FINAL REPORT ON THE EVALUATION OF THE PROCOMSI II ANTI-MALARIA PROJECT

A Report from

Stanford University

to the

United States Agency for International Development

prepared by

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August 1985

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The research reported here has been supported by the Office of Education and the Office of Health of the Bureau for Science and Technology, United States Agency for International Development under contract AID/DSPE-C-0028. The USAID Mission in Tegucigalpa and the Ministry of Public Health, Government of Honduras have provided additional resources in support of the work.

ACKNOWLEDGEMENTS

We are grateful for the help of many people and institutions in performing this work. Without the cooperation of our colleagues at the Ministry of Public Health and the Academy for Educational Development, none of this research would have been possible. The Institute of Nutrition of Central America and Panama provided assistance of all levels of research design and data analysis, as well as in data collection. In particular, Drs. John Townsend and Bruce Newman made invaluable contributions. Mrs. Cathy Baldizon undertook the difficult task of translating the report drafts from Spanish to English.

EXECUTIVE SUMMARY

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

The purpose of the evaluation was to determine the impact of the campaign on knowledge, attitudes and practices related to the prevention of malaria and its treatment in Health Regions 4 and 7 in Honduras. The major findings are summarized below.

The evaluation was conducted in 1984 using survey interviews with 192 members of the general population in those regions, including 49 malaria patients. In addition, the 27 Malaria Volunteers posted in the study communities were also interviewed. Based on this sample, and using comparisons with prior studies performed by AED in 1982 and 1983, before and after measures of knowledge, attitudes and practices were used to determine the impact of exposure to the mass communication interventions of PROCOMSI II. The impact of different media on knowledge, attitudes, and practices was also determined.

Basic exposure levels to campaign messages are high. A total of 62.0% of the families interviewed had a working radio and 66.1% of these families remembered having heard the messages. Given the level of radio ownership and the high percentage of those not owning a radio who had been exposed to the messages it can be assumed that possession of a radio is not a limiting factor for the campaign. Of those who had heard radio messages, slightly less than a quarter among the general population and slightly less than half among the Malaria Volunteers could complete the jingle used in the campaign, which is a considerable achievement for a radio campaign of two months duration.

Fewer people had heard the longer radio program, the "Voice of Health" (19.8%) and they were less likely to remember the content about malaria that had been mentioned in the programs.

Print materials were also distributed by the campaign. The fumigator's pamphlet had coverage of 28.3% in the two Health Regions studied one year after initiating distribution. Since fumigators potentially visit every house, distribution of pamphlets through this channel is a promising means of delivering printed information. The distribution of the Malaria Volunteers' pamphlet, which contains information about prevention and curative measures, is unknown since it is only given out to those who are acutely ill, a group not sampled by the evaluation.

In general, knowledge levels are high after the campaigns. Families know that mosquitos breed in water (86.5%), that the insecticide kills when the mosquito lands on it (88.0%), what to do if side effects occur while taking medication (59.9%), the fact that "paludismo" and malaria are the same disease (64.1%) and what to do if you have fever with chills (74.0%). There seems to

be no need to modify the population's practices after fumigation except to encourage them to wait the recommended time before re-entering their houses. Between 85 and 95 percent reported that they followed instructions to sprinkle water on the ground, sweep well, burn and bury the garbage, and wash the children's hands after the spraying. Three-quarters of them said they waited the full two hours outside before re-entering the house. There is also no problem with recognition of the mosquitos as the malaria vector. Levels of knowledge on many of these variables are so high that future campaigns might consider introducing more complex concepts or information.

The limited comparisons of changes in knowledge, attitudes, and practices between 1982 and 1984 show success in terms of support of the fumigator and an association between fumigation and reduction of mosquitos, prevention of malaria and improved health. In comparison with the "baseline" data collected by AED in 1982, the 1984 evaluation data show significant improvements in reasons for accepting fumigation - - "because it kills mosquitos" rises from 49.4 percent to 93.8 percent and "because it prevents malaria" rises from 15.5 percent to 54.0 percent. These aspects are very important for acceptance of the fumigator and are the basis for a more positive attitude toward prevention and treatment of malaria. Thus a straight pre-post comparison shows uniform improvement across categories.

Comparing data collected by AED in 1983 after a similar campaign to the one evaluated here shows varied results. Between 1983 and 1984, knowledge about appropriate self-treatment increased in both regions, and coverage of the "Voice of Health" program improved in Region 4. However, exposure to radio spots was lower in the second campaign, and decreases were noted in people's ability to recall the exact content of messages. The samples in the two studies are not exactly comparable, however, so the changes are difficult to interpret.

The impact of the fumigator's pamphlet may be limited because families already claim to comply with the practices. However, since the coverage of the population by the fumigators is so complete and the combination of interpersonal and print communication is especially powerful, it is suggested that this pamphlet include other messages as well.

Acceptance of the spraying team is complete (99.0%) and cooperation with the team is equally high (97.9%). Very substantial portions of the target audience know why they shouldn't disturb sprayed areas (78.1%) and how long they should wait outside after spraying (74.5%).

The Malaria Volunteers exhibited slightly better levels of knowledge, attitudes or practices than the general population. Prior to initiating their work 14.8% had received no training and 29.6% had not received training in the last three years. Because they are permanent educational agents within the community, they may represent a resource that could be tapped for greater productivity if more training were provided.

Indices were created for exposure through the various separate channels of communication, overall exposure, knowledge and practice. These indices were used in analysis of strength of association among each other. The strongest associations with change in knowledge and practice come with the combined exposure to print and interpersonal communication (in this case, a visit from a field worker), because the two events generally co-occurred. Curiously, print alone, and radio alone do not show significant relationships with either knowledge or practice. This may suggest that the impact of the personal contact was so strong that it obscures the independent effects in the other channels, but it may also be indicating that the duration and intensity of the radio portion of the campaign (two months of broadcasting) was not

sufficient to generate a strong improvement over the previous high levels of knowledge and behavior. Exposure pooled across channels is related to compliance with the promoted practices.

Overall the results show that there was high awareness of the campaign and good knowledge of its content. The biggest impacts seem to have come from the field worker visits to spray the house, but there is clearcut evidence of learning from the radio component as well.

The print materials are confounded with field worker contacts; their impact may also have been influenced by unavailability. The combination of integrated messages across all three channels produced a measurable effect on knowledge and practice as expressed in self-report.

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I. INTRODUCTION

This is a report of the evaluation of the Malaria campaign of the Primary Health Care component of the Mass Media and Health Practices Project. It covers the second phase of the Mass Media and Health Practices Project, known in Honduras as the Proyecto de Comunicacion Masiva Aplicada a la Salud Infantil (PROCOMSI). The Primary Health Care component is the second phase (PROCOMSI II). This evaluation focuses on a malaria campaign carried out in 1983-1984 by the Ministry of Public Health with technical assistance from the Academy for Educational Development. The project and the evaluation were funded by the Office of Education and the Office of Health of the Bureau for Science and Technology, United States Agency for International Development (USAID), with additional support from the USAID Mission in Honduras and the Ministry of Public Health.

In its first stage (1980-1982), PROCOMSI designed and developed an integrated communication methodology which, when used systematically, was quite successful in promoting the use of oral rehydration salts and in changing the population's behaviors with regard to treatment and prevention of diarrhea in children. The methodology used village-level research for planning, social marketing, and behavioral analysis to develop an integrated set of messages that were delivered through multiple channels. This program has been described extensively in The Mass Media and Health Practices Evaluation in Honduras: A Report of the Major Findings (1985). In the second phase (1982-1984), PROCOMSI utilized this same methodology to develop educational campaigns in the four areas targeted as priorities by the Ministry of Public Health: Control of Diarrheal Disease, Immunizations, Control of Vectors, and Tuberculosis. The specific objectives of PROCOMSI II were: (1) to educate the general public in terms of certain health topics, and (2) to

increase the motivation of volunteer health workers in rural communities. The project developed integrated multi-channel campaigns that combined radio messages (short spots and pre-recorded programs) with the development and distribution of pamphlets and posters, and provided for the training of health personnel in their use.

The evaluation of PROCOMSI II was conducted by Stanford University's Institute for Communication Research under contract AID/DSPE-C-0028 with the Office of Education and Office of Health, Bureau for Science and Technology of the United States Agency for International Development (USAID). The evaluation was also supported by the USAID Mission in Honduras. Responsibility for the evaluation was later transferred to Stanford's Food Research Institute and its subcontractor, Applied Communication Technology. The Divisions of Education and Vector Control and the Science and Technology Unit of the Ministry of Public Health, and the Institute of Nutrition of Central America and Panama (INCAP) also cooperated in this project. The general purpose of this evaluation was to measure the impact of the Mass Communication Project on the four priority areas in terms of changes in behavior, attitudes, and use of health services by the target population. This report details the evaluation of the Malaria Vector Control portions of the project.

II. BACKGROUND

A. History of the Malaria Program in Honduras

Malaria control activities began in 1942 on a very limited basis with help from the Cooperative Public Health Services (SCISP). In October 1949,

the Honduras PAHO/WHO-SCISP agreement was signed in order to increase activities related to control of malaria and to initiate eradication of Aedes aegypti. In 1950, residual spraying with DDT was begun in fifteen locations in the Department of Choluteca.

A National Services for Eradication of Malaria agency (SNEM) was created in Honduras in 1955. Between 1956 and 1957 the preparation phase for the Eradication Program was carried out and in 1958 the attack phase aiming for total coverage was initiated. The program was supported and administered by the SCISP with technical assistance from PAHO and material aid from UNICEF.

In 1964, a triennial plan was developed based on the epidemiological situation. This required a loan from AID which was approved in January 1966, and increased in 1968 given a worsening situation. In March of 1969, the plan's progress was evaluated and adjustments were made in view of its limited progress.

In 1970, according to resolution WNA 22.39 of the 22nd meeting of the World Health Assembly, an operational plan was prepared for 1971-77, with the advice of PAHO/WHO. In 1974 emergency aid was made available from AID to deal with the damage caused by hurricane Fifi. In 1975, projects 0200-Eradication of Malaria and 0700-Eradication of Aedes aegypti were joined and in 1978 the integration of the National Malaria Eradication Corps (SNEM) into the General Services of the Ministry of Health was begun.

B. Description of Current Malaria Programs

The following subsections describe the objectives, major activities, and the operational goals and resources of the malaria program.

(1) Objectives

The major objectives of the national program for control of malaria cases and vectors are listed below:

- Timely identification of malaria cases in order to begin treatment and avoid complications.

- Reduction of the circulating gametocytes in humans and thereby a decrease in the possibility of infection of the anopheles population.

- Reduction of the life expectancy of the anopheles which feed on humans and thereby avoid continued sporogony.

- Reduction of the anopheles population near the principal sources of malaria transmission.

(2) Major Activities

In 1983 the malaria program carried out the following types of activities in pursuit of its goals.:

- Search for new cases of malaria among members of the population experiencing fevers. This was accomplished through the activities of: General health services; Voluntary aides (Malaria volunteers); Personnel from the Vector Control Division (VCD) in localities lacking a notification post, in the indicator districts and in locations selected for mass medication for malaria.

- Early parasitoscopic diagnosis.

- Opportune administration of comprehensive treatment to confirmed

cases and their epidemiological contacts by Malaria Volunteers and personnel from the VCD.

- Administration of mass comprehensive treatments in areas defined as having high incidence of malaria.

- Applications of insecticides in specific areas of those localities within the malaria zone which permit this operation.

- Antilarval campaigns in localities which, given their operational characteristics, permit the application of these measures.

(3) Operational Goals and Resources

During 1983 the program established a series of operational goals for the year. They are given here along with information about the size of the human and other resources available to the program to give a sense for the magnitude of the existing effort. The operational goals were:

- 560,000 blood samples would be tested.
- 60,000 blood samples would be taken by active search.
- 475,000 presumptive treatments would be given out.
- 96,000 comprehensive treatments would be administered.
- 60,115 sprayings with DDT would be carried out.
- 304,035 sprayings with Phenitrothion would be carried out.
- Anti-larval measures would be taken in 44 localities where 75,000 inhabitants are concentrated.
- Ultra-low level sprayings would be carried out in 60 locations with a total population of 319,479 inhabitants.

The resources required to achieve these goals were substantial, and included both human resources, physical materials, and machines. The lists below show the resources available in 1983 to accomplish these tasks.

HUMAN RESOURCES	NUMBER
Malaria volunteers	4,256
Evaluators	91
Medicine dispensers	34
Group chiefs	6
Fumigators	245
Brigade leaders	45
Larval Control aids	40
Foremen	5
Entomological assistants	15
Epidemiological assistants	13
Area Inspectors	20
Regional Inspectors	7
Central supervisors	5
Lab technicians for Primary Microscopic Diagnosis	22
Lab technicians for Review of Microscopic Diagnosis	7
Drivers	36
Watchmen	7
Janitor	1
Secretaries	7
Accountants	8
Artist	1
Engineer	1
Physicians	4
International advisors	2

MATERIAL RESOURCES	NUMBER
Four-wheel drive vehicles	139
Motorcycles	104
Leco machines	5
Picks	100
Shovels	100
Machetes	100
Stretchers	100
DDT Insecticide	45,000 kg.
Phenitrothion Insecticide	400,000 kg.

C. Description of the PROCOMSI II Project

The Mass Communication for Children's Health Project (PROCOMSI) worked through the Education Division of the Ministry of Health, carrying out integrated communication campaigns in support of priority health programs. PROCOMSI I was initiated in 1980 in order to modify behavior related to the treatment and prevention of childhood diarrhea. PROCOMSI developed a systematic communication methodology which involved the use of radio, print materials, and interpersonal communication.

In 1982, the Ministry officially instituted a National Program for Diarrhea Control and began to apply the educational methodology developed by PROCOMSI to programs dealing with the country's other high priority health problems. Thus, in 1983, PROCOMSI I extended its work into the areas of control of malaria and tuberculosis and immunization against communicable disease. This second phase became known as PROCOMSI II.

PROCOMSI's most general objective was to provide educational support for the Ministry's health programs in order to aid them in reaching their goal of reducing mortality and morbidity levels.

The educational methodology utilized by PROCOMSI combined the use of (1) radio (short programs and spots); (2) printed material (posters, brochures, pamphlets, photo-novels, etc.); and (3) training and interpersonal communication (workshops, courses, seminars, and interaction with the health workers into an integrated campaign with highly focused behavioral objectives).

The process for producing radio messages and printed material included developmental investigation to determine the needs and prior knowledge of the potential audience, formative evaluation for message design and pretesting, production of audio-visual materials, and monitoring of campaign processes for

administrative purposes.

(1) The Research Basis for the Anti-Malaria Educational Campaign

In order to analyze the population's educational needs with regard to malaria, PROCOMSI II conducted two field investigations. The first, in December 1982, made the formulation of working hypotheses possible. The second one, conducted in February 1983, allowed for further development of these hypotheses and, based on the results, obtained analyses of the specific educational needs of the target population with respect to the Ministry of Health's malaria eradication objectives. This last investigation was carried out within the framework of the Workshop for Baseline Social Research Techniques. Personnel from PROCOMSI and the Educational Division made educational recommendations based on the results of these surveys.

The February 1983 sample included 142 people from the general population, six Malaria Volunteers, the regional inspector for Vector Control and three groups of fumigators. The study took place in Region 4 with focus groups of mothers in Alianza, El Obraje, Linaca; El Guapinol, Marcovia; and individual interviews in Apacilagua, Agua Fria Nacaome and San Rafael Namasigue.

The most significant results and recommendations from the Socio-Economic Baseline Study, December 1982 are outlined below.

- A lack of knowledge was discovered with regard to the way insecticide works. This ignorance led to actions which reduced the effectiveness of the insecticide, such as washing, papering over or white-washing the walls.

- People associated the effectiveness of the insecticide with its odor. That is, it was thought that the smell itself was

poisonous so that when this disappeared, the effect was also gone. The public complained, therefore, of the rapid return of the mosquitos which had momentarily fled due to the spraying. They were unaware of the residual action of the insecticide and its effect through contact with the mosquito. It was recommended that messages be designed to inform the public that the insects are not killed by the odor itself, but rather through contact with the surfaces exposed to fumigation.

Many people underestimated the duration of the insecticide's effectiveness. This happened in spite of explanations specific to the type of insecticide used which were provided by the fumigation teams. About 55 percent of those interviewed understood that the spray was effective for at least three months and 53 percent thought it lasted for less than three months. (Never is the duration of effectiveness less than three months.) It was recommended that messages emphasize the long-lasting effects of the chemicals so that people would understand that walls should not be washed, papered-over or white-washed where they were sprayed until an appropriate time had passed.

The survey revealed a certain degree of confusion with regard to population definitions of malaria. Malaria was considered by most people to be distinct from "paludismo," a term which described the symptoms of fever with chills which might or might not turn into malaria. People suffering from these symptoms tended not to seek medical care or to have necessary tests done, but rather to treat themselves. This caused a loss of

reliability of the test results for identifying malaria. It was recommended that people be informed that "paludismo" and malaria are one and the same, and that anyone experiencing fever with chills should immediately visit a Malaria Volunteer.

- Of those who had ever been tested for malaria, 60 percent had experienced uncomfortable side effects. Strong coffee and lemon juice were remedies most often used to ameliorate these discomforts. It was recommended that messages promote the drinking of liquids to reduce the discomfort of malaria treatment.

- Only 36 percent of those interviewed who had had malaria used the Malaria Volunteers' services. It was recommended that messages advocate taking advantage of these services.

- The survey revealed long delays in returning the results of malaria tests to those who had submitted samples. The average delay was one and a half months, but it ranged from one to three months. Such delays reduced demand for the services of the Malaria Volunteers.

(2) Plan for the Mass Communication Campaign

The plan for the campaign was developed on the basis of the findings from the developmental investigations. It specified an integrated activity involving radio, print, and interpersonal communication. It included the use of radio to transmit the following messages in five separate radio spots :

- "Paludismo" and malaria mean the same thing; when anyone experiences fever and chills they should see the Malaria Volunteer.

- Mosquitos die when they land on the areas which have been sprayed. The insecticide must be left undisturbed because its effects last for many months.

- Walls and other surfaces which have been sprayed must not be washed, papered over or white-washed.

- In order to avoid side effects from the malaria pills, you should eat before taking them.

- If the pills do cause any discomfort, you should drink plenty of liquids and rest.

The campaign plan also called for the distribution of informational packets. Two different types of pamphlets were printed. One was handed out by the fumigators in each house after spraying. This pamphlet outlined the measures to be taken immediately after termination of the spraying and it recommended that sprayed walls and other surfaces not be washed, papered or white-washed. Another pamphlet was distributed by the Malaria Volunteers to people who requested their services. It gave general information regarding transmission of malaria and offered recommendations for disease treatment and for the prevention of mosquito breeding areas. Information about the Malaria Volunteers' visit and how to avoid or treat the possible side effects of malaria medication was also included.

The anti-malaria campaign was carried out in two phases. The first phase

took place in April and May, 1983, and the second in January to March 1984. These phases were timed to coincide with periods of appropriate activity by the national malaria control program. Both phases included radio broadcasts, print materials, and interpersonal contact through spraying teams and Malaria Volunteers. Radio spots and longer programs of 15 minutes each were broadcast on two national stations and seven local ones. The print materials included different pamphlets distributed by the spraying teams and the Malaria Volunteers, as well as comic books for distribution through the schools.

(3) Organization

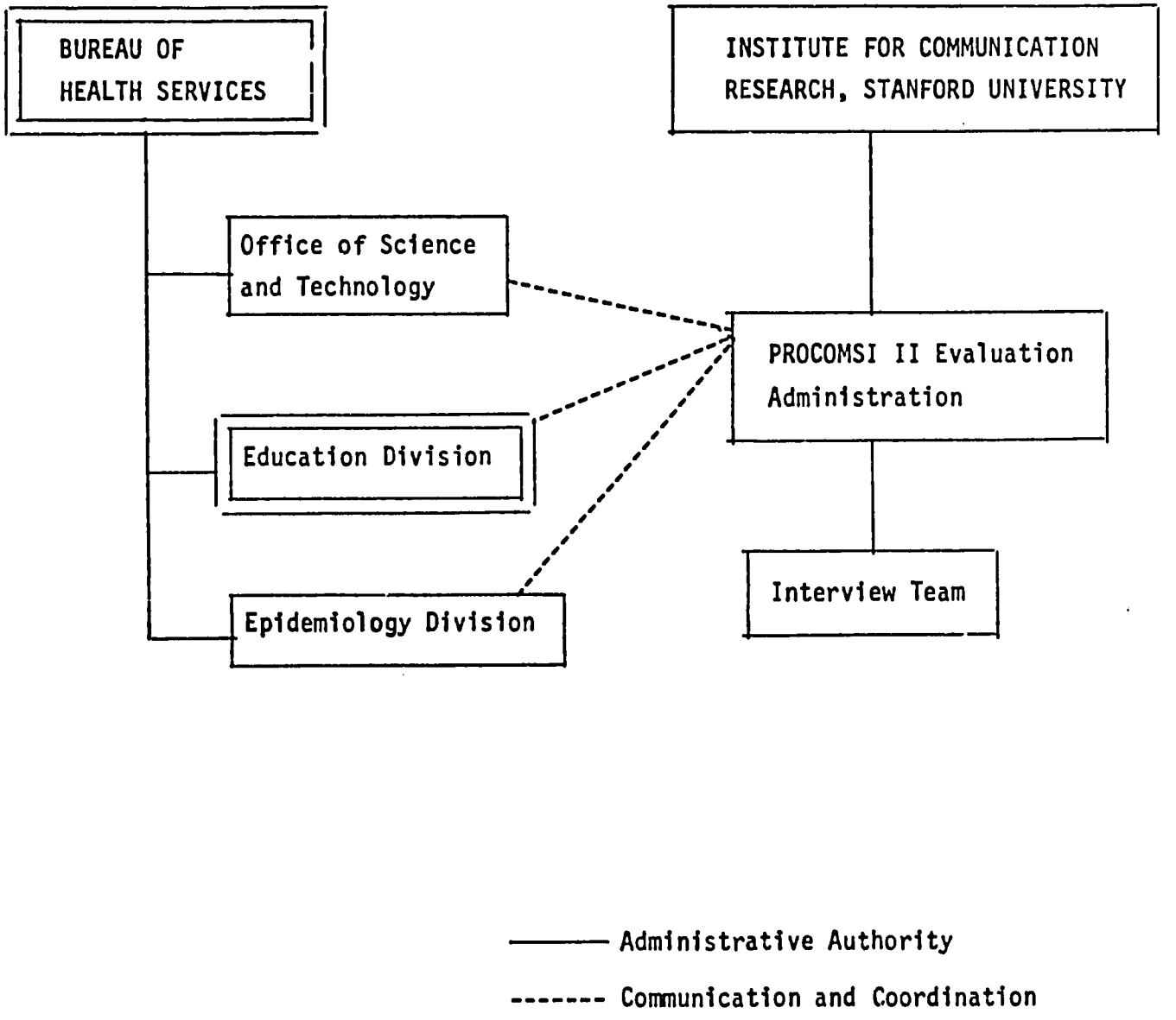
Accomplishment of the PROCOMSI II activities and evaluation was dependent on the cooperation of various organizations. The Academy for Educational Development provided technical assistance and resources to the Education Division of the Ministry of Public Health of Honduras in order to complete activities including: (1) the development of radio spots, (2) printing pamphlets and posters, and (3) training of personnel.

Stanford University was responsible for the evaluation of the impact of PROCOMSI's activities. The Ministry of Public Health of Honduras designated the Office of Science and Technology as the Stanford's in-country counterpart; however, the administrative responsibility for carrying out the evaluation rested with Stanford University.

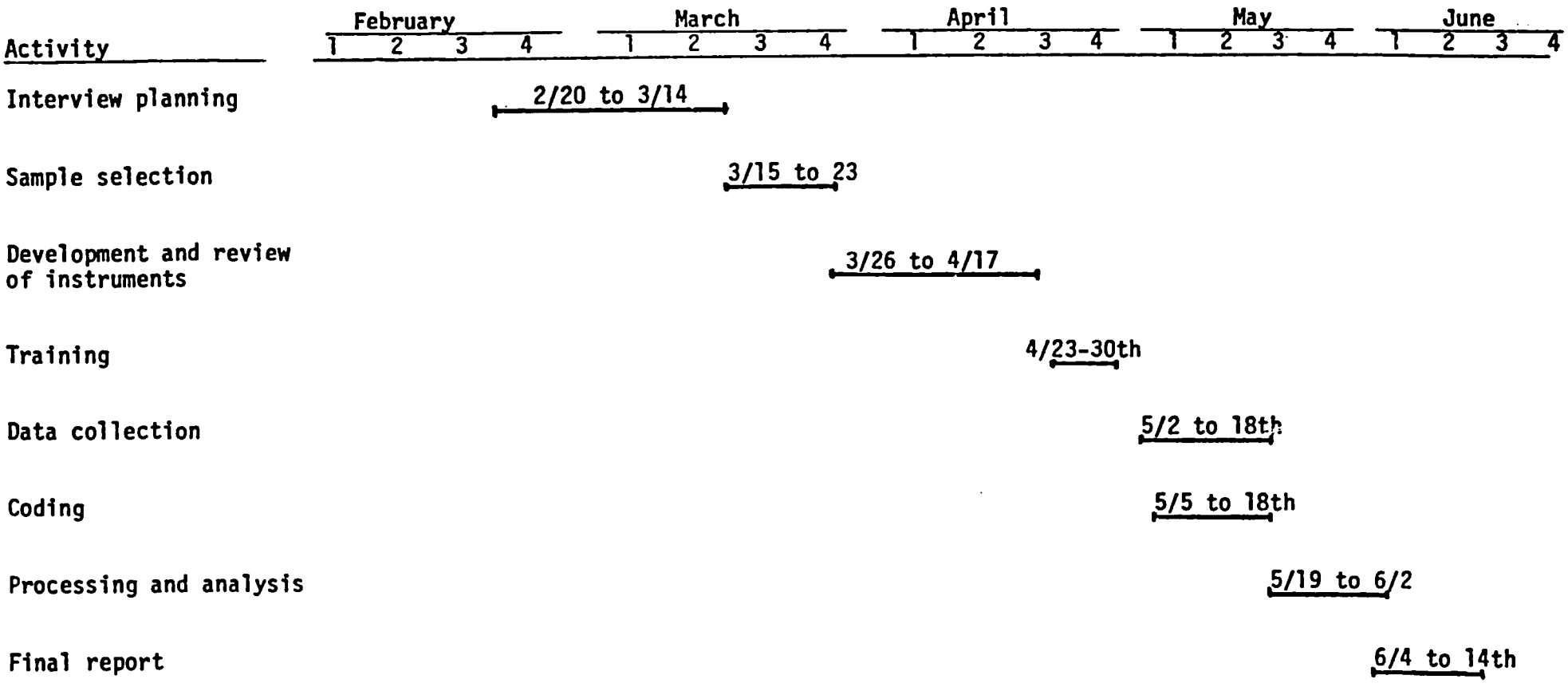
The administrative organization of the PROCOMSI II evaluation is shown in Figure 1. The evaluation chronogram showing the timetable of the Anti-Malaria evaluation follows Figure 1.

FIGURE 1

ORGANIZATION OF THE PROCOMSI II EVALUATION



EVALUATION ACTIVITIES CHRONOGRAM, PROCOMSI II, 1984



III. Evaluation Objectives

The overall objectives that the evaluation set for itself cover the full range of program characteristics and effects. The major objectives were:

- To describe PROCOMSI II activities with regard to the Anti-Malaria Program.
- To describe the population of Health Regions 4 and 7.
- To measure the exposure of the general population and Malaria Volunteers to PROCOMSI II anti-malaria messages.
- To determine the knowledge, attitudes, and practices of the general population and Malaria Volunteers concerning malaria prevention and treatment.
- To evaluate changes in the knowledge, attitudes, and practices of the general population concerning malaria prevention and treatment from 1982 to 1984.
- To evaluate the impact of the mass media campaign on the knowledge, attitudes, and practices of the general population, its relative effectiveness within certain segments of the population, and its relative effectiveness at conveying specific messages.
- To determine the degree of training of Malaria Volunteers, the demand for and performance of their services, and the nature of follow-up treatment.

These objectives guided the design and execution of the evaluation plan. The details of that plan are presented in the next section.

IV. The Evaluation Plan

A. Design

PROCOMSI has, from its inception, aimed at achieving changes in the knowledge, attitudes, and practices of the target population. Information was collected from both families and Malaria Volunteers concerning their knowledge about malarial disease symptoms, transmission, prevention and treatment. Attitudes about the acceptability of and trust in the efficacy of regular spraying of homes were determined. In addition, family members and patients were asked for their opinions about Malaria Volunteers, and vice versa. Compliance of both the general population and Malaria Volunteers with specific advocated practices related to malaria prevention and treatment were also determined.

The population's exposure to the communication media were assessed. These media included the radio campaign in general, the "Voice of Health" program in particular, the pamphlets and other graphics distributed by fumigation teams and other health workers, and interpersonal contact with fumigators and Malaria Volunteers and the messages they communicated.

In order to establish the context of the evaluation, descriptive statistics were collected for the study population. These included socio-demographic characteristics and information about living conditions including housing and sanitation conditions.

Finally, the training and support given to the Malaria Volunteers, the demand for their services, and their willingness to cooperate with other health sector programs were evaluated. Aspects of their work were also examined, including their work load, their communication with patients and other health workers, and the time it took to send samples and receive results

from malaria test facilities.

The PROCOMSI II evaluation relies on three main sources of data in its examination of the effects of the campaign. The primary source is data collected in March, April, and May of 1984 by the Stanford Team. These data derive from rigorous survey formats administered to a variety of target groups. The other sources of data are from AED activities which occurred prior to each of the two campaign periods. Thus there is data of some sort from 1982, 1983, and 1984. However, the data collected by AED was intended for other purposes, used different collection methodologies, and is not strictly comparable to that collected by Stanford. The AED data is used where appropriate as a comparison group to establish changes over time.

The basic design was one of survey data collection on representative groups of malaria patients and their families, health workers, and the population at large. The design is a post-only measurement by necessity, but the limitations of that approach are ameliorated by the use of similar data from other sources.

The Evaluation design was divided into four major areas:

- Description of the coverage, content and performance of the mass communication components of the anti-malaria program during the years 1982, 1983, and 1984. Baseline data from 1982, together with data from the 1983 formative research (Academy for Educational Development) and from the final evaluation data collection by Stanford (1984) were used. Data concerning goals and achievements of specific preventive and curative activities of the Ministry of Public Health's Vector Control Division for 1982, 1983, and 1984 were also analyzed.

- Determination of the overall impact of all communication activities on levels of knowledge, attitudes and practices concerning malaria prevention and treatment. Changes over time were assessed using data from the three cross-sectional studies mentioned above. The baseline research in 1982 preceded any communication campaign activity, while the formative research in 1983 followed the first radio campaign, and the final evaluation in 1984 followed the second radio campaign.

- Evaluation of the impact of specific media (radio and print as well as interpersonal contact with health personnel) and specific message content on levels of knowledge, attitudes and practices concerning malaria prevention and treatment. This also provided criteria for judging the future need for communicating specific information to the general population. This information was obtained from the 1984 final evaluation.

- Description of use of services by malaria patients and evaluation of the levels of knowledge, attitudes, and practices of the Malaria Volunteers as well as the training they have been provided. This information was derived from the 1984 final evaluation interviews with patients, families, and Malaria Volunteers.

B. Sample Definition and Selection

The formula in Figure 2 was used to estimate the necessary family sample size. The formula in Figure 3 was used to estimate the necessary size of the Malaria Volunteer sample.

For the general population sample, the sampling universe included all families in the previously selected communities in Regions 4 and 7 (those with more than 100 cases of malaria in 1982). There were 19 such communities in Region 4 and 9 communities in Region 7. Seven families were selected from each community according to the following criteria:

- Two families from among those with a malaria patient were selected randomly.

- Five additional families were selected randomly from the list of dwellings in the community census prepared by the Vector Control Division. If no census was available for a particular community, the information was obtained from the mayor's office of the municipality. Every fifth dwelling was selected (from a random starting point). Families living in public buildings were not included.

- If there were not two families with malaria patients in the community, additional families were selected from the census list to make up the total of seven families per community.

Since each community had one Malaria Volunteer assigned to it, all 28 Malaria Volunteers were included in the Volunteer sample.

FIGURE 2

Formula Used to Estimate Family Sample Size

$$n = \frac{4\ PQ}{L^2} = \frac{4(.80)(.20)}{(.06)^2} = 178$$

where:

- n = Number of family surveys
- 4 = Constant which corresponds to $Z^2 \alpha .05$
- P = Percentage of those interviewed who know that malaria is the same disease as "paludismo"
- Q = 1-P
- L = Limit of acceptable error in the estimate, that is (0.06).

FIGURE 3

Formula Used to Estimate Malaria Volunteer Sample Size

$$n = \frac{4\ PQ}{L^2} = \frac{4(.80)(.20)}{(.15)} = 28$$

where:

- n = Number of Malaria Volunteers
- 4 = Constant which corresponds to $Z^2 \alpha .05$
- P = Percentage of Malaria Volunteers who have functioned as such for more than one year
- Q = 1-P
- L = Limit of acceptable error in the estimate, that is (0.15).

C. Instruments

Two precoded survey forms were prepared in order to obtain information from the general population and Malaria Volunteers. Both forms contained sections referring to informant characteristics, housing, and sanitation conditions, exposure to mass communication media and knowledge, attitudes and practices related to preventive and curative aspects of the Anti-Malaria Program.

The form for the general population included a section concerning the experiences and behavior of the respondent who had had malaria.

The survey form used with the Malaria Volunteers included a section for concerning demand for their services, the activities they performed, the time needed for specific activities and the Volunteer's relationship to other members and entities of the health sector.

D. Plan for Data Processing and Analysis

Questionnaire forms were checked for errors and inconsistencies at the ffice level and were then coded according to the instruction manual. These were then forwarded to the Computer Center of the Institute of Nutrition of Central America and Panama (INCAP) in Guatemala. The forms were then recorded and verified and the data were cleaned by ranges using the LIMPIEZA option of the DISTRIB Program and the CORREGIR program on a Hewlett Packard HP3000/30.

The data were analyzed using sub-programs FREQUENCIES and CONDESCRIPTIVE (from SPSS and SPSS-X) to generate descriptive data for the two health regions separately and combined. Based on the distributions obtained, additive indices were constructed for exposure to communication media, and knowledge, learning, and practice of malaria prevention and treatment (see Chapter V,

Section E).

The sub-program CROSSTABS was used to compare distributions of dependent categorical variables between Regions 4 and 7, between Malaria Volunteers and the general population and according to specific message exposure or training. The significance of frequency distributions was evaluated using Chi-square corrected for continuity so as not to over-estimate possible associations between variables. In order to compare continuous dependent variables, the non-paired t-test was used with the sub-program TTEST.

Comparisons between the 1984 evaluation survey results and those of the baseline (1982) and formative research (1983) surveys were based on only summary statistics from the earlier surveys. Analyses were done by hand using the PROB program to evaluate the significance of differences, always correcting for continuity in the case of 2x2 tables. Because there were large differences between the three surveys in terms of composition of the sample, regions covered, questions asked, etc., more comparable sub-samples were selected. This resulted in varying numbers of observations as indicated in the respective tables.

V. Results

A. Characteristics of the Sample

All but one scheduled interview were successfully completed (Table 1)with 25 percent of the informants being malaria patients or their relatives. There was a greater percentage of malaria patients in Health Region 7 than in Health Region 4 (Table 2).

Malaria Volunteers were, on the average, younger than the general

TABLE 1

Evaluation Interviews Coverage - 1984

Interviews	Families	Malaria Volunteers	TOTAL
Scheduled	196	28	224
Completed	196	27	223
Coverage	100%	96.4%	99.5%

Source: Study of PROCOMSI Malaria Evaluation, conducted in Regions 4 and 7.

TABLE 2

Types of Informants in Health Regions 4 and 7

Type of Informant	Region 4 (n=133)	Region 7 (n=59)
Patients with malaria	9.8% (13)	27.1 (16)
Patient's family member	12.0 (16)	6.8 (4)
Family without malaria patient	78.2 (104)	66.1 (39)

Source: PROCOMSI Evaluation Malaria study conducted in Regions 4 and 7, Ministry of Health, Honduras, 1984.

Variable: HLTHREG, PERINTER

$X^2 = 10.02$, df = 2, p .007

population (30.1 versus 36.8 years of age, respectively). Females outnumbered the males in both samples. Statistically significant differences existed between the family informants and the Malaria Volunteers with regard to marital status. The Volunteer group had greater numbers of people who were single, widowed or separated (Table 3). The educational level of the families corresponds to Honduran national statistics while the Volunteers had to have greater literacy levels in order to be selected for their posts (Table 4).

Table 5 shows that more females were interviewed in Region 7 than in Region 4. There were no major differences in marital status or rural/urban distribution between the two regions. There was, however, greater literacy in Region 7.

More Malaria Volunteers than family members worked as skilled laborers or public servants, while more family members reported their occupation to be housewife or merchant (Table 6). Housing conditions were similar for family members and Malaria Volunteers, although Volunteers most often lived in adobe homes while the general population lived most often in houses of wattle and daub construction (Tables 7 and 8). There were no significant differences between Malaria Volunteers and family members in terms of available sanitary facilities, but individuals in Region 7 had significantly better human waste disposal facilities than did individuals in Region 4 (Tables 8 and 9).

Family members and Malaria Volunteers were similar in terms of the amount of land owned and cultivated (Table 10).

TABLE 3

Informants' Characteristics

Variable	Families (n=192)	Malaria Volunteers (n=27)	Probability
Age ($\bar{X} \pm SD$)	36.8 ± 12.8	30.1 ± 10.17	$p<.01$
Sex			
Male	11.5	11.1	N.S.
Female	88.5	88.9	
Marital status			
Single	11.5	22.2	
Married	78.6	55.6	
Separated, divorced or widowed	9.9	22.2	$p<.03$
Length of time in this location ($\bar{X} \pm SD$)	20.5 ± 14.3	21.7 ± 13.23	N.S.

Source: PROCOMSI Evaluation Malaria Study conducted in Regions 4 and 7, Ministry of Public Health, Honduras, 1984

Variables: AGE, SEX, CIVSTAT, YEARSCOM

TABLE 4

Educational Level of Informants

Variable	Families (n=192)	Malaria Vol. (n=27)	Probability
Read and write	61.5	100.0	$p < .001$
Education:			
Never attended school	3.4	0.0	
1 to 5 grades	64.5	44.4	
6 or more grades	32.1	55.6	
Average of grades passed	3.85 ± 2.3	5.18 ± 2.0	$p < .01$

Variables: LITERACY, SCHOOL

TABLE 5

Informant Characteristics by Health Region

Variable	n=133 Region 4	n=59 Region 7	Probability
Sex			
Male	15.0%	3.4%	$x^2=4.25, p < .040$
Female	85.0	96.6	
Marital Status			
Single	10.5	13.6	
Married	78.9	78.0	N.S.
Divorced or Widowed	10.5	8.5	
Residence			
Urban	26.3	28.8	N.S.
Rural	73.7	71.2	
Literacy			
No	43.6	27.1	$x^2=4.02, p < .045$
Yes	56.4	72.9	

Variables: SEX, CIVISTAT, COMMSET, LITERACY

Ml: 4=133, 7=59

TABLE 6

Principal Occupation of Informants

Occupation	Families n=192	Malaria Vol. n=27
Housewife	77.6	66.7
Merchant	6.2	0.0
Farmer	4.6	3.7
Laborer	6.3	14.8
Public servant	1.0	11.1
Student	1.6	3.7
Other	2.6	0.0

Variable: OCCUP

TABLE 7

Housing Construction Materials

Variable	Families n=192	Malaria Vol. n=27	Probability
Floors			
Dirt	66.1	70.4	
Clay tile	5.7	3.7	
Cement	17.2	18.5	N.S.
Wood	2.6	3.7	
Cement tile	8.3	3.7	
Walls			
Wattle and daub	43.8	37.0	
Adobe	28.6	51.9	
Wood	12.5	7.4	N.S.
Brick	10.4	3.7	
Cane	1.0	0.0	
Other	3.6	0.0	
Roof			
Tile	91.1	96.3	
Tin	7.8	3.7	
Cement	0.5	0.0	N.S.
Other (Parm)	0.5	0.0	

Variables: FLOOR, WALLS, ROOF

TABLE 8

Housing Characteristics

Variable	Families n-192	Malaria Vol. n=27	Probability
Number of rooms	2.3 ± 1.0	2.5 ± 1.2	N.S.
Average number of people living in house ($\bar{x}$ ± SD)	6.8 ± 2.7	7.8 ± 2.8	N.S.
Distance from closest house			
Adjoining	23.4	14.8%	
Less than 50 meters	63.5	70.4	N.S.
50 meters or more	13.0	14.8	
Toilet facilities			
None	47.9	40.7	
Latrine	46.9	51.9	N.S.
Toilet	2.1	3.7	

Variables: ROOMS, FAMSIZE, VECINITY, BATHROOM

TABLE 9

Human Waste Disposal in Regions 4 and 7

Variable	n=133 Region 4	n=59 Region 7
None	60.2%	20.6
Latrine	36.1	71.4
Toilet	3.8	8.5

Variables: BATHROOM, HLTHREG

$x^2 = 26.0$, $p < .000$

TABLE 10

Quantity and Ownership of Cultivated Land

Variable	Families n=192	Malaria Vol. n=27	Probability
None	52.1	37.0	N.S.
If they farm, what amount of land (in manzanas)	3.6 ± 3.2	3.5 ± 2.9	N.S.
Percent of farmers owning more than ½ manzana	50.0%	47.1%	N.S.

Variables: LANDCUL, LANDOWN

B. Exposure to and Recall of Mass Media Messages

Not everyone in the samples had equal exposure to campaign messages. Table 11 shows that 62.0% of the general population owned a working radio and 66.1% claimed to have heard some radio messages about malaria. The four stations most frequently monitored were Radio Valle (26.6%) in Region 4; H.R.N. (19.8%) and Radio America (12.5%), the national stations; and the Circuito Radio Centro (12.5%) also in Region 4.

Malaria Volunteers were slightly more likely to own a radio than the general public but were equally likely to have heard a radio message about malaria. Compared to the general public, Malaria Volunteers more frequently monitored the national stations, H.R.N. (40.9%) and Radio America (25.9%), and Radio Valle (14.8%) in Region 4. Stations broadcasting only in Region 7 were not the preferred stations by any segment of the sample. Even so, there were more radio spots broadcast over the Region 7 stations than any others during both 1983 and 1984 phases of the radio campaign (Table 12). Better coverage might have been obtained if the radio spots had been concentrated on the stations that were apparently more popular.

Table 13 shows the relationship between radio ownership and reception of messages. Reception of campaign messages was clearly associated with owning a working radio, although a substantial number of those who did not own radios (47.9%) claimed to have heard the radio messages. Roughly one-quarter of those with radios had not heard or did not remember hearing any malaria messages on the radio.

People who had heard the radio messages were asked to complete a phrase from the spot "Deje el rociado en su lugar . . . (que el zancudo va a matar)". Table 14 shows that 22.4% of the general population and 44.4% of the Malaria Volunteers could complete the phase correctly. The level of recall of the

TABLE 11

Access and Exposure to Radio Messages*

Variable	Families (n=192)	%	Malaria Vol. (n=27)	%	Probability
Own a working radio	119	62.0	19	70.4	N.S.
Heard some ad about malaria this year	127	66.1	18	66.7	N.S.
On which station?					
Radio Valle	51	26.6	4	14.8	N.S.
HRN	38	19.8	11	40.7	p .03
Radio America	24	12.5	7	25.9	N.S.
Circuito Radio Centro	24	12.5	3	11.1	N.S.
Radio Juticalpa	18	9.4	1	3.7	N.S.
Radio Choluteca	17	8.9	2	7.4	N.S.
Radio Majestad	17	8.9	0	0.0	N.S.
Radio Honduras	2	1.0	1	3.7	N.S.
Others	21	10.9	3	11.1	N.S.

Variables: RADIOOWN, RAMEHEAR, RADIOST1 + RADIOST2.

*Percentages total more than 100% because multiple responses were possible.

TABLE 12

Number of Daily Radio Spots:

National Stations and from Regions 4 and 7

Stations	DAILY SPOTS 1983 (Mar.28 - May 25)	1984 (Jan. 5 - Mar. 25)
National		
Radio America	27	9
H.R.N.	11	11
Region 4		
Circuito Radio Centro	11	15
Radio Valle	11	15
Radio Choluteca	19	15
Region 7		
Radio Majestad	25	25
Radio Juticalpa	20	20
Radio La Voz de Olancho	0	25

TABLE 13

Distribution of Radio Ownership

and Exposure to Radio Messages

Exposure	Has radio N	Has radio %	Doesn't have radio N	Doesn't have radio %	TOTAL N	TOTAL %
Has heard messages	92	77.3	35	47.9	127	66.1
Has not heard messages	27	22.7	38	52.1	65	33.9
TOTAL	119	100.0	73	100.0	192	100.0

$X^2 = 16.14$, p .0001

Variables: RADIOOWN, RAMEHEAR

TABLE 14

Identification of Spots by Listeners*

Spot	Families (n=125)	Malaria Vol. (n=18)	Probability
"Deje el rociado en su lugar... (que el zancudo va a matar)"			
Incorrect	77.6	55.6	N.S.
Correct	22.4	44.4	

Variable: SPOTCOMP

*Asked only of those who said they had heard radio spots.

exact phrase may be an underestimate because the survey was begun 38 days after the 1984 radio campaign had ended.

Table 15 summarizes exposure to the "Voice of Health" radio program. Less than 20% of the general population had heard the program; of those who had heard 31.6% it could correctly remember the information it conveyed about malaria.

The pamphlet distributed by the fumigation teams reached slightly more of the sample (28.3%) than did the radio program. Among those who received it, 57.4% could remember some of its contents (Table 16).

Information about malaria prevention and treatment was also delivered face-to-face by the fumigators who went to each home several times a year. Table 17 shows what people remembered being told by the fumigators during their spraying visits. About three-quarters of the family sample remembered being told not to disturb the sprayed areas, and 72.1% remembered being advised to visit a Malaria Volunteer if they came down with fever and chills. Over 44% were advised to prevent the proliferation of mosquitos by draining standing water near their homes, and a few (14.2%) remembered being told not to take malaria prevention medication if they had a fever.

Malaria Volunteers were more able to remember information from the fumigator's visits than were members of the family sample. More than 85% of the Volunteers remembered being told not to disturb the sprayed areas, and over half of them remembered being advised to drain standing water near their homes. More than one-quarter of them also remembered being told to avoid taking malaria medication if they had a fever.

Table 18 compares the levels of exposure and recall in Health Regions 4 and 7. A greater proportion of individuals in Region 7 owned working radios, but this did not necessarily translate into greater message exposure.

TABLE 15

Exposure to "The Voice of Health" Program

Variable	Families (n=192)
Have you heard "The Voice of Health" Program?	
Never	80.2
At some time	19.8
Of those who heard it, do you remember any information about malaria?(n=38)	
Incorrect	68.4
Correct	31.6

Variables: HEARUDSA, REMVDSA

TABLE 16

Exposure to Fumigator's Pamphlet

Variable	Families (n=191)	Malaria Vol. (n=27)	Probability
Was a pamphlet delivered when your house was fumigated?			
No	71.7	63.0%	
Yes	28.3	37.0	N.S.
If so, do you remember anything about what the pamphlet explained?			
No	42.6	-	
Yes	57.4	-	N.S.

Variables: FLIERGOT, FLIERREM

TABLE 17

Information Conveyed by Fumigators

Variable	Families (n=190)	Malaria Vol. (n=27)	Probability
If you have fever and chills, go see the Malaria Volunteer	72.1	44.4	$p < .01$
Standing water should be drained	44.7	51.9	N.S.
Don't take Aralen if you have a fever	14.2	25.9	N.S.
Don't disturb the areas which have been sprayed	74.2	85.2	N.S.

Variables: PERCOMM1, PERCOMM2, PERCOMM3, PERCOMM4

TABLE 18

Exposure to and Recall of Radio Messages and Pamphlet by Region

Variable	N=133 Region 4	N=59 Region 7	Probability
Has a working radio?			
No	39.8%	33.9	N.S.
Yes	60.2	66.1	
Heard radio messages about malaria?			
No	33.1	35.6	N.S.
Yes	66.9	64.4	
Able to complete radio message*			
Incorrect	26.1	16.2	
Correct	19.3	29.7	N.S.
Don't know	54.5	54.1	
Heard "The Voice of Health"?			
Never	82.0	76.3	
Heard it more than 1 mo. ago	9.8	10.2	N.S.
Less than 1 month ago	8.3	13.6	
Received pamphlet from fumigator?			
No	66.2	84.5	$x^2 = 5.81$,
Yes	33.8	15.5	$p < .016$

Variables: RADIOOWN, RAMEHEAR, SPOTCOMP, HEARVDSA, FLIERGOT

*Asked only of those who said they had heard the radio spots; Region 4: n=88, Region 7: n=37.

However, more individuals in Region 7 than in Region 4 were able to correctly complete the phrase from the radio spot (29.7% and 19.3%, respectively). There were no major differences in exposure to the "Voice of Health" in the two regions, but significantly more fumigator pamphlets were distributed in Region 4 (33.8%) than in Region 7 (15.5%).

Exact data on the distribution of pamphlets by the Malaria Volunteers and Fumigators were not available. It is known that on May 31, 1984, 41,000 and 20,000 copies of the Malaria Volunteer's pamphlet were distributed to Health Supervisors in Regions 4 and 7, respectively. These numbers correspond to the total dwellings programed for spraying in these Regions during 1983 (Table 20). According to the June 1983 report of the Academy for Educational Development, Inc. ("Malaria Campaign Formative Research"), 20,000 copies were printed to totally cover Regions 2, 4 and 7.

The fumigator pamphlet was distributed in two stages: one edition of 80,000 copies was distributed to the seven Regions after April 6, 1983. Another run of 80,000 copies was destined for Regions 2, 4 and 7. As of October 1984, 51,000 copies were in storage.

Other sources of exposure to information about malaria were the posters and bulletins posted in the communities. In Table 19 it can be seen that 41.1% of the families interviewed had seen printed material of various types and 70.9% of these families indicated that they had seen them in the Health Center. Only 31.2% correctly remembered some of the message, although 10.8% could correctly remember the content of a second poster, as well. All of the Malaria Volunteers who had seen a poster could correctly remember its content and 38.5% of them could also remember correctly the content of a second poster.

TABLE 19

Exposure to and Recall of Malaria Posters

Variable	Families (n=192)	Malaria Vol. (n=27)	Probability
Have you seen any poster or bulletin about malaria anywhere in your community? (Yes)	41.4	48.1	N.S.
If yes, where?*			
- Health Center	70.9	61.5	
- Malaria Volunteer's house	15.2	30.8	N.S.
- Hospital or other	13.9	7.7	
Message remembered correctly?*	31.2	100.0	.000

Variables: POSTSEEN, POSTWHE, POSTREM1

*Asked only of those who claimed to have seen poster; families: n = 79, volunteers: n = 13.

TABLE 20

Spraying of Houses with DDT and Phenitrothion by Health Region

	REGION	I	II	III	IV	V	VI	VII	TOTAL
1981	Planned	20082	13188	52252	32131	10147	49245	17585	194627
	Completed	13796	9648	45608	27600	8131	44115	17351	166249
1982	Planned	14343	8240	44283	44209	9493	49242	17584	187394
	Completed	15331	8184	43961	83387	8807	41699	15241	216610
1983	Planned	13781	11350	29382	40487	6345	58825	19326	179496
	Completed	11259	10765	23920	36841	5976	53346	15369	157476
1984	Planned	12350	11689	27271	42218	4434	20485	6872	125319
	Completed	-	2605	-	9980	1580	3764	-	

Note: 1984 completed as of April.
Ministry of Public Health, Vector Control Division

C. Knowledge, Attitudes and Practices of the Study Population and Malaria Volunteers

In this section the knowledge, attitudes and practices of the Malaria Volunteers and families interviewed in May 1984 are examined. This will be useful for defining the focus of future educational campaigns.

Some important areas of knowledge about malaria are summarized in Table 21. Malaria and "paludismo" are perceived to be the same disease by two thirds the general population (35.9%) and three-quarters of the Malaria Volunteers (25.9%). Knowledge of the cause of malaria is relatively high - - 90.1% for the general population and 88.9% for the Volunteers. The population identifies the Malaria Volunteer (74.0%) or the Health Center (15.6%) as the resource to turn to when fever and chills occur.

As preventive measures, spraying (38.0%), burning leaves (15.1%), draining standing water (12.5%), and taking preventive medication (12.0%) were mentioned most frequently. Malaria Volunteers were most likely to cite spraying (37.0%) and draining puddles (25.9%) as preventive measures.

The informants' knowledge of malaria treatment is summarized in Table 22. Almost 60% of the general population identified increased liquid intake as the first measure to take if malaria pills cause discomfort. However, another 21.8% indicated that they would seek help from a Malaria Volunteer or health center.

It should be noted that Malaria Volunteers were more precisely informed on this point with 81.5% mentioning the correct measure to take. Most people in both samples were aware that one should eat before taking malaria medication in order to avoid discomfort. Of the family members, 79.7% answered correctly, while 96.3% of the Volunteers knew the correct procedure.

Table 23 compares the two samples with regard to knowledge, attitudes and

TABLE 21

Knowledge About Malaria Cause,
Treatment and Prevention

Variable	Families (n=192)	Malaria Vol. (n=27)	Probability
Are "paludismo" and malaria the same disease?			
No	29.7	18.5	
Yes	64.1	74.1	N.S.
Don't know	6.3	7.4	
What causes paludismo?			
Mosquito	90.1	88.9	
Dirty water	2.1	3.7	
Poor personal hygiene	3.1	3.7	N.S.
Others	3.1	0.0	
Don't know	1.6	3.7	
What should be done if you have fever with chills?			
Go to see Malaria Volunteer	74.0	-	
Go to Health Center	15.6	-	
Take medicine	9.9	-	
Other	0.5	-	
How can paludismo be avoided?			
Spraying houses	38.0	37.0	
Burning leaves	15.1	11.1	
Draining puddles	12.5	25.9	N.S.
Taking medicine	12.0	3.7	
Avoiding water deposits	9.3	3.7	
Other (mosquito nets, smoke, etc.)	12.9	18.5	

Variables: MALPAL, MALCAUSE, FEVCHIL1, FEVCHIL2, PREVMAL1, PREVMAL2, PREVMAL3

TABLE 22

Knowledge of Problems Related to Taking Malaria Pills

Variable	Families (n=192)	Malaria Vol. (n=27)	Probability
What should be done if the pills cause any discomfort?			
Nothing or doesn't know	2.6	3.7	
Stop taking them	14.6	0.0	
Drink liquids	59.9	81.5	$p < .02$
Take more	1.0	7.4	
Go to Health Center	13.5	7.4	
Go to Malaria Volunteer	8.3	0.0	
What should be done before taking pills?			
Nothing	0.0	0.0	
Eat	79.7	96.3	N.S.
Doesn't know	20.3	3.7	

Variables: PILLDRIN, PILLEAT

practices concerning spraying. There appeared to be a high degree of acceptance of the spraying and the reasons for this positive attitude are quite interesting. Among the general population the most frequently mentioned reasons were: because it kills mosquitos (31.1%); because it kills other insects (26.7%); to avoid malaria (17.5%) and to improve health (10.4%). A high degree of cooperation with the fumigators was found (97.9%) as with the requirement to not disturb the sprayed area (99.0%). Lower levels of knowledge were found for: why the spray should not be disturbed (78.1%); how long one should remain outside the house after spraying (74.5%) and why one should stay outside (45.8%).

Table 24 shows that 22.4% of the general population and 11.1% of the Volunteers estimated that the insecticide's effect lasts less than three months but nearly half of both groups did know the correct answer. Respectively, only 10.9% and 14.8% did not believe that the spray was effective in killing mosquitos while 79.2% and 85.2% could correctly identify the means by which the spray kills mosquitos. Finally, 86.5% of the general population and 81.5% of the Volunteers could correctly identify where mosquitos originate.

Lastly, Table 25 shows that compliance with post-fumigation advice was generally very high. The greatest difficulty existed with regard to the time spent outside the house and even then, 74.5% of the general population said they stayed outside for two or more hours after their house had been sprayed.

TABLE 23

Knowledge, Attitudes and Practices Concerning Fumigation

Variable	Families (n=192)	Malaria Vol. (n=27)	Probability
Is it okay with you that they spray your house?			
No	1.0%	0.0	N.S.
Yes	99.0	100.0	
If yes, why? (n=576; 3 responses per person)		(n=82, 3 responses per person)	
Because it kills mosquitos	31.1	32.1	N.S.
Because it prevents paludismo	17.5	23.5	N.S.
It kills other insects	26.7	28.4	N.S.
It improves health	10.4	4.9	N.S.
Yes, you cooperate with fumigator?	97.9	100.0	N.S.
Do you whitewash, paper or wash the areas which have been sprayed?			
No	99.0	100.0	N.S.
Yes	1.0	0.0	
Correct answer to why you should not disturb sprayed areas	78.1	81.5	N.S.
Correct answer to how long you should wait outside after spraying	74.5	85.2	N.S.
Correct answer about why you should wait this long	45.8	37.0	N.S.

Variables: SPRAYOK, WHYSPOK1, WHYSPOK2, WHYSPOK3, HELPFUMI, SPRAYREM, WHYNOREM, WAITOUT, WHYWAIT

TABLE 24

Knowledge and Attitudes Concerning Fumigation

Variable	Families (n=192)	Malaria Vol. (n=27)	Probability
How long does the effect of the insecticide last?			
0-2 months	22.4%	11.1	
3 months	45.3	48.1	
4-5 months	4.2	0.0	N.S.
6 months	26.5	40.7	
More than 7 months	1.6	0.0	
Is the insecticide effective in killing mosquitos?			
No	10.9	14.8	N.S.
Yes	88.0	85.2	
How do you think it kills the mosquito?			
By the smell	18.8	11.1	
When the mosquito lands on the spray	79.2	85.2	N.S.
Don't know	2.1	3.7	
Where do mosquitos originate?			
Water deposits	86.5	81.5	
Garbage	7.8	11.1	N.S.
Rotten things	2.1	3.7	
In the brush	3.6	3.7	

Variables: SPRAYDUR, SPRAYTRM, SPRAYEFF, MOSQPROC

TABLE 25

Practices After Spraying

Practice	Families (n=192)	Malaria Vol. (n=27)	Probability
Waited two hours outside of house	74.5%	85.2	N.S.
Sprayed water on the ground	94.8	100.0	N.S.
Swept well	95.8	100.0	N.S.
Burned and buried garbage	92.7	100.0	N.S.
Washed children's hands	85.4	96.3	N.S.

Variables: AVOHARM1 - AVOHARM5

D. Knowledge, Attitudes, and Practices: Comparisons between 1982-1984 and 1983-1984, and Changes from 1982 to 1984

The impact of public communication campaigns is often seen most clearly over time. A combination of direct actions on the part of the campaign and indirect actions, such as observing the behavior of others and talking to them about it, affects the knowledge, attitudes and practices of the targeted population. Table 26 compares the responses of members of the family sample to several knowledge, attitude and practice items at the time of the baseline study in 1982 and at the time of the evaluation study in 1984.

In order to make the two samples comparable, only female respondents from the 1984 Region 4 sample were included since there were substantial differences in the two original samples.

There were several significant differences in response between the 1982 and 1984 samples, all in directions that were intended by the campaign. The percentage of individuals who said they cooperated with the fumigation teams increased from 94.4 percent to 100 percent. People in the later sample were also better informed about why fumigation is beneficial and about how long the spray was effective.

In the later sample, people were much more likely to cite correct reasons for accepting fumigation. The proportion who said they accepted fumigation because it kills mosquitos increased from 49.4 percent to 93.8 percent. The proportion who cited malaria prevention as a reason for acceptance also increased from 15 to 54 percent. More than one-quarter of the people in the 1984 sample offered that reason. One possible reason for accepting fumigation -- the fact that spraying kills other insects besides mosquitos -- was not promoted during the anti-malaria campaign, which may account for the decrease in the percentage who gave it as a reason for their acceptance.

TABLE 26

Comparison of Results from PROCOMSI II Baseline (1982) and Evaluation (1984) Studies*

Variable	Baseline 1982 (n=71)	Evaluation 1984 (n=113)	Probability
Correct response: what produces malaria?	95.8%	91.2	N.S.
Correct response: "Paludismo" same as malaria?	55.0	59.3	N.S.
Help fumigator	94.4	100.0	$p < .04$
Positive attitude towards fumigation of home?	98.6	99.1	N.S.
Reasons for accepting fumigation:			
a) Because it kills mosquitos	49.4	93.8	$p < .001$
b) Because it prevents malaria	15.5	54.0	$p < .001$
c) Kills other insects	62.0	44.2	$p < .03$
d) Improves health	5.6	26.5	$p < .001$
How long does effect of the spray last?			
a) 0-2 months	36.6	27.4	
b) 3 months	38.0	58.4	$x^2=11.43$,
c) 4-6 months	21.1	13.3	$p < .005$
d) Doesn't know	4.2	0.9	
Has a working radio	63.4	58.4	N.S.

*Only females from Region 4 were included to increase the comparability of the samples.

Variables: MALCAUSE, MALPAL, HELPFUMI, SPRAYOK, WHYSPOK1, WHYSPOK2, WHYSPOK3, SPRAYDUR, RADIOOWN

People in the later sample were also more likely to know how long the spray effectively killed mosquitos. The proportion of correct answers (three months) rose from 38.0 percent in 1982 to 58.4 percent in 1984. The percentage of people giving answers less than or greater than three months declined over time.

The 1983 formative research sample included only those people with a working radio in the communities of Health Regions 2, 4, and 7 which had been fumigated or were scheduled for fumigation. In order to compare data from 1983 and 1984, only those radio owners in communities in Regions 4 and 7, which had been or were being sprayed, were selected. The results are presented separately by region in Tables 27 and 28.

Table 27 compares the 1983 and 1984 samples from Region 4. Knowledge and practices were already quite high at the time of the 1983 survey. The 1983 data collection occurred just at the end of the first radio campaign, so information was probably still fresh in the minds of survey respondents.

The 1984 cycle of data collection, on the other hand, occurred well over a month after the second radio campaign had been concluded. The lapse of time between campaign activity and data collection is a possible cause of a decrease in people's ability to complete a phrase from the radio spots. In 1983, at the time of the first radio campaign, 75 percent of the people could complete the phrase, "Deje el rociado en su lugar . . . que a los zancudos va a matar," while only 17.5 percent were able to complete the same phrase 38 days after the second radio campaign had ended. On the positive side, the percentage of people who said they had heard the "Voice of Health" radio program rose from 3.1 percent in 1983 to 23.7 percent in 1984. While exposure to radio campaign information improved, it is clear that specific content is easily forgotten as time passes.

TABLE 27

Comparison of Results from PROCOMSI II Formative (1983) and Evaluation (1984) Research in Health Region 4

Variable	Research from 1983 (n=32)*	1984 (n=80)*	Probability
Heard radio messages about malaria or fumigation	93.8%	77.5	N.S.
Completed phrase "Deje el rociado in su lugar que a los zancudos va a matar"	75.0	17.5	$p < .001$
Correct response about the form in which spray kills mosquitos	87.5	88.8	N.S.
Do not disturb sprayed areas	93.8	98.8	N.S.
Correct response to why?	84.4	78.8	N.S.
Correct response to what to do before taking anti-malaria pills	65.6	83.8	N.S.
Correct response: Malaria same as "paludismo"	75.0	73.8	N.S.
What should be done in case of fever with chills	84.4	93.8	N.S.
What to do in case pills cause side effects	43.8	60.0	N.S.
If heard "Voice of Health"	3.1	23.7	$p < .02$
If received pamphlet about malaria from fumigator	78.1	37.5	$p < .001$

*Includes only radio owners in communities that had been sprayed or were scheduled for spraying.

Variables: RAMEHEAR, SPOTCOMP, SPRAYEFF, SPRAYREM, WHYNOREM, PILLEAT, MALPAL, FEVCHILL, PILLDRIN, HEARVDSA, FLIERGOT

An apparent breakdown in the delivery of pamphlets to fumigator teams is probably responsible for the dramatic decrease in the percentage of people who received that pamphlet from sprayers. In 1983, 78.1 percent of the people said they had gotten the flyer, but only 37.5 percent in 1984 had gotten it. The fact that this information was not delivered might also explain why there was little improvement in some areas of knowledge about fumigation and what to do after the sprayer teams had left.

Table 28 compares the 1983 and 1984 results from Region 7. As in Region 4, fewer people in the later sample were able to complete the phrase from the radio spot (from 73.7 percent down to 26.8 percent). Unlike Region 4, however, there was a significant decline in the percentage (from 100 percent to 75.6 percent) of people claiming to have heard any radio messages which were campaign-related. There were also significantly fewer people in the later sample who knew how spraying killed mosquitos (73.2 percent down from 98.2 percent).

Significant positive changes were seen in the percentage who knew why sprayed areas should be left undisturbed (92.7 percent, up from 73.7 percent) and in the percentage who knew they should eat something before taking malaria pills. It should be noted that at least the first of these items was apparently emphasized heavily by fumigation teams on their community visits (refer back to Table 17).

TABLE 28

Comparison of Results from PROCOMSI II Formative (1983) and Evaluation (1984) Research in Health Region 7

Variable	Research from 1983 (n=57)*	1984 (n=41)*	Probability
Heard radio messages about malaria or fumigation	100.0%	75.6	$p < .001$
Completed phrase "Deje el rociado en su lugar que a los zancudos va a matar"	73.7	26.8	$p < .00$
Correct response about the form in which spray kills mosquitos	98.2	73.2	$p < .001$
Do not disturb sprayed areas	100.0	100.0	-
Correct response to why?	73.7	92.7	$p < .031$
Correct response to what to do before taking anti-malaria pills	57.9	85.4	$p < .007$
Correct response: Malaria same as "paludismo"	86.0	73.2	N.S.
What should be done in case of fever with chills	73.7	78.0	N.S.
What to do in case pills cause side effects	45.6	58.5	N.S.
If heard "Voice of Health"	31.6	31.7	N.S.
If received pamphlet about malaria from fumigator	16.3	19.5	N.S.

*Includes only radio owners in communities which had been sprayed or were scheduled for spraying.

Variables: RAMEHEAR, SPOTCOMP, SPRAYEFF, SPRAYREM, WHYNOREM, PILLEAT, MALPAL, FEVCHILL, PILLDRIN, HEARVDSA, FLIERGOT

E. Impact of the Campaign on Knowledge, Attitudes and Practices

The impact of the various components of the communication campaign was assessed using indices of Exposure, Knowledge and Practice. The impact of the campaign on people's attitudes concerning malaria treatment and prevention was difficult to evaluate because few attitude items were included on the questionnaire. Furthermore, responses to the only question asked at several points in time ("Is fumigation of your house acceptable?") were overwhelmingly positive (98.6 percent) in 1982 with little room for improvement. The percentage of people who answered affirmatively in 1984 was 99.1 percent.

An Exposure Index was constructed by summing each informant's responses to questionnaire items concerning exposure to the radio, print, and interpersonal components of the campaign (Table 29). For each item, positive exposure was assigned a value of "1", while no exposure was assigned a value of "0". For example, an individual who had been exposed to all five of the interpersonal messages delivered by fumigators, had heard radio spots about malaria, had heard the "Voice of Health" radio program, had seen anti-malaria posters, and had received a copy of the anti-malaria pamphlet from the spray teams would have an Exposure Index score of nine. Each index was constructed in a similar way. The range of possible values for each index was then collapsed into three categories (low, medium, and high) such that, as nearly as possible, a third of the informants fell into each category.

The various indices were then crosstabulated to determine the associations between, for example, high levels of exposure to campaign messages and high levels of knowledge about malaria treatment and prevention. The value of chi-square was computed for each association table to determine whether or not the obtained distribution could have occurred by chance. The results are presented in Tables 30 to 34.

TABLE 29

Questionnaire Items in Indices of Campaign Exposure and Outcomes

Index	Questionnaire Items
EXPOSURE	Had heard radio messages about malaria. Had heard the "Voice of Health" radio program. Had received pamphlet from fumigator. Had seen anti-malaria poster. Was told by fumigator to see Malaria Volunteer if had fever and chills. Was told by fumigator to drain puddles of water near home. Was told by fumigator not to take malaria medication for fever. Was told by fumigator not to disturb newly sprayed areas. Was given any other directions by fumigator.
RADIO EXPOSURE	Had heard radio messages about malaria. Had the "Voice of Health" radio program.
INTERPERSONAL EXPOSURE	Was told by fumigator to see Malaria Volunteer if had fever and chills. Was told by fumigator to drain puddles of water near home. Was told by fumigator not to take malaria medication for fever. Was told by fumigator not to disturb newly sprayed areas. Was given any other directions by fumigator.
PRINT EXPOSURE	Had received pamphlet from fumigator. Had seen anti-malaria poster.

(continued)

Table 29 continued.

Index	Questionnaire Items
KNOWLEDGE	Was able to complete phrase from radio spot.
	Knew how spraying killed mosquitos.
	Knew why not to disturb newly sprayed areas.
	Knew how long spray was effective.
	Knew to eat food before taking anti-malaria medication.
	Knew how to avoid side-effects of anti-malaria medication.
	Knew to go see Malaria Volunteer for fever and chills.
	Knew how long to wait outside after home was sprayed.
	Knew why one should wait outside after spraying.
	Knew cause of malaria.
	Knew that malaria is the same as "paludismo".
	Knew how mosquitos proliferate.
	Could remember content of "Voice of Health" radio program.
	Could remember content of an anti-malaria poster
PRACTICE	Did not disturb newly sprayed area.
	Helped fumigators by clearing house before spraying.
	Waited two hours outside home after spraying.
	Dampened floor before sweeping up spray dust.
	Swept floors carefully after spraying.
	Burned and buried trash swept from home after spraying.
	Washed child's hands frequently after home had been sprayed.
	Kept updated Vector Control Spraying Record card.

Table 30 shows the degree to which high (or low) levels of exposure to various components of the campaign are associated with high (or low) levels of knowledge or compliance with practices promoted by the campaign. In each case where a chi-square value is significantly large, low levels of exposure were strongly associated with low levels of knowledge or practice and high levels of exposure were associated with high levels of knowledge or practice.

People with a high overall exposure to radio messages, pamphlets distributed by fumigation teams, anti-malaria posters, and advice given by fumigators were not significantly more knowledgeable about malaria treatment and prevention. They were, however, more likely to practice the behaviors promoted by the campaign, most of which were related to cooperating with fumigation efforts and taking precautions not to reduce the effectiveness of the spray or to contaminate one's family with insecticide. Neither exposure to radio messages or to print messages alone appeared to have a significant impact on either knowledge or practices. However, people with high levels of exposure to interpersonal messages were more likely to practice promoted behaviors. Furthermore, people with a high level of exposure to both interpersonal and print messages were more likely to have high levels of both knowledge and practice than people with low levels of exposure to print and interpersonal messages.

Table 31 shows the strong relationship between exposure to the campaign and compliance with the promoted practices. While 29.5 percent of the people with low levels of overall exposure also had a low level of compliance with promoted practices, only seven percent of the people with high levels of exposure had low levels of practice. Only 50 percent of the low exposure group exhibited high levels of appropriate practice, but 54.5 percent and 63.4 percent of the medium and high exposure groups, respectively, had high levels

TABLE 30

Strength of Association Between Exposure to Campaign Messages and Campaign Outcomes

Type of Exposure		Chi-square	Significance
Overall Exposure	with Knowledge	7.10	N.S.
	with Practice	10.28	$p < .036$
Exposure to Radio Messages	with Knowledge	5.60	N.S.
	with Practice	1.05	N.S.
Exposure to Print Messages	with Knowledge	3.02	N.S.
	with Practice	3.20	N.S.
Exposure to Interpersonal Messages	with Knowledge	7.81	N.S.
	with Practice	19.44	$p < .001$
Exposure to Print and Interpersonal Messages	with Knowledge	10.13	$p < .038$
	with Practice	15.76	$p < .003$

*Degrees of freedom = 4

Variables: See Table 29

TABLE 31

Association Between Overall Exposure to Campaign Messages and Compliance with Promoted Practices

		Level of Exposure to Campaign			
		Low	Medium	High	Total
Level of Compliance with Promoted Practices	Low	29.5 (13)	18.2 (14)	7.0 (5)	16.7 (32)
	Medium	20.5 (9)	27.3 (21)	29.6 (21)	26.6 (51)
	High	50.0 (22)	54.5 (42)	63.4 (45)	56.8 (109)
	Column Total	100.0 (44)	100.0 (77)	100.0 (71)	100.0 (192)

$X^2 = 10.28$, df = 4, $p < .036$

of practice.

The effect of exposure to interpersonal messages is seen in more detail in Table 32. Of the people who had the least amount of exposure to the fumigation teams' messages, 34 percent had low levels of compliance with the practices promoted by the campaign, while 46 percent of them had high levels of compliance. In the high exposure group, however, only 5.6 percent were low level compliers while 65.6 percent had high levels of compliance.

It appears that high exposure to both print and interpersonal messages affected people's level of knowledge. Table 33 shows that while only 16.7 percent of the low exposure group had high levels of knowledge about malaria treatment and prevention, 35.3 percent of the high exposure group did. Almost 41 percent of the low exposure group also had low levels of knowledge, while only 19.1 percent of the high exposure group was low on knowledge. Exposure to both print and interpersonal messages also affected one's practices. Table 34 shows that although more of the low exposure group had high levels of appropriate practice (47 percent) than low levels of practice (30.3 percent), only 5.9 percent of the high exposure group had low levels of practice, while 67.6 percent had high levels of practice.

These last results are consistent with conventional wisdom that mass media (in this case posters and flyers) are somewhat better at disseminating information and stimulating changes in knowledge than face-to-face communication, while interpersonal contact can be more persuasive and more likely to stimulate changes in behavior. The advice given by spray teams was apparently an important element in convincing people to improve the effectiveness of the fumigation efforts. There were not enough questions asked about other specific practices, such as taking anti-malaria medication or other preventive measures, to allow conclusions about the broader impact of

TABLE 32

Association Between Exposure to Interpersonal Communication and Compliance with Promoted Practices

		Level of Exposure to Interpersonal Messages			
		Low	Medium	High	Total
Level of Compliance with Promoted Practices	Low	34.0 (17)	19.2 (10)	5.6 (5)	16.7 (32)
	Medium	20.0 (10)	28.8 (15)	28.9 (26)	26.6 (51)
	High	46.0 (23)	51.9 (27)	65.6 (59)	56.8 (109)
	Column Total	100.0 (50)	100.0 (52)	100.0 (90)	100.0 (192)

$X^2 = 19.44$, df = 4, $p < .001$

TABLE 33

Association Between Exposure to Print and Interpersonal Communication and Knowledge of Malaria Treatment and Prevention

		Level of Exposure to Print and Interpersonal Messages			
		Low	Medium	High	Total
Level of Knowledge of Malaria Treatment and Prevention	Low	40.9 (27)	34.5 (20)	19.1 (13)	31.3 (60)
	Medium	42.4 (28)	41.4 (24)	45.6 (31)	43.2 (83)
	High	16.7 (11)	24.1 (14)	35.3 (24)	25.5 (49)
	Column Total	100.0 (66)	100.0 (58)	100.0 (68)	100.0 (192)

$x^2 = 10.13$, df = 4, $p < .038$

TABLE 34

Association Between Exposure to Print and Interpersonal Communication and Compliance with Promoted Practices

		Level of Exposure to Print and Interpersonal Messages			
		Low	Medium	High	Total
Level of Compliance with Promoted Practices	Low	30.3 (20)	13.8 (8)	5.9 (4)	16.7 (32)
	Medium	22.7 (15)	31.0 (18)	26.5 (18)	26.6 (51)
	High	47.0 (31)	55.2 (32)	67.6 (46)	56.8 (109)
	Column Total	100.0 (66)	100.0 (58)	100.0 (68)	100.0 (192)

$x^2 = 15.76$, df = 4, $p < .003$

the campaign on malaria-preventive behavior.

Radio broadcasts were not good predictors of levels of knowledge, even though they reached more people than did other media. Only a combination of printed messages (primarily the spray team flyers) and advice from the spray teams had a strong relationship with people's knowledge of malaria treatment and prevention.

F. Malaria Volunteer Training and Service

In this section, information obtained from interviews with the Malaria Volunteers about their own activities and training is examined along with information from malaria patients and their families about the services rendered by Malaria Volunteers.

(1) Volunteer Training and Support

The majority of Volunteers (62.9 percent) had been working as such for between one and five years; 14.8 percent of them had one year of experience or less (Table 35). Over 80 percent of them had been recruited by the Vector Control Division, while the rest had been selected by the members of the community in which they lived. More than 85 percent of them had received at least some training to be a Volunteer, but 14.8 percent said they had received no training at all. Almost 30 percent of the Volunteers said they had not received any training in the last 36 months.

Only one of the Volunteers claimed to have received official identification as a Volunteer in the Anti-Malaria Program and almost 90 percent said they were not given any special attention when they made a trip to their local Health Centers. In spite of this low official recognition, the

TABLE 35

Training and Experience of Malaria Volunteers

Variable	N = 27
Length of time as a Malaria Volunteer:	
Less than one year	14.8%
One to two years	29.6
Three to five years	33.3
More than five years	22.3
Who selected you as Malaria Volunteer?	
The community	18.5
Vector control	81.5
Received training prior to initiating activities?	
No	14.8
Yes	85.2
How long ago did you receive your last training?	
12 months	44.4
12 to 24 months	11.1
24 to 36 months	14.8
more than 36 months	29.6
Has official Identification Card?	
No	96.3
Yes	3.7
Receives special attention at Health Centers?	
None	88.9
Quick attention	7.4
Other	3.7

Variable: VOLWRKTM, CHOSENBY, TRGOT, TRLAST, MVOLCARD, HLTHFCL1.

vast majority expressed their willingness to cooperate in other government health programs: Tuberculosis (29.6 percent), Oral Rehydration Therapy (96.3 percent), and Family Planning (88.9 percent) (Table 36).

Table 37 records estimates by the Volunteers of the quantity of services they had provided during the first four months of 1984. Because the study communities had been selected for having a minimum of 100 cases of malaria in 1982, they are not representative of all communities in the regions studied. The fact that the averages are higher than the median scores indicates that some Volunteers experienced very high demand for their services.

When Volunteers prepared slides for lab testing, the samples were most often sent to the Vector Control Division laboratories with supervisors or evaluators (88.9 percent). Although the Volunteer is responsible for taking blood samples and making slides, the results are most often delivered to the patients (66.7 percent of the time) by a Health Services Evaluator, rather than by a Volunteer (Table 38).

(2) Malaria Patient Descriptions of Services

Most malaria patients (81.6 percent) said that they had sought out treatment within four days of the appearance of symptoms (Table 39). In 98 percent of the cases, they were given a required blood test on seeking treatment.

Evidence of the importance of Volunteer services is provided in Table 40. In 72.9 percent of the cases, malaria patients had their blood tests done by a Malaria Volunteer. An additional 16.7 percent had the tests done at a nearby Health Center. In cases where malaria was suspected and presumptive treatment initiated, 73.5 percent of the patients reported that treatment was initiated by a Malaria Volunteer and 16.3 percent said their treatment was begun at a

TABLE 36

Malaria Volunteers' Interest in

Cooperating in Other Programs

Variable	N = 27
Would like to cooperate with the anti-tuberculosis program?	
No	7.4
Yes	92.6
Would like to cooperate with the oral rehydration program?	
No	3.7
Yes	96.3
Would like to cooperate with the family planning program?	
No	11.1
Yes	88.9

Variables: BETBVOL, BEDHMVOL, BEPFVOL

TABLE 37

Services Provided by Malaria Volunteer, January to April 1984

DEMAND	$\bar{X}$	SD	Median
Number of patients seen	31.9	22.7	25.0
Number of patients given treatment	31.9	22.8	25.0
Number of blood slides made	31.4	22.7	25.0
Number of blood samples taken	13.6	14.1	8.0

Variables: NPATIENT, NTREATD, NSLIDES, NBLOOD

TABLE 38

Means of Sending Lab Slides and of Advising Patient of Exam Results

Variable	Malaria Volunteer (n = 27)
How were lab slides sent to Vector Control Laboratory?	
Supervisor, evaluator	88.9
Someone from the community	7.4
Other	3.7
How was the patient informed of results of the blood tests?	
Evaluator took results to patient	66.7
Patient came to Malaria Volunteer's house	11.1
Sent message	11.1
Had set up an appointment	7.4

Variables: SNDSMPLS, TLRESULT

TABLE 39

Diagnosis of Patients Presumed to Have Malaria*

(n=49)

Variable	Percentage
Time elapsed before seeking treatment:	
1 - 4 days (still feverish)	81.6
5 - 30 days (recently feverish)	18.4
Blood test done?	
No	2.0
Yes	98.0

*Asked of families with malaria patients only.

Variables: MALATREA, BLOODTES

TABLE 40

Blood Test and Presumptive Treatment Locations*

Place	Blood Test (n=48)	Treatment Rec'd (n=49)
Malaria Volunteer	72.9%	73.5%
Health Center	16.7	16.3
Hospital	8.3	8.2
Other	2.1	2.0

*Asked of families with malaria patients only.

Variables: TESTPLAC, TREAPROV

Health Center.

The initiation of presumptive treatment is probably a good idea in some cases because in 34.8 percent of the cases, it took more than 15 days for the results of the blood test to be returned to the patient (Table 41). In over half the cases, however, the results arrived in a week or less.

Finally, Table 42 shows than an Evaluator administered comprehensive treatment in the majority (83.3 percent) of the cases. Compliance by patients with this treatment was high with 97.2 percent of the patients reporting that they had taken all of the prescribed medicine.

TABLE 41

Time Between Taking Blood Sample and Receipt of Results*

Time Elapsed	% Patients (n=46)	Cumulative %
Same day	17.4%	17.4
1 - 4 days	26.1	43.5
5 - 8 days	10.9	54.3
9 - 15 days	10.9	65.2
16 - 30 days	21.8	87.0
60 - 90 days	10.9	97.8
More than 90 days	2.0	100.0

*Asked of families with malaria patients only.

Variable: TESTRESU

TABLE 42

Comprehensive Treatment*

(n=36)

Variable		Percentage
Who gave comprehensive treatment?		
	Malaria Volunteer	11.1%
	Evaluator	83.3
	Other	5.6
Completed treatment?		
	No	2.8
	Yes	97.2

*Asked of families of malaria patients only.

Variables: NEWTPROV, TREATCOM

VI. Conclusions and Recommendations

The mass communication in support of the Anti-Malaria Program consisted principally of radio spots focused on treatment and spraying, a radio program, the "Voice of Health," and educational pamphlets and interpersonal instruction distributed by Malaria Volunteers and the fumigators from the Vector Control Division.

In spite of the fact that only 62.0 percent of the families interviewed had a functioning radio and that the study began 38 days after the radio campaign had ended, 66.1% remembered having heard the messages. In spite of the low radio ownership, a high percentage (41.2 percent) of those without radios had been exposed to the messages, which suggests that possession of a radio is not a limiting factor in the campaign. The relatively low (22.4%) ability to remember specific phrases from the messages suggests that the radio campaign should be longer and more integrated with other media as well as the activities of the Health Workers.

Although exposure to the radio program the "Voice of Health" increased over time, adjustments are needed to make it more appealing. The fact that the radio spots have greater penetration than the "Voice of Health" program might indicate that a shorter, more dynamic format would achieve greater and more effective diffusion.

The fumigators pamphlet had an apparent coverage of less than 30 percent in the two Health Regions even though it had a potential distribution of 100 percent. Given the excellent coverage of the population by the fumigators and the apparent impact of personal contact with the spray teams, it is suggested that distribution of this pamphlet be improved and that it be supplemented with other materials promoting malaria prevention and environmental sanitation measures. The distribution of the Volunteer's pamphlet which contained

information about preventive and curative measures is unknown, given that it is only given out to malaria patients.

Up-to-date information about knowledge, attitudes and practices provided by the 1984 evaluation research suggests areas in which additional emphasis is needed: measures to take during treatment, especially in terms of side effects (40.1%); regarding malaria and "paludismo" being the same disease (35.9%); on how the insecticide kills mosquitos (20.8%), and in general with respect to environmental sanitation as a preventive measure against malaria. Compliance with post-fumigation practices was high overall except for the tendency to not wait long enough before re-entering their houses. Most people recognize mosquitos as the malaria vector. It is recommended that future campaigns construct their messages around these established areas of knowledge in order to overcome other areas of deficiency.

In the limited comparisons carried out with regard to changes in knowledge, attitudes, and practices between 1982 and 1984, greater support for the fumigator was achieved. The spraying was associated with the benefits of reducing mosquitos, preventing malaria and improving health, all of which are preconditions for acceptance of the fumigator. This knowledge lays the groundwork for a more positive attitude towards prevention and treatment of malaria.

The comparisons between 1983 and 1984 indicate increases in knowledge related to treatment and in the coverage of the "Voice of Health" program. Substantial decreases were noted in the ability to remember the exact content of the messages, although this may have been due to the difference in the timing of each study relative to the radio campaign. While the long-term ability to remember a specific phrase from a radio spot may not, in itself, be important, the implication is that knowledge tends to drop off and that

measures must be taken to ensure the retention of important information.

Most of the campaign impact on practices was related to fumigation efforts. It is not known to what extent other preventive behaviors such as removing standing water or taking anti-malaria medication were affected because compliance with other promoted practices was not measured.

The fumigator's pamphlet seemed to be a more effective means of communication and persuasion than the other mass media used, perhaps since it was so well-integrated with the personal contact by fumigators during their spraying trips. While radio messages may have greater coverage, their content is apparently more fleeting, as evidenced by the decline in ability to recall their content. Having a simple graphic campaign pamphlet around the house may be thought to provide repeated exposure to campaign messages. This impact may be further enhanced by the fact that spray teams explained the pamphlet to people as they delivered it. Coordinating the content of flyers with information presented by spray teams and radio spots might more effectively disseminate information and reinforce the practices advocated.

The Malaria Volunteers demonstrated only slightly better knowledge, attitudes, or practices than the general population. About 14.8 percent had not received any training prior to initiating their work and 29.6 percent had not received training in the last three years. Additional training would be a good investment since this person is an obvious, permanent resource within the community. They also require greater encouragement such as providing them with official identification as members of the Anti-Malaria Program or benefits of some kind. In general they are enthusiastic about their work and willing to participate in other programs such as Oral Rehydration (96.3%), Tuberculosis (92.6%), and Family Planning (88.9%).

The results of this evaluation suggest conclusions in two areas - - mass

media and interpersonal communication.

For the mass media channels of print and broadcast, it is clear that they played an important role in information dissemination. That role might be enhanced in any of the following ways:

- Extend the radio campaign for a longer period of time.
- Continue to adjust the contents of mass communication messages to the present and ongoing information needs of the target population.
- Review and clarify potentially ambiguous messages.
- Develop more posters to place in key spots in the community (Volunteers, Health Promotors, Health Centers).

For the interpersonal channel, the strong impact of in-person communication is amply demonstrated. Ways in which the process might be made more effective are:

- Maximize use of the fumigators as agents and broaden the range of information they convey.
- Train Malaria Volunteers to be more effective permanent educational resources in the community and provide them with more encouragement.
- Improve pamphlet distribution.
- Emphasize that fumigation is a public health measure carried out to protect the community from outbreaks of malaria.