

PD-AAZ-612

FINAL REPORT ON THE EVALUATION OF THE
PROCOMSI II TUBERCULOSIS CAMPAIGN

A Report from
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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 for 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 Tuberculosis Campaign of the Primary Health Care component of the Mass Media and Health Practices Project in Honduras. The project is known in Honduras 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 study was designed to determine the impact of an integrated mass media intervention when applied to information and behavior change related to the tuberculosis program in Health Regions 2 and 4.

Interviews were used to obtain information from samples of the general population (n=136), tuberculosis patients (n=68), and their families (n=68) as well as health personnel (n=38) in charge of the program. Levels of knowledge, attitudes and practices were measured for these three groups.

Dissemination of campaign messages, particularly by radio, was high. It was found that: more than 70% (n=193) of the families interviewed owned a working radio; 49.2% reported having heard some radio message about tuberculosis the previous year; 49.7% claimed to have been exposed to some printed educational material; and 28.0% reported hearing the radio program, "Voice of Health", at some time. Of the tuberculosis patients, 74.6% reported having heard some message about tuberculosis and 45% claimed to have seen posters in health establishments. The "Voice of Health" radio program was listened to by 28.4% of the TB patients, and 50% of the radio listeners could remember any information from the radio spots. Almost all of the auxiliary nurses (97.4%) heard the radio messages and 81.6% had seen some printed educational material. Only 35.1 reported having listened to the "Voice of Health" Program.

A tuberculosis control program has been in operation for many years. The auxiliary nurses reported making home visits to 46% of the families with TB patients, but only 18.3% of the families reported such visits. The nurses ordered sputum examinations for 76.3% of patients with respiratory symptoms. Only 12% of the patients were diagnosed based solely on sputum examinations; 18.5% were diagnosed solely from x-rays, and both tests were used for 69.2% of the patients.

Only 3.4% of the patients had any difficulty providing sputum samples, but an average of 28 days elapsed between sending the sample out and receiving the results.

Supervised treatment was received by 20.6% of the Tuberculosis patients while 77.9% were on self-administered treatment. About a third of the cases which do not comply with treatment receive home visits by the auxiliary nurse and 56.1% of the patients have not been asked to have sputum examinations as a way of monitoring the treatment.

The auxiliary nurses generally have adequate supplies of the materials needed for taking sputum samples and preparing the slides. Occasional scarcities were reported to disrupt their work.

Most auxiliary nurses did not have educational materials available for their talks and 10.5% did not have the Tuberculosis Norms Manual; 71.2% had received some training with regard to tuberculosis in the last three years.

Only 17.9% of the families of TB patients identified health personnel as a source of information about tuberculosis; however, of those who were visited or called to the Health Center, 80% received instructions about the contagious aspects of the disease, the need to examine family members and the importance of complying with treatment.

About half of the families in the sample had heard radio messages about tuberculosis, and exposure to campaign messages was clearly related to people's knowledge about TB and the likelihood that they would practice behaviors advocated by the campaign.

Families which owned radios were three times as likely to know the content of campaign messages, and families with TB patients were twice as likely to know the content of campaign messages than were families without TB patients.

Exposure to radio and to printed messages were both associated with higher levels of knowledge and practices, but were most strongly associated with the ability to recall campaign messages. Interpersonal communication, on the other hand, was most strongly associated with higher levels of practice.

Given the short duration of the radio campaign (August 22 to October 23, 1983), it is impressive that exposure and knowledge reached such high levels. However, the lack of adequate prior measures of knowledge, attitudes and practices regarding tuberculosis, make it difficult to estimate how much behavioral impact the campaign activities had.

In the tuberculosis campaign, the only printed messages available were from previous tuberculosis campaign efforts. Radio was used intensively, but the materials intended for use by auxiliary nurses as educational aids were not available. Without the specially designed educational materials, the power of interpersonal communication may have been reduced. Even so, all the media employed were shown to be associated with higher levels of knowledge and practices.

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I. INTRODUCTION

This is a report of the evaluation of the Tuberculosis 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 Tuberculosis campaign carried out 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 II 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 Tuberculosis portions of the project.

II. FRAME OF REFERENCE

A. Background

The Tuberculosis Division was created in 1959 and functioned vertically until 1968 when incorporation into the general health services was begun. By 1973, the Division had been incorporated as a horizontal program within the Epidemiology Division. When this Division was departmentalized in 1979, the Program became part of the Department of Communicable Diseases.

When the Tuberculosis Control Program functioned vertically it had its own resources and financing (dispensaries, wards and the national sanitarium) with at least 1,400 beds for in-patient care of tuberculosis patients (1962). At this time the country's population was approximately two million inhabitants.

When the program was integrated into the general public health system, the tuberculosis wards in the Health Regions were closed and the number of available beds was reduced. At the same time the strategy for detection of cases in the community was changed from interviews with those identified by tuberculosis tests to the use of Bacilloscopy (sputum examination).

B. Organization, Resources, and Objectives

The Tuberculosis Control Program has technical-normative responsibilities and offers logistical support as part of the Chronic Communicable Diseases Department of the Epidemiology Division of the Health Bureau. Completion of program activities is the responsibility of the Health Regions and therefore

is organized horizontally as a part of general health services.

Personnel at the regional level are therefore the persons with primary responsibility for implementing the control program for Tuberculosis. In Region 2, the staffing includes a senior regional officer, an epidemiologist, a nursing supervisor for the program, a regional nursing supervisor, nursing supervisors, a statistician, a microbiologist, laboratory technicians and auxiliary nurses. This region has eight laboratories. In Region 4, the staff complement consists of a senior regional officer, an epidemiologist, a regional nursing supervisor, nursing supervisors, a statistician, a microbiologist, laboratory technicians and auxiliary nurses. This region has two laboratories. All Health Region Personnel work in various programs. There are no funds assigned specifically to this program; its budget is part of the MOH general budget.

The objectives of the Tuberculosis program have been articulated in the following way:

General Objectives:

- To reduce the incidence of tuberculosis to levels which do not represent a public health problem for the Honduran population in the long term.
- To reduce the risk of infection by at least five percent annually within the general population - - medium term.
- To increase efficiency of the Program's activities at the national level from 40 percent to at least 60 percent in the short term.

Specific Objectives:

- To detect at least 60 percent of the new cases of tuberculosis expected in the present year.
- To initiate medical treatment for 100 percent of the new TB cases detected in the country's general health services.
- To reduce the rate of abandoned treatments to ten percent (as a national average).
- To increase to at least 50 percent, the compliance with bacilloscopies for control of cases in treatment.
- To achieve a cure in at least 90 percent of those cases where treatment is completed.
- To confirm over 80 percent of new tuberculosis cases with bacilloscopy.
- To increase to at least 80 percent the proportion of health centers which regularly report on their activities and all newly detected TB cases.
- To promote compliance with Program norms on the part of professional and auxiliary health personnel responsible for patient treatment.
- To promote operative and epidemiological research in the field of tuberculosis by specific service physicians, professional nurses and microbiologists.
- To provide to 100 percent of all MOH Health Posts the material necessary for detection, diagnosis, education, treatment, control

and notification of tuberculosis patients.

- To reduce the risk of tuberculosis infection for children living in contact with active tuberculosis cases.

C. Defining the Problem

In the period from 1957 to 1980, morbidity (incidence) and mortality rates for tuberculosis have been decreasing and almost parallel.

In the sixties the mean incidence rate was 105 x 100,000 inhabitants and in the seventies it was 52 x 100,000. Mortality decreased slightly less than morbidity with the mean mortality rate for the sixties being 8 x 100,000 inhabitants and for the seventies it was 5 x 100,000 inhabitants (38% decline). This decrease detected in the study period does not represent the real tendency for tuberculosis in Honduras but rather the registered tendency (see work by Dr. Yanuario Garcia). The number of tuberculosis cases detected in these two decades has fluctuated annually between 2,000 and 2,800. It is important to note that there is a prevalence of male over female tuberculosis cases (1980: 54% male and 46% female) and the majority of patients are young people of productive age (94% of cases in females with occupation of homemaker and 76% of men, laborers). More than 80 percent of the cases are diagnosed by laboratory examination of sputum.

In spite of the activities carried out in the fight against tuberculosis, a series of difficulties exist with regard to achievement of Program objectives. Some of these difficulties originate in erroneous knowledge and attitudes of the general population, patients and health personnel. The most common problems related to achievement of these objectives are:

- Reluctance on the part of the potential patients to have the necessary examinations.
- Low return rate of those who request the first examination and those who actually pick up the results.
- Poor quality of sputum samples for these examinations.
- Impossibility of locating some patients with positive test results, given false address.
- Little value placed on sputum exam as a diagnostic tool by both general population and health personnel.
- High percentage of confirmed TB patients who do not begin treatment.
- High percentage of confirmed TB patients who abandon treatment before achieving a cure.

D. Description of PROCOMSI

The PROCOMSI program works within the Education Division of the Ministry of Health (MOH), carrying out integrated communication campaigns in support of priority health programs. PROCOMSI I was begun in 1980 in order to modify behavior related to the treatment and prevention of childhood diarrhea. PROCOMSI I developed an effective systematic communication methodology which integrated the use of radio, graphics, and training.

In 1982, the Ministry officially instituted a National Program for Diarrhea Control and began to apply the educational methodology developed by PROCOMSI to support other priority health programs in the country. Thus, in

1983, PROCOSI I had extended its work into the areas of Malaria Control, Immunizations, and Tuberculosis. This second phase was known as PROCOSI II.

PROCOSI II's most general objective was to provide educational support to the Ministry's health programs so that these could generate decreases in population mortality and morbidity. The educational methodology used by PROCOSI integrated the use of radio (by means of spots and short radio programs), graphics (posters, brochures, pamphlets, etc.), and training (workshops, courses, seminars). For the production of radio materials and graphics, the process included baseline data collection, design and pretesting of material, production, and subsequent periodic impact evaluations. The next section discusses how these components worked together in the creation of the intervention.

E. The PROCOSI Tuberculosis Campaign

(1) Development of the Tuberculosis Theme and Messages

The campaign design was developed on the basis of research and formative evaluation. The schedule of campaign activities is shown in Figure 1.

a. Baseline Data Collection

In the second week of June 1983, the PROCOSI II staff began baseline data collection regarding knowledge, attitudes and practices related to the treatment and prevention of tuberculosis. The data collection was carried out in two states lasting approximately two weeks each. The baseline survey design was based on the results of a preliminary study in December 1982.

FIGURE 1
 Time Schedule for the PROCOMSI II
 Tuberculosis Campaign and Evaluation

Campaign Activity	Dates
Baseline data collection*	June 1983
Radio campaign*	August 22 - October 23, 1983
Formative evaluation of radio campaign	October 24 - November 7, 1983
Collection and analysis of administrative information about the TB program and PROCOMSI II **	December 1983 - January 1984
Development of instruments**	December 15, 1983 - January 15, 1984
Selection of personnel for training**	January 16-25, 1984
Interviews in Health Regions 2 and 4**	January 27 - February 13, 1984

*Activities undertaken by PROCOMSI II staff.

**Activities undertaken by the Evaluation Team.

The purpose of the baseline study was to determine specific needs for knowledge in order to formulate messages and design the campaign.

In the first stage of the baseline survey, 361 people (including 20 health promoters, 12 patients and 3 people in charge of regional tuberculosis programs) were interviewed by means of surveys and focus groups. This took place in nine communities in the three health regions.

In the second stage of the baseline survey, 75 tuberculosis patients in treatment and 35 of their family members were interviewed by means of surveys and focus groups in the three regions. Completion of these interviews was difficult given the remoteness of the dwellings of the different patients and the difficulty of transporting them to meeting places in order to develop the focus group technique. Also interviewed were 12 nurses, three regional epidemiologists, laboratory chiefs and microbiologists in each Region.

The results of the baseline survey guided the selection of messages and strategies for the campaign. The main results are presented below:

- The study population indicated that fear of contagion was the fundamental reason for rejection of the TB patient. The patients also noted this fear as the cause of their isolation and the basis for their apathy and lack of motivation for treatment and recovery.
- Patients were found to believe that while treatment does prevent TB-associated mortality it does not return them to complete normality even if the disease itself is cured.
- Two major reasons for difficulty in detecting TB victims were made evident in the research:
 - When a person had a persistent cough he was reluctant to think of

tuberculosis as anything more than a very remote possibility. Thus the symptoms of cough and weakness were first treated with cough suppressants and vitamins. Health personnel also did not usually think of tuberculosis immediately in cases of persistent cough; they tended to classify it as a cold or bronchitis symptom. It should be noted that cough suppressants and bronchial decongestants are the medicines most commonly given out at rural health posts.

- The quality of sputum samples taken from those identified as having respiratory symptoms was generally poor.
- The research also confirmed a series of taboos, myths, and beliefs concerning the disease and the conduct to be followed by the patient. These had no scientific basis but were common among the general population as well as among medical personnel.
- A general lack of knowledge was observed in the population with regard to tuberculosis. The health services did not provide any educational service concerning TB and, as a result, some patients only realized they had TB because of the kinds of medicines which were prescribed.

(2) The Tuberculosis Educational Campaign

The findings of the baseline research were used to formulate a set of messages for the intervention. A strategy of integration across broadcast, interpersonal, and print channels was planned. However, because of severe time and resource limitations, only the radio messages were able to reach the public. The messages carried the following information:

- A tuberculosis patient in treatment is not contagious. This was the

"good news" around which the radio campaign was designed. It was also the slogan and jingle for the campaign.

- Tuberculosis is curable if treated in time. The sooner it is treated the easier it is for the patient to get back to normal.
- When you have a persistent cough for more than two weeks, have a sputum test done.

Six versions of the three radio spots were prepared as well as an identifying jingle for the campaign and the principal message: "The TB patient in treatment is not contagious."

The radio spots were pre-tested for appeal and intelligibility on a total of 180 people in nine communities in the three study regions (Health Regions 2, 4 and 7).

The radio campaign began on August 23, 1983 and continued until October 22 of the same year. It consisted of an average of 38 spots daily from Monday to Saturday divided between the two major national radio stations and 185 spots daily divided among nine local stations in Regions 2, 4 and 7. In addition, 15 spots per week were included in the program, the "Voice of Health."

Three posters were designed to reinforce the three main messages of the radio campaign. Also, a pamphlet and a flipchart were prepared for use by nurses for patient education and educational chats with patients and family members. None of these materials were able to be distributed during the campaign given the limited time available, delays involved in contracting with printing firms and the time needed by the printers to produce and deliver the materials. Similar delays occurred producing the disposable cups to be used for sputum sample collection. The campaign was therefore confined to the one

medium, radio, with the limitations implied therein.

(3) Formative Research

In November, 1983, immediately after termination of the radio campaign, a formative evaluation was conducted by the PROCOMSI II staff to analyze the degree of understanding and acceptance of the radio messages. The sample size for this evaluation was 271 radio listeners and 15 auxiliary nurses in health centers of Regions 2, 4 and 7. The results for this exercise are presented below.

Ninety percent of those interviewed understood and believed the radio message that "a TB patient in treatment is not contagious." Eighty percent could give the reason, promoted by the radio spot, why a patient in treatment is not contagious.

Of those interviewed, 37 percent understood that tuberculosis is totally curable if treated in time; 11 percent only partially understood this message. Of those interviewed, 68 percent knew that if a TB patient wanted to be cured, he or she needed to complete the treatment.

Eighty-two percent of those interviewed understood and believed that when a person has a cough for more than two weeks he or she should go to the Health Center to ask for a sputum examination. Eighty-four percent also knew that if you take a sputum sample to the Health Center you have to return to pick up the results.

The results of the formative evaluation were used to modify the radio messages for subsequent campaigns.

III. THE PROCOMSI II TUBERCULOSIS EVALUATION

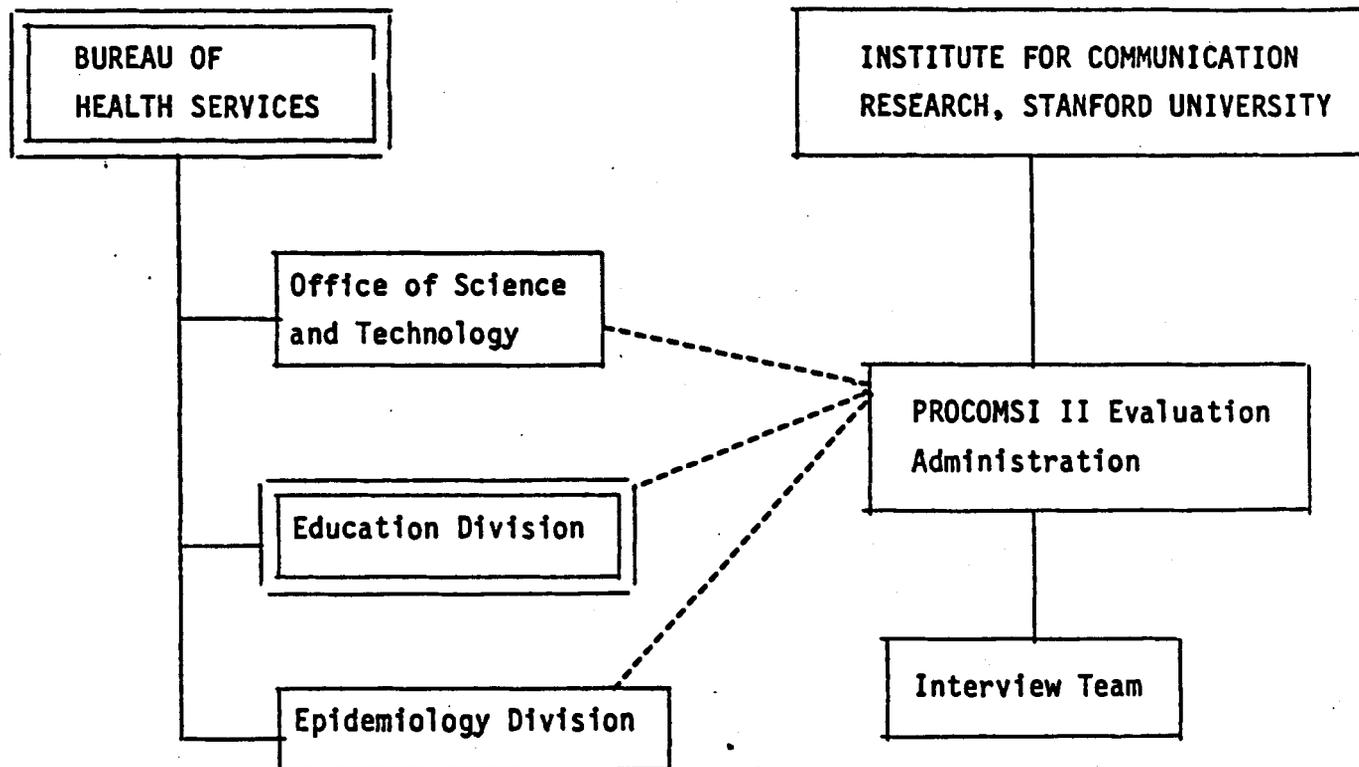
A. General Objectives and Organization

- To review the work done by PROCOMSI II in support of the tuberculosis control program.
- To measure the exposure of Health Service personnel, the general public and TB patients to the components of the program.
- To determine the sources of information about tuberculosis for patients and their families, the general population and health personnel.
- To determine the degree of training received by health personnel in the TB control program, before and after the PROCOMSI II education program.
- To measure the level of knowledge of the content of the specific messages about tuberculosis, its treatment and control and the attitudes of the health personnel, confirmed TB patients and their families toward tuberculosis treatment and control.
- To evaluate the coverage of diagnostic and treatment services by auxiliary nurses and other health personnel.
- To compare the marginal effect of the PROCOMSI II activities with the results of the National Tuberculosis Program.
- To evaluate the impact of campaign communications on levels of

public knowledge, attitudes and practices with regard to tuberculosis treatment and prevention.

Implementation of the PROCOMSI II activity and its evaluation was dependent on cooperation among several organizations. In coordination with the Health Services Bureau of the Ministry of Health, the Academy for Educational Development was responsible for providing technical assistance and resources to the Education Division. With that support, the Education Division broadcast radio spots, printed materials, and organized training in support of the services of the Tuberculosis Control Program. The Epidemiology Division was responsible for the technical-normative activities of the Tuberculosis Control Program.

The Ministry of Health in Honduras designated the Office of Science and Technology as the counterpart of the Institute for Communication Research at Stanford University for evaluating the impact of the activities of PROCOMSI II. Administrative responsibility for the evaluation was Stanford University's. The organization chart of the PROCOMSI II evaluation is found in Figure 2.

FIGURE 2**ORGANIZATION OF THE PROCOMSI II EVALUATION**

————— Administrative Authority

----- Communication and Coordination

IV. METHODOLOGY

A. Design

The principal design of the tuberculosis study was a cross-sectional follow-up of patients diagnosed as having tuberculosis between October 1982 and September 1983, and their families, in Health Regions 2 (Departments of Comayaque, La Paz, and Intibuca) and 4 (Departments of Choluteca and Valle). In these same communities, families without TB patients served as a comparison group. Auxiliary nurses and other personnel from the health services were also interviewed to determine the institutional context of diagnosis and treatment.

Data from the baseline survey conducted by the Academy for Educational Development in 1983 were used to describe general population opinions regarding tuberculosis before initiating the educational activities of PROCOMSI.

Finally, data from the MOH about anti-tuberculosis services from 1980 to late 1983 were reviewed in order to describe the change in the demand for institutional sources over time.

B. Definition and Selection of the Sample

(1) Sample of Tuberculosis Patients

The primary target group for the campaign messages about treatment is newly identified cases, because that is the group that has the opportunity to display the promoted practices. This reduces the number of "qualifying" individuals and influences the sampling design.

The universe of tuberculosis cases during the period from October 1982

and September 1983 numbered only 206 individuals. All confirmed cases in the MOH records between these two dates, in Health Regions 2 and 4, were included. The necessary sample size for this finite population was computed and corrected using the formulas given in Figures 3 and 4. A random selection proportional to the distribution of cases in the two regions was made, yielding 20 patients from Health Region 2 and 48 patients from Health Region 4. Both sub-samples were over-selected to allow for a projected 24% dropout rate.

(2) Sample of Families With and Without Tuberculosis Patients

All families of selected tuberculosis patients were included in the sample (n=68). The sample of families without TB patients was drawn from the universe of families in the general population. The necessary size of the sample was computed using the formula in Figure 5. It was determined that for each family of a TB patient that was interviewed, two families from the same community would be selected for comparison.

The comparison families were selected on the basis of the location of the TB patient's home, using the following criteria:

- In rural areas, the third and fourth closest dwellings to the northwest were chosen; if no dwellings existed in that direction, dwellings to the southwest were used.
- In urban areas, the tenth and eleventh dwellings to the northeast were chosen; if none existed in that direction, dwellings to the southeast were chosen.
- Families living in public buildings were not interviewed, nor were servants. Only heads of households (or TB patients) were

FIGURE 3

Formula Used to Estimate the Size of the Sample of Families with TB Patients

$$n = \frac{4PQ}{L^2} = \frac{4 (.75 \times .25)}{(.10)^2} = 75$$

Where:

n = Number of interviews of families with TB patients

4 = Constant that corresponds to Z_{α}^2

P = Percentage of families who believe tuberculosis is curable (75%)

Q = 1 - P

L = Limit of error acceptable in the estimation (.10)

FIGURE 4

Corrected Formula for Required Sample Size

$$n^1 = \frac{n}{1 + \left(\frac{n}{N}\right)} = \frac{75}{1 + \left(\frac{75}{206}\right)} = 55$$

Where:

n^1 = Final sample size

n = Sample size without correction

N = Number of patients in the universe

FIGURE 5

Formula Used to Estimate the Size of the Sample of Families without TB Patients

$$n = \frac{4PQ}{L^2} = \frac{4 (.50 \times .50)}{.10^2} = 100 \text{ families}$$

FIGURE 6

Formula Used to Determine the Number of Auxiliary Nurses to be Interviewed

$$N = \frac{4PQ}{L^2} = \frac{4 (.10 \times .90)}{.10^2} = 36$$

Where:

4 = Constant which corresponds to $Z^2_{\alpha .05}$

P = Percentage of auxiliary nurses who indicate the need for sputum exams to those with respiratory symptoms (10%)

Q = 1 - P

L = Limit of acceptable error in the estimation (.10)

interviewed.

(3) Sample of Auxiliary Nurses

The sample of Auxiliary Nurses was drawn from the universe of all Auxiliary Nurses in Health Regions 2 and 4. The needed sample size was determined using the formula in Figure 6. Thirty-eight nurses were interviewed, with 19 selected from each Health Region.

(4) Sample of Other Health Professionals

The following professional personnel were interviewed in Health Regions 2 and 4: 1 Regional Epidemiologist, 1 pneumologist, 1 Regional Nursing Supervisor, 1 Regional Laboratory Chief, 1 Hospital Laboratory Chief, 1 Hospital Nursing Supervisor, 5 Area Chief Physicians, 5 Social Service Physicians, 5 Area Nursing Supervisors and 1 Chief Sector Nurse.

The distribution of interviews with families, patients, and auxiliary nurses is summarized in Figures 7, 8, and 9.

C. Instruments

Three survey forms were used to collect survey data: TB1 for families with or without tuberculosis patients, TB2 for tuberculosis patients, and TB3 for Auxiliary Nurses. All three instruments covered the following general areas:

- Exposure to the PROCOSI campaign messages in the form of radio messages, posters, or interpersonal communication with health services personnel.
- Knowledge of campaign messages, beliefs and attitudes regarding

FIGURE 7

Places and Number of People Interviewed in
Health Region #2

PLACE NAME	Establishment	Aux. Nurse	No. of Patients	# of Families w/ TB Patients	#Families w/o TB Patients	TOTAL
COMAYAGUA	HOSPITAL	2	8	8	16	34
SIGUATEPEQUE	CESAMO	1	1	1	2	5
LAS LAJAS	CESAMO	1	3	3	6	13
FLORIDA OPATORO	CESAMO	1	1	1	2	5
LA PAZ	CESAMO	1	1	1	2	5
TUTULE	CESAMO	1	1	1	2	5
LAS FLORES	CESAR	1	1	1	2	5
MEAMBAR	CESAMO	1	2	2	4	9
PALMITAL	CESAR	1	1	1	2	5
PORTILLO DE LA MORA	CESAR	1	1	1	2	5
LA LIBERTAD	CESAMO	1	0	0	0	1
SAN JERONIMO	CESAR	1	0	0	0	1
PALO PINTADO	CESAR	1	0	0	0	1
EL ROSARIO	CESAMO	1	0	0	0	1
AJUTERIQUE	CESAR	1	0	0	0	1
LEJAMANI	CESAR	1	0	0	0	1
LAMANI	CESAR	1	0	0	0	1
VILLA DE SAN ANTONIO	CESAMO	1	0	0	0	1
TOTAL		19	20	20	40	99

FIGURE 8

Places and Number of People Interviewed in
Health Region #4

PLACE NAME	Establishment	Aux. Nurse	No. of Patients	# of Families w/ TB Patients	#Families w/o TB Patients	TOTAL
CHOLUTECA	HOSPITAL REG.	2	35	35	70	142
EL CORPUS	CESAMO	1	1	1	2	5
LIURE	CESAR	1	1	1	2	5
SAN LORENZO	CESAMO	1	1	1	2	5
APACILAGUA	CESAR	1	1	1	2	5
LLANITOS	CESAR	1	4	4	8	17
MARCOVIA	CESAR	1	1	1	2	5
EL TRIUNFO	CESAMO	1	1	1	2	5
CONCEPCION DE MARIA	CESAR	1	2	2	4	9
NACAOME	CESAMO	1	1	1	2	5
YUSGUARE	CESAR	1	0	0	0	1
OROCUINA	CESAMO	1	0	0	0	1
MONJARAS	CESAMO	1	0	0	0	1
CEDEÑO	CESAR	1	0	0	0	1
NAMASIGUE	CESAR	1	0	0	0	1
PESPIRE	CESAMO	1	0	0	0	1
SAN ANTONIO DE FLORES	CESAR	1	0	0	0	1
PAVANA	CESAR	1	0	0	0	1
T O T A L		19	48	48	96	211

FIGURE 9

DISTRIBUTION OF INTERVIEWS WITH AUXILIARY NURSES

Place	Region 2		Region 4		Total		
	Universe	Sample	Universe	Sample	Universe	Sample	%
Hospital	1	1	1	1	2	2	100.0
Cesamo	13	7	8	5	21	12	57.0
Cesar	68	10	70	12	138	22	16.0
TOTAL	82	18	79	18	151	36	24.0

* Note: The services in the sample include 20 that have been selected randomly for having tuberculosis patients plus 16 others nearby.

tuberculosis, its treatment and prevention.

- Behavior and practices related to tuberculosis, its treatment and prevention.

Prior to their use, the questionnaires were pre-tested twice. Four interviewers were trained for two weeks in the techniques of informant selection, use of the survey forms and standardization of interviewing and coding procedures. During the course of the survey, the PROCOMSI Evaluation Director provided the supervision necessary to maintain control of the sample to insure the quality of the data being collected, and to monitor the progress and coverage of the interviews. The Evaluation Director also carried out 22 interviews with medical, nursing, and laboratory personnel.

D. Major Variables in the Tuberculosis Study

The evaluation plan called for the inclusion of many different variables for the different audiences. The following sections summarize the intended variables, organized by level of impact. Three successive levels of impact were envisioned - exposure to the campaign components, cognitive changes (attitudes and knowledge) and behavioral changes.

(1) Exposure

- Exposure to radio messages.
- Contact with health workers for diagnosis and treatment.
- Participation in educational activities.
- Recognition of and possession of campaign posters and pamphlets.

(2) Cognitive Changes

- Patients' knowledge about tuberculosis and its treatment.
- Patients' attitudes about TB, probability of cure, feasibility and value of following the treatment schedule.
- Patients' families' knowledge about contagion and risk of contagion.
- Attitudes towards TB patients.
- Knowledge of specific content of campaign messages.

(3) Behavioral Changes

- Patients' behavior during initial contact for diagnosis including compliance with examination procedures.
- Patients' behavior during treatment process including compliance with treatment regimen.
- Participation of patient and/or family in educational activities.
- Behavior associated with prevention of TB contagion.
- Change in family support in response to new needs of patient.

V. RESULTS

A. Results of the Surveys of Patients, Families, and Auxiliary Nurses

(1) Characteristics of Patients and Families

Table 1 shows the proportion of scheduled interviews that were successfully completed. All members of the nurse's sample were interviewed, while 98.5% and 94.6% of the TB patients and families, respectively, were successfully contacted.

Heads of household, whether of families with TB patients or without, tended to be younger than TB patients by about 8 years on the average (Table 2). While over 90% of the heads of household interviewed were female, the majority (68.8%) of TB patients were male. TB patients also tended more often to be unmarried than heads of household. Over 75% of heads of household were married, while only 53.7% of TB patients were married. Families had lived an average of 18.5 years in their present location.

Tuberculosis patients had slightly, but not significantly lower levels of education than the general population (Table 3). Just over 50% of the people in both samples were able to read and write, but patients had completed an average of 4.6 years of schooling compared to 5.5 years for the general population. Fifty-four percent of the TB patients had never attended school compared to 43.7% of the heads of household.

The greatest single percentage of respondents in both the family and patient samples said that they were occupied as housewives, although this accounted for 63% of the heads of household and only 25.4% of the patients (Table 4). Almost 18% of the TB patients claimed to be unemployed, while only 2.1% of the family sample was unemployed. There was a greater proportion of farmers, laborers and public servants among the TB patients than among the

TABLE 1
Evaluation Interview Coverage

Interviews	Families*	TB Patients	Auxiliary Nurses	TOTAL
Programmed	204	68	38	310
Completed	193	67	38	298
Coverage	94.6%	98.5%	100%	96.1%

*The families of two TB patients could not be interviewed because they were in prison.

TABLE 2
Informant Characteristics

	Families (n=193)	TB Patients (n=67)
Age (\bar{x} • S.D.)	37.4 ± 13.2	45.1 ± 19.1
Sex		
Male	9.3%	61.2%
Female	90.7	38.8
Civil Status		
Single	15.0	29.9
Married	75.6	53.7
Separated, Divorced or Widowed	9.3	16.4
Years lived in present location	18.5 ± 17.1	-
Location		
Urban	-	71.6
Rural	-	28.4

* Differences between family and TB patient groups were significant at the $p < .05$ level.

Variables: AGE, SEX, CIVSTATT1, STATUST2

TABLE 3
Education of Informants

	Families (n=193)	TB Patients (n=67)
Read and write	54.4%	52.2
Schooling		
Never attended school	45.6	53.7
First to fifth grade	30.6	31.3
Sixth grade or higher	23.8	14.9
Average number of grades passed in school	5.5 ± 3.6*	4.6 ± 3.3*

* Based on number who completed at least one year of school:

N of family sample = 105, N of patient sample = 31

Variables: LITRCYT1, LITRCYT2, SCHOOLT1, SCHOOLT2

TABLE 4
Informant's Principal Occupation

Occupation	Families (n=193)	TB Patients* (n=67)
Housewife	63.2%	25.4
Unemployed	2.1	17.9
Merchant	15.0	7.5
Farmer	2.6	14.9
Laborer	6.3	10.4
Public Servant	3.1	10.4
Other	7.7	13.5

* 59.4% have the same job they had before contracting tuberculosis,
40.6 have changed jobs.

Variables: OCCPATT1, OCCPATT2

heads of household, while more of the latter were merchants.

For the most part families with and without TB patients lived under similar conditions although housing characteristics were slightly less desirable among families with TB patients. Table 5 compares the construction of houses among the two groups. Significantly more of the families with patients lived in homes with dirt rather than cement floors and walls of wattle and daub rather than adobe or wood. Their homes were also more likely to have tin than tile roofs. In other respects, the houses of the two groups were similar: number of rooms, distance to the houses of neighbors, and toilet facilities (Table 6). More of the families with TB patients had no toilet facilities at all (46.4% versus 41.6%), while more of the families without TB patients had flush toilets (16.8% versus 9%).

Over 70% of both samples had no farm land, either of their own or as tenants, although families without TB patients were slightly more likely to have access to more land (Table 7).

(2) Access and Exposure to Campaign Information

a. Radio

More of the families without patients owned radios (73.7%) than did families of tuberculosis patients (69.7%) (Table 8). Even so, a greater proportion of families with patients claimed to have heard radio messages about tuberculosis in the past year (60.7% versus only 44.5%). An even greater proportion of the TB patients themselves claimed to have heard the tuberculosis messages (74.6%). Higher rates of exposure to radio messages in the face of potentially lower access may reflect a greater motivation on the part of TB victims and their families to be informed about the disease and what to do about it. Information about tuberculosis would certainly be more

TABLE 5
Construction of Houses

Variable	Families with TB patients (n=56)	Families without TB patients (n=137)
Floor		
Dirt	76.8%	59.1*
Cement	7.2	16.8
Other	16.0	24.1
Walls		
Wattle and daub	37.5	27.0*
Adobe	23.2	37.2
Wood	14.3	17.5
Brick or cinder block	16.1	8.8
Other	8.9	9.5
Roof		
Tile	76.8	85.4
Corrugated tin	12.5	10.2
Cement	5.4	4.4
Other	5.4	0.0

* The differences between groups in types of floors and walls were significant at $p < .05$ level.

Variables: FLOORT1, WALLST1, ROOFT1

TABLE 6
Housing Characteristics

Variable	Families with a TB patient (n=56)	Families without TB patient (n=137)
Number of rooms in house	2.1 \pm 1.2	2.3 \bullet 1.1
Distance to closest house:		
Houses are joined	44.6%	44.5%
Less than 50 meters	46.4	51.1
50 meters or more	9.0	4.4
Toilet facilities:		
None	46.4	41.6
Latrine	44.6	41.6
Toilet	9.0	16.8

Variables: ROOMST1, CLOSET1, BATHRMT1

TABLE 7
Amount of Land Cultivated

Quantity	Families with TB patient (n=55)	Families without TB patient (n=137)
None	72.7	71.5
0.1 - 1.0 manzanas	10.9	10.9
1.1 - 2.0 manzanas	10.9	5.1
2.1 - 4.0 manzanas	3.6	6.6
More than 4.0 manzanas	1.8	5.8

Variable: LND CULT1

TABLE 8
Radio Ownership and Exposure to Broadcast Messages about Tuberculosis

	Families with Patients (n=56)	Families without Patients (n=137)	Patients (n=67)	Aux. Nurses (n=37)
Have a radio	69.6	73.7	-	-
Heard some announcement about TB last year	60.7***	44.5	74.6	97.4*
What station was announcement heard on?	(n=34)	(n=61)		
HRN	52.9	68.9	72.0	56.8
Radio Valle	14.7	8.2	12.0	8.1
Radio America**	8.8	4.9	0.0	21.6
Radio Corporacion	8.8	4.9	4.0	8.1
Other	14.7	13.2	12.0	5.4

*The difference between groups was statistically significant at $p < .05$.

**Radio America was mentioned most frequently as a second response (station where announcements were heard) by all groups except families with patients, 23.1%, 24.2%, 31.0%, respectively.

***The differences between families with and without patients is significant:
 $\chi^2 = 3.21$, $df.=1$, $p < .05$

Variables: RADOWNT1, RADMSGT1, RADMSGT2, RADMSGT3, RADST1T1, RADST2T1, RADST1T2, RADST2T2, RADST1T3, RADST2T3.

salient for individuals with firsthand experience than it would be for those without. It may be that while both families with and without patients heard the messages about TB, families of tuberculosis patients were more likely to remember having heard them.

The most frequently listened to radio station for all groups was the national station, H.R.N., with over 50% of each group claiming to have heard TB announcements on that station. Radio Valle, a station broadcasting only in Region 4, and Radio Corporacion which broadcast in Region 2, were also important sources of information about TB. Only the auxiliary nurses listened to the second national radio station, Radio America, very heavily (21.6%).

Radio spot recall was high. Table 9 shows the ability of those who claimed to have heard radio spots about tuberculosis to complete specific phrases from those spots. Families without patients were least likely to be able to complete the phrases, "A tuberculosis patient in treatment...(is not contagious to others)" and, "Tuberculosis is curable...(if treated in time)." Members of families with patients were significantly more likely to remember both phrases than were families without patients (55.9% versus 26.3%, and 55.9% versus 32.8%). Fifty to sixty percent of the auxiliary nurses were also able to complete the two radio spots.

Longer radio programs had less listenership, but those who listened recalled the TB messages. Coverage of the "Voice of Health" radio program was low among all groups (Table 10). Over 60% of all groups said they had never heard the program. Families with patients and auxiliary nurses were most likely to have heard it, with 39.3% and 35.1%, respectively saying that they listened to the program sometimes. Of those who said they had heard the program, patients were again most likely to remember any information about tuberculosis from the program, while families without patients were least

TABLE 9
Ability to Complete Phrases from Radio Spots

Spot	Families with TB patient (n=34)	Families w/o TB patient (n=61)	Patients (n=50)	Aux. Nurses (n=37)
A tuberculosis patient in treatment ... (is not contagious to others)				
Correct	55.9*	26.3*	46.0	51.4
Incorrect	44.1	73.2	54.0	48.6
Tuberculosis is curable... (if treated in time)				
Correct	55.9**	32.8**	48.0	59.5
Incorrect	44.1	67.2	52.0	40.5

*Difference between families with patients and those without was significant: $\chi^2 = 7.02$, $df=1$, $p < .01$.

**Difference between families with patients and those without was significant: $\chi^2 = 3.91$, $df=1$, $p < .05$.

Variables: RMSG1T1, RMSG2T1, RMSG1T1, RMSG2T1, RMSG1T3, RMSG2T3.

TABLE 10
Exposure to and Recall of the "Voice of Health" Program

	Families with TB patient (n=56)	Families w/o TB patient (n=137)	Patients (n=67)	Aux. Nurses (n=37)
Have you listened to the "Voice of Health"?				
Never	60.7%	76.6	71.6	64.9
Sometimes	39.3	23.4	28.4	35.1
Of those who have heard it, do you remember any informa- tion about tuberculosis?	(n=22)	(n=32)	(n=20)	(n=13)
Yes	45.5	40.6	55.0	53.8
No	54.5	59.4	45.0	46.2

Variables: HRVOZT1, REMVOZT1, HRVOZT2, REMVOZT2, HRVOZT3, REMVOZT3.

likely to remember. Only 40.6% of families without patients could remember any information about tuberculosis from the "Voice of Health" while 45.5%, 53.8% and 55.0% of families with patients, auxiliary nurses, and patients, respectively, could remember TB information from the program.

b. Posters

While the posters designed specifically for the PROCOMSI II campaign were not printed in time to be distributed during the August-October campaign period, posters from earlier promotional efforts by the Ministry of Health were available in health centers and hospitals. Over 81% of the auxiliary nurses had seen these posters, while around 45% to 50% of other people interviewed had seen them (Table 11). Posters were more often seen in health centers than in hospitals.

Of those who had seen the posters, over 80% of the auxiliary nurses were able correctly to describe the content of at least one poster. Forty-two percent were able correctly to describe the content of two posters. Tuberculosis patients were the next most likely to be able to correctly describe the posters they had seen. Forty-eight percent of them could describe one poster correctly, and almost one-quarter could describe two posters. Only 22.5% of people from families without TB patients could describe a poster they had seen.

c. Interpersonal Contact

Another important source of information about tuberculosis was face-to-face contact with other people. Table 12 shows the contact which families with and without tuberculosis patients had with people who provided information about the disease and its treatment. Nearly 80% of families with

TABLE 11
Exposure to and Recall of TB Posters

Variables	Families with TB Patients (n=56)	Families w/o TB Patients (n=137)	TB Patients (n=67)	Auxiliary Nurses (n=38)
Has seen posters about tuberculosis*				
Yes	44.6%	51.8	44.8	81.6
Where were posters seen?	(n=25)	(n=71)	(n=30)	(n=31)
Health Center	52.0	74.6	60.0	45.2
Hospital	48.0	22.5	33.3	41.9
Other	0.0	2.8	6.7	12.9
Can those who saw the posters describe the message?*	(n=25)	(n=71)	(n=30)	(n=31)
At least 1 correct	36.0	22.5	46.7	80.6
Both correct	12.0	2.8	23.3	41.9
Incorrect, or doesn't know	36.0	57.1	53.3	22.6

*Differences between groups are significant at $p < .05$ level.

TABLE 12
 Exposure to Interpersonal Sources of Information
 about Tuberculosis

	Families with a TB patient (n=56)	Families without TB patients (n=137)
Health services personnel	17.9%	8.8
Other sources:		
Relatives	25.0	19.7
Health Promoters	3.6	2.9
Private doctor	17.9	11.7
Pharmacist	3.6	0.0
Teacher	7.1	2.9
Other	3.6	3.6
Some kind of contact	78.8	49.6

Variables: INFCTRT1, INFFAMT1, INFGDST1, INFDOCT1, INFDRGT1,
 INFTCHT1, INFOTHT1.

patients received information about tuberculosis from some interpersonal source, while less than 50% of families without patients received information interpersonally. The two most common sources of information for both groups were relatives and private doctors. Families of patients also had slightly more contact with health promoters, pharmacists, and teachers who relayed information about tuberculosis.

One of the most important sources of information for patients and their families about tuberculosis and its treatment was the auxiliary nurse who informed them of a positive diagnosis of TB. The nurses themselves were more likely than patients or their families to claim that they provided certain types of information. Nevertheless, it appeared that in most cases important information was, in fact, delivered (Table 13). Information about the nature of tuberculosis was not as often conveyed as were other types of information. Apparently more stress could have been placed (for families) on complying with requests to provide sputum samples.

(3) Knowledge and Attitudes about Tuberculosis and its Treatment

As might be expected, patients and their families were often better informed about tuberculosis than were families without patients. Auxiliary nurses were usually the most knowledgeable group. Table 12 compares the four groups in terms of their knowledge about the disease and its consequences. Families of patients were more likely than families without patients to recognize that tuberculosis is a contagious disease (87.5% compared to 78.8%) while auxiliary nurses were even more likely to do so (94.7%).

By a margin of 8.9% to 21.2%, families of patients were less likely than

families without patients to believe that patients needed to be quarantined, a practice that is no longer necessary once the patient is receiving treatment. Although the differences were not significantly large, families of patients were more likely to know that once a patient entered treatment, he or she is no longer contagious. While only 10.7% of families with patients believed so, 19% of families without patients believed them to still be contagious. Only 2.6% of the nurses were misinformed on this point. Oddly, the percentage of patients who believed themselves to still be contagious while in treatment was higher than for the other groups (28.4%), although the difference was not statistically significant. (Table 14).

While almost everyone interviewed understood that tuberculosis could be fatal (Table 13), fewer of the people in families without TB patients understood that the disease was curable (90.5% versus 98.2%).

Few people in families with or without patients knew the symptom which indicated one should have a TB checkup, although families with patients were slightly better informed. Only 8.8% of families without patients knew that a cough which persisted for more than eight days was reason enough to go for a checkup, compared to 17.9% of families with patients who mentioned eight days of coughing as a danger sign. The low levels of knowledge on this point may have been the result of confusion over the best length of time to wait. While it would certainly be wise to seek advice at a health center if one had a cough for more than a week, both the radio spots used during the campaign and the posters which were still around from earlier campaigns gave 15 days as the appropriate length of time to wait before seeking treatment for a persistent cough (Tables 15 and 16).

Most people know that once a TB exam had been made, one had to return to the test site to pick up the test results. Slightly more of the families with

TABLE 13
 What Auxiliary Nurse Explained after Diagnosing TB

	According to		
	Families with TB Patient (n=28)	TB Patient (n=64)	Auxiliary Nurse (n=36)
What is tuberculosis?	39.3	57.8	88.9
Is it contagious?	75.0	87.5	94.4
Do other family members need to be examined?	85.7	79.7	100.0
The entire treatment needs to be completed for recovery.	71.4	87.5	91.7
Samples should be taken in when requested.	60.7	82.8	80.6

*The difference between groups regarding what tuberculosis is was significant, $p < .05$.

Variables: CNTR1T1, CNTR2T1, CNTR3T1, CNTR4T1, CNTR5T1, CNTR1T2,
 CNTR2T2, CNTR3T2, CNTR4T2, CNTR5T2, TOLD1T3, TOLD2T3,
 TOLD3T3, TOLD4T3, TOLD5T3.

TABLE 14
 Knowledge About Contagion and Treatment of Tuberculosis

	Families with TB Patient (n=56)	Families w/o TB Patients (n=137)	Patients (n=67)	Auxiliary Nurses (n=38)
Believes that TB is contagious ("yes")	87.5%	78.8	-	94.7
Believes TB patients should be separated from the family ("yes") ^{1,2}	8.9	21.2	-	-
Believes that TB patient in treatment can transmit disease to others.	10.7	19.0	28.4	2.6
What would happen if TB patient abandoned treatment?				
Would continue to be sick	30.4	17.5	-	32.8
Would get worse	26.8	45.3	-	43.3
Would die	39.3	35.8	-	20.9

¹The difference between families with and without TB patients regarding the separation of patients was significant: $\chi^2 = 4.45$, $df=1$, $p < .04$.

²The time of separation indicated by families was: Less than 6 months (13.5%), 6 months to a year (51.3%), and more than 12 months (35.2%). No significant difference was found between families with and without patients.

Variables: CONTAGT1, SEPRATT1, CONTAGT3, TBSPRDT1, TBSPRDT2, TBSPRDT3, STPTRTT1, STPTRTT2.

TABLE 15
 Knowledge about Recovery and Mortality
 from Tuberculosis

	Families with Patients (n=56)	Families w/o Patients (n=137)	Patients (n=67)
Do you believe tuberculosis can be cured?			
Yes	98.2	90.5	98.5
No	1.8	9.5	1.5
Do you believe tuberculosis will be fatal if not treated in time?			
Yes	100.0	99.3	100.0
No	0.0	0.7	0.0

Variables: TBCURET1, CANDIET1, TBCURET2, CANDIET2.

TABLE 16
 Knowledge about Tuberculosis Checkups

	Families with a TB patient (n=56)	Families without TB patients (N=137)
When should a person be sent for a check-up, to see if he/she has tuberculosis?		
Mentioned cough for more than 8 days	17.9	8.8
What should be done to find out the results of an sputum test?		
Go pick up the results	98.2	96.4
Wait for the results to be sent out	1.8	3.6

Variables: WNCKUPT1, RSLTCKT1

patients knew this (98.2%) than did families without patients (96.4%).

In almost 60% of the cases, the tuberculosis patient was head of the household or spouse of the head of household (Table 17). A major problem for victims recovering from TB is overcoming community or personal rejection as a result of feared contagion. Both radio and print components of the campaign stressed that it was unnecessary to quarantine a TB patient in treatment because the danger of contagion had been eliminated. On the average, patients reported that people were accepting of their condition.

When it was discovered that a family member had tuberculosis, most families accepted the news and tried to help the patient deal with his or her illness and recover (Table 17). Patients reported feeling more acceptance than their families reported giving (93.9% versus 78.7%), which is psychologically better than the other way around. Friends and workmates were somewhat less accepting. Forty-two percent of the patients reported that their friends responded to news of their disease with indifference or rejection. This was apparently even worse among the patients' workmates, only 50% of which were reported to be accepting. This could be one reason for the fact that 40.6% of patients said they had changed jobs since being diagnosed to have tuberculosis (see Table 4).

(4) Patient Practices Related to Diagnosis and Treatment

What motivated most patients to seek treatment at health centers or hospitals was a simple cough (Table 18). Over 47% cited coughing as the reason they came to a Health Center for tests, but other reasons included fever (23.9%), general weakness (22.9%), and bloody expectorant (19.4%). As noted above, while few people knew that one should seek help for a cough persisting more than a week, 27.7% said they actually did seek help after

TABLE 17
Relationship of TB Patient with Others

	Families with TB Patient (n=61)	TB Patient (n=66)
Relationship of patient:		
Head of household	44.3%	-
Spouse	14.8	-
Son or daughter	16.4	-
Other relative	24.6	
What has the family done since finding out one of its members has TB? (n=46)		
Accepted it and tried to help	78.7	93.9*
Indifference or rejection	21.3	6.1
What have friends done since finding patient has TB?		
Accepted it and tried to help	-	57.6
Indifference or rejection	-	42.4
What have workmates done since finding out patient has TB?		
Accepted it and tried to help	-	50.0
Indifference or rejection	-	50.0

*Difference between family and patient perceptions of response was significant at $p < .05$ level.

Variables: PATNIDT1, HECHOT1, HECHOT2, VECINOT2, TRABAJT2

TABLE 18
Patient Motivation to Seek Treatment

	TB Patients
What made you seek treatment at the Health Center? *	(n=68)
Simple cough	47.8%
Cough with blood	19.4
Fever	23.9
Weakness	22.9
Pain in chest	7.5
Weight loss	7.5
Other	4.5
How long did you have the cough before coming to the Health Center?	(n=65)
Less than one month	27.7**
1-3 months	35.4
4-6 months	16.9
7-9 months	6.2
10-12 months	
More than 12 months	6.0

* Only 4.5% visited another place for treatment

** Of those who sought treatment within a month, most said they waited 8-15 days before seeking medical help.

Variables: MOTIVET2, COFMONT2, COFDAYT2

having a cough for less than a month. The modal response within that time period was 8 to 15 days. Another 35.4% said they had a cough for between 1 and 3 months before seeking medical help. There is clearly room for improvement in people's responsiveness to danger signs related to tuberculosis.

When patients reported to health centers for tests, 69.2% reported receiving both x-ray and sputum exams (Table 19). In spite of the policy since 1979 to rely more heavily on sputum exams as a means of identifying tuberculosis cases, very few patients reported having their tuberculosis diagnosed exclusively with bacilloscopy. However, 85% of the patients interviewed said that they had gotten their first sputum exam within the past year which indicates that the use of this technique may be on the rise.

Over 98% of the patients said they had been told how correctly to collect the sputum sample for the test (Table 20), and 91.5% of them said they had no problem complying with the collection procedure. The mean number of times a patient gave a sputum sample before being diagnosed to have TB was 2.3 times, with responses ranging from 0 to 8 times.

All but one of the patients (98.5%) said they were currently receiving treatment (Table 21). Patients were in different phases of treatment with a small percentage (7.5%) having completed a full year of treatment. More than three-quarters of them were using a self-administered treatment regimen. It is interesting to note that almost 30% of the patients reported that they had not been told that they were being treated for tuberculosis.

Ninety-seven percent of patients claimed to follow the treatment regimen correctly (Table 22). Most (78.6%) keep their regular monthly appointments at health centers and 86.6% claimed never to have missed their treatment.

Over 90% of the patients said that the treatment made them feel better,

TABLE 19
 Methods used for Diagnosis of TB Patient and Time
 Elapsed Since First Sputum Examination

Variable	TB Patients (N=67)
What examination was conducted to diagnose tuberculosis?	
Sputum exam	12.3%
X-ray	18.5
Both	69.2
How long ago was the first sputum exam done?	
0-3 months	23.3
4-6 months	26.7
7-9 months	15.0
10-12 months	20.0
More than 12 months	15.0

Variables: TBTESTT2, TSTMONT2

TABLE 20
Collection of Sputum Samples

Variable	TB Patients (n=59)
Were they told how to collect the sample	98.3%
How many times was sputum exam done before being told that you had tuberculosis? ($\bar{x} \pm$ S.D.)	2.3 \pm 1.5
Range	(0-8)
Problems encountered taking in the sample?	
None	91.5
Didn't know how	1.7
Was too sick	1.7

Variables: HOWSPTT2, TSTTIMT2, PRBLMIT2

TABLE 21
Treatment of Tuberculosis

Variable	TB Patients (n=68)*
On receiving the examination results, how many patients were told they had tuberculosis?	72.1%
Are you presently receiving treatment for tuberculosis?	98.5
How long have you been under treatment?	
0-3 months	29.4
4-6 months	22.0
7-9 months	17.6
10-12 months	22.1
More than 12 months	7.5
What kind of treatment was received?	
Supervised	20.6
Self-administered	77.9

* 100.0% of the patients felt that they received quality attention at the Health Center.

Variables: ILLNEST2, GETTRTR2, TRTMONT2, WHRTRTT2

TABLE 22
Following the Prescribed Treatment

Variable	TB Patients (N=67)
After the first two months, how often do you have appointments? (N=56) *	
Every 8 days	16.1%
Every 15 days	5.4
Every month	78.6
How many times have you missed treatment?	
Never	86.6
1-2 times	4.5
3-4 times	4.5
More than 4 times	4.5
Do you follow treatment as directed?	
Yes	97.0
No	3.0

* Twenty patients had not been in for treatment for more than two months.

Variables: APPTST2, MISTRIT2, TRTRIT2

but only 7.4% said that they had discontinued treatment as a result (Table 23). Less than half of them had had a follow up sputum exam since beginning treatment. Almost two-thirds of patients were treated with pills only while one-third said their treatment included both pills and injections (Table 24). Of the 36.8% who said they felt uncomfortable side effects from the TB pills, only 12% knew that the side effects could be diminished by eating before taking the medication.

Families of TB patients told interviewers that the greatest problem encountered in getting proper treatment for the patient was transportation to the treatment site. Patients most often traveled to Health Centers on foot (61.2%) taking less than half an hour's time, with 31.3% using public transport which took, on the average, 41 minutes (Table 25.) The cost of food, transportation, and miscellaneous expenses to travel to the health center for treatment averaged 1.67 lempiras, or about 84 cents U.S.

(5) Evaluation of Services Provided by Auxiliary Nurses

Auxiliary nurses were an important link not only in the process of providing medical and para-medical services to the public, but also in the process of educating and persuading patients, their families and the general public about tuberculosis diagnosis and treatment. This section examines the training, knowledge, experience and activities of the auxiliary nurses as they relate to the tuberculosis campaign.

Table 26 shows that in spite of the fact that nurses are often the first contact a potential patient sees for medical help, almost one-third of them said they had never received any training about tuberculosis. Of those who had been trained about tuberculosis, almost 70% had been trained since 1980. Only 11.1% had received training at the Central Level, and nearly 60% had been

TABLE 23
Results of Treatment

Variable	TB Patients (N=68)
Did you feel better after starting treatment?	91.2
On feeling better, did you stop treatment? (yes)	7.4
How many times was the sputum exam done since beginning treatment?	
Never	54.4
1-3 times	39.6
More than 3 times	3.0
$\bar{x} \pm SD$	1.0 \pm 1.6

Variables: IMPROVT2, HLTTT2, NSPITT2

TABLE 24
Side Effects from TB Pills

Variable	TB Patients (N=68)
What were you given the last time you went to the Health Center for TB treatment?	
Pills	63.2
Pills and injections	35.3
Have you had side effects from TB pills?	
Yes	36.8
No	57.4
What have you done to avoid side effects?	(n = 25)
Nothing	36.0
Eating before taking pills	12.0
Stopped taking pills	4.0
Consult with Health Center	24.0
Other	24.0

Variables: TRTGIVT2, MEDSCKT2, PILSCKT2

TABLE 25

Time and Cost Associated with Following TB Treatment

Variable	TB Patients (N=67)	
	Percent	Time (minutes)
What means of transportation do you use to get to the Health center?		
On foot	61.2	24.9 ± 28.3
Public transportation	31.3	40.6 ± 32.9
Other	7.5	18.0 ± 13.5
Average expenditure to go for treatment (transportation, food and miscellaneous) in lempiras?		Expense (\bar{x} + S.D.)
		1.67 ± 3.68

Note: One lempira equals US\$0.50

Variables: TRAVELT2, TIMHRST2, TIMMINT2, TCOSTT2, FDCOSTT2

TABLE 26
 Training of Auxiliary Nurses about Tuberculosis

	Aux. Nurses
Have you received some training about tuberculosis? (n=38)	
Yes	68.4*
No	31.6
Year training was received (n=26)	
1983-84	26.9
1981-82	42.3
1979-80	23.1
Before 1979	7.7
Who provided the training (n=27)	
Central	11.1
Regional	29.6
Area	59.3

* Training included: Special courses, in-service training and specific messages received during studies.

Variables: TRAI NT3, LSTTR NT3, WHOTR NT3

trained only at the Area Level.

The nurses had worked for the Ministry of Health an average of 7.7 years (Table 27). Half of them worked at a rural Health Center staffed only by an Auxiliary Nurse, 44.7% worked at a Health Center staffed with a doctor and other medical personnel, and 5.3% worked at a Regional Hospital. The average length of time working in their present location was three and a half years.

Table 28 shows that the nurses were generally knowledgeable about how to identify an individual with tuberculosis and what procedures to follow. Ninety-five percent knew that a cough which persisted for more than 8 days was a respiratory symptom of tuberculosis. More than 76% said that the first thing to do for a patient with a persistent cough was to take a sputum sample for testing.

Almost 95% of the nurses said that they had, at least on some occasion, sent sputum samples for testing (Table 29). In 77.8% of the cases, samples were not tested at the location where they were collected, but rather were sent to another center or hospital for testing. On the average, nurses sent the samples to be tested within 9 days of their being collected, although 63.8% of them said they sent the samples in within 3 days of collecting them (Table 30). It took an average of 17.7 days for the test results to come back, even though about 30% of the results were received within 3 days. Overall, it took an average of almost 28 days for a sputum sample to be collected, tested and the test results returned to the health facility from which it originated. These delays in getting back test results, on top of the time patients wait to seek treatment in the first place, mean that tuberculosis is often well advanced and the risk of transmission quite high before treatment is initiated.

Table 31 shows that most respiratory patients are those who seek medical

TABLE 27
Service Records of Auxiliary Nurses

Variable	Aux. Nurses (n=38)
How long have you been working for the Ministry of Health?	7.7 ± 5.0 years
[Range]	(1 - 19)
Where do you work at present?	
Cesar	50.0%
Cesamo	44.7
Regional Hospital	5.3
Years working at this place	3.5 ± 3.8 years
[Range]	(1 - 15)

Variables: WRKMINT3, SERVICT3, WRKESTT3

TABLE 28
Auxiliary Nurses' Knowledge About TB Symptoms and First Aid

Variable	Aux. Nurses (n=38)
When is a patient considered to have respiratory symptoms?	
Cough for more than eight days	94.7%
Only cough	5.3
When a patient with respiratory symptoms is detected, what is done first?	
Give expectorant	2.6
Have a doctor check the patient	5.3
Send to have a sputum exam	76.3
Other	15.8

Variables: SYMPTMT3, FIRSTT3

TABLE 29
Processing of Sputum Samples

	Aux. Nurses (N=38)
Have you ever sent sputum sample to the laboratory?	
Yes	94.7%
No	5.3
To what laboratory was latest sample sent?	
This Health Center's	22.2
Another center or hospital	77.8

Variables: EVRSNTT3, WHRSNTT3

TABLE 30
 Sending of Sputum Samples and Receipt of Results

Variable	Days ($\bar{X} \pm SD$)	Days	Percent
Time waited to send sample	9.3 \pm 11.9	0-3	63.8
Days	Range = 0-30	4-15	13.9
		More than 15	22.2
Time to receive test result	17.7 \pm 16.2	0-3	31.6
Days	Range = 1-60	4-15	23.7
		More than 15	44.8
Total time to get results	27.9 \pm 23.5	0-3	16.7
Days	Range = 2-90	4-15	25.0
		More than 15	58.3

Variable: IMWAITT3, RSLTTMT3

N: Time waited = 36, Receive results = 38, Total time = 36

TABLE 31

Auxiliary Nurses' Experience in Patient Management

	Aux. Nurse
How many TB patients have you treated in the last year? (n=38)	
None	13.2%
1 - 5	52.6
6 - 10	18.4
11 - 15	5.3
More than 15	10.5
Did you receive referrals of respiratory patients from health promoters last year? (n=36)*	
Yes	27.8
No	58.3
There is no promotor	13.9

*Of the 31 nurses in communities with a health promoter, 32.3% received referrals and 67.7% did not.

Variables: NPATNTT3, REFERDT3

help from the auxiliary nurse or are identified by the nurse herself. Only 27.8% of the nurses said they received referrals from Health Promoters working in their communities. Fourteen percent of the nurses said that there was no Health Promoter in their community. The majority of nurses (65.8%) had treated less than 5 tuberculosis patients in the past year; 10.5% of the auxiliary nurses reported treating more than 15 cases in the past year.

Because one of the problems with implementing greater reliance on bacilloscopy as a diagnostic technique had been the poor quality of samples received for testing, auxiliary nurses had been instructed to give explicit directions to patients about how properly to collect sputum samples. The nurses were (by their own report) quite efficient in providing directions (Table 32). Virtually all the nurses said that they had told their patients to collect samples early in the day before breakfast (100%), to collect lung rather than nose secretions (97.4%), and to bring the sample to the health center in a covered container (97.4%). Very few (7.9%) of the nurses, however, had told their patients to bring a sample of the proper volume, between 5 and 10 cc.

For the most part, nurses had the necessary primary supplies to prepare sputum samples (Table 33.) Some items were lacking, most notably lab slides, wooden applicators, and alcohol for alcohol lamps. Medications were generally available and a high percentage of patients were receiving first line drug therapy (Table 34).

While 97.4% of the nurses said that BCG vaccine was being used in their area, only 68.4% said that they had any of the vaccine in stock (Table 35). It had been over a month since 48.6% of them had used BCG vaccine in their community. The Tuberculin test was virtually unavailable.

Almost 90% of the nurses possessed a copy of the Norms manual, the basic

TABLE 32

Directions Given to Patient About Providing Sputum Sample

Variable	Aux. Nurses (n=38)
Collect sample early before breakfast	100.0%
Sample should not be nasal secretion, but rather from the lungs	97.4
Sample size between 5 and 10 cc.	7.9
Bring it in in a cup with lid	97.4

Variables: HOWTK1T3, HOWTK2T3, HOWTK3T3, HOWTK4T3

TABLE 33
Availability of Equipment for Sample Taking

	Aux. Nurses (n=38)
Availability of equipment:	
Cups for sample collection	92.1%
Slides	86.8
Alcohol lamp	84.2
Wooden applicator	73.7
Lab Slides	60.5
Equipment or supplies lacking for exams:	
Nothing is lacking	44.7
Grease pen	18.4
Lab slides	15.8
Alcohol	15.8
Slides	10.5
Lamp	7.9
Applicator	7.9
Other	15.8

Variables: EQUIPIT3 - EQUIP5T3, XMLACKT3

TABLE 34
Medications Used in TB Treatment

	Aux. Nurses (n=36)
Drugs presently given to TB patients:	
Hain	75.0%
Diateben	94.4
Streptomycin	80.6
Rifampin	52.8
Ethambutol	55.6
Other	2.8

Variables: DRUGS1T3 - DRUGS6T3

Table 35

Availability and Application of BCG Vaccine and Tuberculin Tests

Variable	Aux. Nurses (n = 38)
BCG vaccine is in stock?	
Yes	68.4%
No	31.6
Is BCG applied to the population in your area?	
Yes	97.4
No	2.6
When was the last time you vaccination with BCG in the community?	
Less than one month ago	50.0
1 - 3 months ago	41.8
4 - 6 months ago	7.8
Have you done a tuberculin test in the past year?	
Yes	5.3
No	94.7

Variables: HVBCGT3, GVBCGT3, LASTGVT3, TBTESTT3

reference manual of the tuberculosis campaign, but very few had any of the educational materials which the campaign planners had hoped to make available (Table 36). What few posters, flip-charts, and pamphlets were available were leftovers from earlier campaign efforts, and were not the materials specifically designed for this campaign.

In terms of support from the Ministry of Health, only 3 of the nurses (7.9%) had never had a supervisory visit by other personnel in the Ministry of Health. All but 4 (90.5%) had been observed by an Area Nurse, some as many as a dozen times. On the average, auxiliary nurses were visited three times by an Area Nurse, and more than once by a Regional Nurse and a Regional Epidemiologist (Table 37).

B. The Impact of Campaign Communication on Knowledge and Practices

The impact of the various components of the communication campaign was assessed using indices of exposure, learning, knowledge, and practice. For example, the 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 (Tables 38 and 39). For each item, positive exposure was assigned a value of "1", while no exposure was assigned a value of "0". An individual who had been exposed to all nine interpersonal messages delivered by health workers, family members and others, had heard radio spots about TB, had heard the "Voice of Health" radio program, had seen TB posters, and had been given printed materials at the Health Center could have an exposure index score of 14. 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

TABLE 36
Availability of Support Materials

Variable	Aux. Nurses (n=38)
Do you have a copy of Norms Manual?	
Yes	89.5%
No	10.5
What educational materials do you have?	
Posters	28.9
Rotafolio	26.3
Pamphlets	7.9
Other	5.3

Variables: HVBOOKT3, EDUC1T3 - EDUC4T3

TABLE 37
Supervisory Visits to Auxiliary Nurses in the Tuberculosis
Program in 1983

Source	Number of times ($\bar{x} \pm SD$)	Range	n
Area nurse*	3.0 \pm 3.4	0-12	30
Regional nurse	1.3 \pm 2.5	0-12	33
Regional epidemiologist	1.2 \pm 2.2	0-8	36
Regional chief	0.3 \pm 0.8	0-3	36
Central level	0.6 \pm 1.1	0-4	36

*Does not include two auxiliary nurses in hospitals who receive daily supervision.

Variables: SPRVS1T3 - SPRVS5T3

TABLE 38
Questionnaire Items in Indices of Campaign Exposure
and Outcomes: Family Sample

Index	Questionnaire Items
EXPOSURE	<p>Had heard radio message about tuberculosis. Had heard the "Voice of Health" radio program. Was given TB information by health worker at Health Center. Had received TB information from family member. Had received TB information from pharmacist. Had received TB information from doctor. Had received TB information from teacher. Had seen TB poster. Was told at Health Center about TB. Was told at Health Center about TB contagion. Was told at Health Center about TB exams for family members. Was told at Health Center that TB is curable if properly treated. Was told at Health Center how to collect sputum samples. Was given TB pamphlet at Health Center.</p>
RADIO EXPOSURE	<p>Had heard radio messages about tuberculosis. Had heard the "Voice of Health" radio program.</p>
PRINT EXPOSURE	<p>Had seen TB poster, Was given TB information by health worker at Health Center. Was given TB pamphlet at Health Center.</p>
INTERPERSONAL EXPOSURE	<p>Had received TB information from family member. Had received TB information from pharmacist. Had received TB information from doctor. Had received TB information from teacher. Was told at Health Center about TB. Was told at Health Center about TB contagion. Was told at Health Center about TB exams for family members. Was told at Health Center that TB is curable if properly treated. Was told at Health Center how to collect sputum samples.</p>
LEARNING	<p>Could complete first phrase from radio spots. Could complete second phrase from radio spots. Could correctly remember content of "Voice of Health" program. Could correctly remember content of 1st poster. Could correctly remember content of 2nd poster.</p>

(continued)

Table 38 - page 2

KNOWLEDGE

Knew 1st thing to do if coughing lasts 15 or more days.
Knew that TB is contagious.
Knew TB patient need not be quarantined.
Knew when patient should get TB checkup.
Knew how to obtain test results.
Knew that TB could be cured.
Knew patient in treatment was not contagious.
Knew when patient had to go for treatment.
Knew what to do if medication caused discomfort.
Knew what would happen if patient abandoned treatment.

PRACTICE

Patient was taken to Health Center after TB diagnosed.
Appointments were made at Health Center for treatment.
Family response to patient was supportive.
Had not allowed patient to miss treatment.

TABLE 39
Questionnaire Items in Indices of Campaign Exposure
and Outcomes: TB Patient Sample

Index	Questionnaire Items
EXPOSURE	<p>Had heard radio message about tuberculosis. Had heard the "Voice of Health" radio program. Had seen TB poster. Was told at Health Center about TB. Was told at Health Center about TB contagion. Was told at Health Center about TB exams for family members. Was told at Health Center that TB is curable if properly treated. Was told at Health Center how to collect sputum samples. Was given TB pamphlet at Health Center. Was shown TB poster at Health Center. Health worker told patient how to collect sputum.</p>
RADIO EXPOSURE	<p>Had heard radio messages about tuberculosis. Had heard the "Voice of Health" radio program.</p>
PRINT EXPOSURE	<p>Had seen TB poster. Was shown TB poster at Health Center. Was given TB pamphlet at Health Center.</p>
INTERPERSONAL EXPOSURE	<p>Health worker told patient how to collect sputum. Was told at Health Center about TB. Was told at Health Center about TB contagion. Was told at Health Center about TB exams for family members. Was told at Health Center that TB is curable if properly treated. Was told at Health Center how to collect sputum samples.</p>
LEARNING	<p>Could complete first phrase from radio spots. Could complete second phrase from radio spots. Could correctly remember content of "Voice of Health" program. Could correctly remember content of 1st poster. Could correctly remember content of 2nd poster.</p>
KNOWLEDGE	<p>Knew patient in treatment was not contagious. Knew when patient had to go for treatment. Knew what to do if medication caused discomfort. Knew what would happen if patient abandoned treatment.</p>
PRACTICE	<p>Sought treatment within 15 days of persistent coughing. Regular appointments were made for treatment. Family response to patient was supportive. Had not missed treatment. Did not abandon treatment if health improved. Followed treatment regimen correctly. Received both sputum and x-ray tests. Ate before taking medicine to avoid side effects.</p>

of the informants fell into each category. In the cases of learning, practice, and radio exposure for the family sample, the distributions of index values were so heavily skewed in one direction that it was necessary to collapse the range of values into only two categories: low and high. For the TB patient sample, only the print exposure index was collapsed into two categories.

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 tuberculosis and its treatment. The value of chi-square was computed for each association table to determine whether or not the obtained distribution could have occurred by chance.

(1) Impact of Exposure on Campaign Outcomes

Table 40 shows, for members of the family sample, the degree to which high (or low) levels of exposure to various components of the campaign were associated with high (or low) levels of learning from the campaign, knowledge of information disseminated by the campaign, and compliance with practices promoted by the campaign. In each case where a chi-square value is significantly large, low levels of exposure were associated with low levels of learning, knowledge or practice and high levels of exposure were associated with high levels of learning, knowledge or practice.

People with high levels of overall exposure to radio, print and interpersonal communication were more likely to remember the content of messages, whether this was a specific phrase from a radio spot, or the general content of the "Voice of Health" or of TB posters. They were also more knowledgeable than people with low levels of overall exposure, and more likely to practice the behaviors advocated by the campaign.

TABLE 40

Effect of Exposure on Campaign Outcomes: Family Sample

Association of		Chi-square	d.f.	Significance
EXPOSURE	with LEARNING	49.26	2	.0000
	with KNOWLEDGE	28.60	2	.0000
	with PRACTICE	16.28	4	.0027
RADIO EXPOSURE	with LEARNING	70.93	2	.0000
	with KNOWLEDGE	12.68	4	.0130
	with PRACTICE	9.72	2	.0078
PRINT EXPOSURE	with LEARNING	15.46	1	.0001
	with KNOWLEDGE	8.88	2	.0118
	with PRACTICE	.001	1	N.S.
INTERPERSONAL EXPOSURE	with LEARNING	28.06	2	.0177
	with KNOWLEDGE	11.96	4	.0177
	with PRACTICE	76.75	2	.0000

N = 204

Similar associations were found between greater exposure to specific media and higher levels of outcome. High levels of radio exposure and high levels of interpersonal contact were both clearly associated with higher levels of learning from the campaign, higher levels of knowledge about tuberculosis and its treatment, and a tendency toward appropriate practices. Exposure to printed messages, while associated with higher levels of learning and knowledge, did not appear to affect levels of practice. It is interesting to note that exposure to radio alone had a stronger effect on learning than exposure to multiple media. The chi-square value for the association between radio exposure and learning is half again as large as for the association between overall exposure and learning.

While overall exposure, exposure to radio messages and exposure to printed messages were all more strongly associated with learning than with knowledge or practice, interpersonal exposure was most strongly associated with higher levels of practice. The value of chi-square for the association between interpersonal exposure and practice is more than four times the chi-square value for the association between overall exposure and learning. This finding is consistent with conventional wisdom that mass media are more useful at disseminating information and stimulating knowledge gain, while interpersonal communication is more persuasive and more often leads to changes in behavior.

Table 42 shows the effect of exposure on campaign outcomes among TB patients. Unlike the family sample, levels of exposure had no effect on levels of knowledge or practices for TB patients. Overall exposure, exposure to radio messages and exposure to printed materials were associated with higher levels of learning among TB patients, but interpersonal contact was not significantly associated with any outcome.

(2) Impact of Learning and Knowledge on Campaign Outcomes

Family members who were able to remember the content of radio spots and posters were also more likely to know about tuberculosis and how to treat it (Table 41). They were also more likely to practice the behaviors advocated by the campaign. The chi-square value for the association between knowledge and practice is larger than that for the association between learning and practice. If knowledge involves a deeper understanding than mere recall, then it makes sense that, for family members, a higher level of knowledge about the diagnosis and treatment of tuberculosis was more strongly associated with appropriate practices than was the mere ability to recall specific information from radio spots and posters.

For TB patients, only a higher level of learning was at all associated with a higher level of appropriate practices (Table 42).

C. Results of the Interviews with Medical, Nursing, and Laboratory Professionals of Health Regions 2 and 4

All 22 health professionals who were interviewed agreed that tuberculosis was a health problem in their communities but with variations in magnitude

Sixty-eight percent (n=15) of those interviewed considered the functioning of the national Tuberculosis Control Program to be deficient and irregular, 23% (n=5) said that despite its limitations the Program had improved, and 9% (n=2) considered it to be excellent.

The following observations about the Tuberculosis Program were noted:

- The treatment regimen was long and difficult, leading to rates of patient drop-out.

TABLE 41
Effect of Learning and Knowledge on Campaign
Outcomes: Family Sample

Association of		Chi-square	d.f.	Significance
LEARNING	with KNOWLEDGE	13.80	2	.0010
	with PRACTICE	12.61	1	.0004
KNOWLEDGE	with PRACTICE	20.07	2	.0000

N=204

TABLE 42
Effect of Exposure and Learning on Campaign
Outcomes: TB Patient Sample

Association of		Chi-square	d.f.	Significance
EXPOSURE	with LEARNING	17.83	4	.0013
RADIO EXPOSURE	with LEARNING	28.80	4	.0409
PRINT EXPOSURE	with LEARNING	11.44	2	.0033
LEARNING	with PRACTICE	9.68	4	.0463

N=68

- Human and material resources for its development were lacking.
- Patients experienced allergic reactions to medicines, especially children with diabetes, seniors, and alcoholics.

Interviews with health professionals identified several program characteristics which limited its impact:

- Poor functioning of the patient referral and center-referral system.
- Poor communication between different levels of the health service.
- Lack of transportation and per diem for home visits by nurses.
- Difficulty controlling contagion within families with TB patients.
- Difficulty locating patients who had discontinued the treatment regimen.
- Delays in sending sputum samples and in receipt of results.
- Lack of motivation on the part of personnel and reluctance to prepare sputum samples for fear of infection.
- Poor sample preparation techniques.
- Little cooperation from the patient.
- Complicated paperwork.

When asked whether they had received training in the TB program in the

past year, 59.1% said no, 27.7% said yes, and 13.6% said yes, but very little. Of those who had received training, five said it was very good, three said it was too short, and one said it was a review of what had been presented in Medical School.

With regard to participation in TB education for personnel, 13 answered that they had participated in in-service training during global supervisions, five had participated in courses for auxiliary nurses and the other three had not participated in staff training. Questions were asked about the existence of a formal TB education program within the health establishment: 15 of those interviewed (68.1%) answered no, five (22.7%) answered yes, and two (9.1%) didn't know. The majority agreed that the educational effort that existed consisted of occasional talks on tuberculosis and detection of respiratory symptoms, talking to community workers, and vaccinations.

All (100%) said they had heard the radio messages about tuberculosis, and 13 thought they were very good, five rated them as good, and four as okay. Suggestions for message improvement were requested but only a few informants offered any. These suggestions included: that the messages be shorter and less dramatic and that they be broadcast more frequently and by all stations, that they emphasize the consequences of abandoning treatment, and that having a sputum sample examined does not in itself mean you have tuberculosis.

Despite their sometimes critical comments, the vast majority of health professionals we interviewed felt that the campaign was working. When asked if they thought that campaign messages had gotten through to the community 17 said yes, two said "maybe", and two said no. They noted however that patients referred to the radio messages during talks, interviews or consultations and that more people with respiratory symptoms were requesting sputum exams "like they say on the radio."

Twelve of the professionals thought that an increased demand for TB-related services indicated that the campaign had had an impact; eight thought the campaign had had no impact, and two did not know. Those who were aware of increased demand were not aware of the proportion of increase. Eleven of those who thought the campaign had had an impact said that the greatest problem generated by increased demand was the scarcity of resources and materials.

Several problems associated with collection and analysis of sputum samples were noted:

- Staff resistance to preparation of the samples.
- Delay in sending the samples.
- Lack of cups with lids for collection of sputum samples.
- Lack of slides, stains, etc., for sample preparation.
- Poor quality of samples collected by the patients.
- Unreliable results from bacilloscopy.

When asked if they listened to the "Voice of Health" radio show, 64% answered no and 36%, yes. Those who did listen to the program considered it to be clear and informative.

These informants were asked about their personal involvement in the Tuberculosis Control Program. Sixteen (73%) said they had been involved in supervising some aspect of the program. Twenty-seven percent had educational posters and flip-charts, while 45% had no educational materials. Seventy-three percent had a supply of BCG vaccine. All said they did not have tuberculosis themselves.

VI. CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the findings of the evaluation and presents some recommendations for consideration.

A. General Characteristics of Informants

The tuberculosis patients (n=68) and the family informants (n=197) are young adults; 46.3% of the TB patients and 24.3% of the family informants are single, separated, or widowed. More than fifty percent of the family informants and TB patients were literate. Over 63% of family members were housewives, while the occupations for the TB patients were more varied: 25.4% household tasks, 14.9%, agriculture and 17.9% unemployed.

The quality of the dwellings of families with TB patients tended to be inferior (dirt floors, wattle and daub walls) to those of families without TB patients; 50% of the former and 44.5% of the latter lack adequate waste disposal systems. Seventy percent of the families interviewed did not possess land for cultivation.

B. Campaign Penetration

Around 70% of the families interviewed owned a working radio but more families without patients had radios than did families with patients. Of the families with radios, 61% of families with patients and 45% of families without patients had heard the radio spots about tuberculosis. Even higher percentages of TB patients and auxiliary nurses had heard the messages.

The "Voice of Health" program was listened to occasionally by between 23%

and 39% of the families. Of those who listened to the program, 50% remembered some of the information.

Posters and other printed material intended for use in the campaign were unavailable due to production problems. People were, nonetheless, exposed to printed materials left over from earlier tuberculosis campaigns. More of the families without patients claimed to have seen them.

C. Functional Level of the Tuberculosis Control Program

Home visits to families with TB patients were carried out 50% of the time according to the auxiliary nurse; however, only 18% of the patients and 24% of the families said they had been visited by a nurse. The TB patient was diagnosed by means of a sputum exam in 12.3% of the cases, by X-rays in 18.5% of cases and using both in 69.2% of the cases. Of the patients who initiated treatment 56.1% had never been told to have sputum exams for control of the disease and treatment. Of those with respiratory symptoms, 76.3% were asked to have a sputum examination but 92.1% of these did not receive a clear explanation of how much sputum should be collected. Slightly over 13% of the auxiliary nurses stated that they had never treated tuberculosis patients; auxiliary nurses that had a health promotor in the influence area of the Health Region received referrals of patients with respiratory symptoms in 32.2% of the cases.

Too much time elapsed between sending the sample and receiving results; the average was 25 days. There was an adequate supply of materials for carrying out sputum examinations; nevertheless, 10.5% of the auxiliary nurses claimed not to have the Norms Manual for Tuberculosis and educational materials were largely unavailable.

Supervision of the program from other levels is conducted with reasonable frequency.

For families of tuberculosis patients, 17.9% of their information about the disease is provided by health service personnel, for families without patients, 8.8% comes from health personnel. Other important sources of information are relatives, private physicians, teachers, health promoters, etc. Almost 80% and 50% of families with and without patients had at least some interpersonal contact.

Of the families with TB patients who were visited or called to the Health Center (n=28), 40% received information about the cause of tuberculosis (57.8% of TB patients were given this information); 75% of these families received explanations about the contagious aspect of the disease, the need for examination of family members and the importance of completing the treatment program.

Of the patients interviewed, 20.6% received supervised treatment and the rest (77.9%) relied on self-administered treatment. In 78.6% of the cases, the patients had monthly appointments to receive their medication (after the initial two months). If a patient did not comply with treatment the auxiliary nurse made a home visit in 35.1% of the cases.

D. Impact of the Campaign

Exposure to the various communication components of the campaign was clearly related to higher levels of campaign impact. Overall exposure to radio messages, printed materials and interpersonal communication was positively associated with being able to recall the content of those messages. It was also positively associated with knowledge about the nature of

tuberculosis, how it was diagnosed, and how it should be treated, as well as with appropriate practice related to TB diagnosis and treatment.

Exposure to the radio messages alone was strongly associated with learning campaign information, while exposure to interpersonal communication was very strongly associated with appropriate practices advocated by the campaign. Exposure to printed materials was related to higher levels of learning and knowledge, but not with practices. Members of TB patient families who were more knowledgeable about tuberculosis were also more likely to behave in ways promoted by the campaign. For TB patients themselves, only the ability to recall the specific content of campaign messages was related to higher levels of appropriate practice.

E. Recommendations

The campaign had direct impacts on what people knew and did about tuberculosis. For that reason, and because new "patients" enter the system continuously, the campaign should be reinstated periodically. The following suggestions show areas where improvement is still possible.

- Print material has the potential to make a significant contribution to impact. In future campaigns, measures should be taken to ensure that availability and distribution of posters, pamphlets, and other printed materials which auxiliary nurses and other health personnel use as educational aids.
- Efforts could be directed toward the improvement of the "Voice of Health" radio program. An attempt might be made to make it more appealing and to promote it to the public as an important source

of health information.

- Several specific areas of knowledge and practice were not sufficiently affected by the campaign and could be emphasized more heavily in future efforts:
 - More emphasis should be placed on the importance of completing the treatment regimen, and not abandoning treatment as soon as improvement is felt.
 - People still tend to wait too long before seeking medical help for a persistent cough.
 - Few people know how to avoid the side effects of taking tuberculosis medication.
 - Some friends and workmates of TB patients continue to ostracize someone who is diagnosed as having tuberculosis. Efforts should continue to be directed toward convincing the general public that once a patient has entered treatment for the disease, the danger of contagion is eliminated.
 - More effort is needed to educate the public how to collect sputum samples for TB exams. Many samples are still too small or otherwise inadequate so that tests are impossible or ineffective.
 - Delays in processing exams and returning the results to patients must be reduced. Delays increase the health risk to patients and extend the contagious period during which healthy individuals come into contact with disease carriers.

- More effort may be needed in integrating the various components of the campaign so that radio messages, posters, pamphlets, and information provided by health workers are complementary and reinforcing. The unavoidable difficulties experienced in this campaign with print and training lowered the impact of the effort. This underscores the importance of careful planning of integrated activities focused on a limited set of high priority objectives.