

**Brief Summaries  
of  
PRICOR-Supported Studies**

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## PRICOR I BRIEF SUMMARIES

<u>COUNTRY</u>	<u>TOPIC*</u>
Bangladesh	CHW
Benin	CF
Bolivia	CF/CHW
Brazil	CF/CHW/ORT
Dominica	CF
Dominican Republic	ORT/CF
Ecuador	CHW
Egypt	ORT
Grenada	CO/ORT
Haiti	CF/CHW/ORT
Honduras	CF
India	CCD/CF/CO
Jamaica	CF/CHW
Korea	CO/CHW
Liberia	CF/CHW/ORT
Mali	CF
Mexico	CHW/ORT
Nigeria	CHW
Papua New Guinea	CHW/CO
Peru	CHW
Philippines	CF/CHW
Senegal	CF
Sierra Leone	ORT
Somalia	CCD
Swaziland	CF/CHW
Tanzania	CHW
Thailand	CF/CHW
Uruguay	CO
Zaire	CF

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CCD	Community-Based Commodity Distribution
CF	Community Financing
CHW	Community Health Worker
CO	Community Organization
ORT	Oral Rehydration Therapy

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CHW  
Bangladesh

## Primary Health Care Operations Research

### Study Abstract

#### DETERMINANTS OF HEALTH CARE UTILIZATION IN RURAL BANGLADESH

The problem of under utilization of primary health care (PHC) services in Companiganj upazilla (sub-district) in Bangladesh was the subject of an operations research study carried out jointly by The Johns Hopkins University and the Christian Commission for Development in Bangladesh (CCDB). In rural areas of Bangladesh, the PHC program and other organized health care projects function parallel to, and often in competition with, many alternative health care providers. Although government PHC services are free and managed by trained professionals, many rural people prefer these alternative providers (private physicians, traditional healers, etc.) to the formal government systems. This results in under utilization of government PHC facilities, despite tremendous health needs and repeated efforts by the government to improve its services. The goal of the study was to identify changes that could be made in the existing PHC system so that utilization would be improved.

The Companiganj Health Project (CHP) was a demonstration model for delivery of comprehensive health and family planning services carried out from 1973 to 1980 as a joint venture between the Government of Bangladesh and CCDB. All services were delivered almost free of cost according to the policy of the government. Curative services were delivered in two well-equipped hospitals (main centers) and seven sub-center clinics. Preventive and promotive services were delivered by two sets of community health workers (CHWs), male and female, who made routine home visits.

In order to analyze the problem of under utilization of PHC health services, the researchers examined three sets of data: 1) birth records, 2) death records, and 3) major causes of morbidity records. For each event, socio-demographic background of the individual, the nature of the illness, and health care service utilization patterns were given special attention. A series of bivariate and multivariate analyses of the data were done, with utilization of health care services and choice of service providers as the dependent variables and a set of user and health system factors as the independent variables.

The results of these analyses provided some predictors of utilization of health services. The major predictors were found to be age of the patient, socioeconomic status of the family, season, and total number of health care providers available in the community. The winter and rainy seasons were associated with decreased utilization of health care services, despite the fact that those were periods of highest morbidity. The presence of many health care providers in the community was associated with increased utilization of health care services. The only other health system factor that had some positive correlation with utilization of health care services was home-visiting by a female CHW.

The patient's choice of health care provider was also examined. Modern medicine was found to be the preferred source of care for 75 percent of the patients who use medical services. However, this care is provided primarily by unlicensed, semi-trained or self-trained practitioners called Daktars. Stated preference for a

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particular provider did not predict actual utilization during illness episodes. For example, 42 percent of patients report that they prefer to use formal PHC services, while only 25 percent actually use them. Fifty percent of individuals under study were seen by Daktars, 25 percent went to PHC facilities, 16 percent were seen by traditional practitioners, and 9 percent went to homeopaths. Children under 5 were seen by traditional practitioners and homeopaths significantly more often than the higher age groups.

A comparison of some aspects of service delivery between the Daktars and the PHC services showed that in terms of availability and accessibility, place of treatment, travel and waiting time, and type of medications dispensed, the Daktars' services are more attractive to the villagers than the PHC services. Only in terms of cost of treatment are the PHC services more attractive.

Community members, health care providers, and local officials participated in solution development through a structured group process that elicits information from informants through questionnaires (Delphi technique). The participants completed questionnaires aimed at identifying the components of the under utilization problem and obtaining suggestions regarding solutions. Based on the results from this initial questionnaire, a revised questionnaire was developed and distributed to the same participants. This process continued for four rounds until consensus had been reached on some alternative solutions to the problem. The participants of the survey identified two major problems areas, non-availability and non-accessibilities of PHC facilities at the time of need, and communication gap between the provider of PAC and the community to be the major reason for under-utilization.

Recommendations from the participants in the Delphi survey for improving utilization emphasized the need for at least one PHC clinic per population of 5,000. Clinic hours should be extended to include both morning and evening hours, and PHC workers should be willing to treat emergencies and acute episodes of illness if the need arises even after hours. Other recommendations include improvement of supplies, changes in the orientation of the PHC clinics, change in the staffing including appointment of TBAs, increasing awareness of the public about PHC services and the establishment of proper quality control.

The researchers then took the variables that were found to be predictors of utilization and choice of provider from the problem analysis and categorized them into constraints, facilitators, and decision variables. In light of these, various components of the existing PHC system were analyzed and specific problems were identified. These, along with the results of the Delphi survey, were used to develop program recommendations. These recommendations included: a) establishment of a PHC clinic in every ward (approximately 7,000 population), b) selection of an accessible site by community residents and PHC officials, c) staffing of the clinic by paramedics and traditional birth attendants, d) extended clinic hours, and e) consideration of minimal fee-for-service charges to provide incentive to health workers.

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This study was conducted from June 1985 through March 1986 by the Johns Hopkins University School of Hygiene and Public Health. Further information is available from the principal investigator, Dr. A.T. Shafiq A. Chowdhury, Johns Hopkins University School of Hygiene and Public Health, Department of International Health, 615 N. Wolfe St., Baltimore, Maryland 21205, or from Ms. Lani Rice Marquez, PRICOR study monitor (Chevy Chase).



## Study Abstract

### COMMUNITY FINANCING OF PHC SERVICES IN THE PAHOU HEALTH DEVELOPMENT PROJECT, BENIN

An operations research study was conducted by the Unitarian Universalist Service Committee in the People's Republic of Benin during 1983-85 to develop a community financing strategy to support the Pahou Health Development Project's primary health care (PHC) system. After considering several viable alternatives, the project managers proposed two financing strategies to the families living in the 15 villages that constitute the communes of Pahou and Avlekete: fee per episode for curative treatments, with prices marked up to cover other costs, and a prepayment insurance-type scheme that would give them free access to PHC services. Even though it had been expected that both options would be selected, the families all chose to pay the fee per episode. Families explained that even though they recognized that they would benefit from a prepayment scheme, they could not afford to make the annual (or even semiannual) payment in advance. Only the 11 members of the health staff chose the prepayment scheme for their families.

With the agreement of the community leaders, the revenue generated from the payment of curative care was used to cover the costs of drug supplies and village health worker (VHW) remuneration. The investment costs were supported by foreign donors with the understanding that the operating costs would be financed by the Beninese government (health center staff salaries and infrastructural costs) and by the communities.

Standing orders guide VHWS and health center staff in diagnosis and treatment and in determining what fee to charge the patient. The treatment fees charged by health centers and VHWS are standard throughout the project. The base treatment charge is the cost of the drugs involved in the treatment plus a percentage to help cover operating costs. This markup was calculated by estimating the number of cases of the disease and thus the proportion of personnel time devoted to the treatment. This calculation was then used to determine the percentage of the operating costs to be added to the drug costs. In addition, a proportion of total preventive care costs (e.g. pre/postnatal care, vaccinations, and home distribution of Oralyte) are included in the price of curative care. The reduction in drug costs as a result of using generic drugs makes it possible to mark up the treatment prices so that they cover other costs (besides drugs and VHW remuneration) and yet remain affordable and acceptable to the population.

People seeking curative care pay for the entire treatment at their first visit, regardless of the number of followup visits. Curative care and preventive interventions are administered free to school children and indigents. Treatment prices have been quadrupled for those people residing outside the project area who wish to use project services. In addition to increasing project revenue, this helps limit the influx of "outsiders" and prevents them from coming to obtain project drugs to resell for a profit elsewhere. The "outsider" treatment prices are also applied at the health center to people living in the project area but whose VHW has not referred

them to the health center, supporting the VHWs and increasing their credibility by ensuring that people follow the established procedures.

A considerable effort went into managing and sustaining the community financing system. Both the health center staff and the VHWs received training in resource management and logistics. The head nurse of the health center also received inservice training in bookkeeping by an accountant who regularly goes over the health center and VHW accounts of the cash box. Control of cash box transactions (collection of receipts and of incurring expenses) is the responsibility of a sub-committee on financial management of the Commune Health Committee comprised of three community leaders and the health center's head nurse. In addition, biannual evaluations of coverage levels achieved are carried out by the health center staff. These results, discussed with the Commune Health Committee, have led to readjustments in the prices of certain treatments. Supervisors also use the receipts to compare the amount of drugs used and revenues collected with drug stocks and expected revenues. When nurses' or VHWs' receipts are lower than they should be, this amount is deducted from the responsible person's remuneration.

The revenue from this financing system has assured 90-100 percent accessibility to services for the entire population (defined as living within 2 kilometers of service delivery locations) and a VHW attrition rate of less than 7 percent in 3 years. Between July 1983 and June 1985, receipts from community members registered in the project were able to cover 40-50 percent of the following recurrent costs: replenishing of drugs, remuneration of VHWs, petrol for supervision and mobile maternal and child health clinics, maintenance of the health center, and the information system at the village level (VHW treatment forms, home visit forms, pre/postnatal forms). When "outsider" receipts are included, 60-80 percent of these costs were covered. In the second half of 1985, total revenues generated from curative treatments were able to cover all of these expenses.

The cost analysis was based on a series of studies of utilization, personnel time (work-logging), and resource utilization (logistics records). The preliminary results (July 1983 through June 1985) showed an average cost of \$4.75/capita per year, including all recurrent costs, annual amortized capital costs, and a yearly portion of costs of startup activities amortized over ten years. These costs represent real project costs, including consultants, extra training for project staff, time for research, and training of student midwives by the health center staff. Estimated recurrent service costs come to \$2/capita per year.

In conclusion, to become self-sufficient, a community financing system needs at least 2 years of good management (routine monitoring of coverage and strict accounting). Further, a community financing system operating only at the village level should not expect to cover the costs of drugs, VHW remuneration, and such support services as supervision. The study showed that only 25 percent of project revenues came from village-level treatments (including "outsider" receipts). However, further study might reveal other ways of generating revenues and organizing service delivery to allow self-sufficiency at the village level.

This study was conducted by the Unitarian Universalist Service Committee (UUSC) from April 1983 to December 1985. Further information is available from the principal investigators, Dr. Eusebe Alihonou, B.P. 1822, Cotonou, Benin, or Ms. Elizabeth Coit, UUSC, 78 Beacon Street, Boston, Massachusetts 02108, or from Ms. Marty Pipp, PRICOR study monitor (Chevy Chase).

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**Study Abstract****COMMUNITY FINANCING TO REDUCE ATTRITION OF  
COMMUNITY HEALTH WORKERS AND INCREASE  
HEALTH SERVICE COVERAGE IN RURAL COMMUNITIES**

Researchers from the Instituto de Investigaciones Médico Sociales (IIMS) undertook an operations research study to find ways of reducing attrition rates of community health workers, or Sanitarios Nativos (SNs), in Cochabamba, Bolivia. The objectives of the study were to identify both the conditions under which a community would be willing to support a health worker, and feasible financing schemes that would provide stable salaries for the SNs. Preliminary results show that villagers are willing to pay in kind for health worker salaries provided the workers are reliable and work exclusively in their own communities. Since the total revenue from these in-kind payments would cover only about half the SN's current salary, the researchers concluded that stable, community-supported health workers could be provided only by training and deploying a lower level health promoter at a reduced salary level to be determined by the community. This scheme would also allow for the expansion of services into areas where no formal services had previously been provided.

In order to determine how best to manage these in-kind payments, project investigators worked with community groups and individuals and held open community discussions. After several sessions the project investigators were able to propose the following scheme: the quotas (in the form of either wheat or potatoes) will be collected in May after the harvest. The quota is roughly equivalent to US\$ 7.00 per family regardless of the family's land holdings. The organization and collection of the quotas rely on two community organizations: the sindicato and the health committee. The sindicato, a traditional and highly visible organization in rural communities, is an ideal collaborating organization because it exists in each community and attendance is obligatory for each family head. Each sindicato director in the study area supports the project and will be responsible for ensuring that each family pays its quota. Furthermore, each sindicato has elected a member to serve on the second collaborating organization for this scheme, the health committee. This group, composed of the representative from the sindicato and an elected mother, will be directly responsible for the collection, storage, and marketing of the in-kind payments. The overall scheme will be supervised by two Bolivian physicians who work with INEDER, a Dutch private voluntary organization (PVO).

The scheme, already implemented in seven communities, involves retraining the existing SN to provide better services and to supervise six promoters located in satellite villages. Promoters differ from the SN in that they are generally older mothers, with little or no education, who will receive half the salary of the SN for the same time worked. The SN's longer training, and his previous year's work experience in the health post, partially explain the pay differential.

Training and supervision of the promoters is conducted by the research staff and the two Bolivian physicians who supervise the overall scheme. Bimonthly training focuses on specific health topics such as ORT, first aid, or sanitation. The worker is provided with pamphlets that include illustrations to reinforce important points. Supervisors visit once a month and review workers' records and meet with the community organizations responsible for the management of the health workers' salaries.

A signed contract between the Ministry of Health (MOH) and INEDER guarantees continuity of this project's personnel, and institutional support, for at least 3 more years. Dissemination of the project's results has been accomplished through several meetings with the MOH and PVOs working in the Cochabamba area. Two PVOs (IDEPO and Project Tirague) hope to use the results from the PRICOR study to expand the model.

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This study was conducted from October 1984 through March 1986. Further information is available from the principal investigator, Dr. René González, Director, IIMS, Casilla 4444, Cochabamba, Bolivia, or from Ms. Karen Evalyn Johnson, PRICOR study monitor (Chevy Chase).



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## Study Abstract

### DETERMINING ALTERNATIVE COMMUNITY FINANCING MECHANISMS FOR SUPPORTING PRIMARY HEALTH CARE SERVICES IN BOLIVIA

The Bolivian Mission of the U.S. Agency for International Development conducted a feasibility study in the early 1980's to investigate the potential to develop privately financed Primary Health Care services in the Department of Santa Cruz, Bolivia. In 1984 PRICOR funded the Fundación Integral de Desarrollo (FIDES) of Santa Cruz to design PHC service packages and test alternative financing mechanisms. During the preliminary stages of this project, three regional cooperatives had been identified to jointly administer the project. It was hoped that through these cooperatives, a PHC Delivery System could be established which would provide essential primary health care services to unserved or underserved, high-risk populations in selected rural and marginal urban areas of Santa Cruz, and that these services would be supported entirely by community-generated funds at the end of the project's third year. The coops are particularly suited for this purpose because they are client-oriented, privately administered and are often organized in part to provide limited health services to their members.

Based on the belief that the new PHC services would be administered and financed through these cooperatives, FIDES/PRICOR designed the field study around the idea of cooperative-based PHC for low income households. Data were collected through a variety of studies to describe the environment in which the PHC would operate including: (1) a literature review, (2) key informant interviews in the Montero area, (3) case studies of innovative health care financing approaches in Bolivia, (4) household surveys, (5) an inventory of institutional resources in the Montero area, (6) an analysis of communities in the Mineros and San Julia area, (7) area mapping, (8) family notebooks, (9) longitudinal data collection/analysis, and (10) an analysis of the program environment. FIDES initiated this effort by conducting a household survey of three different populations in the Department of Santa Cruz: peri-urban neighborhoods in the Departmental capital, Santa Cruz; the town of Mineros and its rural dependencies; and the remote rural colonization zone of San Julian.

For several reasons beyond the scope of this report, the PHC services will not be administered through the original three cooperatives. The data presented here, however, are still appropriate for any entity concerned with serious health planning in the Santa Cruz region and should be so considered.

The survey was administered to 545 households in Santa Cruz, 470 households in the Mineros area and 267 in the San Julian area, all households within the coop health projects' target populations. Information gathered included: basic socio-demographic characteristics of the household; a two-week recall of illness episodes; a one-month recall of hospital utilization; fertility data for the last year for all women 15 - 45 years old; data on health care utilization and expenditures during last two weeks; the education and economic status of the household; informants' community participation and health

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attitudes; and types of health services that informants would like to have access to and for which they would be willing to pay.

The results of the household survey in the three locations can be separated into three distinct areas:

- What people consider to be the preferred or ideal delivery system
- What financing mechanisms people would be willing to support
- What are the current health expenditures

The interviewer asked the household respondent (head of household) whom he felt was responsible for providing health services in the community. In each area, over half (51.1-63.5 percent) of the respondents felt that the government should provide health services. In Santa Cruz, 25 percent felt that the community/families should provide services, while that figure was 17 percent in Mineros and only 2.1 percent in San Julian.

In strong contrast to the ideal provider, the responses to the ideal payment mechanism indicated that a majority of households felt it was the family's or the community's responsibility to pay for health services: 51.3 percent in San Julian; 57.6 percent in Mineros; and 61.0 percent in Santa Cruz.

While it is informative to understand the preferred, or ideal, delivery scheme (provider and payment mechanism) in each area, it is perhaps more useful to examine what financing schemes people in these areas are willing to support. In San Julian, the most popular financing mechanisms were crops, annual fees, and installments. In Mineros, they were installments, annual fees and payments-in-kind. In Santa Cruz, long term credit was overwhelmingly the most popular, followed by annual fees and installments. The percentage of respondents unwilling to support any of the schemes was very low in each area: 3 percent in San Julian, 1.5 percent in Mineros, and 1.3 percent in the city of Santa Cruz.

While it seems clear that people in each of the survey areas would be willing to contribute to the financing of health services, it is recommended that a combination of financing strategies be implemented in each of the areas since no one mechanism is supported by a majority of residents. Fee for services and drug sales are two common ways to finance curative services. The strongest rationale in support of fees and drug sales is that it is possible to encourage cost sharing while at the same time reducing potential overutilization. However, these mechanisms may exclude the poorer members of communities who cannot afford to pay, and a graduated scale might be developed in accordance with ability to pay.

However, due to Bolivia's current economic crisis, the inflation rate seriously hinders the continuation of revolving drug funds or set fee-for-services. The authors argue that regardless of the particular combination of financing schemes in each area, all goods and monies should be converted into durable goods immediately. Because of Bolivia's unprecedented inflation rates, this represents a challenge for any community financing plan.

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This study was conducted from April 1984 to August 1985. Further information may be obtained from the principal investigator, Mr. Martin Miller, Fundación Integral de Desarrollo, Casilla 1911, Santa Cruz, Bolivia, or from Dr. Jack Reynolds, PRICOR study monitor (Chevy Chase).

## Study Abstract

### THE USE OF VISITADORAS AND FINANCING OF COMMUNITY WATER SUPPLY

Researchers from the Fundação Serviços Especiais de Saude Publica (FSESP) and Johns Hopkins University conducted a retrospective case study of FSESP in rural Brazil. The FSESP is a public foundation started by AID and the Brazilian Government in 1942. It is linked to the Ministry of Health and provides primary health care and water supply services to over 13 million people (approximately 10 percent of Brazil's population). In particular, the study focused on FSESP's work with community health workers (visitadoras) and community financing of water supplies.

This study presents the findings of many earlier operational studies and the resultant changes. The PRICOR researchers believed that primary health care (PHC) planners and workers all over the world would benefit from the documentation of experiences of a highly successful and enduring program of PHC delivery and backup secondary care.

#### COMMUNITY HEALTH WORKERS: THE VISITADORAS

In their study of the visitadora (CHW) program, the PRICOR researchers looked at the role, selection, training, supervision, compensation, total costs, quality of care, coverage, and productivity of the visitadoras. The investigators found that the FSESP visitadora program was directed from the central level and was highly organized. Visitadoras perform a variety of PHC tasks in such areas as maternal health, infant and child health, school health, control of communicable diseases, curative health care, and community education. Selection of young women for the job of visitadora was rigorous and highly competitive and a great deal of effort and resources went into their training and supervision. The visitadoras received regular salaries that were four times as much as the standard minimum salary in Brazil. The monetary incentives and job security made the job of visitadora an attractive employment opportunity for young women in rural areas of Brazil.

Using the data from a 1982 expenditures survey of the regional directorates, the study team calculated annual costs of each FSESP health post. Total annual costs per health post, each of which serves an average population of 1,250 people, were estimated at US\$ 18,208. The training costs for each visitadora were only 0.5 percent of this total. The combined salaries of the visitadora and a sanitary auxiliary, including their social security benefits, accounted for 70 percent of the total costs of the health post.

The costs of direct supervision from the support unit were estimated to be 1.2 percent of the total annual costs of the health post. All of these costs were covered by FSESP with funds from the Government of Brazil. FSESP authorities recognize that the cost of the high quality health services provided by the

visitadora could not be paid by the rural communities served and that government subsidization is required to meet the needs of the "poorest of the poor."

While utilizing the service statistics available for visitadoras, the researchers discovered inefficiencies in FSESP's health information system. Although data collected by the visitadoras and their supervisors were sent to the central level and put on a computer, these data were not analyzed, condensed, or appropriately displayed. Therefore, they were of little use for evaluation or supervision. As a result of the research, changes in the information system were proposed to FSESP officials.

#### COMMUNITY FINANCING OF WATER SUPPLIES

A review of the development of FSESP's system of water supply financing and operation revealed that FSESP has assisted over 1,000 Brazilian communities to install water supply and sewage systems. FSESP has created municipal authorities (SAAEs), with paid employees, to manage the water supply and sewage systems. Where necessary, FSESP provides technical and economic support. This approach has been very successful and many SAAEs have generated surplus cash which has been used to expand the systems.

The methods used to generate capital varied from community to community. The most common methods were subsidies, external financing, community contributions of labor and money, and some combination of these. Most smaller communities' water systems are capitalized through loans from development banks, while loan interest payback, operation, and maintenance costs were met through user charges. Rates for utilization of water and sewage systems were based on the minimum salary in Brazil and thus adjusted for inflation. Rates were set to favor poor users rather than large commercial users.

The PRICOR team discovered that small communities in Brazil are able to pay for both maintenance and operation of water supplies if a suitable financing system is used. In the case of FSESP, the regular payment of water bills by the community was achieved through the efficient management of the water system by the SAAEs and proved to be an adequate financing mechanism for operating costs. The researchers think that expanding water supply coverage depends more on the method and efficiency of billing and collection than on the wealth of the community and the amount of charges for water.

The methods and results of the PRICOR study on community financing of water supplies are being used to evaluate and revise the new national scheme to develop water systems (PLANASA) in Brazil. A survey of the State Water Supply Agencies is being conducted using the same approach used in the PRICOR study. Results of this survey will be compared with those obtained in the PRICOR study.

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This study was conducted from January 1983 to April 1984 by the Johns Hopkins University School of Hygiene and Public Health and the Fundação Serviços Especiais de Saude Publica. Further information is available from Dr. Timothy Baker, School of Public Health and Hygiene, the Johns Hopkins University, 615 North Wolfe Street, Baltimore, Maryland 21205, or from Dr. David Nicholas, PRICOR study monitor (Chevy Chase).



## Study Abstract

### COMMUNITY FINANCING OF PRIMARY HEALTH CARE IN RIO DE JANEIRO

An operations research study was undertaken by the Centro de Pesquisas de Assistência Integrada à Mulher e à Criança (CPAIME) of Brazil, a private nonprofit organization, to identify and test alternative schemes for community financing of primary health care (PHC) at selected CPAIME health units and miniposts. Ten low-income communities of Rio de Janeiro served by CPAIME participated in the study. The objective was to identify the PHC community financing strategies (i.e., mixture of several community financing schemes) for CPAIME units and miniposts that maximize coverage and utilization of services, cover the largest proportion of recurrent costs of service delivery, and decrease CPAIME's dependence on external financing sources.

To begin, CPAIME identified four groups to share in decisionmaking regarding the community financing (CF) projects: community residents, community leaders, CPAIME service providers, and a representative group of CPAIME managers, supervisors, and researchers called the "Group of Ten." The meeting participants also generated a ranked list of alternative community financing schemes and constraints using Nominal Group and Delphi techniques. From this list the group constructed a preliminary matrix and identified major information gaps.

To fill these gaps, CPAIME researchers conducted two surveys of 10 low-income Rio de Janeiro communities: one of the community and one of CPAIME health service providers. Community leaders were also interviewed to get their opinions and suggestions regarding community financing of PHC.

The surveys provided useful information on community utilization of and payment for health services. Most households (93 percent) reported that at least one household member is covered by public sector health insurance. Government facilities provided the major source of health care for women age 15 to 49 and children under 5. Payment for health care was made for only 6 percent of the children and 8 percent of the women, based on most recent visits. Some women did pay for dental care (22 percent), injections (17 percent), and gynecological care (7 percent). Most vaccinations, pediatric care, well-child care, and emergency care, were attained free at public health facilities. Household members also paid for drugs and contraceptives from pharmacies.

Solutions to the PHC financing problem were developed by the relevant decision groups using preference and impact interaction matrices. These matrices were completed by all members of the Group of Ten and by all CPAIME supervisors and service providers working in nine communities. Consumers were represented by the community survey data from which the research staff made inferences. The Group of Ten incorporated the opinions of community leaders into their matrix entries.

The final ranking of the financing schemes in each community was determined from tabulation of these matrices. These rankings were used to construct financing strategies (mixtures of several schemes) specific to each community. For example in Vila Alianca, the strategy consisted of payment for selected services and visits, sale of prescribed drugs, collection of registration fees, and contributions of funds and labor by a community organization for the maintenance of a women's health care unit. For schemes involving payment, group debates identified which services, visits, and drugs would be sold and their prices. The community and health care provider surveys provided important input to this decisionmaking process.

Once final details of each strategy were defined, they were reviewed in a meeting between community leaders and Group of Ten representatives. Schemes or elements of schemes not considered acceptable to the leaders following these discussions were deleted. Community leaders were asked to sign written agreements detailing the responsibilities of both CPAIMC and the community in implementing the CF strategy.

The individual community financing strategies were implemented in nine study communities over a period of nine months and then evaluated. The evaluation of each community financing strategy was based on three indicators of success: (1) its ability to generate revenue to cover PHC costs, (2) its effect on service utilization, and (3) its effect on service coverage.

The mean monthly revenue generated by the schemes during the 9-month test varied significantly among the nine communities, ranging from US\$ 121 to US\$ 4. The three most successful strategies covered approximately 11 percent of total costs (20 percent of direct costs) of PHC service provision. The CF schemes that generated the largest proportion of revenue in all communities combined were payment for selected services and sale of prescribed drugs and contraceptives. The scheme components that generated the most revenue were charges for Pap smears, contraceptive sales, physician visits, and drugs, in that order.

In six of the eight service sites, the trend in total number of visits remained unaltered following implementation of the CF strategies, while in two of the sites it decreased significantly. Only one association appears to exist between individual financing schemes and changes in utilization trends: in all five units where registration and Pap smear fees were charged there was a significant decrease in the number of initial visits for women. The lack of control communities in the evaluation of PHC service coverage precluded any conclusions as to the effect of CF strategy implementation on coverage.

During a final community survey, information was collected from all households regarding their knowledge of CPAIMC services and CF schemes, and their opinions on PHC community financing. Nearly three-fourths of the respondents stated that charging for services does not impede service utilization. Fully 65 percent of the respondents who knew of the CPAIMC service site in their respective communities stated that community residents should help maintain the CPAIMC unit/minipost.

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This study was conducted from July 1983 through March 1986 by the Centro de Pesquisas de Assistência Integrada à Mulher e à Criança (CPAIMC). Further information is available from the principal investigator, Ms. Karen Johnson Lassner, CPAIMC, Avenida Presidente Vargas 2863, 20210 Rio de Janeiro, RJ, Brazil, or from Dr. Wayne Stinson, PRICOR study monitor (Chevy Chase).

## Study Abstract

### MOBILIZING TRADITIONAL HEALERS TO DELIVER ORT

In northeastern Brazil diarrhea is a major source of morbidity and mortality among infants and small children. In rural areas, traditional healers have long been the first source of medical care for children suffering from diarrhea and other illnesses. The healers are available to the community 24 hours a day and work out of a desire to serve their community, without monetary incentives. A PRICOR study showed that these healers can be effective in preventing and treating dehydration and in reversing mothers' harmful health practices, at a very low cost. The objective of the study, conducted by faculty from the Federal University of Ceara and the University of Virginia, was to determine how best to mobilize and integrate traditional healers into the official health system to clinically manage diarrheal illnesses and to deliver oral rehydration therapy (ORT). The study was conducted in Pacatuba, a rural community of about 7,000 near Fortaleza, the capital of Ceara.

In the problem analysis, the researchers sought to understand the social, cultural, and medical systems in which the traditional healers work. Data was collected from surveys on the knowledge, attitudes, and practices of the community regarding the treatment of diarrhea/dehydration and child morbidity and mortality due to diarrheal diseases. Ethnographic analyses were undertaken of the health care delivery system and utilization patterns, and in-depth interviews were conducted to reconstruct patterns of household response to a diarrhea illness episode.

These analyses revealed some interesting findings on the incidence of diarrhea in the region and the possibility of using traditional healers to deliver ORT. First, the infant mortality rate was high, at almost 150/1,000, with over half the deaths due to diarrhea/dehydration. Mothers widely perceived diarrhea as a "fright disease", or other supernatural malady which requires the intervention of the traditional healer. Seventy-seven percent of mothers - representing all socioeconomic strata - first sought a traditional healer in cases of diarrhea. Knowledge of oral rehydration therapy in the community was high, but lack of service providers resulted in low utilization. Finally, mothers experienced serious problems with the modern health care system, including long waits, rationed appointments, extensive travel, and expensive and improperly prescribed drugs.

During Phase II of the study, the researchers worked with traditional healers to develop a strategy to involve them in the promotion and use of ORT. Group meetings were held during which the traditional healers had their first opportunity to share ideas with one another and participate in the formulation of a strategy for incorporating ORT into their healing rituals. They also participated in choosing an ORT recipe that was most acceptable to the target community. Forty-six popular healers in Pacatuba were trained in how to correctly prepare and administer ORS and to teach mothers how to give the solution to their children at home.

The healers were provided with the basic equipment needed to prepare ORS, including measuring utensils, containers, and water filters. In several cases the community contributed by helping to build "curing rooms," simple mud and thatch room additions on the healers' homes where they could treat patients. A manual for

instructing traditional healers was produced with substantial input from the healers, and guidelines were formulated to assess their clinical competency in the identification and treatment of diarrhea and dehydration. Healers were also taught to identify and refer severe cases that do not respond adequately to ORT.

The testing of the strategy began in October 1984, and after 12 months of activity, the impact of the traditional healers' efforts has been dramatic. A comparison of the responses of 204 mothers with children less than 5 years old before the PRICOR study with the responses of 226 mothers after the study showed a highly significant increase in mothers who know about homemade ORS, from 3% to 72% (p less than .001). Over half of the mothers surveyed had used the traditional healers' ORS, with the greatest number among the poorest families. Moreover, the traditional healers' promotion of ORT positively influenced mothers' feeding and medication use behaviours during diarrheal episodes. After the intervention, the number of mothers who believe they should continue breastfeeding during diarrheal episodes increased by 20.5 percentage points (p less than .001) and the number who believe that feeding should continue (not be withheld) increased by 18.0 percentage points (p less than .01). A significant decrease of 25.5 percentage points (p less than .0001) was shown in the number of mothers using expensive, commercially prepared ORS packets. The use of pre-diluted ORS dropped by 11.6 percentage points (p less than .01). The greatest percentage drops in the use of these expensive methods occurred in the poorest neighborhoods, where the traditional healers' homemade solutions enjoyed the greatest increase in popularity. A significant decrease (from 93% to 63%) was also shown in the number of poorest mothers who believe they must give pharmaceuticals to a child with diarrhea/dehydration.

Traditional healers have demonstrated that they are capable of preparing safe salt and sugar solutions and are effective at conveying the value of ORT to mothers. The introduction of ORT through traditional healers did not change villagers' medical beliefs about the causes of diarrhea, but rather strengthened the healers' role in the community by the incorporation of ORT skills.

A cost analysis of the intervention showed that the costs of incorporating traditional healers into ORT delivery is quite low since the healers work without salaries and because the community supplied much of the materials needed to construct the curing rooms. The average cost of constructing a curing room was US\$ 26.22, and equipping it for ORT, US\$ 43.15. The operating expenses for the program, including biweekly supervision, salt, sugar and replacement supplies for preparing ORS, averaged US\$ 71.18 per month. The cost of sugar needed per month per healer was only US\$ 0.48, suggesting that the costs of providing salt and sugar for the traditional healers could be borne by the community.

Based on the successful experience with traditional healers in Pacatuba, the researchers are planning for the incorporation of traditional healers into a new large-scale child survival project that the Federal University of Ceara is implementing in 33 municipios (counties) in Ceara with funding from Project HOPE and AID.

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This study was conducted from March 1984 to February 1986 jointly by researchers from the Federal University of Ceara, Brazil and the Division of Geographic Medicine in the Department of Medicine of the University of Virginia. Further information is available from the principal investigators, Dr. Marilyn K. Nations, Box 485, School of Medicine, University of Virginia Medical School, Charlottesville, VA 22908, and Dr. Maria Auxiliadora de Souza, Caixa Postal 1674, Aldeota 60.000 Fortaleza, Ceara, Brazil, or from Dr. David Nicholas, PRICOR study monitor (Chevy Chase).

# PRICOR Primary Health Care Operations Research

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## Study Abstract

### REVOLVING DRUG FUNDS IN DOMINICA

To increase the availability of essential drugs in its primary health care (PHC) program and at the same time decrease the government costs of supplying those drugs, the Dominica Ministry of Health (MOH) proposed the establishment of a national revolving drug fund (RDF). To aid development of the planned RDF, Management Sciences for Health (MSH) worked with the MOH using operations research to identify key operational problems and issues related to design and implementation of the RDF and to develop and test solutions for these problems.

The study began with a systematic analysis of Dominica's pharmaceutical supply system. This analysis identified the problems that impede effective and efficient operation of the system. A preliminary systems model for the RDF was available from the start of the study and was used as the basis of study planning and all subsequent activities. The model consisted of eight components: finance; management information system (MIS); selection; procurement; warehouse/inventory management; distribution; organizational development; and public knowledge, attitudes, and practices. While operational issues were identified and solutions developed within each component, the issues are interdependent and interacting. It is the composite result--the sum of solution development in the various components--that emerges from this study.

During the course of the study it was decided that the RDF should be implemented in two phases. During Phase One, the districts and independent government health facilities were the clients, purchasing drugs and medical supplies from the central medical stores (CMSs) with funds provided in their budget. During Phase Two, the patients became the clients, reimbursing the RDF through payments at government health facilities for drugs and medical supplies consumed. The MOH, through the CMSs, operated the RDF which was initially capitalized with a \$500,000 loan from the Social Security Fund.

The goal of Phase One was to develop and establish the capability of the CMSs to successfully operate the national RDF. The objectives of this phase were: to decrease the unit costs paid for drugs and supplies; to improve CMS inventory and distribution management; to increase the availability of drugs and medical supplies to health districts and independent government health facilities; to increase cost consciousness on the part of the users (defined in Phase One as health districts and independent government health facilities); and to develop the financial management system at the district level necessary to institute consumer payment. The objectives in Phase Two were: to implement and evaluate consumer payment for drugs and supplies at the district and independent government health facility level; and to increase cost consciousness on the part of the consumer.

Phase One has achieved remarkable success. One of the major factors influencing the success of the RDF was the decision to implement it in two phases. This allowed the MOH as well as researchers to focus on central

managerial systems for both financial and materials management and implementation of the MIS accounting system. The systems development efforts required to introduce consumer charges for drugs on a national level seem, in retrospect, nearly unattainable without the support of these central level management systems. This may be one of the clearest and simplest, yet most important, findings from the study. Introducing this preliminary phase has the effect of stretching out the timeline for all of the management systems development work required for an RDF, allowing the necessary attention to be focused on central systems development rather than dispersed across a wider range of issues.

The results of Phase One identified the following four issues as critical to the implementation of an effective and efficient RDF.

Adequate Capitalization. The level of capitalization required is the product of the monthly usage rate and the length of the pipeline, i.e. time required for flow of drugs from supplier to user and flow of funds from user to supplier. If accurate data are not available at the outset, the information system should be designed to collect the necessary data for continually monitoring both usage and pipeline length, in order to continually refine the capitalization estimate and make the necessary adjustments. Adequate funds for capitalization must be available if the RDF is to succeed.

Assurance of RDF Reimbursement. Because all distribution of drugs and supplies from the RDF must be reimbursed in order for the fund to revolve, two variables - distributions and reimbursements - are important and must be kept in equilibrium. This means that if distributions are to increase, as is happening in Dominica, additional funds must be found to reimburse the RDF.

Coordinated Leadership and Management. Authority and responsibility for RDF assets should be vested in either a single person or in a committee that meets regularly to review financial reports, address operational problems, and make managerial decisions.

Adequate Staff. Initial design of the RDF, and in particular of the MIS accounting system, requires the advice of an expert accountant. RDF maintenance requires all the staff normally required at a CMS to maintain the supply system, plus an RDF accountant. This accountant will maintain the accounting books and will ensure maintenance of other aspects of the MIS that provide information for RDF management; he or she should report to the RDF manager or RDF management committee.

Phase Two has not been implemented, although some Phase Two operational issues in some components have been addressed. District physicians and pharmacists are monitoring the value of the usage of drugs and supplies against their budgetary allocations and are beginning to manage their inventories by monitoring patient usage. The physicians and pharmacists are also beginning to discuss the value of drugs with patients. Usage monitoring and patient education are prerequisites to a successful RDF with consumer drug sales.

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This study was conducted from April 1983 to March 1986 by Management Sciences for Health (MSH) and the Dominica Ministry of Health. Further information is available from Mr. Peter Cross, MSH, 165 Allendale Road, Boston, MA 02130; Dr. Desmond McIntyre, Health Services Coordinator, Ministry of Health, Roseau, Dominica; or Dr. David Nicholas, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### IMPROVING DISTRIBUTION OF ORS IN THE DOMINICAN REPUBLIC

Diarrheal diseases are a leading cause of death among infants in the Dominican Republic, where approximately 550,000 children are under 3 years old. A nationwide government campaign to promote the use of oral rehydration therapy (ORT) was being planned for 1984. The purpose of the PRICOR study was to assist the government to ensure the supply and distribution of oral rehydration salts (ORS) nationally and to determine an appropriate price for the packets. The study was thus concerned with developing solutions to a number of problems in the supply and distribution of ORS.

The study began with an inventory of the available health statistics to determine the incidence of diarrhea. However, the quality of the existing data was not high enough to support sound planning. It was therefore decided to conduct a survey to collect basic data on the incidence of diarrheal diseases and on the degree to which ORT was currently being used. This information was crucial for the development of solutions and to the government in planning a distribution program.

The survey, which examined records of 27 hospitals, 21 regional subcenters, and 91 rural clinics, gathered data on mortality, morbidity, and use of ORT. In the rural areas socioeconomic data and information on health practices was also collected. In the end, the survey data proved unreliable and, therefore, not as useful to the solution development as originally hoped. However, it was the only data available, so some tentative conclusions were drawn for general planning purposes.

A quantitative inventory model was formulated to determine the best way to order, transport, store, and distribute ORS. The application of this model required both information from the government on how it proposed to distribute ORS and data from the incidence and coverage survey. The information from the government was not available, and the model was applied using only the general conclusions drawn from the survey. The resulting recommendations emphasized the importance of developing nongovernmental supply channels and using as many kinds of organizations as possible, including private commercial distribution.

The study team developed a theoretical pricing model to determine the best pricing strategy for ORS. The principal operational problem was to determine a price that was high enough to cover most costs and a small margin for the retailers and yet low enough to be affordable. Due to the unreliable survey data, this model was applied using income and expenditure studies from the

central bank and time series data on prices and sales of essential medicines. The study assumed a two-tier pricing system. It recommended a price per packet of US\$ .08 for the low and moderate-income market and a price of US\$ .30 for the high-income market. Approximately 6.5 million packets would be made available each year. This would be enough to provide universal coverage in the D.R. assuming the use of four ORS packets per episode of diarrhea. The private pharmacies would provide about 25 percent of the packets and the government 75 percent.

The design of this study depended heavily on input from the Government of the Dominican Republic. However, since the resources and political support to move ahead in planning the national ORT program were not available, the government was unable to supply the necessary information needed to complete the PRICOR study. Nonetheless, recommendations based on the results of the technical analyses were made to the government in the areas of management information systems, inventory and distribution management, and pricing. These recommendations might serve as a framework of basic ideas and information for developing a complete distribution plan in a future ORT project.

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This study was conducted from December 1983 through April 1985 by the San Juan, Puerto Rico consulting firm of Clapp and Mayne, Inc., in cooperation with the Secretariat of Health and Social Assistance in the Dominican Republic. Further information is available from Dr. Jose A. Herrero, Km. 25, Autopista Duarte, Santo Domingo, Dominican Republic; from the principal investigator, Dr. Alan Udall, Clapp and Mayne, Inc., 1606 Ponce de Leon Avenue, San Juan, P.R. 00909, or from Dr. Jack Reynolds, PRICOR study monitor (Chevy Chase).



## Study Abstract

### OPERATIONS RESEARCH TO IMPROVE THE SUPERVISION, LOGISTICAL SUPPORT, AND TRAINING OF RURAL HEALTH PROMOTERS IN ECUADOR

Since 1980, the Ministry of Health in Ecuador has trained some 472 volunteer health promoters to extend coverage of primary health care (PHC) services in rural areas. Despite efforts to improve the health promoter program, many operational problems exist that limit the effectiveness of these community-level health workers and contribute to the high dropout rate. In collaboration with the Ministry of Health (MOH), researchers from the Fundación Eugenio Espejo carried out an operations research study from 1983 to 1986 to examine problems in the promoter program and to propose solutions that could be implemented by the MOH. Preliminary analysis of the promoter program identified three basic problem "subsystems" as priorities for operations research: training, supervision, and logistical support of the health promoters.

The study team examined each of the three subsystems to identify specific operational problems impeding the effectiveness of promoters. Due to the commonality of the variables, data for supervision and logistical support were collected simultaneously. A survey of 86 promoters and 139 health personnel who had some involvement in the supervision of the promoters was carried out in six provinces representing the three geographic regions of the country (coast, highlands, and eastern jungle).

Results from the survey indicated that promoters perceived supervisors as only partially efficient in their supervision activities. Supervisors made approximately 15 contacts per year with an average of two to three promoters in their area, but these contacts were not always supervisory contacts. Problems identified by the supervisors were insufficient training and financial resources, ill-defined roles, and inadequate appraisal of their work by the MOH.

Logistical problems the survey identified included lack of regulations regarding supplies, irregular and varied demand for medications, lack of first-aid supplies and materials for community health education, and irregular and inadequate provision of supplies from the provincial level. Aspects of supervision that the researchers could modify to improve supervision included the supervisory agent, frequency of contact, number of promoters per supervisor, content of the supervision contact, and tools used by supervisors. A decision tree was used to analyze the cost and expected effectiveness of various possible supervisory agents. In addition, regression analyses were performed on data from the surveys to determine supervisor characteristics that served as predictors of promoter productivity. Experts and officials from the MOH with decisionmaking powers analyzed these variables to determine the most appropriate solution.

The improved strategy for supervision called for revising norms for the content and frequency of supervisory contacts and designating the auxiliary nurse as the most appropriate supervisory agent. Specific supervisory itineraries and the number of promoters assigned to each supervisor were also specified. A protocol was prepared to guide the auxiliary nurses during the supervisory visits. In addition, checklists were prepared to help the supervisor monitor priority activities of the promoter. To improve logistical support, a supply inventory control form was designed to be used during supervisory visits.

To analyze the training subsystem, the study team reviewed the MOH training modules used for promoters and conducted a survey of promoters. Problems, many cultural, were identified in the training modules. Traditional value systems of the communities have not been adequately incorporated into the health system and promoters were therefore not sufficiently oriented as to how to integrate their activities into the socioeconomic and cultural context of the communities they served. Also, the objectives of the training were unclear and skill requirements for trainers had not been clearly defined. Finally, opportunities for continuing education were inadequate.

To resolve training problems, the promoter course content was modified to better meet community needs. A new decentralized training strategy was also proposed to involve local health personnel and other community resources in the training of promoters and to increase practical experience in the training course.

During the period of PRICOR funding, the researchers conducted a field test of the supervision strategy using a quasi-experimental design with two experimental and two control provinces. Thirty promoters were included in the two experimental provinces. A 4-day workshop was conducted for the promoters, supervisors, and central- and provincial-level decisionmakers in each experimental province to introduce them to the supervision strategy and explain the protocols and checklists.

After a 5-month field test, a post-test survey was conducted to evaluate the supervision strategy. Significant differences were found between experimental and control provinces for variables such as average number of supervisory visits, average time spent with the promoter, contact with community leaders, and visits with promoters to the houses of pregnant women. In addition, supervisors in the experimental villages gave greater support to promoter activities in health education, curative care to children and adults, surveillance of water sources, garbage and human waste disposal, and diarrhea and respiratory disease control. Provision of supplies was significantly better in experimental villages, but funds for medicine remained insufficient.

The solutions developed and tested by the study have been incorporated into revisions to the MOH norms and supervision guidelines. Interest in the new supervision strategy has also been expressed at the provincial and county levels and by other popular organizations. Although the proposed alternative training strategy has not yet been implemented, a field test of the decentralized training strategy has been proposed and is currently under consideration by the MOH.

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This study was carried out from September 1983 through March 1986 by a research team from the Fundación Eugenio Espejo. Further information is available from the principal investigator, Lic. Jorge Luna Acosta, Fundación Eugenio Espejo, Atahualpa 333 y Ulloa, Quito, Ecuador, or from Ms. Lani Rice Márquez, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### ADDING NUTRITION REPLETION EDUCATION TO ORT PROGRAMS IN EGYPT

The prevention and treatment of childhood diarrhea and subsequent malnutrition was the subject of an operations research (OR) study carried out in 1985 through 1986 by researchers from the Nutrition Institute of Egypt. The study focused on children under 3 years old who were given oral rehydration therapy (ORT) at primary health care (PHC) units in rural lower Egypt, rural upper Egypt, and a suburban district near Cairo.

The health problem addressed by this study was the "diarrhea-malnutrition-diarrhea cycle" which had not been broken, although a national ORT program was in place and functioning relatively effectively. Researchers from the Nutrition Institute had observed that immediately following an episode of diarrhea, a child's body has an increased capacity to absorb nutrients and utilize calories in order to regain a healthy nutritional status. However, this nutritional "catching up" can occur only if the child is provided with nutritious foods during and after the bout of diarrhea. Traditional infant feeding practices in Egypt do not normally provide extra food for the child who is sick or has recently been sick. Thus, ORT was working relatively well for the short-term treatment of dehydration, but was not solving the long-term problem of nutritional depletion. The objective of the study was to develop ways to incorporate a nutrition repletion component into the existing ORT program of the Egyptian PHC system.

A Policy Committee composed of decisionmakers from the PHC system, the Nutrition Institute, and other relevant agencies participated in problem analysis. The existing system for ORT delivery was thoroughly described, and knowledge and data about feeding of children during diarrheal episodes was shared. This group concluded that there was a need to get more information to mothers and health providers on appropriate infant feeding practices during and after diarrhea. It was decided that health providers at PHC facilities would give this information to mothers when they brought their children in to be treated for diarrhea. Three different types of health centers would be included in the study: those participating in (1) the national ORT program alone, (2) both the ORT program and the Nutrition Education (NE) program, and (3) both the ORT program and the Strengthening Rural Health Delivery (SRHD) program.

The Policy Committee used a modified nominal group process to develop an educational message to teach mothers to replete their child nutritionally during and after an episode of diarrhea. The message was designed in such a way as to help mothers themselves decide what to feed their child during and

after diarrhea, based on the foods available to them. The message finally developed consisted of three parts: (1) continue feeding your child when he/she has diarrhea, (2) if the child is breastfed, continue breastfeeding, and (3) the child may continue any foods that he/she had eaten previously, only the food should be boiled. During the period of the study, a TV/radio message was released by the National Diarrheal Disease Control Project (NDDCP) which encouraged mothers to breastfeed their children during and after diarrhea.

Before the introduction of the educational message in the health facilities, baseline surveys of more than 1,000 mothers, 341 health care providers, and 60 pharmacists were conducted. These surveys were administered at 104 health centers on days that the Maternal and Child Health (MCH) clinics met. A checklist for health facilities helped determine how ORT was being used in those facilities.

This initial survey revealed some interesting findings about infant feeding practices in the study areas. The majority of the mothers reported a "correct" usual diet for the child before 6 months and after 18 months of age. During the period of 7 to 18 months, a significant number of mothers continued to give their infants an unsupplemented milk diet (at a time when other sources of calories and nutrients become important). By the age of 13 to 18 months, about one quarter of the children were receiving a complex diet without any milk. A large proportion of the mothers (39 percent) reported that they had made a change in the child's diet during this illness. About 10 percent indicated that they had stopped feeding the child completely.

The directors of each of the three programs (ORT, NE, and SRHD) then incorporated the nutrition message into their clinics using their regular training and management techniques. Health care providers at the three different types of health units delivered the educational message to mothers who brought children in to be treated for diarrhea during a 3-month period. The message "feed your child any boiled foods" was unique to this PRICOR study, so if mothers did remember this advice, the researchers could be relatively certain that they had heard it from the health care providers at the study units.

About 3 months later, the research group carried out a post-intervention survey of mothers and health care providers. This version of the survey was slightly improved over the pre-intervention survey, so the results cannot readily be compared. It was apparent, however, that a significant proportion of mothers attending the health facilities had heard the educational message and made positive changes in their behavior as regards feeding during diarrhea and ORT use. Upon recommendation of the Policy Committee, the educational message tested in this study has been fully incorporated into the PHC system.

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This study was conducted by researchers from the Nutrition Institute from February 1985 through March 1986. Further information is available from the principal investigator, Dr. Osman Galal, Director, Nutrition Institute, 16 Kasr el Aini Street, Cairo, Egypt, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### IMPROVING ORS INVENTORY MANAGEMENT IN RURAL HEALTH FACILITIES OF EGYPT

An operations research study of the availability, distribution, and inventory management of oral rehydration salts (ORS) during the period 1978-1985 was carried out by researchers from the Strengthening Rural Health Delivery (SRHD) Project in Egypt. The study focused on rural health facilities and surrounding communities in Fayoum Governorate (Upper Egypt) and Dakahleya Governorate (Lower Egypt).

Although oral rehydration salts were introduced to government health facilities in Egypt in 1977, by 1983 initial results had shown less effect than anticipated in lowering mortality and morbidity from dehydration. The objective of this study was to improve the availability of ORS in rural communities and thus maximize the impact of the oral rehydration therapy (ORT) program in reducing childhood mortality. In order to analyze the problem, the study team examined the 1978-83 production/distribution system and the current (1984) availability and consumption of ORS at each level, from the center to the periphery. These data were then analyzed to identify the strengths and weaknesses of the production/distribution system.

At a solution development workshop early in 1985, feasible solutions for improving ORS availability and utilization were proposed to decisionmakers from the Ministry of Health and other agencies concerned with promoting ORT. The PRICOR researchers offered alternative solutions, including: (1) improve the ORS inventory management information system; (2) train health providers, including pharmacists, in ORT; (3) educate communities about ORT; and (4) distribute ORS through home visits by nurses or volunteers. The decisionmakers were first asked to rank a set of criteria for evaluating the alternative solutions. They then ranked the proposed solutions in order of importance. The solutions judged most promising as a result of this process were: (1) increase the demand for ORS through education of the community and training of health providers, including pharmacists; and (2) improve the inventory management system through an improved flow of information on ORS from the periphery to the center. Because major programs in public education and health provider training were already being carried out by the National Control of Diarrheal Diseases Project (NCDDP), it was decided that the SRHD/PRICOR project would focus on improving the flow of ORS inventory information.

The researchers developed a system of ORS reporting forms to facilitate the flow of information on levels of ORS consumption from rural health facilities to the center. They then field tested the forms in rural health facilities in

Fayoum and Dakaleya Governorates from May through October 1985. Data from the forms were supplemented by data abstracted from drug inventory books and clinic records at rural health facilities for the 18-month period, May 1984 through October 1985. Information from the individual health facilities was compiled on a district level form, and the district forms were compiled at the governorate level. Inventories of ORS stocks were carried out at both district and governorate level drugstores. A simple questionnaire was also designed and implemented to determine the attitudes of health facility physicians and their supervisors about the NCDDP information system.

The research team analyzed the data gathered through the new ORS inventory reporting system using three alternative mathematical inventory models. The objective of this exercise was to develop an analytical tool which could be used by the physician/manager at each level of the system to improve inventory management. Two of the models, a cost-based set of equations and a multiple regression model, produced poor or impractical results. The third, more useful model consisted of a set of equations relating both inventory and safety (buffer) stocks to seven key system variables: annual demand, lead time, variability in lead time, lead time demand, order frequency, order quantity, and acceptable stock-out level. This model produced valuable insights into inventory system dynamics, which were subsequently incorporated by the principal investigator into a simplified periodic ordering scheme. According to this scheme, ORS orders are placed monthly at the periphery, every 2 months at the district level, and quarterly at the governorate stores. The quantity to be ordered by the physician/manager at each level is estimated from three easily calculated parameters: average cycle demand, demand during the previous cycle, and inventory level at the close of the previous cycle. To minimize spoilage, managers should follow the inventory rule of "first in - first out" in distributing ORS. This system is being implemented throughout the SRHD project area and has been recommended to the NCDDP and the Ministry of Health for use elsewhere.

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This study was conducted from January 1984 to March 1986 by the Strengthening Rural Health Delivery (SRHD) Project of the Egyptian Ministry of Health. Further information is available from the principal investigator, Dr. Ahmed Nagaty, Director, Strengthening Rural Health Delivery Project, Nutrition Institute Building, 16 Kasr El Aini Street, Cairo, Egypt, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase). The former principal investigator of the study was Dr. Youssef Tawfik, now at Management Sciences for Health in Boston, Massachusetts.

# PRICOR Primary Health Care Operations Research

## Study Abstract

### PROMOTING THE USE OF ORT IN GRENADA THROUGH THE DEVELOPMENT OF COMMUNITY ORGANIZATIONS

Concerned about morbidity due to early childhood diarrhea and its sequelae, PRICOR-supported researchers in Grenada used operations research to develop improved methods of involving community organizations in health behavior education and oral rehydration therapy (ORT). The researchers described and facilitated the process of community organization, rather than trying to evaluate the effectiveness of different models of community organization. This phase of the project began in the Autumn of 1984, between the time of the US intervention and the elections in December of 1984, and lasted until April of 1986.

Lacking an existing model of community organization (CO) process within which to organize their data, the research team developed a model of the "Community as a System". It allowed the researchers to identify the belief systems, social structures and roles within the community, and to take into account the external political, institutional, economic and physical factors acting to influence these dynamics throughout the CO process.

While several methodologies exist to promote CO, the researchers espoused the Responsive Shaping approach and distinguished it from the Active Design approach. The latter approach presents a CO form to the community and fosters conditions to help bring it about. Responsive Shaping, on the other hand, anticipates and responds to developmental events occurring in, by, and around the community, and allows the community to determine the final shape of its organization. This methodology distinguishes two dynamic processes - the Formation Phase, and the Maintenance Phase.

To encourage formation of community organizations, the team made home visits and distributed flyers to generate enthusiasm and motivate community members to come together for a meeting. At the meeting, the members were encouraged to elect officers, to identify and prioritize their needs, and finally to select one problem to solve. The problem was to be relatively obvious and tangible with short-term solutions. In two communities road repair and piped water were identified as their top choices. In four of the five communities (re)construction of a community center was listed among the top three choices. The researchers were instrumental in securing USAID funds for three communities - two of which were well on their way in the formation process and one which showed potential. The team provided technical support for the center's design and construction through a process which involved the community in the planning as well as implementation stages.

Since none of the communities identified health needs as a priority, the McMaster team encouraged existing local groups to incorporate health behavior education and ORT activities into their meetings. Health education sessions were conducted in all communities by the project's field team. The team also had as its major objective to train community members as ORT distributors. A major hurdle in accomplishing this was the government's policy for health facility based distribution. The team finally secured approval in December 1985 to train and supervise community distributors in project communities.

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Distributors were either recruited by the research team because of their interest in child health or were trusted by the primary health care team's nurse. Training was conducted by the field staff using the experience-based 'learning-by-doing' method. Afterwards, the community distributors were evaluated and certified by the team's physician for their understanding and ability to use ORT. The late date of approval for training and the low incidence of diarrheal episodes (due to seasonal variations) resulted in only one distributor using the packets for two incidences of diarrhea - thereby preventing any meaningful evaluation of the community distributors capabilities.

Findings: The formation of community organizations met with qualified results. While many communities had had prior CO experience under the previous government, the post-Intervention administration dismantled most organizations. Communities were understandably reluctant to invest energy in reactivating these organizations in light of the uncertain political support. In the five project communities, the one which had a previous successful experience at organizing found it the easiest to resume CO activities. Their leadership was experienced and able to mobilize the community support and action. Some of this community's leaders were also members of the project's field team and were able to participate in project management and decision making.

Difficulties in organization were experienced by communities when (1) intra-community differences and tensions erupted, (2) outside groups attempted to determine what was best for the community or assumed ownership of the community's projects, or (3) attempts were made to build onto previously unsuccessful organizational frameworks.

While no organization reached the maintenance phase, one was well on its way, having successfully completed its first project and being actively involved in two others. For that community, and the others which were progressing through the formation phase, success was attributed to (1) strong, committed leadership, (2) a sense of group cohesion and identity, (3) identification and prioritization of needs, (4) selection of a short term, tangible and soluble problem, and (5) external support in the form of motivation, funding, training, and a governmental policy commitment.

There is no strong empirical evidence from this study to support the theory that CO efforts in relation to health projects will happen faster, less expensively, or more effectively if a community acts in concert on projects. In fact, as the research team found, it was difficult to organize a community around a cause which they did not perceive as a priority need. Since health problems are more subtle and take longer to solve than road repair or construction of a community center, they are less likely to come to the top of the community's agenda until the community has had the time and success on previous projects to come into a sense of itself.

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The "McMaster Child Health Project" was conducted from 1981 through 1986. It was a collaborative effort between the Grenada Ministry of Health, McMaster University, University of Toronto, University of Waterloo, and the University of the West Indies. PRICOR supported research on community organization activities from September 1984 through April 1986. Further information is available from the principal investigators, Dr. Norman F. White (Professor, Faculty of Health Sciences) and Dr. S. Martin Taylor (Professor, Department of Geography) of McMaster University, Hamilton, Ontario, Canada, or from Dr. Wayne Stinson, PRICOR study monitor (Chevy Chase).

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**Study Abstract****ALTERNATIVE METHODS OF MOTIVATING COMMUNITY HEALTH WORKERS**

The Ministry of Health of Haiti has adopted a strategy of primary health care (PHC) to achieve the goal of "Health for all by the Year 2000." The success of this strategy depends largely on the ability to recruit and support government health workers, or non-government community health collaborators, who will provide community-based preventive PHC services. The recurrent cost of financing these peripheral-level workers is too high for either the government or private institutions to absorb. Save the Children Canada (AEDC), in collaboration with institutions associated with the Haitian Association of Voluntary Health Institutions (AOPS), conducted a study during the period 1984 - 1986 to examine the best ways of motivating the CHWs to provide preventive services that would encourage mothers to learn about, use, and maintain their competence in child survival interventions.

Given that subsidies from institutions managing the CHW programs were not an acceptable option, the researchers began by identifying alternative community financing mechanisms. These included: (1) funds from the community (fee-for-service at rally posts, contributions from existing community groups, prepayment for services); (2) volunteers; and (3) revenue-generating activities.

Data were collected in community surveys and intensive case studies to better understand the motivation problem and the feasibility of the proposed alternatives. Results from the surveys, carried out in three rural areas, showed that people are not willing to pay for preventive services. Communities perceive curative care as their primary health need and CHWs in the rural areas do not provide curative care. In fact, people perceive health care as a "service" delivered by an outside agency. While people understand the value of health promotion, they expressed no willingness to finance a health care delivery system. Given these constraints, the researchers and consultants then systematically evaluated the options using a multiple criteria utility assessment.

With regard to community funds, increasing revenues from fee-for-service activities at the rally posts (where health services are delivered from mobile units), was not acceptable to local institutions. This option was eliminated because the doctor-oriented, "curative" focus would detract from the four child survival interventions, and it would not generate enough money to regularly pay the CHWs (as demonstrated in Mirebalais). Local community groups often pool resources for special projects. However, most community groups agreed that although they appreciate the work of the CHWs and would like to encourage it, they did not normally have enough funds or community support to use existing funds to regularly finance a CHW. The prepayment scheme was not feasible because people were not willing to pay for preventive health services.

The second alternative for providing preventive services was volunteers. Existing volunteer projects were examined and it was found that they shared the common characteristic of being discrete activities of short duration. None were ongoing activities. Volunteers did not seem a likely source of energy for the preventive health work. The third major alternative considered was revenue-generating activities that would produce enough profit to reimburse the CHWs for their work. The major problem with these activities was that they usually did not provide incentives to the CHW to do preventive services.

The solution the group found most likely to motivate the CHWs to do preventive tasks was a combination of the prepaid scheme, the existing community groups, and a revenue-generating activity. It is based on traditional Haitian credit associations called "cengle" or "solde." In these traditional rotating credit schemes, friends contribute a fixed amount of money each month to a general fund and take turns receiving the entire pool. In the proposed health financing scheme, groups of mothers who can demonstrate competence in the four child survival interventions and whose children are fully immunized and participating in growth monitoring will be eligible to participate. These women, organized in small groups by their natural friendship networks, each pay an annual fee for her health card (which is used to support the CHW). The group decides the monthly contribution each person must make depending on how much they know that person can pay. The monthly contributions are used by the women as in a traditional cengle. However, the real attraction of the health card is not the cengle but the access that the affinity group then has to low-interest loans from the Bureau de Crédit Agricole (BCA) for income-generating activities. The pooled monthly member contributions are matched by a one-time grant from the institution sponsoring the CHW program. This matching grant is used as capital for the loan, kept at BCA. BCA will lend four times that amount to the group for income-generating activities. A counselor from the BCA will help the affinity groups develop feasible projects and a payback schedule. The affinity group is an essential component of the scheme as its cohesion is the reason people will be motivated to continue paying into the fund.

This project appears to have produced favorable results for a number of reasons. Credit schemes such as these are attractive to rural residents because there is great demand for credit, and private-source interest rates are very high. Because low-interest credit is so desirable, there is an economic incentive for the mothers to learn about the health interventions in order to have access to the pooled funds. As the CHW salary is based on the number of mothers who qualify for the health cards, the financing scheme cleverly links the promotion of preventive health interventions with revenue generation. Some of the groups have developed successful income-generating projects. One group bought a mature mango tree from which they will harvest and sell mangos. Another group bought a goat with their loan and have recently acquired another with their monthly contributions.

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This study was conducted from December 1984 through March 1986 by the Alliance pour l'Enfance et le Développement Communautaire, in collaboration with institutions associated with the Association des Oeuvres Privées de Santé. Further information is available from the principal investigator, Dr. Antoine Augustin, Alliance pour l'Enfance et le Développement Communautaire, 3 Ruelle Duncombe, Port-au-Prince, Haiti, or from Ms. Marty Pipp, PRICOR study monitor (Chevy Chase).



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## Study Abstract

### ROLE OF TRADITIONAL BIRTH ATTENDANTS IN MATERNAL HEALTH

Maternal mortality rates in Haiti have remained at the same high levels for the past 10 years despite the implementation of a maternal health care system that incorporates trained traditional birth attendants (TBAs). Researchers from the Complexe Médico-Social de la Cité Soleil in Port-au-Prince carried out an operations research study with the objective of determining the most cost-effective method of training and utilizing TBAs to help decrease maternal and neonatal morbidity and mortality.

Cité Soleil is a slum area with a population in excess of 100,000 located on the outskirts of Port-au-Prince. Several neighborhoods in the area are served by the Complexe Médico-Social de la Cité Soleil, a multipurpose private nonprofit organization. The residents of these neighborhoods are the subjects of the Complexe's extensive health information gathering system which uses community health workers (CHWs) to register all inhabitants on family register sheets, to identify target groups, to monitor health surveillance programs, and to record all vital events. A numeric coding system identifies each individual living in Cité Soleil by neighborhood, sector, family, and CHW assigned to them.

To identify and analyze problems with the current maternal care system, including the TBA subsystem, the investigators collected data from Complexe records and from interviews with TBAs. Data on maternal and newborn health problems were collected from a review of maternity records and neonatal death records, a study of 300 pregnant women receiving pre- and post-natal care from September to October 1983, and the 1983 Cité Soleil census. Health problems found to be common during the post-partum period included hypertension, birth canal laceration, and infections.

From these data, a description of how TBAs fit into the Complexe's maternal care services was prepared. Traditional birth attendants have been provided with special training in safe delivery methods, referral of high-risk cases, general concepts of public health, the importance of pre- and post-natal care, nutrition, and family planning. This training was provided by a public health nurse during a series of 27 sessions. Once all lessons were covered, TBAs were required to pass an examination before being certified as trained TBAs. The tasks specified for TBAs included encouraging pregnant women to attend pre-natal clinics, identifying women with potential complicated pregnancies, educating pregnant women in hygiene and nutrition, recognizing signs of labor, performing routine deliveries, referring difficult cases, and encouraging mothers to practice family planning.

The PRICOR investigators had already determined, based on interviews with 20 TBAs, that this TBA training program was not having the desired impact on maternal mortality and morbidity. TBAs were performing only three of their assigned tasks: encouraging pregnant women to attend pre-natal clinics, performing routine deliveries, and referring difficult cases. Reasons which the TBAs provided for neglecting other tasks were brevity of encounters with pregnant women, fear of being labeled "nosy", and fear of being blamed for complications in delivery.

The PRICOR investigators then proceeded to determine if a shorter, competency-based training program would result in better TBA performance and thus reduce maternal and neonatal morbidity and mortality. Untrained TBAs were selected from the community and divided into two groups. Group I received the standard (27-session) training course and group II received a shorter competency-based (5-session) training course. The new training program to be tested also differed from the current program in that it placed stronger emphasis on recognition of high-risk situations. In terms of nutrition, TBAs were trained to deliver two simple messages: (1) eat an extra meal a day (ante- and post-partum) and (2) give only breast milk to the newborn until age 3 months. The TBAs were instructed to recommend hospital delivery for all high-risk pregnancies.

Group I TBAs were assigned to cover women living in the Boston, Cité Jean Claude, PCS, Brooklyn, and Wharf neighborhoods. Group II TBAs were to cover women living in the Ilene Cité and the TBB neighborhoods. A third neighborhood, with no TBA program, was selected as a control. Because of the Complexe's population-based registry system, the women covered by the two different groups of TBAs could be followed throughout their pregnancies and subsequent deliveries to determine the effects of the two different training programs.

After the TBAs had been trained and had been delivering services in the communities, the researchers interviewed the women in the two groups to determine the presence of risk factors during pregnancy, the utilization of pre-natal, delivery, and post-natal services, and the outcome of the pregnancy. Extensive information was gathered on any infant or maternal deaths. Analysis of the results of these interviews showed that there was little difference in impact on maternal morbidity or mortality between the two training approaches. The only significant difference in TBA practices was that TBAs who had attended the shorter training session referred more high risk women for prenatal care and hospital delivery. Since there were no major differences in outcomes of the two training programs, the researchers decided to implement the shorter, competency-based course in the Cité Soleil health project on a permanent basis. The investigators are now reviewing the results from their analysis of the entire maternal care system and from individual case studies of maternal and infant deaths to determine what other changes in the system would be appropriate to reduce morbidity and mortality.

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This study was conducted by the Complexe Médico-Social de la Cité Soleil from February 1983 through March 1986. Further information is available from the principal investigator, Dr. Carlo Boulos, B.P. 1666, Port-au-Prince, Haiti, or from Dr. David Nicholas, PRICOR study monitor (Chevy Chase).

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# PRICOR Primary Health Care Operations Research

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## Study Abstract

### COMMUNITY ORGANIZATION IN PROMOTING EFFECTIVE USE OF ORT IN HAITI

Severe dehydration is responsible for one-half of the deaths of children under 5 in Haiti. A 1984-86 PRICOR study, carried out by researchers from the Association des Oeuvres Privées de Santé and the University of South Carolina School of Public Health, addressed the need to extend the use of oral rehydration therapy (ORT) to the rural areas of Haiti, even in villages without a resident agent de santé (health worker). The operational objective of the study was to mobilize existing community resources (formal groups, informal networks, institutions, and leadership) to increase the availability and use of oral rehydration salts (ORS), both packets and home mix, and to ensure appropriate caretaker preparation and administration of ORS. The project site was the Petit Goave Health District in the Western Public Health Region of Haiti.

During the problem analysis phase, a series of overlapping data collection instruments was used to identify the major obstacles to more effective caretaker use of ORT and to set priorities among these problems for operations research. To achieve these two objectives, the study team identified obstacles through: (1) surveys that provided information on household KAP, socioeconomic characteristics, ORS usage levels, willingness of community leaders and sellers to help promote ORS, and existing health facilities and ORT programs in the health district; (2) interviews with residents living at different distances from sales posts; and (3) focus groups. Twenty villages in the district were selected for inclusion in the study.

Solution development began with an analysis of the studies mentioned above. Four priority sub-problems were identified: ORS availability, ORT usage, ORT preparation, and clinical treatment and referral of children with severe dehydration. The study team developed models for each of the sub-problems and presented them to members of the project policy committee (including members of the National Campaign Against Diarrhea). Using a nominal group process, the committee then examined each model and evaluated the variables in terms of both their individual importance and the extent to which they could be manipulated by the decisionmaker. Those variables that passed the tests were kept in the model and others were added at the suggestion of the policy committee. Community-based solution models were developed to address only the first three sub-problems. Based on the process described above, these solutions were then presented for review to the Petit Goave District Health Committee and to leaders in the intervention communities and revised as necessary.

To improve ORS availability, 28 new ORS sales posts were established in the intervention communities. Operators of these posts and operators in villages already having posts were trained in effective procedures for storing, promoting, and selling ORS. To increase the use of ORS and to improve preparation and administration of the solution, a community-based educational strategy was developed and modules prepared to train a wide variety of community leaders to promote ORT. Health workers from the District Health Office trained groups of village leaders in central locations. Agents de santé visited villages to reinforce community participation.

The solution validation phase consisted of five steps: (1) a pre-test of household KAP; (2) training of "agents de santé" (health workers) from the District Health Office to mobilize community leader participation; (3) training of school teachers, traditional birth attendants (TBAs), village leaders, and owners of ORS sales posts to promote ORS; (4) an intervention period of 2 1/2 months (reduced from the originally scheduled 11), during which the trained community resource leaders carried out ORT promotional activities; and (5) a household KAP post-test which was virtually the same as the pre-test.

The study was successful in identifying and developing significant community leadership resources and involving them in the ORT program. It demonstrated that a variety of village leaders could be mobilized and trained to serve as volunteers in a way that could reach a large percentage of a given target population. Forty-three percent of the households in the post-test indicated that one or more of the trained leaders had discussed using ORT with them, in home visits or at community meetings. Due in part perhaps to the limited intervention period, ORT use in the intervention villages did not increase significantly more than in the control villages. However, important gains were registered in the intervention villages in caretaker knowledge of diarrhea and correct preparation and appropriate administration of ORT. The investigators suggest that because of time limitations, not enough attention was given to determining how best these community leaders could be used, nor to linking these efforts to on-going national training programs. They recommend future operations research studies to determine how best each of these community resources could be used in ORT planning and related activities.

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This study was conducted from March 1984 to March 1986 by the Association des Oeuvres Privées de Santé (AOPS) and the University of South Carolina. Further information is available from Dr. Michel Cayemittes, AOPS, B.P. 76, Port-au-Prince, Haiti, or from Dr. William B. Ward, Department of Health Promotion and Education, School of Public Health, University of South Carolina, Columbia, South Carolina, 29208, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

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Study Abstract

RESOURCE ALLOCATION IN PRIMARY HEALTH CARE PLANNING FOR HAITI:  
OPTIMIZATION OF TASK ALLOCATION FOR COMMUNITY HEALTH WORKERS

PRICOR researchers carried out a study to determine the best way for community health workers (CHWs) to allocate their time among four critical child survival interventions: growth monitoring, family planning, oral rehydration therapy (ORT), and immunization. Although CHWs bring information about these health services to underserved communities, the amount of time each can devote to training mothers in these interventions is limited. A systematic analysis has been made of CHWs' activities in one area served by a private voluntary organization in Haiti. Using estimates of probable use and use-effectiveness of each intervention in reducing child mortality, and an analysis of how much time it takes for a CHW to bring a mother to competency in each of the interventions, the researchers have developed a scheme to allocate CHW time most effectively among the four interventions. A field test of the time allocation scheme also examined the effect of targeting high-risk mothers instead of trying to teach all mothers about these interventions. An epidemiologic assessment was used to assign mothers to risk categories. The researchers have found that it is more efficient to concentrate the educational efforts of the CHWs on high-risk mothers.

During the initial problem analysis, it was discovered that the CHWs, who are essentially volunteers, can devote only 12 hours per week to health promotion. The remainder of their time is spent travelling, attending health rallying posts, maintaining vital statistics, and working at their own personal income-generating activities. With such limited time available, it was particularly important to help the CHWs maximize the health benefits to the community. Benefit in this case was measured as survival of children two years and under. Quantitative estimates were made of the increased probability of intervention use once taught, the effectiveness of reducing cause-specific mortality if the intervention is used, and the time necessary to teach a particular intervention.

Estimates of the probability of use were obtained from data available from other studies in Haiti. The effectiveness of the interventions was estimated from general medical knowledge. Data on the time needed to train mothers were generated for the study. High-risk mothers were identified through an existing population-based registration system, and included those who were aged 35 with four or more children, at least one of which was under 5; those with more than five children, one of which was under age 5; those with a child under 5 diagnosed as malnourished; or those who had lost a child within the past year.

Using the time allocation scheme developed earlier, the study team developed a plan to field test the effect of risk targeting. Because of the short time available for the field test, training was given to the mothers only in ORT and family planning. The study area was divided into three sub-areas. In the first, each CHW was asked to train all 300 mothers in ORT, and as many high risk mothers as possible (39) in family planning. The relative time spent on each intervention was in accordance with the allocation scheme. In the second area, ORT training was given only to the 60 highest-risk mothers; the time remaining for family planning education was sufficient to reach 48 of the high-risk mothers with this intervention. In the third area, the control, the CHWs continued to allocate their own time as before. All CHWs in all three groups were given special training, particularly in the area of teaching skills. CHWs received a stipend at the end of the study that depended on the percentage of mothers who were competent in the two interventions. Participating mothers who were successful in achieving competency received incentives, including the opportunity to purchase a health card and participate in rural credit clubs. (See study entitled: "Alternative Methods of Motivating Community Health Workers," Haiti).

The results of the field test showed that the targeted approach was both efficient and effective. Not surprisingly, CHWs found that it was much easier to deal with a limited and defined set of mothers at any one time. Moreover, the targeted approach did not appear to severely penalize the other mothers, because they acquired their knowledge at rally posts. The investigators conclude that it would be advantageous to institute a screening system to identify at-risk children. Also, village-level educational sessions for mothers of at-risk children could improve the communities' knowledge of key interventions. Such sessions would be especially effective in areas where a major educational effort already takes place at the rally posts.

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This study was conducted from November 1984 through March 1986 by Eye Care-Haiti, a private nonprofit organization providing primary health services and ophthalmic care in rural Haiti. Further information is available from Dr. Antoine Augustin, Eye Care-Haiti, P.O. Box 1319, Port-au-Prince, Haiti, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### FINANCIAL ALTERNATIVES TO SUPPORT EXTENSION OF BASIC HEALTH SERVICES IN HONDURAS

Seeking alternative means of financing basic health services, researchers from the Honduran Ministry of Health (MOH) and Management Sciences for Health (MSH) conducted an operations research (OR) study in several regions of Honduras. This study focused on identifying alternatives for financing primary health care services and on assessing the viability of selected alternatives at the community level.

The researchers used three separate methods to determine how primary health care (PHC) services were being financed: (1) intensive observation of a small number of Honduran families; (2) a household survey in four Health Regions; and (3) case studies of existing community-financed health care programs. In addition, interviews were held with community leaders, cooperatives and syndicates, and key government officials to identify the range of alternatives considered feasible.

Observation of Families. A locally-trained observer visited 25 households in urban slums of Tegucigalpa during October and November 1982. Direct observations of these families revealed that they regularly use multiple sources of medical treatment for illness, often at the same time. Observation of specific illness episodes was particularly useful in identifying this phenomenon.

Household Survey. The survey team completed 1,017 household interviews in 29 sampling sites in four Health Regions of Honduras during the first 3 months of 1983. Within these households, 1,648 illnesses were reported for the 15-day recall period and 910 interviews were conducted in households that had experienced illness. Approximately 26.1 percent of the sample population reported having been sick in the past 15 days. Nearly 46 percent of these illness episodes had been treated at home. The mean expense for illness episodes treated at home was approximately US\$ 2.50. Most of this amount was for the purchase of medications. Reported monthly household health care expenditures averaged US\$ 20.32 (11.4 percent of total reported monthly expenses) and were the third highest category after food and clothing. Ninety-four percent of the respondents reported a willingness to pay for MOH services.

Case Studies. The study team completed 10 case studies of clinics, health centers, or hospitals in Honduras that were either charging for services or receiving active community support. Following data collection, the researchers developed concise analytical descriptions of the financial scheme

and the effects of community support at each health care facility visited. The results of the case studies generally reinforced what had been learned from the household survey. In all 10 case studies, patients showed a willingness to pay for or otherwise support health care services, provided they thought the services were of high quality.

Alternative financing mechanisms were developed using the information collected through the observation of families, the survey, and the case studies, and from interviews with key personnel in the MOH and other health-related agencies. Two analytical techniques, decision flowcharts and P/N/I force field analysis, were used by a multidisciplinary group to evaluate the financing alternatives. The four alternatives considered most appropriate were: (1) standard fees-for-services (cuotas), (2) payment for medications, (3) community contributions of labor for construction and maintenance of health centers, and (4) rotating drug funds managed by local health committees. These alternative solutions were recommended to the MOH.

This study resulted in the adoption of MOH community financing policies. The data on common illnesses, illness behavior, and expenditures on drugs, gathered for the PRICOR study, convinced decisionmakers in the MOH of the importance of making low-cost, high-quality, essential medications available to all Hondurans. Several mechanisms (some of them proposed by the PRICOR study) are now under study or are ready for field testing. These include a system of "popular" pharmacies; community rotating funds for medications; commercialization of oral rehydration salts (ORS); and expansion of Lab-PANI, a semi-autonomous, government-sponsored pharmaceutical production facility. There has been, however, a considerable gap between the adoption and implementation of these policies to extend the availability of basic drugs. As an indirect result of this study of PHC financing alternatives, the MOH has instituted a policy that encourages hospitals to recover a greater portion of their operating costs. The MOH has directed all hospitals to increase recovery to a minimum of 30 percent of their annual operating costs through fees-for-services from patients. In 1984 hospitals recovered an average of 4.2 percent of their annual operating budgets, a 30 percent increase over 1983.

The operations research technique itself had significant impact on the way the Honduran MOH makes decisions. Because of the satisfaction of key MOH personnel with OR as a decisionmaking tool, a Science and Technology Unit has been created within the MOH to coordinate OR studies. Ongoing OR studies include: a study on the effectiveness of trained vs. untrained TBAs; a feasibility study of the commercialization of ORS; and a comparison of alternatives for expanding hospital services without reducing PHC services.

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This study was conducted from August 1982 through December 1984 by the Ministry of Health of Honduras and Management Sciences for Health (MSH), a nonprofit organization based in Boston, Massachusetts. Further information is available from the principal investigator, Dr. Frederick Hartman, MSH, 165 Allandale Road, Boston, Massachusetts 02130, or from Dr. Jack Reynolds, PRICOR study monitor (Chevy Chase).

## Study Abstract

### AN OPERATIONS RESEARCH STUDY OF FINANCING, ORGANIZATIONAL, AND MANAGERIAL PROBLEMS OF COMMUNITY HEALTH PROJECTS IN INDIA

To meet the complex demands of grossly underserved rural populations of India, numerous voluntary agencies have started community health projects in the last two decades. In their efforts to work out effective methods and processes of delivering health care, these projects have had to develop solutions to a number of financial, managerial, and organizational problems. This study, conducted by researchers from the Institute of Rural Management, Anand (IRMA) in India, and U.S.-based Management Sciences for Health (MSH), examined eight such voluntary health projects and identified the most important operational problems they have faced, along with solutions and results achieved.

The study focused on financing, community organization, and personnel management problems. To gather information on the eight health projects, the researchers interviewed the directors and randomly-selected staff from the projects as well as community leaders, practitioners, and a sample of community members in villages served by the projects. Focus group discussions were also held with staff and community members. Case studies were conducted by soliciting information from management and by using currently available service statistics of the projects and literature published about or by the projects. After data analysis, the researchers organized a three-day workshop in Anand for representatives of the eight study projects, other voluntary health projects, the Voluntary Health Association of India, and international donor agencies. The purpose of the workshop was to discuss the priority problems and alternative solutions identified through the study, point to unresolved issues, and make recommendations.

Financing. The PRICOR investigators found that three major approaches had been used to finance the health projects. First, all projects raised some funds and in-kind assistance from outside the community for starting up the project. Half of the project directors felt that external resources were absolutely essential at this point. Second, the projects obtained resources for recurring expenses from a variety of local and external sources. Local sources included donations of land, labor, and buildings; fees for drugs and services; and membership and insurance fees. The government was an important source of external funding. Third, the projects pursued a policy of relentless cost containment. To increase efficiency, the eight health projects used various strategies to economize on buildings, transport, and the purchase and use of drugs. Strategies included using existing buildings; allowing project personnel to own and maintain two-wheeled vehicles; and purchasing drugs in bulk at competitive prices.

The single, most difficult financial problem cited by the project directors was how to achieve greater community self-reliance. In particular, how can projects involve community members in contributing toward the cost of preventive health services which are usually disassociated from current health problems and in developing resources for treating incurable diseases? Local organizations proved to be important resource bases.

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Community organization. Based on the experience of the eight health projects, the researchers concluded that starting with previously existing or related community organizations instead of new organizations helped achieve broad coverage more quickly and more easily -- at least over the short run. However, the fast and efficient start achieved through existing organizations did not necessarily result in greater breadth of participation in the long run. There is some evidence that a pre-established organization, if it represents only part of the community, may perpetuate restricted participation.

Overall, multi-purpose organizations demonstrated an advantage in breadth of participation, i.e., high percentages of community members who participated. However, in terms of depth of participation (community involvement in project planning, management, and service delivery), only newly organized multi-purpose organizations achieved greater participation. In previously existing multi-purpose organizations, members tended to assume fewer active roles.

In support of multi-purpose organizations, some respondents explained that their projects had achieved wide participation by starting with a strongly felt need in the community, even if that need was only indirectly related to health. On the other hand, adherents of single-purpose organizations warned of potential bankruptcy of multi-purpose organizations, where failure of a single activity could drag down the entire organization.

Community poverty was a real barrier to the projects in achieving broad community participation, but so was wealth. Not only did poor people refrain from joining health schemes, but affluent community members gravitated to private physicians. Serving the entire spectrum of economic strata therefore required, on the one hand, services such as hospital referral to attract the wealthy, and on the other hand, services such as food supplementation and income generation to attract the poor.

Personnel Management. The researchers concluded that turnover and salaries are likely to be lower and dedication higher among locally trained staff as opposed to professionally trained personnel. The experience from the projects suggested that it would be wise to train local personnel to undertake many tasks which would otherwise be performed by professionals. They also felt that those professional staff who are recruited for health projects should learn the skills of the support staff to lessen social distance and reduce dependence. For example, health workers could be allowed to drive and maintain their own two-wheeled vehicles instead of riding as passengers with drivers of more expensive four-wheeled vehicles.

During the workshop, channels for further dissemination of information were identified and plans made for networking among nongovernmental community health projects. The sponsoring institution, IRMA, will distribute the PRICOR study findings widely so that other voluntary health projects facing similar problems might benefit from solutions that have been effective elsewhere. IRMA is also considering proposals to include training in the management of rural community health programs in its curriculum and to provide opportunities for student internships in the management of voluntary health projects.

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This study was conducted from January 1985 through March 1986 by Management Sciences for Health (MSH) in collaboration with the Institute of Rural Management, Anand (IRMA), Gujarat, India. Further information may be obtained in India from Professor D. Nagabrahmam (IRMA), and in the U.S. from the principal investigator, Dr. Henry Elkins, Jr., MSH, 165 Allendale Road, Boston, Massachusetts 02130, or from Dr. Jeanne S. Newman, PRICOR study monitor (Chevy Chase).



## Study Abstract

### IDENTIFICATION OF AN OPTIMUM DISTRIBUTION SYSTEM FOR VACCINES IN RURAL INDIA

Between the time vaccines are manufactured and the time they are administered to the target population, many countries experience serious operational difficulties in distributing the vaccines and in providing effective services, particularly in remote rural areas. The results all too often are poor immunization coverage and a possible loss of potency of the vaccines. Such operational problems are cited as among the reasons for the persistently high infant mortality rates in many parts of India.

In 1985-86 researchers from Management Consultancy and Services (MACONS), in cooperation with the Directorate of Health and Family Welfare of Karnataka State in South India, conducted an operations research study of the state's vaccine distribution system. They undertook this study to identify the most critical operational problems and to develop a planning and managerial tool for use in restructuring the system. They identified three major areas in the vaccination system where problems are known to exist: distribution, delivery of vaccines to the field subcenters, and utilization. The distribution system, considered to be the most problematic area among the three, was chosen for detailed study.

In Phase I, three districts of the state were selected. In these districts, trained investigators collected and analyzed data on population, size of the total target groups covered by each Primary Health Center (PHC) and its subcenters, immunization coverage, inventory control for vaccines at various storage points, and the physical distribution of the vaccines. Key decision variables, important constraints, and their relationships were specified. Based on these analyses, and using some of the population statistics and rates obtained from different sources, alternative mathematical models of the vaccine distribution system were constructed. The models were tested by feeding data from PHCs representing varied field conditions (population density, patterns of distribution of PHCs and their subcenters among population, variable communication facilities, etc.) into a specially designed software program. After developing and testing the simulation model, the researchers made trial runs for weekly cycles over a 10-year period, using alternative assumptions about key system decision variables such as buffer stocks, targets for coverage (75%, 85%, and 95%), ordering policy, strategies for handling priority orders, and important constraints.

The results of each simulation include estimates of the average number of stock-outs in a given period; average inventory; average consumption; average time between first and second, between second and third, and also between

first and third doses; number of persons fully immunized; incomplete immunization; and average PHC workload and its variability. Comparison of the results of the simulations permit managers to identify the most promising distribution strategies for a given situation before undertaking an expensive field test.

The researchers hope that, apart from its use in determining an optimal vaccine distribution system under varying field conditions, the model can also be redesigned and applied to the distribution of other commodities and to other field conditions, organizational structures, and storage points. More importantly, with some modification the software package could be used for periodic analysis and appraisal of vaccine stocking policies, strategies, etc. in ongoing systems. The major advantage, according to the researchers, would be the ease with which a district level administrator not very familiar with sophisticated techniques and methods of operations research could use the model as a decisionmaking tool.

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This study was conducted from April 1985 to March 1986 by Management Consultancy and Services (MACONS). Further information may be obtained from the principal investigator, Mr. Krishnaswamy Subramanyam, Executive Director, MACONS, 77 A, West Marredpally, Secunderabad-500026, India, or from Dr. Jeanne S. Newman, PRICOR study monitor, (Chevy Chase).

## Study Abstract

### THE STUDY OF PRIMARY HEALTH CARE TEAMS IN JAMAICA

Study researchers investigated productivity problems of primary health care (PHC) teams in Jamaica and developed a resource allocation planning model. Trial computations of the model, run for two districts in the Cornwall Region, have provided projections on demand for service, personnel needs, cost of personnel, and clinic hours and configurations. These computations have shown not only that services and population coverage can be significantly increased but that personnel costs can at the same time be decreased.

PRICOR undertook this study at the request of the Health Management Improvement Project (HMIP) whose objective is to improve the delivery of PHC by improving management within the Ministry of Health (MOH). In Jamaica, preventive and curative services are provided by three types of health centers. These centers range from small, simple centers offering few services, to large, sophisticated centers providing full medical and dental services. The centers are linked by a patient referral system and by staff visits from the larger to the smaller centers.

The Department of Social and Preventive Medicine of the University of the West Indies (UWI) and Price Waterhouse Associates, Management Consultants, Jamaica were identified as the research teams. They, together with PRICOR and HMIP, developed a study protocol and four study objectives: (1) to develop a methodology for measuring the productivity and cost effectiveness of PHC teams; (2) to describe how the various categories of personnel in the health center distribute their working time among certain predefined activities; (3) to determine how productive and cost effective PHC teams are now and how these factors relate to coverage of the population with essential services; and (4) to develop strategies to improve productivity and to work with the MOH to implement selected strategies on a trial basis.

Researchers observed 496 randomly selected workers representative of the various types of staff working in health centers (HCs) throughout the country. These observations, part of a work sampling survey, showed that the nonproductive time of health workers ranged from 26 to 66 percent. Based on similar studies done in the private sector, Price Waterhouse (PW) and the MOH expect that nonproductive time should be kept below 25 percent. The PW team developed a productivity index which was determined by comparing the actual output of a clinic to the expected output given the critical work station time available. Analysis showed wide variations in productivity indices, ranging from 30 to 150 percent. A cost index was also determined by comparing personnel cost units used in serving patients to the personnel cost units

allocated to scheduled clinics or HCs. The analysis showed an average cost index of 46 for scheduled clinic hours and of 20 percent for HCs. The low cost indices suggested that there is great opportunity to improve the efficiency of the HCs.

Productivity broadly defined is the effective use of resources. The most expensive resource employed in the PHC sector is manpower. Manpower allocated to an HC is tantamount to creating service capacity. Therefore, such capacity should be based on expected demand for services and on time required to deliver a unit of service. A model was developed that improved productivity through manpower allocation and clinic rescheduling. This model helped to optimize productivity by determining the demand for the major services offered at the health center, based either on projections of ideal coverage or past trends; the mix of services the various clinics at a HC should offer; the number of clinic hours that should be programmed in a year for the various clinics to meet demand; the scheduling of the clinics; the number of each type of personnel that should be allocated to a HC; and the assignment of critical personnel (expensive and in limited supply, such as doctors) to geographic clusters of HCs to maximize their use. Thus the model can help PHC managers adjust their system to make optimum use of available resources. The model also allows a sensitivity testing for each of the variables.

The model is now being tested in two pilot districts in the Cornwall region, where the test will be used to determine the best ways to restructure clinics in those districts and to reallocate personnel. Changes in productivity will be closely monitored over a 6-month period. If the test is successful, the plan is to implement the model nationwide as a dynamic planning tool for resource allocation.

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This study was conducted from June 1983 through March 1986 by the Department of Social and Preventive Medicine of the University of the West Indies, and Price Waterhouse Associates, Management Consultants, Jamaica, with the cooperation of the USAID-funded Health Management Improvement Project in Jamaica and the Jamaican Ministry of Health. Further information is available from Ms. Patricia Desai, Department of Social and Preventive Medicine, University of the West Indies, Mona, Kingston 7, Jamaica; from Mr. Bobby Zachariah, Price Waterhouse Associates, Box 372, Kingston, Jamaica; or from Dr. David Nicholas, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### PRIMARY HEALTH CARE PROGRAMS IN KOREAN RURAL COMMUNITIES WITH THE SUPPORT OF EXISTING VILLAGE ORGANIZATIONS

Korean researchers used an operations research approach to address the problems caused by insufficient attention to preventive and promotive health activities in rural areas of the Keyonggi Province of Korea. The objective of their study was to contrast the feasibility and effectiveness of Primary Health Care (PHC) programs that use non-health community organizations as support structures.

The researchers initially went into the study areas (three counties in Keyonggi province) and developed good working relationships with community leaders, community health practitioners (CHPs), and officials of local, provincial, and central government. This was accomplished through multiple visits, meetings, telephone calls, and letters. Channels of communication were established between CHPs, the community people, and referral facilities. This set the stage for working closely with the community.

Baseline data were collected through a household survey, analysis of CHP activity records, and surveys that focused on the characteristics of CHPs, community leaders, and the study villages. Several problems related to the health care system, health care utilization, and leadership capacities of the communities were discovered: (1) The emigration of the younger generation to urban areas caused many hardships for those people left in the rural areas; (2) A high birth rate indicated the need for maternal and child health (MCH) and family planning services; (3) The morbidity rate was high and many people were relying on self-diagnosis and purchase of drugs at pharmacies; (4) CHP activities were mainly concentrated on clinic-based medical care services for minor illnesses; (5) Community leaders had limited knowledge about health care and did not serve as good role models for the community in health matters.

Based on these results and those of earlier studies, the researchers wanted to determine if community organization support of community health practitioners would improve the quality of PHC delivery. They decided to test the effectiveness of informal community organizations vs. formal community organizations in this role. In the study areas where CHPs were to work with community organizations, the following interventions were implemented: 1) further training of CHPs with a focus on outreach activities and preventive/promotive care; 2) establishment of better communication between the CHP and the community through existing community organizations; 3) education of community health leaders (CHLs) about the importance of community participation in PHC; and 4) development and training of community leaders to serve as communicators, health educators, motivators, and health care providers.

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A quasi-experimental research design (two experimental counties and one control county) was used to test the effects of these strategies. Experimental group I (Yang Pyong county) incorporated Bansang-Hoe (formal village organizations) as substructures for PHC services. Experimental group II (Icheon county) incorporated various informal community groups, such as mothers' clubs, 4-H clubs, church groups, agricultural cooperatives, clan meetings, and development committees, as substructures for PHC services. In the control group (An Sung county), CHPs continued to provide PHC services without the assistance of any community organization.

The first project input in the experimental counties was the training of CHPs in field-based activities through 3-day workshops. After their own training, CHPs trained leaders of the community organizations to serve as CHLs. CHLs and CHPs were later trained to fill out monthly checklists of their PHC activities. The research team also developed educational leaflets with health messages for use and distribution by the CHPs and CHLs.

After the CHLs had been active in the experimental counties for several months, the researchers carried out a process evaluation. One-third of all CHLs in Yang Pyong and Icheon were interviewed, as well as a sample of community residents in both counties. In response to the survey, the CHLs said that they had tried to inform the community about the activities of the CHP and tried to inform the CHP about health problems in the community. They also indicated that they had discussed MCH, family planning, chronic health problems, and health hazards with community people when the topics came up in conversation. The CHLs complained, however, that their new role was not recognized by the community. This discouraged the CHLs from performing the health education and information tasks assigned to them. In response to this problem, the CHPs conducted educational sessions for villagers on the CHLs' role and the study team held a two-day workshop for CHPs to bolster their enthusiasm.

After a period of 15 months, the researchers carried out a final evaluation in order to compare the effectiveness and efficiency of the PHC services delivered by CHPs in the three study counties. Each CHP program was evaluated according to: (a) the effectiveness of the program in terms of selected health and health service indices; (b) productivity of CHPs and CHLs in terms of quantity of services; and (c) efficiency in terms of cost incurred per population served. The comparisons were made using three different methods: simple statistical analysis, a computer simulation technique, and a cost effectiveness analysis.

The major conclusion of the study was that PHC services that incorporate formal community organizations are more effective and efficient than both those that incorporate informal organizations and those that do not incorporate any community organizations. All three methods of data analysis confirmed this general result.

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This study was conducted from January 1983 to January 1986 by the Department of Nursing of Seoul National University. Further information is available from the principal investigator, Dr. Yeo Shin Hong, Department of Nursing, College of Medicine, Seoul National University, 28, Yundeun-Dong, Chongno-Ku, Seoul, Korea, or from Dr. Stewart Blumenfeld, PRICOR study monitor (Chevy Chase).

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**Study Abstract****DIARRHEAL DISEASE INTERVENTION IN LIBERIA**

In 1985 researchers working in Kolahun District, Liberia, noted that children with diarrhea were being brought to the clinic when they were already 5 to 10 percent dehydrated. This observation was the impetus for an operations research study on the problem of dehydration due to diarrheal disease in selected communities. This study was conducted by the Christian Health Association of Liberia from 1985 - 1986. The objectives of the study were to determine caretaker knowledge, attitudes, and practices (KAP) toward diarrheal disease and to use that information to design a strategy to improve caretaker KAP. The strategy developed was then to be field tested in the study villages.

The researchers first examined the problem of dehydration and reduced it to two subproblems. The first subproblem was the delayed utilization of health facilities for cases of childhood diarrhea. It was hypothesized that this problem could be explained by the lack of basic knowledge on the part of caretakers and the lack of accessible health facilities.

The second subproblem was that many of the practices of caretakers during diarrheal episodes contributed to dehydration. Caretakers often stopped breastfeeding, withheld fluids, and gave inappropriate medications.

To analyze the problem of dehydration further, the research team conducted a survey of caretakers in 30 villages in Kolahun District, using a two-stage cluster sampling method. In each village, 15 caretakers with children under 5 were randomly chosen for interview. Included in the questionnaire were questions on characteristics of caretakers, recent diarrheal episodes experienced by children, treatment of diarrhea, oral rehydration therapy (ORT) utilization, and other topics.

This KAP survey confirmed the assumptions of the researchers concerning caretakers' lack of knowledge about how to treat diarrhea and their use of traditional practices that contribute to dehydration. Over 60 percent of caretakers had not heard of the home-mixed sugar/salt solution used to treat diarrhea. More than 50 percent of caretakers did not know how to mix the oral rehydration salts (ORS) packet and 60 percent did not recognize the ORS packet. More than 90 percent of the caretakers gave medications for diarrhea. Less than half continued breastfeeding during the child's diarrheal episode. Only 15 percent of the caretakers' children had received ORT during their last illness.

A 1-day seminar was held to place the subproblems in priority order for the PRICOR study and to develop appropriate solutions. Participants included the PRICOR investigator, two research assistants, the Principal of the Kolahun Public School, and a teacher. Using a modified preference matrix, the group

decided that the project would focus on the subproblems in the following order: (1) caretakers' lack of basic knowledge about diarrhea treatment, (2) the adverse practices of caretakers during diarrheal episodes, (3) local beliefs that adversely affect the care of children with diarrhea, and (4) inadequacies of the health care system for diarrhea treatment.

Using similar preference matrices, the participants proposed solutions to the priority problems and developed a strategy to educate and motivate caretakers to use the home-mixed sugar/salt solution to treat childhood diarrhea. Village health workers (VHWs) and traditional birth attendants (TBAs) would be trained to educate and motivate the caretakers, and primary school students would be taught simple lessons about diarrhea which they were expected to pass on to their parents.

Three VHWs and two TBAs were trained as educators and motivators. For a period of 8 months, these community-level health workers encouraged caretakers of children with diarrhea to make and use the simple, home-mixed sugar/salt solution to treat diarrhea. Sessions with caretakers were also used to reinforce positive diarrhea interventions and discourage negative ones. The VHWs and TBAs were required to record in simple ledgers the names and ages of patients they treated for diarrhea, the length of treatment with ORT, and the outcome of the treatment. During the field test period, students in a class at the Kolahun Public School (consisting of 75 students up to the 7th grade level) were taught simple lessons on diarrhea management.

In the course of the field test, the researchers became convinced that VHWs and TBAs can be effective as educators and motivators of caretakers in the use of ORT. The VHWs and TBAs reported a total of 94 children and adults treated for diarrhea with ORT during the 8-month period of the field test. Of these, four were referred because of dehydration. No deaths were reported. Although the number of patients reported seen and treated for diarrhea by the health workers is small, the researchers believe that ORT is gaining acceptance in the study villages and will be more widely used as more caretakers become aware of its utility in saving lives.

The primary school students were very enthusiastic about the lessons they received on diarrhea treatment with ORT. The impact of these lessons on the incidence and degree of dehydration has yet to be assessed. The researchers believe that the lessons will have an impact and recommend that the simple lessons on diarrhea and ORT be incorporated into the curriculum of the primary schools.

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This study was conducted from May 1985 through March 1986 by the Christian Health Association of Liberia (CHAL). Further information is available from the principal investigator, Dr. Andrew Cole, P.O. Box 1046, Monrovia, Liberia, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### PLANNING AND EVALUATING COMMUNITY FINANCING IN LIBERIA

Although considerable resources, both public and private, have been devoted to improving primary health care (PHC) services in Liberia, these services often cannot be sustained when external funding is withdrawn. In response to this problem the Liberian Ministry of Health (MOH), in cooperation with the Christian Health Association of Liberia (CHAL), conducted an operations research study from 1984 - 1985 to develop effective ways for communities to generate funds to finance some or all of their PHC services.

The financing schemes had to satisfy certain conditions: (1) they must cost less than the income generated; (2) a high proportion of the target population (children under 5 and pregnant and lactating women) must use the services provided; (3) a large fraction of households must contribute; and (4) the villagers themselves must be able to sustain the financing scheme(s) developed.

Problem analysis began in January 1984 when three villages were selected to participate in the study. A Health Service Utilization Survey was conducted to generate demographic data on these villages. The survey found that households were headed by older men (age 55+), most of whom were farmers with no formal education, and the average household income was considerably less than the national average of \$280 per year.

In each village the town council and other village leaders met to consider four issues: what health care services would be provided, who the health care provider would be, who would participate, and how much the services would cost. Each village established a village health committee (VHC) to manage the project and chose a member of that committee to be trained as the community health worker (CHW). A major health care concern of the villagers during these discussions was the availability of drugs. A large revolving drug fund at the Kolahun District Health Center was seen as a resource and possible model for revolving drug funds at the village level.

Community leaders in each of the study villages discussed eight alternative financing schemes for generating PHC funds within the community. Each of the three study villages constructed a preference matrix and, on each, the same four schemes ranked highest, although in different order: (1) drug sales, (2) production-based prepayment, (3) community and individual labor, and (4) donations and ad hoc assessment. During a 12-month field test, the villages were successful in partially financing their PHC services through their chosen

schemes. Revolving drug funds were established and managed by the VHC, and monthly supervisory visits to each village were made by the principal investigator or the research assistant. Training and logistical support were provided by CHAL and MOH.

Ad hoc assessment and drug sales were highly successful in raising sufficient funds to establish and sustain village-level revolving drug funds. Ad hoc assessment provided seed money of \$59.00 to \$209.60 in each village, with 75 to 90 percent of the households participating in these assessments. The revolving drug funds have been sustained by means of a 25 percent markup at the village level on drugs obtained from the Kolahun District Revolving Drug scheme. Stocks of drugs have been increased and diversified while drug costs have remained low. Sales revenues per case treated by CHWs range from \$0.27 to \$0.95.

Production-based prepayment and labor in communal rice fields have not yet provided any direct resources for PHC funds but might be called upon if needed. Some community labor has been provided in the fields of individual CHWs, although the CHWs have indicated they prefer to be paid a salary. The assumption by the investigators and village leaders that CHWs would be supported by the traditional application of community labor, as is the case in the compensation of traditional healers, has been recognized as erroneous.

The project's success and replicability have been amply demonstrated by the 10 villages that now participate in the project. Six of these have revolving drug funds, and in another four, CHWs have been selected and are now being trained; plans for revolving drug funds in these four are underway. Additional funds and support raised through community labor, donation, and farm contract work have been applied to the direct support of PHC. The results for those communities participating in the full scheme include locally available health care providers, drugs, and PHC management. The establishment of the village health committees has also provided the framework for continued efforts to improve PHC. Both CHAL and the MOH have agreed to continue their support for these efforts, and the district medical officer will continue to provide supervision.

Adherence to a systematic operations research approach has enabled this project to move successfully from problem identification, through the development and systematic assessment of alternative solutions, to field implementation. The selection of a solution combining multiple financing schemes has allowed participants to contribute to PHC according to their means and has provided a broader base for project success.

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This study was conducted from January 1984 through October 1985 by the Christian Health Association of Liberia (CHAL). Further information is available from the principal investigator, Dr. Andrew Cole, Christian Health Association of Liberia, P.O. Box 1046, Monrovia, Liberia, or from Dr. Jeanne Newman, FRICOR study monitor (Chevy Chase).

## Study Abstract

### TRAINING MOTHERS TO USE ORT IN RURAL LIBERIA

Severe budgetary constraints in Liberia have limited the delivery of primary health care (PHC) services, including the distribution of prepackaged UNICEF oral rehydration salts (ORS). This situation has left many rural areas of the country largely unserved by health workers and oral rehydration therapy (ORT) programs. From 1984 to 1986, researchers from the University of Liberia and the Ministry of Health and Social Welfare undertook an operations research study to design the most effective ORT program for remote areas where there are no health workers. The research team realized that training volunteer workers to serve in these areas would be the most feasible approach. The study had two objectives: to identify which of several possible home-mixed ORT solutions the caretakers would prefer and to develop and test alternative strategies for training mothers to prepare and administer the chosen solution.

Early in the study, researchers identified two teaching strategies and four possible home-mixed solutions. Realizing that the testing of each possible combination would be expensive and time consuming, the study team conducted a pilot study to try to eliminate some of the options. After collecting baseline information on caretaker knowledge, attitudes, and practices (KAP) and socioeconomic data, volunteer village trainers were selected and taught to mix the four ORT solutions. These volunteers would, in turn, train caretakers, either individually or in small groups, to perform this task. The researchers then divided the caretakers who had children under 5 and who lived in the pilot area into two groups according to the type of ORT training method they would receive (individual or group).

To determine which ORT solution(s) the mothers preferred, each caretaker was taught to prepare all four solutions. Results from the post-test interviews with caretakers indicated that most of the mothers favored a salt-sugar solution flavored with orange.

To determine which training method was more effective, researchers identified 21 indicators of ORT and diarrhea KAP and tested caretakers on these indicators before and after the ORT training intervention. Because the results from the pilot test did not show conclusive differences in the effectiveness of the two teaching methods in improving mothers' KAP, the researchers then conducted the full-scale field test among 15 randomly selected villages.

Before the field test, the 15 villages were stratified into three groups. This division was based on socioeconomic indicators considered likely to influence ORT use. One village from each group was randomly selected as the control village, and the other four were divided according to the training strategy. In half the villages, volunteers were trained to teach mothers individually and in the other half, volunteers were trained to teach mothers in groups. The salt-sugar-orange solution was the only ORS solution used in the field test. To determine which strategy was more effective, 21 indicators of mothers' KAP were measured for all mothers in the 15 test and control villages. A total of approximately 400 mothers were trained.

The results from the pre- and post-test interviews for all experimental villages showed that both methods of training significantly increased caretaker knowledge and awareness of the nature, causes, and effects of diarrhea and the ways to treat diarrhea with ORS. Comparison of the 13 indicators designed to detect differences in the effectiveness of the two teaching strategies shows only a slight superiority of individual training over group training. However, the caretaker dropout rate was significantly lower among the group-trained caretakers. The researchers suggest that this may be due to the fact that the trainers are neither paid nor sufficiently motivated to make the number of required visits to individual caretakers' homes to complete the training. These results indicate that group training may be the most efficient way of training caretakers using limited volunteer time.

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This study was conducted from June 1984 through March 1986 by the Dogliotti College of Medicine, University of Liberia, in cooperation with the Liberian Ministry of Health. Further information is available from the principal investigator, Dr. Moses Galakpai, A.M. Dogliotti College of Medicine, Department of Preventive Medicine, University of Liberia, Monrovia, Liberia, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### TRAINING ADOLESCENTS TO PROMOTE HEALTH IN LIBERIA

In an operations research study conducted during the period 1984-86, researchers from Cuttington University College and Tuskegee University addressed the problems posed by the lack of formal health services and health workers in much of Bong County, Liberia. The study team recognized that many of the tasks Liberian adolescents perform in their daily lives are health related and that adolescents might be trained to serve as health promoters in their communities. The objectives of the PRICOR study were: (1) to identify ways in which the existing roles of adolescents in the community can be extended to include health promotion; and (2) to develop and test a health education curriculum for adolescents based on existing community health concerns and on adolescents' traditional tasks.

An advisory committee, composed of the PRICOR investigators, a member of the Ministry of Education, a development specialist, and consultants from Tuskegee University, conducted an initial brainstorming session to identify prevailing health problems and the domestic tasks that adolescents perform. The researchers reviewed literature on the health problems identified and their management. Based on these preliminary activities, the advisory committee selected six potential areas for the development of training modules: oral rehydration therapy (ORT) and nutrition, skin diseases, poisons and accidents, oral hygiene, intestinal diseases, and malaria/germs.

In order to determine the appropriateness of the selected health education modules, village chiefs were consulted and a household survey was conducted in four selected villages of Bong County. A total of 320 heads of household were interviewed. The questionnaire was designed to gather data on sanitary conditions, recurring health problems, and the level of health knowledge, attitudes, and practices in the villages. Health problems identified included diarrhea, intestinal worms, malaria, and poor sanitation. Tasks routinely performed by adolescents were identified and included disposing of wastes, sweeping yards, preparing meals, caring for younger siblings, fetching water, and washing clothes. These results confirmed that health education modules based on the six selected topics would deal with community-perceived health problems and build on tasks that adolescents were already performing.

Using the information from the community survey and the brainstorming sessions, the researchers refined the solution to be tested. Teaching modules were developed for each of the selected topics. Constraints, such as time and money, were identified and taken into account in deciding which adolescents would receive the health education modules and who would teach the modules to the adolescents. A second survey of 80 "strategic informants" in the communities collected more information on specific health habits and environmental conditions relevant to the selected health modules. The researchers decided that the health modules would be included in the science

curriculum of 6th grade students (average age 16-17 years) in primary schools. The new health topics would be taught to these students by their regular teachers. It was expected that the adolescents would pass the health information on to their families and other community members. Thirteen teachers from four primary schools were selected to participate in modifying the modules to fit local conditions. In two workshops, one of which lasted 5 days and the other of which lasted 2 days, the teachers were taught how to teach the new health education curriculum and how to improve classroom management. The teachers received a small bonus for the training and the extra work required to teach the modules. After the completion of their training, the teachers began to teach the health education modules as a part of their normal classroom routine. The modules were taught to over a hundred adolescents in the four primary schools participating in the study.

Several different methods were used to evaluate the effects of the project activities on the knowledge, attitudes, and practices of the adolescents. Before each module was presented, the students took a pre-test to determine existing knowledge of the health topic. After the module had been taught, a post-test was given. The pre- and post-tests were then analyzed to assess the impact of the modules on the students' knowledge. In addition, after the modules had been presented, each student was asked to write an essay describing the health promotion activities they had performed in the community after learning the modules. The adolescents were also asked to write at the end of the essay the correct recipe for home-mixed oral rehydration solution. Finally, a brief survey of a few students, teachers, and parents was carried out to determine any actual changes in health practices after the health modules had been taught.

According to reports from these evaluative activities, plus anecdotal accounts from community members, it seems that the students, the teachers, and the mothers have learned the new health curriculum and have begun to use the information in their daily lives. The percentage of correct answers given by the students was substantially higher in the post-test than in the pre-test. The small evaluation survey found that eight of the nine teachers interviewed had actually seen the students apply lessons from the modules. Nine of the 11 parents interviewed said they had received health advice from their child. Seven of these parents reported receiving advice on ORT. Eleven of the 12 students interviewed reported carrying out new health activities after learning the curriculum. Specific activities mentioned by the students included ORT, personal hygiene, home sanitation, malaria prevention, and referrals to the nearest hospital. The Ministry of Education is interested in adopting the health curriculum used in the PRICOR study for their national primary school curriculum plan. The investigators conclude that, by building on their existing roles and tasks, adolescents can be trained to serve as effective health promoters in their homes and communities.

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This study was conducted from April 1984 to March 1986 by Cuttington University College in Monrovia, Liberia and Tuskegee University, Alabama, U.S.A. Further information is available from the principal investigators, Ms. Janet Moore, Cuttington University College, P.O. Box 277, Monrovia, Liberia, or Dr. Paul Wall, Carver Research Foundation, Carnegie Hall, Tuskegee University, Tuskegee, Alabama 36088, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### COMMUNITY FINANCING OF PRIMARY HEALTH CARE IN PERIPHERAL AREAS

The Republic of Mali's formal health infrastructure of hospitals and health centers serves only a small part of the country's inhabitants. Eighty percent of the people live in rural areas and receive only basic primary health care (PHC) services provided by small dispensaries, village health workers, and village pharmacies. The problem of financing PHC delivery in these underserved areas is acute and stems largely from the inability of communities to sustain PHC services once outside funds have been depleted. The Director General for Planning and for Health and Social Services Education therefore undertook an operations research study to find ways for communities to help meet the recurrent costs of maintaining PHC, particularly at the village level.

With the participation of members of the Comité d'Orientation et de Coordination des Etudes et Programmes Socio-sanitaires (COCEPS) of the Ministry of Health (MOH), the research team first identified the PHC services to be provided at the village and "secteur de base" (a group of 5-10 villages) levels. These were, in order of priority:

- Essential drugs;
- Maternal and child care;
- Treatment of acute illnesses and wounds;
- Health education;
- Immunization against the six EPI diseases; and
- Drinking water and basic sanitation.

This group then determined the best strategies for providing the services. These strategies included establishing an initial stock of drugs; training various types of health workers for the villages and "secteurs de base" and establishing a system for their supervision; holding quarterly health education sessions in the villages; establishing a logistics and supply system to provide regular immunizations in the villages; and refurbishing existing water sources and creating and ensuring maintenance of new ones.

The next step was to determine the types of recurrent costs involved in providing the targeted services. These costs included items such as drugs, vaccines, immunization equipment and supplies, salaries, transportation, food, and lodging for health workers and supervisors.

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To collect data for developing a solution to the financing problem, the study team used two questionnaires. One was used to interview local leaders of 60 villages in the areas of Koro and Kita. The other questionnaire was used to interview 1,800 family and household heads in the same villages. Answers to the questionnaires provided information on topics such as health worker remuneration, drug supplies at the village level, family expenditures for health services, and villagers' attitudes toward those services.

In light of the replies to the questionnaires, the study team proposed that PHC services in rural areas be financed as follows:

- Restocking of village pharmacies: payment of a five percent markup over the purchase price or a fixed fee for services.
- Payment of village health workers: in kind at the discretion of the recipients.
- Living expenses of village health workers during retraining: to be paid by the village council.
- Remuneration of "secteur de base" health workers: fixed salary to be paid from a budget supported by fee-for-service payments or through prepayments.
- Living expenses of "secteur de base" health workers during retraining: to be paid by the "arrondissement" (level above "secteur de base") council.
- Lodging for head medical center nurse on supervisory visits: to be paid by the "arrondissement" council.
- Vaccines, lodging, and transportation of vaccinator: to be paid from a budgetary program financed by the vaccination recipients, the recipient villages, and from "arrondissement" resources.
- Maintenance of water source: to be paid by the village council.

The first specific evidence of implementation of these results has been the agreement of the Development Council of Koro to finance the 1986 budget presented by the Chief Medical Officer of the Koro Health Center. This budget includes many of the financing strategies developed in this study. In general, it is hoped that as a result of the study's recommendations, villages will finance certain costs associated with the delivery of curative services, with "arrondissements" and "cercles" assuming financial responsibility for preventive and supervisory activities.

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This study was conducted from June 1984 to March 1986 by the Direction Nationale de la Planification et de la Formation Sanitaire et Sociale of the Ministry of Health of Mali. Further information is available from the principal investigator, Dr. Mamadou Traore, Directeur, Direction Nationale de la Planification, Ministère de la Santé Publique et des Affaires Sociales, Bamako, Mali, or from Dr. David Nicholas, PRICOR study monitor (Chevy Chase).

## Study Abstract

A MARKET RESEARCH STUDY OF THE QUANTITATIVE AND QUALITATIVE  
ASPECTS OF THE MARKETING AND DISTRIBUTION OF  
ORAL REHYDRATION SALTS IN MEXICO

A market research study of oral rehydration salts (ORS) was carried out in Mexico by Promotora de Planificación Familiar (PROFAM), a Mexican nonprofit organization. Mexican health agencies have widely encouraged the use of packets of ORS granules to combat high infant morbidity and mortality from diarrheal diseases. PROFAM was interested in producing, marketing, and distributing an inexpensive, easy-to-use ORS tablet and wanted to know if the public would find this product acceptable. Since drugstores are a popular source of ORS products, it was decided that a survey of pharmacists would provide a relatively good measure of supply and demand for ORS.

The survey included 116 private drugstores: 55 in Mexico City, 30 in the hot region, and 31 in the temperate region. The researchers asked pharmacists and other drugstore personnel to answer questions regarding the distribution and sales of ORS, their knowledge of the purpose and correct use of ORS, the demand for ORS, and their opinions on the presentation of ORS products.

Distribution and Sales. Analysis of the survey results showed that the majority of the drugstores surveyed (99 percent) sell ORS products, more than half without a prescription. Although the prices are probably too high for many consumers who need ORS products (US\$ .73 - .94 per 500 ml bottle), the pre-mixed liquid sells well. The pharmacists report that most sales are made to women.

Knowledge of Purpose and Use. Most of the pharmacists stated correctly that ORS products are used to treat dehydration caused by diarrheal diseases. Many of the pharmacists, however, were not sure of the directions for use. Only one of the ORS supplier companies occasionally provided the pharmacists with information on the purpose and the correct use of their ORS product. The pharmacists reported that pre-mixed liquid ORS products had the highest demand.

Demand and Presentation. The demand for ORS products was seasonal, with the largest quantities being bought in the spring and summer. A few pharmacists felt that demand could be increased by adding flavoring to existing ORS products. Opinions were mixed about the acceptability of an ORS tablet. On the one hand, many of the pharmacists thought that tablets would be easy for the consumer to use and more economical than other ORS products. On the other hand, many pharmacists feared that use of contaminated water to dissolve the

tablets would be a problem and that the tablets might be difficult to dissolve. When asked to indicate whether ORS tablets or granule packets would be more suitable, 33 percent of the pharmacists chose tablets, 48 percent chose granule packets, and 19 percent had no opinion. The investigators emphasized that these results are the opinions of pharmacy personnel and do not necessarily represent those of consumers.

Based on the study results and subsequent discussions, PROFAM decided not to proceed with the production of ORS tablets. The two major reasons for this decision were suitability and cost. The survey showed no particular consumer advantage of the ORS tablets over granule packets, and the tablets also cost slightly more than granule packets to produce. Instead, PROFAM will produce packets of granules that can be dissolved in an 8-ounce glass of water. The 8-ounce glass is a more convenient container for consumers than the 1-liter vessel required to dissolve existing granule packets. PROFAM was to begin manufacturing the packets as soon as they received Government approval.

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This study was conducted during July 1983 by Promotora de Planificación Familiar (PROFAM), a private, nonprofit Mexican association. Further information is available from Ing. Luis de la Macorra, President, PROFAM, Apartado Postal 34, El Pueblito, 76900 Villa Corregidora, Queretaro, Mexico, or from Dr. David Nicholas, PRICOR study monitor (Chevy Chase).



## Study Abstract

### MICROPLANNING OF ACTIVITIES OF COMMUNITY HEALTH AUXILIARIES IN THE STATE OF MEXICO

In recent years, special attention has been placed on primary health care (PHC) as the main strategy for delivering health care to unserved or underserved communities in Mexico. In the State of Mexico, one of 31 states in the country, the Coordinated Public Health Services of the State of Mexico (SCSPEM) provides health care to the majority of the citizens. Although Community Health Auxiliaries (CHAs) are a key component in the PHC program, it is recognized that discrepancies exist between the activities of the CHAs as planned and executed and the needs and demands of the communities they serve. The objective of this study was to increase the effectiveness of CHAs through improving the match between health care services and community health needs.

The first phase of this study consisted of a problem analysis of the CHAs' current practices to: (1) determine the nature and degree of incompatibility between the CHA activities and the communities' needs and demands and (2) better understand how the CHA actually participates in planning her own work. Several techniques were used for this phase. First, because the State of Mexico is very heterogeneous, a typology of the different communities was constructed to allow the investigators to group localities with similar socioeconomic characteristics. Five community prototypes were developed: rural, indigenous, urban industrial, urban nonindustrial, and traditional industrial. All subsequent data collection activities were carried out using a sample of microregions stratified by prototype community.

A survey of 381 CHAs was conducted to better understand the actual practice of the auxiliaries. The survey collected descriptive information about the CHAs, their activities, perceived problems, and their contacts with other levels of the health system and with the community. To corroborate the self-reported activities, a "shadow study" of 38 CHAs was undertaken to observe over a 3-day period the activities of auxiliaries in each of the prototype microregions. Finally, the research team conducted interviews with formal and informal leaders and held public meetings in 10 communities to discuss the findings of the survey and shadow study. In the public meetings, the nominal group technique was used to identify and rank the main problems threatening the health of the community.

The problem analysis concluded that CHAs in the State of Mexico were overburdened with too many tasks and were unable to respond to the specific problems and concerns of their community. The resulting solution objective was to find ways to improve the microplanning of CHA activities to ensure that the auxiliary's efforts are more efficiently and effectively channeled towards

the concerns of both the health delivery system and the community. The strategy developed to meet this objective involved reducing the number of tasks programmed at the central level for the CHA and training CHAs and their supervisors in the microplanning process.

Microplanning is a process the CHA carries out with the participation of the community and her supervisor to identify, plan, and implement actions to resolve local health problems. This process begins with the analysis by the CHA and her supervisor of available basic population data from family health records, surveys carried out by the State Health Service, and from a community census carried out by the auxiliary herself. This includes data on number and size of families, age distribution, education level, access to water and sanitation, and employment in her microregion. Understanding the relationship of this data to health problems in her community is a first step in directing the CHA's activities to meet community needs. The next step in the microplanning process is to talk with members of the community about their perceptions of key health problems and their causes. This can be done in a number of ways, including community meetings, small group discussions, and conversations with formal and informal leaders. The problems and actions identified are then incorporated into the planning of weekly and monthly activities for the CHA, which is done jointly by the health auxiliary and her supervisor. This process should result in improved CHA effectiveness since it allows the CHA to directly access her community's health problems and demands and incorporate these into her work plan.

Microplanning was introduced on a test basis in a representative group of CHAs in the different prototype communities in the State of Mexico in early 1986. Twelve CHAs and their supervisors were taught to diagnose the problems of their community, to consult with members of the community to understand their perceived problems and priorities, and then use this information to plan daily activities. The supervisors have also received training in how the CHA can and should be involved in the planning of her activities.

It is still too early to evaluate the program based on the goals but it is encouraging to note that at the completion of the research study, community diagnoses had been completed for eight communities. In addition, the auxiliaries, along with their supervisors, have begun developing and implementing weekly, monthly, and annual work plans. It should also be pointed out that components of the microplanning process training program have been incorporated into the PHC training of 150 physicians from throughout the State who will be responsible for implementing this process in their own areas.

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This study was carried out from May 1984 through March 1986 by the Coordinated Public Health Services of the State of Mexico. Further information is available from Dra. Ana Ramos, Principal Investigator, Porto Alegre 12256, Col. San Andrés, Tetepilco, C.P. 09440, Zona 13, Mexico, D.F.; or from Ms. Lani Rice Márquez, PRICOR study monitor (Chevy Chase).

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Study Abstract

## ATTRITION AMONG VILLAGE HEALTH WORKERS IN NIGERIA

During the period 1968-83, the Christian Reformed Church of Nigeria (CRCN) Rural Health Program in southern Gongola State, Nigeria, trained some 70 village health workers (VHWs). These VHWs work at remote village health posts where they treat common diseases with basic drugs and provide health education. However, most of the VHWs leave their work after 1 to 3 years. The objective of CRCN's study was therefore to determine why the VHWs leave and to find ways to keep them on the job.

Using information from case studies of other VHW programs and from questionnaires and interviews with village health committees, active and inactive VHWs, traditional birth attendants (TBAs), and selected women leaders, the study team identified variables that have contributed to the high VHW attrition rate:

- Low salaries.
- Displeasure with VHWs' limited curative role (e.g., they are not certified by the government to give injections).
- Small number of patients treated (average of two per day).
- Lack of community support and respect.
- Infrequent supervisory visits (fewer than two per year in most cases).
- Absence of opportunity to upgrade skills or to enter professional health training.
- Competition from more prestigious health facilities nearby.

The following are interesting statistics that emerged from the survey:

- Men continued as VHWs an average of 3 years, women only 1.5 years.
- Length of service was no different for those above and below age 30.
- VHWs with the lowest pay left their jobs after 1 year (women) or 2 years (men), while those paid more stayed on 1.5 years (women) to 3 years (men).
- Among those who dropped out, about half moved into higher training in health work and half returned to full-time farming.
- The presence of a larger health facility nearby (6 km or less) shortened the median length of service of the VHW from 3 to 2 years.

To develop a solution to the attrition problem the principal investigator, together with the research assistant and six members of the health staff who served as trainers of the VHWs, met to evaluate the responses from the

interviews and questionnaires. Using a nominal group process to elicit participants' views, they developed five solutions for testing:

1. Impose specific guidelines for the selection of trainees (e.g., they should be over age 25, married, and primary school graduates).
2. Improve the local health committees.
3. Institute regular supervisory visits (every two months).
4. Conduct inservice training for VHWs.
5. Upgrade the task specification of the VHW (e.g., train Community Health Aides instead of VHWs for larger villages).

The fifth solution was based on the discovery during the study that the community did not really want VHWs but rather a higher level of worker who could deliver a broader range of services.

The study team later added two more possible solutions to the above list: (1) offer VHWs the opportunity to be trained as Community Health Aides after working 2-3 years as VHWs; and (2) develop a health education program for church women's groups and male church leaders.

All these solutions will be tested during the next 5 years, the results of which are expected to be useful not only to the work of CRCN but also to other church-funded primary health care projects and to the Nigerian Ministry of Health.

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This study was conducted from January 1984 through March 1986 by the Christian Reformed Church of Nigeria (CRCN) Rural Health Program. Further information is available from the principal investigator, Dr. Herman Gray, CRCN Rural Health Program, P.O. Box 30, Wukari, Gongola State, Nigeria, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

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**Study Abstract****INCREASING THE PRODUCTIVITY OF COMMUNITY HEALTH WORKERS THROUGH  
SUPERVISION IN RURAL AREAS OF NIGERIA**

Low productivity of community health workers (CHWs) has resulted in inadequate health care coverage in rural areas of Nigeria. A research team from the University of Ife, having identified lack of CHW supervision as a major cause of this low productivity, conducted an operations research study during 1984 - 1985 to identify inadequacies in current supervisory practices and to propose strategies for improving supervision.

Data on the supervision process were gathered through a set of pretested, complementary questionnaires for supervisors, CHWs, and households in the Ife-Ijesha area of Oyo State in Nigeria. Analysis of the questionnaires showed that current supervisory practices were inadequate. The frequency of visits to CHWs was low and the duration of each visit was short -- less than one visit per month and less than one hour per visit. The majority of the PHC units in the area were not, in fact, visited by supervisors more than once a year. Supervisors gave little priority during these visits to reinforcing CHW community outreach activities or home visiting and seldom followed up on the unresolved problems of the CHWs.

The supervisory system contributed to the inadequacies in supervision by failing to provide supervisors with the resources and support they needed to supervise effectively. Few of the supervisors participating in the study had been trained specifically in supervisory methods and management techniques. No guidelines or protocols were available to assist the supervisors in planning and implementing supervisory visits. Although some of the supervisors were required to travel as much as 300 km a month on visits to CHWs, few received mileage allowances or travel advances or had access to official vehicles. Resources such as essential drugs and dressings were often unavailable to the supervisor or the CHW. Moreover, the supervisors had major clinic responsibilities in addition to their supervisory duties.

Home visiting coverage by CHWs was selected by the PRICOR researchers as an indicator of CHW performance, especially in preventive care. Analysis of the data showed that the longer and more frequent the supervisory visits were, the greater the proportion of homes visited. Supervisory tasks (such as planning, coordinating, and holding staff meetings; monitoring clinic operations; reviewing and collecting statistics; and giving technical assistance) were positively correlated with high home visiting coverage.

Having identified the problems, the researchers proposed several alternative strategies for improving supervisory practice. A large solution development workshop was held to assess the feasibility, effectiveness, and importance of these and other strategies. At this workshop 108 participants, including the

supervisors themselves, health officials, and policymakers, used the operations research technique of Multiple Criteria Utility Assessment (MCUA) to select strategies for improving supervision.

As a result of the workshop, the following strategies were recommended to the Federal and State Ministries of Health:

- Establish inservice training programs in supervisory methods and management techniques for current supervisory cadres of health workers.
- Include similar training in the curricula of the educational programs for new supervisory personnel, and see that at least one member of the faculty of each training center is trained in supervision and management.
- Revise the schemes of service for new cadres of CHWs to stress prevention and community outreach.
- Develop planning tools, guidelines, and protocols for supervisors, and train supervisors in their use.
- Carry out a field trial of the solutions suggested, especially the supervisory protocols developed by the study team.

These recommendations, along with the draft supervisory protocols, have been presented to the Federal and State Ministries of Health, UNICEF, and WHO. A third phase of the research to test the recommended solutions has been proposed to the Federal Ministry of Health.

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This study was conducted by the Department of Community Health and Nutrition of the University of Ife from March 1984 through December 1985. Further information is available from the principal investigator, Dr. Ebenezer Ojofeitimi, Faculty of Health Sciences, University of Ife, Ile-Ife, Nigeria, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

## Study Abstract

### TRAINING HEALTH WORKERS IN PAPUA NEW GUINEA

The Government of East New Britain Province has set a policy of reorienting health services in the province from a largely curative-focused system to one more in accord with the philosophy of primary health care (PHC), that is, with more emphasis on prevention and promotion at the community level. Among the various problems associated with such reorientation, health officials give high priority both to additional training for local health workers (Aid Post Orderlies, or APOs) and more community involvement in decisions concerning health care services. This study was conducted by the University of Tennessee Division of Public Health with the Church Health Service of Papua New Guinea from 1984 to 1986.

Early in the study, a planning group was formed comprising personnel from all levels of the Church Health Service (which has been mandated with providing service to much of the province) and the Provincial Health Service. Using such group decisionmaking techniques as brainstorming, nominal group, and multiple criteria utility assessment (MCUA), the planning group came to agreement on the most important elements of PHC, defined and set priorities among program objectives, and decided upon a strategy for training not only the health workers but also community leaders. They identified three operational clusters for concentration: specifying tasks for the local health worker, developing a program for their training, and creating community and system demand and support for PHC.

Next, the planning group proposed and analyzed several feasible strategies for achieving their objectives in these four problem areas. Again using MCUA, they decided upon a solution centering on training the APOs and the community leaders in the villages, that is, "among the people" instead of "within the health system." This approach was to emphasize for both the health workers and the villagers the role of the latter in the system. These planning sessions also served to teach the planning group members the use of the group decisionmaking techniques. These skills were sharpened at a pilot workshop involving the head of each division in the health department, as well as the heads of other development-related sectors, funding agency representatives, and people from 12 villages.

Four actual workshops for villagers and health workers were held to test the training strategy. Results were evaluated on the basis of change in health workers' and villagers' knowledge and application of targeted skills, and of village organization of PHC-related projects such as clean water or nutrition-oriented community gardens. These behavioral changes and PHC projects demonstrated the training strategy's effectiveness. However, the investigators and health service officials considered just as important the

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villagers' effective participation in the process of specifying their own health problems and priorities, and their demonstration--especially to themselves--that they could affect the delivery system in ways that they saw as beneficial. Finally changes also occurred within the delivery system. Of particular importance was the incorporation of PHC tasks into the rural health worker's job description, reporting system, and performance appraisal.

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This study was conducted from November 1984 through March 1986 by the Division of Public Health of the University of Tennessee in collaboration with the Church Health Service of Papua New Guinea. Further information is available from Ms. Ellen Vor der Bruegge, Dr. Sherilynn Spear, and Dr. Charles Hamilton at the Division of Public Health, University of Tennessee, Knoxville, Tennessee 37996-2700, or from Dr. Stewart Blumenfeld, PRICOR study monitor (Chevy Chase).

# PRICOR Primary Health Care Operations Research

## Study Abstract

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### AN IMPROVED SYSTEM FOR THE DELIVERY OF BASIC HEALTH SERVICES IN A HIGH JUNGLE AREA OF PERU

International Health Technologies, Inc. (IHT), in cooperation with the Universidad Peruana Cayetano Heredia, has been developing ways to use portable microcomputers to solve some of the health information problems associated with the delivery of primary services at the community level in Peru. The PRICOR portion of their study consisted of a field trial in a remote high jungle area to test the feasibility of using microcomputers with solar power source. Researchers hoped to determine how health workers respond to using microcomputers and how microcomputer use can affect data collection, worker motivation, and utilization of resources (e.g., pharmaceuticals).

The pilot study consisted of equipping 10 community health workers with a Hewlett-Packard lap-top HP 110 computer and training them to use the computer's interactive software routines in their consultations with members of their communities. The core software package used in the study consisted of the following modules: household census, visit registration, routine child visit (immunization status and growth monitoring based on the UNICEF "Road to Health" chart), and diarrhea diagnosis and treatment. Following early problems associated with the rainy season and with matching a solar-recharging system to the computer battery-charging system, the study team was able over a period of several months to implement the complete prototype system for pilot testing in 10 community health posts.

Since the study is being continued until the end of 1986, with funding from the Ministry of Health, final results of the demonstration trial are not yet available. However, the study has already produced sufficient data to support some key preliminary findings.

First, with regard to the adaptability of the microcomputer hardware, the HP 110 computer has been reliable and appropriate for the environment. Since the HP 110 has no moving parts, its frequency of repair record is expected to be very good. The main problem with the computer, battery recharge, was solved by replacing the direct charging circuit with a solar panel and storage battery system (using a standard, inexpensive 12-volt battery).

Second, the training of the health workers to use the computer was neither difficult nor time consuming, after the initial anxiety of the health workers about using computers was overcome with hands-on practice. Through the use of a simple letter-hunting game that teaches the computer keyboard, the trainees, whose education level averaged sixth grade, quickly became confident in their ability to "master the machine." All 10 returned to their communities after

4-7 days of training able to do an ongoing census. The supervisor, during community visits, introduced the health workers to the other modules, each of which required only about 2-4 hours of training. The researchers found that training could become even more rapid and efficient by developing for each of the modules a well-crafted, interactive training program, that is, one in which the computer "controls" the training session.

Third, the health worker and the community have enthusiastically accepted the computer and computer assistance. The health worker finds the computer useful in at least two important ways: the messages that appear on the screen serve not only as prompts for the next step in the child's evaluation but also as an authority which the health worker reads or cites to the mother. The mother perceives that she is getting not simply the health worker's opinion but an authoritative statement from a valid source of medical expertise. She therefore seems to be more willing to accept the advice of the health worker guided by the computer than that of the health worker alone. At the same time, health workers' status in the community appears to have increased since the introduction of the microcomputer.

Finally, the computer-based system already appears to be improving service delivery and recordkeeping for targeted activities. The interactive census module, which permits health workers to maintain an accurate up-to-date census of the families in their communities, appears to be having a psychological effect on parents who sense that the system is "paying attention" to their children. Health workers in the study villages, with the assistance of the monitoring module, the UNICEF card, and scales provided by the project, have been able to take each child through a thorough well-child examination and obtain an expert evaluation of that child's risk status each month.

Results to date suggest that microcomputer-aided health delivery at the community level is not only possible but can be a powerful mechanism for improving the quality and quantity of such health care. The computer-based system used in this study, name PROMETHEUS-PHC by the investigators, has been officially recognized and enthusiastically supported by the Government of Peru and even appears to have the potential to attract venture capital from Peruvian industry.

Funds from the Ministry of Health, together with private IHT resources, will enable the field trial to continue until December 1986, at which time the investigators will report final results to PRICOR.

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This study was conducted from August 1985 through March 1986 by International Health Technologies, Inc., in cooperation with the Universidad Peruana Cayetano Heredia. Further information is available from the principal investigators, Dr. William H. Spira and Dr. Paul Skillicorn, International Health Technologies, Inc. P.O. Box 30178, Bethesda, Maryland 20814, or from Ms. Lani Rice Márquez, PRICOR study monitor (Chevy Chase).

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Study Abstract

ALTERNATIVE TRAINING STRATEGIES  
FOR BARANGAY HEALTH WORKERS

Researchers from the University of the Philippines College of Nursing, in collaboration with staff from the Training Division of the Ministry of Health, undertook an operations research (OR) study to examine the problems in training barangay (village) health workers (BHWs). The objectives of the study were to: (1) analyze positive and negative aspects of the existing BHW training programs; (2) develop and field test alternative training strategies; and (3) propose improved strategies for selecting and training BHWs.

Three study sites in the Luzon region (one urban, two rural) were considered models in primary health care (PHC) delivery. To assess the quality of training at these sites, the investigators reviewed the program design, and surveyed the BHWs, the BHW trainers, and the community.

While the training manuals were found to be adequate in terms of topics covered, there was some disagreement between the BHWs and their trainers on the rank-order of topics in terms of their practical importance to the work of the BHWs in the communities. There was significant dissatisfaction with training scheduling, with the general training approach (too much lecturing), with the lack of sufficient materials, and with the use of English as the primary teaching language, given that for most barangay residents English is a second language understood at a basic level. Among some communities, knowledge of what services BHWs could provide was quite low. Not surprisingly, utilization of BHW services was also low.

Earlier evaluations of reasons underlying the turnover and malfeasances of some BHWs had raised questions about selection criteria. Therefore, some psychological testing was done of personality traits of the BHW group to see how well they matched the expectations of their trainers on traits assumed to be relevant to stability and performance. It was anticipated that these personality portraits would be compared to BHW performance indicators, but this analysis was given lower priority and was not finished in the course of the main OR study. Nevertheless, the data gave some insights into the group and allowed some educated guesses about traits that seem to be associated with higher performance (empathy, willingness to give service, maturity, and self-confidence).

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As a result of this analysis of the problem, a new selection and training approach was developed to include the following features:

- A more targeted recruitment campaign.
- More prevention-oriented course content.
- More focus on skill-development than information transfer.
- Standardization of length of training at 5 weeks (1 day lecture, 4 days practicum per week).
- Group dynamics (warm-up) sessions before all lecture periods.
- Monitoring of practicum activities through use of weekly worksheets.
- Use of pre- and post-tests to assess learning progress.
- Emphasis on BHW household assignments at a 1:20 ratio.
- Regular post-training monitoring of BHW activities and performance by means of a BHW Performance Rating Scale designed jointly by the BHWs, the trainers, and a panel of community health experts.
- Dissemination to BHWs of the results of the community survey conducted before and after implementation of the alternative training program.

To evaluate the output of the alternative training program, the study team used case study analysis and structured interviews of BHWs, trainers, and community respondents. The following are some of the major conclusions derived from the study:

- The alternative training strategies provided BHWs with basic knowledge and skills they needed.
- Separate subject modules were both effective teaching tools and useful references after training.
- Periodic consultations with BHWs regarding modification of the training program increased motivation.
- Group dynamics sessions contributed to individual growth of BHWs as well as to team building.
- Tangible incentives are necessary to sustain BHW interest and motivation.
- Supervision and monitoring still needed improvement.
- The community needs to be more involved in the recruitment process.

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This study was conducted by the University of the Philippines College of Nursing from December 1983 through February 1986. Further information is available from the principal investigator, Dr. Leticia Lantican, College of Nursing, University of the Philippines, Padre Faura Street, Manila, Philippines, or from Dr. Stewart Blumenfeld, PRICOR study monitor (Chevy Chase).

## Study Abstract

### INCREASING THE EFFECTIVENESS OF BARANGAY HEALTH WORKERS IN PROVIDING NUTRITION SERVICES WITHIN THE PHC FRAMEWORK

A recent decline in food production in the Philippines has increased problems of childhood malnutrition and resultant mortality. The development of a nutrition intervention program within the primary health care (PHC) structure has therefore been identified as a top priority. In April 1984, an operations research project aimed at improving the delivery of nutrition services by barangay (village) health workers (BHWs) was initiated by the Institute of Public Health (IPH) of the University of the Philippines in cooperation with the Nutrition Service of the Ministry of Health (MOH).

The researchers used three sources of data to identify specific operational problems with the current village-level nutrition service: (1) the current BHW nutrition training module, (2) interviews with BHWs and MOH midwives who provide supervision for the BHWs, and (3) a survey of community members in four barangays.

The review of the BHW nutrition training module indicated that there were information gaps on some important nutrition topics. The module emphasized food production, with less attention given to growth monitoring, promotion of appropriate nutrition practices, and rehabilitative maternal and child nutrition. The BHW and midwife survey revealed further problems with the training of BHWs for nutrition service delivery. The BHWs felt that insufficient time was spent on nutrition topics during training sessions. They also felt that the emphasis on food production was inappropriate given the lack of land, space, and capital in their communities. Moreover, they reported that mothers in the barangays were not interested in nutrition services.

The respondents to the community survey were typically mothers with more than three children. Many community members knew the value of breastfeeding and participation in the national child weighing program (Operation Timbang), but few were aware of the availability of nutrition rehabilitation wards, nutrition clinics, or other nutrition services. Perceived problems affecting nutrition included lack of nutrition information, inappropriate selective provision of food supplementation by clinic workers, and lack of space for backyard gardening. The major nutrition activity reported by the community members was referral of malnourished children to the local midwife.

As a result of the survey analysis, the research team concluded that the priority operational problem was revision of the MOH training program in nutrition for BHWs. Using multiple criteria utility assessment (MCUA), they devised a strategy for modifying both the training modules and the training approach. Factors considered in the MCUA were topic content and emphasis, appropriate trainers, method of instruction, and duration and location of training. Topics selected were importance of good nutrition, food handling, weighing, nutrition during pregnancy and lactation, infant and preschooler nutrition, common nutritional disorders, introduction of nutrition classes in

the community, and family productivity. Trainers selected were a mix of public health nurses, midwives, and regional nutritionists. The method of instruction designed was a combination of lecture, discussion, demonstration, role-playing, and group dynamics. The curriculum was presented over a 5-day period. [This training program was designed to help BHWs perform three major tasks: determine nutritional status of household members, deliver selected nutrition services, and monitor nutrition status of the community.] Results of pre- and post-training tests of the BHWs showed improvement in the nutrition knowledge of 60 percent of the trainees.

Following their training, the BHWs in each barangay developed their own action plans for delivering nutrition services based on their new knowledge and skills. For example, in one barangay, the plan included organizing community classes on nutrition and proper use of herbal medicines, conducting home visits during the month of July, and home weighing sessions every second quarter of the year. In another barangay, the BHWs agreed to implement family planning education, weighing sessions, and a house-to-house nutrition education campaign.

Using participant observation and monitoring forms, the PRICOR researchers documented the nutrition-related activities of the BHWs. A post-intervention survey of mothers was carried out to detect changes in knowledge, attitudes, and practices (KAP) towards nutrition. The post-intervention survey showed that mothers' KAP were positively influenced over the study period. For example in one barangay, utilization of nutrition services increased from 38 to 67 percent of the village women after three months. Utilization of the training modules extended beyond the project to other organizations. In two barangays, community participation in nutrition services provided by the BHWs initially increased, but declined as BHW interest apparently decreased. In a third barangay, however, there was a progressive increase in community participation in nutrition activities.

A variable that seemed to be key in the success or failure of the nutrition activities was the support of the local midwife and the community. In the two communities where BHW interest decreased, neither the midwife nor the communities gave strong support to the BHWs in their nutrition service delivery. In the more successful barangay, community input and strong support from the midwife led to continued improvement in the BHW's nutrition activities. The researchers concluded that, in order for BHWs to carry out successful nutrition service delivery, training would probably need to be supplemented by strong supervision by the midwife and substantial community support.

The new BHW training curriculum devised by the research team has been endorsed by the MOH Nutrition Service and now is being used in the MCH's BHW training program.

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This study was conducted from May 1984 through March 1986 by the Institute of Public Health of the University of the Philippines, in cooperation with the Ministry of Health. Further information is available from the principal investigator, Dr. Carmencita Salvosa-Loyola, University of the Philippines, Institute of Public Health, P.O. Box EA 460, Manila, Philippines, or from Dr. Stewart Blumenfeld, PRICOR study monitor (Chevy Chase).

# PRICOR Primary Health Care Operations Research

## Study Abstract

### ALTERNATIVE STRATEGIES FOR FINANCING PRIMARY HEALTH CARE IN THE PHILIPPINES

With PRICOR assistance, a team from the University of the Philippines in the Visayas (UP-V) conducted a 2-year operations research study in Iloilo Province aimed at developing feasible approaches to mobilizing community resources to help pay for primary health care (PHC) services. The study was part of a larger project (Panay Unified Services for Health-PUSH) carried out by the National Economic Development Authority in the region to improve PHC services on the island of Panay.

The UP-V/PRICOR study had three major objectives: (1) to help the people in each of the study villages (barangays) determine what services they would support; (2) to help them find appropriate means for raising funds and then help them develop and implement effective financial management schemes; and (3) to encourage them to use part of their resources to pay for preventive and promotive services.

Six barangays, selected to represent different economic sectors of the island, participated in the study. In each barangay a baseline survey was carried out to determine what people believed to be the most important health problems in their community. The survey also identified people's perceived needs in terms of health services; their attitudes toward, and utilization of, available local health services, particularly the Barangay Health Workers; their current expenditures for health services in the public and private sectors; and their stated willingness to pay for additional services not available locally through some sort of community financing mechanism. The major health problems were perceived to be respiratory and gastro-intestinal illnesses. Annual health expenditures per household were estimated to range from P200 (\$29) to P300 (\$43). The unavailability of drugs and poor water supply facilities were perceived as major health-related problems. The majority of households expressed willingness to participate in community financing of health activities. In the six barangays, the purchase of drugs and the operation of a drug depot (botika) were projects that community members were most willing to finance.

Solution development consisted of several steps that involved the barangay residents in community financing projects. First, the study team charted the results of the baseline survey pictorially and presented them to the barangay residents at community assemblies. After learning the results of the baseline survey and discussing them, the communities selected health activities they would fund through a community financing project and the type of financing mechanism they would use. Five barangays chose to finance and run community

drugstores, botikas sa barangay, and one barangay decided on an emergency hospitalization loan fund. These would be revolving funds in which user payments for drugs (or repayment of loans) are used to replenish stocks (or replenish the loan fund). Most barangays selected a flat rate contribution from households for the initial capitalization of the project, but supplementary fundraising activities, such as taxes on sales of produce and livestock, raffles, and parties, were also included in some of the plans. One month after the community financing schemes were initiated, the researchers held a workshop in each barangay for members of a core group of villagers who had agreed to take responsibility for the project. These workshops were used to plan the community financing project in more detail, to strengthen the management capabilities of the core group, and to teach concepts of primary health care. During this workshop, community women were selected for the jobs of "lead mother." These unpaid volunteers were to assist the barangay residents in implementing preventive and promotive health activities.

Most of the barangays were able to collect an average of 46.1 percent of the targets they had set for fundraising through flat rate contributions. The botikas were managed and run by volunteers from the communities. One person was generally in charge of dispensing drugs, collecting money, and maintaining stocks. Each botika made its own arrangements to buy its initial stock and replenishments. Pricing policy was set by each barangay. Stock turned over at annualized rates ranging from 132 to 913 percent and profit on sales ranged from 16 to 22 percent, despite claims of very small markups. Nine months after the research study had ended, the botikas and the emergency fund were found to be still functioning. Between 83 and 92 percent of barangay residents had contributed to the capitalization of the botikas (99 percent to the loan fund). Utilization of the botikas ranged between 54 and 77 percent of households. The results of the lead mothers program were mixed. Those barangays where lead mothers were active and effective did make clear, however, that potential beneficiaries of health services (lead mothers) can take on roles as preventive and promotive health care motivators if they are given adequate support.

From the success of the botikas sa barangay, it can be concluded that these Filipino villagers valued having a local source of desired drugs sufficiently to pay for this service. They were not, however, willing to pay for preventive and promotive health services, as had been initially hoped by the PRICOR researchers. With considerable outside assistance, the barangay residents did learn how to capitalize, organize, and manage revolving funds. Extensive community participation in designing, financing, and managing the botikas seemed to be a key factor in their performance and sustainability.

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This study was conducted from January 1983 to May 1985 by the University of the Philippines in the Visayas Foundation. Further information is available from the co-principal investigators, Dr. Trinidad S. Osteria, Institute of Southeast Asian Studies, Heng Mui Keng Terrace, Pasir Panjang, Singapore, and Professor Ida M. Siason, University of the Philippines in the Visayas, Iloilo City, Philippines, or from Dr. Stewart Blumenfeld, PRICOR study monitor (Chevy Chase).



## Study Abstract

### COMMUNITY FINANCING OF PRIMARY HEALTH CARE IN RURAL AREAS OF SENEGAL'S SINE SALOUM REGION

One of the objectives of the second phase of the Sine Saloum Rural Health Project (SS-RHP) in Senegal is to decrease the dependence of the project on USAID funding. Given rigid budget constraints, the Senegal Ministry of Health (MOH) needs to find alternative means of financing the basic health services provided by the project. An operations research study carried out by the Harvard Institute of International Development in 1983 addressed this problem. The objective of the study was to determine whether community financing could adequately support rural primary health care (PHC) in Sine Saloum.

The Sine Saloum Rural Health Project has been in operation since 1977. The project provides PHC services to 880,000 people in five of six departments of the region through a network of self-sustaining "health huts" (village-based health care facilities) in about 600 villages. Villagers are expected to construct the huts, encourage their fellow community members to use the new services, and compensate the village health workers (VHWs) trained by the project. Funds to cover costs are to come from the fees collected for medicine and other services. Ideally, government supervisors visit each village once a month to supervise VHWs and to encourage village health committees in their support of the VHW and of PHC. Phase II of this project was being designed at the time of the PRICOR study.

In order to examine the potential for community financing of PHC, the principal investigator proposed to analyze the economic feasibility of 13 government-initiated PHC activities. These activities were broken down into those that were involved in establishing a local PHC program and those that were involved in operating and maintaining such a program.

Establishment phase activities included: sensitization of villagers, agreement of village leaders to participate in the PHC program, nomination of community members to serve as volunteer health workers (VHWs), preservice training of VHWs, construction of a health hut, and provision of an initial stock of drugs and other medical supplies to the VHWs. The operation and maintenance phase included: patronage of VHWs by the villagers, availability of VHWs to serve the villagers, resupply of drugs and related products, physical maintenance of the health hut, management of project income by community representatives, supervision by government health officials, recording and reporting of service data, and inservice training of VHWs.

Through a review of existing documentation on PHC interventions in Senegal and interviews of health care providers and decisionmakers at all levels of the health system, the principal investigator described activities relating to supervision, VHW remuneration, and drug distribution. He also attempted to determine whether each activity is essential to the maintenance of rural PHC and, if essential, how it can be financed. He then made the following conclusions regarding the community financing potential of each of these recurrent cost components.

The major supervision costs to the Sine Saloum Project were those associated with supervisors' transportation to the villages (e.g. motorcycle fuel, maintenance, and repair). None of the possible financing sources examined seemed likely to pick up a substantial share of these costs in the near future. The investigator therefore proposed that a less intensive supervision system be established.

In the area of VHW remuneration, an in-depth sociological observation of the existing situation was proposed. The investigator thought that this would be necessary to assess the present level of VHW compensation in Sine Saloum, as well as its variability, its stability, and its adequacy to sustain VHW-based PHC.

The investigator also concluded that the existing network of private commerce in Sine Saloum could handle the distribution of pharmaceuticals at a fraction of the cost incurred by public sector agencies, and with greater reliability and frequency of resupply.

Using these conclusions, the PRICOR investigator developed recommendations for the design of the second phase of the Sine Saloum Rural Health Project. Concerning the extension of the project to the remaining departments of the region, he recommended that a preliminary sociological and anthropological investigation be a prerequisite to the implementation of the program (construction of the health hut) in any village. The purpose of this investigation would be to determine the villagers' perceptions of their health problems; the procedures the villagers are currently following to obtain health care; how much time, effort, and money it cost villagers to obtain health goods and services; and what improvements in health care they expect from the new PHC program. The investigator also recommended developing studies to assess the effects of phasing out onsite supervision and to determine how modified arrangements for drug procurement affect the reliability of supply in those areas where USAID support for the PHC program is gradually being withdrawn.

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This study was conducted from July 1983 through December 1985 by the Harvard Institute of International Development (HIID). Further information is available from the principal investigator, Dr. Clive Gray, HIID, 1737 Cambridge Street, Cambridge, Massachusetts 02138, or from Dr. David Nicholas, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### TRAINING MOTHERS TO USE ORAL REHYDRATION THERAPY

Although good estimates of national incidence rates are not available, official statistics indicate that diarrhea is the second most frequent condition of children aged 0-5 seen in the hospitals. In an effort to combat the problem through the promotion of oral rehydration therapy (ORT), the National Diarrheal Disease Control program was established by the Ministry of Health in 1980. In the Bombali District, where the infant mortality rate was nearly 200 per thousand live births, the Health Education Unit in the Northern Province conducted an operations research study in oral rehydration therapy. Because the high morbidity rate suggested that mothers still lacked knowledge, skills, and experience in the techniques of ORT, the purpose of the study was to determine the most effective methods of training mothers to properly use ORT when their children have diarrhea.

The problem analysis phase of the study consisted of a baseline survey of mothers, an identification of possible trainers, and an investigation of the operational issues to be considered in the diarrhea problem. The solution development phase of the study led to the selection of trainers, and the prioritizing of the operational issues, and the solution validation phase of the study field tested the impact of different trainers on mothers' use of ORT for treating diarrhea.

The maternal survey was conducted in four chiefdoms to assess knowledge, attitudes and practices with regards to diarrhea and ORT. While approximately one fourth of mothers knew that contaminated food or polluted water could cause diarrhea, nearly two thirds thought that "bad breast milk" might be responsible. The first action of half of the mothers in response to diarrhea was to take their child to the health center, while one fourth gave their child native herbs. Although one fourth of the mothers had heard of using a salt-sugar solution for treating diarrhea, less than five percent said they would give the ORT.

Persons who could function as potential trainers were identified through the maternal survey. Mothers reported that when their child had diarrhea they most frequently sought advice from health center staff, village health workers (VHWs), traditional birth attendants (TBAs), and traditional healers. Advice from village headmen, family members, religious leaders, and community leaders was also obtained. These potential trainers were interviewed to assess their knowledge of diarrheal diseases, their health habits, and their access to mothers and their willingness to train them.

Using a multiple interaction matrix in the solution development phase of the study, the researchers plotted the types of potential trainers against a list of eight selection criteria. Each potential trainer was assessed high, medium, or low against each criterium and those with the highest aggregate scores were selected as trainers. They were: Community health workers (VHWs and TBAs), school teachers and school children, and community leaders.

The third component of the problem analysis phase of the study included a review and break-down of the larger problem of diarrheal diseases into two smaller problems: (1) ensuring proper case management, and (2) strengthening preventive measures. Each sub-problem was further sub-divided into several specific operational problems including training, supervision, logistical support, monitoring and evaluation, health education, water sanitation, waste disposal, food hygiene, proper nutrition, and personal hygiene. Training was the strategy chosen to solve the 'proper case management' sub-problem. Solutions to strengthen preventive measures were subdivided into long and short term strategies, with the highest priority for the latter given to personal hygiene and proper nutrition. Health education, a strategy common to the solution of both sub-problems was given high priority; it was geared towards personal hygiene and feeding habits related to the management and prevention of diarrhea.

Field testing of the proposed solutions was carried out in three chiefdoms, with the fourth as a control. The trainers were selected within the chiefdoms; each of the 3 chiefdoms used a different type of trainer. The training of trainers was conducted by PHC supervisors and lasted two days. After completing their training, the trainers were assigned to specific villages and began training mothers and other community members over a six month period.

A post-test survey revealed that mothers who have heard about the salt-sugar solution rose from 27 percent in the baseline survey to 71 percent in the intervention areas, compared to 44 percent in the control area. The primary sources of information in each of the chiefdoms were the respective trainers, with VHWs and TBAs being more effective than either community leaders or school teachers. Training was conducted primarily in individual homes, in the evening hours; the most popular methods of training included talks, demonstrations and songs. The most frequent problems encountered by the trainers were lack of salt or sugar, poor attendance by the mothers, and inadequate teaching materials.

Results showed that while 93 percent of mothers in the intervention areas could prepare the salt-sugar solution, not a single mother in the control area could prepare it. Similarly, a majority of mothers in the intervention areas knew how to administer the correct dosage of the solution. Lower post-test scores in the control area also showed that mothers tended to forget the formula and dosage for the salt-sugar solution. This suggests that the training of mothers must be a continuous process; reinforcement is necessary.

In the post-test too, more mothers in the intervention areas expressed a belief that contaminated food and polluted water cause diarrhea, while the belief in "bad breast milk" and witchcraft declined. Improvements in personal hygiene and food handling were accompanied by a decrease in the incidence rate of diarrhea in the experimental areas. However, even where the incidence of diarrheal diseases remained high, those mothers who had practical experience with ORT more readily accepted it as their first line of action for diarrhea.

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This study was conducted from February 1984 through February 1986 by the Health Education Unit (Northern Province) of the Sierra Leone Ministry of Health. Further information is available from the principle investigator, Mohammad Bailor Jalloh, Ministry of Health, Primary Health Care Office, Makeni, Sierra Leone, or from Dr. Stewart N. Blumenfeld, study monitor (Chevy Chase).

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## Study Abstract

### OPERATIONAL PROCEDURES TO IMPROVE AVAILABILITY OF PHC DRUGS

An operations research study focusing on the use of modern drugs in rural areas of Somalia was carried out by researchers from the Somali National Academy of Arts and Sciences and Medical Service Consultants, Inc. (USA). The study, supported by PRICOR and UNICEF, with the cooperation of the Somali Ministry of Health (MOH) and USAID/Somalia, was conducted in villages in six geographically diverse regions of Somalia.

The research team first discussed the problems of drug delivery in the rural areas of Somalia with officials from the MOH and several international health agencies. These decisionmakers believed that the shortage of drugs in rural areas was a major constraint to implementing the Primary Health Care (PHC) Program in Somalia. Factors that might contribute to breakdowns in drug delivery were identified.

Three country-specific survey documents were designed and pretested to gather facts about (1) patient use of modern drugs at the village level; (2) prescriber practices in dispensing these drugs; and (3) drug stocks actually present at the prescribing facilities.

Thirty rural villages were selected for a household survey that used a multistage cluster sample design. In each village, 24 households were randomly chosen for the survey. The total number of households interviewed was 716. Thirty-two percent of households had purchased drugs in the past 6 months. The 716 households interviewed reported average drug expenditures of 68.64 Somali Shillings (US\$ .83) in the past 6 months. A significant portion of Somali villagers seem to be willing and able to make out-of-pocket payments for drugs, based on the fact that they are already doing so.

Some drug users (approximately 7.0 percent of the total sample or 16.7 percent of apparent drug users) reported purchasing drugs from a PHC or MOH clinic (where drugs are supposed to be free). Apparently, some government health care facilities were charging for drugs in order to help meet costs. Forty-nine percent of respondents indicated that PHC or other MOH facilities were their first choice when seeking modern medicines. The demand for modern drugs in the rural areas is, however, much greater than the government PHC facilities have been able to meet.

Of 31 different diseases named by dispensers surveyed at clinics, health posts, and drug stores used by villagers, the three most often cited were malaria, diarrhea/dysentery, and bronchitis. This seems to correspond

approximately with the most common illnesses reported by the households: cough, diarrhea, fever, headache, influenza, malaria, and stomach distress. The most frequently mentioned drugs for the "most common diseases" were penicillin, chloroquine, and aspirin. Drugs reported by households to have been received from PHC or other MOH facilities included chloroquine, aspirin, ORS, ferrous sulfate, cough medicine, ampicillin, and ciltotrim. Of the 47 items recommended by the dispensers as treatments for the "most common diseases," only 12 items would be sufficient to treat the spectrum of illnesses.

The survey data were then organized to focus on the following areas of interest: (1) household profiles; (2) household reports of drug use, cost, and source; (3) practitioner or dispenser reports of most common diseases and the drugs recommended for them; and (4) selected PHC drug items existing at facilities furnishing pharmaceutical services to the target villages.

A summary of the findings from the three surveys was circulated to seven decisionmakers in the MOH, together with a list of strategies to improve the delivery of drugs to the rural areas of Somalia. The MOH decisionmakers were asked to comment on the findings of the study and to rank the alternative strategies in terms of effectiveness and feasibility. Six of the participants cited the following three options as the most feasible: improve the drug distribution system, improve inventory control at the central drug warehouse, and improve dispenser awareness of appropriate drug use. The same six options were ranked from most to least important for improving the availability of drugs to the rural population. Seeking the local production of pharmaceuticals was ranked as most important. Limiting the number of drugs to be handled and improving the distribution system tied for second place.

After examining the findings of the PRICOR study and the strategies suggested by the Somali MOH decisionmakers, the study team developed recommendations for improving drug delivery to the rural areas. The researchers felt that both the public and the private sectors should be used for PHC drug delivery. The study team also recommended the preparation of a written "Guide to PHC Drug Use" that could be used to teach the Somali villagers. A functioning Somali women's organization was identified as a group to work with in developing the education program. It was also recommended that the MOH review the PHC drug list with the goal of limiting the number of items included.

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This study was conducted from April 1985 to December 1985 by the Somali National Academy of Arts and Sciences, and Medical Services Consultants (MSC), Inc. Further information is available from MSC, 1716 Wilson Blvd., Arlington, Virginia 22209, or from Dr. Stewart Blumenfeld, PRICOR study monitor (Chevy Chase).

# PRICOR Primary Health Care Operations Research

## Study Abstract

### DEVELOPMENT OF APPROPRIATE METHODS FOR SUSTAINING RURAL HEALTH MOTIVATORS

The Rural Health Motivator (RHM) is a key primary health care (PHC) element in rural Swaziland. The program, however, suffers from high turnover rates. In conjunction with the Primary Health Unit (PHU) of the Ministry of Health (MOH) and with the support of the PRICOR Project, a team from the Social Science Research Unit (SSRU) of the University of Swaziland undertook an operations research (OR) study to find ways to stabilize the RHMs.

The solution to the problem was identified as having three main components: community participation, stronger supervision, and dependable compensation. RHMs receive a monthly stipend from the Ministry, but it is small and delays in payment are not uncommon. In setting priorities to resolve the problem, the MOH/SSRU team decided, on the basis of previous work with groups of RHMs, that small, irregular compensation was probably the major cause of RHM turnover.

Supplementation by the community was thought to be an appropriate solution because it offered the benefit not only of increasing the RHM's payment for services, but also promoting increased community involvement in assuring availability of PHC. However, the researchers determined that before communities would be willing to pay for RHM services, the skills of the RHM would have to be strengthened. The objectives of the research, therefore, became to define a set of skills within the capabilities of the RHM that were acceptable to the MOH and that the community would consider worthy of compensation, and to develop an appropriate compensation scheme.

Several OR techniques were used in the problem analysis phase of the study to examine the organization of the country's PHC system and to identify constraints, inputs, processes, outputs, and outcomes. A nationwide survey, which elicited information crucial to solution development, focused on four areas: utilization patterns of health care, health expenditure, willingness of communities to support the RHMs, and attitudes of the RHMs themselves toward their work. An interesting finding of the survey was that while 28 percent of the respondents said they would be willing to support the RHM financially, not one of the RHMs interviewed believed the community would be willing to do so, mainly because the RHMs were, in principle, already receiving a salary from the government. Based on comments from the RHEAs, experience gained from other projects, discussions with health professionals, and the results of the community survey, the research team developed matrices to determine what RHM activities should be strengthened or introduced. The matrix results, in combination with discussions with MOH officials, determined that immunization, oral rehydration therapy (ORT), and growth monitoring

should be emphasized. Another matrix helped identify prepayment for services as the most appropriate form of compensation.

Solution testing took the form of a demonstration field test in a single chieftaincy over a period of 6.5 months. The research team initiated the test by conducting community meetings and a 2-day training course for the eight RHMs. The test was carefully monitored through meetings with RHMs and community leaders. A community survey and interviews with RHMs and community leaders were used to evaluate the field test.

The field test evaluation revealed that the PHC skills training for the RHM had served to broaden the community's perception of the role of the RHM in relation to children's health. For example, respondents perceived the RHM to be the primary source of information on ORT, and mothers complied well when the RHM referred their children for immunization. The newly-introduced growth monitoring skills were well received by both the community and the RHMs, and RHMs proved to be proficient and active in performing these skills.

The RHM support scheme the community chose involved the donation of communal land and agricultural labor toward the production of a crop to be given to the RHM, who could then sell the crop for cash. This plan did not quite reach fruition because the area chief, who alone has the power to direct the people to perform civic duties, was absent at the crucial field preparation period due to the coronation of a new king. The field set aside for the RHM was prepared by the community, but the RHM deemed it too late for planting. The chief and the community agreed that the RHM should remain active and that the community would prepare the field again for the next planting season. An adjacent chieftaincy, without any promotion from the research team, has indicated that it would also try the same scheme.

The following three recommendations were made to the MOH as a result of the study. First, RHMs should be trained to perform growth monitoring at the community level. This training should include local-language curriculum materials, careful referral guidelines, proper tools such as scales and growth cards, and adequate supervision and inservice sessions. Second, RHM inservice training should be revised to emphasize immunizations and ORT. Third, the Public Health Unit (PHU) should try to improve community support for RHMs. These efforts should include encouraging communities to devise their own, locally-appropriate forms of RHM compensation, considering ways to make RHM spouses more aware and supportive of RHM activities, and increasing efforts to keep the traditional leaders informed of and involved in PHU and RHM activities in their communities.

The study team emphasizes what is probably a key finding of the study, i.e. that only after community support for RHMs is improved should further efforts to establish community-based in-kind or in-cash contribution schemes be pursued.

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This study was conducted by researchers from the Social Science Research Unit of the University of Swaziland from April 1984 through March 1986. Further information is available from the principal investigators, Ms. Laurie H. Dunn, P.O. Box 4, Malkerns, Swaziland, or Ms. B. Dlamini Vilakati, Ministry of Health, Mbabane, Swaziland, or from Dr. Stewart Blumenfeld, PRICOR study monitor (Chevy Chase).

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## Study Abstract

### COMMUNITY PARTICIPATION IN IMPROVING VILLAGE HEALTH WORKER SUPERVISION IN TANZANIA

Researchers from the Faculty of Medicine, University of Dar Es Salaam, conducted an operations research study to address the problem of inadequate supervision of village health workers (VHWs) in Bagamoyo and Hanang districts. The overall objective of the study was to improve the utilization and coverage of primary health care (PHC) services provided by VHWs by improving VHW supervision. The study relied on extensive participation of villagers, village governments, VHWs, supervisors, and Ministry of Health (MOH) decisionmakers.

Three sets of information were used to analyze the supervision problems. First, supervisory decision variables were clarified through a series of large group discussions attended by PRICOR investigators, MOH decisionmakers, and project leaders from the study districts. Having identified 15 variables through this exercise, the PRICOR team developed questionnaires directed to supervisors, VHWs, and villagers. The ratings given to each supervisor for each supervisory decision variable were weighted depending on the position and education of the respondent. By this method, the opinions of those who had the best opportunity to implement changes in the supervisory system were given the most weight. Weighted averages on a scale from 1 to 5 were calculated for all 15 variables. As a result of this survey, two supervisors with poor performance ratings were replaced.

The second source of information was a survey of VHWs to determine their performance levels in 10 essential PHC activities. VHWs were asked how many times they performed a certain activity, such as health education or oral rehydration therapy (ORT), within a fortnight (2-week period). For example, in Bagamoyo district, an average of one diarrhea patient per fortnight per VHW was treated. In Hanang, the average was 3.6 diarrhea patients per fortnight per VHW.

The third source of information was a limited analysis of the VHWs' coverage of several PHC services. Malaria treatment, nutrition monitoring, environmental sanitation, and latrine construction were assessed from the findings of three existing surveys conducted in Bagamoyo district. Coverage figures for home visiting, health education, and ORT were calculated using VHW monthly reports. VHW coverage was highest for latrine construction (78 percent of households had latrines) and health education (65.5 percent of the expected number of health education sessions were conducted by the VHWs).

Based on these sources of information, the PRICOR team, decisionmakers from the MOH, and PRICOR consultants identified seven constraints to good supervision in Tanzania: time, fuel, stationery supplies, drug supplies, equipment, travel allowances, and vehicles. The participants determined the maximum amounts of time and money available for supervision in each study area.

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With the information gathered from the problem analysis, the PRICOR team proceeded to involve communities, VHWs, supervisors, and decisionmakers in setting goals for the supervision of VHWs. Ten PHC goals were placed in priority order according to their importance and feasibility as judged by decisionmakers. Immunization coverage was given the highest priority, followed by ORT utilization and latrine construction. The PRICOR team then went into the study villages and assisted the villagers in setting PHC goals for their communities for each PHC priority activity in terms of percent coverage and utilization. This exercise created a great deal of interest in the activities of the VHWs among the village leaders. Supervisors were asked to set PHC goals for the VHWs under their supervision, bearing in mind the goals set by the villagers and the constraints of supervision. These goals were discussed by PRICOR researchers and decisionmakers using a nominal group process.

Six influential decisionmakers from the MOH, the research team, and the PHC supervisors participated in goal setting for the supervision system. In this exercise, the participants looked at two hypothetical supervision teams that differed in their supervision aptitudes and in one of the supervision decision variables. The participants then gave their assessment of what it would take to raise the performance of the poor supervisory team to that of the good supervisory team. In another exercise, the decisionmakers, the PRICOR team, and supervisors used nominal group process (Delphi technique) to arrive at a revised supervisory system based on the inputs from villagers, VHWs, supervisors, and decisionmakers.

As a result of the study findings, it was possible to implement significant revisions in the system of supervision in Bagamoyo district. The number of supervisors assigned to the project area has been doubled. The number of supervisory visits required has been increased and each supervisor now visits his or her assigned sites at least twice a month. Supervision schedules have been developed and each supervisor is required to prepare monthly work plans and monthly reports. A checklist for use on supervisory visits has been developed and is now in use. Supervisors have been provided with bicycles. The budget for supervision of VHWs has also been increased.

The village people are now significantly involved in the supervision of their local VHW. Village health committees are active and assist in the supervision of the VHW. Supervisors have formed good relationships with village leaders in an atmosphere of cooperation. A "team safari" plan, developed by the PRICOR team, has been adopted in all villages. According to this plan, a team composed of the village health committee, the VHW, the VHW supervisor, local teachers, and agriculture and water development workers visit every house in the village on a regular basis. On each visit, the team discusses the health and well-being of the family with the household members. The teams make a list of all cases requiring followup by the VHWs. VHWs report their followup activities to the village health committee before the next team safari.

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This study was conducted by researchers from the University of Dar es Salaam from January 1983 through March 1986. Further information is available from the principal investigator, Dr. F.D.E. Mtango, University of Dar es Salaam, Department of Epidemiology and Biostatistics, Faculty of Medicine, Box 65001, Dar es Salaam, Tanzania, or from Dr. Jeanne Newman, PRICOR study monitor (Chevy Chase).

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Study Abstract

ALTERNATIVE APPROACHES TO SUPERVISION OF  
COMMUNITY HEALTH WORKERS IN THAILAND

Village health volunteers (VHVs) deliver primary health care (PHC) services in almost every village in Thailand. However, the Ministry of Health (MOH) recognized that the quality of the VHVs' work was not as high as it should be, due primarily to an ineffective system of communication and supervision following orientation and training. The Institute of Nutrition of Mahidol University and the Office of Primary Health Care of the Thai MOH therefore undertook an operations research study to develop alternative approaches to the supervision of village health volunteers.

The joint University of Mahidol-MOH team analyzed the macro and micro PHC supervision system in eight provinces. This analysis included interviews of PHC personnel from the MOH, village-level volunteers, and villagers. In addition, a literature search was conducted on supervision. These surveys were supplemented by a 2-month anthropological observation study in eight villages of the four regions in Thailand. The research team and PHC experts and implementors then assessed the findings through meetings and seminars. Through these meetings supervisory functions and means were identified.

The following supervision problems were identified in Phase I of the study:

- (1) Supervision of VHVs by health personnel is highly formal and vertical. It is, in general, limited to monitoring and evaluating VHVs' performance of centrally-promoted activities and tasks.
- (2) Sub-district health officers, those directly involved in supervising VHVs, are not always well prepared to supervise VHVs' community health development work; supervision therefore tends to emphasize the quantity of work accomplished rather than the quality of community participation. There are no adequately detailed guidelines for officials to follow in supervising volunteers, as opposed to MOH personnel.
- (3) Supervision is frequently sporadic and often tied to specific activities, such as preparing a village for a special PHC contest. When no special activity is underway, supervisory visits decline dramatically.

The various groups participating in solution development agreed upon the following:

- An effective system of VHV supervision should include the following components: training and technical assistance, guidance, monitoring activities on site, coordination of village support, problem solving for non-technical problems, management support, evaluation, and motivation.
- The above components should be implemented by personnel at all levels (from community leaders to MOH officers) and through various media (e.g. village public address systems, radio, movies, television).
- An appropriate combination of supervisory agents may be required to perform all the supervision functions. All levels of personnel who have supervisory responsibilities should be properly trained.
- Supervision should, in general, be provided by community leaders and sub-district health officers, with supplementary support from district and provincial officers, and from available media. Regional socioeconomic and cultural differences should be taken into account when designing alternative village health worker supervision systems.

The technique of multiple criteria utility assessment (MCUA) was used to determine which supervisor is responsible for different supervisory functions. VHVs from the four study regions also participated in small group discussions during the solution development period. The resultant alternative approaches to supervision of VHVs were then presented to administrators and decisionmakers of the MOH by the research team. The research team then developed a general model for VHV supervision involving community participation in administrative supervision and health officer technical supervision, supported by communications media. From the general model, four different region-specific models were developed. These models will be field tested later this year.

The MOH administrators and technical officers involved in the study have agreed on the benefits of operations research in finding solutions to the problems of supervision. Provincial Chief Medical Officers have been particularly interested in the findings, as these are relevant to a comprehensive public health development project being implemented in selected provinces throughout Thailand.

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This study was conducted from January 1985 to March 1986 by the Institute of Nutrition of Mahidol University and the Office of Primary Health Care of the Thai Ministry of Public Health. Further information is available from the principal investigator, Dr. Kraissid Tontisirin, Institute of Nutrition, Mahidol University, c/o Research Center, Ramathibodi Hospital, Rama III Road, Bangkok 10400, Thailand, or from Dr. Jack Reynolds, PRICOR study monitor, (Chevy Chase).

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**Study Abstract****COMMUNITY FINANCING OF PHC ACTIVITIES  
IN NUTRITION, WATER, AND SANITATION**

Researchers from the National Economic and Social Development Board (NESDB) conducted a study to identify and test cost-effective models of community financing for primary health care (PHC) activities in nutrition, water, and sanitation.

The Thai Government recognized that nutrition, water, and sanitation activities were crucial to an effective PHC program, but the Ministry of Public Health (MOPH) did not have the funds to pay for these health interventions, nor would the interventions be successful without community participation and support. Thus, the purpose of the study was to identify a model or models of community financing of PHC activities in nutrition, water, and sanitation that would best mobilize community resources in support of these activities.

The solution development phase of the study employed three data collection activities. First, the MOPH sent a letter to all 5,000 tambon health officers (tambons are subdistricts consisting of 6 to 10 villages) asking them to identify PHC funds in their jurisdictions. Over 70 percent of the health officers responded and identified over 12,000 funds. Next, more detailed questionnaires were mailed to the health officers asking for specific information about the 12,000 funds: their age and origin, management characteristics, procedures, diversification, and problems; as well as services they provide and households they serve. Completed questionnaires were received providing information on 4,631 funds. Finally, 63 in-depth case studies were carried out in 22 provinces around the country.

The data were analyzed to: (1) distinguish and describe existing viable models of community financing; (2) explain variations in viability and performance; and (3) propose alternative models for testing and implementation. The analysis showed that there are five types of funds:

1. Single-purpose funds (drugs, nutrition, water, and sanitation)
2. Single-purpose subsidized funds
3. Comprehensive PHC funds (support all PHC services)
4. Multipurpose funds (not limited to PHC)
5. Health card funds.

The data also showed that funds vary systematically with the primary health care activity they are set up to finance and the population they serve. For example, drug funds are the oldest, most numerous, most consistently profitable PHC funds in Thailand. They serve more households, have more diversified income sources, show more potential for diversification of services and less regional variation than nutrition or sanitation funds.

Nutrition funds are the next most widespread, located primarily in the northeast and north. They tend to be found in smaller, poorer villages, have little financial base for profitability or capital appreciation, be heavily dependent on labor contributions of women, and/or are decapitalizing. Ironically, the most profitable of these are often the least active in reducing malnutrition and the least successful by other PHC criteria. Finally, sanitation funds are the least numerous, with half located in the northeast. There are regional variations in working capital, profitability, interest rates, share purchases, and services. They tend to be located in larger and more prosperous villages. The most successful concentrate on providing loans at market interest rates for construction of water-sealed privies.

The research team examined various financing models and compared them against a set of standard criteria, including viability, profitability, services, coverage, and ability to support basic PHC services. They concluded that the best solution to the operational problem is multipurpose funds, for several reasons: (1) income sources are multiple and diverse, risk is spread, and income is likely to be more dependable, profits higher, and capital growth more rapid; (2) purchase of shares by households is encouraged by the real prospect of profit; (3) multipurpose funds conserve on scarce management time and skills--one multipurpose fund requires fewer people and less time to manage than 5-10 single-purpose funds; and (4) higher profits and rapid capital growth enable a multipurpose fund to support nutrition activity, even if it does not make money, and to make loans for sanitation improvements (particularly to low income people).

These results and recommendations were presented to and accepted by the MOPH. The Secretary General of the NESDB presented a summary of the findings and recommendations to the Thai Cabinet at the request of the Prime Minister. The MOPH has accepted the recommendation that existing PHC funds, particularly drug funds, should be encouraged to diversify and that new multipurpose funds should be established when conditions permit. Starting in 1985, the MOPH began carrying out these recommendations. In the solution validation phase of the study the research team conducted longitudinal testing of the various models of establishing multipurpose funds.

An interesting finding of the study was that the success of community financing was not the ability to put up a certain form or models of financing schemes, but the ability to transmit the concept of community financing to the rural community, who will in turn formulate their own finance scheme that is responsive to their particular needs and settings. The essential elements of such financing schemes are: (1) the pooling of capital and non-capital resources within the community that are rotatable and self-generating; (2) the ability to pool resources from within and without the community; (3) the community has the ultimate decision making power over the administration of the pooled resources; (4) the community has the ultimate decision-making power over the utilization and determination of activities of/for the pooled resources; and (5) the community has a central body or network of central organization to overload the pooled resources.

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This study was conducted from March 1983 through January 1986 by the National Economic and Social Development Board (NESDB) of Thailand. Further information is available from the principal investigator, Ms. Orathip Tanskul, NESDB, Krung Kasem Rd., Bangkok 10100, Thailand, or from Dr. Jack Reynolds, PRICOR study monitor (Chevy Chase).

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Study Abstract

COMMUNITY ORGANIZATION IN RESOLVING HEALTH PROBLEMS

During the period 1983 - 1985, the Centro Latinoamericano de Economía Humana (CLAEH) conducted an operations research study in marginal urban neighborhoods of Montevideo. This study addressed the problem of inadequate community participation in the provision of preventive community health services by popular private polyclinics (community health centers). The overall objective of the study was to demonstrate that certain health problems could be resolved through strengthened community organization. This could occur by creating volunteer committees that would select, train, and supervise community health promoters. The researchers hypothesized that the action of the health committees and promoters would serve as a catalyst to change residents' attitudes toward health problems, to increase their awareness of factors affecting their health, and to encourage them to take action to resolve those problems.

CLAEH staff conducted a baseline survey of 849 households to determine community knowledge, awareness, and practices concerning health issues. In addition, direct observation was used to determine environmental health conditions. This included assessing sanitary conditions of local activity centers and the existence and conditions of community services that affect health (polyclinics, trash disposal facilities, availability of clean water, etc.).

Three marginal urban neighborhoods were selected to form a volunteer health committee; three similar neighborhoods were selected as controls. In each experimental neighborhood, the health committee was composed of individuals from the community suggested by community organizations, representatives from the polyclinic, and one CLAEH researcher. The committees then chose health pre-promoters (a large group from which the health promoters would be chosen). The number of health pre-promoters and committee members depended on the size of the community being served.

Training of the pre-promoters and committee members took place in the communities. The two groups discussed findings from the baseline study and direct observation and were asked what they saw to be health problems and solutions. The training, which was carried out in eight sessions held in each of the experimental neighborhoods, covered basic principles of health promotion as well as environmental and individual factors affecting health. The pre-promoters were also taught to identify health problems in the neighborhood, to work with groups, to raise community consciousness about health issues, and to develop viable solutions to the health problems. Those pre-promoters who responded best to training were selected as promoters.

After the training and selection of promoters was completed, the health committees and promoters in each neighborhood began to select the problems they would address and to develop action plans for resolving them. No formal agreements were made between the committees and the health promoters, although the committees were charged with supervising and supporting the promoters in their work. Health promoter tasks were not formally established by the researchers but instead were left to the health committees and promoters to define. Motivation for the health promoters was based on their interest in community service and their concern about health conditions. They were not paid or reimbursed in other ways.

The health promoters and committees worked with existing groups in the communities (religious, social, sports, etc.) and formed groups of individuals with a common health problem (e.g., parents of malnourished children). Through informal meetings, these groups discussed health concerns and identified solutions that could be implemented through shared community effort. Activities undertaken as a result of the work of the promoters and health committees included the creation of a community feeding center, fundraising activities for the polyclinic and the feeding center, the organization of recreational activities for neighborhood children, and the presentation to national water authorities of a community petition for the extension of the water supply in their neighborhood. The committees held weekly or bi-weekly meetings to gauge the progress of the promoters' efforts. The researchers attended these meetings and provided technical assistance throughout the intervention.

CLEAH evaluated the project through a repeat household survey 6 months after the promoters began their work. The researchers compared changes in the responses in the test communities with changes in control communities. Committee members, promoters, community members, and clinic staff were interviewed as part of the evaluation. The evaluation demonstrated that community organization around the issue of health increased the use of polyclinics and broadened knowledge of the clinics' services. Moreover, in areas where health committees were organized, people were more likely to appreciate the health aspects of environmental sanitation and malnutrition. In assessing the community organization experience of each of the three experimental communities, the researchers concluded that the health committees functioned more effectively when membership on the committee included representatives of existing community groups.

Although their formal involvement with the committees ended in late 1985, the CLAEH researchers have maintained a relationship with personnel from the popular private health services.

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This study was conducted from May 1983 through September 1985 by the Centro Latinoamericano de Economía Humana (CLAEH). Further information is available from the principal investigator, Dr. Obdulia Ebole, CLAEH, Casilla de Correo 5021, Montevideo, Uruguay, or from Ms. Lani Rice Marquez, PRICOR study monitor (Chevy Chase).



## Study Abstract

### TESTING ALTERNATIVE PAYMENT SCHEMES IN HEALTH CENTERS IN ZAIRE

In 1982, the Zaire Government decentralized public health activities and created health zones which were to be largely self-financed. The Basic Rural Health Services Project (SANRU), a collaborative effort of the Government of Zaire, USAID and the Church of Christ in Zaire, was created in 1982 to coordinate this reorganization. One of the tasks of the SANRU project was to identify sustainable PHC community financing schemes.

The study team identified four PHC payment schemes being used in rural areas, namely, (1) fixed fee for episode, regardless of illness; (2) fixed fee for visit, with varying medication fees related to daily dosage and drug cost; (3) fee for episode, varying with severity of illness and cost of drugs; and (4) fixed fee for visit and drugs, but reduced fees for necessary repeat visits. The first two schemes were selected for study because the third and fourth were viewed as variations of the second.

Two principal data collection techniques were used. First, a baseline household survey was carried out at each study site before and after a new scheme had been introduced. Second, a cost analysis of health services was carried out in five health zones supported by the SANRU Project.

In each of five rural health zones, two health centers were chosen to participate in the study. In four of the zones, one center was asked to change to a scheme based on fee per episode of illness. The other center continued to use a payment scheme based on a fixed consultation fee and variable drug fee. In the fifth zone, a health center with a fee per episode scheme changed to fee per consultation while the other continued with the fee per episode. These schemes were observed for one year.

Curative visits per capita varied enormously from one health center to another, from a low of 3 visits per year per 100 population in Katanda and Tshileo to a high of 245 per 100 persons in Lukunga. One reason for this was that the proportion of persons seeking health care who went to the SANRU health center ranged from 1.4 percent in Katanda (where the nurse set up a competing private practice) to 83.2 percent in Lukunga (a small, well-defined, and isolated service area). A second explanation was that people in some areas reported very infrequent use of any health care provider (only 10 visits per 100 persons per year in Tshileo, for example), while in other areas visits were up to 35 times more frequent. Visits per episode of illness varied from scarcely more than 1.0 in Lukunga, Muadi Kayembe and Kaniama to over 6.0 in Kangoy.

Curative care costs per capita, per visit, and per episode also varied enormously. (Costs are reported in US dollars, and are based on an exchange rate of US\$ 1 = Z 43.8 from October 1984 - March 1985 and US\$ 1 = Z 52 from April 1985-September 1985.). In Tshileo (the area with low utilization), direct operating costs for twelve months were only 2 cents per capita, while in Lukunga they were 90 cents. Costs per visit ranged from 4 cents in Kangoy to \$3.46 in Katanda. The latter

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center experienced extremely low utilization so that fixed costs were spread over a relatively small number of visits, while the former had extremely high utilization.

Health center operating costs per episode ranged from 27 cents in Kangoy to \$7.46 in Katanda, with a median of 95 cents. At the average center, a patient payment of 95 cents per episode would have covered personnel salaries, zonal supervisor and mobile team salaries for the time they spent on field activities, all inservice training, administrative and maintenance supplies, drugs, vaccines, kerosene, minor building repairs, and transport for personnel and materials including supervisors and the mobile team.

Medical supply costs (mainly for drugs) accounted for nearly half of all curative care costs, ranging from 8.8 percent in Katanda (where fixed personnel costs were high for an underutilized clinic) to a high of 70.1 percent in Kaniama. Most health centers spent 22 to 34 percent of their funds on preventive care.

The operating costs of four of the five zones were \$3,500 to \$5,500 per year although the number of health centers that they supervised differed significantly from 6 to 47.

The fees that clinics set varied from one health center to another and were set in diverse ways. No technical formula for setting prices was agreed upon, yet the 6 centers with usable revenue data reported that they covered a median of 107.3 percent of their curative costs, including costs of zonal supervision and mobile teams. Preventive revenues covered between 0.4 percent and 10.6 percent of preventive costs, but three health centers collected revenue from curative care in excess of costs permitting cross-subsidization of preventive care. Overall, the six clinics reported median cost recovery of 66.5 percent.

Investigators learned a great deal about the process of introducing or changing community financing schemes and about the effect of this process on clinic operations and community utilization. Fee levels set through the "unscientific" process of community decisionmaking and crude cost calculation proved to be adequate for significant cost recovery, especially for curative care. Clinic management, staff quality and morale, drug supply, and relations with the community as a whole were probably more important influences on utilization in these ten centers than was payment scheme, yet these factors were themselves affected by staff and community reaction to change. Clinic staff in several locations disliked either the payment scheme they were asked to implement or the fee levels that had been set. Utilization declined severely in one center because the nurse quit and established a competing private practice; his successor was subsequently dismissed for malfeasance. The community which was asked to switch from fee per episode to fee per visit objected to what they considered a less desirable system and began making greater use of other providers. During this time period in this country, the way in which a payment scheme was established and managed appeared to affect utilization, cost, and cost recovery, more than did the precise nature of the scheme.

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This study was conducted for SANRU through the African Intermennonite Mission from September 1983 through March 1986. Information is available from the principal investigator, Dr. Lusamba Dikassa or from Dr. Frank Baer, P.O. Box 3555, Kinshasa, Zaire or from Ms. Marty Pipp, PRICOR study monitor (Chevy Chase).

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