do they consult with when a child has ARI?

Ethnographic research, focus groups, and provider interviews were employed to obtain qualitative information related to these factors.

##### **A. Ethnographic Research**

The ethnographic research was conducted in six culturally different communities with a total of 85 informant mothers. Interviewers spent a minimum of two hours interviewing urban and rural women in their homes. Complete demographics are detailed in Appendix A. Most women lived in humble conditions: 55% of homes had dirt floors, 60% no sanitary facilities, 65% without electricity. The ethnographic research method uses two main techniques: the open interview, which allows the researcher to go as deeply as necessary into a topic, and direct observation, which permits identification of actual behaviors. In this way, the MOH was able to establish a popular taxonomy for ARI, with a terminology that is shared by almost all

Honduran mothers.(see Figure 4) From this taxonomy, it became clear that mothers recognize significant symptoms of pneumonia to be the severest of respiratory infections: stomach indrawing (chest indrawing) & lips turning blue.

Some findings from the ethnography were that most mothers do recognize mild ARI even if they do not do much about it. The majority administered inappropriate treatment, if any. Some women thought that a runny nose and cough were normal, and stated that the "child was born with a cold." It was also found that when ARI worsens, mothers tend to consult with traditional healers, older-aged neighbors and pharmacists, before consulting physicians. They lose valuable time in this way, and children can die before entering the health care system.

## **B. Focus Groups**

Thirty-five focus groups were conducted to identify home treatment and feeding habits during ARI episodes. These groups were conducted among mothers of various economic status and representing different geographical areas. The groups validated the fact that mothers do very little about severe ARI and do it too late. While opinions were varied, mothers in the focus groups saw health services more negatively than indicated in one-on-one interviews. Some mothers saw health services as being irregular and provided by impolite staff. Some saw lack of medicines in the centers as being problematic. Treatment at home seems to be a middle and upper class behavior in Honduras.

Almost all informant mothers, both in the ethnographic study and in focus groups, reported that while regular breastfeeding continues, some types of foods are eliminated from an infant's diet when an ARI episode occurs. They basically withdraw food staples that belong to the "cold" food group, among others: beans, rice, avocado, oranges, lemons, grapefruits, butter, and in some cases, fish, pork, and beef. They systematically stop the administration of these food items when the child shows any kind of ARI symptoms. They also discontinue the intake of low temperature foods such as ice-cream and cold beverages.

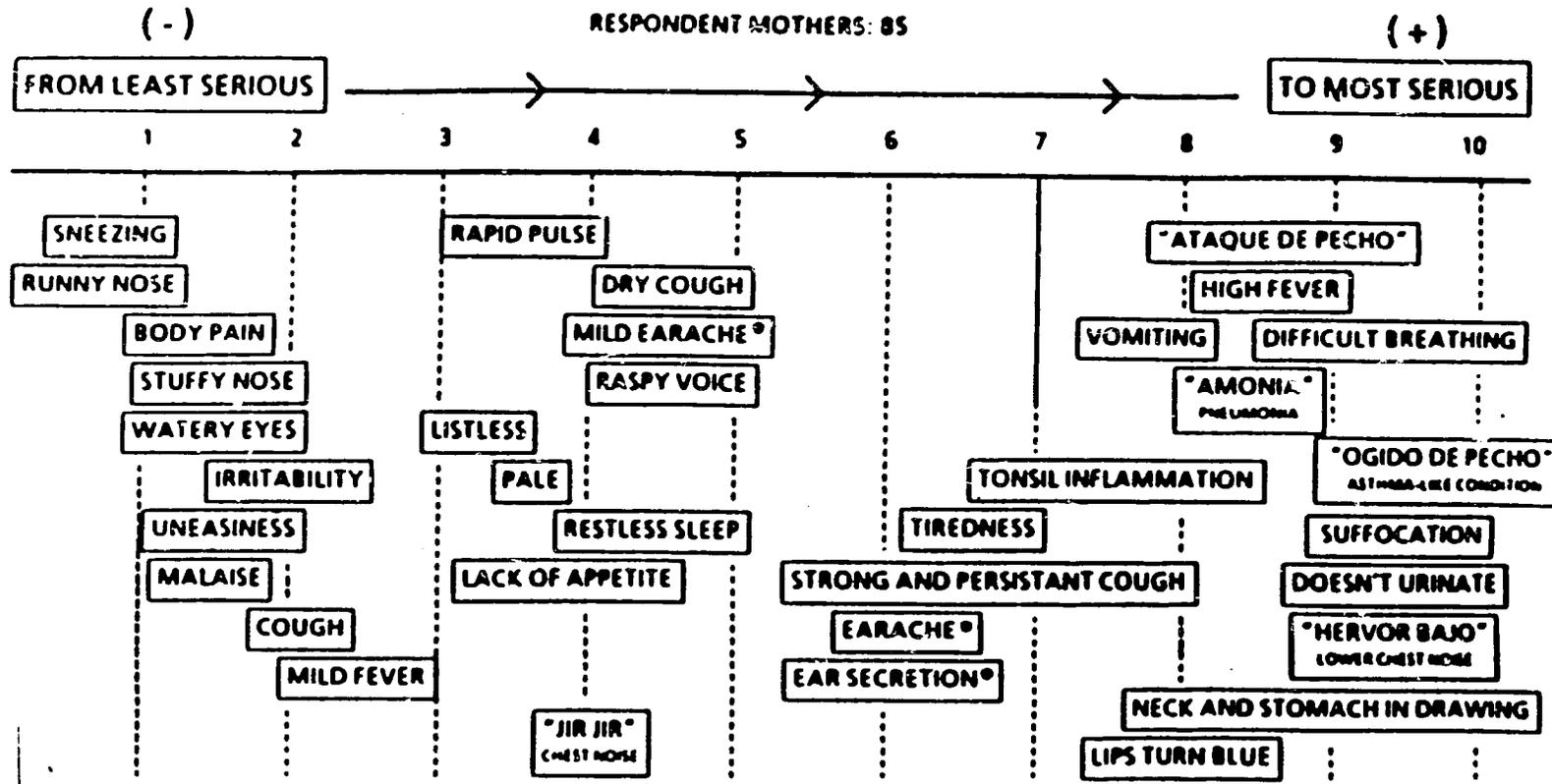
## **C. Interviews with Health Personnel**

During the ethnographic research, 84 clinic-based health workers and traditional care givers were interviewed. One of the most striking findings from these interviews was that other than physicians, health workers' knowledge and case management skills were not much different from what mothers reported in the community.

Among the health workers in clinics, the most striking finding was the tendency to use antibiotics when available regardless of symptoms. The mothers reinforced this practice, asking specifically for antibiotics, even for relief from mild ARI. (Appendix A provides detailed results of these qualitative studies.)

Figure 4

ARI Ethnographic Research  
PERCEIVING SERIOUSNESS OF INFANT ARI



\* GENERALLY NOT CONSIDERED TO BE ARI SYMPTOMS

## V. QUANTITATIVE RESEARCH

### A. Survey of Mothers

The next phase of research involved a scientific survey of 851 mothers nationwide who had children under five years of age. Most of them were married and "housewives" with 4.5 years of education. Eighty percent reported being able to read and write. Using the results of the assessment of cultural factors in the qualitative research phase, a questionnaire was designed to assess specific social, cognitive, behavioral, and motivational factors which elicited, formed, and maintained health-related behavior on the part of mothers. The purpose of this survey was to quantify problems and to further the development of the health promotion intervention.

The average age of the mothers interviewed was 28 years, with the average years of residence in the particular community being 18 years. Mothers had a mean of four and a half years of education. The median income was between US\$ 20 and US\$ 50 per household per month.

Three-fourths of the mothers indicated mucous running from the nose as being the most common symptom of ARI. Nearly half of the mothers saw general weakness as being one of the main etiological factors for ARI.

In terms of behavioral reactions to ARI, over half of the mothers indicated that they did not consult anyone for initial symptoms. If the ARI became severe, 25% went to a private practicing physician, while nearly half went to a physician at the health center.

### B. Provider Interviews

The qualitative research also included interviews with 84 community, traditional and professional health care providers representing the range of services used by the target audience. In Honduras there are two types of health care centers besides the hospital: the CESAMO, which is fairly centrally located and is served by a physician, and the CESAR, located in more remote areas (and up to two hours distant from those it serves), which is run by one or two auxiliary nurses. The target group relied as well upon *guardians*, or community workers, and traditional providers such as midwives (*parteras*), masseurs (*sabadores*), herbalists (*curanderos*), and injectionists. The survey included all of these providers.

Providers in the formal sector were knowledgeable about the symptoms and treatment of ARI, with a few notable exceptions. One of the most striking findings from these interviews was that health workers' knowledge and case management skills were in many ways similar to those of mothers in their communities. Barring physicians, many of the providers (auxiliary nurses, *guardians*, midwives, etc.) supported the common practices of feeding different oils and

withholding "cold foods." In addition, those who had access to antibiotics tended to use them regardless of the severity of a child's symptoms. Many health care providers also recommended extended use of expectorant syrups and antitussives.

The provider surveys and the caretaker studies also asked questions about the quality of interactions between the two groups. In general, mothers who visited traditional healers of some kind knew what treatment they sought and said they were satisfied with the service. Relations between health centers and their clients were more ambivalent. This study also revealed typical areas of tension: mothers often thought health workers were overwhelmed or inattentive; physicians often thought communities had insufficient regard for their own health needs. Thus, any strategy to improve the mutual support and regard of client and service provider for each other could only increase the chances that children would be treated in a timely manner.

### C. Behavioral Observations

Our next step was to design a communications campaign which specifically designated both culturally relevant and medically effective methods for dealing with the child with mild ARI. From the ethnographic research, a strong relationship was found between stuffed noses and suspension of breastfeeding so the intervention would promote nose clearing. We therefore needed to learn more about existing nose wiping practices, and test the acceptability of various alternatives. In spite of the extensive information derived from the ethnography and the survey, we still felt a need to observe directly how mothers cleared their children's stuffed or runny noses, as their self-report of these behaviors may have been subject to recall bias or problems in expressing verbally that which they typically did. Subsequently, we hoped to promote specific instruments and methods (e.g., tissues or handkerchiefs) and incorporate these and other information as a part of our health promotion campaign for ARI control. In order to accomplish this, we developed a "behavioral preference test" for determining specifically what methods mothers used to respond to stuffy, runny noses by actually observing them doing so.

The instruments selected for the behavioral preference test were a nasal aspirator (a small, tapered tube capped by a suction ball), small pieces of linen cloth, tissues, toilet paper, Q-tips, and nose drops. Mothers were asked to indicate whether they used any method for nose clearing when their children had colds. They were then asked to demonstrate the method they used.

Based on these observations, it was decided that: a) cloth, toilet paper, tissue, and related material were acceptable to the women and could serve either for pull and wipe, or insert method for cleaning. b) Q-tips were also acceptable to the population but were quite dangerous and not always available; and c) contrary to initial expectations, the mothers did not see aspirators as appropriate for this type of intervention. The use of herbal tea drops, though of questionable appropriateness given the variety of drops used, is already widely practiced. The direct observations of these practices subsequently led to the development of specific radio and print

media messages (see Figure 5) and to graphic representations of nose clearing for comic book, flip chart, and other illustrations. (A detailed summary of the quantitative research results is presented in Appendix B.)

Figure 5

## ARI BASIC MESSAGES

- **CUE TO BEGIN CHILD CARE AT HOME**
  - Runny Nose
  - Cough
  
- **CARE FOR CHILD AT HOME MEANS:**
  - Give a lot of liquids
  - Continue with feeding
  - Continue with breastfeeding
  - Clean the nose
  - To lower fever, apply lukewarm compresses
  
- **CUE TO SEEK HELP**

<p><b><u>FORMER SIGNS</u></b></p> <ul style="list-style-type: none"><li>• Persistent Cough</li><li>• High Fever</li><li>• Difficulty Breathing</li><li>• Pus and pain in the ears</li></ul>	<p><b><u>CURRENT SIGNS</u></b></p> <ul style="list-style-type: none"><li>• Rapid Breathing</li><li>• Chest indrawing</li><li>• Difficulty in swallowing</li><li>• Blue lips and fingers</li><li>• Swollen and painful lymph glands</li><li>• High Fever</li><li>• Pus and pain in the ears</li></ul>
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- **IF CHILD GETS WORSE**
  - Take Child to the Health Center or Private Physician

## VI. THE COMMUNICATION PLAN

The extensive qualitative and quantitative research efforts then lead to the planning of the actual intervention and its evaluation. This intervention followed the approach of the research, emphasizing knowledge, attitude, behavioral, and reinforcement factors applicable to both mothers and providers.

The communication plan emphasized reaching the primary audience of mothers with children under the age of five and the secondary audience of institutional personnel and community providers for the purposes of promoting health and controlling acute respiratory infections (see Figure 6). The principal objective of the communication plan and of the ARI program, for that matter, was to reduce the infant mortality from ARI with an emphasis on rural and marginal urban populations. Responsible parties for carrying out the plan were the divisions of epidemiology and education of the Ministry of Health and the General Directorate of Health. Other participants whose actions were coordinated in this effort were the divisions of Human Resources, Maternal and Child Nutrition, the Science and Technology Research Unit, and programs for vaccination and control of diarrheal diseases.

The communication plan emphasized a variety of target behaviors. These target behaviors focused on actions mothers could take to care for or seek care for children with acute respiratory infections. Specific targets were chosen based on: a) impact on health; b) the relative simplicity with which they could be described and promoted; c) their compatibility with existing community practices; and d) the cost and effort required by the user to adopt a new behavior or change an existing one. Behaviors included the recognition of ARI symptoms, feeding and the administration of liquids, recognition of the potential danger of certain home remedies, behaviors with respect to avoiding giving certain antibiotics and keeping the airway clean, and recognizing symptoms of increasing disease severity which should result in referral to a health facility.

Basic ARI messages were developed and were promoted through broadcast, print, and interpersonal channels (see Figure 5). The "creative strategy" of the communication plan emphasized interpersonal communication to groups of mothers brought into special training sessions at health centers, a brief contest whereby mothers were eligible for small prizes based on their ability to answer fundamental questions regarding ARI; the use of a diploma and when possible, radio program announcements reinforcing mothers for having learned about treating ARI; and, ultimately, the ongoing maintenance and reinforcement of mothers' knowledge and skills in recognizing, controlling, and treating ARI (see Figure 7). The research and intervention strategies originally set forth in the communication plan are outlined in Figure 8 (Note: The tripartite classification of ARI is no longer current; the new strategy reflecting these changes is illustrated in Figure 2).

In summary, background information, qualitative research, quantitative research emphasizing survey interviews and behavioral observations, and specification of specific target behaviors and social marketing issues all led to the development of the communication plan which, in turn, led to a pilot or "test market" intervention in four health regions across the country.

## **VII. DESIGN OF THE ARI INTERVENTION TRIAL**

### **A. Pilot Research Design**

The multiple baseline (staggered control group, time-series design) is a research design particularly well suited to the measurement of individual behavior change in field settings (see Figure 10). It allows plotting behavior (of an individual or group of people) at a site before and after an intervention occurs. The intervention is implemented sequentially from one site to the next. This way data can be analyzed visually, looking at behavior change from baseline to post-intervention at each site individually. Data can also be analyzed across sites, looking for a jump in the level of performance at each site from baseline to post-intervention. The consistency of this phenomenon suggests that the intervention, and not other events occurring in the environment, produced this effect. Because each site functions as its own control, a multiple baseline can show an intervention's effect without using a separate (no intervention) control group. This is particularly useful when measuring program impact because logistics often prohibit simultaneous start-up at multiple sites; and no site needs to be without an intervention in order to serve as an experimental control.

### **B. Intervention**

After conducting the qualitative and quantitative research, the Honduran Ministry of Health and the HEALTHCOM Program designed a communication strategy for ARI which integrated face-to-face communication between health workers and mothers, with print materials and radio broadcasts. Print materials included comic books depicting one mother teaching a neighbor about ARI control, while flip charts distributed to clinics provided the resources necessary for health education sessions with the mothers. As part of this strategy, health workers were trained both to communicate the basic educational message on ARI and its treatment, and to use participatory teaching methods and the flip chart especially designed for these talks. Essentially, mothers were to be taught: a) how to recognize mild and severe ARI; and b) to manage the former at home and seek medical care for the latter. Figure 11 shows the list of participatory methods health workers learned, Figure 12 summarizes the content of the ARI messages (see also Figure 5).

Health workers then used these techniques and the message content whenever they taught mothers about ARI. On a specified day, which was also announced over the radio in some regions and with megaphones in others. A special contest was held in each clinic to reinforce mothers' new knowledge and skills on ARI management. In front of the group, individual mothers were asked four questions on ARI. If their answers were correct, they were applauded and entered into a drawing for a prize. Three women in each group were winners, and everyone present received a comic book and calendar, both of which reinforced the ARI messages heard at the meeting.

The MOH selected eight clinics in four regions to participate in piloting this communication program before considering doing it nationwide. The research therefore attempted to answer the following questions:

- Did training change how health workers communicated on ARI?
- Did the new approach of health workers have any impact on mothers' knowledge of ARI symptoms and management?
- Did any information spread into the community and change community awareness?

Health worker training, which was the pilot intervention augmenting the overall communication effort, was conducted in one region every month, thus following the multiple baseline design described earlier (page 15). Throughout the entire pilot project, participating clinics received observers monthly to measure health worker communication skills both before and after training. The observers also measured changes in mothers' knowledge of ARI with a brief interview before and after health education sessions. Following the clinic sessions, the observers went into the community and requested brief interviews with approximately 20 women who had not attended the ARI sessions in the clinic, selecting them from every third residence (in towns) or every second residence (in villages). This assessed the extent to which information had spread informally to women in the community not attending the clinic sessions.

### **C. Results**

What effect did training have on the health workers' communication skills on ARI? Some data are presented in the following figures. Figure 13 portrays the effect of training on ARI content covered by health workers. Areas 1-4 on the graph are the 4 regions (2 clinics for

Figure 6

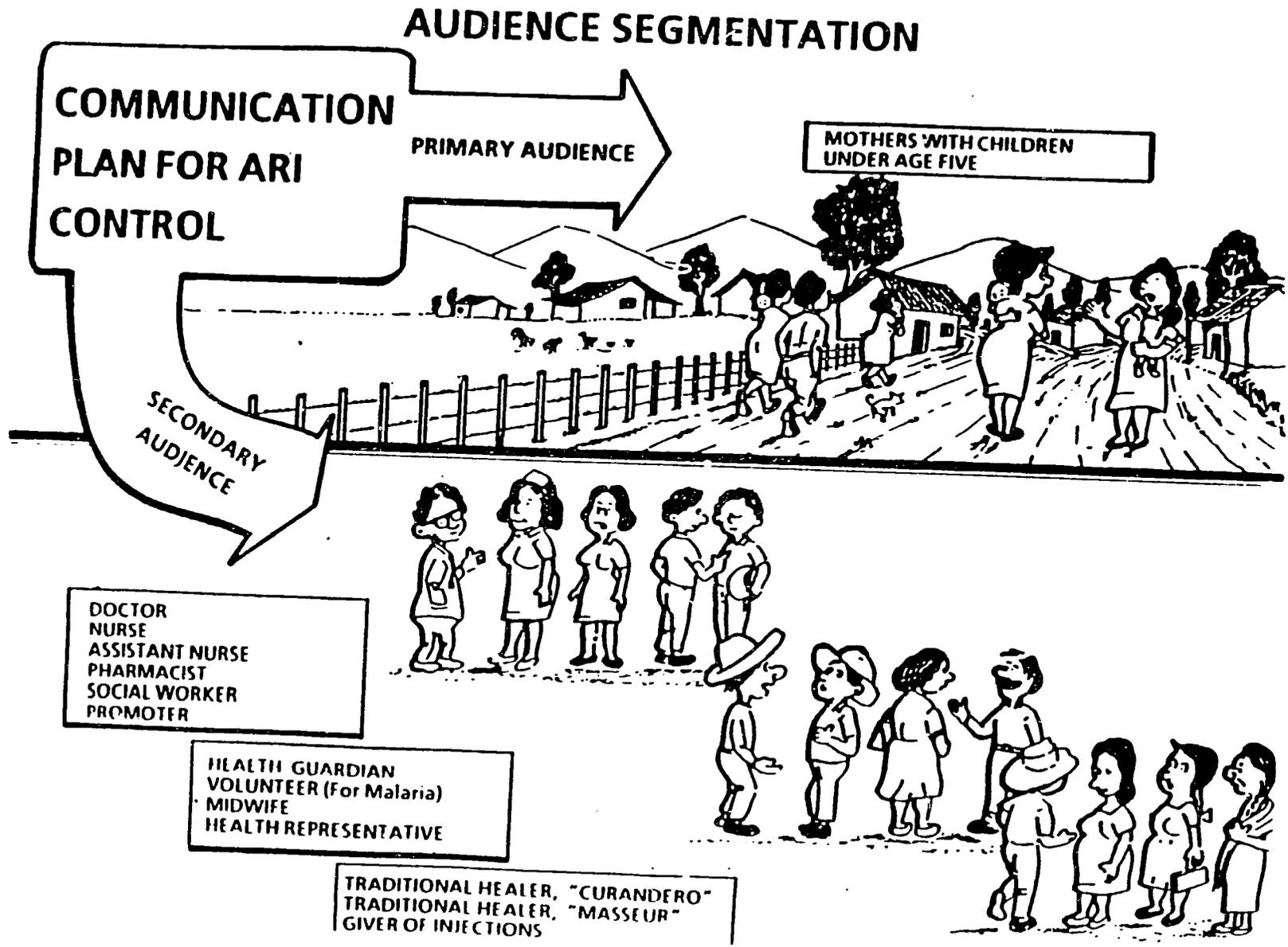
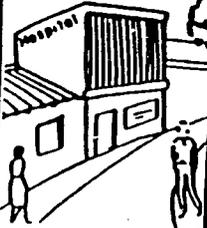


Figure 7  
Creative strategy: ARI Communications Plan



Figure 8  
Strategies of the ARI Control Program

		MILD ARI	MODERATE	SEVERE	MORTALITY
OBJECTIVE	PREVENTION OF ARI	PREVENTING OF WORSENING	TREATMENT REDUCTION IN MORTALITY		ANALYSIS
STRATEGY	<ul style="list-style-type: none"> <li>Measures to reduce incidence of low birth weight</li> <li>Immunizations</li> <li>Nutrition</li> <li>Hygiene</li> <li>Control of environmental pollution (smoke)</li> <li>Health education</li> </ul>	<ul style="list-style-type: none"> <li>Support measures</li> <li>Breast milk</li> <li>Liquids</li> <li>Antipyretics</li> <li>Maintain feeding</li> <li>Surveillance</li> <li>Consultation if worse</li> </ul>	<p>Case management</p> <pre> graph TD     A[Case management] --&gt; B[Antibiotics and ambulatory treatment]     A --&gt; C[Antibiotics and hospitalization or out-patient care]     B --&gt; D[Support treatment and other measures when necessary]     C --&gt; D                     </pre>		
CARE LEVEL	<p>COMMUNITY HOME</p> 	<p>HOME COMMUNITY PERSONNEL</p> 	<p>1st LEVEL INSTITUTIONS Cesar-Cesamo Type</p> 	<p>1st LEVEL Hospital Referral</p> 	<p>Regional and Area team</p> <p>National death Registry</p> 

**Figure 9**  
**Estrategias del programa control de**  
**Infecciones Respiratorias Agudas (IRA)**

Condición	Prevención	Gripe/Resfriado	Neumonía/Asma Otitis/Faringitis	Neumonía Enfermedad Grave	Mortalidad/ Morbilidad
Acciones	Medidas de Prevención	Tratamiento en casa	Tratamiento en Centro de Salud	Manejo en Hospital	Análisis
<b>Estrategia Educación Comunicación</b>	<ul style="list-style-type: none"> <li>♦ Inmunizaciones</li> <li>♦ Buena Nutrición</li> <li>♦ Lactancia Materna</li> <li>♦ Control de contaminación Ambiental (Humo)</li> <li>♦ Medidas para reducir la incidencia de bajo peso al nacer</li> </ul> 	<ul style="list-style-type: none"> <li>♦ Limpíele la nariz</li> <li>♦ Aplíquele agua de manzanilla en la nariz</li> <li>♦ Bájele la fiebre con pañitos de agua tibia</li> <li>♦ Déle abundantes líquidos</li> <li>♦ Continúe dándole el pecho</li> <li>♦ Continúe alimentándolo</li> <li>♦ Humedezca el ambiente</li> </ul> 	<p>(Referencia al Hospital)</p> <p>Antimicrobiano + Tratamiento de apoyo</p> <p>Vigilar señales de peligro</p> <p>Seguimiento</p> 	<p>Medidas de apoyo de emergencia</p> 	<p>Reducción de atención por resfriado</p> <p>Aumento de atenciones por neumonía</p>
<b>Nivel de Atención</b>	 <b>Comunidad Hogar</b> 	 <b>Hogar y Personal Comunitario</b> 	 <b>Primer Nivel</b> CESAR CESAMO 	 <b>Segundo Nivel</b> Hospital Area Región 	 <b>Equipo Regional y de Area</b> 

Figure 10

DIAGRAM OF MULTIPLE BASELINE DESIGN

Observation Period					
AREA	1	2	3	4	5
1	BL	X	PI	PI	PI
2	BL	BL	X	PI	PI
3	BL	BL	BL	X	PI
4	BL	BL	BL	X	PI

BL = Baseline Observation X = Intervention PI = Post-Intervention Observation

each region) involved in the pilot. These data points represent the average number of content items observers recorded during health worker ARI talks. Health workers in Areas 1, 2, and 4 show clear and notable increases in the number of appropriate subjects covered in their talks when comparing the baseline with post-intervention scores. Area 1 increased from a baseline score of 5 to post intervention scores were 10 and 13. Content increases were particularly marked in the management of mild ARI and the recognition and management of worsening ARI. Area 2 increased from baseline of 4, 6, and 7 to post intervention of 13 and 11. In Area 3, small 7, 5, and 9 and post intervention scores of 10 and 13. So the "jump" between baseline and post-intervention Area 3 was only one point compared to an average across settings of 5.5 for baseline and 11.8 for post intervention. Nevertheless, the absolute post-intervention scores in Area 3 were on par with the other areas' scores.

Training in interactive teaching techniques was scored in a similar manner and produced similar results, even though these behaviors are harder to train (see Figure 14). All areas showed marked increases from baseline to post-intervention observations. There were approximately 15 teaching behaviors on the checklist. Health workers scored no more than 4 during baseline and

scored up to 12 during the post intervention period. The dip in post intervention scores seen in Area 4 was due to a personnel change at one clinic and one health worker who seemed unaffected by training.

Figure 11

## **HEALTHWORKER TRAINING**

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### **Educational Techniques**

- Ask Questions
- Answer Questions
- Personalize the Message
- Instruct
- Demonstrate
- Practice
- Give Feedback
- Reinforce
- Use Flip Chart
- Distribute Print Materials

These data suggest that health workers were delivering more information on ARI in a more interactive way, but did such an approach have a discernable impact on mothers' knowledge and practices? Four hundred and fifty-two mothers attending clinic health education talks were given a short test before and after the health education sessions. Figure 15 shows the average difference between each mother's pre-and post test. The low difference between their scores during baseline indicates that before the health workers were trained, mothers did not retain much information from ARI sessions.

Post-intervention scores, however, suggest that the new health talks were communicating more information on ARI than before. Results are most striking in Areas 2, 3, and 4. Average difference in mothers' pre- and post-test scores during baseline for Area 2 were 1 and 2, and post intervention average differences were 8, 7, and 8. Areas 3 and 4 show similar patterns. Results from Area 1 are ambiguous: baseline score of 2 and post intervention scores of 3, 4, 7, and 8. Although there was no dramatic jump in mothers' scores immediately after health worker training, over time their scores were comparable to those in the other areas. Taken together, these scores show that after participating in the new health education sessions, mothers were retaining more information on ARI treatment than before. Post-test scores were, on average, 7 points higher than their pre-test scores. During baseline, this difference was only 2.

Figure 12

## HEALTHWORKER TRAINING

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### Message Content

Mild Case =

- Recognize Symptoms
- Treat at Home

Aggravated Case =

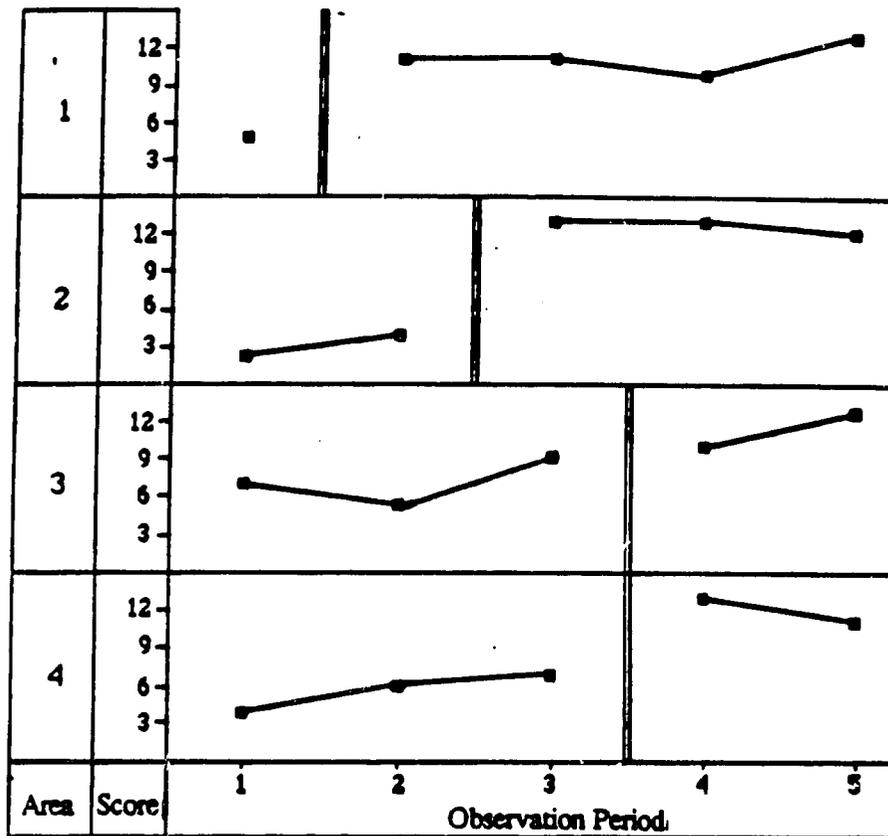
- Recognize Symptoms and Danger Signs
- Take to Clinic or Private Physician

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The other intended result of the communication strategy was for information on ARI to reach mothers in the community who do not frequent the clinic. Figure 16 shows the changes in community awareness of ARI during the communication program. All areas show gradually increasing scores over time. We would not expect a dramatic jump between baseline and post-intervention conditions in this case because we are measuring the communication effect on a secondary audience, and it takes time for word to spread. Nevertheless, community awareness of ARI symptoms and management does show an increasing trend during the measurement period. Average baseline score for all areas was 3 and post intervention was 7 out of a possible 15 points. This suggests that mothers coming from the clinic were talking about what they had learned and perhaps were showing neighbors the print materials distributed at the ARI educational session. A possible refinement in the communication strategy is to find ways to encourage mothers to "spread the word" to their friends and neighbors. (Appendix C presents detailed results of the intervention.)

Figure 13  
 MESSAGE CONTENT OF HEALTHWORKER ARI PRESENTATIONS,  
 BY AREA AND OBSERVATION PERIOD;

ARI Control Program Pilot Study, Honduras 1988



— - Initiation of Intervention

**D. Follow-up**

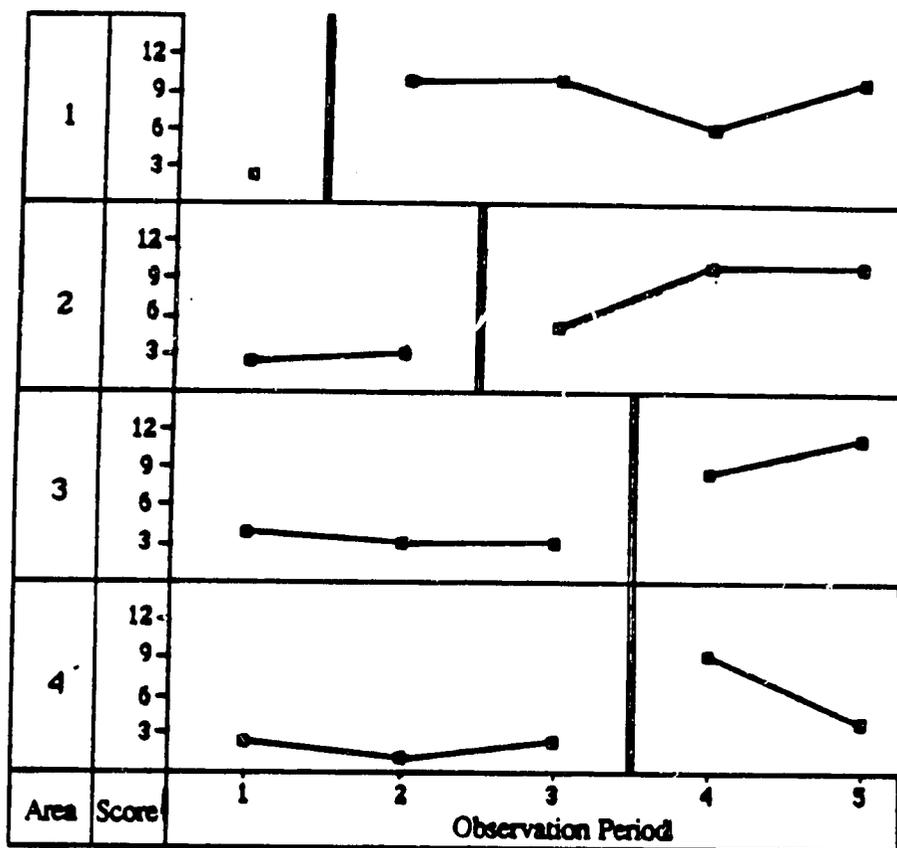
A follow-up investigation of the pilot study, conducted six months after the intervention training, indicated that the intervention was still producing beneficial effects at the six sites observed. Staff who had participated in the intervention trainings still exhibited learned

behaviors, though to a somewhat lesser degree than during the post-intervention observations of the pilot study. Of the five health workers observed, only three had attended the "pilot" intervention training. Attendees of ARI presentations by trained health workers appeared to achieve higher average differences on pre/post-tests. Perhaps one of the most important results of the intervention training was to stimulate local staff to implement and to continue implementing ARI health promotion. In conclusion, the successful effects of the intervention in the ARI control program pilot study also had detectable benefits more than six months later. The longevity of the pilot results demonstrated to the MOH that the communication strategies used were supported expansion to national program.

Figure 14

**EDUCATIONAL TECHNIQUES OF HEALTHWORKER  
ARI PRESENTATIONS, BY AREA AND OBSERVATION PERIOD;**

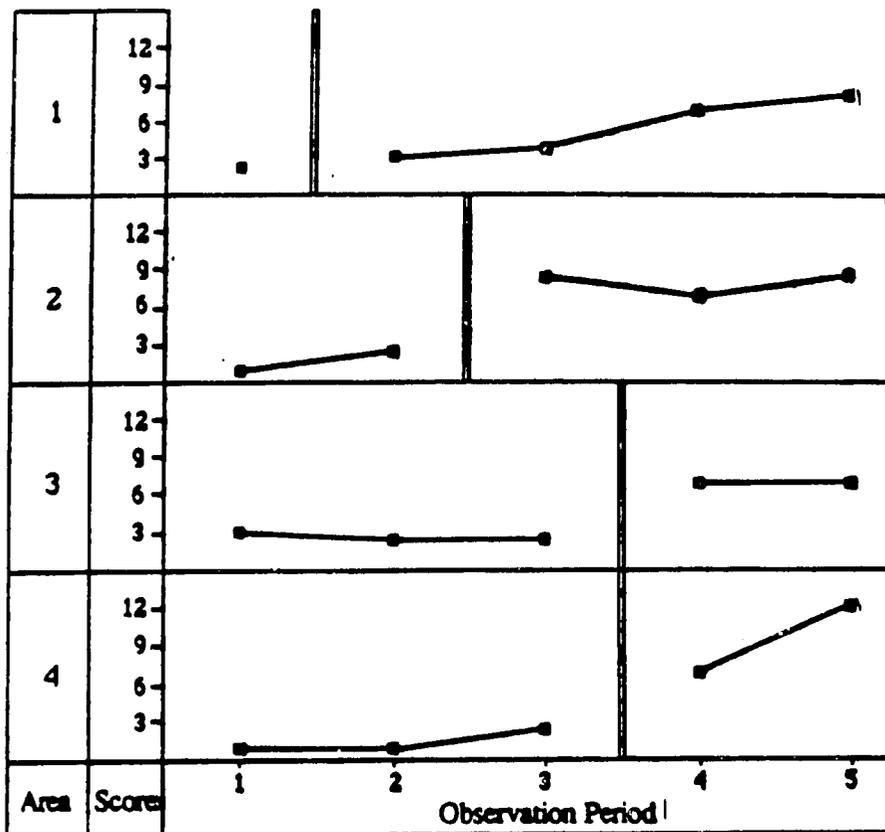
ARI Control Program Pilot Study, Honduras, 1988



┆ - Initiation of Intervention

Figure 15  
 MOTHERS' PRE/POSTTEST AVERAGE DIFFERENCE AFTER  
 HEALTHWORKER ARI PRESENTATIONS, BY AREA AND OBSERVATION PERIOD;

ARI Control Program Pilot Study, Honduras, 1988

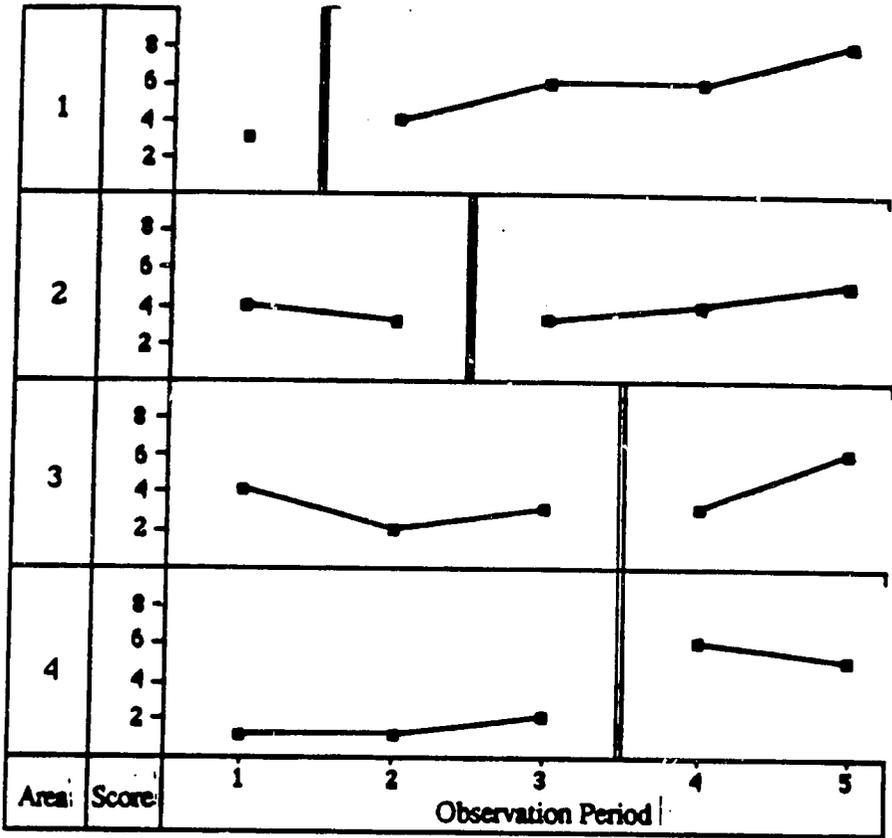


 - Initiation of Intervention

Figure 16

**RECOGNITION OF SIGNS AND MANAGEMENT OF ARI,  
COMMUNITY SURVEY BY AREA AND OBSERVATION PERIOD;**

ARI Control Program Pilot Study, Honduras, 1988



— Initiation of Intervention

## E. Conclusions

This pilot of the communication strategy in Honduras provides an example of how an integrated training program and measurement of important behaviors in both health workers and mothers, targeted media, and community activity can be integrated into an ARI communication effort. The specific lessons learned from this research effort are as follows:

- We need to recognize that appropriate adult behavior is critical to saving lives of children with ARI. Therefore, the behaviors of health personnel and parents need to be addressed directly in the design of public health interventions. Specifically, these are case management and communication skills of health workers and the health practices of parents.
- How behavior change can be maintained over time and generalized to other previously untrained individuals is an important aspect of the evaluation of communication programs.
- The behavioral and social sciences define the broader context and provide the technology for initial qualitative and quantitative research preceding a communication campaign. Such research must ultimately lead to the specification of appropriate target behaviors and methods for changing them.
- It is particularly important in ARI communication programs that messages to health personnel and parents represent a simple and clear call for action, yet address the complexity of symptoms and behaviors necessary to combat ARI.
- There is a methodology that can help identify those adult behaviors that need to be encouraged, changed or trained. This methodology allows us to look at the "soft" area of health practices in a scientific fashion, to measure the changes produced by interventions, and to modify communication programs to enhance desired changes.

**APPENDIX A**

**DETAILED SUMMARY OF QUALITATIVE RESEARCH RESULTS**

## APPENDIX A

### A. ETHNOGRAPHIC STUDY

The ethnographic study was conducted with 85 mothers throughout the country. Interviewers spent two hours or more interviewing these mothers on a one-to-one basis regarding various aspects of their social/community and living conditions, the phrases and ideas they used to think about health and illness, specific cognitive and behavioral aspects of the way they respond to illness and how they maintain health, and consequences that they perceive for these various behaviors. The ethnography and summary addressed all aspects of mothers' perceptions of signs and severity of ARI. These are presented in Figure A-1 and are summarized below.

1. Social Factors. Not surprisingly, the vast majority of the women lived in very humble circumstances. Fifty-five percent of them, for instance, had homes with dirt floors. Thirty-four percent lived in houses with only one room, while 31% had two rooms. Forty-one percent of the homes had a kitchen that was actually separate from the house, while 33% had a separate kitchen within the house. Seven percent had their kitchen in the actual bedroom, while 4% had no kitchen whatsoever. Seventy-three percent used a *fogón* (typical Honduran oven) which did not have a chimney to carry the smoke out of the room in which cooking was being done.

Sixty percent of the homes had no sanitary facilities, while 65% were without electricity. Radios were found in 52% of the homes, with televisions located in 22%. Only 12% of the homes had refrigerators, and 4% of the dwellers owned automobiles.

2. Cultural Factors. This portion of the ethnographic research emphasized the mothers' perceptions of conditions of health and illness among the children in terms of the language they used to describe these conditions. This aspect of the investigation was critical in designing the subsequent scientific survey, especially in terms of the wording to be used in various questions which assessed the incidence and prevalence of illnesses. Indirectly, this assessment of language factors lent itself the design of the intervention, again with the goal of being consistent with the language that typical mothers used to describe the illness of their children. The highlights of this portion of the ethnographic interviews are presented below.

*Amonia* (pneumonia) was described as chest pains with cough and fluctuation in temperature. It seemed to be a fairly widely shared term among mothers.

*Asthma* was described as a severe disturbance in respiration similar to suffocation.

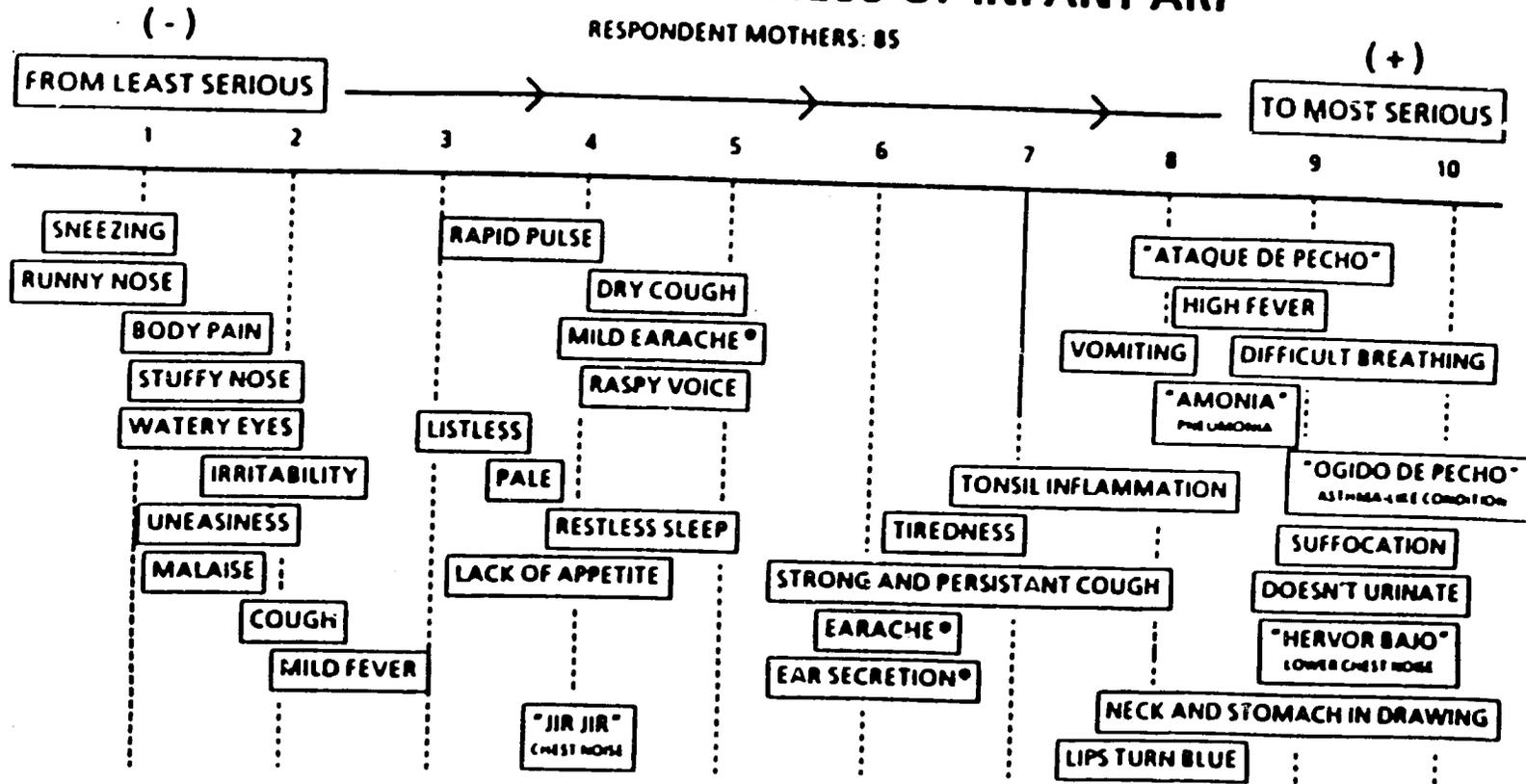
*Ataque del pecho* (chest attack) was described in similar terms with *amonia*, and included a worsening of symptoms of head cold.

*Bronchitis* was described fairly accurately as an infection in the bronchial area, with chest noises and severe cough.

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# ARI ETHNOGRAPHIC RESEARCH

## PERCEIVING SERIOUSNESS OF INFANT ARI



\* GENERALLY NOT CONSIDERED TO BE ARI SYMPTOMS

Figure A-1

*Calentura* (temperature) was described as a raising of the temperature above normal, when the body becomes very warm and splotchy.

Three words in Spanish to describe a cold are *catarro*, *gripe* and *resfriado*. The latter two were recognized among the mothers interviewed, while *catarro* was not understood. *Gripe*, was described as an illness that included cough, a rise in temperature, runny nose, and warm hands. It was described as being very common and in its more severe forms resulted in a stuffed nose and chronic cough. *Resfriado* was described as the onset of this illness.

*Mal de ojo* or simply *ojo* (evil eye) was the most widely held folk belief related to disease etiology. This was described as an illness produced by a powerful stare, which bothers a child severely and results in diarrhea, high temperature, vomiting, and other problems.

*Ogido de pecho* is a severe asthma-like condition which has symptoms similar to uncontrolled coughing and suffocation.

*Tos* (cough) was described as a complication of *gripe* and symptomatically described as one would expect.

Finally, two words for vomiting are found to be common. These specifically are *vasca* and *vomito*, which were described as one would expect.

The second part of the investigation of these linguistic factors emphasized the use of various terms to represent nutrition. Specifically, interviewers asked mothers their perceptions of the words *alimento* (food), *comida* (a meal), and *dieta* (diet). *Alimento* was described in terms of specific food (e.g., meat, milk, beans, tortillas, potatoes) or in terms of a meal in general (e.g., that which is eaten three times a day). Other mothers did not actually understand the term. *Comida* was described as everything that is eaten or that can be eaten. Again, some mothers described it in terms of specific foods, while others said it was the same as *alimento*. *Comida* seemed to be the most widely used generic term. *Dieta*, in contrast, was perhaps the least understood of the three terms. It was described as "eating that which causes no harm," a specific regimen of prescribed foods, or actually making an effort not to eat (presumably, to lose weight).

3. Cognitive Factors. Interviewers then turned to assessment of specific knowledge, attitudes, and related cognitive factors in response to childhood illness and specifically ARI. Figure A-1 presents the major finding of this portion of the research in terms of perceptions of the seriousness of various symptoms related to ARI. (This represents a subjective summary developed by the interviewers after the completion of the ethnography).

As can be seen, factors such as sneezing, runny nose, body pain, watery eyes, irritability, malaise, cough, and a mild fever are seen as serious manifestations of ARI and its onset. At the most serious end we have symptoms such as *ataque del pecho*, an asthma-like condition, lack of urination, or chest noise and related problems. Interestingly, these relatively tightly clustered

perceptions of symptoms relate closely to the then-current medical diagnostic classifications of mild and severe ARI. In the middle range, less reliable and more varied responses included rapid pulse, dry cough, listlessness, and carache which indicated to mothers that the ARI episode was worsening.

Mothers' perceptions of the causes of ARI (or more specifically its various symptoms) were also considered important for this stage of the research. *Gripe* was perceived as being caused by eating "cold foods" (e.g., rice, bananas, and others; not related to the actual temperature). Other causes mentioned were exposure to cold air and breezes, dust in the air, dampness, malnutrition, and a lack of vitamins. Perceptions of cough etiology comprised dampness, cold weather, dust, cold food consumption, and other factors parallel to those perceived as causal for *gripe*. Asthma-like symptoms were seen as a complication of *gripe*, while bronchitis was seen to be caused by rainy weather, dust, or improper care. Similar causal factors were identified for the other symptoms of ARI. Interestingly, even a high body temperature was perceived as being at least partly caused by the consumption of cold foods.

At a more general level, interviewers assessed perceptions of healthy and ill children. Healthy children were seen as those who were very animated or had a good appetite by the majority of mothers. Between 10% and 30% of the mothers included a lack of signs of illness, pink, healthy skin color, and good sleeping patterns as other signs of healthiness. The majority of mothers perceived a lack of animation or a withdrawn child as indicating illness, which also could be manifested by a lack of ability to be comforted or no appetite. Between 10% and 30% of the mothers also saw headache and temperature, excessive or a lack of sleeping, diarrhea, or pale skin as symptomatic of general childhood illness.

Mothers' views of health providers comprised a key feature of the assessment of cognitive factors. Perceptions of the accessibility and availability of health providers is, of course, of critical importance to the development of any health promotion program through the established health sector. These perceptions are quite likely based, at least in part, in the direct experience mothers have had with health systems or indirectly through word of mouth in the community. In other words, the "consequences" (see later section) of previous visits to health providers will in turn influence the extent to which mothers use the health system for treating ARI. It was very important therefore to assess such perceptions, which was begun through the ethnographic research.

In the present study, views of both traditional and "modern" medical providers were assessed. Traditional providers included traditional birth attendants (*parteras*), masseurs/bone setters (*sobadores*), herbalists (*curanderos*), and injectionist (see Figure A-2). Modern medical providers included pharmacists, private physicians, and health personnel at either a health post, health clinic, or hospital (*CESAR*, *CESAMO*, and *hospital*). Additional birth attendants were consulted for pre-, peri-, and postnatal attention as well as a control of infant diarrhea, *gripe*, and other illnesses. *Sobadores* were consulted for digestive problems, setting of bones, and a variety of "superstitiously" perceived illnesses. Herbalists were consulted for problems related to the evil eye, but were also frequently consulted for objectively defined illnesses including ARI

and diarrhea. Injectionists were accessed especially when a pain killer for various aches and pains was desired.

Formal medical providers were preferred for the prescription of various medicines (especially pharmacists), for medical, dental, and laboratory consultations (the public health sector), or more directly to access medical care and medication more efficiently through private physicians.

Opinions of the various providers varied by type of provider. *Sobadores* had a reputation of responsive service to the community with good results. Injectionists also were seen as accessible and inexpensive. Herbalists had the confidence of the community and were seen as very effective. Traditional birth attendants were seen as inexpensive and had a good reputation as well as confidence of the community, especially those who had received formal training. Health posts and clinics had a good reputation also, although they were somewhat more expensive than traditional attendants. Some respondents perceived the clinic-based health workers as having very poor interpersonal styles, however. Other mothers saw that they were being treated by nurses or auxiliaries, and were aware of the fact that the relatively highest ranking individual in the clinic (i.e., the physician) was not always the person providing the service.

4. **Behavioral Factors.** Socio-cultural and cognitive factors described above were viewed in terms of their effects on specific behaviors. Childrearing practices of mothers will, in any society, include relatively adaptive and maladaptive behaviors which in turn influence the health of their young children. The next step in the ethnographic research was to shed some light on the specific practices that mothers were found to use. The key findings of this stage of the study were as follows:

- a) There was a significant decrease in the quantity of food given when a child became ill. This is especially the case with the so-called "cold foods," an indigenous classification that included fruits, rice, and other foods rich in vitamins and carbohydrates. This, in turn, resulted in a significant decrease in the overall quality of the diet. A related problem to this maladaptive reaction on the part of the mothers was in the effects of the onset of ARI on premature weaning. As the child's stuffy nose led to less breast milk demand, mothers were more likely to wean the child early and thereby diminish his chances of a speedy recovery and overall healthiness in terms of nutrition and protection against other infections.
- b) It also was found that children were often exposed to cold, windy, and smoky environments. Ironically, houses which were often too smoky (because the kitchen was close to the living/sleeping area) were at other times affected by excessive cold and wind.

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# TRADITIONAL HEALTH PROVIDERS CONSULTED TO TREAT CHILDHOOD ILLNESSES

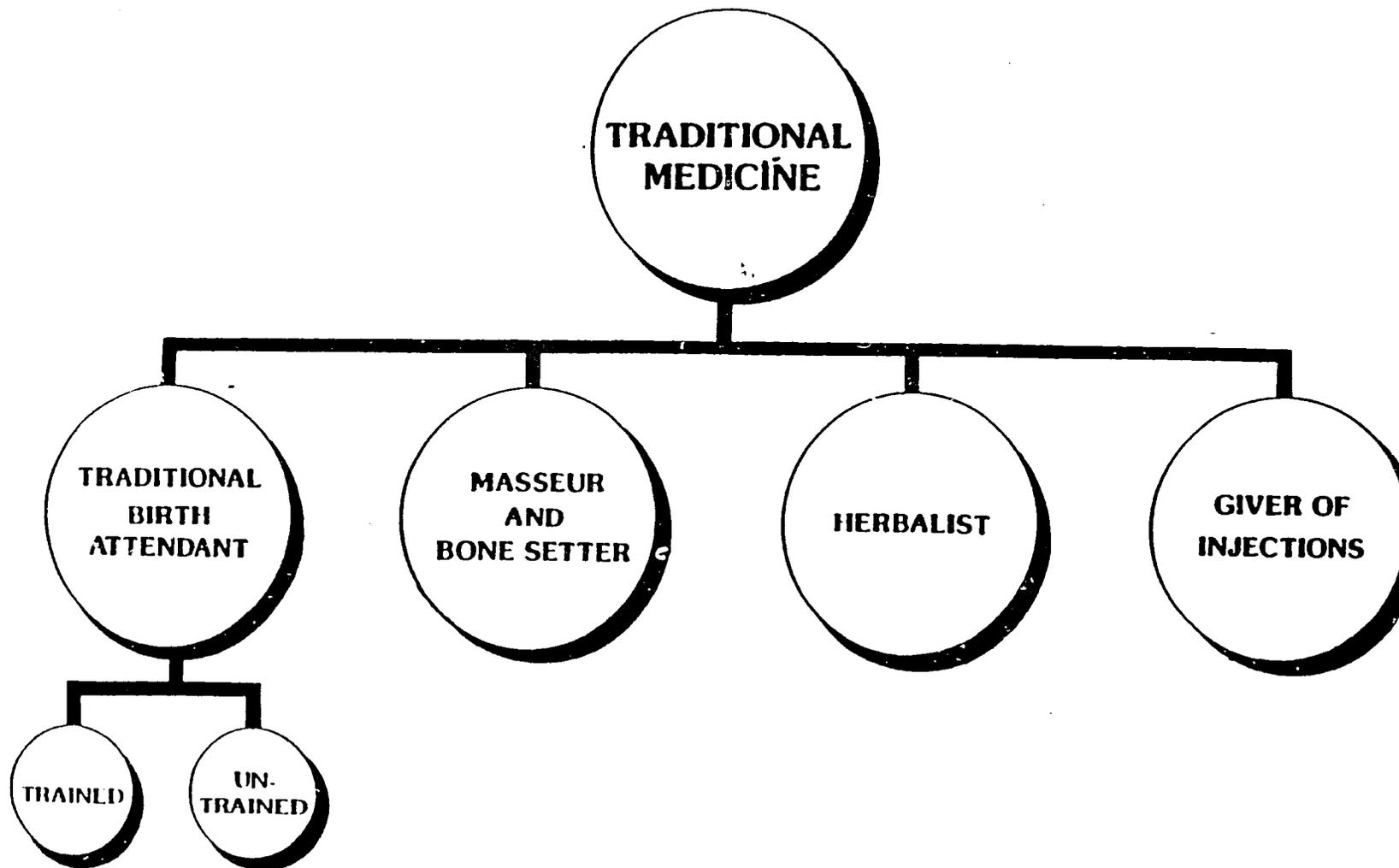


Figure A-2

- c) Once an ARI episode had its onset, mothers often initiated home treatment too late, if at all. Treatment included various home remedies which were either maladaptive or often simply ineffective. They included the oral administration of various fats and oils, honey, syrup, herbal and spice concoctions, and pills which were either inappropriate or excessive for the specific illness. Finally, the worsening of the child's symptoms did not necessarily result in a timely referral to the health center, at least in part for reasons described above. Interestingly, baths, massages, and vaporizers were preferred at least equally to care provided by formal providers.
- d) Specific delineations of attempt at dietary management were assessed in this phase of the study. Mothers typically suspended beans, lemon, mango, oranges, rice, milk, and certain chicken dishes when the child developed *gripe*, while they were more likely to add certain soups or purees to the child's diet.
- e) The most frequently mentioned symptoms which indicated the onset of ARI for these eighty-five mothers interviewed included runny nose, cough, a lack of animation, difficulty in breathing and crying or other signs of discomfort. In other words, mothers seemed to recognize specific symptoms of the onset correctly. In terms of being able to prevent it, mothers saw a general weakness as being a problem, as well as cold foods, a previous illness, dust in the air, and exposure to someone else who was already ill. In order to prevent ARI, therefore, they saw good feeding practices and (in contradiction) avoiding cold foods as being the essential ingredients of prevention. Avoiding contaminated air and cold was also seen as being important as a preventive measure. Initial attempts at home management of ARI included giving of tea, lemonade and other liquids, giving analgesic medicines, and massages with Vicks Vaporub, alcohol, or other ingredients as their most important actions.

5. Motivational Factors. Whether a given practice continues or discontinues will depend on whether the consequences for that practice are perceivable, and if so, whether they are pleasant or aversive. In other words, an individual may be "positively reinforced" or "punished" for a practice. If a mother visits a health center, is received politely, and is provided timely and effective treatment, she is positively reinforced for this visit and more likely to take further advantage of the health center in the future. On the other hand, if she visits a health center and is treated rudely, and/or receives treatment which she perceives as not (at least immediately) effective, she will be less likely to use this service again in the future. These factors were assessed in the present ethnographic study.

First, mothers were asked why they go or do not go to health centers. Mothers who go to the health center stated that they were given an ample amount of medicine, that the consultations were inexpensive, that generally the health service is a great benefit to the community, and because they could not afford a private physician. Mothers who did not typically use health center services reported costs, the inaccessibility of the physicians, frequent

unscheduled closing of the center, better service from natural providers, better service from pharmacists or private physicians, the "crankiness" of the nurses and physicians who worked there, and slow or inadequate attention to their problems as being aversive consequences.

## B. FOCUS GROUPS

The next stage in the qualitative research phase consisted of conducting 35 focus groups with an average of 10 mothers per group. These groups were conducted among mothers of various economic status and representing different geographical areas. During this phase, 39 in-depth interviews with health care providers were also conducted (see below).

In the focus groups, additional information was gathered on specific cultural, cognitive, and behavioral factors (i.e., all factors except social and reinforcement) assessed in the investigation/intervention model. Not surprisingly, responses were similar to those results derived from the ethnographic interviews. The first discussion topic was, "What types of illnesses are common among most children?" Some mothers mentioned that diarrhea, high temperature, asthma, bronchitis, and *gripe* were most common, while others mentioned vomiting and air in the stomach as being problematic. Others mentioned *empacho* (digestive problems), malnutrition, and fever as being important types of illnesses, while the "evil eye" was an additional type of problem.

The second thematic question was, "From what do children get sick and die?" Bronchitis, fever, diarrhea, chronic vomiting, and asthma-like symptoms were mentioned most frequently.

The third theme was, "In what season are children most likely to get sick?" Here there was quite a bit of variation. Some cited the early summer (dry season) as being the most problematic, given the excessive dust, heat, and related climatic variables. Others cited winter and the cold season as being the more likely to produce problems, while individuals on the coast indicated that windy conditions were the most troublesome.

The question, "How do you know when a child has *gripe*?", again assessed variables from the cognitive and behavioral (i.e., symptom recognition and response) domains. Mothers answered that children do not eat, are withdrawn, have stuffed noses, have a higher temperature, and spontaneously added that these problems can worsen until *bronchitis* sets in, indicating a binary diagnostic classification parallel to that currently being promoted by the Ministry of Health. Other mothers indicated that *amonía* was the designation used to indicate worsening.

A fifth theme assessed factors from both the cognitive and behavioral (in this case, preventive) domains. Specifically, interviewers asked, "Why do children get these illnesses?" Mothers responded that inadequate diet, changes in climate, lack of appropriate medication or access to a health center, and exposure to individuals who were already sick are important causes of these illnesses. In addition, they indicated that garbage near the home which attracts insects,

a lack of appropriate sanitation including latrines, and general environmental and food contamination were also likely to make children sick.

Specific treatment behaviors were assessed through the question, "What do you do when your child has *gripe* and a cough?" Mothers indicated that they gave massages with Vicks Vaporub, sought medication, especially for severe signs of ARI, gave hot lemonade or pills that already were in the home to the child, or (in one case) have the child bleed. A variety of herbal medications were also discussed, while some mothers seemed to feel that these illnesses simply needed to be waited out. Many, however, indicated that if the child was not better in one to three days, they generally took them to the health center.

A related question regarding treatment behavior was, "What care do you give to the child when he/she is sick?" Mothers responded that they had them sleep apart from others, did not bathe them as much, did not give them cold or greasy foods, kept them away from breezes, withheld rice and cold liquids, and took them to the health center.

An additional question from a cognitive and behavioral/preventive domain was, "Do you know how these illnesses are transmitted?" Most mothers had some idea, responding that other people can transmit them directly or through utilization of the same drinking/eating utensils. Some mothers confused ARI with other illness transmission, indicating that flies and cockroaches were often responsible for transmitting these diseases.

A question from the behavioral (prevention) domain was, "What do you do to prevent these illnesses?" Vaccinations, keeping hands clean before eating, bathing the children daily, appropriately destroying or disposing of garbage, keeping food clean and generally keeping the house clean, and sending the child to the doctor on a regular basis were the most frequently mentioned measures. One mother mentioned a ritual whereby a toad was killed, as a method of preventing or quickly curing an illness.

Finally, mothers were asked, "From whom do you seek assistance when the child is ill?" Some mothers mentioned their neighbors' advice as being the most important, while others mentioned elderly women as being the best advised in this area. Less frequently mentioned were traditional and professional providers.

With respect to reinforcement and cognitive factors related to utilization of health services, mothers in focus groups evidenced attitudes which were more negative than were indicated in the one-to-one interviews. In the focus groups, mothers saw health services as being irregular and provided by impolite and often cranky staff. Some saw a lack of appropriate medicines in the health center as being problematic. Others desired these services only when a doctor was present, and one mother noted that her child received some medication from the health center and did not get better. On the other hand, many other mothers saw these health services as being appropriate and had high opinions of them.

### C. PROVIDER INTERVIEWS

A variety of variables related to cognitive and behavioral attributes of various health providers were assessed through in-depth interviews with 84 informants equivalently divided among physicians, nurse auxiliaries, guardians, birth attendants, herbalists, and older persons/opinion leaders. Each individual in these categories were asked what the most frequent type of illness was among children that they attended, the most frequent symptoms of ARI for which they gave consultations, specific treatment recommendations, dietary recommendations and specific things that they did not recommend in terms of dietary change, how to prevent ARI, to whom they referred cases of ARI, and general difficulties in promoting maternal-child health.

Physicians saw ARI as the most frequent type of illness among their infant and child patients, followed by diarrhea. Nurse auxiliaries saw diarrhea, bronchitis, and *gripe* as being the most frequent, while guardians saw *gripe*, cough, and diarrhea, respectively. Birth attendants and herbalists agreed with *gripe* and diarrhea being highly prevalent, followed by stomach disorders. Older people saw dengue fever, *gripe*, and diarrhea as being most common in their communities.

Physicians were most likely to provide consultation for high fever and cough, while nurse auxiliaries were most likely to attend fever, runny nose, and cough among the ARI symptoms. Guardians were consulted for the same symptoms as nurse auxiliaries, while birth attendants saw cases of cough, bronchitis, and fever. Herbalists saw cases of high temperature and breathing problems, similar to cases attended to by seniors.

Physicians were most likely to use expectorants or antibiotics as treatment, while nurse auxiliaries gave aspirins for ARI related problems. Guardians also recommended aspirins and expectorants as well as some home remedies, while traditional birth attendants, herbalists, and seniors generally recommended herbal teas and various types of oils (e.g., chicken fat).

Physicians and nurse auxiliaries correctly recommended increasing the amount of liquid and serving bland foods as well as normal foods to ill children, recommendations which were followed very closely by all categories of traditional attendants. The differences among providers was more apparent in foods that were not recommended in cases of *gripe*. Specifically, physicians recommended against suspending any sort of food, while all other providers recommended against various "cold foods" during cases of ARI (e.g., oranges, watermelon, milk, cold soups, ice cream).

Physicians recommended keeping a child dry and warm, making sure he/she had adequate nutrition, and making sure vaccinations were up-to-date as the best measures for avoiding ARI. Nurse auxiliaries additionally recommended avoiding contact with people already ill, as well as not bathing the child daily. Guardians more or less followed the nurse auxiliary model with the addition of not bathing children at all during cold weather, while traditional birth attendants thought that giving cold foods or drinks to the child could result in them coming down with ARI. Herbalists did not generally see that ARI was preventable, while older people generally

recommended the same sorts of preventive measures that nurse auxiliaries, guardians, and birth attendants recommended.

All categories of providers indicated that they would refer severe cases of ARI to the public health sector (i.e., *CESAMO*, *CESAR*, or hospital). Physicians saw lack of medication and lack of collaboration on the part of the community as well as inadequate health education as being the major problems with respect to promoting maternal-child health generally. Nurse auxiliaries agreed with all of these observations except seeing the indifference on the part of the physicians as being more problematic than the attitude of the members of the community. Guardians saw a lack of medicine and training and transport as being major problems, while birth attendants and herbalists did not generally see that there were major problems. Seniors saw a general lack of education (e.g., illiteracy on a large-scale basis) as being the single most problematic issue in health and well being.

Over 80% of individuals interviewed in each category indicated being satisfied with their roles.

A surprising result was the general uniformity of opinion among the various providers in terms of how they would detect and treat ARI, and their perspectives on general community health. Indeed, the overall level of knowledge was the most encouraging result of this aspect of the research. On the other hand, the most unsettling aspects were the fact that large percentages of individuals in each category except physicians recommended suspension or avoidance of the "cold foods" in treatment or even prevention of ARI. Second, most individuals saw a general lack of education and welfare as being the root causes of illness among children, while physicians attributed part of this problem to an indifference on the part of the community toward illness in general. In contrast, all other providers (including the nurse auxiliaries supervised by the physicians) saw the community as being fairly responsive toward any initiative to promote health and welfare. Moreover, nurse auxiliaries saw indifference on the part of the physician as being problematic. These results complemented data derived from the focus group interviews indicating both further rough going in promoting better utilization of services and at the same time more responsiveness on the part of formal care providers. These data indicate that there was not only a need to increase knowledge and skills among both mothers and health workers, but to do it in such a way as to improve their communication with each other. Some of these findings were used in the design of the messages for implementation of the program.

**APPENDIX B**

**A DETAILED SUMMARY OF THE QUANTITATIVE RESEARCH RESULTS**

## APPENDIX B QUANTITATIVE RESEARCH

### A. SURVEY OF MOTHERS

The second phase of research involved a scientific survey of 851 mothers nationwide who had children under five years of age. Using specific language indicated in the results of the assessment of cultural factors in the qualitative research phase (see Appendix A), a questionnaire was designed to assess specific social, cognitive, behavioral, and reinforcement factors which elicited, formed, and maintained health-related behavior on the part of mothers. The specific purpose of this survey was to quantify problems and to contribute further information to the development of the health promotion intervention.

1. Social Factors. The average age of the mothers interviewed was 28 years, with the average years of residence in the particular community being 18 years. Mothers had a mean of four and a half years of education, and 80% of them were married. Eight percent were single, another 8% were either divorced or separated, and 3.5% were widowed. Eighty percent of the women listed "housewife" as their profession, 10% indicated that they operated some business out of their home, and another 10% worked in the formal sector outside of their home. The median income was between 50 and 100 *lempiras* (i.e., between US\$20 and US\$50 ) per household per month. Eighty percent of the mothers indicated that they knew how to read, while 79% indicated that they were able to write.

2. Cognitive Factors. The first question assessing the general knowledge and attitudes regarding ARI was, "How do you know when a child has *gripe*?" Seventy-five percent indicated mucous running from the nose as being the most common indicator, while 10% indicated listlessness and 7% indicated cough as being the most common signs. Forty-one percent indicated that the second way in which they knew a child had *gripe* was because they were clearly bothered or were crying a lot. The third factor indicated by the mothers as indicative of *gripe* was increase in temperature.

Nearly 50% of the mothers saw general weakness as being one of the main etiological factors for *gripe*. Exposure to cold was indicated as the primary etiological factor by 26% of the mothers, while nearly 14% thought that eating "cold foods" or frozen foods was a causative factor.

3. Behavioral Factors. The next series of variables assessed through the survey technique were specific behavioral reactions to ARI on the part of the mothers. The first question in this regard was who was consulted when symptoms of ARI first occur. Fifty-seven percent of the mothers indicated that they did not consult anyone for initial symptoms, while 21% indicated that they consulted "seniors" and nearly 11% additionally specified that they consulted their mothers. Fourteen percent continued to reject consulting anyone when symptoms worsened, while 29% went to a physician at the health center, 11.5% went to a private physician, and 13.5% went to the nurse auxiliary at a health post. Seventeen percent continued to specify seniors, while 8% specifically mentioned their mothers. During various severe

episodes of ARI, 25% went to a private physician, while nearly 49% went to a physician at the health center. Nurse auxiliaries were consulted by 20% of the mothers with severe cases of ARI.

With respect to feeding practices, mothers breastfed children anywhere between one and forty-eight months with a median time of fourteen months. Sixty-five percent of the mothers supplemented breast milk with other milk, at a mean of three months. The food supplements were begun by half the mothers before or at the fourth month.

The *chupón* is a type of pacifier which is often soaked in some laxative and given to children soon after birth. This piece of cloth may often be contaminated or may contain danger levels of laxative, in many cases reportedly leading to mortality. Fifty-three percent of the mothers reported having used the *chupón*, with half of these using it as a purgative, one-fourth stating that they used it because they were having trouble breastfeeding, and one-sixth simply stating that they did it as part of a custom.

A series of questions were then asked assessing the potential for broadcast, interpersonal, and print media. Fifty-seven percent of the women lived in a house that had a radio, with approximately two-thirds of these listeners tuned in between the hours of 4:00 a.m. and 8:00 a.m. Twenty-seven percent reported having a television in their home. Only 11% reported having heard a health *charla* (brief health education "chat" or session) at their local health cluster center recently, while only 9% had received print material regarding health-related education/promotion issues. Eighty percent stated they could read, while 79% stated that they knew how to write. Eighteen percent reported belonging to some sort of community organization, the most common of which was a type of religious organization or club. These data in concert indicate that the greatest potential at that point in time was perhaps for print media, with the greatest "undiscovered" potential being for interpersonal media through health education sessions at health centers. Radio messages had a great potential for complementing efforts through print and interpersonal channels. The use of television seemed to hold no real potential.

## B. PROVIDER INTERVIEWS

The qualitative research also included interviews with 84 natural care givers and professional health care providers representing the range of services used by the target audience. In Honduras there are two types of health care centers besides the hospital: the *CESAMO*, which is fairly centrally located and is served by a physician, and the *CESAR*, located in more remote areas (and up to two hours distant from those it serves), which are run by one or two auxiliary nurses. The target group relied as well upon guardians, or community workers, and traditional providers such as midwives (*parteras*), masseurs (*sabadores*), herbalists (*curanderos*), and injectionists. The survey included all of these providers.

Providers in the formal sector were knowledgeable about the symptoms and treatment of ARI, with a few notable exceptions. One of the most striking findings from these interviews was that health workers' knowledge and case management skills were in many ways similar to those of mothers in their communities. Barring physicians, many of the providers (auxiliary nurses, guardians, midwives, etc.) supported the common practices of feeding different oils and withholding "cold foods." In addition, those who had access to antibiotics tended to use them regardless of the severity of a child's symptoms. Many health care providers also recommended extended use of expectorant syrups and antitussives.

The provider surveys and the caretaker studies also asked questions about the quality of interactions between the two groups. In general, mothers who visited traditional healers of some kind knew what treatment they sought and said they were satisfied with the service. Relations between health centers and their clients were more ambivalent. This study also revealed typical areas of tension: mothers often thought health workers were overwhelmed or inattentive; physicians often thought communities had insufficient regard for their own health needs. Thus, any strategy to improve the mutual support and regard of client and service provider for each other could only increase the chances that children would be treated in a timely manner.

### C. BEHAVIORAL OBSERVATIONS

Our next step was to design a communications campaign which specifically designated both culturally relevant and medically effective methods for dealing with the child with mild ARI. In spite of the extensive information derived from the ethnography and survey, we still felt a need to observe directly how mothers cleared their children's stuffed or runny noses, as their self-report of these behaviors may have been subject to recall bias or problems in expressing verbally that which they typically did. Subsequently, we hoped to promote specific instruments and methods (e.g., kleenex, Q-tips) and incorporate these and other information as a part of our health promotion campaign for ARI control. In order to accomplish this, we developed a "behavioral preference test" for determining specifically how mothers responded to stuffy, runny noses by actually observing them doing so.

In May, 1987, personnel from the Ministry of Health, Honduras, and the Academy for Educational Development conducted a series of behavioral observations to determine reactions to six potential techniques for nose clearing for children with mild ARI symptoms (which includes runny noses). The instruments selected for the behavioral preference test were [a nasal aspirator], small pieces of linen cloth, kleenexes, toilet paper, Q-tips, and nose drops. Mothers were asked to indicate whether they used any method for nose clearing when their children had colds. If they answered "yes," they were then asked to indicate which type of method they used and were shown one of the instruments (each of which had been kept under the desk and out of their sight) which most closely matched what they had mentioned. If they had answered "no," they were asked what they would use if they were going to clear the nose and again were shown the instrument matching their response. They were then asked to demonstrate on their child their specific method for clearing the nose. Mothers who answer "no" were asked to

demonstrate hypothetically which instrument they would use and how they might use it. Then, the mother was shown the rest of the instruments and asked to indicate which of them they had also used or would be willing to use and how. Finally, they were specifically asked if they knew what the aspirator was and how it was used. As this was the most novel of the suggestions made by health professionals for promoting nose clearing in this population, we had a special interest in seeing whether a promotion campaign could be developed for the aspirator.

Eleven mothers from three distinctly different areas were individually interviewed. These included the *barrio* of El Chile in urban Tegucigalpa; San Juan, a black coastal village near Tela; and Las Conchas, a rural village near Lake Yogo. The responses of five urban women recruited from a Well-Baby Clinic varied between using the "pull-and-wipe" and the "dig" method, with all using some sort of instrument rather than just their hands. Two preferred Q-tips and two linen cloth (one of which was the tip of the baby's diaper). One of the users of the Q-tips, however, reported that she typically dipped it in oil before inserting it, thereby making this practice more dangerous and inappropriate. Most of the mothers indicated that the aspirator was the only perplexing or non-acceptable item among the various instruments presented. The four black women from San Juan near the coast presented similar responses with interesting variations. Two (including one who was a grandmother) used a mouth suction technique for cleaning mucous and were therefore interested in the aspirator as a functional equivalent and a sanitary replacement for their technique. One said she basically ignored runny noses but was able to figure out how to use the instruments when they were presented. Another preferred the baby's diaper. Both used the dig method with this type of instrument.

In Las Conchas, the first woman interviewed used matchsticks with cotton wrapped around them to emulate a Q-tip/dig method. When showed the other instruments, she tried to wrap them around sticks as well. The second mother was primarily unresponsive, while the third (actually a grandmother who was taking care of her grandchild during the mother's long absence) used a pull and wipe method with a diaper, but indicated she would prefer Q-tips.

In general, the mothers were responsive to the procedures of observation, although, of course, indicating some timidity due to the presence of a male observer in a few of the cases. Based on these findings, it was decided that a) cloth, toilet paper, kleenex, and related material could serve either for pull and wipe or insert method but was generally acceptable to the population and appropriate for responses to mild ARI; b) Q-tips were also acceptable but were somewhat dangerous given that the mothers might emulate the matchstick technique which could double for ear cleaning; and c) contrary to initial expectations, aspirators were generally not appropriate for this type of intervention. The use of drops, though of questionable appropriateness given the variety of drops used, is already widely practiced.

The direct observations of these practices subsequently contributed to the development of specific radio and print media messages and to graphic representations of nose clearing for comic book, flip chart, and other illustrations. The objectivity of the direct behavioral assessment thus complemented the larger scale interview research, with both contributing to optimal campaign design.

Flip charts, training procedures, and other materials appropriate for health workers as well as brochures, radio messages, messages and other communication procedures for targeting mothers directly were then developed. Behavioral observations proved a valuable adjunct to the medical-anthropological and survey-based data used in the development of the communications campaign as little was previously known about specific actions mothers take to clear nasal passages.

**APPENDIX C**  
**COMMUNICATION PLAN**

## **THE COMMUNICATION PLAN**

The communication plan emphasized reaching the primary audience of mothers with children under the age of five and the secondary audience of institutional personnel and community providers for the purposes of promoting health and controlling acute respiratory infections (see Figure C-1). The principal objective of the plan and of the ARI program, for that matter, was to reduce the infant mortality from ARI with an emphasis on rural and marginal urban populations. Responsible parties for carrying out the plan were the divisions of epidemiology and education of the Ministry of Health and the General Directorate of Health. Other participants whose actions were coordinated in this effort were the divisions of Human Resources, Maternal and Child Nutrition, the Science and Technology Research Unit, and programs for vaccination and control of diarrheal diseases.

A variety of target behaviors were emphasized in the communication plan. These target behaviors focused on actions mothers could take to care for or seek care for children with acute respiratory infections. Specific targets were chosen based on: a) impact on health; b) the relative simplicity with which they could be described and promoted; c) their compatibility with existing community practices; and d) the cost and effort required by the user to adopt a new behavior or change an existing one. Behaviors included the recognition of ARI symptoms, feeding and the administration of liquids, recognition of the potential danger of certain home remedies, behaviors with respect to avoiding giving certain antibiotics and keeping the airway clean, and recognizing symptoms of increasing disease severity which should result in referral to a health facility.

Basic ARI messages were developed and were promoted through broadcast, print, and interpersonal channels (see Figure C-2). The "creative strategy" of the communication plan emphasized interpersonal communication to groups of mothers brought into special training sessions at health centers, a brief contest whereby mothers were eligible for small prizes based on their ability to answer fundamental questions regarding ARI; the use of a diploma and when possible, radio program announcements reinforcing mothers for having learned about treating ARI; and, ultimately, the ongoing maintenance and reinforcement of mothers' knowledge and skills in recognizing, controlling, and treating ARI (see Figure C-3). The research and intervention strategies set forth in the communication plan are outlined in Figure C-4 (Note: The tripartite classification of ARI is no longer current; however, actions with respect to what had been "moderate" and "severe" ARI are today applicable to the current classification of pneumonia.)

In summary, background information, qualitative research, quantitative research emphasizing survey interviews and behavioral observations, and specification of specific target behaviors and social marketing issues all led to the development of the communication plan which, in turn, led to a pilot or "test market" intervention in four health regions across the country. Evaluation of the impact of the pilot interventions on the target audience led, in turn, to the ability to expand the ARI program to the entire country. This process is summarized in Figure C-5.

# AUDIENCE SEGMENTATION

C-2

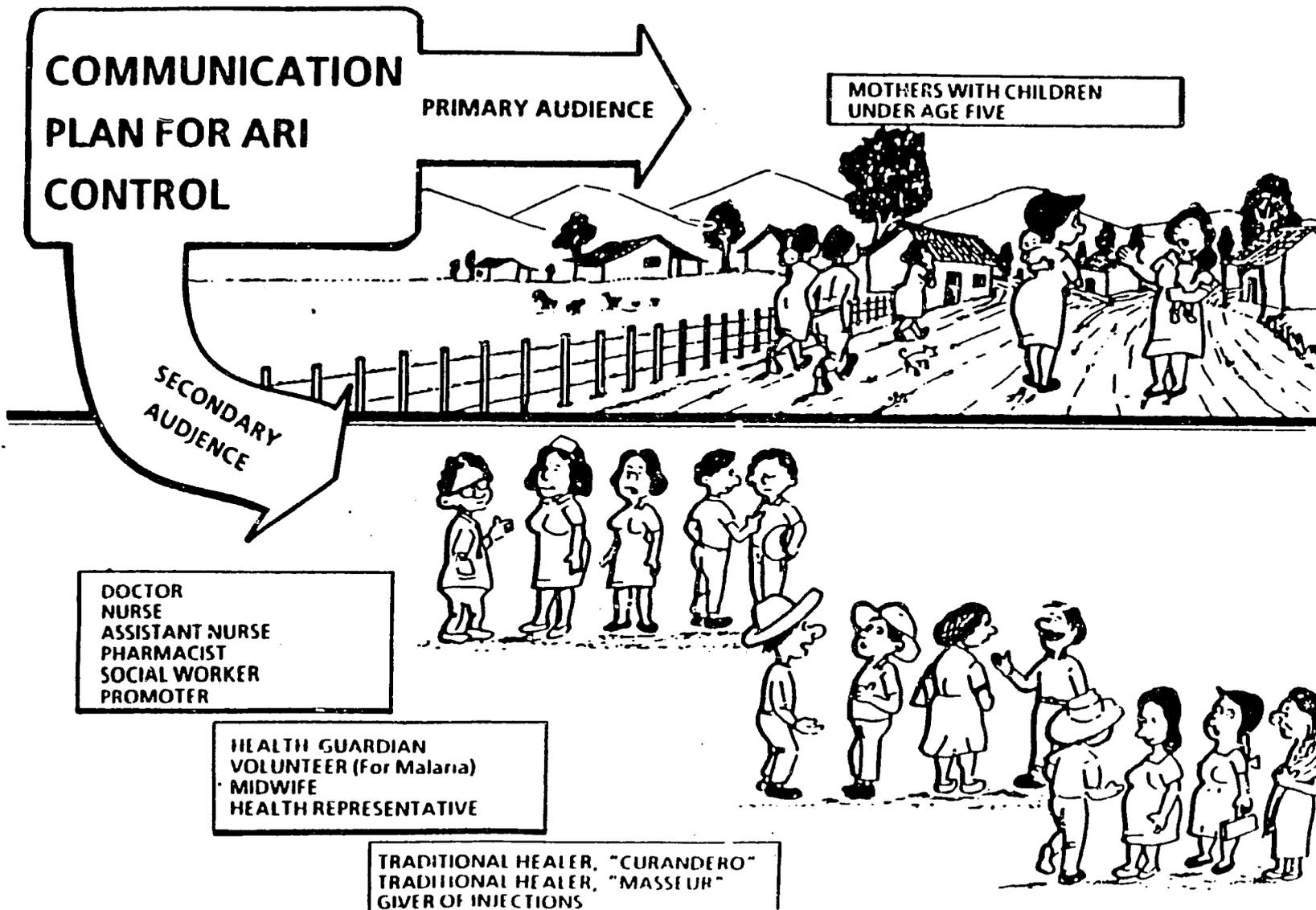


Figure C-1

Figure C-2

## ARI BASIC MESSAGES

- **CUE TO BEGIN CHILD CARE AT HOME**
  - Runny Nose
  - Cough
  
- **CARE FOR CHILD AT HOME MEANS:**
  - Give a lot of liquids
  - Continue with feeding
  - Continue with breastfeeding
  - Clean the nose
  - To lower fever, apply lukewarm compresses
  
- **CUE TO SEEK HELP**

<u>FORMER SIGNS</u>	<u>CURRENT SIGNS</u>
• Persistent Cough	• Rapid Breathing
• High Fever	• Chest indrawing
• Difficulty Breathing	• Difficulty in swallowing
• Pus and pain in the ears	• Blue lips and fingers
	• Swollen and painful lymph glands
	• High Fever
	• Pus and pain in the ears
  
- **IF CHILD GETS WORSE**
  - Take Child to the Health Center or Private Physician

Figure C-3

# ESTRATEGIA CREATIVA, PLAN DE COMUNICACIONES IRA

**1** LAS MADRES SON CONVOCADAS A TRAVES DEL CENTRO DE SALUD Y LA RADIO

**2** LAS MADRES ACUDEN AL CENTRO DE SALUD

PARTICIPAN EN EL SORTEO Y CONTESTAN ESTAS PREGUNTAS :

1. ¿ QUE ES IRA ?
2. ¿ COMO SABE QUE EL NIÑO TIENE IRA ?
3. ¿ COMO TRATARLO EN CASA ?
4. ¿ CUANDO DEBE LLEVAR AL NIÑO AL CENTRO DE SALUD ?
5. ¿ QUE DEBE EVITAR CUANDO EL NIÑO TIENE IRA ?

**3** LAS MADRES RECIBEN UN DIPLOMA Y SU NOMBRE ES ANUNCIADO EN PROGRAMAS RADIALES, EN MURALES, ETC.

**4** RECIBEN REFORZAMIENTO POSITIVO

FELICITACIONES A LAS MADRES QUE

**5** COMPORTAMIENTOS ADECUADOS SE INCREMENTAN EN CALIDAD Y CANTIDAD

EL TIERNO ESTA CON CATARRO. HAY QUE CUIDARLO PARA QUE NO SE AGRAVE

# STRATEGIES OF THE ARI CONTROL PROGRAM

OBJECTIVE	MILD ARI		MODERATE	SEVERE	MORTALITY
	PREVENTION OF ARI	PREVENTING OF WORSENING	TREATMENT REDUCTION IN MORTALITY		ANALYSIS
STRATEGY	<ul style="list-style-type: none"> <li>- Measures to reduce incidence of low birth weight</li> <li>- Immunizations</li> <li>- Nutrition</li> <li>- Hygiene</li> <li>- Control of environmental pollution (smoke)</li> <li>- Health education</li> </ul>	<ul style="list-style-type: none"> <li>- Support measures</li> <li>- Breast milk</li> <li>- Liquids</li> <li>- Antipyretics</li> <li>- Maintain feeding</li> <li>- Surveillance</li> <li>- Consultation if worse</li> </ul>	<p>Case management</p> <pre> graph TD     A[Antibiotics and ambulatory treatment] --- B[Antibiotics and hospitalization or out-patient care]     A --- C[Support treatment and other measures when necessary]     B --- C             </pre>		
CARE LEVEL	<p>COMMUNITY HOME</p> 	<p>HOME COMMUNITY PERSONNEL</p> 	<p>1st LEVEL INSTITUTIONS Cesar-Cesamo Type</p> 	<p>1st LEVEL Hospital Referral</p> 	<p>Regional and Area team</p> <p>National death Registry</p> 

Figure C-4

25

# DEVELOPMENT OF THE ARI COMMUNICATIONS PLAN

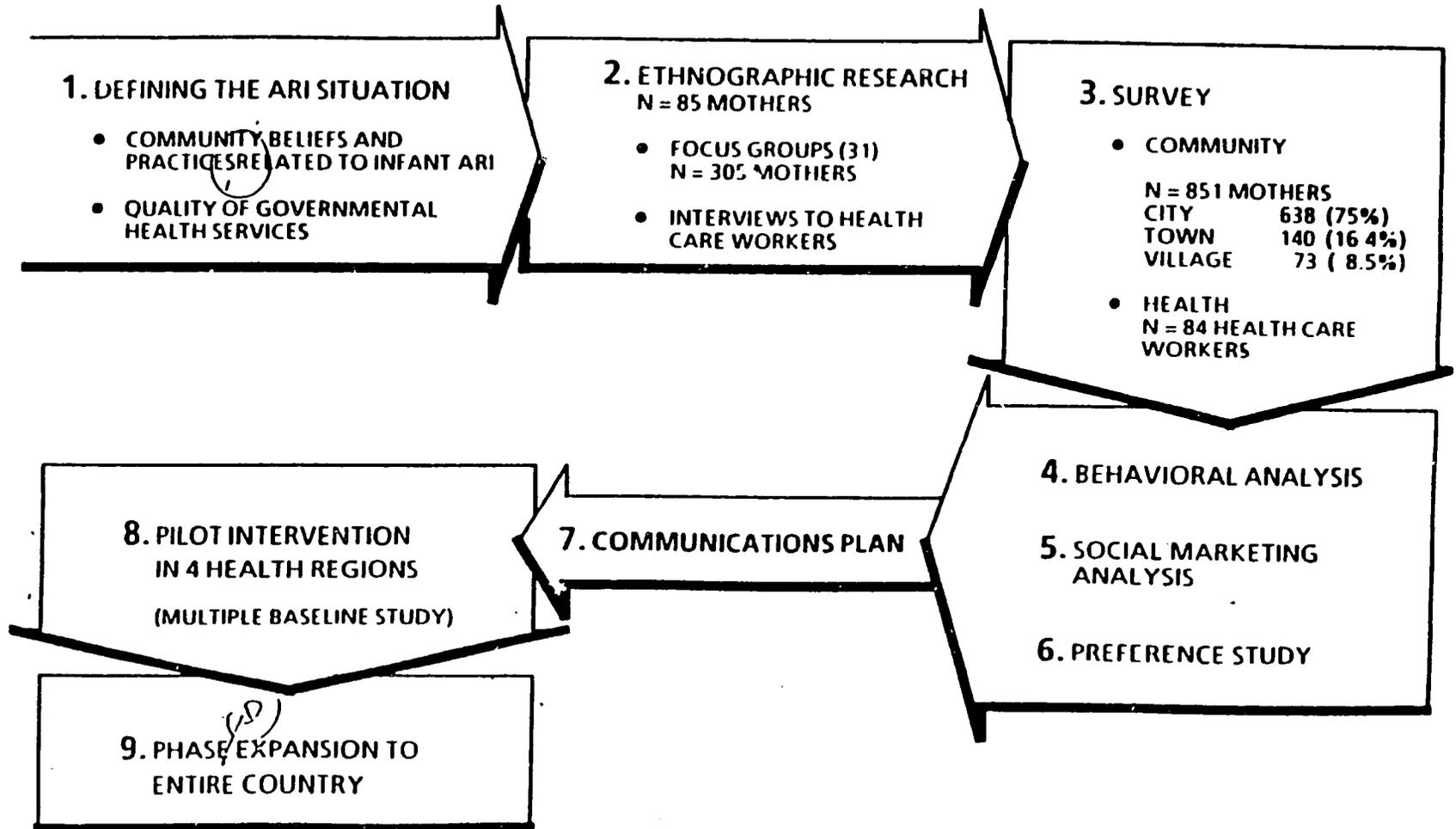


Figure C-5

## INTERVENTION TARGETS AND INTERVENTION MATERIALS

In concert, the main intervention procedures and tools cut across the spectrum of knowledge, attitude, behavior, and reinforcement pattern modification for both mothers and providers. The specific intervention materials included a comic book, radio spots, and training procedures for knowledge and attitude modification; a handkerchief, other aspects of the comic book, other aspects of the radio spots and other training procedures for behavior modification; and a diploma and a lottery (*sorteo*) for reinforcing behavior change.

Parallel complementary interventions were implemented at the provider level as well which set in process many of the interpersonal aspects of the intervention with mothers. Providers also received training on facts about acute respiratory infections and pamphlets which complemented this training. Second, they were given skills training specifically on how to conduct *charlas*, and were given flip charts, other materials to give to the mothers, and otherwise were enabled to conduct the interpersonal aspect of the intervention more successfully. They were taught to use diplomas and lotteries as procedures to reinforce mothers. Interestingly, these procedures probably indirectly reinforced the health workers as well because the entire educational process became more enjoyable for all participants and the mothers were more likely to express their appreciation for health services. Health workers' performance was also reinforced through radio spots and directly by Ministry and regional officials for maintaining their efforts in educating mothers.

Examples of how knowledge and attitude as well as skills were addressed in print materials are presented in Figures C-6 and C-7, taken from pages of the comic book. In Figure C-6, we can see one woman explaining to her neighbor Maria what ARI is and whom it attacks. In Figure C-7, specific home management and recommendations for clinic-based treatment should symptoms get worse are made through appropriate illustrations. Similar types of educational materials were available in the other formats described above.

Figure C-6

Section of the comic book that addresses cognitive (knowledge and attitudinal) factors, whereby one mother explains ARI to a neighbor.



Figure C-7

Behavioral skill factors being addressed in the comic book.



**APPENDIX D**

**TRAINING HONDURAN HEALTH WORKERS AND MOTHERS  
IN INFANT ACUTE RESPIRATORY INFECTION CONTROL**

**Reprinted, with permission, from:  
Elder, J., Boddy P., Aguilar A., y Espinal H.,  
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# Training Honduran Health Workers and Mothers in Infant Acute Respiratory Infection Control<sup>1</sup>

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## ABSTRACT

*The Honduras Ministry of Public Health, with consultation from the Academy for Educational Development's HEALTHCOM Project, has conducted a countrywide study looking at patterns and correlates of, as well as interventions for, acute respiratory infections (ARIs) in children in Honduras. Following a population-wide ethnography, an intervention was designed to communicate to mothers how to detect ARI at early stages and what actions to take during mild, moderate, or severe episodes. Procedures included radio communication, behavioral training procedures, and incentives for both health workers and mothers to disseminate and learn the specifics of ARI control. Results showed that the improved effectiveness of the use of behavioral training procedures (including demonstrations and practice) by health workers contributed substantially to mothers' abilities to manage ARI in their children.*

## INTRODUCTION

Acute respiratory infections (ARIs) refer to diseases or pathologies of sudden onset in the respiratory tract caused by infectious agents. In many parts of the developing world, ARI has become the principal cause of death in children under the age of five years, and particularly in those of less than one year of age (Denny & Loda 1986; Berman & McIntosh 1986). The great majority of these deaths due to ARI are preventable, a fact that is not widely recognized (Chretien et al. 1984). The central problem is not specifically the incidence or occurrence of ARI in children, which appears to be comparable in both the developing world and developed areas (Friej & Wall 1977; James 1972; McConnochie, Hall, & Barker 1988; Monto & Ullman 1974; Pan American Health

Organization/World Health Organization 1986; Unidad de Ciencias y Tecnologia, in press), but instead the significantly greater mortality and severe morbidity requiring hospitalization resulting from ARI in children in the developing world as compared with the developed nations. Reducing mortality in children from ARI is a priority for all developing areas (Grant 1987; Pio 1986; World Health Organization/UNICEF 1986; World Health Organization 1983).

ARIs were the leading cause of death of Honduran children under one year of age in 1987 and the third cause of death in children between the ages of 1 and 4 (A.L. Aguilar, Personal Communication, February 8, 1988). Using a modification of the then current WHO classification scheme (World Health Organization 1985), the Honduran National

<sup>1</sup> Reprinted, with permission, from Elder, J., Boddy P., Aguilar A. y Espinal H., "La Experiencia Hondureña en el Control de las Infecciones Respiratorias Agudas Infantiles," *Boletín de la Oficina Sanitaria Panamericana*, 110(5)91. Copyright-Pan American Health Organization, Washington, D.C., 1991.

Nutrition Survey of 1987 (Unidad de Ciencias y Tecnologia, in press) found that 69.6% of a sample of 3,406 referred to an episode of ARI in children under the age of five during the 15 days preceding the survey interview.

No single intervention is considered to be adequate to achieve a reduction in mortality from ARI (Stansfield 1987). Current case management of ARI relies on the ability of the mother to detect signs of moderate or serious disease in the child, and to take the ill child to the health worker (Tupasi et al. 1989). The health worker is likewise trained to detect signs of moderate and severe disease, and to provide treatment or referral as necessary (Pio 1986; Stansfield 1987; Monto 1989). Two other

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*No single intervention is considered to be adequate to achieve a reduction in mortality from ARI.*

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components are essential to an ARI control program: (1) community education in order to teach families about the importance of recognizing the signs of ARI (which this paper describes), and (2) research to identify local terms and beliefs regarding ARI which, in turn, informs the development of programs for training mothers and health workers (James 1972; A.L. Aguilar, personal communication, February 8, 1988; Monto 1989).

This report presents the results of a study of a behavioral approach to ARI control in Honduras (Stansfield 1987). Ultimately, the success of any ARI control or other child survival program can only be evaluated in terms of the reduction in morbidity and mortality among infants and young children in a targeted area. Mortality reduction involves the early detection and treatment of pneumonia and other severe lower respiratory infections. The specific, short-term purpose of the

present program, however, was to improve both general community and specifically health worker ability to recognize and respond appropriately to childhood ARI. Therefore, our evaluation emphasized these specific targets.

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*Mortality reduction involves the early detection and treatment of severe lower respiratory infections.*

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## METHODS

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### ■ Research Setting and Subjects

**Design.** The multiple baseline design (Barlow & Hersen 1984) consists of initiating baseline (BL) or preintervention observations at all sites at the same time, then implementing the intervention at different and successive times at each site, followed by conducting postintervention (PI) observations (see table 1). Potential temporal biases are addressed through this staggered intervention. Moreover, multiple baseline and other time-series data allow one to observe visually whether a predicted effect actually occurred and what the stability of this effect was. It is particularly advantageous over significance testing when the sample size is limited by the unit of analysis (in this study, four pairs of communities).

**Subject and site selection.** The study had two subgroups of subjects nested within groupings: (1) health care workers (HWs) and (2) mothers (with related and/or social support network persons). HWs participating in the study were those assigned to sites selected by the Ministry of Health (MOH) on the basis of general representativeness. Mothers and other participants in the health education sessions presented by the HWs were essentially volunteers (i.e., they indicated an interest in

**Table 1**  
*Diagram of Multiple Baseline Design*

Sites	Observation Period'				
	1	2	3	4	5
1 & 2	BL	PI	PI	PI	PI
3 & 4	BL	BL	PI	PI	PI
5 & 6	BL	BL	BL	PI	PI
7 & 8	BL	BL	BL	PI	PI

-- = Intervention;  
BL = Baseline observation;  
PI = Postintervention observation.

attending such a class) or happened to be present at the health center when a presentation was made. Community survey subjects were obtained by visiting every second or third house or dwelling (depending on the size of the village), on streets or other areas of a data collection site, with a different street or area surveyed during each observation period. Participants in the knowledge demonstration contests (*sorteos*) were all volunteers who responded to a general invitation to attend.

### ■ Target Populations

Two target populations were selected. The primary target was mothers with children under the age of five, and indirectly, those persons who formed part of their social support network. The secondary target was local HWs, including physicians, registered nurses, nursing assistants, health technicians, social workers, midwives, and community volunteers. In most cases, nursing assistants implemented health education activities.

Generally, the HWs worked at one of two local health care institutions in Honduras, both operated and staffed by the MOH. The first local health center is called a Centro de salud con medico

(CESAMO), and has at least one physician plus supporting staff. The second is a Centro de salud rural (CESAR), and is only staffed by nursing and auxiliary personnel. A CESAMO staff usually supervises several CESARs. In 1986, there were 115 CESAMOs and 519 CESARs located in rural villages and semirural and periurban areas in Honduras.

### ■ Data Collection Sites

The intervention was implemented at two sites each in four different areas of Honduras. A site consisted of a rural village with a health center, either a CESAMO or a CESAR. The first area was rural Tegucigalpa; the chosen sites were two small villages, Monte Redondo and Río Hondo, each with a CESAR, approximately 30 minutes by car from the metropolitan area of Tegucigalpa. The second zone was north of Tegucigalpa in the *departamento* (state) of La Paz, approximately one and a half hours from Tegucigalpa. The sites were the relatively large village of Villa San Antonio, with a CESAMO, and the medium-sized village of Ajuterique, with a CESAR. The third zone was east of Tegucigalpa, in the departamento of Olancho, with one site about one and a half hours distant, and the other about two and a half hours distant. The former was Guamaca, a large village with a CESAMO, and the latter was Concordia, a small village with a CESAR. These six sites were representative of the majority of rural Honduras.

The fourth zone was distinct from the others. La Mosquitia, the tropical Caribbean coast near the border with Nicaragua, is populated mostly by Miskito Indians, many of whom speak little or no Spanish. The two sites selected were Puerto Lempira, a large village with a CESAMO, and the small village of Mocerón, with a CESAR.

The sites were numbered for identification purposes within the pilot study. The numbering had no other significance. The sites were numbered as follows: 1) Monte Redondo; 2) Río Hondo; 3) Villa San Antonio; 4) Ajuterique; 5) Guamaca; 6) Concordia; 7) Puerto Lempira; 8) Mocerón.

## ■ Intervention

The intervention consisted of two basic parts: (1) HW training and (2) education of mothers with promotion of new behavioral responses.

**HW training.** HW training had two emphases: (1) the basic educational message and (2) education/communication techniques. The object of the training was to enhance and utilize HWs as agents for immediate and long-term communication and initiation of behavior change in mothers, specifically, and in the community at large, in general, in regards to the recognition and management of childhood ARI.

The basic educational message emphasized that mild ARI, characterized by an irritated throat, light fever, pain in the ears, cough, and/or runny nose, could be treated at home. Methods for this included giving a lot of fluids, continuing regular feeding (including breastfeeding), looking for and lowering fever as appropriate, keeping airways clear, and humidifying the air. High fever, difficulty in breathing, a deep cough, and/or greater pain in the ears indicated a more severe level of ARI episode. In such cases, the message emphasized the need to seek immediate professional care from the nearest health post or center.

The message training reviewed the basic educational message, emphasizing the key concepts of ARI control and inculcating the idea that the message should be delivered as simply and clearly as possible. Traditionally, HW training focused on a topic area that HWs should present to their audience, such as "acute respiratory infections in children," and provided up-to-date, comprehensive information on that subject. HWs would then select those aspects of the information they considered important and present them, commonly trying to cram as much knowledge as possible into the small periods of time usually available for health promotion activities. The present training, in contrast, specifically emphasized the key concepts of the recognition and management of childhood ARI. A flip chart presenting these key

concepts in pictorial form was prepared to assist in guaranteeing the integrity of the basic educational message and to facilitate HW presentations.

**Education of mothers and others.** The ultimate purpose of the intervention was to train HWs, in turn, to provide mothers of children under the age of five and members of their social support networks the capability of recognizing the signs of mild and moderate to severe ARI, and to establish appropriate behavioral responses to both. The latter refers to home management of mild ARI and use of a health center or a private physician for moderate to severe ARI. The elements used to achieve this purpose were the following:

- An educational session presented by an HW, which introduced, explained, and illustrated the basic educational message to mothers and other attendees. The effectiveness of the session was augmented by the communication and behavioral skills from the HW training and the use of the flip chart. The HW was specifically instructed to use a skills training rather than health education approach, including having the mothers specifically practice their new skills and receive immediate feedback.
- An illustrated, comic-book style, booklet was prepared to present the basic educational message directly, clearly, and agreeably.
- A contest/drawing or sorteo, under the auspices of the health centers, was held at least once in each area, serving several purposes. It promoted and drew attention to the ARI control program, served as a stimulus to get involved in the program, and reinforced learning. Only mothers and women of childbearing age took part in the contest. On the contest day, people gathered together, and one by one, participants appeared before the whole group. They were each asked four questions about ARI recognition and management, which had to be answered orally in front of everyone.

If the participant answered the questions correctly, she was asked to demonstrate to the audience what she would do if her child had a runny, congested nose. Several items, such as clean cloths or toilet paper, were made available for her to use in her demonstration. If the participant was successful, her name was entered into a drawing for a small package of grocery items. After everyone who wanted to had answered questions and demonstrated behaviors, the drawing was held among those who had successfully performed, and three persons won prizes. Everyone who attended received an ARI control program calendar and a new handkerchief with the program logo. As each mother listened to the questions she was asked and gave answers, so too listened the entire gathering, such that all those present were exposed to multiple repetitions of the key concepts and appropriate responses.

### ■ Procedure

The intervention began with the HW training. In accord with the multiple baseline design, the intervention was introduced in each of the four areas at different times (i.e., between different observation periods), with the two sites in each area beginning at the same time. There were five observation periods of two weeks each with one observation per site per period.

The HW training in Area 1 was held between the first and second observations; in Area 2, between the second and third observations; and in Areas 3 and 4, between the third and fourth observations.

To provide an adequate comparison for BL and PI observations, pilot study personnel asked regional supervisors to instruct HWs to schedule talks on ARI, and to inform them that people might visit their health center at that time. No HW was asked to give a "spontaneous" or "surprise" talk on ARI. Thus, in effect, conventionally prepared ARI talks are compared with those inspired by the HW training. The presentations were made at a health center or other community locale. Volunteer attendees were recruited from persons who had arrived at the health center for a medical or health

service or who had come specifically for the presentation.

The booklets were distributed by HWs through the health centers and to all those who attended the educational presentations, where they served as a reinforcement to the talks. People could also take booklets to distribute to their friends and neighbors.

The *sorteos* were announced one to two weeks in advance at the health center corresponding to the *sorteo* site. On the day of the event, cars and trucks with megaphones circulated throughout the village and surrounding area, promoting the *sorteo* and inviting people to attend. Health center personnel also walked throughout the village and personally invited people to attend. The *sorteo* was coordinated and presented by pilot study personnel with the assistance of health center staff. This procedure allowed HWs to experience how the *sorteos* functioned so that they could direct them at their sites in the future. Calendars and handkerchiefs were distributed to all *sorteo* attendees.

### ■ Observations and Evaluation

Evaluation of intervention results was realized by observing HW performance in their educational presentations, assessing the effects of the presentations on mothers and other attendees, and surveying residences in the communities surrounding health centers at observation sites for knowledge on ARI. Three instruments (described below) were used to make observations. Data from each completed instrument were codified and entered into computer files at the end of each observation period.

Using three different instruments, a team of two observers conducted an observation at each site once every two weeks. The first instrument was an assessment of the HW presentation, specifically concerning the message content and education/communication techniques used by the HW. Both members of the observation team sat in the rear or behind the audience, and each

completed an instrument during the presentation. Before the presentation, the observation team members greeted the HW and informed him or her that they would be present and were evaluating the audience.

The second instrument was a pre/posttest of the attendees. Immediately prior to initiation of the HW presentation, the observation team interviewed those who were going to attend and completed the pretest (second instrument). At the termination of the presentation, the same attendees were interviewed again, and the observers completed the posttest for each one.

The third instrument was termed the community survey questionnaire and was completed by the observers at the conclusion of the HW presentation. Observers left the health center and visited every third residence in the surrounding community, interviewing mothers or others. Interviewees were first asked if they had been interviewed previously. If they answered affirmatively, the interview was suspended, and the observer proceeded to the next residence.

**Observers.** The observers were recruited from among MCH personnel. There were four regular observers: two registered nurses and two social workers, all females. Point-to-point percentage agreements between pairs of observers were calculated for each site. Mean reliabilities ranged from 76% to 91%, with an overall mean of 83% agreement.

**Instruments.** The three instruments were questionnaires to be completed by the observers. The first instrument was based on an observer's observations; the second and third instruments were interview questionnaires. The instruments were pretested on staff and field tested.

Instrument 1 (Q1) consisted of 57 items divided into four sections: (1) identification, (2) information about the HW presentation, (3) personal data about the HW, and (4) information about the presentation itself.

Each HW received two summary scores for each presentation. One summary score was concerned with the educational message content of the presentation, and the other related to the education/communication techniques employed by the HW in his or her presentation.

The message summary score indicated to what degree the key concepts of the basic educational message of the intervention were included in the HW presentation, and had no implications concerning the effectiveness of the presentation. A summary score of educational and communication techniques used by the HW in his or her ARI presentations was also devised. The technique summary score was only related to the manner of presenting the message and had no implications for the content of the message. The range of possible scores was 0 to 18.

Instrument 2 (Q2) was applied by interviewing attendees of the HW presentations. Interviews were conducted before and after the presentation, such that there should have been a pretest and posttest Q2 for each person interviewed. A summary score of responses related to the recognition of signs of childhood ARI and appropriate management was devised. This score facilitated comparisons of changes between pretests and posttests, as well as within- and between-series comparisons of pre/posttest changes. The pretest score was then subtracted from the posttest score to determine what change occurred after the HW presentation. The change was reported as positive, negative, or no change (zero).

Instrument 3 (Q3) was completed by interview of community members as described previously. Observers filled out one questionnaire for each person interviewed. A summary score was formed that joined together responses related to the recognition of the signs and appropriate management of childhood ARI. This score facilitated comparisons of within- and between-series community surveys in regard to knowledge of the key concepts in the basic message.

## RESULTS

The total number of the Q1s completed during the five observation periods was 87, based on the presentations of 16 different HWs. All of the HWs except one were females. Professionally, 13 (81%) of the HWs were assistant nurses, 2 (12%) were physicians, and 1 (6%) was a volunteer health promoter. Five CESARs and three CESAMOs comprised the eight data collection sites. The most variation of HWs was at the CESAMOs, where Sites 3 and 5, Villa San Antonio and Guiamaca, each had four different HWs make the ARI presentations. Two HWs made presentations at the third CESAMO, Site 7, Puerto Lempira, and the two physicians and the volunteer health promoter gave presentations at the third site, Villa San Antonio.

Between two to four observations of each HW presentation were made, except at Site 4, Ajuterique, during the third observation period, when only one HW observation was made. No HW presentations were made at Site 6, Concordia, during the second observation period, or at Site 2, Río Hondo, during the fifth observation period for internal reasons of the health centers.

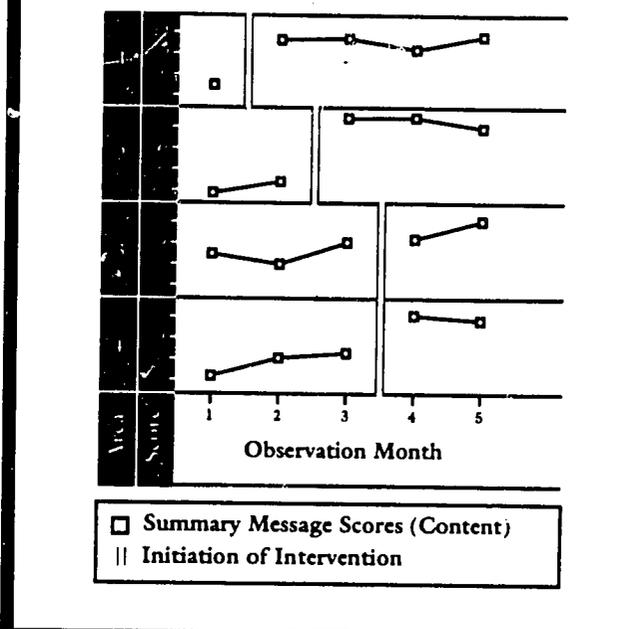
The message and technique summary scores are averaged by sites and areas, and area average scores are reported. This form represents the effects of the intervention on organizational units of the MOH and may include the performance of more than one specific person. Consequently, the area scores are indirect indicators of the efficacy of the intervention, regarding specific effects of the intervention on the secondary targets (HWs). However, site or area summary score averages provide a more realistic indication of the efficacy of the intervention for the health unit's catchment area.

### ■ Area Message Content Summary Scores

The summary scores for the message content of the HW educational presentations are graphed in figure 1. The results for Areas 1, 2, and 4 show clear and notable increases of the message content

scores in the postintervention periods compared with those in the baseline periods. Area 3 PI scores are higher on the average than BL scores, but there was not a clear-cut increase.

**Figure 1:**  
Message Contents of Health Worker ARI Presentations



Area 1 increased from a BL score of 5 to two PI scores of 11, one of 10, and one of 13. This change was notable after the initiation of the intervention between periods 1 and 2, when scores increased from 5 to 11. The content increases were particularly marked regarding the management of mild ARI and the recognition and management of worsening and moderate to severe ARI. Area 2 increased from BL scores of 2 and 4 to PI scores of 13, twice, and 12. The intervention was introduced between periods 2 and 3, and scores increased from 4 to 13. The slight tendency to increase seen in the BL was not sufficient to explain the comparatively high PI increase. The message content particularly increased in the management of mild ARI and the recognition of worsening or moderate to severe ARI.

Area 4 increased from BL scores of 4, 6, and 7 to PI scores of 13 and 11. The intervention was

introduced between periods 3 and 4. Scores after the intervention began increased from 7 to 13. Again, the slight tendency to increase seen in the BL was not enough to explain the higher increase seen in the PI period. Message content was notably augmented in the management of mild ARI.

Area 3 showed a PI increase in the message content scores, but the change was not as remarkable as in the other areas. There was a decrease in BL message scores from period 1 to 2. The score decreased from 7 to 5. Thereafter, from periods 2 to 5, the scores increased in a consistent fashion from 5 to 9 to 10 to 13. The intervention was introduced between periods 3 and 4, and the scores changed from 9 to 10.

The average of all BL message scores was 5.5, and the average of all PI scores was 11.8. Although it is not appropriate simply to average all BL and PI scores, it does provide an overall indicator, particularly if there were no extreme scores to increase or decrease artificially the averages.

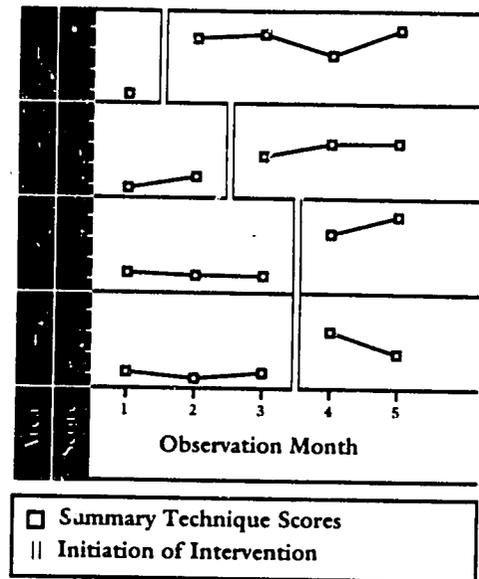
### ■ Area Technique Summary Scores

The summary scores of the educational and communication techniques used by the HWs in their ARI presentations are graphed in figure 2. There were clear and impressive increases of the PI scores compared with BL scores in all of the four areas.

The BL score in Area 1 in the first observation period was 2. After the intervention, introduced between the first and second observation periods, the technique summary score rose to 10 in both the second and third observation periods, fell to 6 in the fourth period, and rose to 10 in the fifth period. The decrease in the summary score in the fourth period appeared to coincide with personnel problems at both sites of the area. Nevertheless, the PI scores are clearly superior to the BL.

Area 2 had two low BL scores (2 and 3) that rose moderately to 5 immediately after the HW training (initiation of the intervention), then increased to 10 and 12. Area 3 had stable BL scores of 4, 3, and 3.

**Figure 2:**  
*Educational Techniques Used by Health Workers in ARI Presentations*



After beginning the intervention, PI scores were 8, then 11, again demonstrating an increasing trend.

Area 4 also had a relatively stable BL with scores of 1, 1, and 2. After the HW training, the first PI score was 9 but dropped to 4. This last score also reflects a personnel change at one of the area's sites (Site 7), coupled with the one HW (at Site 8) who apparently was not affected by the HW training.

### ■ In-clinic Interviews of Mothers

A total of 519 persons were interviewed by the observers immediately before the HW ARI presentation and/or at the termination of the session, and completed a pre- and/or posttest at the eight sites during the five observation periods. Of this total, 46 only completed pretests or the interview just before the presentation. The great majority of these were persons who left early for some reason or who left while others were being interviewed. A further 21 only completed posttests or interviews at the end of the presentation. The majority of these persons had arrived just as the HW began his or her presentation or within five to

ten minutes of the beginning, depending on what had been said by the HW when a latecomer arrived. If a person arrived after the HW had mentioned more than one key concept, or later than ten minutes after the beginning of the talk, that person was not interviewed.

A total of 452 Q2s were paired pre/posttests of the persons who had attended the HW ARI presentation. Of those interviewed, 91% were females, and 83% had children under the age of five. The average age of the respondents was 28, and the range was between 13 and 76. (The 13-year-old had a child under the age of 5.) Eight of the pre/posttest pairs were incomplete and had to be discarded.

**Figure 3:**

*Average Improvements Between Pre-and Post-test Scores of Mothers' Knowledge of ARI Messages Among Those Attending Educational Presentations (1988)*

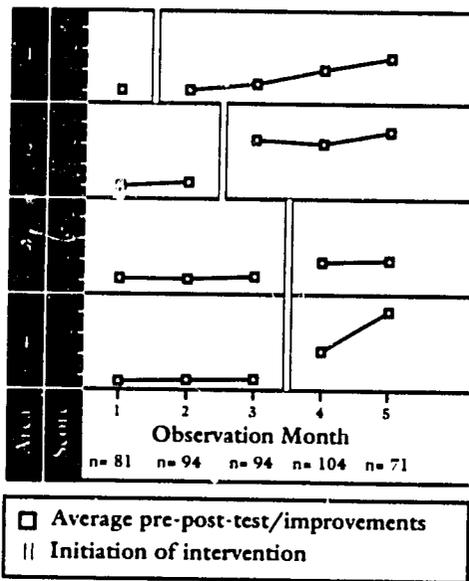


Figure 3 presents the data from Q2. The pre/posttest difference was obtained by subtracting the pretest summary score from the posttest summary score. This served as an indicator of the net effect that might be attributable to attending the

HW presentation. If the difference was positive, that represented a net increase compared with the pretest after the HW educational session. The average differences by area are graphed in figure 3.

All four of the areas demonstrated significant increases in pre/posttest differences after the initiation of the intervention (i.e., the HW training). This improvement was clearer in Areas 2, 3, and 4. Area 2 had BL pre/posttest average differences of 1 and 2 and PI average differences of 8, 7, and 8. Area 3 had BL average differences of 3, 2, and 2 and PI average differences of 7 and 7. Area 4 had BL average differences of 1, 1, and 2 and PI average differences of 7 and 12. Area 1 results initially appeared ambiguous. The BL average pre/posttest difference was 2, and the following PI differences continued an increasing trend: 3, 4, 7, and 8. The fourth and fifth observation period differences were comparable to those in the other areas.

### ■ Community Interview

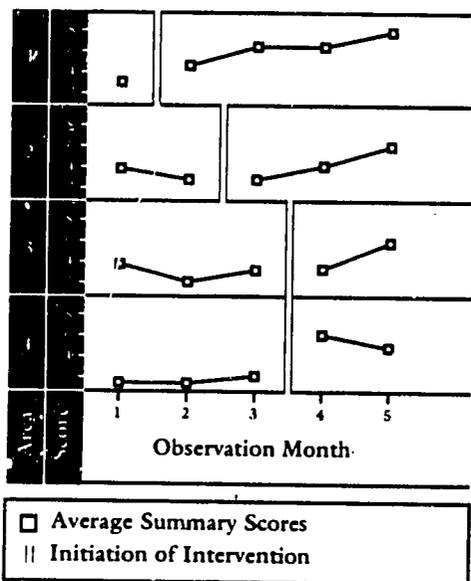
A general (and imprecise) indicator of the effects of the HW training on the ARI presentations is derived from a comparison of aggregate pre/posttest average differences for all baseline observations with all postintervention observations. The average difference for all BL observations was 2, and the average difference for all PI observations was 7. Given that the summary score had a total of 15 possible, this general average increase of 5 implies an overall increment of over 30% in PI pre/posttest improvement.

Area 1 showed a moderate increasing trend, with a BL average score of 3 and PI average scores of 4, 6, 6, and 8. It is unclear if the trend was the result of the intervention or had other causes. Area 4 showed clear summary score increases after the initiation of the intervention (i.e., the HW training). The BL average summary scores were 1, 1, and 2, whereas the PI scores increased to 6 and 5 (see figure 4).

Areas 2 and 3 had similar ambiguous results. There was an initial decline in average summary scores, followed by several scores at the same level,

then a slight increase. The overall average of all baseline summary score averages was 3 and of all postintervention summary score observations was 7. Although there was a clear summary score increase in only one area, a somewhat ambiguous increasing trend in another area, and equivocal results with possible delayed increasing trends in the other two areas, nevertheless, the overall average implies a generalized increase after the intervention (HW training).

**Figure 4:**  
Recognition of Signs and Management of ARI, Derived from Community Interviews



## DISCUSSION

The purpose of the present study was to increase the ability of HWs and mothers to recognize and respond appropriately to childhood ARI. This integrated communication and behavior change approach to improve the detection and management of ARI generally proved highly successful. Unique features of this study included the training of HWs to function as change agents for mothers, a *sorteo* to supplement the effects of the intervention, and direct observation used as an evaluational methodology throughout the study.

The intervention proved effective in producing a change in HW behavior in most of the targeted health centers. In addition, a major change in the level of knowledge of the signs and management of childhood ARI occurred in persons who attended the HW educational presentations. More importantly, this change seems to have generalized to the community as a whole. Finally, it was demonstrated that this intervention could feasibly and effectively be implemented nationally in Honduras.

Health communication, education, and behavior change technologies can serve as important complements to improvements in diagnosis, case control, treatment, and other primary health care efforts. Communication efforts have proven effective in enhancing child survival through improvement of abilities to respond to diarrhea and treat dehydration, through the promotion of immunization, and through other health promotion campaigns. The present study represented an application of state-of-the-art health communication technology to the control of ARIs. Specifically, we had to determine which behaviors of mothers and HWs to target and, second, to enhance their behavior abilities to respond to ARI through a training program that focused on these abilities. This complex behavioral management approach to ARI control advocated in the present intervention would have been very difficult to describe through a mass communication campaign. Therefore, the health communication from health worker to mother was a very important feature of the ARI control program.

Although the present study demonstrated the feasibility of enhancing behavioral skills and knowledge of health workers and mothers for ARI control, future research efforts should emphasize whether changes in mothers' practices subsequently occur, and whether actual reductions in morbidity and mortality can be achieved. We also hope to investigate whether it is feasible to implement this health worker intervention throughout the nation of Honduras and in other developing countries. Should this expanded intervention prove effective, we expect to apply similar procedures to the

promotion of diarrhea control, vitamin A consumption, and other child survival programs typically addressed through other health education and communications technologies.

## ACKNOWLEDGEMENTS

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## REFERENCES

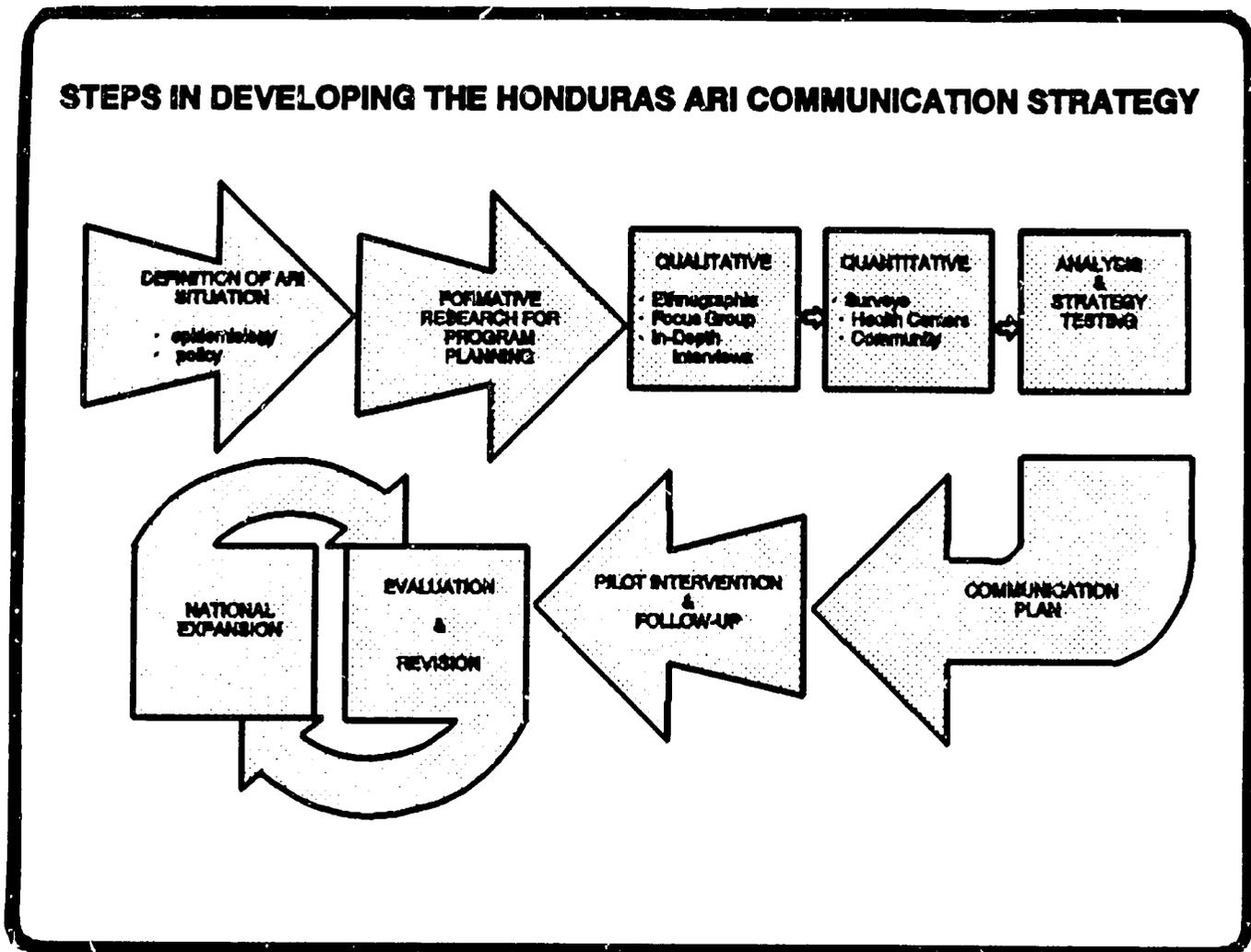
- Barlow, D. H., Hersen, M. 1984. *Single case experimental designs: Strategies for studying behavior change*. 2d ed. New York: Pergamon Press.
- Berman, S., McIntosh, K. 1986. Acute respiratory infections. In *Strategies for primary health care: Technologies appropriate for the control of disease in the developing world*, ed. J.A. Walsh and K.S. Warren, 29-46. Chicago: University of Chicago Press.
- Chretien, J.; Holland, W.; Macklem, P.; Murray, J.; Woolcock, A. 1984. Acute respiratory infections in children: A global public health problem. *New England Journal of Medicine* 310:382-84.
- Denny, F. W., Loda, F. A. 1986. Acute respiratory infections are the leading cause of death in children in the developing world. *American Journal of Tropical Medicine and Hygiene* 35:1-2.
- Friej, L., Wall, S. 1977. Exploring child health and its ecology: The Kirkos study in Addis Ababa: An evaluation of procedures in the measurement of acute morbidity and a search for causal structure. *Acta Paediatrica Scandinavica, Supplement* 267.
- Grant, J. P. 1987. *The state of the world's children, 1987*. Oxford: Oxford University Press (UNICEF).
- James, J. W. 1972. Longitudinal study of the morbidity of diarrheal and respiratory infections in malnourished children. *American Journal of Clinical Nutrition*, 25:690-94.
- McConnochie, K. M.; Hall, C. B.; Barker, W. H. 1988. Lower respiratory tract illness in the first two years of life: Epidemiologic patterns and costs in a suburban pediatric practice. *American Journal of Public Health*, 78(1):34-39.
- Monto, A. 1989. Acute respiratory infections in children of developing countries: Challenge of the 1990s. *Reviews of Infectious Disease*, 11(3):498-505.
- Monto, A. S., Ullman, B. M. 1974. Acute respiratory illness in an American community: The Tecumseh study. *JAMA* 227:164-69.
- Pan American Health Organization (PAHO)/World Health Organization (WHO). 1986. *Guide for planning, implementing, and evaluating programs to control acute respiratory infections as part of primary health care*. WHO/RSD 186.29. Washington, D.C.:PAHO/WHO.
- Pio, A. 1986. Acute respiratory infections in children in developing countries: An international point of view. *Pediatric Infectious Disease*, 5(2):79-183.
- Stansfield, S. K. 1987. Acute respiratory infections in the developing world: Strategies for prevention, treatment and control. *Pediatric Infectious Disease* 6(7):622-27.
- Tupasi, T.; Miguel, C.; Bagasao, T.; Natividad, J.; Valencia, L.; De Jesus, M.; Lupisan, S.; Medalla, F. 1989. Child care practices of mothers: Implications for interventions in acute respiratory infections. *Annals of Tropical Paediatrics*, 9:82-88.
- Unidad de Ciencias y Tecnologia. In press. *Encuesta nacional de nutrición, Honduras, 1987* (National nutrition survey, Honduras, 1987). Tegucigalpa, Honduras: Dirección General de Salud, Ministerio de Salud Pública, Republica de Honduras.

World Health Organization (WHO). 1983. *Global medium-term programme, programme 13.7, acute respiratory infections*. TRI/ARI/MTP/83.1. Geneva: WHO.

World Health Organization (WHO). 1985. *Case management of acute respiratory infections in children in developing countries*. WHO/RSD/85.15. Geneva: WHO.

World Health Organization (WHO)/United Nations Children's Fund (UNICEF). 1986. *Report of technical inter-agency meeting on acute respiratory infections, 18 - 19 March 1986*. New York: UNICEF.

Figure 1



Following overall definition of the country situation, the next vital step in communication planning is the assessment of actual behaviors related to a particular health outcome. What is striking about any work in child survival is that although the primary objective is improving the health of children, children themselves are not responsible for their own prevention and care. Therefore, the primary target of child survival programs must be the adults responsible for children: parents, community health workers, physicians and nurses. Specifically, health communication must focus on improving the health-related behavior of these adults if we truly hope to have an impact on child survival. Increasing knowledge or awareness levels of adults will have no effect on children if it does not lead to changes in the care or treatment of children. We assess the behaviors of both health workers and mothers because we are interested in maintaining appropriate practices in both groups. In the present study, for example, we observed health workers providing training to mothers for ARI management and mothers actually engaged in caring for a child with ARI.

Figure 2

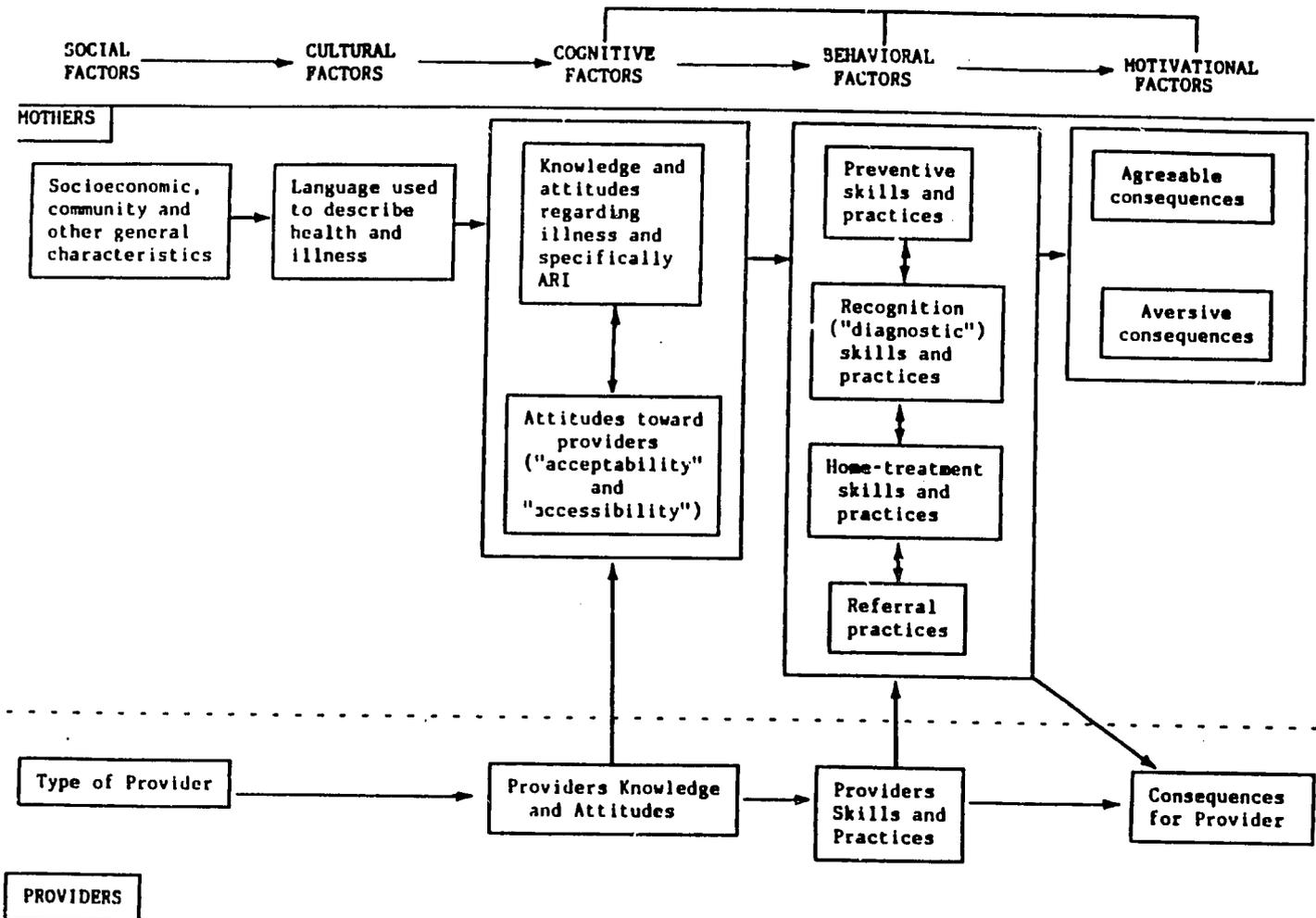
<b>WHO TERMINOLOGY USED IN STUDY</b>	<b>SEVERE ARI</b>	<b>MODERATE ARI</b>	<b>MILD ARI</b>
<b>ARI Signs</b>	Severe wheezing  Danger signs of very severe disease:  . Not able to drink; . Convulsions; . Abnormally sleepy or difficult to wake; . Stridor in calm child; or . Severe undernutrition	Wheezing with possible pneumonia  Acute ear infection (acute otitis media)  Suspect streptococcal sore throat	Wheezing  Chronic ear infection (chronic otitis media)  Sore throat (without suspected streptococcal sore throat)
<b>NEW TERMINOLOGY</b>	<b>SEVERE PNEUMONIA</b>	<b>PNEUMONIA</b>	<b>COUGH OR COLD (WITH NO PNEUMONIA)</b>
<b>Management Plans for First-level facilities</b>	Urgent referral to hospital after first dose of antibiotic	Antibiotic and home care  (+ salbutamol)	Home care  (+ salbutamol)

**WHO Programme for the Control of ARI.**

At that time a long-term plan was developed for investigation of actual ARI behaviors. The Honduras ARI communication program developed a model for all aspects of its investigation, intervention planning and implementation, basing the model on behavioral research derived from medical anthropology, health systems analysis, behavioral psychology and communications research.

Behavioral research provides a systematic way of documenting the complexity and prevalence of critical behaviors of both health worker and mother alike. Findings from this research can then help build a communication strategy. Specifically, behavioral research helps identify appropriate behaviors already being practiced. These practices we attempt to reinforce.

Figure 3  
The Honduras ARI Investigation and Intervention Model



As can be seen, the factors start with issues which are relatively distant from the mother's day-to-day experience (or, for that matter, that of the health providers) and proceed to specific cultural and cognitive factors which influence behavior more immediately. We then look at specific practices which include the prevention, recognition, and treatment of ARI. Mothers experience either success or failure and therefore are more or less motivated to take similar actions again in the future. Among the most important individuals external to the mother and the immediate family in the case of the health and illness of children are community- or clinic-

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media messages (see Figure 5) and to graphic representations of nose clearing for comic book, flip chart, and other illustrations. (A detailed summary of the quantitative research results is presented in Appendix B.)

Figure 5

## ARI BASIC MESSAGES

- **CUE TO BEGIN CHILD CARE AT HOME**

- Runny Nose
- Cough

- **CARE FOR CHILD AT HOME MEANS:**

- Give a lot of liquids
- Continue with feeding
- Continue with breastfeeding
- Clean the nose
- To lower fever, apply lukewarm compresses

- **CUE TO SEEK HELP**

**FORMER SIGNS**

- Persistent Cough
- High Fever
- Difficulty Breathing
- Pus and pain in the ears

**CURRENT SIGNS**

- Rapid Breathing
- Chest indrawing
- Difficulty in swallowing
- Blue lips and fingers
- Swollen and painful lymph glands
- High Fever
- Pus and pain in the ears

- **IF CHILD GETS WORSE**

- Take Child to the Health Center or Private Physician

Figure 10

DIAGRAM OF MULTIPLE BASELINE DESIGN

Observation Period					
AREA	1	2	3	4	5
1	BL	X	PI	PI	PI
2	BL	BL	X	PI	PI
3	BL	BL	BL	X	PI
4	BL	BL	BL	X	PI

BL = Baseline Observation X = Intervention PI = Post-Intervention Observation

each region) involved in the pilot. These data points represent the average number of content items observers recorded during health worker ARI talks. Health workers in Areas 1, 2, and 4 show clear and notable increases in the number of appropriate subjects covered in their talks when comparing the baseline with post-intervention scores. Area 1 increased from a baseline score of 5 to post intervention scores were 10 and 13. Content increases were particularly marked in the management of mild ARI and the recognition and management of worsening ARI. Area 2 increased from baseline of 4, 6, and 7 to post intervention of 13 and 11. In Area 3, small 7, 5, and 9 and post intervention scores of 10 and 13. So the "jump" between baseline and post-intervention Area 3 was only one point compared to an average across settings of 5.5 for baseline and 11.8 for post intervention. Nevertheless, the absolute post-intervention scores in Area 3 were on par with the other areas' scores.

Training in interactive teaching techniques was scored in a similar manner and produced similar results, even though these behaviors are harder to train (see Figure 14). All areas showed marked increases from baseline to post-intervention observations. There were approximately 15 teaching behaviors on the checklist. Health workers scored no more than 4 during baseline and

- 14

scored up to 12 during the post intervention period. The dip in post intervention scores seen in Area 4 was due to a personnel change at one clinic and one health worker who seemed unaffected by training.

Figure 11

## HEALTHWORKER TRAINING

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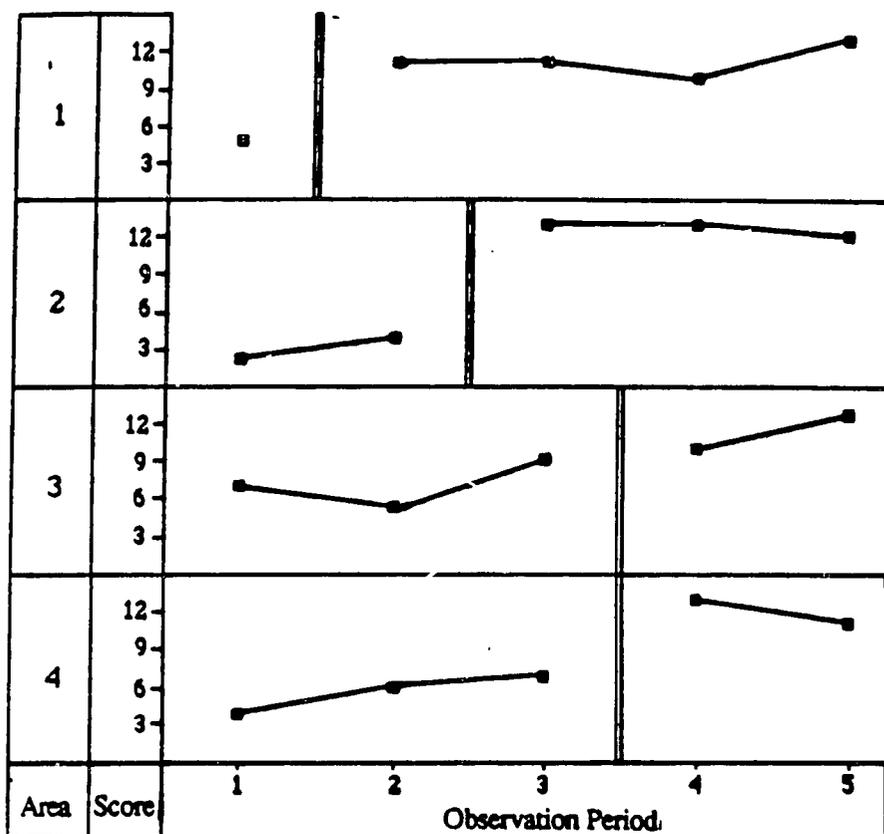
### Educational Techniques

- Ask Questions
- Answer Questions
- Personalize the Message
- Instruct
- Demonstrate
- Practice
- Give Feedback
- Reinforce
- Use Flip Chart
- Distribute Print Materials

These data suggest that health workers were delivering more information on ARI in a more interactive way, but did such an approach have a discernable impact on mothers' knowledge and practices? Four hundred and fifty-two mothers attending clinic health education talks were given a short test before and after the health education sessions. Figure 15 shows the average difference between each mother's pre-and post test. The low difference between their scores during baseline indicates that before the health workers were trained, mothers did not retain much information from ARI sessions.

Figure 13  
MESSAGE CONTENT OF HEALTHWORKER ARI PRESENTATIONS,  
BY AREA AND OBSERVATION PERIOD;

ARI Control Program Pilot Study, Honduras 1988



┆ - Initiation of Intervention

**D. Follow-up**

A follow-up investigation of the pilot study, conducted six months after the intervention training, indicated that the intervention was still producing beneficial effects at the six sites observed. Staff who had participated in the intervention trainings still exhibited learned

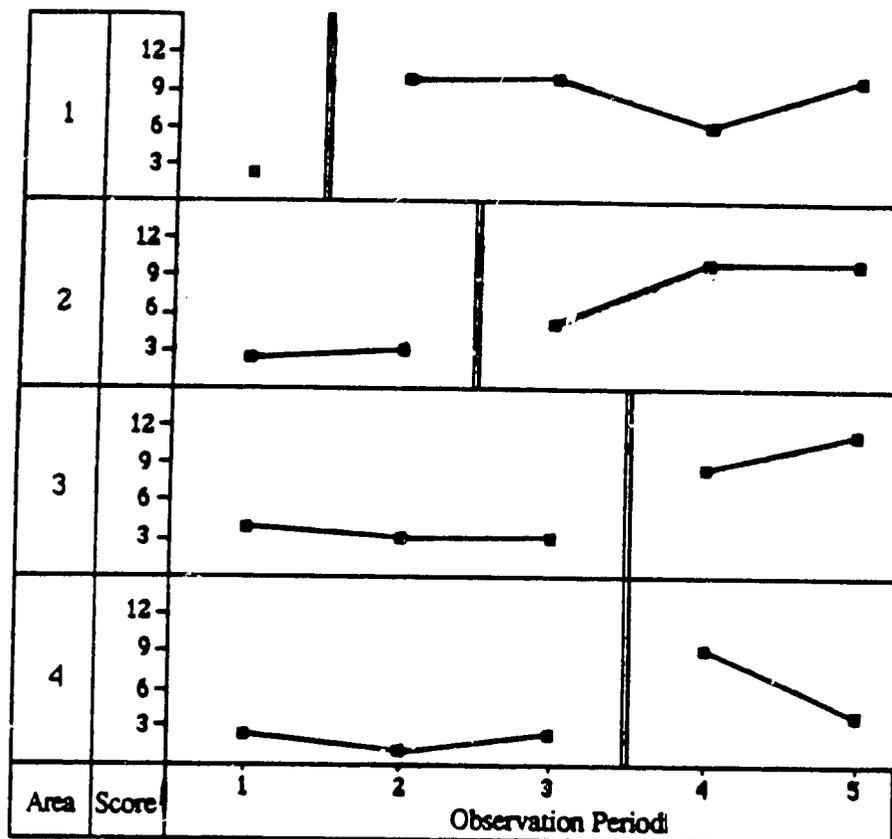
16

behaviors, though to a somewhat lesser degree than during the post-intervention observations of the pilot study. Of the five health workers observed, only three had attended the "pilot" intervention training. Attendees of ARI presentations by trained health workers appeared to achieve higher average differences on pre/post-tests. Perhaps one of the most important results of the intervention training was to stimulate local staff to implement and to continue implementing ARI health promotion. In conclusion, the successful effects of the intervention in the ARI control program pilot study also had detectable benefits more than six months later. The longevity of the pilot results demonstrated to the MOH that the communication strategies used were supported expansion to national program.

Figure 14

**EDUCATIONAL TECHNIQUES OF HEALTHWORKER  
ARI PRESENTATIONS, BY AREA AND OBSERVATION PERIOD;**

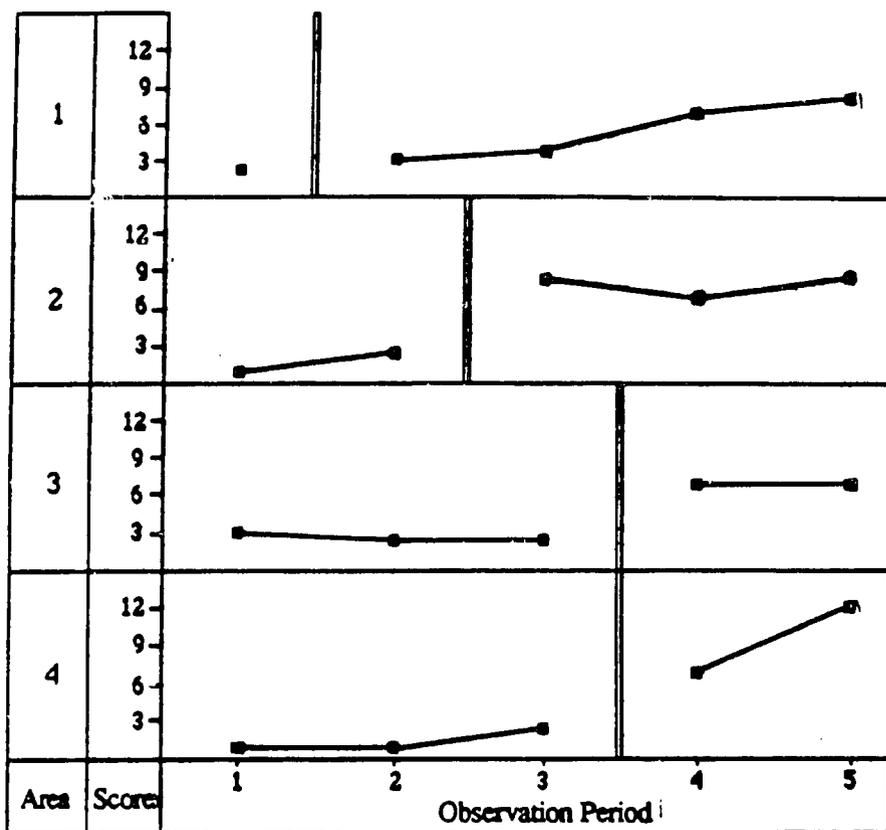
ARI Control Program Pilot Study, Honduras, 1988



— - Initiation of Intervention

Figure 15  
 MOTHERS' PRE/POSTTEST AVERAGE DIFFERENCE AFTER  
 HEALTHWORKER ARI PRESENTATIONS, BY AREA AND OBSERVATION PERIOD;

ARI Control Program Pilot Study, Honduras, 1983



— - Initiation of Intervention

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## RESULTS

The total number of the QIs completed during the five observation periods was 87, based on the presentations of 16 different HWs. All of the HWs except one were females. Professionally, 13 (81%) of the HWs were assistant nurses, 2 (12%) were physicians, and 1 (6%) was a volunteer health promoter. Five CESARs and three CESAMOs comprised the eight data collection sites. The most variation of HWs was at the CESAMOs, where Sites 3 and 5, Villa San Antonio and Guiamaca, each had four different HWs make the ARI presentations. Two HWs made presentations at the third CESAMO, Site 7, Puerto Lempira, and the two physicians and the volunteer health promoter gave presentations at the third site, Villa San Antonio.

Between two to four observations of each HW presentation were made, except at Site 4, Ajuterique, during the third observation period, when only one HW observation was made. No HW presentations were made at Site 6, Concordia, during the second observation period, or at Site 2, Río Hondo, during the fifth observation period for internal reasons of the health centers.

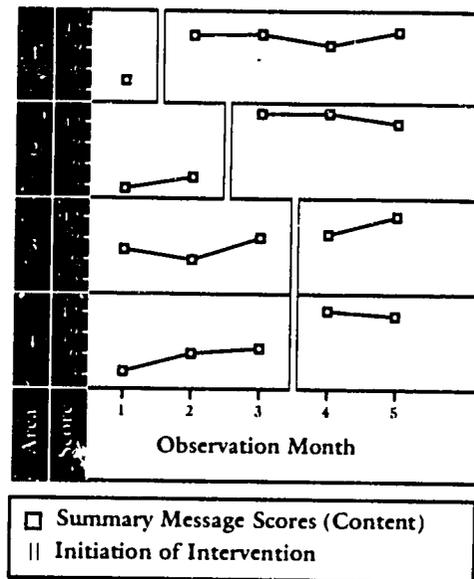
The message and technique summary scores are averaged by sites and areas, and area average scores are reported. This form represents the effects of the intervention on organizational units of the MOH and may include the performance of more than one specific person. Consequently, the area scores are indirect indicators of the efficacy of the intervention, regarding specific effects of the intervention on the secondary targets (HWs). However, site or area summary score averages provide a more realistic indication of the efficacy of the intervention for the health unit's catchment area.

### ■ Area Message Content Summary Scores

The summary scores for the message content of the HW educational presentations are graphed in figure 1. The results for Areas 1, 2, and 4 show clear and notable increases of the message content

scores in the postintervention periods compared with those in the baseline periods. Area 3 PI scores are higher on the average than BL scores, but there was not a clear-cut increase.

**Figure 1:**  
Message Contents of Health Worker ARI Presentations



Area 1 increased from a BL score of 5 to two PI scores of 11, one of 10, and one of 13. This change was notable after the initiation of the intervention between periods 1 and 2, when scores increased from 5 to 11. The content increases were particularly marked regarding the management of mild ARI and the recognition and management of worsening and moderate to severe ARI. Area 2 increased from BL scores of 2 and 4 to PI scores of 13, twice, and 12. The intervention was introduced between periods 2 and 3, and scores increased from 4 to 13. The slight tendency to increase seen in the BL was not sufficient to explain the comparatively high PI increase. The message content particularly increased in the management of mild ARI and the recognition of worsening or moderate to severe ARI.

Area 4 increased from BL scores of 4, 6, and 7 to PI scores of 13 and 11. The intervention was

introduced between periods 3 and 4. Scores after the intervention began increased from 7 to 13. Again, the slight tendency to increase seen in the BL was not enough to explain the higher increase seen in the PI period. Message content was notably augmented in the management of mild ARI.

Area 3 showed a PI increase in the message content scores, but the change was not as remarkable as in the other areas. There was a decrease in BL message scores from period 1 to 2. The score decreased from 7 to 5. Thereafter, from periods 2 to 5, the scores increased in a consistent fashion from 5 to 9 to 10 to 13. The intervention was introduced between periods 3 and 4, and the scores changed from 9 to 10.

The average of all BL message scores was 5.5, and the average of all PI scores was 11.8. Although it is not appropriate simply to average all BL and PI scores, it does provide an overall indicator, particularly if there were no extreme scores to increase or decrease artificially the averages.

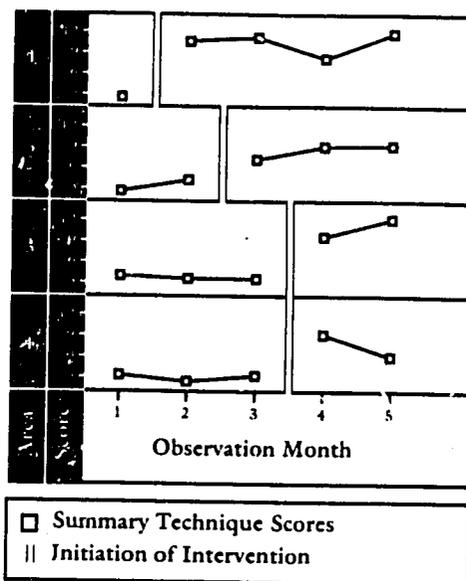
### ■ Area Technique Summary Scores

The summary scores of the educational and communication techniques used by the HWs in their ARI presentations are graphed in figure 2. There were clear and impressive increases of the PI scores compared with BL scores in all of the four areas.

The BL score in Area 1 in the first observation period was 2. After the intervention, introduced between the first and second observation periods, the technique summary score rose to 10 in both the second and third observation periods, fell to 6 in the fourth period, and rose to 10 in the fifth period. The decrease in the summary score in the fourth period appeared to coincide with personnel problems at both sites of the area. Nevertheless, the PI scores are clearly superior to the BL.

Area 2 had two low BL scores (2 and 3) that rose moderately to 5 immediately after the HW training (initiation of the intervention), then increased to 10 and 12. Area 3 had stable BL scores of 4, 3, and 3.

**Figure 2:**  
*Educational Techniques Used by Health Workers in ARI Presentations*



After beginning the intervention, PI scores were 8, then 11, again demonstrating an increasing trend.

Area 4 also had a relatively stable BL with scores of 1, 1, and 2. After the HW training, the first PI score was 9 but dropped to 4. This last score also reflects a personnel change at one of the area's sites (Site 7), coupled with the one HW (at Site 8) who apparently was not affected by the HW training.

### ■ In-clinic Interviews of Mothers

A total of 519 persons were interviewed by the observers immediately before the HW ARI presentation and/or at the termination of the session, and completed a pre- and/or posttest at the eight sites during the five observation periods. Of this total, 46 only completed pretests or the interview just before the presentation. The great majority of these were persons who left early for some reason or who left while others were being interviewed. A further 21 only completed posttests or interviews at the end of the presentation. The majority of these persons had arrived just as the HW began his or her presentation or within five to

ten minutes of the beginning, depending on what had been said by the HW when a latecomer arrived. If a person arrived after the HW had mentioned more than one key concept, or later than ten minutes after the beginning of the talk, that person was not interviewed.

A total of 452 Q2s were paired pre/posttests of the persons who had attended the HW ARI presentation. Of those interviewed, 91% were females, and 83% had children under the age of five. The average age of the respondents was 28, and the range was between 13 and 76. (The 13-year-old had a child under the age of 5.) Eight of the pre/posttest pairs were incomplete and had to be discarded.

**Figure 3:**

*Average Improvements Between Pre-and Post-test Scores of Mothers' Knowledge of ARI Messages Among Those Attending Educational Presentations (1988)*

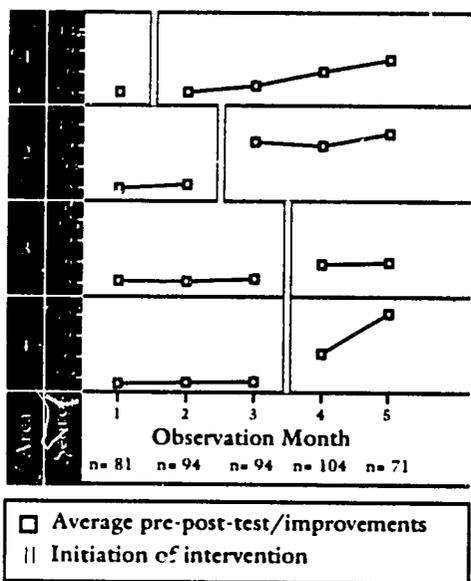


Figure 3 presents the data from Q2. The pre/posttest difference was obtained by subtracting the pretest summary score from the posttest summary score. This served as an indicator of the net effect that might be attributable to attending the

HW presentation. If the difference was positive, that represented a net increase compared with the pretest after the HW educational session. The average differences by area are graphed in figure 3.

All four of the areas demonstrated significant increases in pre/posttest differences after the initiation of the intervention (i.e., the HW training). This improvement was clearer in Areas 2, 3, and 4. Area 2 had BL pre/posttest average differences of 1 and 2 and PI average differences of 8, 7, and 8. Area 3 had BL average differences of 3, 2, and 2 and PI average differences of 7 and 7. Area 4 had BL average differences of 1, 1, and 2 and PI average differences of 7 and 12. Area 1 results initially appeared ambiguous. The BL average pre/posttest difference was 2, and the following PI differences continued an increasing trend: 3, 4, 7, and 8. The fourth and fifth observation period differences were comparable to those in the other areas.

### Community Interview

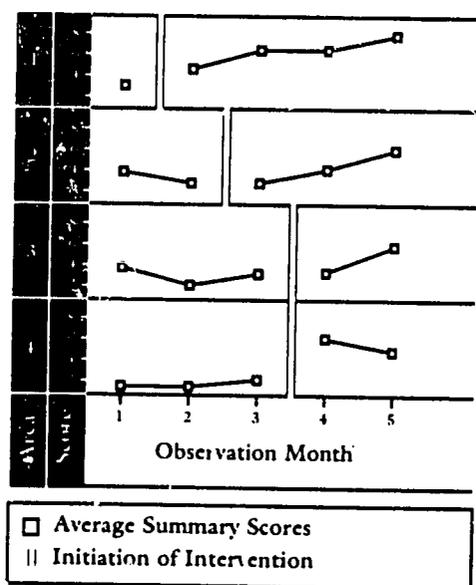
A general (and imprecise) indicator of the effects of the HW training on the ARI presentations is derived from a comparison of aggregate pre/posttest average differences for all baseline observations with all postintervention observations. The average difference for all BL observations was 2, and the average difference for all PI observations was 7. Given that the summary score had a total of 15 possible, this general average increase of 5 implies an overall increment of over 30% in PI pre/posttest improvement.

Area 1 showed a moderate increasing trend, with a BL average score of 3 and PI average scores of 4, 6, 6, and 8. It is unclear if the trend was the result of the intervention or had other causes. Area 4 showed clear summary score increases after the initiation of the intervention (i.e., the HW training). The BL average summary scores were 1, 1, and 2, whereas the PI scores increased to 6 and 5 (see figure 4).

Areas 2 and 3 had similar ambiguous results. There was an initial decline in average summary scores, followed by several scores at the same level,

then a slight increase. The overall average of all baseline summary score averages was 3 and of all postintervention summary score observations was 7. Although there was a clear summary score increase in only one area, a somewhat ambiguous increasing trend in another area, and equivocal results with possible delayed increasing trends in the other two areas, nevertheless, the overall average implies a generalized increase after the intervention (HW training).

**Figure 4:**  
*Recognition of Signs and Management of ARI, Derived from Community Interviews*



## DISCUSSION

The purpose of the present study was to increase the ability of HWs and mothers to recognize and respond appropriately to childhood ARI. This integrated communication and behavior change approach to improve the detection and management of ARI generally proved highly successful. Unique features of this study included the training of HWs to function as change agents for mothers, a *sorteo* to supplement the effects of the intervention, and direct observation used as an evaluational methodology throughout the study.

The intervention proved effective in producing a change in HW behavior in most of the targeted health centers. In addition, a major change in the level of knowledge of the signs and management of childhood ARI occurred in persons who attended the HW educational presentations. More importantly, this change seems to have generalized to the community as a whole. Finally, it was demonstrated that this intervention could feasibly and effectively be implemented nationally in Honduras.

Health communication, education, and behavior change technologies can serve as important complements to improvements in diagnosis, case control, treatment, and other primary health care efforts. Communication efforts have proven effective in enhancing child survival through improvement of abilities to respond to diarrhea and treat dehydration, through the promotion of immunization, and through other health promotion campaigns. The present study represented an application of state-of-the-art health communication technology to the control of ARIs. Specifically, we had to determine which behaviors of mothers and HWs to target and, second, to enhance their behavior abilities to respond to ARI through a training program that focused on these abilities. This complex behavioral management approach to ARI control advocated in the present intervention would have been very difficult to describe through a mass communication campaign. Therefore, the health communication from health worker to mother was a very important feature of the ARI control program.

Although the present study demonstrated the feasibility of enhancing behavioral skills and knowledge of health workers and mothers for ARI control, future research efforts should emphasize whether changes in mothers' practices subsequently occur, and whether actual reductions in morbidity and mortality can be achieved. We also hope to investigate whether it is feasible to implement this health worker intervention throughout the nation of Honduras and in other developing countries. Should this expanded intervention prove effective, we expect to apply similar procedures to the