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MIDTERM EVALUATION  
OF  
PRIMARY HEALTH CARE OPERATIONS RESEARCH-II PROJECT  
(PRICOR II)  
(Cooperative Agreement No. DPE-5920-A-00-5056-00)

Prepared for the  
Agency for International Development  
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Office of International Health  
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## LIST OF ACRONYMS AND ABBREVIATIONS

AID	Agency for International Development
ARI	Acute Respiratory Infection
CA	Comparative Analysis
CDC	Centers for Disease Control
CHS	Center for Human Services
DCI	Data Collection Instrument
GM/P	Growth Monitoring/Promotion
HIID	Harvard Institute for International Development
HIS	Health Information Systems
LQAS	Lot Quality Assurance Sampling
LTS	Logical Technical Services Corporation
MIS	Management Information System
NCIH	National Council for International Health
OR	Operations Research
ORT	Oral Rehydration Therapy
PRITECH	Technology for Primary Health Care Project
PHC	Primary Health Care
PVO	Private Voluntary Organization
REACH	Resources for Child Health Project
RSSA	Resources Support Services Agreement
S&T/Health	Bureau for Science and Technology/Office of Health
SA	Systems Analysis
TA	Technical Assistance
TAG	Technical Advisory Group
WCPH	Western Consortium for Public Health

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## EXECUTIVE SUMMARY

The evaluation team agrees that the concept underlying PRICOR II is exciting and original. The attention focused on the process of service delivery is all too rare; no one has ever attempted to develop a systematic approach or tools to identify implementation problems and develop solutions to those problems at the periphery. The level of support received from the individual country missions in the form of buy-ins speaks well of the project given the competing demands against funds available to missions. The team concludes that there is compelling evidence of the need for the PRICOR II project concept and approach. The report outlines how the project has been conducted to date and makes recommendations on how performance can be improved.

### Concept

The Midterm Evaluation Report on PRICOR II is divided into seven sections which deal with different aspects of the project; they are the PRICOR II concept, the Thesaurus, systems analysis, operations research, comparative analysis, dissemination, and implementation/institutionalization. The Findings and Conclusions and the Recommendations which follow are divided into the same seven sections. The concept has resulted in an ambitious and challenging project. Because there is no precedent in the field to follow, there is no easily accessed reservoir of knowledge and experience to tap. However, there are precedents in other fields of research which could provide examples and guidelines for PRICOR II staff. For example, PRISM staff have incorporated some organizational attributes (from the organization theory literature) into their analyses.

One difficulty that has come to the evaluation team's attention is the natural tension between the social scientist focusing on rigorous research and the manager focusing on the practical realities of day to day operations. With regard to this project, the social scientist and the manager are further separated by the fact that the manager is local and the social scientist in charge of the study typically is not. Also, there are complaints that the project is too centrally driven. This normal tension is probably heightened by the fact that PRICOR II is breaking new ground. A better balance between scientific and practical managerial considerations can be developed as both sides gain confidence in the concept and the approach itself. The recommendations for the concept are intended in part to suggest ways to deal with the bold scope and the complexity of the PRICOR II approach.

While concentrating evaluative efforts at the periphery may correctly identify problems in the process of health care service delivery, unless the methodology requires a concurrent macroanalysis of the system as a whole, generic or system-wide causes of these deficiencies may not be identified.

Comparability among the studies included in PRICOR II may be compromised because there are five different contracting and subcontracting organizations, each following different approaches, and because the buy-ins, in some cases, have resulted in efforts which do not fit into the general PRICOR II approach.

It is not absolutely clear whether the goal of PRICOR II is to carry out OR studies in order to identify common problems or to institutionalize a capacity on the part of host country program managers to identify and solve problems in a systematic manner. If the latter is a goal, then the training component should be an essential part of the PRICOR II approach.

### Thesaurus

The Thesaurus, a compilation of the steps followed in each of the seven child survival interventions for service delivery to the client, is uniformly cited by PRICOR II subcontractors and country personnel as a useful reference. The PRICOR staff have used it most extensively to develop data collection instruments for studies in several countries. Subcontractors have also used it as a reference and it has been used for training activities.

At the same time, the Thesaurus has been criticized as intimidating and cumbersome. The evaluation team noted that Volume II of the Thesaurus is very detailed and overwhelming to consider, especially as a single volume. The team could find no evidence that any other programs, such as the centrally-funded projects of PRITECH and REACH, had found the Thesaurus useful or had adopted it. In addition, there appear to be no written instructions on how to use the Thesaurus in the field.

### Systems Analysis

The systems analysis is intended to be a problem finding step in the PRICOR II approach. Data collection instruments are created with the help of the Thesaurus, data are collected and analyzed to determine where problems exist in the service delivery system and what the magnitude of those problems may be. The systems analyses that have been conducted have tended to be expensive exercises largely directed by Washington-based contractor staff. They will undoubtedly not be repeated. Ideally the systems analysis should be repeated periodically to determine if the solutions developed and implemented following the operations research studies have improved the situation.

In addition to identifying problems with the service delivery systems, the systems analyses in several instances have resulted in serendipitous findings. The benefit of such results should not be ignored in the overall assessment of the PRICOR II project.

As would be expected, the subcontractors on the PRICOR II project have each handled their portion of the project differently. PRISM and HIID, in particular, have developed tools that could be incorporated into other studies in PRICOR II. PRISM has included an emphasis on

organizational attributes as independent variables which significantly influence the delivery process. In addition, they rely more heavily than CHS on local focus groups to determine the problems to be addressed in the systems analysis. On the basis of some a priori assumptions, they aggregate data elements into constructs giving their DCI a more macro definition than CHS. They use role playing sessions with health workers as the focal points for observation rather than directed field observations. They also use Likert-type forced choice rating scales.

HIID has developed and tested the application of Lot Quality Assurance Sampling (LQAS) to measure the adequacy of coverage in the delivery of primary care services. LQAS activities do not fit the rubric of SA in the strict sense as defined by PRICOR II; however, they are an important quantitative refinement to the SA process which can yield more efficient, less costly sampling through the innovative application of industrial quality control theory and practice to peripheral health facilities.

Further deviations from the PRICOR II concept and model have occurred as a result of mission buy-ins. While some of these activities deviate from the rigorous PRICOR II model, they also represent the need for flexibility in securing the cooperation of Mission and Ministry officials in the host countries.

#### Operations Research Studies

The operations research studies are intended to test solutions to the problems identified as a result of the systems analyses. These studies were further intended to be smaller in scope and less costly than the OR studies conducted as a part of PRICOR I. According to information provided by CHS, they are. By the most conservative estimate, the PRICOR II OR studies are almost six times cheaper than the comparable PRICOR I studies. The PRICOR II OR studies are also completed over twice as quickly as the PRICOR I studies.

The PRICOR II project calls for 30 different OR studies in each of 12 countries, 360 OR studies in all. PRICOR II has funded 47 OR studies in six different countries to date. It is not always easy to determine exactly what problem these studies are addressing because there is no clear statement or description of the problem being addressed. Eighty-five percent of the studies are to focus on services provided by nonprofessionals and the lowest ranking category of professional health worker. Sixty-one percent of all studies meet that criterion.

If one considers the 14 possible subsystems to be addressed by PRICOR II (the seven child survival interventions and the seven accompanying support subsystems which include planning, training, supervision, community organization, logistical support, financial management, and information system, monitoring, and evaluation), four subsystems (acute respiratory infections, ORT, malaria, and immunization) are receiving a greater share of the funding than expected if we assume that each of the subsystems should receive an

equal proportion of the funding. At the same time it should be noted that 12 of the 14 subsystems are the subject of at least one OR study and 10 of the subsystems are the subject of multiple OR studies. Only the maternal health and child spacing subsystems have no OR studies underway to date.

Most (71%) OR studies have originated from the systems analyses. Most (76%) OR studies follow the three steps in the general OR process, problem analysis, solution development, solution testing and validation. A variety of research methods are being employed in the OR studies.

#### Comparative Analysis

Comparative analysis of the systems analyses and the operations research studies are also a part of the PRICOR II project. These analyses are in the early planning stage; no comprehensive plan for conducting these analyses has been produced yet. The recommendations section provides some suggestions for proceeding.

#### Dissemination

PRICOR II staff have developed a mailing list of over 900 individuals and groups. A combined total of 640 copies of the two volumes of the Thesaurus have been distributed. Two major publications of the PRICOR II project are the PRICOR Report with two issues published and the Child Survival Report with six issues published. Other dissemination activities include a 10 minute slide/video and a more extensive 30 minute video which is in production. Various PRICOR II staff have presented papers at conferences and briefings have been held for AID, CDC, and several of the centrally funded projects such as REACH. One subcontractor also publishes its own Peru PRICOR Report.

Three levels of dissemination are considered, within a project country, within the project, and outside the project. Outside the project has been PRICOR's primary focus.

#### Implementation/Institutionalization

The implementation and institutionalization of the PRICOR II concept, approach, and tools will depend on PRICOR II being perceived as having a high potential for functional utility and efficiency. It must be perceived as a process built on solid, objective research methodologies, not as a research project operated from a centrally based contractor staff.

Whatever its considerable merits as a research effort, the more important characteristic is the capacity building aspect of PRICOR II. By its emphasis on the analysis and improvement in process components at the most peripheral delivery levels of the primary care system, it has the potential for building the management and resource allocation infrastructure necessary to assure the efficient and effective delivery of primary health care. It would be a serious error to assume that the

SA/OR approach could be an adequate substitute for managerial experience and judgment. The recommendations for the institutionalization of PRICOR II results and findings recognize their potential utility to managers in focusing and enhancing that judgement factor, not as a substitute for it.

The evaluation team's recommendations are provided in Section IX of the report.

## I. INTRODUCTION/BACKGROUND

### A. Objective

The Cooperative Agreement for the PRICOR II Project was signed at the end of September 1985. The agreement called for a midterm review of the project's activities, including site visits, during the third year of the project. The Scope of Work for the evaluation team is attached (Annex I). The basic objective of the midterm evaluation was to determine the current status of the project activities, and compare that with the project objectives as stated in the Cooperative Agreement. The team was requested to review, challenge and critique the conceptual and operational foundations of PRICOR II. We were expected to assess the process and products of the prime contractor as well as of the four relatively independent subcontractors. We were afforded access not only to the contractors, but had an opportunity to spend time with project, program and AID staff in Peru and Zaire as well as in Washington.

To conduct this midterm review, OIH/PHS/DHHS and S&T/Health of USAID selected a team consisting of professionals experienced in study of the delivery of health services. Special efforts were made to include individuals on the team who had extensive experience in the U.S. health services. With the exception of the Team Leader who has spent almost 20 years studying the problems of implementation of community-based health interventions in Third World countries, the rest of the team had primarily domestic experience. Much of this experience was in health service delivery research; one of the team members had special expertise in evaluation methodology and another on organizational development. The objective was to assess PRICOR II against the standards of objective rigor and systematic development which apply to operations research in health in the United States.

### B. Background

The overall objective of PRICOR II was similar to that of the PRICOR I Project in that it attempted to improve the cost-effectiveness of health service delivery. The manner whereby this was to be accomplished differed radically. PRICOR I was essentially a grants program which focused on four topical areas:

- o Community health workers;
- o Community financing of PHC Services;
- o Community organizations to support PHC; and
- o Community-based distribution of PHC commodities.

Approximately 50 operations research studies were funded under PRICOR I, and they were scattered in over 30 countries. These studies were typically small, unrelated, isolated and not attached to any large-scale program, and thus had limited impact on the improvement of the quality of service delivery for the population at large.

PRICOR II developed a methodology and an approach to improve the cost-effectiveness of a large-scale Primary Health Care service delivery program. According to the design of the project, PRICOR II was to develop an approach and instruments to enable those responsible for the management of the delivery of health services to deal more effectively with the process aspects; i.e., the factors influencing the implementation of the interventions. The project design also focused attention on the periphery or the point at which the services reach the client or beneficiary. Finally, the decision was made that PRICOR II would concentrate its energies on Child Survival interventions. This meant that immunization and Oral Rehydration Therapy (ORT) along with interventions like malaria, Acute Respiratory Infection (ARI), and growth monitoring promotion were given priority while child spacing and maternal health have received much less attention.

It should be emphasized that what PRICOR II was attempting to do was experimental in nature; attention to the process of service delivery is all too rare and no one had ever attempted to develop a systematic approach to the subject or tools to assist those charged with the task. Thus, there was no precedent to follow, no reservoir of knowledge or experience to tap. PRICOR had to chart its own course and test various approaches and methods to identify and develop some useful tools.

### C. Evaluation Methodology

The evaluation team met in Washington in early November to review project documents, interview AID officials (from S&T/Health as well as the regional bureaus), hear briefings from the subcontractors on their respective field projects, and discuss the approach and project progress to date with the PRICOR staff at the CHS. The team then split into two groups with one (Hudson and Pyle) going to Zaire and the other (Hendricks and Marshall) visiting Peru. It should be pointed out that AID selected the sites to be visited; they wanted to have the team observe one CHS and one subcontractor site. Annex II gives a list of the individuals contacted in Washington and in the course of the site visits. It should also be noted that AID arranged the schedule of appointments in Washington, determining the individuals the team would meet. This was partially required because of the limited time available to the team, but the outcome of the review might have been affected by the lack of time to interview others who might have had views on and experience with PRICOR that might have been relevant.

The site visits took place between 4 and 12 November. This time in the field was found to be very useful, enabling the team members to translate the theoretical, methodological descriptions received in Washington into a practical, more operationally oriented idea of what the PRICOR approach was meant to be. However, in the case of both Peru and Zaire, the field site visits were arranged by the PRICOR subcontractor (in Peru) or CHS representative (in Zaire). This again precluded a totally independent appraisal, but despite this fact the team members felt confident that they received an accurate and objective assessment of what PRICOR was doing and attempting to achieve in the field.

#### D. Report Format

The midterm evaluation report is divided into nine sections, with individual team members taking responsibility for each. The team had several opportunities to meet and discuss as a group to ensure that everyone's opinions and observations were included. Following the Introduction/Background (Pyle), the concept underlying PRICOR II is spelled out (Hudson). Chapter III discusses the development, testing and application of the Thesaurus (Hudson). Next is a chapter on the Systems Analysis approach as developed and applied by PRICOR II (Marshall). This is followed by a discussion of the Operations Research Studies being carried out under PRICOR II (Hendricks). Chapter VI focuses on the comparative analysis and how the PRICOR II Project should address this difficult issue (Hendricks). This is followed by a chapter on the dissemination of information on PRICOR II methodology and approach in technical reports, house publications, briefings and presentations (Pyle). Chapter VIII consists of a discussion of implementation/institutionalization/operationalization issues (Marshall). The final chapter reiterates the recommendations that are made in the individual sections (Ferry).

## II. CONCEPT

### A. Rationale

The objective of PRICOR II, initiated in 1985, is to develop an organized system of operations research projects, comparable across a number of developing countries, designed to provide information for use in the improvement of primary health care programs. It represents a new approach in terms of its scope of services studied uniformly and in terms of the detail to which discrete steps in the process of care are investigated. It is designed to provide the manager/evaluator precise information about the internal operations of the entire system that lead ultimately to identifying results. This is the first time such a detailed microanalysis has been attempted on such a large scale. If successful, the method should not only provide health care managers with a basis of program evaluation but also provide personnel in the field the means to make frequent, informed, on-the-spot modifications in program design.

### B. Description

PRICOR I was essentially an operations research project carried out through a Cooperative Agreement with the Center for Human Services (CHS) beginning in 1981. The research program was limited to four topical areas: community health workers, community financing of primary care services, community organization to support primary health care and community-based distribution of primary health care commodities. Approximately 50 studies were funded in 30 countries. By April, 1985, virtually all of PRICOR's research budget had been committed. The studies that had been developed were unrelated in terms of overall correlation and were carried out in relative isolation. The external evaluation of 1984 identified a number of studies dealing with issues of questionable priority. At the same time it was felt that some topics appearing to be quite important for the overall effectiveness of primary care programs had received inadequate attention. The diverse approaches taken by different studies limited the opportunity to compare one study with another.

PRICOR II project calls for the implementation of large scale primary health care support projects in 12 separate countries, with the goal of completing approximately 30 studies in each country. The objective is to incorporate operations research studies to the extent that a complete understanding can be ascertained as to the processes of primary health care rather than assessing only outcome variables, as was the case in PRICOR I. It is expected that these studies will consist of a series of small-scale OR studies focused on a variety of specific, circumscribed service delivery activities. Thus, the focus of PRICOR II is on the periphery. In the past, traditional operations research studies and program evaluations have focused on measuring program inputs (e.g., training and supplies) and on outcomes (e.g., the number of children immunized). Much less attention has been devoted to describing the actual service delivery activities that, when provided

in a given sequence, produce a given outcome. PRICOR II aims to balance the emphasis on process compared to the previous emphasis on inputs and outcomes.

### C. Application

The activities of PRICOR II are not to simply duplicate the PRICOR I program but to use the previous experience as a base for further advances in operations research. It is expected that the activities will incorporate many of the successful elements of the PRICOR I program such as a systems approach to health problems and detailed attention as to how operations research should be conducted. The system should provide an objective approach to identifying the most important service delivery problems, and should ultimately, through appropriate operations research activities, help local providers identify appropriate intervention strategies to improve services. Several methodological approaches incorporating assessment instruments have been established to achieve the objectives of improved service delivery:

#### 1. Thesaurus

This is to be developed as a tool to assist program managers to identify exactly where the delivery of primary health care services for child survival breaks down. It consists of a set of operational definitions of the activities logically necessary to deliver a limited range of basic health services. It is divided into service and support indicators.

#### 2. Systems Analysis

With the help of the Thesaurus, a health care manager will be able to develop the data collection instruments (DCIs) to determine the nature and extent of the delivery problem. The systems analysis describes in detail basic service delivery in a region or entire country. The findings of the systems analysis are to be used to provide a basis for selecting specific service delivery problems for subsequent operations research studies. The Thesaurus should serve to standardize descriptions among various programs and may also be used to direct attention to the very functions that may be entirely absent from a given program.

#### 3. Operations Research Studies

Based on results of the systems analysis, specific operations research studies will be designed with the objective of overcoming the problems identified. The studies would include a large range of methodologies and approaches, including descriptive studies, prospective interventions in service delivery, and longitudinal studies with multiple observations of the same variable. For the most part, the scale of individual studies should be designed to reflect the level of precision required for a specific management decision. Compared to previous operations research programs, this project is to emphasize small-scale, relatively unsophisticated studies of brief duration.

#### 4. Comparative Analyses

It is expected that at the end of the project results from studies in the 12 countries can be compared objectively. Lessons learned in the 12 countries could be consolidated and could serve as a basis for promoting the systems analysis/operations research approach to process monitoring in other primary health care programs in the Third World. One of the purposes of the Thesaurus is to facilitate standardized systems analysis exercises in the 12 PRICOR countries.

#### 5. Dissemination

The findings of these discrete operations research studies are to be shared with others in the country where they are carried out, among other PRICOR countries by means of workshops and publications and in non-PRICOR countries who might be interested in the problem identification/solving approach developed by PRICOR II.

#### D. Critique of the General Concept

Analysis of operations in the 12 countries under the PRICOR II project will focus on process of care at the periphery. Such an approach is intended to provide evaluators and managers with a clear and precise picture of what is working well and what is not. The analyses should provide aggregate data for overall evaluation while at the same time the derived information should provide managers with the facts necessary to facilitate effective changes on the spot. While offering the potential for providing much more useful information than obtained from traditional outcome studies, both the scope and emphasis of this methodology present theoretical problems, some of which have been identified already in the field.

##### 1. Macroanalysis vs. analysis at the periphery

There is a danger of missing the forest for the trees. Excessive resource commitment to exhaustive studies of discrete processes of care might jeopardize the capacity to evaluate completely system-wide problems. Concentration of evaluative efforts at the periphery may identify correctly the links in the process chain where supervision or accountability or understanding is lacking, but unless the method calls for a concurrent macroanalysis of the system as a whole, generic or system-wide causes of these deficiencies may not be identified.

##### 2. Problems of comparability

PRICOR II involves sub-contracting with four organizations, each following different approaches. Provided that the operations research studies are described accurately and the methodologies utilized in each can be classified in some comparable manner, and provided that the discrete processes of care are measured in a uniform

manner, useful comparative analyses are possible. The Thesaurus has been developed to address the latter problem. Careful descriptive statements and explanation of the studies across the four contractors seem critical.

3. The need for balance between competing goals in PRICOR II

One goal of the project might be to develop centrally the most sophisticated, yet practical evaluative methodology applicable to large scale field studies, to test this under field conditions until it was perfected, and then to apply this to the improvement of health services. Another goal might be to spend resources primarily in the training of local managers/evaluators in the methodological design, with the objective of facilitating locally designed and executed studies of uniform format to assure some inter-country or inter-region comparison. There exist sufficient differences in these two goals as to result in rather marked differences in the scientific rigor of the systems analyses and operations research studies that should be anticipated from each methodology. Lack of clarity in the overall goals could result in serious disappointment in terms of the ultimate products.

4. The question of relevance

If one of the major goals of the PRICOR II project is to provide local field managers with an instrument to identify areas in the process of care where immediate corrections can be made, one must be aware and take into consideration the capacity and limitations for the managers to make such decisions within their program jurisdictions. For example, it is difficult to envision how field managers in many typical ministry of health programs could effectively use the PRICOR II approach in this manner. These managers typically have little control or authority to make management decisions at the local level.

E. Findings and Recommendations

Discussions during the briefings in Washington and during on-site visits to Peru and Zaire underscore, to varying degrees, these concerns:

1. Macroanalysis vs. analysis at the periphery

Although detailed systems analyses had been completed on a large scale in Zaire, and on a more circumscribed scale in Peru, no objective macroanalysis had been completed in either country. A macro analysis of sort has been completed in Zaire by local PRICOR staff. It is, however, normative and lacking in analysis, and it provides nothing more than a description of the program and structure. Whereas a number of operations and research studies are underway in Zaire, the ultimate impact of such studies may be reduced unless proper account is taken of the environmental and contextual (e.g., organization and political) variables that might be better understood through a more analytic macro study. Presumably, the same concern will be applicable in other countries where PRICOR II operations research studies will be underway.

**RECOMMENDATION:** Serious attention should be given to the development of a uniform format to conduct macroanalyses to complement the extensive process studies at the "periphery" as featured by the PRICOR II concept. The PRICOR II work done in Thailand was primarily of a macro nature and could be used as a starting point.

## 2. Problems of comparability

Because of the different approaches made by the four different sub-contracting organizations, problems relating to comparability are evident. The Harvard Institute for International Development (HIID) approach starts with problem identification and then determines the nature/extent of the problem so that it can be corrected. The Western Consortium for Public Health (WCPH) in Indonesia is following more of an epidemiologic approach. This is far more traditional and not necessarily in keeping with the PRICOR II emphasis on small, relatively uncomplicated operations research studies. The Logical Technical Services (LTS) activity in Togo was assumed by PRICOR originally as a contracting mechanism to continue a project started under a RSSA with OIH funded by S&T/Nutrition when this came to an end; they have since adopted the PRICOR II approach and completed a Systems Analysis utilizing the Thesaurus. LTS also contributed to the development and testing of the Growth Monitoring/Promotion (GM/P) section of the Thesaurus. In Peru, PRISM has carried out a systems analysis project with some use of the Thesaurus.

Within the CHS-managed projects there is tremendous variety as well. In Columbia, the systems analysis has been carried out relating to child survival activities undertaken by community volunteers. Here the Thesaurus has been used in the early design of the systems analysis. In Peru, likewise, a systems analysis has been carried out with extensive local use of the Thesaurus. In Thailand, the evaluation has been concentrated mainly at the macro level in an effort to improve the general management information systems and to facilitate decentralization of health services activity. In Haiti, the systems analysis had been completed; but the government would not approve the next stage of operations research efforts. Projects just now being launched in Niger and Senegal are focused more on support systems, especially on supervision. In Zaire and in the Philippines, systems analyses have been completed. Operations research studies have been identified and initiated in Zaire, and several are just beginning in the Philippines. In these latter two countries, the prototype PRICOR II approach seems to be developed most extensively.

Local conditions also impede comparability across programs. The relationship of priorities held by ministers of health and workers in the field may cause disparity of goals from one program to the other. Decentralization of authority and responsibility in one region may allow for different processes for utilizing the methodology. Differences in local capability to organize and support research of this nature may make cross-country comparability difficult.

The extent of local funding for the systems analysis and operations research studies to-date demonstrates, for the most part, an enthusiastic "buy in" to the concept by local authorities. Nevertheless, the site visit in Zaire uncovered complaints that PRICOR is too driven from the sub-contractor's central offices in Washington (e.g., the approach is developed by the prime contractor and then imposed upon the field). Some of the mission's high-priority needs are not included (for example, AIDS in Zaire), because they do not fall within the Child Survival Interventions. The explanation for this centralized direction is made on the basis of having to provide a standardized approach which can be applied elsewhere.

This, however, is contradicted by the inclusion of numerous country efforts which do not fit into the general PRICOR II approach. One example is Indonesia where the mission works very closely with the School of Public Health. If PRICOR wanted to work in that country, it had no choice but to work with the School. In addition, it had to begin its activities evaluating management of acute respiratory infections. When centering its attention on acute respiratory infections, it was found that there was no existing program with service delivery to study. As a result, the PRICOR activity in Indonesia became more of an epidemiologic pilot study which identified effective intervention approaches for acute respiratory infection, somewhat different from the primary goal of PRICOR II.

**RECOMMENDATION:** Attention should be directed towards methods that can improve the comparability of study design and data collection methods from country to country. Clearer descriptions of the operations research and systems analyses studies would be useful.

### 3. The role of local training and local study design

There appears yet to be a question within the PRICOR program about the project's ultimate goal. It is not absolutely certain whether the goal is to carry out 30 operations research studies in 12 countries in order to identify common problems, or to institutionalize a capacity to identify and solve problems in a systematic manner in each country so that after PRICOR II is completed, the host country program manager will continue to manage operations effectively. These two goals are quite different, and the ultimate decision between the two goals must be resolved before the project goes any further. A case in point, uncovered during the Zaire site visit, was the apparent difficulty that the Zaire office had in getting permission to carry out its own approach to conducting workshops for the orientation to operations research. The local project office was told that PRICOR was not in the training business. If it is true that PRICOR is interested only in generating a number of studies to improve knowledge of the service delivery process and to make improvements in program effectiveness, this raises concerns about the viability of the program in local regions after PRICOR II is completed. If the ability to carry

out the type of operations research studies PRICOR II advocate is to be institutionalized locally, the training component should be an essential part of the PRICOR II approach.

**RECOMMENDATION:** AID should determine the emphasis to be placed on training local managers in the design and carrying out of local studies. If this is an essential part of the overall project goal, then the sub-contractors must be so informed and directed toward this end. Institutionalization of the process should be a priority objective for the last two years of PRICOR II.

#### 4. Problems of definitions and objectives

There exists a tension between rigorous research on the one hand and operationally relevant and feasible methodologies on the other. Those with more formal academic training or associations are critical of operations research studies carried out under PRICOR II. For example, the sampling designs may not meet normal operations research standards. Yet the type of problem identification and solving methods required by a field manager must be necessarily simple, quick, and inexpensive if they are to be utilized as a regular feature of the operation. It might be helpful to consider using another term. If one might drop the word "research," one could lower expectations in terms of rigorous study methodology. Possibly a more appropriate term would be "operational analysis." In the classic industrial model for evaluating product quality or the classic medical quality assurance model, the following steps are generally described:

1. Problem identification
  - a. Is there a problem?
  - b. Where in the system does the problem exist?
  - c. What is the magnitude of the problem (in terms of variants from expected performance)?
2. Problem prioritization
  - a. How important is the problem in effecting desirable outcomes?
  - b. How easily can these tentative problems be ascertained?
  - c. Do we have the capacity to correct the problem?
3. Identification of possible corrective actions
4. Specific evaluative study
  - a. Establishment of baseline data on part of the system be corrected.

- b. Statement of expected improvement potential (expected level of performance after corrective intervention has been affected).
5. Application of corrective action
6. Re-evaluation after corrective action
7. Continuing monitoring to make sure that corrections have been maintained.

It appears that "systems analysis" in the context of PRICOR II project encompasses step 1 as outlined above. This activity, as envisioned, should establish an objective means for verifying and documenting the magnitude of process problems system-wide. From a practical and feasibility point of view the question is really how extensive and how detailed this initial system analysis can be. How much can the project afford in terms of time and human resources? Should the analysis be area-wide or merely involve one or two health centers? Would the application of further methodology, for example LQAS, improve the efficiency of this operation? Should this process be preceded by some regional prioritization activity in order to determine the boundaries and confines of the original systems analysis?

The "operations research" segment of PRICOR II would seem to encompass steps 2, 3, 4, 5, and 6 in the above outline. In general, this set of activities would be less extensive in scope than the "systems analysis" and would involve discrete studies of individual parts of the primary care process. The importance of step 7 should be emphasized in the planning for regional or national information systems.

The ultimate success of PRICOR II will rest in large measure on its ability to engender capability within the host country to self-initiate and carry out all steps described above. This includes both the "systems analysis" portion and the "operations research" portion. The concept of promoting the capability for continuous monitoring is an important aspect in the PRICOR II total effort. The Thesaurus should be useful to those designing the systems analysis portion as well as the operations research portion, and should serve as an easily available "on the shelf" resource document.

**RECOMMENDATION:** AID should insist that the participating contractors continue to refine and field test the methodologies for the systems analysis and operations research studies of PRICOR II. This refinement and experimentation should encourage better local understanding and application of the methodologies.

### III. THESAURUS

#### A. Rationale

The PRICOR II Project has for its major objective the development of a systematic comprehensive evaluation of the process by which primary health care is provided at the delivery site (clinic, home, field unit, etc.). An important objective of this effort, as stated under the Cooperative Agreement between the Agency for International Development (AID) and the contractor, Center for Human Services (CHS) is "to improve the cost-effectiveness of basic health services by documenting and analyzing prevailing problems and by applying operations research techniques to resolve them." There exists, therefore, a need to develop a methodology to gain precise information about the internal operations in the health system that lead to identified results. This information is to be gained at the local level through the development and subsequent measure of objective indicators for day-to-day primary care activities.

The 12 country PRICOR project will not attempt to analyze and evaluate all primary care services, but rather will concentrate on a series of efforts directed towards child survival. The evaluation methodology should be able to demonstrate an objective assessment of the various processes associated with child survival services and should demonstrate how training, supervision, management information and other systems support can improve the basic tasks associated with such services. The methodology should allow analysis to focus on direct observation at peripheral levels in the primary health care system. Such observations may involve direct recording of care, instruction or supervision as it is being given; participation in and recording of activities performed during simulation exercises; the recording of notations made in the medical record, clinic logs, home records, etc.; and/or direct query of supervisors, practitioners, or mothers.

The total effort in PRICOR II envisions a development of a large number of relatively uniform studies analyzing processes of primary care across a number of countries. Never before has such a detailed microanalysis been attempted on such a large scale. The project is, indeed, "breaking new ground" in this effort. The goal is to produce a number of operations research studies among a number of countries on a standardized rather than ad hoc basis. In order to accomplish this, the evaluation methodology and its instruments must:

1. Assure, as closely as possible, uniformity of standards in measures;
2. Provide reminders to those establishing local studies of the various steps and sub-steps of the process of primary care being evaluated;
3. Facilitate the design and early implementation of studies (systems analyses and operation research studies) in the field;

4. Provide sufficient general guidance so as to avoid the need for extensive effort in "reinventing the wheel" for each initial study and subsequent study.

In order to meet these methodological demands, the contractor, CHS, has developed the Thesaurus. This instrument identifies and describes the logical steps involved in the provision of care either by the health worker or by the mother upon instruction by the health worker.

B. Description

The Thesaurus is a comprehensive listing of discrete primary health care services, support service activities, along with quantitative indicators and data sources by which the indicators can be measured. It provides not only activity lists but also indicators for planning, training, supervision, community organization, logistics, financial management, and information systems.

The indicators for performance are considered to be one of the most important outputs of the Thesaurus development. As stated in the preface to the document prepared by CHS, "the Thesaurus, in sum, enumerates and operationally defines service delivery and support activities and provides objectively measurable indicators for them."

Although comprehensive in scope, the instrument is not purported to be all inclusive or exhaustive. To do so would result in an unmanageably long instrument. In order to concentrate upon and include the activities believed to be important in delivering primary care, the contractor consulted with numerous experts, and referred to a large list of WHO guidelines and committee reports.

The instrument is divided into two (eventually to be three) volumes:

- o Vol. I. Key service delivery and support activities, tasks, and sub-tasks.
- o Vol. II. A list of service and support indicators - for seven interventions:
  - a. Immunizations
  - b. Oral rehydration therapy
  - c. Malaria treatment
  - d. Acute respiratory infections
  - e. Maternal health
  - f. Child spacing
  - g. Growth monitoring promotion

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The support systems include:

- a. Training
- b. Supervision
- c. Logistic support
- d. Planning
- e. Financial management
- f. Monitoring and evaluation
- g. Community organization

- o Vol. III. Abridged List of Selected Critical Activities and Indicators for Rapid Field Use In Ongoing District-Level MIS/HIS Systems (not yet developed)

### C. Application

The sub-contractors suggest that the Thesaurus be used as a research tool to "1) identify problems that require operations research\*, 2) identify the strongest correlations between program effects and specific activities\*\*, and 3) permit objective comparison between programs\*\*\*." It is to be applied in all the countries where PRICOR II activities are developed and should streamline study design and permit the gathering of data within a standardized framework. It is proposed also to be used as a management tool, helping managers design programs and initial small ad hoc assessments of program activities.

Thus, the Thesaurus is proposed for use extensively:

1. Both centrally (at the sub-contractor level) and in the field (at the local country planning level) in the design of area-wide systems analyses studies.

2. At the local level in the design of numerous small scale operations research studies.

3. Centrally, in the ultimate analysis of the 12 country PRICOR effort.

### D. Evaluation

The Center for Human Services states, in the preface to the Thesaurus, Vol. 2:

"The field response to systems analyses based on the Thesaurus has been uniformly enthusiastic. Managers have benefitted greatly

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- \* Presumably to be used extensively in the design of systems analysis studies and development of data collection instruments.
  - \*\* Presumably effective in the design of operations research studies.
  - \*\*\* Presumably useful in establishing uniform data for ultimate PRICOR comparative analyses studies.

from direct observation of the old activities, especially at peripheral levels that they do not normally research. Researchers have appreciated the thoroughness of observation and documentation. Activities have been measured objectively, rather than impressionistically and subjectively. Problems have been looked at from multiple points of view; problem clusters have quickly emerged even with limited data analysis. Everyone involved has gained understanding of how the programs operate and how the various components relate to each other. The effort, though substantial, has proven worthwhile in every country in which PRICOR has worked..."

One must be careful to distinguish between success, as measured by enthusiasm for the systems analysis based on the Thesaurus versus enthusiasm for the Thesaurus itself in the design of the systems analyses studies. Efforts were made to make this distinction by the evaluation team during the site visits to Peru and Zaire. Anecdotal information was gained on-site at both locations.

In Peru, the team found that the Thesaurus (English version) had been used extensively by PRISM workers in the design of an initial systems analysis study. The systems analysis, however, was specifically designed to encompass only one limited segment of the primary health care delivery system. In other words, the systems analysis did not encompass a large-scale, multi-regional analysis of numerous health interventions. The workers reported that the Thesaurus was quite useful in the study design. It allowed them to be comprehensive in the scope of the study and assured that essential steps in primary care delivery were not overlooked in the analysis.

In Zaire, the Thesaurus was not used locally. It was used extensively in the Washington-based CHS office to design the survey instruments developed for the original large scale systems analysis of multiple facets of the entire primary care process. It is unknown how much time and effort went into the utilization of this Thesaurus at the central headquarter level. Presumably, it required a considerable use of time and resources but ultimately was deemed extremely helpful by central staff in designing the proposed surveying instrument. Once in the field, the instrument was modified to a moderate degree by local workers in order to be certain that it was appropriate to local conditions. The survey was then translated into French for widespread use. Thus, the Thesaurus itself was not used initially in Zaire. Workers there have not seen a copy of the Thesaurus or any part of it translated into French. An English version of the Thesaurus is available in Zaire. The PRICOR staff there made use of the Thesaurus in consulting with local primary care providers as they (the providers) developed their own local operations research studies based on the original systems analysis.

One can conclude at this point that the Thesaurus has as yet received only limited use in the field. The entire Thesaurus in its present form was completed only by mid-1988, although it was used extensively by the central office staff as it was being developed. The time for distribution and utilization has thus been limited.

The team understands that the Oral Rehydration Therapy portion of the Thesaurus has been translated into French and Spanish, and that translation for the other sections is progressing rapidly. In briefings at the central office, the team could find no evidence that the centrally-funded projects supporting field efforts in oral rehydration therapy (PRITECH) and immunizations (REACH) find the Thesaurus to be a useful edition. Except for the PRICOR project, no one has adopted it in their program.

The development of the Thesaurus took much longer than originally anticipated (over two years versus six months). It contains over 2,000 variables. There appear to be no clear written instructions as yet on how the Thesaurus is to be used in the field. Some members in the field have commented that the Thesaurus does not take into consideration some of the softer, yet vitally important, aspects of primary care (e.g., sociological, cultural, political, organizational).

In addition to its primary purpose as a resource for systems analysis and operations research instrument design, the Thesaurus has the potential to serve an additional important function in the field. Managers are likely to find it useful in the training and supervision of health workers. Through its use as a reference document managers can feel comfortable that everything is included (or at least no important elements are missed) in terms of training and supervision details.

The comprehensive identification of services delivery and support process activities contained in the Thesaurus creates a foundation for the identification and analysis of effective positive behavior by service delivery personnel in both the public and private sectors. This function of the Thesaurus should be more highly emphasized in the design of DCIs.

The Thesaurus has been envisioned as a critically important aid to those assigned to analysis studies both at the central office and in the field. With proper use it should reduce non-uniformity of terms and data and should ultimately save considerable time and effort by allowing comparable analyses to be organized without "reinventing the wheel" at the time of each initial and subsequent study. Its design and refinement, however, has been such an enormous task that it has consumed considerable time and effort in its initial development.

Some have criticized the Thesaurus as being too extensive, too comprehensive, too exhaustive. No priority is given to the various steps in the processes included. The evaluation team recognizes these potential faults, and understands that plans are being made to abridge it. This may not be necessary, since the instrument is designed to be a "shelf" reference document and should, of necessity, be extensive and inclusive.

**RECOMMENDATION:** Efforts should be extended to make the Thesaurus more user-friendly. For example, the large volume should be disaggregated into specific topics, e.g., oral rehydration therapy, immunizations, acute respiratory infections, etc. The team understands that this process is already underway.

**RECOMMENDATION:** Completion of the translation into Spanish and French and appropriate distribution in the field should constitute the next priority; however, efforts to abridge the Thesaurus should be delayed for the time being.

**RECOMMENDATION:** Guidance should be provided to assist managers in the field to apply the Thesaurus to the design and implementation of systems analyses and operations research studies. Managers will use the Thesaurus only if they understand how it fits into the process of systems analysis and/or operations research studies, and appreciate what it can contribute to both.

#### IV. SYSTEMS ANALYSIS

Primary health care systems analysis has been defined by PRISM as:

- o The systematic and selective measurement of structure and process variables;
- o Evaluated within an analytical framework which generates useful indicators of both quality and quantity of care linked to attributes of the delivering organization; and
- o Directed toward the identification of effective actions that can be taken to correct deficiencies or otherwise improve performance of individuals and of the organization.

In its most simple representation, CHS describes Systems Analysis (SA) as an attempt to identify and describe, based on the most objective possible observational measurements, the essential basic elements in a process. A generic graphic representation of the key elements in a system would appear as

INPUTS + PROCESS → OUTPUTS → EFFECTS (OUTCOMES) → IMPACT.

Once the micro-elements are described and objectively measured, the dynamics of the model, it is assumed, will then be revealed to the analyst. This assumption is predicated on a belief that the dynamics of systems are orderly and maintain at least some approximation of equilibrium over time. A further assumption is required which holds that the effects on OUTPUTS of changes to INPUT and PROCESS variables can be predictably tracked.

For PRICOR II, the legitimacy and utility of the SA are derived from the validity of the Thesaurus and its subsequent translation into a Data Collection Instrument (DCI). The Thesaurus represents the conceptual model which optimizes the equilibrium of the system, making possible the predictive function of the Operations Research approach to the improvement of primary care delivery.

There is little question but that a rigorous, objective assessment of the basic elements of a system and their interaction is the key to the analysis of how effectively the system is functioning. Similarly, it follows that such a diagnostic analysis is imperative to the design of any therapeutic intervention intended to improve operations within the system.

As detailed in the previous section, the Thesaurus represents a comprehensive and detailed compendium of the process elements essential to the primary care process for the six primary health care interventions originally included in the scope of work as well as for maternal health which was added later to the original intervention elements (ORT, immunization, growth monitoring and nutrition, malaria management, ARI and child spacing).

The analysis of process variables as the focus of the SA represents an original and exciting approach to services delivery improvement. The inclusion in the SA of the essential support services including supervision, training, logistics and information reinforces awareness of the fundamental reliance on these subsystems if quality control is to be achieved and maintained in the delivery system. These elements are particularly critical in decentralized and remote settings where supervision of workers with low levels of technical training is likely to be marginal.

Unfortunately, fidelity to that model in PRICOR II has led to DCIs which are sometimes so complex and burdensome as to compromise their utility as efficient functional tools for field application. As a result, some of the SA work which has been undertaken has not been completed. Much of what should be initiated, according to the original plan, may never be initiated or completed if the DCI is totally driven by the thesaurus. Time and budget constraints will not permit processes as laborious as those observed in Zaire and to a lesser extent in Peru.

This state of affairs is not, however, necessarily cause either for despair or for augmented funding in order to complete the ambitious schedule originally designed to require SA studies of each of the six primary care interventions for each of the 12 countries in the program. If there was an underlying assumption to the PRICOR II effort which held that with sufficient rigor in the design and implementation of the Thesaurus, DCI, SA and OR studies, the results could be aggregated into a gestalt more powerful than the sum of its individual parts, that must be regarded as virtually unattainable. However, this does not preclude generalization and comparability from one study to other settings or countries. The CA approach described in Chapter 6 will permit a determination of the confidence limits which would apply to such generalizations.

This is not to argue that the broad scope of PRICOR II was inappropriate. The boldness and complexity of the approach required a sufficient critical mass of host country participation. The utilization of four contractors, and the reliance on cooperative funding from a large number of individual AID Missions has somewhat compromised the potential for methodological uniformity and subsequent comparability of the individual SA and OR studies. But, that loss has been offset by a diversity of approaches which will benefit adaptability of the findings to multiple health settings in countries with diverse cultures and organizational styles.

A. SA Models In PRICOR II

1. CHS

CHS has developed the SA approach most consistent with the model as originally conceived in the initial PRICOR II development. It derives very closely from the Thesaurus and has been highly centralized in its development, although with a series of iterative interactions with field personnel, in Thailand, Haiti, Zaire, Columbia and in the Philippines. A major SA addressed to supervision is presently being initiated in Senegal.

The CHS approach involves four distinct phases, each of which has considerable implications for time and effort.

Phase I begins with discussions and negotiations between the CHS central office staff and the host country, AID mission staff, and potential participating institutions. The purpose of these is to:

- o Secure approval to proceed,
- o Identify interventions, support activities and geographic areas of principal interest; and
- o Enlist the collaboration of locally experienced research personnel.

CHS estimates that this Phase will require a minimum of two months with at least two or three visits by PRICOR staff from CHS headquarters.

Phase II is for detailed planning and pretesting preliminary to data collection. The Phase II objectives are to:

- o Develop, translate, pretest and produce data collection instruments;
- o Schedule and make logistical arrangements for fieldwork; and
- o Hire and train interviewers and observers.

A critical element at this stage is the collaboration between external advisors and local staff. CHS believes that external advisors are not likely to have adequate knowledge of local conditions and resources, while local staff require extensive orientation to SA techniques and instruments. CHS estimates about six weeks and one PRICOR staff visit for this phase.

Phase III involves the data collection in peripheral areas with heavy supervision of observers, interviewers and daily tabulation with cross-checking of their completed forms. Although not explicitly stated, we can assume a heavy CHS staff role in these activities. Up to four "team months" are estimated for this phase, although the use of multiple teams can shorten this estimate. The costs in additional training, and inter-team observer reliability would be factors in a decision to use multiple teams.

Phase IV is described as transitional to the OR activities. This final phase involves data analysis (dBase), calculation of indicators, and tentative exploration of management questions.

It is not likely, based on observations of the Evaluation Team in Zaire, that the model would be applied in a host country absent strong intervention and support from CHS.

A more detailed description of the CHS approach (October 1988), together with summaries of the SA activities undertaken by CHS in Colombia, Haiti, Niger, Pakistan, Philippines, Senegal, Thailand, and Zaire are in Annex 3.

## 2. PRISM

While not as closely derived and tightly driven by the Thesaurus as the CHS model, the PRISM approach to SA also spawns complex DCI demands resulting in an enormous data burden. The PRISM model differs from that of CHS primarily along four dimensions.

First is its additional emphasis on the influence of organizational attributes as independent variables which significantly influence the delivery process. These are important issues, but the danger is that the PRISM work could focus on the explication of organizational theory more than is appropriate.

Second, PRISM relies much more heavily than does CHS on locally convened focus groups in determining the problems to be addressed in the SA. The Thesaurus may be used as part of that interaction, or may only be used in preparation for the focus group sessions. But, the process is perceived as much more driven by local issues, including the needs of project, district, regional, and Ministry of Health (MOH) managers, than is the more centrally derived CHS approach.

Third, in its conceptual model, PRISM makes a priori assumptions as a basis for aggregating some of the data elements into constructs. This results in a slightly more macro definition to its DCI than is characteristic of the CHS efforts.

Finally, PRISM has introduced two unique social science methods into the SA process. These are role playing sessions with health workers as focal points for observation rather than directed field observations, and the use of Likert-type forced choice rating scales.

Like CHS, PRISM has at times allowed issues of research methodology to preempt the services delivery focus of the work under PRICOR II. CHS has digressed into the application of academic research standards for what is intended as an application of simple SA/OR methodologies to improving primary care services delivery. PRISM appears, at times, preoccupied with breaking new social science and organizational theory ground.

A more complete description of the PRISM model is attached in Annex 4.

### 3. Harvard Institute for International Development

Although HIID used the Thesaurus as a reference guide for an SA of the measles immunization subsystem in December, 1987, the PRICOR II SA methodology is not a principal focus of the Costa Rica effort. The objective of the HIID activity is to develop and test the application of Lot Quality Assurance Sampling (LQAS) to measure the adequacy of coverage in the delivery of primary care services.

Defined broadly, LQAS activities can be construed as fitting under the rubric of SA, although not in the strict sense as defined by PRICOR II. Rather, they represent an important quantitative refinement to the SA process which can yield more efficient, less costly sampling through the innovative application to peripheral health facilities adapted from industrial quality control theory and practice.

The HIID approach provides a generalized snap-shot which can, with minimal sample size and data collection efforts target deficiencies in service delivery coverage. It cannot, however, yield identification of the causes for those deficiencies. OR studies will be necessary for that diagnostic step.

Using a sample of only 28 households (in which there were children under the age of 24 months) for each of 60 randomly chosen health outposts over a two month period, the SA was able to estimate the levels of:

- o Immunization Status (polio, DPT, measles);
- o Knowledge of the recipe for home-mix ORT;
- o Referrals of pregnant women and newborns; and
- o Home visits made by the health worker.

This process, at a cost of approximately \$3/household, permitted analysis not only of overall performance, but also identified the effectiveness of each center against specific performance criteria.

A serious deficiency with respect to measles immunization was identified through a further SA which focused just on that process. One problem identified in the preliminary analysis is of a large waste of vaccine which is supplied in 10 cc vials but only one or two doses are given from each vial since immunizations are almost always provided only during home visits.

#### 4. Western Consortium for Public Health

This activity is based on an epidemiologic approach to clinical outputs for ARI. There is no focus on process variables. WCPH does not use the Thesaurus and has no commitment to the PRICOR II approach. The work does not meet even the most loose criteria for Systems Analysis.

However deviant from the rigorous PRICOR II model these activities may be, they do represent the need for flexibility in securing the cooperation of Mission and Ministry officials in the host country even when that may lead to some compromise from the PRICOR II concept and model.

A similar deviation from the strict PRICOR II model also exists in Togo which involves PRICOR II as a funding mechanism for completion of a project started under other auspices.

**RECOMMENDATION:** Although mission buy-ins should continue to be sought and encouraged, S&T/Health should attempt to maintain greater consonance with the PRICOR II conceptual model in arranging future buy-in activities.

#### B. Discussion

What is needed as PRICOR II moves into the latter portion of its half-life, is a comparison of the relative validity, efficiency, and efficacy of the various approaches taken by the individual contractors to SA. The standard for comparison should be their utility for application in the field by indigenous personnel with only a bare minimum of outside technical assistance.

The proposed analysis would not necessarily require a controlled experiment. It might include longitudinal analysis to ascertain and document changes in delivery process tracked to variations resulting from natural experiments occurring as a result of local conditions during implementation of the SA. A retrospective critical incidents analysis might be structured to provide this type of information. The expected yield should be applications guidelines for each of the SA approaches which had been differentiated, including intra-contractor differences, over time between sites and studies.

As described above, three of the four contractors applied models which, although they were basically derived from the Thesaurus, differed significantly in their formal reliance on the ideal model, the size and complexity of the DCI, and the level of detail in the data base.

The SA activities have represented a significant, heavy expenditure not only of PRICOR dollars, but of other resources as well. All are highly labor intensive not only for the primary data collection through application of the DCI, but in the planning and negotiating which precede data collection. The Ministry of Health (MOH) in the Host Country, the AID Mission and in some cases, local educational institutions all make major commitments of time and resources.

It has been an impression of the Evaluation Team that the SA activity has a potential for becoming too research oriented. There is a danger that it could become autonomous of the larger goals of PRICOR II.

The SA completed in Zaire may be a case in point. It addressed four interventions (ORT, immunization, growth monitoring and malaria). The SA took almost 10 months to complete at a cost to the contract of approximately \$200,000. It included only 4 of the 319 health zones in the Country. These were selected because they were believed to have the best performing health centers, of which there were a total of 18. The SA involved 72 villages and 648 families.

The sampling frame for the Zaire SA effort has been criticized for failure to observe random, and perhaps representative sampling. That is far from the most serious of its deficiencies. In fact, it can be argued that in terms of the design of management interventions to improve performance, it can be safely assumed that the worst centers have all of the problems of the best ones. Therefore, corrective actions derived from observations of good projects will also have a salutatory effect on those centers which have less good performance.

Most telling was that after complex analysis of the 3.1 million bites of data which were collected and analyzed from this SA, the problems were presented at a "prioritization" workshop. A list of 36 topics were identified as priorities. Six of these came from the floor rather than from the SA.

On the other hand, there are many situations where valid observations and descriptions of problems are made, based on sound program knowledge and experience, but which are subsequently rejected because they are not quantified. Numbers are convincing, but at what cost?

This is not to argue that the Zaire SA products should not have been developed. There was a need for a totally comprehensive model. That model should be available as a guide to those designing future efforts. It should not, however, be promulgated as a standard without

which an SA exercise would not produce useful diagnostic information or afford a basis for the design of OR studies.

**RECOMMENDATION:** PRICOR II must develop, validate and disseminate simplified SA methodologies which are less complex, burdensome and costly than the single rigid model which reflects the entire level of detail contained in the Thesaurus.

**RECOMMENDATION:** Future work on PRICOR II should not be directed toward further SA and DCI refinements. Rather, the objective should be toward developing instruments which will focus on "need to know" from the manager's perspective rather than what is "nice to know" in terms of the niceties of social science.

If PRICOR II is to have a significant impact on primary care delivery consistent with the level of effort and aggregate expenditures which it has consumed, it must provide analytic methods and instruments consistent with local organizational imperatives, resources and operational requirements.

PRICOR II represents an innovative and creative approach to that application of objectively-based, analytical methodologies drawn from academic and applied research. But, whatever its considerable merits as a research effort, the more important characteristic is the capacity building aspect of PRICOR II. By its emphasis on the analysis and improvement in process components at the most peripheral delivery levels of the primary care system, it has the potential for building the management and resource allocation infrastructure necessary to assure the efficient and effective delivery of PHC.

Unless specific strategies are developed, during the remainder of the contract period, for maintaining an appropriate balance between the research focus and the needs of the PHC delivery system, PRICOR II will not contribute to the development of the necessary infrastructure. The recommendations for implementation and institutionalization, including training, are addressed at Section VIII. Unless these are emphasized, the prospects for a long-range impact from PRICOR II will be minimized.

**RECOMMENDATION:** S&T/Health must develop specific strategies, to be applied during the remainder of the contract period, to maintain an appropriate balance in PRICOR II between the research focus and the needs of the PHC delivery system. Formation of a Technical Advisory Group (TAG) which represents not only research perspectives, but individuals with experience and sensitivity to technical skills, political factors and resource limitations in field operations would be an important step toward that end.

**RECOMMENDATION:** In order to assure optimum parsimony, consistent with practical constraints likely to be operative in any LDC PHC system, the remaining SA projects should be designed and implemented within a fixed budget for:

- o Time;
- o Money; and
- o Data burden.

**RECOMMENDATION:** The Thesaurus should be available as a reference for SA design, but alternative approaches should be encouraged so long as they are sufficiently documented to permit application in other settings.

**RECOMMENDATION:** CHS should prepare generic, broad instructions for SA implementation to permit SA activities less directed by CHS headquarters. The objective should be to allow host country SA activities with no more than five days of contractor support.

These instructions should address:

- o Sampling strategies;
- o Options for collection instruments; and
- o Options for analytic plans.

**RECOMMENDATION:** PRISM should prepare a non-technical handbook to document the process for convening focus group activities as a basis for SA. These guidelines should address:

- o Construct libraries for organizational attributes;
- o Panel selection;
- o Facilitator role and activities;
- o Scoring and interpretation; and
- o Translation to OR activities.

Such documents should be generic rather than limited in their focus to Peru and should be formatted for translation.

**RECOMMENDATION:** HIID should develop non-technical material descriptive of other potential applications of LQAS to SA of PHC. These materials should be appropriate both for application at the periphery as well as at other levels of management within the health sector of potential client countries. Again, these materials should lend themselves to translation to local vernacular.

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## V. OPERATIONS RESEARCH STUDIES

This chapter evaluates the operations research (OR) studies funded under PRICOR II. It addresses a number of issues within three broad questions: (1) What OR studies have been funded? (2) What problems are being addressed by these studies? and (3) How are these studies designed? This chapter also makes a number of recommendations for AID to consider.

Information for this chapter was obtained from a five-day site visit to the PRICOR project in Peru, from a desk review of PRICOR project documents and descriptions of each of 47 funded OR studies, and from personal and telephone interviews with key persons at the University Research Corporation/Center for Human Services (CHS): David Nicholas, Stewart Blumenfeld, Lani Marquez, Pat Sayer, and Wayne Stinson. In addition, CHS staff reviewed preliminary versions of Tables 1, 2, and 5 for accuracy and completeness.

Some of the data elements in Tables 1-6 have been extracted directly from documents, but others have been interpreted more subjectively. These latter elements are, of course, more subject to error, and they should be viewed accordingly.

### A. What OR Studies Are Being Funded Under PRICOR II?

#### 1. Number of studies funded

According to official documents, a goal of PRICOR II is to fund approximately 30 different OR studies in each of 12 countries, for a total of approximately 360 studies in all:

"Twelve program-specific studies addressing an average of 30 service delivery issues each."<sup>1</sup>

Table 1 contains information provided to the evaluation team by CHS. It lists, by country, each OR study funded as of November 14, 1988. This table shows that PRICOR II has funded 47 OR studies, or 13% of the original goal. CHS directly manages 31 of these studies, and two subcontractors manage the remaining 16 studies. (The Harvard Institute for International Development manages three studies, and the Western Consortium for Public Health manages 13 studies.)

**RECOMMENDATION:** AID should consider its original goal of funding a total of 360 different OR studies. If this goal is still important, specific plans should be made to fund an additional 313 studies in the remaining two years of the project.

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<sup>1</sup> "Project Design Summary Logical Framework: Primary Health Care Operations Research, 936-5920" (Washington, DC: USAID/S&T/Health, undated).

TABLE 1:

PRICOR OPERATIONS RESEARCH STUDIES - NOVEMBER 14, 1988

COUNTRY	CODE	TITLE OF OPERATIONS RESEARCH STUDY
<u>Part I - Studies Directly Managed by PRICOR</u>		
Colombia	C-1	Volunteer Supervision and Support
	C-2	Volunteer Activities and Task Planning
	C-3	Volunteer Activities in Growth Monitoring and Nutrition Programs
	C-4	Volunteer Tasks and Training in Acute Respiratory Infections
	C-5	Local Information System for Health Volunteers
Zaire	Z-1	Inventory, Description and Rapid Evaluation of Type of Growth Monitoring Sessions in Zaire
	Z-2	Description and Testing of Three Models of Growth Monitoring Sessions in the Rural Health Zone of Mangembo
	Z-3	Improvement of Recording of Growth Data in Maternities and Health Centers by Health Workers
	Z-4	Development of an Effective Tool to Routinely Monitor the KAP of Mothers' Home Treatment of Malaria in Children Under 5 Years of Age
	Z-5	Factors Affecting the Utilization of PHC Services
	Z-6	Recruitment and Motivation of CHWs and Health Committee Members
	Z-7	Development of an Appropriate Message and Health Education Strategy to Train Mothers in ORT (Kirotshe)
	Z-8	" " " " " " " " " " " " " " " " (Panzi)
	Z-9	Development of an Appropriate Message and Health Education Strategy to Teach Mothers the Correct Use of Chloroquine for Febrile Children (Bosobe)
	Z-10	" " " " " " " " " " " " " " " " (Kingasani)
	Z-11	Study of the Financial Needs and Sources of Income for Health Zone Central Offices (Kinshasa)
	Z-12	" " " " " " " " " " " " " " " " (Nord-Kivu)
	Z-13	Study of Factors Related to Utilization of Child Survival Services (Walikale)
	Z-14	" " " " " " " " " " " " " " " " (Zongo)
	Z-15	" " " " " " " " " " " " " " " " (Kenge)
	Z-16	" " " " " " " " " " " " " " " " (Kasai)
	Z-17	Analysis of the Problem of Mothers Who Don't Give Home Chloroquine Treatment to their Febrile Children or Who Give an Inadequate Dosage (Kinshasa)
	Z-18	" " " " " " " " " " " " " " " " (Haut-Zaire)
	Z-19	Study to Improve the Management of Acute Diarrhea Cases in Children in Health Centers
	Z-20	Development of a Method for Health Educators and Their Supervisors to Evaluate the Efficacy of Their Health Education Sessions in Health Centers
	Z-21	Study of Discordance between Reported Vaccination Coverage and the Reported Morbidity for Immunizable Diseases
	Z-22	Study of the Causes of Low DTP and Polio Vaccination Completion Rates and How to Increase Them

TABLE 1 (CONTINUED):

PRICOR OPERATIONS RESEARCH STUDIES - NOVEMBER 14, 1988

COUNTRY	CODE	TITLE OF OPERATIONS RESEARCH STUDY
Pakistan	P-1	Mansehra Community Health Worker Pilot Project
Thailand	T-1	A Study of Alternatives to the PHC Volunteer and Community Organization Strategy
	T-2	Development of Decentralized Management Support for PHC
	T-3	Development of a Model HIS/MIS in Srisaket Province
<u>Part II - Studies Managed by Subcontractors</u>		
Costa Rica	CR-1	Supervision
	CR-2	Mothers' ORT KAP
	CR-3	ORT Information
Indonesia	I-1	The Feasibility of Warung Distribution of ORS - ORALIT
	I-2	Research on Nutritional Improvement for Children under Five Through Improvement of Supplementary Food for Families of Low Socio-Economic Group
	I-3	The Efficacy of Infant Calendar Action Poster as Reminder for Continuity of Care
	I-4	Development and Testing Community-Based Methods to Increase Tetanus Toxoid Immunization Coverage of Pregnant Women
	I-5	Current Practices of Supervision for Posyandu's Health Kaders
	I-6	Relative Effectiveness of Group and Individual Health Education to Reduce EPI Dropouts - Or Reasons for Drop Out of Immunizations
	I-7	Improvement of Birth Reporting by Experimenting with Three Different Approaches in Community Compared with Traditional Method
	I-8	Randomized Control Trial of Antibiotic Treatment for Mild Acute Respiratory Infections (ARI) in Indonesia
	I-9	Effect of an Adequate Supply of Antibiotics and Knowledge of ARI Case-Management Procedures on the Clinical Progression of Moderate and Severe ARI
	I-10	Effect of a Letter of Order and Active Supervision in Decreasing the Use of Antibiotics for Treating Mild ARI
	I-11	Training Kaders to Provide a Community Health Education Approach to ARI Case Management
	I-12	A Clinic-Based Health Education Approach to ARI Case-Management
	I-13	Training Kaders for Home-Diagnosis and Referral of ARI Cases

Of the 47 studies funded, 12 studies (all in Zaire) involve duplicate sites for the same study. For example, Table 1 shows that four different rural health zones in Zaire are involved in a simultaneous "Study of Factors Related to Utilization of Child Survival Services" (studies Z-13 through Z-16). These four sites are each counted as a separate OR study. If the 7 duplicate sites are not counted as separate studies, PRICOR II has funded only 40 OR studies, or 11% of the original goal.

**RECOMMENDATION:** AID should determine whether the same OR study conducted in four different sites should be considered to be one study or four separate studies. This decision has implications for both (a) how OR studies are conceptualized and conducted, and (b) how PRICOR II performance is ultimately evaluated.

2. Countries in which studies are funded

The 47 OR studies have been funded in six different countries: Zaire (22 studies), Indonesia (13 studies), Colombia (5 studies), Costa Rica (3 studies), Thailand (3 studies), and Pakistan (1 study). This figure represents 50% of the original goal of 12 countries.

**RECOMMENDATION:** AID should consider its original goal of funding OR studies in 12 different countries. If this goal is still important, specific plans should be made to fund studies in six additional countries in the remaining two years of the project.

B. What problems are being addressed by the OR Studies?

1. Size of problems being addressed

According to official documents, a goal of PRICOR II is to fund OR studies which focus on smaller, more circumscribed problems than did those studies funded by PRICOR I:

"Studies will generally be limited to a very circumscribed portion of the program or even to a discrete, individual service delivery activity."<sup>2</sup>

"...the detailed observations of the systems analysis will facilitate development of studies that focus on relatively small, circumscribed problems in service delivery."<sup>3</sup>

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<sup>2</sup> "Statement of Work for PRICOR Project" (Washington, DC: USAID/S&T/Health, undated).

<sup>3</sup> "Scope of Work for the Mid-Term Evaluation Team: Primary Health Care Operations Research-II Project (PRICOR II)" (Washington, DC: USAID/S&T/Health, October 1988).

"OR studies focused on smaller, more specific components of the delivery system also take advantage of the considerable similarities that clearly exist among PHC programs, even in widely differing programs."<sup>4</sup>

Table 2 attempts to list the specific problem being addressed by each of the 47 OR studies, even though this is often difficult to determine. In fact, we were originally unable to determine what problem is being addressed by nine studies, seven of which are in Indonesia. As a result, we asked CHS staff to complete the missing sections of Table 2.

**RECOMMENDATION:** AID should require proposals for all future OR studies to contain a very simple, very specific description of the "problem being addressed by this study". This will help in both (a) conceptualizing, developing, and implementing the study, and (b) monitoring and evaluating the entire array of studies.

Comparing this list of problems with the titles of the 45 OR studies funded by PRICOR I<sup>5</sup>, it appears clear that PRICOR II is, in fact, funding "smaller, more specific components of the delivery system".

For example, while PRICOR I funded an OR study of "Health Care Utilization in Bangladesh", PRICOR II is funding an OR study to solve the problem that "Only 40% of children receive all 3 DPT and antipolio vaccinations." Similarly, while PRICOR I funded an OR study of "Training Mothers to Use ORT", PRICOR II is funding an OR study to solve the problem that "Mothers do not know the correct recipes or amounts for home ORT."

## 2. Types of problems being addressed

According to official documents, a goal of PRICOR II is to fund a significant percentage of OR studies addressing activities which are currently not being done adequately:

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<sup>4</sup> "Primary Health Care Operations Research Project Paper Amendment" (Washington, DC: USAID/S&T/Health, March 1987).

<sup>5</sup> "Solving Operational Problems in Primary Health Care 1981-1987: Final Report of the PRICOR Project" (Chevy Chase, MD: Center for Human Services, undated).

TABLE 2:

## PROBLEMS BEING ADDRESSED IN PRICOR OPERATIONS RESEARCH STUDIES

CODE	PROBLEM BEING ADDRESSED	SUBSYSTEM BEING STUDIED	ORIGIN OF STUDY TOPIC
<u>Part I - Studies Directly Managed by PRICOR</u>			
C-1	Volunteers are poorly and irregularly supervised	Supervision	Systems Analysis
C-2	Volunteers engage in diffuse and poorly planned activities	Planning	Systems Analysis
C-3	Volunteers do not distribute food or weigh children in a standardized manner	Growth Monitoring	Systems Analysis
C-4	Volunteers display weak knowledge and interventions in ARI	ARI	Systems Analysis
C-5	Family health record not used for planning or guiding home visits	Information System, Monitoring & Evaluation	Systems Analysis
Z-1	Health workers do not educate mothers about their child's growth	Growth Monitoring	Systems Analysis
Z-2	" " " " " " " " " " " "	Growth Monitoring	Systems Analysis
Z-3	Health workers report widely varying mean weights for age	Growth Monitoring	Group Discussions
Z-4	Mothers cannot provide effective early home treatment of malaria	Malaria	Systems Analysis
Z-5	PHC utilization rates vary widely within Kinshasa	All	Group Discussions
Z-6	CHWs and health committee members are hard to recruit and retain	Community Organization	Group Discussions
Z-7	Mothers do not know the correct recipes or amounts for home ORT	ORT	Systems Analysis
Z-8	" " " " " " " " " " " "	ORT	Systems Analysis
Z-9	Mothers administer chloroquine in doses too low to be effective	Malaria	Systems Analysis
Z-10	" " " " " " " " " " " "	Malaria	Systems Analysis
Z-11	Health offices recover only 60% of their costs from receipts	Financial Management	Group Discussions
Z-12	" " " " " " " " " " " "	Financial Management	Group Discussions
Z-13	Many health zones cover only 25-30% of their under-5 population	All	Group Discussions
Z-14	" " " " " " " " " " " "	All	Group Discussions
Z-15	" " " " " " " " " " " "	All	Group Discussions
Z-16	" " " " " " " " " " " "	All	Group Discussions
Z-17	Mothers give inadequate or no chloroquine treatment at home	Malaria	Systems Analysis
Z-18	" " " " " " " " " " " "	Malaria	Systems Analysis
Z-19	Health centers treat 90% of diarrhea cases incorrectly	ORT	Systems Analysis
Z-20	Mothers underestimate their role in prevention and home treatment	All	Systems Analysis
Z-21	Measles is increasing, even though vaccination coverage has risen	Immunization	Group Discussions
Z-22	Only 40% of children receive all 3 DTP and antipolio vaccinations	Immunization	Systems Analysis

TABLE 2 (CONTINUED):

## PROBLEMS BEING ADDRESSED IN PRICOR OPERATIONS RESEARCH STUDIES

CODE	PROBLEM BEING ADDRESSED	SUBSYSTEM BEING STUDIED	ORIGIN OF STUDY TOPIC
P-1	How to implement a successful community health worker scheme	Training; Supervision	National Plan
T-1	Volunteers are not well recruited, selected, or retained	Community Organization	Systems Analysis
T-2	Unmet management needs exist at the provincial and central levels	Planning; Logistics; Financial Management	Systems Analysis
T-3	Present MIS collects considerable unused data	Information System, Monitoring & Evaluation	Systems Analysis
<u>Part II - Studies Managed by Subcontractors</u>			
CR-1	There is no effective supervision system	Supervision	Systems Analysis
CR-2	Mothers have poor knowledge of how to prepare home mix ORT	ORT	Systems Analysis
CR-3	Many homes with no register of H.A. home visits and problem	Information System, Monitoring & Evaluation; ORT	Systems Analysis
I-1	Inaccessibility of ORS inhibits timely home care	ORT	Previous study
I-2	Supplementary feeding is not as effective as anticipated	Nutrition (?)	Previous study
I-3	Mothers do not bring children for immunization at scheduled ages	Immunization	Previous study
I-4	TT coverage is low	Immunization	Previous study
I-5	Health kader effectiveness is weak at the Posyanda	Supervision	Previous study
I-6	Immunization dropout rates are unacceptably high	Immunization	Previous study
I-7	Vital events reporting (births, in this case) is unreliable	Information System, Monitoring & Evaluation	Previous study
I-8	Physicians continue to treat mild cases of ARI with antibiotics	ARI	Systems Analysis
I-9	Health centers often have an inadequate supply of antibiotics	ARI	Systems Analysis
I-10	Physicians use scarce antibiotics to treat mild cases of ARI	ARI	Systems Analysis
I-11	Kaders are not effectively training mothers to handle ARI correctly	ARI	Systems Analysis
I-12	" " " " " " " " " " "	ARI	Systems Analysis
I-13	" " " " " " " " " " "	ARI	Systems Analysis

"A major area of concern for the OR studies involves service activities that are found to be minimal or absent."<sup>6</sup>

Table 2 shows that 40 of the 47 OR studies (85%) do, in fact, focus on activities which are "minimal or absent". For example, many studies focus on the low levels of recruitment, supervision, planning, knowledge, educational activities, diagnosis, and treatment.

### 3. Location of health services being studied

According to official documents, a goal of PRICOR II is to fund a significant percentage of OR studies addressing the "periphery" of health services:

"Eighty-five percent of studies will address services provided by non-professionals and the lowest ranking category of professional health worker, including relevant support activities such as training and supervision. Fifteen percent of studies will address issues limited to clinical facilities."<sup>7</sup>

Table 2 shows that 29 of the 47 OR studies focus on volunteers (six studies), community health workers (four studies), or mothers (19 studies). This represents 62% of all studies, or approximately three-fourths of the original goal of 85% of all studies.

At the same time, 18 of the 47 studies focus on health centers and higher-level institutions. This represents 38% of all studies, or more than twice the original goal of 15% of all studies. In other words, PRICOR II appears to be funding fewer OR studies focusing on low-level workers and more OR studies focusing on clinical facilities than was originally intended.

**RECOMMENDATION:** AID should consider its original goal that 85% of all OR studies should focus on low-level workers and 15% on clinical facilities. If this goal is still important, specific plans should be made to alter the current funding mix in the remaining two years of the project.

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<sup>6</sup> "Scope of Work for the Mid-Term Evaluation Team: Primary Health Care Operations Research-II Project (PRICOR II) (Washington, DC: USAID/S&T/Health, October 1988).

<sup>7</sup> "Statement of Work for PRICOR Project" (Washington, DC: USAID/S&T/Health, Sept. 30, 1985).

4. Subsystems in which OR studies are being funded

PRICOR II's Thesaurus contains separate sections for seven "subsystems" (also called "components" or "interventions") of primary health care: (1) immunization, (2) oral rehydration therapy, (3) malaria, (4) acute respiratory infections, (5) maternal health, (6) child spacing, and (7) growth monitoring promotion. The Thesaurus also includes seven different "support subsystems": (8) planning, (9) training, (10) supervision, (11) community organization, (12) logistical support, (13) financial management, and (14) information system, monitoring, and evaluation. An implicit goal of PRICOR II is to fund OR studies in several of these 14 subsystems, not just a few.

Table 2 lists the subsystem involved in the 47 OR studies. These data show that PRICOR II is, in fact, funding OR studies across many subsystems. Table 3 lists each of the 14 subsystems and the number of OR studies being funded in each.

TABLE 3

Subsystems Involved In PRICOR II OR Studies

Service Delivery Subsystems	# of OR Studies	Support Subsystems	# of OR Studies
Immunization	5	Planning	2
Oral Rehydration Therapy	6	Training	1
Malaria	5	Supervision	4
Acute Respiratory Infections	7	Community Organization	2
Maternal Health	0	Logistical Support	1
Child Spacing	0	Financial Management	3
Growth Monitoring Promotion	4	Information System, Monitoring, and Evaluation	4

Table 3 shows that PRICOR II is funding OR studies in 12 subsystems, or 86% of the subsystems possible to be funded. In contrast, only the two subsystems of maternal health and child spacing have no studies funded. Furthermore, PRICOR II is funding multiple studies in 10 subsystems, or 71% of the subsystems possible to be funded. (These numbers and percentages would be even higher if we included the six OR studies which, according to CHS, involve all 14 subsystems.)

From a different perspective, though, it could be argued that a disproportionate number of OR studies are being funded in four subsystems: acute respiratory infections (7), oral rehydration therapy (6), malaria (5), and immunization (5). If the studies were being

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distributed equally into all 14 subsystems, each subsystem would contain approximately 7% of the studies. These four subsystems, however, contain 52% of the studies, or almost twice their "expected" percentage of 28%. However, this disproportionate representation is not necessarily inappropriate, given the priorities of AID.

**RECOMMENDATION:** AID should determine if the current mix of subsystem-specific OR studies is sufficient for individual country studies and for later comparative analyses. If not, specific plans should be made to alter the current funding mix in the remaining two years of the project.

5. Origin of the study topics being funded

According to official documents, a goal of PRICOR II is to fund OR studies which flow directly from the problems identified during a systems analysis. This was partly a reaction to the fact that studies funded by PRICOR I were not always directly related to the most pressing problems of primary health care.

"The research activities to be carried out by the CA should therefore include a systematic effort to identify specific, highly prevalent shortcomings in PHC programs. It is on these issues that subsequent studies should focus."<sup>8</sup>

"...OR studies to explicitly address problems identified through the systems analysis."<sup>9</sup>

"...encourage health managers to conduct a systems analysis to identify priority problems. Ideally, this should be done prior to selecting any OR project."<sup>10</sup>

Table 2 lists the origin of the study topic for the 47 OR studies. These data show that most PRICOR II OR studies have, in fact, been derived from a systems analysis. Twenty-nine of the 47 studies (62%) originated from a systems analysis. However, 10 studies (21%) originated from group discussions about problems, seven (15%) originated from a previous study, and one (3%) originated directly from a national development plan. It is an open question, however, whether

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<sup>8</sup> Ibid.

<sup>9</sup> "Scope of Work for the Mid-Term Evaluation Team: Primary Health Care Operations Research-II Project (PRICOR II) (Washington, DC: USAID/S&T/Health, October 1988).

<sup>10</sup> "Solving Operational Problems in Primary Health Care 1981-1987: Final Report of the PRICOR Project" (Bethesda, MD: Center for Human Services, March 31, 1987).

OR studies originating from Systems Analysis are in any way "better" than OR studies originating from other sources. Future studies might profitably address this important issue.

**RECOMMENDATION:** AID should determine if the current mix of origins of OR studies is acceptable. If not, specific plans should be made to ensure that more future OR studies flow directly from the results of systems analyses.

C. How are the OR Studies Designed?

1. Number of phases involved

According to official documents, a goal of PRICOR II is to fund research which follows the three-phase approach to operations research which was developed during PRICOR I. Specifically, OR studies (or the combination of OR studies preceded by systems analyses) are to follow the:

"...standardized model for OR developed by the project staff. This methodology begins with a previously identified problem in service delivery and guides the investigator through a series of steps to analyze the problem, develop possible solutions, and test the solutions."<sup>11</sup>

Table 4 lists these three distinctive phases of the PRICOR II approach (problem analysis, solution development, and solution validation) and their 13 discrete steps.

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<sup>11</sup> "Statement of Work for PRICOR Project" (Washington, DC: USAID/S&T/Health, Sept. 30, 1985).

TABLE 4

Steps In A General Approach To Operations Research

Phase I: Problem Analysis

1. Define the problem
2. Analyze the problem, divide it into smaller operational problems, collect needed data
3. Set priorities and select the problem for study

Phase II: Solution Development

4. Specify the objective for the solution to each problem
5. Identify the controllable (decision) variables and uncontrollable factors (constraints) of each problem
6. Select and construct an appropriate model for solving each problem
7. Collect required data
8. Use the model to develop the optimal solution(s) for each problem
9. Conduct a sensitivity analysis of each problem

Phase III: Solution Testing and Validation

10. Design the test of the solution(s)
11. Conduct the test and collect needed data
12. Evaluate and modify/adjust the solution(s)
13. Integrate the solution into the larger system

An important question (and one on which there is disagreement) is whether research funded by PRICOR II needs to include all three of these phases to be considered a "true" OR study within the intent of the PRICOR project. On the one hand, perhaps it is an essential element of the "PRICOR approach" that decision makers should (1) analyze their problems at a very specific level of detail, and (2) consider which of the actions available to them has the greatest likelihood to solve the problem, and (3) implement that solution and monitor the results. From this perspective, perhaps it is not possible to justify PRICOR II research which does not involve each of these three phases.

On the other hand, perhaps it is only necessary that the "overall portfolio" of PRICOR II research provides opportunities to learn about problem analysis, solution development, and solution validation. From this perspective, perhaps each and every PRICOR research project need not include all three phases.

Table 5 lists, for 42 of the 47 OR studies, whether the study includes all three phases as outlined above. These data show that 32 of these 42 studies (76%) involve all three phases of problem analysis, solution development, and solution validation, while 10 studies (24%) include only one or two phases.

**RECOMMENDATION:** AID should determine whether or not, as a condition for funding under PRICOR II, a research project needs to include problem analysis, solution development, and solution validation. If so, specific plans should be made to ensure that all future projects include all three of these phases.

2. Whether the study explores the cause of the problem

An implicit requirement of the "problem analysis" phase discussed above is that decision makers, as part of their detailed analysis of the problem, need to determine why the problem has developed and exists. For example, if the problem is that "Mothers administer chloroquine in doses too low to be effective", it seems difficult to design an effective corrective strategy until the decision makers determine why mothers are administering low doses. Similarly, if the problem is that "Mothers are incapable of delivering ORT", then one of the first steps in problem analysis must be to determine why mothers are incapable.

Table 5 lists, for 29 of the 47 OR studies, whether the OR study (or its preceding systems analysis) includes a specific research strategy to determine the reason for the problem. These data show that 12 of these 29 studies (41%) do explore the reasons why the problem exists, but that 17 (59%) do not.

**RECOMMENDATION:** AID should determine whether or not, as a condition for funding under PRICOR II, a research project (i.e., OR study or OR study plus systems analysis) needs to determine the reasons why the problem has developed and exists. If so, specific plans should be made to ensure that all future projects include this element.

3. Research methods being used

According to official documents, a goal of PRICOR II is to fund OR studies which utilize a variety of different research methods:

"Studies will include a range of methodologies and approaches, including descriptive studies, prospective interventions in service delivery, and longitudinal studies with multiple observations of the same variable."<sup>12</sup>

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<sup>12</sup> Ibid.

TABLE 5:

## DESIGNS OF PRICOR OPERATIONS RESEARCH STUDIES

CODE	INCLUDE ALL 3 PHASES?	EXPLORE REASONS FOR PROBLEM?	RESEARCH METHODS USED	ESTIMATED COSTS	ESTIMATED DURATION	CURRENT STATUS
<u>Part I - Studies Directly Managed by PRICOR</u>						
C-1	Yes	Yes	Interviews, observations, record reviews, surveys	\$13,000	13	Underway
C-2	Yes	No	Document analyses, interviews, observations, simulations	7,700	7	Completed
C-3	Yes	No	Interviews, observations, record reviews simulations	10,900	12	Underway
C-4	Yes	Yes	Interviews, observations, record reviews, surveys	14,400	12	Underway
C-5	Yes	Yes	Document analyses, interviews, simulations	9,200	6	Underway
Z-1	No	Yes	Surveys, observations	4,000	2	Completed
Z-2	Yes	No	Surveys	4,900	7	Underway
Z-3	Yes	Yes	Surveys, observations, record reviews	3,700	4	Underway
Z-4	No	No	Interviews	5,900	5	Underway
Z-5	Yes	Yes	Surveys, interviews, observations	12,000	7	Underway
Z-6	Yes	Yes	Surveys, interviews, observations	14,500	7	Underway
Z-7	Yes	No	Interviews, observations, record reviews, surveys	4,900	5	Underway
Z-8	Yes	No	Interviews, observations, record reviews, surveys	5,800	5	Underway
Z-9	Yes	No	Interviews, record reviews, surveys	5,200	5	Underway
Z-10	Yes	No	Interviews, record reviews, surveys	3,700	5	Underway
Z-11	No	N/A	Workshop, analysis	2,900	6	Underway
Z-12	No	N/A	Workshop, analysis	3,300	6	Underway
Z-13	Yes	No	Workshop, analysis, field test	2,900	12+	Underway
Z-14	Yes	No	Workshop, analysis, field test	3,300	12+	Underway
Z-15	Yes	No	Workshop, analysis, field test	3,400	12+	Underway
Z-16	Yes	No	Workshop, analysis, field test	2,500	12+	Underway
Z-17	Yes	Yes	Surveys, workshop, analysis, field test	5,600	12	Underway
Z-18	Yes	Yes	Surveys	5,800	12	Underway
Z-19	Yes	Yes	Observations, record reviews	4,600	9	Underway
Z-20	Yes	No	Workshop, field test	3,600	4	Underway
Z-21	No	Yes	Interviews, observations, workshop	2,300	6	Underway
Z-22	Yes	Yes	Interviews, record reviews	2,500	3	Underway

TABLE 5 (CONTINUED):

DESIGNS OF PRICOR OPERATIONS RESEARCH STUDIES

CODE	INCLUDE ALL 3 PHASES?	EXPLORE REASONS FOR PROBLEM?	RESEARCH METHODS USED	ESTIMATED COSTS	ESTIMATED DURATION	CURRENT STATUS
P-1	No	N/A	Interviews, observations	\$214,375	12	Underway
T-1	No	No	Document analyses, surveys	9,200	11	Completed
T-2	No	N/A	Interviews, observations, record reviews, secondary data analysis	50,000	14	In Design
T-3	Yes	N/A	Interviews	49,400	12	Underway
<u>Part II - Studies Managed by Subcontractors</u>						
CR-1	Yes	?	?	?	?	Underway
CR-2	No	?	?	?	?	Underway
CR-3	No	?	?	?	?	In Design
I-1	?	?	Interviews, record reviews	7,500	?	Underway
I-2	?	?	Interviews, observations	7,500	?	Underway
I-3	?	?	Record reviews	7,500	?	Underway
I-4	Yes	?	?	7,500	?	Completed
I-5	Yes	?	Interviews	7,500	?	Underway
I-6	?	?	Interviews	7,500	?	In Design
I-7	?	?	?	7,500	?	Underway
I-8	Yes	No	Observations	8,100	7	Underway
I-9	Yes	No	Interviews, record reviews	8,200	7	Underway
I-10	Yes	No	Record reviews, surveys	7,600	7	Underway
I-11	Yes	?	Record reviews	6,600	7	Underway
I-12	Yes	?	Record reviews	7,800	6	Underway
I-13	Yes	?	Record reviews	7,900	6	Underway

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Table 5 lists the research methods used in 42 of the 47 OR studies, and Table 6 summarizes the number of studies using each method. These data show that 40% of studies use interviews (17 of 42), 33% use observations and surveys (14 of 42 for each), and 26% use record reviews (11 of 42). Fewer studies use document analyses and simulations (3) or secondary data analyses (1). No studies use either unobtrusive measures or case studies. (Some of these numbers and percentages might be higher if we included research methods which CHS labels "field test".)

TABLE 6

Research Methods Used In PRICOR II OR Studies

Research Method	Frequency
Interviews	17
Observations	14
Surveys	14
Record Reviews	11
Document Analyses	3
Simulations	3
Secondary Data Analyses	1
Unobtrusive Measures	0
Case Studies	0

**RECOMMENDATION:** AID should determine if the current mix of research methods is acceptable. If not, specific plans should be made to teach OR researchers about other, less-used methods and to encourage their use when appropriate.

**RECOMMENDATION:** AID should determine if it is important to monitor the research methods being used in individual OR studies. Available documentation provides this information for 42 of 47 studies (89%), but only with great difficulty. If this type of information is important, AID should require proposals for all future OR studies to contain a very simple, very specific description (perhaps even a checklist) of the "research methods being used in this study". This will help in both (a) conceptualizing, developing, and implementing the study, and (b) monitoring and evaluating the array of studies.

#### 4. Expected cost of studies

According to official documents, another goal of PRICOR II is to fund OR studies which are less expensive than those funded under PRICOR I:

"To address these discrete problems, the project will develop a series of small scale, rapid-turnover OR studies within a given country program. These studies will have a low average cost."<sup>13</sup>

Table 5 lists the estimated cost of 44 of the 47 OR studies. These costs total to \$584,175, for an average of \$13,277 per study (all figures in US\$). Compared to the \$79,526 average cost for PRICOR I studies, a PRICOR II study costs only 17% as much. Put another way, PRICOR II studies are almost 6 times cheaper than PRICOR I studies.

These figures become even more dramatic if we withhold from our calculations three OR studies which are strikingly more costly than the average. These three studies (P-1, T-2, and T-3) cost \$214,375, \$50,000, and \$49,400 respectively, for a total of \$313,775. The next most expensive study costs \$14,500, a difference ranging from \$35,000 to \$200,000. Omitting these three unusual studies from our calculations reduces the average cost to \$6,595, or over 12 times cheaper than PRICOR I studies.

It is also interesting to note that these three unusually costly studies absorb 54% of the total funds being spent on OR studies. In other words, these three studies are costing more than the other 41 OR studies combined.

RECOMMENDATION: AID should determine whether there is an effective "upper funding limit" for a PRICOR II OR study. This decision will affect both the conceptualization and administration of OR studies. If there is such a limit, specific plans should be developed to ensure that future proposals and funding decisions adhere to this limit.

#### 5. Expected duration of studies

According to official documents, another goal of PRICOR II is to fund OR studies which are completed more quickly than those funded under PRICOR I:

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<sup>13</sup> "Primary Health Care Operations Research Project Paper Amendment" (Washington, DC: USAID/S&T/Health, March 1987).

"Many of the PRICOR studies took 18-24 months to complete, while PHC managers often require results in much shorter periods of time. Priority should be given to designing smaller and much more rapid OR studies to provide managers with timely solutions."<sup>14</sup>

"Compared to previous OR programs, this project will emphasize small-scale, relatively unsophisticated studies of brief duration."<sup>15</sup>

Table 5 lists the estimated duration of 37 of the 47 OR studies. These estimates range from two months to 14 months, with an average duration of 8.0 months. Compared to the 21-month average duration of PRICOR I studies, a PRICOR II study takes only 38% as long. Put another way, PRICOR II studies are being completed over two and one-half times faster than PRICOR I studies.

However, eight months is still a significant amount of time in a policy environment, and it is higher than even the upper limits estimated by key persons. Furthermore, 11 of the 37 studies (30%) require a year or more to complete. This may not be as "rapid" as PRICOR II documents originally intended:

"The research results could therefore be rapidly available to service delivery personnel, often within weeks."<sup>16</sup>

**RECOMMENDATION:** AID should determine how quickly OR studies should be completed. If eight months is not "rapid" enough, guidance should be given to OR researchers. This decision affects both (a) the conceptualization, development, and implementation of the OR studies, and (b) monitoring and evaluation of the entire array of studies.

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<sup>14</sup> "Solving Operational Problems in Primary Health Care 1981-1987: Final Report of the PRICOR Project (Bethesda, MD: Center for Human Services, March 31, 1987).

<sup>15</sup> "Statement of Work for PRICOR Project" (Washington, DC: USAID/S&T/Health, Sept. 30, 1985).

<sup>16</sup> "Primary Health Care Operations Research Project Paper Amendment" (Washington, DC: USAID/S&T/Health, March 1987).

6. Current status of studies

Table 5 lists the current status of each of the 47 OR studies. Only four studies (9%) have been completed, while 40 studies (85%) are underway and three more (6%) are in the design stage.

**RECOMMENDATION:** AID should encourage and assist PRICOR II researchers to complete OR studies as soon as possible. The comparative analyses of OR studies is dependent on the availability of a sufficient base of completed studies, and this base does not currently exist.

## VI. COMPARATIVE ANALYSES

This chapter evaluates the comparative analyses (CAs) funded under PRICOR II. It first outlines the CAs called for in the official project documents. It then briefly describes the planning which the Center for Human Services (CHS) has done for the CAs. Since this planning is still incomplete, however, this chapter then offers a conceptual framework for how CHS might approach the CAs during the remaining two years of the project. This chapter then concludes with several additional concerns regarding the CAs. Throughout, it makes a number of recommendations for AID to consider.

Information for this chapter was obtained from a five-day site visit to the PRICOR project in Peru, from a desk review of PRICOR project documents and CHS written materials regarding the CAs, and from two personal interviews with the CHS staff responsible for CAs (Wayne Stinson).

### A. What comparative analyses are expected from PRICOR II?

According to official documents, it is an explicit goal of PRICOR II to make "comparative analyses" among the different systems analyses (SAs) and operations research (OR) studies funded:

"The level of effort estimated for systems analyses and country studies includes analyses of trends and patterns among programs in addition to those limited to an individual program. The design of information-gathering activities should be sufficiently standardized to facilitate such comparisons. Subagreements will specify a common research strategy and the entry of data into an archive maintained by the [cooperative agreement]. Comparisons among programs will take place throughout the project and include identification of issues requiring additional research."<sup>1</sup>

Beyond this paragraph, however, there is little guidance on what AID wants from the CAs or how CHS should conduct the CAs. An official AID amendment to the PRICOR II contract discusses SAs and OR

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<sup>1</sup> "Statement of Work for PRICOR Project" (Washington, DC: USAID/S&T/Health, Sept. 30, 1985).

studies, but it makes no mention of CAs<sup>2</sup>. Similarly, the Scope of Work for the mid-term evaluation team directs the team's attention to seven aspects of the implementation of the project, but comparative analyses is not one of the seven aspects.<sup>3</sup>

**RECOMMENDATION:** AID should determine (a) what it wants to accomplish with the comparative analyses and (b) any advice it has for approaches which might be helpful. This information should be conveyed to CHS as clearly and as soon as possible.

**B. What are CHS' plans for comparative analyses?**

In CHS' original proposal, it recognizes the requirement to conduct CAs of both the SAs and the OR studies funded under PRICOR II:

"The results of the systems analyses and country studies will form the basis for the comparative analyses and will also be used to refine the Thesaurus."<sup>4</sup> (emphasis in original)

"In the PHC-OR project, comparative analyses are one of the major tasks and will begin early with rapid dissemination of results to ensure timely and optimal impact on other studies and programs."<sup>5</sup>

Unfortunately, the timetable for conducting the CAs is far behind schedule, for a variety of reasons. The CHS proposed Project Workplan estimated that CAs would begin in the first half of Year 2 and would be conducted regularly throughout the project. To date, no CAs have been conducted.

Perhaps even more significant, only a limited amount of planning for these CAs has been done. The CHS proposed Personloading Summary allocates 18 person-months of effort to the CAs by the end of Year 3.

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<sup>2</sup> "Primary Health Care Operations Research Project Paper Amendment" (Washington, DC: USAID/S&T/Health, March 1987).

<sup>3</sup> "Scope of Work for the Mid-Term Evaluation Team: Primary Health Care Operations Research-II Project (PRICOR II)" (Washington, DC: USAID/S&T/Health, October 1988).

<sup>4</sup> "3.0 Technical Approach". Primary Health Care Operations Research, Technical Application. (Bethesda, MD: Center for Human Services, July 1985).

<sup>5</sup> Ibid.

To date, however, products of this effort appear to be two separate two-page memoranda and three separate lists of "management questions" which could be compared (one list each for oral rehydration therapy, growth monitoring, and immunizations.) A fourth list is planned for the topic of malaria treatment.<sup>6,7</sup>

**RECOMMENDATION:** AID should decide if it is comfortable limiting the comparative analyses to the four subsystems of ORT, growth monitoring, immunizations, and malaria. If not, plans need to be made immediately for the other subsystems..

Also, the FY88 Workplan indicates that comparative analyses in these four subsystems are already underway, even though the preceding assignment to "Develop CA strategy" has not yet begun.<sup>8</sup> It is difficult to justify beginning these comparative analyses (due March 31, 1989) without first having an overall strategy in place.

**RECOMMENDATION:** AID should immediately require from CHS a more-detailed description of the conceptual framework, proposed methodology, and implementation plan for the comparative analyses of the systems analyses and the OR studies funded under PRICOR II.

CHS currently plans to conduct two types of CAs among the SAs completed or underway in several countries. (CHS currently is not planning to compare OR studies, an issue addressed in section IV of this chapter.)

The first type of CA currently planned will attempt to identify common problems across countries. These CAs will produce information on "the quality of performance of individual Child Survival tasks."<sup>9</sup>

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<sup>6</sup> "Draft Comparative Analysis Plan" ( Bethesda, MD: Center for Human Services, February 1988).

<sup>7</sup> "Comparative Analysis Workplan". Memorandum from Wayne Stinson to Michael Hendricks. (Bethesda, MD: Center for Human Services, November 15, 1988).

<sup>8</sup> "FY88 Workplan." Memorandum from D. Nichols to Mid-Term Evaluation Team. (Bethesda, MD: Center for Human Services, November 11, 1988).

<sup>9</sup> "Comparative Analysis Workplan." Memorandum from Wayne Stinson to Michael Hendricks. (Bethesda, MD: Center for Human Services, November 15, 1988).

The second type of CA currently planned will attempt to determine correlates of strong vs. weak parts of subsystems within a given country. These CAs will produce information on "differences between strong and weak programs"<sup>10</sup> and what factors seem to correlate with each. (CHS plans this as a non-statistical version of discriminant function analysis.)

Both these types of CAs plan to use, as their raw data, the management questions mentioned above, since they represent an intermediate level of generalization about a subsystem (ORT, etc.), somewhere in between a generic assessment of a subsystem and the detailed indicators of the SA.

While these plans seem fine as far as they go, we believe that comprehensive planning can produce additional useful approaches to conducting CAs during the next two years. In an attempt to provide stimulating ideas to AID and to CHS, the next section of this chapter suggests one conceptual framework for conducting these comparative analyses.

C. How might PRICOR II approach its comparative analysis?

1. What information would be useful to compare?

The first step in planning for CAs might be to determine what types of information about SAs it would be useful to compare. Certainly it is important to compare the problems identified by the various SAs, since that is the purpose and main product of each SA.

However, it might also be useful to compare other features of the SAs in addition to the problems identified. For example, it might also be useful to compare (a) the contexts in which the SAs are conducted (economy, politics, etc.), (b) the designs of the SAs (issues, methods, etc.), and (c) the implementation required to actually conduct the SA (revisions necessary, costs, etc.). It seems quite reasonable that comparing and contrasting these other features of the SAs could also lead to interesting insights.

Table 7 lists these four features of a systems analysis (context, design, implementation, and problems identified) and offers some suggested types of useful information about each feature. These suggestions are for illustrative purposes only and can no doubt be improved by AID and CHS staff.

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<sup>10</sup> Ibid.

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TABLE 7

Useful Information About The Systems Analyses

Features of the Analyses	Sample Types of Useful Information Systems to Study About Each of These Features
Context/ Environment	<ul style="list-style-type: none"> <li>* What were the politics of the topic?</li> <li>* How was the economy operating?</li> <li>* Were important decisions pending?</li> <li>* Were there time pressures?</li> <li>* How visible was the topic?</li> <li>* How cooperative were key host officials?</li> <li>* What were the government policies in the topic area?</li> <li>* Etc.</li> </ul>
Research Design	<ul style="list-style-type: none"> <li>* What subsystem was studied?</li> <li>* What management questions were studied?</li> <li>* How broad was the scope?</li> <li>* What were the sources of information?</li> <li>* What methods were used?</li> <li>* What was the sampling strategy?</li> <li>* Etc.</li> </ul>
Implementation	<ul style="list-style-type: none"> <li>* Was the design implemented as planned?</li> <li>* If not, what revisions were necessary?</li> <li>* Who participated and in what roles?</li> <li>* How long did it take?</li> <li>* How much did it cost?</li> <li>* Etc.</li> </ul>
Problems Identified	<ul style="list-style-type: none"> <li>* How many problem areas were identified?</li> <li>* Which specific areas had problems?</li> <li>* How serious was each problem?</li> <li>* Etc.</li> </ul>

**RECOMMENDATION:** AID should require that CHS' comparative analysis plan include a discussion of the types of information which would be useful to compare. Explicit attention should be given to identifying useful information in addition to the problems identified by the SA.

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2. What exactly does it mean to "compare"?

A second step in planning CAS might be to determine exactly what it means to "compare" information. While all the written documents seem to assume that this point is obvious and understood by all, perhaps this is not the case. Perhaps an explicit consideration of the meaning of "compare" might highlight new possibilities and might help to focus the upcoming CAS.

We suggest that it might be useful to think of "comparing" SAs as two separate activities: (1) describing the different features of SAs, and (2) searching for relationships among these different features. Each of these two activities is discussed below.

Describing the SAs is simply the process of presenting the information from the different SAs in such a way as to convey what occurred and what was learned. There seem to be at least four useful ways to "describe" a SA:

- \* Compile the separate items of information from each of the different SAs;
- \* Calculate the typical response to each item of information;
- \* Determine the range of responses; and
- \* Identify unusual responses.

Methodologists will recognize that these categories are exactly analogous to the quantitative procedures of presenting raw data, calculating a measure of central tendency (mean, median, mode), determining the variability (standard deviation), and identifying outliers. These concepts seem just as useful for describing a set of SA information as for describing a set of numerical data.

Table 8 shows some of the possibilities which result when we recognize that each of these four different ways of describing the SAs might be applied to any of the four different features of the SAs which we discussed earlier. The 16 cells of this 4x4 matrix appear to produce many interesting questions. (As with Table 7, these questions are for illustrative purposes only and can no doubt be improved by AID and CHS staff.)

Searching for relationships among the different features of the SAs might also be useful, especially when we expand the features beyond simply the problems identified. Table 9 shows some of the possibilities which result when we recognize that each of the four features might be related to any of the other three. For example, it is not only useful to see if the design of the SAs relate to which problems are identified; it might also be useful to see to what the context or implementation of the SAs are related.

TABLE 8:

DIFFERENT WAYS TO "DESCRIBE" THE SYSTEMS ANALYSES

	Context/Environment of the Systems Analyses	Research Design for the Systems Analyses	Implementation of the Systems Analyses	Problems Identified by the Systems Analyses
Compile Individual Data Items	<ul style="list-style-type: none"> <li>* What time pressures did the SAs have to face?</li> <li>* What government policies existed on this topic?</li> </ul>	<ul style="list-style-type: none"> <li>* What subsystems were examined in the SAs?</li> <li>* What management questions were pursued?</li> </ul>	<ul style="list-style-type: none"> <li>* What changes had to be made to implement the SAs?</li> <li>* Who was involved in implementing the SAs?</li> </ul>	<ul style="list-style-type: none"> <li>* What problems were identified by the SAs?</li> <li>* How serious were the problems identified by the SAs?</li> </ul>
Calculate Typical Data Items	<ul style="list-style-type: none"> <li>* What were most economies like during the SAs?</li> <li>* How visible did the topic areas tend to be?</li> </ul>	<ul style="list-style-type: none"> <li>* What was the typical scope of the SAs?</li> <li>* What were the common sources of information?</li> </ul>	<ul style="list-style-type: none"> <li>* What did the SAs typically cost?</li> <li>* How long did the SAs typically take?</li> </ul>	<ul style="list-style-type: none"> <li>* How many problems did the SAs typically identify?</li> <li>* What common problems did the SAs typically identify?</li> </ul>
Determine Range of Data Items	<ul style="list-style-type: none"> <li>* How variable were the levels of cooperation?</li> <li>* How extreme were economic circumstances?</li> </ul>	<ul style="list-style-type: none"> <li>* What range of sampling strategies were used?</li> <li>* What range of research methods were used?</li> </ul>	<ul style="list-style-type: none"> <li>* How variable were the costs of the SAs?</li> <li>* How variable were the durations of the SAs?</li> </ul>	<ul style="list-style-type: none"> <li>* What range of problems were identified?</li> <li>* How variable were the number of problem areas?</li> </ul>
Identify Unusual Data Items	<ul style="list-style-type: none"> <li>* What was the harshest time pressure faced?</li> <li>* What political situation was least stable?</li> </ul>	<ul style="list-style-type: none"> <li>* Which SA examined the most management questions?</li> <li>* Which SA used the most rigorous sampling strategy?</li> </ul>	<ul style="list-style-type: none"> <li>* Which SA was implemented with the fewest changes?</li> <li>* Which SA had the highest-level involvement?</li> </ul>	<ul style="list-style-type: none"> <li>* Which SA identified the fewest number of problems?</li> <li>* Which SA identified the most serious problems?</li> </ul>

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TABLE 9:

DIFFERENT RELATIONSHIPS BETWEEN AND WITHIN  
THE FEATURES OF THE SYSTEMS ANALYSES

Context/Environment of the Systems Analyses	Research Design for the Systems Analyses	Implementation of the Systems Analyses	Problems Identified by the Systems Analyses	
Context/Environment of the Systems Analyses seem to influence the	<ul style="list-style-type: none"> <li>* Do government policies relate to economic conditions?</li> <li>* Do impending decisions require limiting politics of the topic?</li> </ul>	<ul style="list-style-type: none"> <li>* Does cooperation lead to stronger research designs?</li> <li>* Do time pressures concerns increase the SA's scope?</li> </ul>	<ul style="list-style-type: none"> <li>* Is there higher-level involvement in visible topics?</li> <li>* Do political policies predict the time needed?</li> </ul>	<ul style="list-style-type: none"> <li>* Do poor economies have more serious SA problems?</li> <li>* Do government certain problems?</li> </ul>
Research Design for the Systems Analyses	<ul style="list-style-type: none"> <li>* What subsystems can be studied with more rigor?</li> <li>* What management questions require a broad scope?</li> </ul>	<ul style="list-style-type: none"> <li>* Are more rigorous SA's harder to implement intact?</li> <li>* Does it cost more to address more management questions?</li> </ul>	<ul style="list-style-type: none"> <li>* Do more rigorous SAs identify more problems?</li> <li>* Which information sources know of serious problems?</li> </ul>	<ul style="list-style-type: none"> <li>* Do more rigorous SAs identify more problems?</li> <li>* Which information sources know of serious problems?</li> </ul>
Implementation of the Systems Analyses		<ul style="list-style-type: none"> <li>* Does high-level involvement lead to fewer changes?</li> <li>* Does it cost more to conduct a longer SA?</li> </ul>	<ul style="list-style-type: none"> <li>* Do more expensive SAs identify more serious problems?</li> <li>* Do certain problem only surface with longer SAs?</li> </ul>	<ul style="list-style-type: none"> <li>* Do more expensive SAs identify more serious problems?</li> <li>* Do certain problem only surface with longer SAs?</li> </ul>
Problems Identified by the Systems Analyses				<ul style="list-style-type: none"> <li>* Do "many problems" also imply "serious problems"?</li> <li>* Which problem area suggest problems</li> </ul>

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Table 9 also reminds us that it might be useful to see how different measures of the same feature relate with each other. For example, what management questions seem to require a broad scope in the SAs? This example represents two measures of the research design. As another example, do those SAs which identify a large number of problems also tend to identify problems as being more serious? This example represents two measures of the problems identified.

There are several different ways to search for relationships among the features of the SAs. Table 10 shows some of the possibilities which result when we recognize that the information from the SAs might be coded as nominal categories or levels and that the search for relationships might be done graphically or statistically.

TABLE 10

Different Ways To Search For  
Relationships Among Features Of The Systems Analyses

	Nominal Categories	Different Levels
Graphic Relationships	* Profiles of "winners" vs. "losers", etc.	* Scatterplots, etc.
Statistical Relationships	* Non-parametric tests, etc.	* Parametric tests, etc.

RECOMMENDATION: AID should require that CHS' comparative analysis plan include a discussion of what it means to "compare" information. Explicit attention should be given to (a) ways to describe the features of SAs, (b) ways to search for relationships among these features, and (c) any other ways CHS can develop to "compare" the SAs.

D. Additional concerns regarding the comparative analyses

1. Should CAs also be conducted on the OR studies being funded?

In its original proposal, CHS recognized the need to conduct CAs of OR studies, especially the second and third phases of solution development and solution validation:

"Where similarities exist in systems or subsystems, solutions that are successfully developed and tested may be applicable across programs."<sup>11</sup>

"Both the models used to develop and evaluate options and the results obtained will be of great interest to others...."<sup>12</sup>

As of now, however, CHS is not planning to conduct CAs on the OR studies, but instead to limit its CAs only to systems analyses. This is difficult to justify, since the ability to generalize workable solutions across several countries seems to be one of the basic goals of PRICOR II.

RECOMMENDATION: AID should clarify with CHS that the CAs are to involve both the systems analyses and the individual OR studies. All of the suggestions offered in section III of this chapter apply equally well to OR studies as they do to systems analyses.

2. Should there be methodological standards for including SAs or OR studies in the CAs?

In gathering the different SAs and OR studies for comparison, CHS will need to decide whether to include every study, or if there need to be criteria for including a study in the comparisons. For example, should only those SAs conducted at more than one service delivery site be included, or is this not important? Should only those OR studies which gather data from more than one information source be included, or is this not important? In other words, should SAs or OR studies be excluded if they do not meet some accepted level of methodological rigor?

RECOMMENDATION: AID should decide if it has a preference on this issue. If so, this should be conveyed to CHS as soon as possible.

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<sup>11</sup> "3.0 Technical Approach". Primary Health Care Operations Research, Technical Application. (Bethesda, MD: Center for Human Services, July 1985).

<sup>12</sup> Ibid.

Should only PRICOR II-funded studies be compared, or should other information be used when appropriate?

In gathering the studies to compare, CHS will need to decide whether to limit the CAs to only those SAs or OR studies funded by PRICOR II or if other information can usefully be incorporated into the analyses. The decision is whether the CAs are to compare (a) only information actually funded by PRICOR II, or (b) any studies which usefully complement that information funded by PRICOR II.

**RECOMMENDATION:** AID should decide if it has a preference on this issue. If so, this should be conveyed to CHS as soon as possible.

## VII. DISSEMINATION

### A. Description of Current Status

With the first two and a half years of the PRICOR II Project being consumed by the development and testing of the Thesaurus, there was nothing in the way of systems analyses or operations research studies available for dissemination before the spring of 1988. PRICOR's Dissemination Plan was not developed until February 1988, a month before the first issue of the PRICOR Report newsletter was distributed.

The first PRICOR II publication to be distributed was the Thesaurus Volume I (activity list). Approximately 265 copies of this technical report were disseminated by the end of FY88. Volume II (activities, indicators and data sources) was published in May 1988, and some 375 copies were distributed in the four months after its release.

PRICOR has developed a mailing list of over 900 individuals and groups which can be divided into four categories:

- o Developing country health officials (decision makers and operational personnel in government and PVOs;
- o AID health program managers (at missions and regional offices abroad and in Washington);
- o PHC researchers and analysts; and
- o Others (including other donor agencies, PVOs, universities).

It is this audience that receives the two major publications of the PRICOR II Project, PRICOR Report and Child Survival Report. Two issues of the former have been produced, the first being in March 1988, the second in May. The first issue gave an overview of the PRICOR II Project, describing its objective, what Systems Analysis is, what the Thesaurus is and how it could be used, and short comments on specific country activities (Zaire, Thailand, Costa Rica, Columbia). The second edition of the PRICOR Report focused on systems analysis and some of the findings derived from PRICOR system analyses; discuss five different countries (Columbia, Zaire, Costa Rica, Ecuador, Thailand) while one addresses problems relating more generally to Oral Rehydration Therapy programs. Several of the subcontractors have published monographs/reports on their respective PRICOR II-supported activities, HIID on their LQAS use in Costa Rica and PRISM on the Cono Sur Project in Peru.

Other dissemination activities of PRICOR II include the production by CHS of a 10-minute slide/video show which informs the audience about the SA/OR approach as being carried out by the project. They are currently in the process of producing a 30-minute video on its operations in the Philippines and Zaire which is supposed to

demonstrate how the PRICOR approach works in the field with the hope of giving the viewer a better understanding of the methodology. In addition, the subcontractor PRISM is doing a video on the role playing and interviewing methodologies they utilized in the Systems Analysis they conducted in Peru. Finally, various members of the PRICOR team presented papers at the conferences. In 1988, for example, two papers (out of nine submitted) were given at the National Council for International Health (NCIH) annual conference and another five were presented at the American Public Health Association Conference.

## B. Effectiveness

The evaluation team identified three levels of dissemination that must be considered:

- o Within a project country - Each country having PRICOR II Project activities must have a dissemination plan of its own to ensure that all those who should be familiar with the approach are kept informed of developments. Several mechanisms have been utilized. In Zaire, for example, the project has conducted a series of workshops in which participants receive an orientation on what SA is and the findings of the SA carried out in Zaire. The OR methodology is also described and participants are given an opportunity to develop their own OR study protocols. Although none of the OR studies have been completed to date, the PRICOR Office in Kinshasa has plans to discuss the findings at the annual SANRU Conference and at the Zairian Public Health Association Annual Meeting. In addition, the relevant findings will be incorporated into the MPH course at the School of Public Health so that all the students enrolled in the program will be exposed to and familiar with the findings in the future and the chances of reinventing the wheel (i.e., carrying out the same or similar study) will be reduced.
- o Within the project - The approach and findings from the various PRICOR countries should be shared between the countries. This is particularly important considering the diversity of approaches being followed and the results being achieved. The evaluation team found that the information in the project countries was limited to the major PRICOR publications (i.e., Thesaurus, PRICOR Report and the **Child Survival Report**); the monographs containing the more detailed information pertaining especially to methodologies and techniques have not been circulated. For example, the PRICOR office in Kinshasa had not received any of the reports on PRICOR activities in other countries, including those on the LQAS techniques as being developed in Costa Rica, an approach which could be of great interest and value to Zaire. Such a sharing would improve the comparability exercise and help tie the disparate activities together.

**RECOMMENDATION:** PRICOR II should make greater efforts to distribute PRICOR monographs and reports on specific country activities and findings (including subcontractors) to other PRICOR II countries.

- o Outside the project - This is the primary focus of PRICOR II's dissemination efforts. In addition to the technical reports (e.g., the various versions of the Thesaurus), PRICOR II has four other principal means of disseminating information on what is taking or has taken place in the project.

House publications - According to the Dissemination Plan, the PRICOR Report and Child Survival Report will be published three times a year and every six weeks, respectively. Because of the delay in initiating field activities (especially OR studies), these publications were not published until March of 1988. The CSRs were then issued in groups of three in March and again in May. Five out of the six CSRs feature CHS activities, while one reviews the Costa Rican work of one of the subcontractors. Nothing to date has been published on the work being done in Peru, Indonesia or Togo by the subcontractors. PRISM has published its own PERU PRICOR REPORT which describes in some detail what is being done in their project and the findings. The use of different vehicles to publicize subcontractor's activities reinforces the impression that they are operating with little relation to the overall PRICOR II approach.

**RECOMMENDATION:** PRICOR II should publish under the direction of the respective participating subcontractor, the subcontractor's reports and findings in the PRICOR house publications/reports series.

Videos - PRICOR II has produced a 10-minute slides/video which informs the audience about the SA/OR approach. While technically well done, it has a somewhat negative and threatening tone in that it refers to identifying problems that exist in the service delivery operations. The evaluation team thought that the message could be presented more effectively and positively if put in terms of assisting managers to solve service delivery problems.

Briefings - PRICOR II has held a few briefings for AID and CDC and several of the centrally-funded projects (e.g., REACH and PRITECH). Despite the effort, the evaluation team identified a general lack of familiarity and support for the PRICOR II approach. This concern is present even within S&T/Health itself. Various members of the office do not fully understand the methodology or appreciate what has been or could potentially be produced through the PRICOR II Project; at this point they see it as an expensive undertaking with very little to show for the resources expended. While the Africa Bureau seemed generally conversant with the project, the other regions had very little knowledge about it.

**RECOMMENDATION:** PRICOR II should conduct more frequent briefings for S&T/Health, the regional bureaus and the centrally-funded projects on the SA/OR approach and on relevant findings from the field projects.

Centrally-funded projects - Finally, the centrally-funded projects expressed little support for what PRICOR II had done to date. It is a concern that REACH with a focus on immunization and PRITECH with a focus on ORT have not found the PRICOR work on these two interventions helpful or collaborated more closely with PRICOR in the development of the sections of the Thesaurus on these two interventions. It is unfortunate that the proposed joint effort with REACH in Bangladesh never materialized. Finally, CCCD personnel in the field expressed a concern that CDC in Atlanta did not fully appreciate and support the PRICOR approach; it is thought that the more technical focus of CDC could profit from the process orientation being developed by PRICOR II.

**RECOMMENDATION:** PRICOR II and the centrally-funded projects and CDC should develop a closer working relationship and, where possible, collaborate in field-level operations.

Presentations - PRICOR II has a list of some 46 presentations given various staff members at professional conferences and workshops between January 1986 and November 1988. Many of these are given as part of project orientation in program countries and several to other organizations (e.g., WHO, UNICEF, CARE). Several people mentioned that PRICOR's presentations at conferences such as NCIH was the best means of gaining an understanding of the SA/OR approach that PRICOR was developing and to appreciate what was going on in the field.

## VIII. IMPLEMENTATION/INSTITUTIONALIZATION

The complexity of PRICOR II affords the opportunity for objectives to be realized at a variety of levels. Given the cost and level of effort invested in PRICOR II, the impact of the exercise should extend far beyond any short-term benefits to the individual projects and countries involved.

At a minimum, there should be documented evidence of improvements at the health centers which were the objects of study and analysis. Beyond that, functionally adequate documentation should be completed based on that experience. This will serve as future reference material for the application of SA/OR principles to improving primary care services delivery.

**RECOMMENDATION:** There should be documented evidence of improvements at the health centers which were the objects of study and analysis to serve as future reference material for the application of SA/OR principles to improving primary care services delivery.

However, more important is the objective of implementing the SA/OR philosophy and approach, with the capacity for its implementation at all levels of the health sector. These would include use by managers at the levels of:

- o Health station or center;
- o Districts and/or regions;
- o Ministry of Health;
- o AID Mission; and
- o AID geographic Bureaus.

What the SA/OR approach offers is a tool for converting data, whether impressionistic or objective, or whether qualitative or quantitative, into information. The objective of that transformation is to create a knowledge base which will optimize resource allocation decisions at all levels in the health care delivery system.

While that effort appropriately must start at the peripheral level, it should not be allowed to end its development there. Unless it has utility for managers at superordinate levels, PRICOR II will not have been worth the development costs because its full potential will never be realized.

The importance of the PRICOR II approach derives not just from the specific analytic tools which are being tested across an array of countries, organizations and delivery systems. Its more significant implications can be potentiated only to the extent that it is accepted

as an objective and equitable approach to efficient management of resources. It should not be regarded simply as a research project but must be marketed as a movement.

Three objectives must be achieved if PRICOR II is to have a long-range and widespread impact.

A. PRICOR II must be perceived as a process built on solid, objective research methodologies rather than as a research project. PRICOR II is presently presented much more emphatically as a research project than as a process leading to a functionally useful management tool for improving health services delivery.

Scientists (research personnel) can be characterized as wanting to know more and more about less and less. Managers, in contrast, operate in a world where least sum of squares solutions must be resolved under the inexorable pressures of real time. Scientists can postpone decisions until more data; i.e., another replication, can be available.

Managers must decide based on the fragments of information available at the moment. What they want is to feel more comfortable; i.e., that the risk of error is less, and that the available information will provide a post hoc rationalization for the choices made and the decision which was taken. To be sure, it is important, even for managers in a bureaucratic setting, to believe that decisions are consistent with personal values and program objectives including the extent to which they will be perceived with approval by subordinates.

To the extent that a process results in information which a manager perceives to have systematic and objective origins, the confidence level will be higher, and so will be the level of comfort and the likelihood that future use of that process will have a high probability of occurrence. For scientists, the comfort; i.e., risk of error, derives from confidence in the design of the experiment and the degree to which that design permits one to discard alternative explanatory hypotheses.

B. PRICOR II must be perceived as having a high potential for functional utility and efficiency.

Put another way, it must generate expectations that the resulting process will be useful in field settings. These settings are likely to have the following characteristics:

- o High demand for services which leaves staff with little time or energy for additional tasks;
- o Scant additional resources to commit to SA/OR;
- o Low level of research or data collection and analysis sophistication;

- o At the distal end of a long and tenuous supervision chain; and
- o High resistance to change.

If an SA/OR approach is to be adopted in these settings, then it must be adapted to them. They will not adapt to the PRICOR II methodologies as represented in the current Thesaurus and DCIs. Future PRICOR II efforts must be shifted away from further refinement and validation of current SA and DCI methodologies. Rather, there should be a heavy focus in the remaining contract period on the translation of research findings into practical guidelines for application at multiple management and decision making levels in the health sectors of the target countries.

The following tasks appear to be of high priority:

**RECOMMENDATION:** Prioritize the major elements of the Thesaurus into a free standing document with the full Thesaurus as a reference guide. The PRISM construct library appears to be a potential useful basis from which to start.

**RECOMMENDATION:** Develop, validate, document and disseminate simplified versions of both macroanalytic and microanalytic tools for SA. The validation efforts should focus on face validity and predictive validity rather than on theoretical validation. The standards for practical validity are much different than those for scientific validity which demands more capacity for replication.

The underlying assumptions for this exercise should emphasize the identification of:

- o Only the critical elements in the organizational attributes and delivery process which have a high potential for intervention given to practical realities and resource restraints of the settings in which the process will be applied.
- o The minimum data elements necessary for functional effectiveness. Measurement is crude in the real world and calculated precision is irrelevant. Beyond that, our ability to effect change in most delivery systems is even more limited than is our ability to measure the dynamics of the delivery process.
- o Alternative options likely to conform to local political and operational realities; i.e., staffing levels, physical plant, communications skills, and political influences, including the degree of centralized relative to decentralized decision making.

C. PRICOR II represents an innovative and creative approach to that application of objectively-based, analytical methodologies drawn from academic and applied research. But, whatever its considerable merits as

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a research effort, the more important characteristic is the capacity building aspect of PRICOR II. By its emphasis on the analysis and improvement in process components at the most peripheral delivery levels of the primary care system, it has the potential for building the management and resource allocation infra-structure necessary to assure the efficient and effective delivery of PHC.

Unless specific strategies are developed, during the remainder of the contract period, for maintaining an appropriate balance between the research focus and the needs of the PHC delivery system, PRICOR II will not contribute to the development of the necessary infrastructure.

**RECOMMENDATION:** Develop strategies for institutionalization of the SA/OR approach at all levels in each host country health sector. Identify focal points for responsibility at every management and resource allocation level from the health station through the MOH.

To accomplish this, it will be necessary to create a set of expectations that the SA/OR process will be applied to program analysis, evaluation and resource allocation decisions. Reinforce those expectations by creating incentives associated with the use of SA/OR methodologies. Incentives might include allocation of additional resources or waivers from some reporting requirements.

One of the sub-ministry managers interviewed in the field shared his perception that the SA was useful for problem identification, but that he saw little utility to the cumbersome and time consuming OR steps for problem resolution. His perspective was of a need for help with problem identification, but that he and his staff had the skill to fix things once it could be demonstrated that they were broken. That view should not be discounted by those of us wanting to bring scientific methods to bear on management.

The most serious erroneous underlying assumption which could seriously compromise the utility of PRICOR II would be that of assuming the SA/OR approach to be an adequate substitute for managerial experience and judgement. SA/OR can focus and enhance that judgement factor. It can never be a substitute.

Training must be given a higher priority as an essential activity during the remainder of PRICOR II. It was reported in Zaire, for example, that training was relegated to a very subordinate role. That emphasis was driven by the research orientation of CHS and was contrary to the perceived needs of the field staff.

**RECOMMENDATION:** Training should be given high priority when soliciting funds for mission buy-ins to PRICOR II.

A training the trainer approach would be appropriate given the need to install competence and enthusiastic commitment at all levels from MOH down to the health station level, but with the most important operational locations being at the periphery and levels immediately above.

**RECOMMENDATION:** Mechanisms should be developed within AID to use results from PRICOR II as a way of improving the targeting and focus of Technical Assistance (TA) provided by PRITECH and REACH.

TA is a scarce commodity and an expensive resource. Its impact can be enhanced if it is directed to the highest priority problems. PRICOR II could be positioned to provide mechanisms to accomplish that enhancement, perhaps not in terms of selecting countries, but in bringing a more tight focus to TA activities.

**RECOMMENDATION:** The PRICOR II contractors should also be creating linkages and exporting SA/OR to Private Voluntary Organizations (PVO) and other U.S. Government activities (CDC) in host countries.

**RECOMMENDATION:** A technical advisory group (TAG) should be established at the S&T/H level to advise in the optimization of PRICOR II efforts during the remainder of this contract. The role of the TAG should focus more on the translation into operational effectiveness of the results of the PRICOR II activities than on the research components of PRICOR II.

## IX. RECOMMENDATIONS

Based on the findings of the evaluation of PRICOR II the team makes the following recommendations which correspond to respective sections of the report.

Concept The overall recommendation regarding the concept is that it should not be changed; however, the goals and expectations of the PRICOR II project should be reexamined to reassess and clarify what AID thinks the balance between research and operations should be.

1. Attention should be given to the development of a uniform format to conduct macro analyses to complement the extensive process studies at the periphery as featured by the PRICOR II concept.
2. Steps should be taken to improve the comparability of study designs and data collection methods from country to country.
3. AID should determine and communicate the degree of emphasis to be placed on training local managers in the design and execution of local studies. Institutionalization of the process should be a priority for the last two years of PRICOR II.
4. AID should insist that the subcontractors continue to define and field test the overall conceptual methodologies embodied in the systems analysis and operations research studies of PRICOR II.
5. AID should recognize the tension between rigorous research and operational practicalities and establish a dialogue with CHS and the subcontractors to determine how best to introduce objective research methodologies to practicing health care service delivery managers.

Thesaurus The overall recommendation regarding the Thesaurus is that no additional time be spent developing, refining, or abridging it.

1. The Thesaurus should be published in sections, as planned, to make it less intimidating to potential users.
2. Each section of the Thesaurus should be translated into French and Spanish to make it more accessible to potential users for designing their own studies. At least one section, on ORT, has already been translated and others are in process.
3. Guidelines for using the Thesaurus to create data collection instruments for systems analysis and/or OR studies should be developed.

### Systems Analysis

1. Mission buy-ins should continue to be sought and encouraged; however, greater consonance with the PRICOR II conceptual model should be maintained in arranging future buy-in activities.

2. Future work on PRICOR II should focus on the manager's perspective rather than the niceties of operations research and social science.

3. PRICOR II must develop, validate, and disseminate simplified systems analysis methodologies.

4. The remaining SA projects should be designed and implemented within a fixed budget for time, money, and data burden.

5. While the Thesaurus should be available as a reference for SA design, alternative approaches should be encouraged so long as they are sufficiently documented to permit application in other settings.

6. CHS should prepare generic, broad instructions for SA implementation to permit SA activities at the local level, less directed by CHS headquarters.

7. PRISM should prepare a nontechnical handbook to document the aspects of their process which differ from the model used by CHS. Documentation on the focus group activities and the construct libraries for organizational attributes, among other things, should be included.

8. HIID should develop nontechnical material descriptive of other potential applications of Lot Quality Assurance Sampling to systems analysis of primary health care.

Operations Research studies. The overall recommendation regarding the operations research studies is that AID should reconsider the goals of this portion of the project to determine what is important in PRICOR II and proceed accordingly.

1. If the goal of 360 different OR studies is important, then plans should be made to fund an additional 313 studies in the remaining two years of the project.

2. AID should determine what actually qualifies to be counted as an OR study.

3. If the goal of having OR studies in 12 different countries is important, then plans should be made to fund studies in six additional countries in the remaining two years of the project.

4. All future OR studies should contain a simple, specific description of the "problem being addressed by this study."

5. If the goal of having 85% of the OR studies focus on low-level workers and 15% on clinical facilities, then plans should be made to alter the current funding mix in the remaining two years of the project.

6. If the current mix of subsystem-specific OR studies is not sufficient for individual country studies and for later comparative analyses, then plans should be made to alter the current funding mix in the remaining two years of the project.

7. If the current origins of OR studies are not acceptable, then plans should be made to ensure that all future OR studies flow directly from the results of systems analyses.

8. If, as a condition for funding under PRICOR II, a research project needs to include problem analysis, solution development, and solution validation, then plans should be made to ensure that all future projects include all three of these phases.

9. If, as a condition for funding under PRICOR II, a research project needs to determine the reasons why the problem identified has developed and exists, then plans should be made to ensure that all future projects include this element.

10. If the current mix of research methods is not acceptable, then plans should be made to teach OR researchers about other, less used methods and to encourage their use when appropriate.

11. If it is important to monitor the research methods being used in individual OR studies, then AID should require proposals for all future OR studies to contain a simple, specific description of the "research methods being used in this study."

12. If there is an effective "upper funding limit" for a PRICOR II OR study, then plans should be developed to ensure that future proposals and funding decisions adhere to that limit.

13. AID should determine how quickly OR studies should be completed and provide guidance to OR researchers in that regard.

14. Because comparative analyses of OR studies are dependent on the availability of a sufficient base of completed studies, AID should encourage and assist the PRICOR II researchers to complete OR studies as soon as possible.

Comparative Analysis. The overall recommendation regarding the comparative analyses is that AID and CHS should reassess and clarify the goals of these analyses.

1. AID should determine what it wants to accomplish with the comparative analyses and any advice it has for approaches which might be helpful and convey this information to CHS as clearly and as soon as possible.

2. If AID is not satisfied with limiting the comparative analyses to the four subsystems of ORT, growth monitoring, immunizations, and malaria, then plans should be made immediately for the other subsystems.

3. AID should immediately require from CHS a more detailed description of the conceptual framework, proposed methodology, and implementation plan for the comparative analyses of the systems analyses and the OR studies funded under PRICOR II.

4. AID should require that CHS' comparative analysis plan include a discussion of the types of information which would be useful to compare. Explicit attention should be given to identifying useful information resulting from the systems analyses in addition to the problems identified by them.

5. AID should require that CHS' comparative analysis plan include a discussion of what it means to "compare" information. Explicit attention should be given to ways to describe the features of systems analyses, ways to search for relationships among these features, and any other ways CHS can develop to "compare" the systems analyses.

6. AID should clarify with CHS that the comparative analyses are to involve both the systems analyses and the individual OR studies.

7. If AID has some criteria for determining whether a study should be included in the comparative studies, then these should be conveyed to CHS as soon as possible.

8. If AID has a preference for including only PRICOR II funded studies in the comparative analyses or for including other information when appropriate, then this preference should be conveyed to CHS as soon as possible.

#### Dissemination

1. PRICOR II should make greater efforts to distribute PRICOR monographs and reports on specific country activities and findings to other PRICOR countries.

2. Subcontractor's work should be more integrated into the PRICOR house publications and report series.

3. PRICOR II should conduct more frequent briefings for S&T/Health and the regional bureaus on the systems analyses and operations research approach and on relevant findings from the field projects.

4. PRICOR II and the centrally funded projects and CDC should develop a closer working relationship and where possible collaborate in field-level operations.

#### Implementation/Institutionalization

1. Evidence of improvements at the health centers which were the objects of study and analysis should be documented to serve as reference material for the application of SA/OR principles.

2. Prioritize the major elements of the Thesaurus into a free standing document with the full Thesaurus as a reference guide. The PRISM construct library appears to be a useful basis from which to start.

3. Develop, validate, document, and disseminate simplified versions of both macroanalytic and microanalytic tools for SA.

4. Develop strategies for institutionalizing the systems analysis/operations research approach at all levels in each host country health sector.

5. Training should be given a high priority when soliciting funds for mission buy-ins to FRICOR II.

6. Mechanisms should be developed within AID to use results from PRICOR II as a way of improving the targeting and focus of technical assistance provided by PRITECH and REACH.

7. PRICOR II contractors should create linkages and export SA/OR to PVOs and other U. S. Government activities (such as CDC) in host countries.

8. A technical advisory group (TAG) should be established at the S&T/H level to advise in the optimization of PRICOR II efforts during the remainder of this contract. The focus of the TAG should be on translating the results of PRICOR II into operationally effective activities rather than on the research components.

ANNEX 1

Scope of Work for the Midterm Evaluation Team  
Primary Health Care Operations Research-II Project (PRICOR II)

**SCOPE OF WORK FOR THE MIDTERM EVALUATION TEAM**  
**PRIMARY HEALTH CARE OPERATIONS RESEARCH - II PROJECT (PRICOR II)**

- I. **INTRODUCTION:** In the summer of 1985, about the time that the PRICOR II project was being developed, the parents of a three-year old girl brought their daughter to a rural health clinic in the Southeast of Pakistan. There, the health worker, trained in an A.I.D. -sponsored program, diagnosed acute watery diarrhea with moderate dehydration, and instituted oral rehydration therapy (ORT). Later, the health worker learned that, after leaving the clinic, the child continued to purge and died. What went wrong? In this case, it appears that WHO recommendations for patient follow-up were not effectively carried out. More systematic studies, such as that of Walker (AJPH, 1988, 149-152) confirm the impression that the impact of such programs is related to the details of service delivery. The PRICOR II project is attempting to develop a research program to increase our understanding of how the staff of child survival programs provide these services. The project has a fairly specific research strategy for pursuing this objective. The mandate of the midterm evaluation team includes an assessment of the project's overall strategy, as well as of progress in carrying out that strategy.
- II. **BACKGROUND:** A.I.D. has traditionally used the term "operations research" in the broad sense of research related to the delivery of health programs. In recent years, Agency support for health programs has been increasingly focused on a "child survival" strategy that emphasizes a small number of low-cost services thought to have the greatest potential for mortality reduction, particularly ORT, childhood immunizations, growth monitoring and nutrition education, clinical treatment of acute lower respiratory tract infections (ARI) and presumptive treatment of malaria. A number of A.I.D. projects have supported operations research activities, including PRICOR I, the Applied Diarrheal Disease Research Project, and the Combating Childhood Communicable Diseases Project. These projects have all taken somewhat different approaches to OR. Without questioning the value of these efforts, the strategy of the PRICOR II project attempts to address an area that has been largely neglected, the service delivery activities of health program staff (and the activities that support them).

A large body of research deals with the effect of interventions in terms of epidemiological or KAP surveys. To a large degree, however, these studies treat the program delivery system largely as a "black box," a poorly-understood entity that somehow produces the effects that are so carefully studied. Thus, little research addresses issues such as how to assure appropriate follow-up of a child treated with ORT. The managers of the Pakistan program mentioned earlier had virtually no literature upon which to base their efforts in this area. Indeed, in contrast to the refined tools available to measure the effect of programs, methodologies for describing the process of service delivery are poorly developed.

Certainly, program evaluations carried out by A.I.D. and others have examined service delivery. But these evaluations have largely depended on the subjective insights of expert teams. They are more art than science.

If investigators lack comprehensible detailed information on what program personnel do, it is not surprising that few OR studies address the effectiveness of these activities. One objective of PRICOR II is to develop methodologies for studying these activities, and then generate a corresponding body of knowledge from a variety of programs.

The design of the project also reflects skepticism about the degree to which local

managers themselves know the details of service delivery activities. While service statistics are often collected routinely, managers' knowledge of the actual activities of their staff are largely unsystematic, if not casual, and highly incomplete. Ironically, it is generally these very activities that are most susceptible to corrective action where the program is not having the desired effect. A District physician may know the number of packets of ORS distributed each month, but such data provide limited guidance on what to do next. Contrast this with the potential of, for example, information describing the efforts of field supervisors to monitor the follow-up of cases of diarrhea-associated dehydration. Thus, a central premise of the project is that the development of practical methodologies for gathering process information also has potential management applications, in addition to its role in OR.

Compared to other OR efforts, the PRICOR II Strategy has shifted the focus from the overall design of a program - what it is generally supposed to do - to implementation - the details of what program personnel actually do in practice. In part, this reflects the view that we need a better understanding of the details of implementation to adequately assess a program's design. It is doubtful if we can adequately assess, for example, the potential of a village health worker program without an understanding of the effectiveness of training or knowledge of what their supervisors are doing. Certainly, large scale quasi-experimental research allows investigators to rigorously test the effect of modifying one or two elements of a complex delivery system, but this is a slow and expensive process that has had only limited practical impact.

### III. CHARACTERISTICS OF THE PROCESS INFORMATION SOUGHT IN PRICOR II:

The project's mandate is expressed in reductionist terms: the project's strategy emphasizes the description of discrete, concrete service delivery activities, such as the efforts of a health worker to explain to a mother the significance of her child's growth pattern. Taken individually, such activities appear approachable as a research topic (although, as discussed below, there can be difficult conceptual challenges in dealing with a single, ostensibly straight forward activity.) Conversely, one could argue that if we are unable to understand these individual elements of service delivery, it is difficult to imagine how research will lead to broader improvements such as lowered rates of malnutrition.

This focus on service delivery activities, as outlined in the project's statement of work, has several implications:

- A. PRICOR II is concerned with what program personnel do, concrete behavior that either directly or indirectly, can be observed, as distinguished from abstractions such as supervisory styles.
- B. The project seeks to describe service delivery activities in terms of variables that allow the objective measurement of change in that activity. We want to be able to determine if the health worker's advice to the mother who has brought her child for immunization has gotten better, worse, or stayed the same since the last time it was examined. This measurement process should not be dependent on the subjective assessment of an expert, but rather should rely on a well-defined methodology. However effective the expert with a notebook may be, the project's mandate is to develop a methodology with the potential for application by a wide range of professionals.
- C. In order to develop such a methodology, it is necessary to make an educated guess regarding what is worth knowing about. Project resources are certainly not adequate to study every conceivable service delivery activity for even the simplest

program. Data on the relationship of service delivery activities and health effects are not extensive. Even the correlation of related activities, such as the components of clinically assessing a child with acute diarrhea, are not established. The project must start somewhere and expert opinion is a reasonable point of departure. In developing a strategy for selecting the variables to be measured, the project must also consider the costs of data collection for different variables. At best, the project can examine only a sample of the potentially relevant variables. We expect this to be an iterative process in which some variables turn out to be relatively unimportant.

Sheer size is certainly a potential problem. If too many variables are studied, the overall measurement effort can become technically unwieldy and too expensive to be practical. If the project can successfully characterize even a modest number of service delivery activities, this would in itself represent a considerable advance in the state of the art and could establish the basis for a more detailed examination of service delivery activities. From this perspective, it is more important that individual indicators stand up to scrutiny than it is to include very large numbers of variables.

- D. The project should anticipate finding that a substantial number of the service delivery activities selected for examination will prove to be neglected or virtually nonexistent. Even where certain activities are widely known to be lacking, there may be value in documenting this. It is likely that many supervisory activities, for example, will show such a pattern.
- E. The project statement of work views child survival programs from a "systems" perspective. This view holds that program activities can be usefully grouped into systems that are, for the most part, qualitatively distinct. The project's areas of interest are not limited to clinical services such as immunizing a child. Of equal interest are efforts to educate patients, follow-up, and promotion activities. Similarly, the array of systems that support service provision fall within the project's mandate, such as supervision and training.

The project is explicitly focused on the peripheral elements of the involved delivery systems. This feature is intended simply to limit the scope of an already complex task. Even with this limitation, the various support systems appear critically important. The team should consider the degree to which the project has addressed the following broad areas:

- a. **Service Provision Activities:** Based on field observations elsewhere, one broad area of interest is the degree to which service providers recognize specific service delivery activities as their responsibility. Corresponding efforts by the program to convey specific responsibilities are also of interest. If, for example, no one has explicit responsibility for explaining the implications of infant growth patterns, it would be useful to establish this.

The technical competence of health workers to execute specific activities is also of interest and comparatively easy to collect. The actual quality of clinical care is also an area of concern, along with activities to reach the population in need of the involved service.

Similarly, the effectiveness of educational activities and efforts to reach the appropriate target population are central to the project.

The implication of the project's reductionist orientation is that these broad

areas can be characterized through a sample of discrete, concrete activities. The statement of work takes a similar approach to support services. In this formulation, a measure such as the frequency with which supervisors observe immunization sessions would be considered relatively broad and abstract. More concrete measures might include the extent to which supervisors effectively apply specific information-gathering techniques to a discrete element of immunization, such as educating mothers about subsequent immunizations.

- b. **First-Level Supervision:** The PRICOR II project paper emphasizes the critical role of this poorly-understood support system. To "supervise" is itself an abstraction that must be reduced to operational terms that permit objective measurement. The project paper focuses on the role of primary supervisors in identifying shortcomings in individual service delivery activities, and the corresponding efforts to resolve these shortcomings. In many respects, this role of supervisors parallels the efforts of the project to identify and resolve specific service delivery problems. From this perspective, supervisor efforts to identify and resolve problems can be subdivided into distinct, observable techniques which are in turn applied to discrete service delivery activities. Thus, the project might estimate the extent to which supervisors use role-playing to assess health provider competence in explaining the administration of oral antibiotics in a case of ARI.

This is clearly a challenging area conceptually as well as at the level of field work. At the same time, it is difficult to over-emphasize the importance of understanding the effectiveness of supervisor efforts to monitor and support service delivery activities. Indeed, a detailed catalogue of shortcomings in service delivery is of limited practical utility if the project is unable to clarify how the supervisory system can deal with them effectively.

- c. **Higher Levels of Supervision:** Even at peripheral levels of service delivery, field supervisors are themselves in some sense supervised. Here, the major challenge to the project is to characterize the efforts of higher level supervisors to monitor and support problem-identification and problem-solving by their subordinates. Conceptually, both the supervisory techniques available and the service delivery activities at issue are identical to those for first level supervisors. The major additional considerations are the previous or current efforts of the primary supervisor.
- d. **Training:** Competency-based training is a widely-accepted approach in child survival programs. Both the technical competence of program staff, based on direct assessment by PRICOR II investigators and program documentation of competence are of interest. Here again, the project's overall strategy suggests that competencies be defined in terms of selected, concrete activities. Relevant areas include not only clinical services, but educational activities, follow-up, promotion, supervision, training, logistics management, and management information. These variables are among the more straightforward that the project is to address.
- e. **Management Information:** The management of each of the program areas outlined above is probably influenced by the information available to decision makers. If the district physician has little information on the quality of care for specific service activities or is unaware of the effectiveness of field supervisors in problem solving, he is unlikely to do

anything about it. As with other systems, the project's reference point remains specific, selected service delivery activities. Since information of this nature is potentially subject to verification, the degree to which this is done is also of interest.

- f. **Program Overview:** The focus of the PRICOR II research strategy is clearly on a detailed examination of selected service delivery activities at the periphery. To place these observations in perspective, it is useful to include more general information as background, including the overall structure and organization of the program, major policy and strategic considerations, financing, and community relations.
- F. Child survival programs do not vary widely in the services they attempt to provide, but the complexity of these programs, combined with their varied settings, renders each program unique to a large degree. One rationale for the project's focus on discrete activities is the premise that many of these individual activities are highly comparable even when the corresponding programs are obviously not comparable overall. The overall success of a program in the Philippines based on traditional midwives provides little basis for carrying out a similar program in Zaire. In contrast, insights into specific activities, such as the role of supervisors in monitoring the follow-up of ORT, may be directly relevant in Zaire.
  - G. A major objective of the PRICOR II strategy is to support research that has valid applications in other programs. For many areas of service delivery there is essentially no literature on which to base management decisions. Thus, the project's approach to studying service delivery in different programs should be conducive to comparisons among the involved programs and the application of finding more broadly.
  - H. The design of PRICOR II anticipates that a systematic review of program activities will reveal a range of problems that were not previously recognized by managers. Conversely, local innovations and unusually successful activities may also emerge. To the extent that program staff were already aware of the problems identified through project efforts, the overall approach would be called into question.
  - I. The project must be able to accommodate strategic variants where programs take fundamentally different approaches to a similar objective. For example, EPI programs may employ different combinations of mobile teams, vaccination campaigns, and various clinic schedules to immunize children.
- IV. IMPLEMENTATION OF THE PROJECT:** The PRICOR II Statement of Work outlines the nature of the activities to be supported through the project. As provided for in the Cooperative Agreement, A.I.D. has had substantial involvement in the development of project activities. Because the S.O.W. requires the development of a basically new approach to OR, it is to be expected that this will be an iterative process with false starts and revised strategies. To the degree that project staff draw lessons from this experimentation, the overall project is likely to be strengthened. The team should comment on the fundamental process by which the project is evolving.
- A. **The PRICOR II Primary Health Care Thesaurus.** The S.O.W. asks the recipient of the Cooperative Agreement (the Center for Human Services, 7200 Wisconsin Ave., Bethesda, Maryland) to develop a formal list of the specific activities that are to be studied in the field, including support activities. This is a generic list based on expert opinion and its development preceded the identification of the programs to be studied. It is a list of what the project staff believes is worth knowing about

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service delivery activities such as treating diarrhea or training health workers in nutrition education. The implication is that, for example, for any child survival program that provides ORT, we want to know something about how effectively supervisors monitor the follow-up of cases. Further, this is to be done in measurable terms - quantitative or scaled indicators. (The actual collection of data on the activities listed in the thesaurus, referred to as a "systems analysis" is discussed below.)

This list is, of course, intended to facilitate comparisons among the twelve programs to be studied through the project. Thus, if ten of the studies included ORT, the project would have a framework to compare supervisory monitoring of ORT follow-up in ten programs, as well as perhaps twenty or thirty other process measures.

*The team should comment on the basic premise of the thesaurus and its intended function. A related issue is the degree of specificity that appears feasible and useful. Within PRICOR II, the systems analysis based on the thesaurus serves a screening test function. Once a problem has been detected, it is likely that more detailed studies, possibly including OR, will be needed to characterize the problem before managers can respond. If, for example, clinicians are generally under-treating pneumonia, it would be risky to assume that this is a straight forward training problem without additional information. It is not necessary for the thesaurus to anticipate problems to the point that their cause can be specified by the systems analysis.*

The current version of the thesaurus identifies on the order of 2000 service delivery activities involved in seven child survival services: (1) immunization, (2) oral rehydration therapy, (3) malaria, (4) acute respiratory tract infections, (5) maternal health, (6) child spacing, and (7) growth monitoring and promotion. For immunizations, for example, 316 distinct activities are listed, with quantitative indicators proposed for 214 of them. Immunizations, ORT, and growth monitoring, and ARI have been most widely studied in the project and it would be appropriate for the team to focus on these. Given the limited time available, it may be appropriate for the team to examine subsamples of this sizable list rather than attempt a comprehensive review.

*For individual indicators or related groups, the validity and reliability of the proposed measures merits comment, including samples from the various program areas discussed in section III.E. For example, do the indicators proposed to describe field supervisor efforts to identify problems in the quality of care in ORT appear adequate? Does the team propose modifications in this group of indicators? The team's detailed assessment of a relatively small number of such areas will provide guidance to the project that can then serve as a model for areas that the team is unable to address specifically.*

*The team may also wish to comment on the overall scale and distribution of indicators. If the number of variables appear unwieldy, should the thesaurus provide explicit guidance for arriving at a sample to be collected in the systems analysis? Alternatively, if the overall approach would be strengthened by reducing the number of indicators, it would be useful to illustrate how this reduction in scale could be achieved, using selected sections of the thesaurus. The team may nevertheless identify areas where additional indicators are warranted or propose modifications in those listed.*

- B. Systems Analysis.** While the thesaurus will provide a framework for comparing specific delivery activities in different programs, systems analysis refers to the

actual collection and analysis of these data. The statement of work does not specify the process by which the project moves from a generic list of indicators to the systems analyses. A number of factors have influenced this transition (which appears to have varied from country to country), including: The development of the thesaurus over the first half of the project overlapped with several systems analyses; local interest in the standard indicators varied; subagreements generally did not require specifically that the thesaurus indicators be used in the systems analysis.

*It is important that the team arrive at an overall impression of the project's basic strategy of generic process indicators as a basis for systems analysis. Thus, the team should examine the role of the thesaurus in systems analyses carried out by C.H.S. and through subagreements. Is the prospect for comparisons of different service delivery activities encouraging?*

1. **Participating Countries:** The project S.O.W. anticipates approximately 12 systems analyses in less developed countries in the three A.I.D. regions. Four of these, and the operations research studies to follow, were to be carried out through subagreements technically independent of CHS but responsive to the overall project S.O.W. A.I.D. concurred in all of these studies:

<u>Country</u>	<u>Status</u>	<u>Responsible Organization</u>	<u>A.I.D Mission Funding</u>
Haiti	completed	CHS	partial
Zaire	ongoing	CHS	partial
Colombia	ongoing	CHS	complete
Thailand	ongoing	CHS	partial
Indonesia	ongoing	WCPH	proposed
Peru	ongoing	PRISM	proposed
Costa Rica	ongoing	HIID	-
Togo	ongoing	LTS/CRS	complete
Philippines	ongoing	CHS	-
Senegal	pending	CHS	partial
Pakistan	pending	CHS	complete
Niger	pending	CHS	complete

Each systems analysis included only selected child survival services, according to local priorities.

2. **Methodologies used in Data Collection for the Systems Analyses:** Within the project's resources, there are no restrictions placed on how a systems analysis is to be carried out. Investigators are free to schedule data collection activities as they see fit, make use of local personnel, and apply any methodology they like within the broad mandate of the project. *The team should comment on the merits of different data collection techniques, including potentially useful approaches that are missing or underutilized.* The CHS approach to systems analysis has evolved somewhat over the project. *The team should consider the basis for these changes in design, along with the larger issue of what lessons the staff have learned from these efforts to describe the process of service delivery. The subagreements provide examples of alternative approaches upon which the team may wish to comment.* The following techniques are used to widely differing degrees in collecting process data:

1. Observation of clinic service delivery
2. Observation of support or secondary facilities

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3. Observation of home visits
4. Record review
5. Key informant interview
  - a. clinic staff
  - b. non-professional health workers
6. Client interviews
  - a. household
  - b. exit (from clinic)
7. Role playing observation
8. Review of clinic facilities
9. Training course observation
10. Observation of supervisory contacts
11. Supervisor interview
12. Community key informant interview
13. Population-based surveys

*For a selected group of service delivery activities, the team should consider if the data collection techniques and instruments actually used in the systems analysis appear to be satisfactory. The team may wish to address the following*

- a. **Cost vs. benefit:** *Techniques such as interviewing are easier to carry out than those such as observing supervisory visits. In the course of refining the systems analysis, it may be desirable to compare the results of such different techniques. Has the project pursued such efforts?*
- b. **Reliability & Validity (for several specific topics):** *Several critical delivery areas present particularly difficult measurement problems: (1) Have the Systems Analyses included convincing efforts to characterize the nature and effectiveness of supervisory problem solving? Could the staff plausibly argue that by repeating these same observations in the future, they could say with confidence that supervisors' effectiveness in solving certain problems has gotten better, worse, or stayed the same? What immediate, practical advice could we presently give a supervisor regarding the identification of problems in certain activities and what concrete advice about promising responses to those problems? (2) Are there specific educational activities in providing child survival services for which a systems analysis provides a clear assessment of coverage and effectiveness? Have the systems analyses provided an equivalent understanding of the effectiveness of supervisors and trainers for such activities? (3) Are there activities for which a systems analysis has convincingly established the level of coverage of the corresponding target population for the first time? Do these estimates adequately address high risk subgroups based on factors such as nutrition, poverty, remoteness, or recent illness? (4) Have the systems analyses dealt effectively with describing the adequacy of management information related to specific activities, including quality of care, coverage, educational activities and supervision? Are program efforts to verify such information or otherwise monitor its quality addressed in the systems analyses?*
- c. **Sampling:** *The team should comment on the approach to sampling selected activities. What level of precision appears appropriate for characterizing program performance in areas such as the quality of care of ORT or the content of supervision of nutrition education activities: Have system analyses explored alternative sampling strategies such as serial sampling, convenience samples, purposeful samples, record-based sampling, and quota sampling? Are there program areas that are particularly well-suited to such*

*alternatives? Have efforts to compare regions perceived to be strong and those thought to be weak proved to be useful?*

- d. **Interviews:** *This is a widely-used and convenient methodology for gathering a range of information. For selected activities, the team should consider the validity of this approach for characterizing the concrete activities which are the focus of the project. For example, do interviews of clinic personnel provide a satisfactory estimate of ORT follow-up practices? Should such estimates be verified through other techniques? Should interviews focus on actual examples potentially subject to verification or on more general descriptions of reported practice?*
- e. **Observation:** *The S.O.W. emphasizes observation as distinct from subjective reporting by program personnel, but does not prescribe direct as opposed to indirect observations. The team should comment on the likely observer effect for selected applications of this technique. Does this seriously undermine the results of the systems analysis? Are there additional measures that should be taken to evaluate or minimize the impact of the presence of observers? Is there a need to examine observer variation? The team may wish to comment specifically on the use of self-reporting in the Indonesia study to characterize the clinical management of ARI.*
- The team should also comment on alternative formulations for exactly what is observed and recorded for selected areas. For example, some systems analyses include observation of group or individual educational activities that address home administration of ORT, a common objective in child survival programs. This activity includes several distinct content areas such as the rate of administration, the correct response in case of vomiting, and indication for return to the clinic. There are also distinct methodological elements such as ascertaining the mothers' comprehension through questions in these areas and actual demonstration of administration by mothers. The currently proposed approach is to simply summarize the session as correct or incorrect. Alternatively, distinct elements could be described in the same way or a scale could be applied to the entire session or to each element. An additional option would be to select one or more specific elements to represent the entire group of activities. In this case, effectively conveying the appropriate response to vomiting might be taken as adequate evidence that related elements are also likely to be adequate.*
- f. **Distribution of Effort:** *The relative level of effort invested in field work for different program areas such as quality of care, training, or supervisory problem solving also merits comment. Since collecting data on some indicators is considerably more difficult than others, simply comparing numbers of indicators measured per area may be misleading. Are some areas relatively under- or over-emphasized? For example, compared to the level of effort devoted to examining quality of care in administering immunizations, does the systems analysis appear to give proportional attention to other areas, such as supervision of promotional activities?*
- g. **Potential for Routine Use:** *Apart from its research objective, systems analysis as developed by this project is intended to be a potentially routine management tool. The team should comment on the potential utility of this approach. Are available materials conducive to the routine use of systems analysis in the future?*

**C. Analysis (Analytical Framework):** *The team should also evaluate the strategies used*

*for analyzing these data. The S.O.W. does not specify any particular analytical approach. Analysis is here used to mean all procedures and methods that are used to translate the data from its raw form to the form in which it is presented. What is clear is that so much data is collected in even the most simple systems analysis that some form of analysis or condensation must be used to make the data understandable. This could range from simple cross-tabs or some form of graphical presentation to complex multi-variate analysis. The various country projects have taken different approaches to analysis, the actual results should suggest refinements in future systems analyses.*

Furthermore, the "systems" aspect of the studies demands some type of analytical framework to describe the connections among the various aspects of the health system (i.e. how does supervision tie into service delivery?). The rigor brought to the study by a well-defined analytical framework lets one test hypotheses (or confirm suspicions). This question of how the parts interact in relation to preconceived notions of how the system should work (based on previous experience) is defined in psychometric theory as construct validity. *The team may wish to discuss the degree to which the relationship among indicators follows the expected pattern.* For example, are different elements of the clinical assessment of a dehydrated child closely correlated? Are there specific activities that appear to be problematic in all or most programs examined? Within a supervisory unit, does health work performance vary widely for particular indicators?

- D. **Systems Analysis Findings:** *The team should review the findings of systems analyses as presented in available reports. Overall, have these efforts provided additional insights into the process of service delivery, compared to less elaborate, traditional evaluations? The team should also discuss the extent to which a systems perspective is apparent in the reported data. In particular, do reports effectively convey a systematic review of program elements at the level of concrete observable activities? Are actual or potential comparisons of different programs suggested by the presentation of data or by explicit reference to such a framework? Do the reports address the performance of discrete, observable service delivery activities in terms that allow change in these activities to be measured in the future?*

For activities that fall in the support systems, the corresponding service provider activity provides a relatively accessible measure of outcome. For example, for the efforts of the health worker to provide nutrition education to mothers of growth - faltering children, one support activity is supervision. Field supervisors in turn could apply different problem- identification techniques with certain frequencies, correctly identify problems at a given rate, and go on to resolve them with a range of techniques, each with a success rate. Distinctions among these patterns may prove trivial or important. At a minimum, we should be interested in the relationship between such efforts and the nutrition education actually provided by the health worker. A number of other support services are also of interest with regard to this specific service delivery activity. These include the content of training related to specific nutritional messages and techniques and documentation of health worker competence. Program efforts to communicate this specific responsibility to the health worker are also relevant. Where nutrition education is of particular interest or demonstrates serious deficiencies, the analysis may be extended to the training and role definition of field supervisors in this area and to the role of second level supervisors in monitoring and supporting problem solving in nutrition education.

*The team may also wish to address the extent to which systems analysis findings point to concrete, straight forward management interventions. Have such interventions actually resulted from such findings? The team may be able to*

*suggest steps to exploit this potential through more explicit recommendations, workshops, technical assistance, or analytical reports.*

- E. Operations Research Studies:** The S.O.W. outlines a strategy of developing a series of OR studies to explicitly address problems identified through the systems analysis. The S.O.W. anticipates that the detailed observations of the systems analysis will facilitate development of studies that focus on relatively small, circumscribed problems in service delivery. A further expectation is that by virtue of their focus on simple units of activity and their orientation toward practical management interventions, these studies can be smaller, cheaper, simpler in design, and more rapidly carried out than traditional OR studies. Streamlined administrative arrangements are central to such a strategy if investigators are to be attracted to small scale studies. *The team may wish to comment on the procedural requirements for funding such studies in selected country programs. The team may also wish to comment on the feasibility of developing still smaller studies. Is there a realistic prospect that useful studies could be developed with costs and designs that are compatible with routine use by regular program personnel?*

- 1. Transition from Systems Analysis to Operations Research Studies:** While the S.O.W. anticipates that OR studies will address problems identified in the systems analysis, the interests and priorities of program officials must of course be accommodated. *The manner in which the findings of the systems analysis are presented to local officials as well as the nature of the findings should, however, influence the degree to which actual OR studies reflect the project's overall strategy. The team should review this process for selected country studies. To what extent do the studies derive from specific findings in the systems analysis? If there is a research agenda that is driven by the systems analysis, the team should also examine the proposed or potential research areas that have not been developed. Do the studies that were developed appear to represent a reasonable set of priorities?*

*The team may also wish to comment on the manner in which the systems analysis findings were presented. If certain findings were highlighted by the PRICOR investigators, did this lead to OR studies? A major area of concern for the OR studies involves service activities that are found to be minimal or absent. If, for instance, second level supervisor attention to problem solving in ORT is non-existent, active OR intervention studies will be needed to clarify the effectiveness of different approaches; the systems analysis can provide only limited insights where there is nothing to describe.*

*The team's assessment of the design of a sample of OR studies as also of interest. To what extent do these studies reflect the project's objective of expanding the body of knowledge related to the implementation of child survival services, with an emphasis on specific potential management actions. Do these studies seem likely to contribute to an information base of more general interest, or is the focus limited to strictly local issues? The team may also wish to comment on the execution of the studies, the degree to which findings are adequately documented, analyzed, and presented to program officials in a clear and persuasive form. Do the studies examined by the team represent a reasonable balance between methodological rigor and management needs (such as rapid, low cost information on a large number of activities)?*

- F. Technical Assistance:** The project S.O.W. provides for limited technical assistance to programs in systems analysis and operations research, but without funding from the project to carry out these activities. The most pertinent of these activities have centered on programs in Guatemala. *The team should particularly address the*

*desirability of more actively promoting the availability of such assistance within A.I.D.*

- G. Project Documentation and Dissemination:** The overall strategy of PRICOR II is novel and relatively complex. *The team should assess the degree to which available project documents clearly communicate the findings of the project and their relationship to its larger strategy. Which documents appear most appropriate as an introduction to the project for policy-level staff in A.I.D. local health staff, child survival program managers, and U.S. and local investigators? Are several documents needed?*

## **V. Evaluation Team and Schedule**

The Team Leader is David F. Pyle, Ph.D., Senior Associate, International Health Division, John Snow Public Health Group, Inc.

Members include:

James I. Hudson, M.D., Associate Dean for Academic Administration, University of Maryland.

John E. Marshall, Ph.D., Private Consultant, Washington, D.C.

Michael Hendricks, Ph.D., MH Associates, Washington, D.C.

Diane L. Ferry, Ph.D., Associate Professor, Business Administration Department, University of Delaware.

Chief contacts for the team are:

James Heiby, M.D., Cognizant Technical Officer for the PRICOR II Project, Office of Health, Bureau for Science and Technology, Agency for International Development.

Chris Grundmann, Consultant to STATISTICA, Inc., and Evaluation Facilitator.

Cindy Reeser, Deveres, Inc., Administrator of the evaluation.

David Nicholas, M.D., Center for Human Services, Director of the PRICOR II Project.

Patricia MacDonald, CHS Coordinator for the evaluation.

### **Schedule**

#### **Monday, October 31, 1988**

- 9:30 a.m.: Introduction by Cindy Reeser, Deveres, Inc.  
Team introductions, followed by a brief discussion of the background of the evaluation led by Chris Grundmann.
- 10:30 a.m.: Overview of PRICOR II from A.I.D.'s perspective by Dr. James Heiby.
- 12:00 p.m.: Lunch in Rosslyn
- 2:00 p.m.: Overview of PRICOR II by Dr. David Nicholas, Project Director.
- 4:00 p.m.: Team planning meeting.

#### **Tuesday, November 1, 1988**

- 9:00 a.m.: Discussion of the project in Peru by Dr. Paul Skillicorn of PRISM; convene in Dr. Heiby's office.
- 11:00 a.m.: Discussion with Patricia Moser, A.I.D. Latin America Bureau on Project issues from a regional bureau perspective.
- 12:00 p.m.: Lunch
- 1:30 p.m.: Discussions with Dr. Nicholas on projects in Haiti and Zaire.
- 3:00 p.m.: Discussion of the recently finalized study in Senegal.
- 4:00 p.m.: Discussion of the Thailand study; overviews of pending studies.

#### **Wednesday, November 2, 1988**

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9:00 a.m.: Convene in the offices of the Center for Human Services, 7200 Wisconsin Avenue, Bethesda, Maryland (parking in building; near Bethesda Metro).  
9:15 a.m.: Discussion of the Philippine study with Dr. Stewart Blumenfield and Maridor de los Santos.  
10:45 a.m.: Discussion of the Colombia study and technical assistance in the region with Lani Marquez.  
12:00 p.m.: Lunch; PRICOR II Video (10 minutes)  
1:00 p.m.: Discussion of the Costa Rica Study with Dr. Joseph Valadez, Harvard Institute for International Development.  
3:00 p.m.: Overview of the Thesaurus and Systems Analysis by C.H.S. staff.

**Thursday, November 3, 1988**

9:00 a.m.: Convene at New State to discuss initial impressions and additional team planning as needed.  
9:30 a.m.: Discussions of the Indonesia Project. (Rm. 1406)  
11:30 a.m.: Discussion with Asia/Near East representatives.  
12:00 p.m.: Lunch  
1:00 p.m.: Discussion with representatives of the Africa Bureau.  
2:30 p.m.: Presentation on comparative analysis of country findings by Dr. Wayne Stinson, C.H.S. (Rosslyn)  
3:30 p.m.: Flexible time for reading, team discussions or additional staff interviews.

**Friday, November 4, 1988**

No scheduled appointments.

**November 4-12, 1988**

Team splits and travels to Peru and Zaire (Dr. Ferry will not travel) as follows:

1. Kinshasa, Zaire: Team members Dr. Pyle and Dr. Hudson; local contact will be Loren Greenberger, CHS representative in Kinshasa who will make local travel arrangements and schedule appointments over an estimated 4-5 working days.
2. Lima, Peru: Team members Dr. Michael Hendricks and Dr. John Marshall; local contact will be Dr. William Spira, of Johns Hopkins University, who will make local travel arrangements and schedule appointments over an estimated 4-5 working days.

**November 12 - December 15, 1988**

During this period, subject to team discussions, the team will meet to coordinate preparation of a draft report. Estimated requirements are 1-5 days per team member. A formal A.I.D. debriefing, as permitted by the budget, will be scheduled following finalization of the report.

ANNEX 2

List of Persons Contacted

ANNEX 2

List of Persons Contacted

WASHINGTON

AID

James Heiby	S&T/Health, Cognizant Technical Officer
Roxann Van Dusen	S&T/Health, Deputy Director
Ann Tinker	S&T/Health, Chief of Health Services Div.
Patricia Moser	LAC Bureau
James Sheppard	Africa Bureau
Maryann Micka	Africa Bureau
Neen Alrutz	Africa Bureau, Child Survival Fellow
Chris Crundmann	Consultant, Statistica, Inc.

CENTER FOR HUMAN SERVICES (PRICOR Staff)

David Nicholas	Project Director
Steward Blumenfeld	Deputy Director
Wayne Stinson	Senior Scientist
Lani Marques	Associate Scientist
Patricia McDonald	Research Associate
Jeane Newman	Senior Scientist

HIID (Harvard Institute for International Development)

Joseph Valadez	Principal Investigator, Costa Rica
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Western Consortium for Public Health

Ralph Frerichs	Principal Investigator, Indonesia
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PRISM

Paul Skillicorn	President
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LTS

Charles Teller	Director, International Nutrition Unit
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PERU

USAID/Lima

Linda Lyon	Health Officer
Rita Fairbanks	Population and Health Office
Edgar Necochea	Child Survival Coordinator

Ministry of Health

Dr. Tomas Pinna	Director General, District Health Office (UDES-South)
Hugo Gotelli Molina	Director, Sub-District Health Office (EEP 003)
Dr. Jose Seminario	Director of epidemiologic Surveillance
Dr. Hipolito Cruz	Director of National Diarrheal Disease Control Program
Dr. Carlos Diaz	Director of National Immunization Program
Rafael Caceres	Director of Information, Documentation and Logistics
Dr. Redhead	Director, National Program for Child Survival
The Vice Minister for Health	
The Director, National Material Health Program	
The Director, National ARI Program	
The Director, National Child Spacing Program	

PRISM-PRISMA

Dr. William Spira	Director, PRISM
Donna Stultz, RN, MPH	Research Associate
Jo Gilman	Director, PRISMA
Dr. Eliana Chavez	Research Associate

CARE

Karen Cavanaugh	Associate Director
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University of Peru

Luis Benavente	Assistant Professor
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Maria Auxiliadora Hospital

Dr. Carozzi	Vice-President
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ZAIRE

Sante Rural (SANRU)

Dr. Dwale	Director
Frank Baer	Deputy Director

USAID/Kinshasa

Chris McDermott	Project Officer
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PRICOR

Lauren Greenberger	Country Representative
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School of Public Health (Univ. of Zaire)

William Bertrand	Co-Director
Melinda Moore	Professor
Toko Alphonse Lhay	OR Study P.I.
Kiyulu N'Yanga Nzo	OR Study P.I.
Kambamba Sola Ami	OR Study P.I.
Matamba Tshing	OR Study P.I.
Lukwasa Gize	OR Study P.I.

PEV/CCCD

Andrew Vernon	Epidemiologist
Paluku Kalenga	Head of Research

CEPLANUT

Kembe	Researcher
Vanga	Researcher

Sante Pour Tous

Makamba Mbonariba	Director
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ANNEX 3

CHS Approach to Systems Analysis

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**I. Introduction**

In 1981, the AID/Bureau for Science and Technology/Office of Health (ST/H) entered into a Cooperative Agreement with the Center for Human Services to develop and implement a project aimed at helping researchers and managers in developing countries apply operations research (OR) methods to resolve problems in their primary health care programs. Over a 5-year period, the PRICOR (Primary Health Care Operations Research) Project provided funding and technical assistance to 49 projects in 32 countries.<sup>1</sup> In the course of assisting these projects, the PRICOR staff adapted a number of OR techniques to better suit the the PHC situation in terms of the nature of the problems encountered, the nature of data that could be obtained to help analyze the problems and evaluate alternative solutions, and the quantitative skill levels of many LDC decisionmakers. Related to the last point was the need to provide intuitively logical solution methods so that appropriate decisionmakers could participate in the analytic process, helping to ensure that they internalized both the decisionmaking process and the resultant solution.

In 1985, ST/H extended the Cooperative Agreement for another 5 years. However, while calling for PRICOR to continue to provide assistance in solving operational problems in PHC service delivery, the new Agreement called for a more systematic approach to identifying those problems. In particular, it directed that special attention be paid to the activities of the most peripheral service providers and their supervisors. The methodology developed by PRICOR to describe and analyze system performance and identify operational problems is termed systems analysis.<sup>2</sup> This document describes the methodology and provides some background as to how it was developed, details of its implementation, key findings of systems analyses already carried out, and discussion of current issues in further development of the methodology. The reader is directed to an important companion document to this report which describes the basic tool developed for implementing the systems analysis, the PRICOR thesaurus.<sup>3</sup>

**II. Overview of the Approach**

The system analysis of a PHC service system is intended to serve three broad purposes:

- To describe the components of the system
- To clarify the interaction of the components in operational terms
- To identify significant operational problems

<sup>1</sup> *PRICOR Project Final Report: Solving Operational Problems in Primary Health Care, 1981-1987.* Center for Human Services, Chevy Chase, Md., 1987.

<sup>2</sup> Although in some respects, both systems analysis and operations research could be viewed as forms of evaluation (if evaluation is defined broadly as assessment), PRICOR treats these three technologies, as distinctive, though complementary, in purpose and implementation. Each is intended to answer a different type of management question. Briefly, an evaluation is intended to answer the question "are the goals and objectives of the system being met?" To respond to such a question, evaluation focuses on impacts, outcomes, and outputs of the system. Systems analysis answers the question, "given that goals and objectives are not being met, where is the dysfunction in the system and what are the causes?" Systems analysis focuses on the inputs and process of the system. Operations research answers the question, "given that a dysfunction (i.e., an operational problem) has been identified, under the circumstances that exist what is the best solution to this problem?" Thus, the manager may call on these methodologies in sequence: an evaluation to find out if there is a problem, a systems analysis to see where and what it is, and finally, an operations research study to resolve it.

<sup>3</sup> *PRICOR Project Mid-term Thesaurus Report.* Center for Human Services, Bethesda, Md., October 1988.

There are two basic assumptions underlying PRICOR's approach to developing this methodology. One is that health service delivery programs can be conceptualized and analyzed in terms of a classic systems model. The other is that the process component of the model equates to the activities and tasks carried out by the workers who staff the service system and that those activities and tasks can be disaggregated into objectively verifiable components; it is assumed that inputs to the system can be verified as well.

#### Systems Assumptions, Manager's Focus

The systems analysis methodology is grounded in a conceptualization of the primary health care delivery system as a system in the classic sense. Briefly, the system model states that a specifically desired impact is derived from a combination of effects (or outcomes), which in turn derive from a particular set of outputs, and that the specific outputs required are obtained when certain process activities are carried out and certain inputs are supplied to the system. Graphically:

Inputs + Process → Outputs → Effects (or Outcomes) → Impact
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In programmatic terms, inputs are resources required by the system (human, material—including plans and procedures—and financial), processes are the activities and tasks carried out in the program, outputs are the immediate result of those activities, effects are the next level of results, and impacts are the more distal results, both planned and desired as well as unplanned and undesired. To use an example from oral rehydration: trained service staff, children with diarrhea, and ORS packets are inputs to the system; the interaction between service providers and the children and their mothers are process activities; children treated with ORT and mothers educated about ORT are outputs of the system; children treated earlier and more effectively in future episodes are one effect; and reduced mortality due to diarrheal disease is an impact. To show the relationship between evaluation and the systems model, note that goals correspond to impacts and objectives correspond to effects.

It is the acceptance of this model that allows the systems analysis to focus so heavily on the process (i.e., health worker activities) component of the system, for it says that that process is a powerful determinant of the outputs of the system and, therefore, of the outcomes and impact.

Another advantage of the systems model is its recognition of interlocking systems. For example, trained personnel—an input to the system described above—is the output of the training system. Thus, the model underscores for the decisionmaker the importance of the training program to the ORT program: a weak training program denies necessary inputs to the service system.

Perhaps most important of all, the acceptance of the system model is the intellectual underpinning that allows one to focus so heavily in the systems analysis on the process component of the system, for it says that the process is a powerful determinant of the the output of the system, and that from the output then flows the outcomes and impact delivered by the system.

PRICOR's primary focus is that of the service system (i.e., program) manager. For that reason, in the implementation of the method, the systems framework is moved into the background and the analysis and interpretation of the data are cast in management, rather than systems, terminology.<sup>3</sup> The manager/user deals with sets of data that relate directly to familiar questions such as "Do mothers know about using oral rehydration therapy and how to prepare oral rehydration solution at home" and "Do supervisors check on what health workers actually tell mothers about using and preparing ORS". The use of a more familiar format is expected to make the technique easier for program managers to grasp, internalize, and use.

In the near term, the method being developed will enable program managers, on an as-needed basis, to identify operational problems that are having, or eventually will have, serious effects on the objectives and goals of the program. In the longer run, however, we expect to refine the systems analysis so that it can

become part of the monitoring component of the management information system and thus provide early warning of impending problems.

#### *Emphasis on Activities and Tasks of the PHC Service Providers*

As noted, the Cooperative Agreement for the current phase of PRICOR places emphasis on assessing the activities of primary health care service providers. Many experts familiar with service delivery programs at the periphery of the health care system are convinced that actual performance of these workers falls far short of plans and standard operating procedures and that this is a major contributor to the poor performance records of so many service systems. However, there has been little systematic study of this problem, in part because reliable, objective, cost-effective techniques have not been available. Therefore, the new Agreement specified that the Project was to develop practical techniques for describing and analyzing the activities of the health workers.

#### *The Key Tool: The PRICOR Thesaurus*

A sizable body of work exists on techniques for measuring inputs, outputs, effects, and even impact of primary health care services. Much less, however, has been done to identify comprehensively the many individual activities that PHC workers must carry out well in order to make primary health care effective in meeting its objectives and goals. Even less has been done to disaggregate those large activities into the component tasks and subtasks that comprise the operational definition of an activity. And finally, very little has been done to devise objective indicators of how well health workers perform this myriad of small tasks and subtasks. Yet, when evaluation shows that the goals and objectives of a service delivery system are not being met, it is often this level of analysis that is necessary in order for the system manager to know what exactly is going wrong, information that is the foundation of well-reasoned corrective action.

PRICOR's approach to developing its systems analysis methodology required a tool that makes this information readily accessible. To meet this need, PRICOR has produced a thesaurus of operational definitions, essentially a compendium of activities disaggregated into component tasks and, as appropriate, subtasks.<sup>4</sup> In addition, the thesaurus provides quantitative indicators of task performance. Because of the level of disaggregation employed, it has been possible to select indicators of maximum objectivity, that is, requiring a minimum of subjective judgment. This high level of objectivity greatly facilitates the use of non-expert field staff in data collection, reducing costs and giving the program manager more leeway in selecting staff to carry out the task and more confidence in the data turned in.

The thesaurus was compiled by the PRICOR staff and consultants, drawing on their own experience and relevant written materials such as WHO guidelines. It has been field-tested in systems analyses in Thailand, Haiti, Zaire, Colombia, and the Philippines; it served as a partial basis for other systems analyses in Indonesia, Peru, and Costa Rica carried out by subcontract organizations to PRICOR. Significant modifications in scope and presentation format have been made in the course of this testing, and it is expected that its use in additional systems analyses will result in further refinement of this tool.

#### *Focus of the Systems Analyses*

The Cooperative Agreement specifies that the Project focus on six primary health care interventions: oral rehydration therapy, child and maternal immunization, growth monitoring and nutrition, clinical management of malaria, management of pneumonia (which was expanded to management of acute respiratory infections), and non-clinical family planning. Maternal health was later added as a result of growing interest by the primary health care community in this important area.

<sup>4</sup> *PRICOR Project Primary Health Care Thesaurus, Vols. I and II.* Center for Human Services, Chevy Chase, Md., May 1988.

The Cooperative Agreement also specifies that the Project should consider the role of support systems such as supervision, training, logistics, and information in promoting effective delivery of PHC services. To these the Project also added planning, community organization, and financial management.

The Cooperative Agreement stipulates that approximately twelve countries would be developed as country studies, a country study being a package: a systems analysis to identify a group of significant operational problems, followed by a series of operations research studies designed to resolve those problems. The countries were selected by the Project staff, with the concurrence of the ST/H Project Manager, largely on the basis of previous experience in the country (in a number of cases in the first phase of PRICOR) and a consequent knowledge of the country situation with respect to the primary health care system and its managers and decisionmakers. Concurrence by the USAID Mission in each case was required.

Four of the country studies were to be subcontracted to other organizations in order to widen the range of approaches to designing an effective systems analysis methodology. Country studies have been subcontracted for Indonesia, Costa Rica, and Peru.

### III. Planning and Implementing a Systems Analysis

#### Planning the Systems Analysis

There are at least four major phases in the planning and organization of systems analysis, and the amount of time and effort required for each will depend on local conditions.

First come lengthy discussions with host country officials, USAID staff, and potential collaborating institutions. The objectives of this phase are (1) to secure agreement to proceed, (2) to identify interventions, support activities and perhaps geographic areas of principal interest, and (3) to enlist the active collaboration of locally experienced researchers. Generally, two or three visits from Chevy Chase staff have been required: one to introduce concepts and issues, the others, often several months later, to plan the systems analysis. Negotiation and signature of sub-agreements may take additional visits and exchange of correspondence. Phase 1 appears to require a minimum of two months and sometimes more.

The second phase is for detailed planning and pretesting preliminary to data collection. Objectives are:

- (1) to develop, translate, pretest, and produce data collection instruments;
- (2) to schedule, and make logistical arrangements, for fieldwork; and
- (3) to hire and train interviewers and observers.

The activities to be studied must be defined in both scope and content; activity lists and indicators adapted to local conditions yet kept internationally comparable; observational procedures tested then taught. The quality of local support and of PRICOR input are both critical. Externally based advisors rarely have adequate knowledge of local conditions and resources, while local staff need extensive orientation to systems analysis techniques and instruments; collaboration between the two is essential. About six weeks and at least one PRICOR staff visit are required for this phase.

The third phase is for data collection in peripheral areas. Study sites, observees, and respondents are selected and their PHC activities, tasks and subtasks recorded. Data collection is constantly supervised. Record forms are checked and possibly tabulated nightly. Observations are closely monitored for consistency. Events become more subject to the vagaries of local transport, political conditions, and worker reliability. The quality of local resources becomes paramount in determining how smoothly data collection proceeds. Up to four "team-months" may be required for this phase, but work can be greatly expedited by using multiple teams.

The final phase is for data processing, analysis and utilization. It is the transitional stage to operations research. Data are entered, verified, and cleaned. Indicators are calculated and management questions

tentatively answered. Results are presented to managers at all levels. Reports are written, workshops held, and topics for further research identified. The most important aspects of this phase should be completed within 6 weeks or so after data collection, but report-writing and workshops are likely to continue longer.

### Manpower Requirements

Systems analyses require skilled manpower, including:

- central and/or local PRICOR staff
- host country research collaborators
- local and international technical advisors
- interviewers, observers, fieldwork supervisors, data analysts, and drivers.

Experienced PRICOR staff are critical for initial orientation and conceptualization, for adapting both instruments and procedures to local conditions, for ensuring adequate fieldwork arrangements, and for interpreting results. Our experience to date is that a core PRICOR staff person will visit the country once during each of the four phases and will be present for about half of phases 2 and 3. Time requirements may be reduced if there is a resident advisor with significant experience in other PRICOR systems analyses.

In addition to visiting help, systems analysis may require a local person onsite for at least phases 2 through 4 leading up to OR studies. This person keeps work flowing smoothly and provides ongoing technical guidance. He or she also handles many production and logistical details and greatly increases the effectiveness of central staff visits.

Collaboration with one or more experienced host country researchers is almost always essential. Every aspect of systems analysis is sensitive to local conditions. Data collection instruments must be adapted to local systems, job titles, and work methods. Observational and interviewing procedures must reflect demographic and cultural factors, as well as clinic flow patterns. Production and logistics details can be overwhelming, and local residents are familiar with obstacles and options. Someone closely linked to Ministry of Health and other health delivery managers will help keep systems analysis relevant to program needs as well as facilitate application of results to program management.

Numerous data collection and management staff may also be required, including:

- field work supervisor(s)
- trainers
- translators
- community liaison personnel
- interviewers
- observers
- secretary
- bookkeeper
- driver(s)
- data entry personnel
- statistician/data analyst.

### Other Essential Resources

Researchers need assured access to photo reproduction, to paper supplies, to data processing equipment, and to vehicles and petrol. Computer software will also be required for data entry (dBase III Plus) and statistical processing.

### Development of Data Collection Instruments

Development of data collection instruments (DCI) for each country requires a number of specific steps, including:

1. Determination of what Interventions and support activities to study
2. Review of Thesaurus activity lists: (a) exclusion of irrelevant sections; (b) local adaptation and specification of sections to be included; (c) addition of uncovered areas
3. Review and local adaptation of Thesaurus indicators
4. First draft of data collection instruments (DCI), based on review of available models and instruments from prior systems analyses plus local additions
5. Translation into vernacular language(s)
6. Pretesting and refinement
7. Production.

### Selection of Systems for Analysis

The preferences of local officials and AID are necessarily paramount in selecting systems for study, but experience indicates that PRICOR staff can influence decisions. The following guidelines may be presented for host country discussion:

1. Systems should be analyzed even if managers already think they know what OR studies they want. The systems analysis may change their minds and will in any case provide valuable background data.
2. Systems analyses differ significantly from evaluations and other assessments and are worth doing even if other studies have recently been completed.
3. Analyses should cover support as well as delivery systems for the interventions being studied.
4. Analysts should suggest study of ORT and immunizations because AID considers these to be the two key Child Survival interventions.
5. There are economies of scale in field observation and interviewing (but NOT in data analysis). Systems analyses can be done on only one or two subsystems at a time, but it may be possible to do more at relatively little extra cost. Systems analyses to date have covered an average of about four intervention systems.

### Adaptation of Activity Lists

Activity lists developed in Bethesda should apply broadly to each systems analysis but must be adapted to local needs. Local systems and analyses are likely to differ from "standard" ones in:

- The scope of activities to be examined
- The degree of emphasis given to individual subsystems
- Strategic variants, such as between ORS packets and home mixes
- The training, education, roles, and titles of health workers
- Policy details concerning child spacing methods offered, immunization scheduling, ARI treatments, etc.
- The role of paraprofessional and community health workers
- Service delivery modalities, as between fixed facility and mobile approaches to immunizations.

In reviewing PRICOR activity lists, local researchers may find omissions or other refinements that should be included in the standard Thesaurus. They may also identify items that unduly lengthen fieldwork and do not appear to add significantly to analyses. All local modifications, including those suggested above, should be made cautiously to balance the need for local appropriateness with the need for comparability of data.

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Adaptation requires great familiarity with local systems and is best done in collaboration with local experts. The adaptation process has also proven to be an excellent way to orient local staff to systems analysis objectives and methods.

### First Draft of Data Collection Instruments

Data collection instruments (DCI) are of three types: observation instruments (including some for role plays), interview instruments, and document abstracts.

Thesaurus indicators developed to date imply the following DCI:

- Instruments for observation of service delivery sessions, individual treatment encounters, health education sessions, home visits, training courses, supervision encounters, service delivery inventories
- Questionnaires for interviews of service delivery personnel, community health workers, caretakers exiting treatment sessions, caretakers at home, community key informants, supervisors
- Forms for document reviews at support facilities and service delivery facilities.

The first step in developing data collection instruments is to review indicator lists and identify required observations and interviews. Consideration should be given to changing or dropping a few indicators if they imply significant additional data collection with little economy of scale. Instruments not on the above list may be considered.

Instrument design is best done by a combination of (a) locally informed persons, (b) primary health care specialists, and (c) specialists in instrument design. Persons without training in instrument design, however well educated and motivated, are likely to underestimate the misinterpretations and confusion that faulty instruments may cause respondents and data collectors. SA managers without such training should obtain appropriate technical assistance.

PRICOR's emphasis on quantitative analysis necessitates maximum possible use of closed (i.e., multiple choice) response codes at the data entry stage. Questions/observation items may be left open during data collection but costs of subsequent coding (and demand on technical time) are likely to be great. A few open questions may be unavoidable, but analysts have found that many can be closed during pretesting.

The way in which questions are closed, that is, the selection and phrasing of precoded responses, has considerable bearing on the international comparability of results. Mothers' knowledge of the symptoms of dehydration, for example, should be based as much as possible on the same specific knowledge points in every analysis. Coding before going to the field is especially important for questions or observations dealing with drug dosages, volume and frequency of home ORT, etc. Much thought and technical advice is necessary to assure appropriate question design and response coding. If not phrased appropriately, results will be difficult to interpret or compare between various locations.

### Translation

Observation instruments must generally be translated into the national language, while questionnaires must be in the language in which the respondents feel most comfortable. Interviews with mothers and community health workers will usually be conducted in a non-European language, often several different ones within the same country. Translations must be made beforehand, and in writing, rather than being left to the ad hoc interpretation of individual interviewers. All documents should be reverse translated to confirm that the intended meaning has been preserved.

### Pretesting

Pretesting of the entire systems analysis process, not just data collection instruments, is essential in every study country and may take up to six weeks (including subsequent redesign). Subjects for pretesting or confirmation include:

- the phrasing of individual questions
- question flow, skip patterns, and interviewer ease with the format
- the observability of key tasks and subtasks
- the duration of interviews and observations
- the frequency of certain critical events, such as SDF treatment of diarrhea
- the practicality of planned observational methods
- site and respondent selection processes
- logistics and scheduling
- interviewer, observer and supervisor competence.

### Refinement

Data collection procedures and instruments should be thoroughly reviewed and possibly revised in the final weeks between pretesting and full fieldwork. In particular:

- confusing or unhelpful questions/observations should be dropped or rephrased
- open-ended questions should again be reviewed and, if at all possible, converted to a closed set of options
- all DCI should be precoded and a data field established for each variable to reduce errors during data entry
- time requirements for data collection should be re-estimated
- plans for training and on the job supervision of interviewers and observers should be confirmed
- logistical arrangements and scheduling details should be finalized.

### Selection of Study Sites, Observers, and Respondents

In developing its selection process, PRICOR has had to confront a very important issue: that of representativeness and statistical rigor. Early in the development of the systems analysis methodology, PRICOR realized that enormous resources would be required if all data had to be obtained so as to assure random sampling and national representativeness or if all conclusions had to be based on the application of parametric statistical tests. The thoroughness and flexibility of the approach would be greatly limited.

We concluded that such representativeness and statistical rigor were generally not required. Many, if not most, managerial decisions are based on meager data, especially data concerning the activities and tasks that PRICOR is interested in. We are not trying to determine the confidence interval of an estimate of disease prevalence, nor prove that treatment A is superior to treatment B. Rather we are interested in results that will provide sufficient reliability (as judged by managers) for making certain managerial decisions. Interpretations of results will be based then on logic but often a different form of logic than statistics. For example: one may assume that if task A is not being carried out in four of the best health centers of a district, it is probably not being carried out in any significant number of health centers in a district; thus, a district health officer may decide to assure the performance of task A in the entire district (e.g. by improving training and/or supervision) based on these results.

We must realize and accept that data can aid logical analysis and subsequent managerial decision making but that not all data must be randomly collected nor do all conclusions have to be based on the application of statistical tests. It is important however that we understand the logical basis for our selections and conclusions.

It may be difficult for researchers whose background is that of experimental research or epidemiology to accept a selection methodology not based on parametric statistics. It will require careful explanation by PRICOR staff to foster acceptance of this new approach. It will be important to frequently remind them (and ourselves) that we are not trying to make estimates of a universe based on random sampling but rather to provide logical insights into how a PHC system is operating so as to improve task performance and ultimately program impact.

Two issues arise in sample selection: (a) the number of observations and interviews to be sought, and (b) the process for selecting study units.

Selection of study sites, observees, and respondents occurs at multiple levels, namely, regions, districts, facilities, villages, and households. In some situations, key informants must also be selected. Selection criteria and processes may vary at the different levels.

### Selecting Regions

Most PRICOR analysts have started by identifying one (Thailand, Philippines) to five (Senegal) regions or provinces in which to work. Considerations in deciding how many regions have included: logistics, the number of fieldwork teams likely to be available, the desire for comparisons between regions, and the wishes of host country personnel and AID.

Criteria for selecting specific regions may include:

- accessibility
- interest of regional medical officers
- representativeness (in terms of socio-economic status, rural/urban distributions, public/private sector mixes, ethnicity, etc.)
- national policy or priorities
- specific program characteristics (such as prior donor funding, experimental programs, exceptionally good PHC performance, etc.)
- political/security considerations.

### Selecting Districts

Districts or zones are of different sizes in different countries, but are generally the highest unit for direct study (the support facility level) in systems analysis. Analysts have generally selected a total of three (Colombia) to six (Thailand) districts for study with the norm being about four.

While there are no fixed guidelines, it may be useful to select the best district in each region to get a good idea of how systems work at their best. In Thailand, districts were grouped by PHC achievement (high, medium, low) and two of each group selected.

### Selecting Facilities

Within each geographic area and system, PRICOR's primary interest is in peripheral service delivery facilities (SDFs), and it may be at this level that site selection is most critical. SA tools require session and encounter observation plus interviewing at each service delivery facility studied, and this is likely to limit the number that can be included. Numbers selected have ranged from 2 to 6 per district, or 3 to 36 (Thailand) total. In the absence of unusual factors, analysts should aim for a total of 10 to 20 service delivery facilities.

Performance is the primary selection criterion, especially where facilities are of highly varying quality. (Where quality differences are not great, random selection may be preferred.) Analysts may deliberately select the best facilities to better understand how systems operate under good conditions, but they should then also select one or two average centers and a bad one as well. Several analysts have stratified facilities, using performance statistics or group consensus, and then selected one or two from each strata.

Selected facilities should be ones where activities that need to be observed will take place while the SA team is in the area. Clinic and supervision schedules may have to be checked in cases of doubt. In some cases, it may be possible to reschedule sessions to coincide with team visits.

### Selecting Villages

While villages are not units for systems analysis, they do represent clusters for use in selecting households and community key informants. Analysts have generally selected 2 to 6 per service delivery facility.

Selected villages should be broadly representative of the SDF catchment area, but selection need not be random. Most analysts have first selected the village where the facility was located, then one at a distance and one or two in between. In Zaire, the second village was the farthest away from the SDF on the main road, the third in between, and the fourth a remote village not on the road. In Haiti, all villages within two hours travel time of the SDF were selected.

Selection will be greatly affected by the availability of maps and population data, local settlement patterns, and logistics. Sampling procedures may vary even within a single country because of varying cultural, geographic and infrastructural factors.

### Selecting Households

At the household level, separate samples may be required for interviewing and for observation of home visits. In three analyses conducted to date, the number of household interviews has ranged from 504 to 664, but desired sample sizes have not been rigorously calculated. These total sample sizes have generally led to selection of 3 to 9 households per selected village.

Within villages, population registers were used for random selection in Colombia and Costa Rica and "random walk" techniques in Zaire, Haiti, and Thailand. For the random walk technique, analysts spin a bottle or stick in the village center, then contact every third (for example) household in that direction. If the household does not contain an eligible child (generally defined as under age 5), the next eligible household is taken. Households within one kilometer of the service delivery facility may be excluded as unrepresentative (Zaire). The random walk technique requires close supervision to ensure that interviewers do not follow their personal preferences.

### Manpower and Logistics for Data Collection

Systems analyses are major data collection efforts, usually in remote areas, and planners should not underestimate their complexity. As outlined above, multiple data sources and sites are involved. Data sources include observations, role plays, interviews, document reviews, and focus groups. Review of existing reports, evaluations and studies will also contribute substantially to interpretation of results. Study sites include service delivery facilities (SDFs), support facilities (SFs), training centers, communities and households.

### Types of Manpower Required

Skilled personnel are needed for observation, interviewing, and supervision, and most teams will need one or more drivers as well.

Observers must generally have a strong health background and perhaps some knowledge of medicine/nursing as well. This has been especially true for those observing service delivery sessions and encounters, less true for home visit, supervision, and training observation. In Haiti, planners considered it essential to have physicians conduct observation, though it is likely that skilled nurses might have done the same work had they been available. PRICOR staff have participated significantly in observations, at least during pretesting and the first few facility sessions, but in one case throughout the analysis. Experienced

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health workers can be trained for observation. Professional interviewers without health background can also be trained for certain limited kinds of observation (e.g., immunization encounters), but this must be confirmed by pretesting in each locality.

Interviewing is an acquired skill best performed by experienced interviewers if they are available. Different personnel may be required for interviewing mothers in households and for interviewing health workers; home interviews may have to be done by women, while interviews of senior professional staff may have to be conducted by relatively senior staff. (Doctors, for example, may only wish to be interviewed by doctors.) In most systems analyses to date, at least some of the interviewers have had a university background, while in one case, recently trained health workers were used. PRICOR staff usually assist in key informant interviewing, especially at the support facility level.

Skills for supervision of fieldwork are rare and valuable, especially given our emphasis on observation. PRICOR staff and senior host country counterparts may need to supervise because others may not understand our unfamiliar technology. Daily supervision is always required because completed DCI must be checked and logistical arrangements ensured. Thus, supervisors must be able and willing to work in the field for the duration. Each fieldwork team should have its own supervisor.

Teams generally consist of a driver, a supervisor, and four to five observer/interviewers. (Normally, at least two counting the supervisor must have observational skills.) A locally hired community liaison person may also be helpful in arranging interviews and managing protocol. The size and number of fieldwork teams is largely determined by vehicle capacity, and this should obviously be checked early on. Use of multiple teams greatly expedites fieldwork but requires multiple vehicles and supervisors. It also requires coordination to ensure that data collection procedures are managed as nearly identically as possible in different regions.

### Training

Skilled personnel as well as others require strong orientation to PRICOR systems analysis as well as to specific data collection techniques. Additional training may be needed for those unfamiliar with basic interviewing and observational methods. Training should include detailed discussion of each data collection instrument and how it will be used. Trainees should also practice the use of each instrument.

Training in observational techniques may be particularly difficult because trainers themselves are likely to have limited experience. Role plays, video tapes, and especially direct field observation should be used for practice scoring. It is particularly important that judgmental differences among observers (even senior supervisory ones!) be reconciled before data collection begins to ensure that results are reasonably consistent.

### Liaison and Scheduling

Considerable advance work is needed to secure required permissions, to schedule specific data collection activities, and to make necessary logistical arrangements (see below). Regional and district officials must be contacted and systems analysis explained to them. In some countries, interviewers may be required to wear badges or have letters to show the police. Dates and times for each type of session and encounter that is to be observed must be either ascertained or arranged. Specific arrangements may be required for observation of such rare events as training courses and supervision. It may also be advisable to contact community leaders and even individual households one or two days in advance to schedule specific interview times. Unannounced visits (to determine, for example, whether supervisors make scheduled appointments or health workers come to clinic) should only be considered if it is certain that enough definite observations can be made.

Prior to arranging schedules, analysts should outline the types of data collection required at each location and the amount of time likely to be required for each. The following reflect current versions of the Thesaurus and may not apply in all cases:

- Service delivery facility: observation of at least one session for each PHC intervention being studied; observation of supervision encounter; inventory and document review; multiple interviews with different types of health workers; multiple exit interviews with caretakers; one key informant interview; inventory review.
- Support facility: observation of training course (one per SA); interview with supervisor; interview with SF key informant; document review.
- Community: Multiple household interviews; multiple home visit observations; multiple key informant interviews; multiple interviews with community health workers; inventory review.

For resource planning, the number of observations or interviews and the amount of time required for each must be calculated. Interviews may be expedited by using multi-member teams, but observations generally cannot be. Some observations may require multiple observers.

#### Data Collection Processes

The quality of data collection - the objectivity of observations, the accuracy of recording, the "informativeness" of key informant interviewing - obviously have great bearing on the success or failure of systems analyses. Quality needs to be planned for and enforced in the field; it also needs to be rewarded to keep worker morale high.

#### Observations

Though unavoidably obtrusive in some cases, observations are the heart of PRICOR systems analyses and the preferred method of data collection whenever there is a choice. Observations show what workers actually do as (possibly) contrasted with what they say. They tend to show workers at their best, a bias that makes it easier to gain local acceptance (but which, of course, has to be discounted during analysis). Observations may be hard to do - perhaps the reason they have been avoided for so long - but they contribute immensely to our understanding of how programs operate.

The generally recommended method for observing patients as they move through service delivery facilities is to follow individual clients from station to station. An alternative in some cases may be to post observers at strategic locations within the clinic and thus observe repeated instances of the same task. (Since data collection instruments are patient-specific, they will have to be passed from observer to observer.) In either case, the selected method should be pretested.

Observers should explain their purposes to both clients and workers. First observations of each worker may be systematically discarded (as they were in Colombia) if it is thought that those observed become more comfortable after they get used to the idea. Observers should note activities as they occur but complete forms afterwards (preferably immediately) so as to reduce distractions during the encounter.

Malaria and diarrhea treatments, as well as supervision encounters, have proven difficult to observe in some locations because of their infrequency. Suggestions to overcome this problem have included:

- leaving a single observer on site after other observations to collect sufficient cases;
- retrospective review of medical records (where patient charts are available);
- role plays;
- interviews with mothers of recent patients.

The latter two methods would yield retrospective data which should not be mixed with data from direct observations.

There are two options for observing supervision: (a) to follow the supervisor on his or her rounds and perhaps observe several encounters on a single day or (b) to wait for the supervisor to arrive at the service delivery facility. The first option is more dependable because it increases the likelihood that supervision will actually occur, but it may be more biased if supervisors learn what observers are interested in. The second method fits more easily with other aspects of SDF observation but generally yields fewer measurements. Again, pretesting may help planners decide which method to use.

#### Group Process Techniques

While not directly linked to Thesaurus Indicators, focus groups, nominal groups and other group process techniques may provide invaluable non-statistical data. They may be particularly useful for more in-depth analysis of problems identified through quantitative data collection.

The idea of a focus group is to bring people together in a casual non-threatening environment to discuss complex or sensitive subjects. It is very important that participants feel relaxed and free to say whatever they wish. Groups work best with five to eight participants of similar background or perspective; multiple groups may be needed to represent different population or worker segments. The purpose is to generate ideas, not to gather statistics or teach participants.

Discussion is started by a facilitator, who introduces the subject and explains the purpose of the meeting. The facilitator should then play a background role, raising occasional questions to keep discussion moving in the right direction but otherwise letting participants do the talking. Discussion should generally last one to a maximum of two hours; a shorter time may be inadequate to put participants at ease, but longer may not maintain participant interest.

#### Field Supervision

All completed data collection instruments should be checked for completeness and internal consistency as they are filled in. Certain errors detected during an evening review in the field can be rectified by re-interview or re-examination of health center records. Supervisors should personally re-interview a portion of respondents to verify interviewers' work; the proportion for which this is done should reflect their confidence in the individual interviewer but might start at about 20% and fall to 5 or 10% as problems are worked out. Supervisors may be able to validate observational data by standing behind observers during clinic sessions.

Care should be taken to ensure proper storage and transport of completed data collection instruments to the central data entry facility. Often inexpensive metal boxes or trunks can be purchased locally and used for this purpose.

#### Data Management and Analysis

Data entry, processing and analysis occur chronologically near the end of a study but will be extremely time consuming if not planned well in advance, while instruments are being developed. Subjects for early planning include:

- personnel
- equipment
- software
- precoding of data collection instruments
- types of analyses to be conducted.

Data cleaning and entry should also begin early during data collection since many errors can be rectified or prevented if problems are detected quickly.

All data entry and initial analysis should occur locally, where there is at least some possibility of rectifying errors and interpreting results. Work may either be done in-house or contracted to an outside group, though the first option may give analysts greater control over deadlines. Maintenance of tight turnaround schedules is likely to be critical. Data will eventually be submitted to Bethesda (ideally within two months after data collection ends) for use in comparative studies.

### Equipment

It is likely that all necessary work can be managed on an IBM-compatible 640K micro-computer with a hard drive. Analysts will need assured access to such a machine for at least two months. PRICOR can help expand a machine's capacity or furnish additional equipment but only in cases where there is clearly no alternative.

### Software

dBase 3 is our preferred program for data entry and cleaning.

There is no preferred program as yet for analysis, though both SPSS and Systat have been recommended. It may be desirable to use software with which local researchers are already familiar. Copies of recommended software may be obtained from Bethesda.

Systems analysis yields a rich data base which may be used for multiple studies and reports. Both simple and highly sophisticated analyses may be conducted. Certain analyses should be performed immediately, even while teams are still in the field, but others may be reserved for OR studies or for comparative analyses in Chevy Chase.

### Analytical Plan

Analyses are required for three purposes:

1. To describe how health systems actually operate (as compared to how they are supposed to operate)
2. To identify and help prioritize) problems for operations research
3. To establish "correlations" among indicators and hence identify the most useful indicators for routine systems analyses.

Analyses should exploit SA's strengths, namely, (a) direct observation of service delivery activities and (b) hierarchical linkages between support facilities, service delivery facilities, communities, and households. Quick turnaround is essential - especially for initial country reports.

Analyses and interpretations should reflect the sample design. Most samples (Thailand excepted) have focused on service delivery facilities and only secondarily on households. (Households, in other words, represent selected SDF catchment areas rather than the country or province.) Service delivery facilities were randomly selected only within certain strata, eg., high/low performing facilities within province.

It may be best to start by tabulating data separately for each service delivery facility and then using ranges and modes (rather than means) for aggregation, especially where it is clear that SDF results are highly variable. Means should be calculated only if we have a good idea what the "average" health facility looks like.

### Describing the Service Delivery System

Systems analysis gives managers a unique opportunity to learn more about how basic services are actually provided in the field. Thus, our first reports should use observational data to describe delivery activities and contrast observed reality with norms.

Analysis will generally start with univariate distributions, eg., proportion of diarrhea encounters in which ORS preparation is demonstrated. These "marginal" distributions need only be calculated for indicators of most interest to program managers and should be interpreted cautiously.

Analyses are likely to become more interesting and interpretable when disaggregated by facility or facility group. Facilities may be grouped by pre-determined characteristics, eg., project/non-project or high/medium/low performance. Or they may be grouped by characteristics identified in the data themselves, eg., facilities with and without regular supervision. Marginal distributions may then be calculated within each of these groups.

Indicators of greatest interest should be calculated facility by facility because it is likely that averages will hide enormous performance differences. Results on any given indicator may range from 10 to 90% with few facilities in mid-range, yet the mean might be a misleading 50%. Where this occurs, grouped data should be in terms of modes and ranges so that variations are preserved.

Household data must be cautiously analyzed and presented in cases where respondents were selected to represent service delivery facilities rather than geographic regions. It is suggested that key indicators be calculated facility by facility and then aggregated using ranges and modes rather than means.

#### Problem identification and analysis

Problems susceptible to operations research may be identified in three ways:

1. As discrepancies between expectations and reality, eg., shortfalls in achieving targets;
2. As differences between high and low performing areas; and
3. As breakdowns within systems, eg., major gaps between what health workers teach and mothers practice.

Not all problems so identified warrant operations research, though analysts should be wary of "obvious" solutions which simply haven't been implemented. Often there is a deeper problem that is not so easily resolved; health workers may fail to teach ORS preparation, for example, not because they don't know any better but because their supervisor thinks ORT doesn't work. It is important to identify the fundamental problem, using either extended analyses of existing SA data or some rapid assessment technique such as focus groups.

OR studies are likely to focus either on major gaps within systems or on significant differences between groups of service delivery facilities with different performance characteristics. If workers know how to mix ORS, for example, but fail to teach it to mothers, one OR study might analyze possible reasons and consider ways of overcoming them. If analysts identify activities that seem to be critical for performance, another study might re-examine the contrasting facility groups and look for ways to make the low performance group more like the high performance one. Identification of relationships between variables (or absence of relationships between variables when they should be present) will greatly sharpen problem analysis and expedite solution development.

Results may also contribute to problem analysis once OR begins. Logical chains of tasks and outcomes can then be more fully explored. The links between training, supervision, clinic activities, health education, and practices at home (for example) can then be more fully explored. Often the presenting problem (eg., CHW failure to teach ORT) is not the fundamental one, which may lie back in the design of the training program or the fact that community organizations do not support local workers. These detailed studies, akin to classical systems analysis, should be conducted for specific problems during OR.

### Analyses of Systems

A major PRICOR task is to simplify the Thesaurus and produce an abridged version that lists only the most essential indicators. These indicators should be ones that "flag" system breakdowns early enough in program implementation to prevent major performance shortfalls. Expert opinion is widely used for this purpose, but we have empirical data and should use it. (Because of their complexity, however, analyses described here may be done in Bethesda rather than in the field.)

For any given activity, there is likely to be a logical chain of events which should lead up to a desired outcome, eg., maternal preparation of ORT in the home. Elements of this, often labeled as inputs, processes, and outputs, include:

- trainee instruction in ORS preparation
- worker practice of ORT during training
- supervisory reinforcement for ORS instruction on the job
- support facility provision of ORS packets to service delivery facilities
- maternal visit to service delivery facility during diarrhea episode
- worker demonstration of ORS preparation to mother of sick child
- reinforcement of ORS knowledge through health education
- maternal access to ORS packets in the home or community
- maternal recognition of dehydration
- maternal treatment.

The activities listed above are somewhat sequential in that failure to perform any one is likely to affect performance of activities that follow. When workers fail to teach ORT, for example, mothers may be unlikely to have essential knowledge and hence fail to practice it. Workers may fail to teach ORT because of shortcomings in training and/or supervision. Current data collection instruments assess most or all of these activities, but abridged ones should include only those indicators which best distinguish high performing from low performing systems. The question is what to drop.

The best way to determine what to drop will be to classify facilities by performance and then construct "logical activity chains" using Thesaurus indicators. Initial comparisons may have to be facility by facility, but data may be grouped if their key indicators are "reasonably" similar. (Considerable non-statistical judgement will be required.) It is likely that poorly performing systems will show breakdowns and that activities which logically follow will be poorly performed. The point of the breakdown is critical; there may be little need to measure subsequent indicators once this point is identified.

In comparing data within and possibly between countries, we hope that a small number of indicators will distinguish high from low performing systems. These indicators will be emphasized for the abridged Thesaurus.

### Dissemination and Use of Findings

Systems analysis results are intended primarily for local use, but they are of great international interest as well because of the innovative methodology and the need to know if and how child survival services are actually being delivered in the field. Analysts need to plan dissemination from the start through close collaboration with host country personnel. They then need to ensure that data are quickly analyzed, different reports written for different audiences, and management workshops held.

There are multiple audiences for dissemination, and different approaches may be required for each. Perhaps the most important consists of program managers, ranging from district medical officers to senior ministry personnel. A related audience includes local researchers who will do follow-up studies. USAID health staff, both local and in Washington constitute another important audience. Other audiences include international health consultants and researchers and the development community at large. Reports to local officials and to AID (local and Washington) are the responsibility of the SA team. The full SA report for

wide external dissemination will be a central PRICOR responsibility but requires thorough and unambiguous basic documentation.

### Immediate Results

Managers tend to be interested in systems analysis results even as data are being collected, and their support will be increased if ways can be found to respond. If at all possible, immediate preliminary debriefings should be held, describing the methodology and first impressions about what has been learned. These may be based on hand tabulations of critical indicators. All "first impressions" must be cautiously phrased and verbal rather than written, especially if negative. Debriefings should occur at the district, regional and national levels.

More formal workshops should be held soon after data have been entered, cleaned, and converted to indicators. Workshops should include both managers and researchers; their objectives should be to assist in the interpretation of results and to prioritize problems for further operations research. National workshops may last up to two days; they are likely to be the most important dissemination vehicle for senior staff.

There is an urgent need for PRICOR to disseminate SA results to central AID staff. The Bethesda country monitor should conduct a public seminar soon after reasonably solid results are available.

### The Full Report

The PRICOR scientist and the national principal investigator must also prepare a full written report describing both SA methods and procedures and principal findings. The audience for this report consists of persons interested in the detailed story: this will include senior program staff and AID (locally and in Washington). The full report will serve as the basis for briefer dissemination efforts for wider audiences.

The methodological section of the full report should describe processes in detail so that others can learn from the experience. The table of contents of this manual may serve as an outline. The findings section should in most cases review service delivery and support systems one by one, concluding with recommendations for further research.

The full report should also include a two page (single-spaced) executive summary intended for wide local and international dissemination. It should be freestanding, that is, not dependent on references to the full report. About one third of its length should be devoted to the systems analysis methodology and should be written for those without previous knowledge.

## **IV. Open Issues in Methodology**

The systems analysis methodology, though clearly usable and effective already, is not a finished product. A number of issues remain, some of which we expect to resolve on the basis of additional experience in the field, some of which may not be completely resolved even by the end of this phase of PRICOR.

### Sampling and Representativeness

The systems analysis is intended to portray the reality of the service system as contrasted to the plans for it, and, as a corollary, to identify operational problems. At the same time, the method is supposed to be a practical tool for managers to use. As a practical matter, levels of resources (people, transportation, data archiving/processing facilities) usually available to managers in developing countries militate against sample sizes that allow traditional statistical analyses with high confidence levels.<sup>5</sup> Thus, we are faced with

<sup>5</sup> It might be argued that larger, more heterogeneous samples are required by managers at higher levels of the system who are responsible for large segments of the population, e.g., national or regional level, but that managers at lower levels who are responsible for lesser parts, e.g., province, district, or even the

finding the proper trade-off between sample size in terms of numbers and diversity representing facilities, health workers, and service recipients. There is also the related question of how many observations and interviews to make per facility or worker.

For the time being, PRICOR has sidestepped this issue to a degree by noting that for now we are looking to identify rather egregious deficiencies in the process of service delivery. Our experience to date is that these can be detected with relatively small numbers of cases, which is not to say that these problems could be identified without any systematic analysis at all. Such is not the case. For the longer run, we are examining the utility of lot quality acceptance sampling (LQAS). LQAS is a sampling technique based on the Bernoulli distribution that sacrifices the power of point estimation in favor of estimating whether a particular characteristic has a value above or below a specified threshold. The return is the ability to work with extremely sparse sample sizes. LQAS has been used in industry for many years, but is only recently being considered as a sampling approach in health services research. A subcontracted PRICOR study in Costa Rica is employing LQAS with great success. Having demonstrated its basic feasibility in the field, the Principle Investigator now is working on techniques to pare down requisite sample sizes even further. This is an extremely promising development.

#### Numbers of Indicators

The number of indicators for which to collect data is a major question in the design of each systems analysis. Each systems analysis treats one or more PHC interventions, plus four or five supporting systems. Based on the indicators--many of which are multi-element indexes--offered in the PRICOR thesaurus, any one intervention system and its support systems could produce 200 to 300 variables for data collection. Three or four interventions thus would generate a very unwieldy dataset.

PRICOR's philosophy in data collection is one of minimalism, that is, to try to identify the absolute minimum dataset required to answer a manager's questions. A large dataset requirement for implementing the systems analysis is likely to discourage its use. On the other hand, there is some minimum below which important details of worker activities and key inputs can not be discerned. PRICOR does not believe there is a fixed answer to the trade-off between the amount of data collected and analyzed, the resources required to do this, and the comprehensiveness and certainty of the information produced by the effort. Each manager must make his own utility assessment based on his needs and his situation. One goal, however, of PRICOR's transnational comparative analysis is the production of a suggested set of core data below which the usefulness of the systems analysis becomes questionable.

#### **V. Problems of Possible General Prevalence Identified to Date**

Since data analysis has been completed for only a few systems analyses, there has not yet been a systematic effort in comparative analysis. Thus, at this time identification of operational problems of a widespread and general nature is somewhat impressionistic and is based on review of data compartmentalized by country.

One very strong perception is that health workers have problems communicating with mothers, whether it be in cautioning mothers to expect side-effects following immunization, failing to provide any guidance to mothers while treating a child with ORT, or taking the opportunity to reinforce mothers' understanding of their child's growth chart.

The picture for logistics in both ORS and immunizations is mixed, with some analyses reporting problems and others specifically stating that such problems were not seen.

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catchment area of one facility, are better off because they do not have to deal in large numbers. The obvious response is that the lower one goes in the system, the fewer the resources available to that manager.

Finally, although not well-reflected yet in the datasets that already have been analyzed, there is a clear perception that supervision is a major weakness in the primary health care system. In Colombia, the data show that supervisors have a very different idea of what the order of task priorities is for health workers than do either the workers themselves or the mothers with whom the workers interact. In the Philippines, supervisors are of the opinion that their charges do a much better job in taking histories and doing physicals for ARI than observation of the workers bears out. And in Thailand, the assessment showed that supervisors regarded supervision largely as assuring that records are filled out, and had little interest in performance assessment or on-the-job-training.

#### VI. Systems Analyses Completed, In Progress, and Planned

<u>Country</u>	<u>Interventions</u>	<u>Date</u>
Thailand	Imm,GM,ORT,FamPlan,W&S	4-6/86,6-11/87
Zaire	Imm,GM,ORT,Malaria	4-6/87
Haiti	Imm,GM,ORT,Malaria	11/87-2/88
Costa Rica <sup>a</sup>	[LQAS],Imm(Measles)	[3-7/87],12/87-3/88
Colombia	Imm,GM,ORT,ARI	5-8/87
Indonesia <sup>b</sup>	ARI,Imm(TetTox)	1-3/88,9-10/88
Philippines	Imm,GM,ORT,ARI	5-9/88
Peru <sup>c</sup>	Imm,GM,DDC/ORT,MatHlth	5,7,10/88
Niger	ORT,Malaria,MatHlth	1-3/89
Pakistan	Imm,GM/N,CDD,HeaEd	1-3/89
Senegal	ORT,Malaria (Supervision)	1-4/89

<sup>a</sup>Subcontracted to Harvard Institute for International Development

<sup>b</sup>Subcontracted to Western Consortium for Public Health

<sup>c</sup>Subcontracted to PRISM/PRISMA

**Annex A contains summary sheets providing pertinent details of methodology and findings for systems analyses completed or in progress.**

**SYSTEMS ANALYSIS SUMMARIES**

## COLOMBIA SYSTEMS ANALYSIS SUMMARY

### Intervention Systems Analyzed

The systems analysis was carried out by a private Colombian organization, the Fundacion Santa Fe de Bogota (FSFB), to assess the child survival-related activities of volunteer health promoters who were trained by the FSFB and who work in peri-urban neighborhoods of Bogota. The systems analysis of the health volunteer program of the FSFB examined the inputs, processes, outputs and effects of the volunteers' health promotion, education, and referral tasks in support of diarrheal disease control (ORT), prevention and management of acute respiratory infections (ARI), growth monitoring/nutrition (GM/N), and immunizations (EPI). These four service delivery areas plus the FSFB's general support activities (mainly training and supervision) to direct the volunteers comprised the five subsystems that were studied in the SA. Additionally, one of the objectives of the SA was to compare the child survival-related knowledge and practices of mothers served by the volunteers with those of mothers with similar socio-demographic characteristics but not served by the volunteers, in order to gauge the relative impact of the volunteers' activities. As part of the system overview, a brief study was conducted to compare the volunteers' profile with that of two other primary health agents that operate in marginal urban areas in Bogota: Vigias de la Salud and the MOH urban health promoters. Also, the system overview included analysis of trends in the use of health services at three health centers and posts in the FSFB area of influence and analysis of data from other health surveys previously conducted by the FSFB.

### Field Methods

Data collection instruments were developed by two research staff of the FSFB Community Health Division, with assistance from PRICOR. Indicators were first developed for the elements of interest in the selected subsystems. Questions and items for the data collection instruments were then developed from these indicators. The instruments were pre-tested and refined over a four week period.

The systems analysis was carried out by five contracted interviewers and one data collection supervisor. The interviewers were not health professionals and had previous experience in conducting surveys. Two observers were hired to observe the volunteer home visits; one was a nurse and the other a graduate student in anthropology. Three PRICOR staff provided approximately eight person-weeks of technical guidance in instrument design and data analysis.

Planning and instrument development for the systems analysis were carried out during three months (late January through April 1987). Data were collected from May 9-August 14, 1987. The major data collection activities were: survey of 504 households (304 in FSFB area of influence and 200 in control area); survey of 92 volunteers; observation of 137 home visits by 28 volunteers; survey of 7 FSFB professional staff (self-applied questionnaire); survey of 16 health service providers in FSFB area of influence; and interviews with 28 MOH health promoters and 62 Vigias de la Salud.

The total cost of the systems analysis was \$97,663, of which \$39,010 comprised direct expenditures by the FSFB, including data analysis and report production.

### Major Findings

The systems analysis revealed that while volunteer *knowledge* of interventions such as ORT and immunizations was very good, in practice the volunteers were generally not skilled at communicating what they knew to mothers. For example, while 75% of the volunteers know the importance of continued feeding and liquids during diarrhea, in only one case (of 18 visits where a child had diarrhea) did the volunteer talk about diarrhea management.

The observed visits indicated that the majority of volunteers, who are mostly women aged 18-50, do not recognize or use opportunities for health education and instead tend to follow an established routine in the visits, without necessarily responding to what they find in the household. This finding was unexpected and signaled the need for greater attention to and supervision of the volunteers in health education activities. A positive outcome of the observations was the eagerness of the volunteers to learn what they could do to be more effective health agents in their communities.

The systems analysis also showed that while the most prevalent health problem of children under 5 is acute respiratory infections (65% in last two weeks), 19% of active volunteers have not received any training in prevention and management of ARI. Moreover, the treatment most recommended by volunteers (cited by 67%) was steam inhalation, a practice now discouraged by the MOH. Of 36 home visits to children with acute respiratory infections, volunteers examined child in 7 cases and made recommendations about ARI prevention in only 5.

### Operations Research Studies

Deficiencies in supervisor and volunteer practices uncovered and/or documented by the systems analysis caused FSFB decisionmakers to seriously examine the gap between their "model" program and its actual performance. This led to expressed commitment to make changes in the program and backing of operations research to develop solution alternatives that overcome key problems and for ongoing evaluation of changes in volunteer performance.

Five operations research studies have been initiated by the FSFB as a result of the systems analysis findings. FSFB decided to develop a new supervision strategy and allocate more resources to supervision in order to provide more individual supervision to volunteers in areas of health education and promotion. The first OR study is developing and testing the new supervision scheme. Documentation of volunteers' overemphasis on administrative and curative tasks led to a second OR study to develop and test a planning mechanism which focuses volunteer tasks on prevention of most prevalent health problems. The third study seeks to improve the technical performance of volunteers in relation to food supplementation programs. Gaps in volunteer knowledge and practice in area of acute respiratory infections (ARI) led to a fourth OR study to design, implement, and evaluate a more effective training scheme in ARI with greater emphasis on training in communication and education skills, practice of new skills, competency assessment, and linkage with official health services. A fifth OR study will develop a new family health record and other forms for use by volunteers to generate information for planning, monitoring and evaluating their activities.

## HAITI SYSTEMS ANALYSIS SUMMARY

### Cooperating Agencies

In Haiti, PRICOR worked under the overall direction of the Ministry of Public Health and Population (MSPP) and focussed on MSPP-supported facilities. Relations with the central ministry were generally weak, however, due to political difficulties between Haiti and the United States, and were in the end terminated due to U.S. policy decisions. PRICOR staff were based at the Child Health Institute, a private organization, and took advantage of CHI's resources, both staff and personnel.

### Intervention Systems Analyzed

Analyses were conducted of service delivery activities for ORT, immunizations, malaria, and growth monitoring. Interesting and extensive data were collected on community organization, especially relating to voluntary health workers ("colaborateurs-volontaires"). Limited data were collected on other support systems as well.

### Field Methods

The Haiti analysis was initiated soon after the Zaire study and reflected a similar approach to indicator selection and instrument design.

Analyses were conducted at both the national ("macro") and peripheral ("micro") levels, the first focussing on plans, policies and procedures, the second on performance and impact. The macroanalysis used strategic interviews and existing reports, evaluations and data, and was guided by a general PRICOR protocol.

The microanalysis was guided by an early version of the PRICOR Thesaurus. Activity lists, though not fully developed at the time, proved invaluable in identifying the observations and interviews needed.

Data were collected through:

- interviews of health workers, caretakers of children, and community members;
- reviews of health facility records and reports; and
- observation of service delivery facilities and activities.

The 16 instruments developed for these data collection processes were largely based on those used in Zaire.

Prior to commencing the data collection stage of the systems analysis, a pre-test was carried out in Port au Prince to field test the data collection instruments and the logistics for the microanalysis.

The microanalysis was carried out in the Transverse and the Southern Regions. In each case, the systems analysis team met with the regional and district directors and selected the best district plus one other. The participants at this meeting were also asked to categorize health establishments in the selected districts into 3 groups: best, average and poor. In each district one health center and three dispensaries were chosen. In the best district the best health center was chosen and in the other district an average center was studied. In each district 3 dispensaries were selected; the best, an average and a poor. In the Southern region, it was possible only to complete the district of Cayes, considered to be the best district.

Field work commenced in early November 1987 after numerous delays due to administrative difficulties and political problems in the country. The data collection took 2 to 2 1/2 days per health facility and although it was originally anticipated that the field work would be concluded in 2 months, because of political unrest in the country it was not completed until the beginning of February, 1988.

### Major Findings

#### Oral Rehydration Therapy

Over 40% of the caretakers whose children had had diarrhea in the past 30 days either gave ORS directly or took their child to the health center for treatment. At the health facilities, over 50% of health workers had received ORT training and most knew the appropriate ORS treatment schedule. Health worker training appears to be associated with appropriate caretaker behavior. Over 80% of the caretakers identified health workers and health centers as the source of information on ORS preparation. Health centers were the major source of ORS packets and were generally well supplied.

At the facility level, nevertheless, it appears that categorization by weight and severity of cases is not being practiced. There appears to be a high rate of use of medications other than oral rehydration solutions to treat diarrhea amongst all levels of health workers. Health education does not appear to involve demonstration of ORS preparation at the health facility.

Despite a relatively high recognition rate (73%) for ORS packets, moreover, relatively few mothers (24%) were able to give the correct recipe for its preparation. Currently, clean water rather than boiled water is recommended for the

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preparation of ORS. Many mothers suggested that the water should be boiled and many of these said that the water needed to be reduced by a significant amount - often from the correct value of 1 liter to something much less. It would appear that mothers have probably received varying educational messages in the past few years and that the result is a relatively high frequency of possibly dangerous solutions.

### Immunizations

A very positive feature of the Haitian immunization program is that health workers appear to practice good sterile technique, as judging by 83 observed immunization encounters without a single error on this critical technical point. All but 6 nurses/auxiliaries mentioned numerous contraindications to vaccination apart from high fever - the sole contraindication set by MSPP - but observation of immunization encounters indicated that this incorrect knowledge may be rarely applied.

There are serious cold-chain problems within the program. In several facilities the refrigerators either were not functioning or experienced interruptions in electricity or propane. In those facilities with working fridges, only 3 or 4 had temperature logs and for 1/3 of the time during the previous month the temperature was above the safe range. Six of the 7 refrigerators had cold dogs, but in only 4 of these were they frozen.

Six of 12 observed facilities had breaks in supply of vaccines which had resulted in the cancellation of vaccination sessions during the previous year. The major difficulty was in obtaining supplies of BCG. Vaccination cards were unavailable or ran out during 2 of 8 observed immunization sessions. Also, the vaccination register was not completed in 2 sessions.

### Malaria

Except for 1 facility, there is no means of obtaining emergency stocks of chloroquine if the facility runs out. Fifty percent of interviewed mothers said that they had paid for malaria treatment even though care by Col-vols is supposed to be free.

### Growth Monitoring

Weighing occurs with children wearing varying quantities of clothing; in some cases they are fully clothed and wearing shoes. The weighing process becomes a production line with little interaction between parents and health workers. Minimal attention is paid to obviously ill or malnourished children. Their weights are recorded and graphed but understanding of the growth curve and its application to the

clinical situation seems limited. Road to health cards are often not available.

#### Operations Research Studies

Five studies were designed prior to completion of the systems analysis (based on an earlier PRICOR-supported management study). In the end, none of these studies was implemented due to the cutoff in American assistance to the Haitian Government.

## NIGER SYSTEMS ANALYSIS SUMMARY

### Cooperating Agencies

In Niger, PRICOR is assisting the Ministry of Health, Social Welfare and Women's Affairs to conduct an analysis of the national village health worker program. Results of this analysis and subsequent operations research will guide major program revisions expected during 1989.

Implementing units within the Ministry are the Direction des Etablissement des Soins and the Direction des Etudes and de Planification.

### Intervention Systems Analyzed

The focus of this study is on overall program management, especially with regard to three key primary health care interventions: ORT, malaria, and maternal health. Nutrition education and water and sanitation activities will be analyzed in lesser detail. Support systems of major concern include supervision, training, logistics, financial management, and information systems.

### Field Methods

This study is currently (October 1988) being designed and is scheduled for field implementation in January-February 1989. A two person Ministry team has been formed, consisting of one person each from the two involved units. A locally-based PRICOR consultant with wide field research experience in West Africa provides ongoing support, assisted by U.S.-based staff.

Data collection instruments are being drafted in both Niamey and Bethesda and will be partially translated into Hausa and Djerma as well as French. Innovative techniques for measuring the overall workload of village health teams will be developed and tested. Interviews will be conducted at the departmental, arrondissement, dispensary and village levels, while observations will focus on the two lowest levels.

It is planned to use two five-member teams. Three departments -Dosso, Maradi and Tahoua - will be studied. The teams will work alongside each other in each department, spending three weeks in each.

## PAKISTAN SYSTEMS ANALYSIS SUMMARY

### Cooperating Agencies

The Primary Health Care Project of the Federal Ministry of Health (Basic Health Services Cell) has sought the assistance of PRICOR in improving the operation of rural health services in Pakistan through a number of related operations research activities. One of these, undertaken at the request of and in collaboration with the Ministry of Health of Punjab Province, is a systems analysis of the activities of the Multi-Purpose Health Workers (MPHW), a cadre unique to Punjab, and of the Basic Health Units (BHUs) (in some cases Rural Health Centers or RHCs) to which they relate. Responsibility for the study is lodged within the Epidemiology Division of the provincial directorate, under the direction of Dr. Mohammed Rafique Ch., Deputy Director of Health Services (Epidemiology). Technical assistance may also be given to this project by the Pakistan Medical Research Council.

### Intervention Systems Analyzed

The cadre of staff now termed MPHWs was established in 1985 from three formerly single-purpose outreach workers: mobile vaccinators, malaria control workers, and dispensers, each of whom carried out specific activities and tasks in their respective areas of responsibility. In an effort to expand coverage in the rural areas, the decision was taken to retrain each of these single-purpose workers in the skills of the other two, plus new training in additional aspects of primary health care, and transform them all into multi-purpose workers. The authorities of the Punjab Ministry of Health have serious questions about how effectively this program is working at the rural community level. They want to know what activities are in fact being carried out in the field by these workers, how well, and whether there are gaps and/or duplication of effort, with a view toward a possible reallocation of tasks and responsibilities among the outreach workers and between them and the staff of the RHC/BHU.

Accordingly, although theoretically the MPHWs are responsible for all eight components of primary health care, the specific interventions to be analyzed will include those of highest priority: immunization, diarrhea, malaria, and health education, including nutrition and sanitation. In addition, note will be made of any other activities the MPHWs engage in during the observation period, but detailed analyses of these are not anticipated during the initial observation period. The supervisory activities of the RHC/BHU male Health Technician and/or Sanitary Inspector with respect to these workers will also be studied.

### Field Methods

The study will be carried out in three widely separated and ecologically distinct Districts of Punjab province: Sheikhpura, Sargoda, and Jhelum. In each District, an attempt will be made to examine and compare activities of MPHWs from functioning and non-functioning BHUs, as identified through a combination of expert opinion and available data on immunization coverage and/or other outcome measures. Data collection instruments will be developed in Pakistan by the PRICOR-Punjab Representative and staff of the Epidemiology Division, with assistance from the PRICOR/Bethesda Technical Monitor. Indicators will first be developed for relevant elements in the selected subsystems, using the PRICOR Thesaurus. Questions and specific items for the data collection instruments will then be developed for these indicators; reference will be made to sample instruments from other PRICOR systems analyses, where appropriate. Instruments will be translated into the appropriate local language, tested in the field, and modified as necessary.

Two teams of four-five observer/interviewers plus a supervisor are anticipated for each District; agreement in principle has been reached on training students from the Health Technicians Schools for these teams, each team observing workers in a District other than their home District, but details have yet to be finalized. There has also been discussion of involving social scientists from the Pakistan Medical Research Council in

training and supervising the teams, but this has not yet been decided. UNICEF has been planning an evaluation of the impact of these MPHWs; it is likely that the two studies will collaborate in certain activities. Again, details of such collaboration will be worked out during the next few weeks.

Recruitment for the PRICOR-Punjab Representative is continuing, with a decision expected at the visit to Pakistan of the PRICOR Technical Monitor in the last week of November. Planning and instrument development for the systems analysis are expected to continue during December and into January, with data collection now tentatively scheduled for late January-February. The goal is to be able to provide the provincial authorities with a preliminary analysis and tentative identification of operational problem areas in the MPHw program in March, 1989. Should the Pakistan Primary Health Care Project be extended through September 1989, it is anticipated that the PRICOR-Punjab project will then help the Ministry to carry out problem-solving studies to address some of the operational problems identified.

#### Major Findings

Not yet applicable

#### Operations Research Studies

Not yet applicable

## PHILIPPINES SYSTEMS ANALYSIS SUMMARY

### Cooperating Agencies

By agreement with the Secretary of Health, the country study is being carried out as a project of two Undersecretariat components of the Department of Health, the Undersecretariats for Public Health and for Management. The former deals with the substantive areas of primary health services in the country, while the latter deals with all aspects of management such as logistics, personnel, and information. While the relevance of the Undersecretariat for Public Health is obvious, the Secretary also felt that the PRICOR Project should be viewed as an opportunity to institutionalize the scientific management technologies of systems analysis and operations research in the DOH. Both Undersecretaries serve as counterparts to the PRICOR country study manager.

### Intervention Systems Analyzed

On the basis of recent evaluations, data available from the H/MIS, and field observations of the Undersecretary for Public Health, it was agreed that the focus of the systems analysis would be in acute respiratory infections (ARI), ORT, growth monitoring, and immunization. As these are major child survival interventions, USAID gave its concurrence.

### Field Methods

Data collection instruments (DCI) were developed using the version of the thesaurus that was available in February 1988; this is very similar to latest version of the thesaurus (May 1988). Initial draft DCI were prepared by PRICOR staff. These were then taken to the Philippines and modified at a workshop comprising staff of the central DOH, the Region, and the Province in which the systems analysis would take place. Modifications consisted mainly of some additional data desired by regional and DOH staff and rewording of some questions to be more culturally sensitive.

The systems analysis field team consisted of 7 BA level people, 4 of whom had degrees in nutrition, the others in various social sciences. Five had had some previous experience as field interviewers, but none as "observers". Training required 10 days, and comprised an initial orientation to the Philippine primary health care system, a review of the instruments item by item, and field experience with the instruments. Besides serving as training for the staff, the field experience also served as a final tune-up of the DCI concerning standardized language (in Tagalog), cultural appropriateness to the rural setting, and feasibility in the clinical settings encountered.

The systems analysis was carried out in one (of 79) province which had been selected because knowledgeable DOH staff deemed it reasonably representative in terms of available resources, quality and scope of services, and SES distribution of the population. It was also fairly accessible from Manila. The sampling unit was the Rural Health Unit (RHU), the second level up in the system from the periphery. Rather than attempt to develop a tight statistical sampling frame for the province, a more management-oriented approach was taken in which RHUs were ranked on the basis of existing performance data (service outputs and outcomes) and 6 at or near the top, 6 at or near the bottom, and 6 roughly in the middle of the rankings were selected. Those 18 RHUs and their satellite 80 Barangay Health Stations (BHS) comprised the sample. Although the Philippines does have community health workers, this cadre was not included because their activities are limited to non-care tasks in the BHS and the Secretary does not view them favorably.

Collection of data began in mid-May and concluded in early September. The last part of the data have just been entered into the dBaselll archive. The systems analysis cost approximately \$21,000, not including the time and travel expenses of the PRICOR country study monitor.

### Major Findings

As data entry is just concluding, no analysis has yet been done. However, on the basis of brief scans of raw forms, observational comments by the systems analysis team, and quick counts of available dBaselll files, it is anticipated that operational problems will be found in every one of the interventions and in some of the support areas. For example, many BHS staff do not understand the proper use of the growth card, inadequate explanations to mothers of anticipated side-effects of immunization (drop-out rates are known to be high), and there is a considerable discrepancy between what supervisors think their charges do in taking histories and physicals in ARI and what the workers are actually observed to do.

### Operations Research Studies

Systems analysis findings will be presented to PHC program managers and members of the DOH Research and Development Coordinating Unit at a workshop in January 1989. Operations research studies will specified and prioritized by that group. It is anticipated that the first group of OR studies will get under way shortly thereafter.

## **SENEGAL SYSTEMS ANALYSIS REPORT**

### **Cooperating Agencies**

This PRICOR study is based on an subagreement with the Ministry of Public Health in Senegal. Two units with the MOPH will be involved in the design and implementation of the systems analysis: Directorate of Research, Planning and Training (DRPF) and Directorate of Hygiene and Sanitary Protection (DHPS).

### **Intervention System Analyzed**

The objective of this project is to improve the cost-effectiveness of the system of PHC supervision presently used in the USAID-supported Rural Health Services II Project so that this system may be used as a model for PHC supervision nationwide. Both administrative and technical supervision will be examined; analysis of technical supervision will focus on two major child survival interventions, ORT and Malaria Treatment/Prevention.

### **Field Methods**

An initial set of data collection instruments (DCIs) were developed in Senegal by the Senegalese researchers and sent to the PRICOR staff for review. In addition the PRICOR staff developed a set of DCIs based on the Thesaurus (May 1988 version). The instruments developed by the Senegalese focus primarily on administrative supervision issues, while those developed by the PRICOR staff are directed to technical supervision issues.

Two PRICOR staff will travel to Senegal in early November to conduct a workshop on Systems Analysis, and continue working with the Senegalese research team on development and pretesting of the supervision data collection instruments.

Data collection will involve both direct observation of supervisory activities, as well as in-depth interviews with supervisors, trainers, supervisees, and other key informants in the PCH system. The project will be headed by a Principal Investigator and a Technical Research Associate. In each region, the Regional Medical Officer will be involved and Regional Research Coordinators will be appointed. These research leaders will all work together during the pre-test and will train their regional research teams.

The full systems analysis will take place in the two USAID-supported health regions of Kaolack and Fatick, and in three other regions Tambakounda, Ziguinchor, and Louga. In preparation for the systems analysis, the research team visited each of the 5 Project regions and, with the regional teams (Regional Medical Officers and Regional PHC Supervisors), selected the medical circumscriptions (CM) in each region will be studied. Three CMs were selected in each of the two USAID-supported regions, and two CM in each of the three other regions.

The pretest will take place in the region of Diourbel which borders the region of Kaolack and is not one of the 5 regions covered by the PRICOR Project. The pretest will be conducted during the TA visit (Nov-Dec 88), and the systems analysis is expected to begin February 89.

### **Major Findings**

There are no findings at this time. The pretest will take place December 1988, and the systems analysis will follow in February 1989.

## THAILAND SYSTEMS ANALYSIS SUMMARY

### Cooperating Agencies

In 1986, the Ministry of Public Health (MOPH) and USAID/Thailand requested technical assistance in conducting a management needs assessment. At the conclusion of the management needs assessment, MOPH asked PRICOR to provide assistance in research aimed at further analyzing specific needs and developing appropriate responses. PRICOR offered this assistance in the form a systems analysis. The Thai cooperating agency was the Office of Primary Health Care of MOPH: A special unit, the Management Improvement Unit (MIU), was set up in the Office of Primary Health Care to guide the systems analysis and subsequent operations research.

### Intervention Systems Analyzed

Subsequent to the management needs assesment, the analysis focused on the immunization, growth monitoring, oral rehydration, family planning, and water/sanitation service systems. These areas were mutually agreed upon by the central MOPH and the Provincial Medical Office of Srisaket Province, in which the systems analysis would take place.

### Field Methods

MOPH requested that the systems analysis in Thailand identify problems not only in direct service delivery at the periphery, but in support systems at higher levels in the system as well. Therefore, the systems analysis was conducted in two phases. The first was a "macro" (or contextual) analysis based largely on focused interviews with decisionmakers at the central and provincial levels. This was designed to identify organizational components and their relationships and interactions as these bear on the service delivery level. The second was a "micro" analysis designed to analyze service delivery operations, particularly the activities of the several different kinds of health workers. A literature review also was undertaken to document organizational problems reported in the recent past by various research groups in the country.

The macro analysis was done before the thesaurus was very well-developed. Moreover, the thesaurus focuses on the periphery of the system, while the macro analysis focused on higher levels. However, opportunity was taken to test portions of the thesaurus that were in early stages of development. This test led to greater emphasis on simplification of the thesaurus.

The macro analysis was carried out from April to June 1986. The micro systems analysis was carried out from June to November 1987.

### Major Findings

The macro analysis (management needs assessment) identified the following broad problems:

- A. The basic community-oriented concept of PHC is not really well-understood by many health workers and managers;
- B. Contrary to the stated policy of promoting PHC, planning is highly centralized.
- C. Training of workers and volunteers at the primary care level is poor, probably traceable in part to their own poor training as trainers.
- D. Supervision of health workers is weak.
- E. The village health volunteer program suffers from high attrition and may be fundamentally unsound.
- F. The HIS is cumbersome at the peripheral level, and the data are underused by managers and policymakers, possibly because they view it as unreliable.

The micro analysis indicated that:

- A. Most children do not receive their immunizations on schedule and that this is traceable to mothers' indifference to the schedule, which in turn derived from health worker's inadequate communication skills.
- B. Most mothers did not know benefit of ORT, which was traceable to the Village Health Volunteers' inadequate knowledge; many mothers accept diarrhea as "normal"; there were also problems in local supply of ORS.
- C. Only 20% of mothers obtained the prescribed four prenatal visits, 59% none or one; may be related to inadequate obstetrical skills of many midwives.
- D. Less than 50% of children are weighed effectively; only 11% of children had a growth card and only 30% of mothers knew how to interpret a growth card

#### Operations Research Studies

One major study (contracted to Mahidol University) on alternative approaches to the existing village health volunteer program has been completed. A large study is being carried out under the auspices of the Office of Primary Health Care Management Improvement Unit to investigate and test decentralization strategies using one province as a laboratory/pilot. Another OR study is under way to develop a streamlined, effective MIS in the same province; this study is integrated with the overall decentralization study.

## **ZAIRE SYSTEMS ANALYSIS SUMMARY**

### *Project Description*

The PRICOR project in Zaire is being carried out with the collaboration of the various agencies and institutions involved in planning or implementing PHC programs in Zaire and with buy-in financial support from SANRU/USAID. The project is being carried out in two parts: Part I is the analyses of the PHC system, identification of operational problems and elaboration of the OR agendas. This part was carried out with the collaboration of the School of Public Health (SPH); Part II is the execution of approximately 30 OR studies, 15 of which will be managed by the SPH.

### *Intervention Systems Analyzed*

Although PHC organization was analyzed in general, there was special emphasis placed on immunization, treatment of diarrhea (ORT), treatment of malaria and growth monitoring.

### *Field Methods*

Data collection instruments (DC) were developed using the version of the thesaurus that was available in February 1987. That version was based on pre-test work done in Haiti in December 1986. The thesaurus was modified substantially after the Zaire systems analysis. Initial draft DCI were prepared by PRICOR staff. These were then taken to Zaire and modified at a workshop comprising staff of PRICOR, the SANRU project, FONAMES and the EPI/CCCD project. Modifications consisted mainly of additional data desired by USAID/Kinshasa on community participation.

Two teams of 9 persons each were used to analyze PHC activities in health centers and their catchment areas in 4 rural health zones, each in 4 different regions of Zaire (Kinshasa, Bandundu, Equateur and Shaba). Each field team was composed of a supervisor, a deputy supervisor, 5 observers/interviewers, and 2 drivers. The supervisor was a PRICOR staff person, the deputy field supervisor was a Zairois with experience in field survey research and PHC. Three observer/interviewers were regional supervisors in either the EPI/CCCD or CEPLANUT programs; 2 interviewers were seconded from the field interview staff of the National Institute of Statistics. The supervisors had all participated in a 6-week pre-test in Zaire done 2 months prior to the systems analysis. The other observers/interviewers were trained in a 5-day training session which took place in each zone just prior to the systems analysis. The observers/interviewers were fluent in the local language prevalent in the zone where they worked. Training included field practice with the instruments and full discussion of each item.

Zaire is a very large country with 300 health zones, each of which may have from 25 to 50 health centers. These centers serve from 10-30 villages and a population of about 100,000. Resources did not permit, nor did the systems analysis objective require a representative national sample in collecting systems analysis data. Four regions were selected and a nominal group method was used to select the best zone from each region.

In each zone we selected 4 of the best health centers (HC) and one poorly functioning center, based on the assessment of the M<sup>ed</sup>ecin Chef de Zone. For household surveys we selected 4 villages. One village was the village in which the HC was located. A second was furthest away from the HC on the main road, a third was midway between the first and second on the main road, and the fourth was far away from the HC but not on a main road. In each village 9 households were randomly selected for interviews.

The data collection took place from mid-April to mid-June, 1987. Not including PRICOR staff and pre-test expenses, the cost was \$48,000.

### Major Findings

The systems analysis confirmed that the Zaire's SANRU project has made great progress in expanding child survival programs in the zones studied. Coverage of target groups with immunizations and growth monitoring is consistently high. There is also active community participation. Direct observations reveal that volunteers from local village health committees ensure that mothers attend growth monitoring and immunization sessions, as well as selected technical tasks.

The systems analysis also enabled researchers to identify areas requiring improvements. For example, most data sources indicated that health workers often did not adequately educate mothers regarding the key child survival tasks they should perform. Most mothers did not correctly perform basic home-based treatments. With the Malaria program, 35% of mothers gave chloroquine for children with fever, yet most gave ineffective doses. With ORT, though 90% of mothers knew about ORT, the great majority were not administering ORT correctly or effectively to their children with diarrhea. Since only a small percentage of children are brought to health centers for diarrhea management or malaria treatment, correct performance of PHC tasks by mothers at home is critical to program impact.

### Operations Research Studies

A workshop was held in September 1987 to review the findings of the systems analysis. About 100 representatives of various PHC agencies and donor groups helped select 34 priority problems. Negotiations were then undertaken with the School of Public Health, SANRU, Sante Pour Tous, CEPLANUT and EPI/CCCD to supervise a series of OR studies to solve these problems. Workshops were held in April and July 1988 to develop protocols of these studies and a third is planned for November 1988. Twenty-one studies are underway as of October 1988, covering 15 of the priority problem topics.

## PRICOR/ZAIRE LIST OF OR STUDIES

1. Inventory, Description and Rapid Evaluation of Type of Growth Monitoring Sessions in Zaire.
2. Z-88/01/3300: Description and Testing of Three Models of Growth Monitoring Sessions in the Rural Health Zone of Mangembo.
3. Z-88/02/3300: Improvement of Recording of Growth Data in Maternities and Health Centers by Health Workers.
4. Z-88/03/88: Development of an Effective Tool that Can be Used by Health Center Personnel to Routinely Monitor The KAP.
5. Z-88/04/3300: Factors Affecting the Utilization of PHC Services
6. Z-88/05/88: Recruitment and Motivation of CHWs and Health Committee Members
7. Z/SPH/01: Development of an Appropriate Message and Health Education Strategy to Train Mothers in ORT.
8. Z/SPH/02: Development of an Appropriate Message and Health Education Strategy to Train Mothers in ORT.
9. Z/SPH/03: Development of an Appropriate Message and Health Education Strategy to Teach Mothers the Correct Use of Chloroquine for Febrile Children.
10. Z/SPH/04: Development of an Appropriate Message and Health Education Strategy to Teach Mothers the Correct Use of Chloroquine for Febrile Children.
11. Z/SPH/05: Study of the Financial Needs and Sources of Income for Health Zone Central Offices.
12. Z/SPH/06: Study of the Financial Needs and Sources of Income for Health Zone Central Offices.
13. Z/SPH/07: Study of Factors Related to Utilization of Child Survival Services.
14. Z/SPH/08: Study of Factors Related to Utilization of Child Survival Services.
15. Z/SPH/09: Study of Factors Related to Utilization of Child Survival Services.
16. Z/SPH/10: Study of Factors Related to Utilization of Child Survival Services

17. Z/SPH/11: Analysis of the Problem of Mothers Who don't Give Home Chloroquine Treatment to their Febrile.
18. Z/SPH/12: Analysis of the Problem of Mothers Who don't Give Home Chloroquine Treatment to their Febrile.
19. Z/SPH/13: Study to Improve the Management of Acute Diarrhea Cases in Children in Health Centers.
20. Z/SPH/14: Development of a Method for Health Educators and Their Supervisors to Evaluate the Efficacy of Their Health Education Sessions in Health Centers.
21. Z/SPH/15: Study of the Discordance between Reported Vaccination for Immunizable Diseases.
22. Z/SPH/16: Study of the Causes of Low DTP and Polio Vaccination Completion Rates and How to Increase Them.

ANNEX 4

The PRISM Systems Analysis Model



# The PRISM Systems Analysis Model

*A Summary with Emphasis on the Framework of Analysis*

## INTRODUCTION

The PRISM Group has undertaken a country study in Peru to assess primary health care (PHC) programs under the terms of a subcontract to U.S.A.I.D. Cooperative Agreement #DPE-5920-A-00-5056-00: Primary Health Care Operations Research (PRICOR) Project. The *PRISM Cono Sur PRICOR Project* is being done in collaboration with the Peru Ministry of Health and focuses on PHC service delivery in 14 health centers located in the southern peri-urban fringe (the "Cono Sur") of Lima, Peru.

One of the terms of the subcontract called for PRISM to produce, if it chose, an alternative to the existing PRICOR approach to systems analysis. We have exercised this option and have developed the PRISM Systems Analysis Model, or PRISM SAM, which is summarized below. We have given particular emphasis to the framework of analysis since this is where the PRISM SAM and the existing PRICOR approach differ most.

## BACKGROUND

We try to view "PHC systems analysis" from the perspective of the health systems manager as well as that of the scientist. The following definition is intended to capture this concern for both sound theory and practical utility:

***PHC systems analysis is:***

- 1) ***the systematic and selective measurement of structure, process and outcome indicators encompassing the performance of primary health care service organisations;***  
***evaluated within***
- 2) ***an analytical framework which specifies relevant and testable relationships between the three classes of indicators;***  
***and directed toward***
- 3) ***the identification of effective actions that can be taken by operations management to correct deficiencies or otherwise improve individual or organisation performance.***

The three classes of indicators referred to in the first paragraph of this definition were first distinguished with precision by Donabedian.<sup>1</sup> **Structural indicators** are those organizational attributes which determine an organization's potential or capacity for effective work (e.g., proportion of registered nurses, average educational level of health auxiliaries).

**Process indicators** have dimensions of quality and quantity and relate to members' activities in carrying on their work. Process indicators apply both to direct services such as care and patient education and to support services such as supervision, logistics, etc.

**Outcome indicators** refer to the status of the objects on whom the work is performed. Changes in characteristics that can be attributed to the work performed upon them can be interpreted as impact. The most common examples of outcome indicators are morbidity and mortality.

The steps required for implementing such a systems analysis are: 1) develop an analytical framework; 2) construct a set of measurement instruments; and 3) define and put into action a process for implementation. These steps are summarized in more detail in the following sections.

Many of the ideas and approaches that have gone into creating the current PRISM SAM have been developed and proven by others. We have gleaned much of this material from the U.S. domestic literature on management, organization theory and behavior, information systems and cybernetics, education, and psychometrics. The writings of Donabedian on quality assessment, which we referenced earlier, plus those of Van de Ven and Feary on organization assessment, and Shortell on health care management have been particularly noteworthy as sources of much of what has been incorporated into the theoretical framework of the current SAM.

## **DIFFERENCES BETWEEN THE PRISM SAM AND THE EXISTING PRICOR APPROACH**

Though some theoretical aspects of the PRISM SAM remain sketchy and many analytical components remain to be operationalized and tested, it is already clear from our experience that the model is both sound and powerful. It shares with the existing PRICOR approach a special emphasis on process indicators in the measurement of performance. In a number of important respects, however, it represents a significant departure from the existing model:

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<sup>1</sup> Donabedian, A. Evaluating the quality of medical care. *Milbank Memorial Fund Quarterly*. 44(2): 166-206. 1966.

- a. **The SAM has, at its core, a comprehensive model of the Health Center as a complete operating system (Figure 1, described in more detail below). This system model comprises six distinct modules, three of which are concerned with structure, two with process and one with outcome. The model describes relationships between these six modules and creates a rigorous framework for analysis.**

*The existing PRICOR approach embodies a defined process model (i.e., how to carry out an evaluation), but no system model beyond the undifferentiated Input/Process/Output model of General Systems Theory.*

- b. **The SAM is designed from the point of view of the Health Center Director: primarily to meet his or her needs at the health center level for routine performance information linked to activities and infrastructure that are under his or her control.**

*The existing PRICOR approach is unclear as to its primary constituency but appears to take a perspective similar to that of a member of an ad hoc evaluation team. The measures used are aimed at a variety of different levels of analysis (i.e., the health center, the supra-organization, and the community) without being clearly differentiated in this regard.*

- c. **The development of analytical instruments flows directly from the comprehensive systems model and the perspective just mentioned. This process has five main steps:**

- 1) **Each of the six modules in the system model of Figure 1 is described by a limited set of concepts. For example, the Support Service Structure, which is Module II, is described by 15 concepts having to do with job design (e.g., task difficulty) and job incumbent characteristics (e.g., expertise).**

**Ideally, each of these concepts will possess a unique meaning in the set and this meaning will be consistent when the concept is applied to different PHC programs or to the same program in different countries.**

- 2) **Each concept is operationalized by defining an indicator and establishing the rules for its use and interpretation. Examples of indicators range from a single-item evaluation (e.g., on the socioemotive behavior scale "uninvolved/ bored to interested/concerned") to a score for the performance of a complex task tested by a simulation exercise (e.g. ability to diagnosis dehydration status during a role-playing exercise).**

**Nevertheless, each indicator is assumed to be measuring a unique dimension. Whenever possible, indicators are adapted from successful, published methodologies.**

- 3) **The specific manner in which each dimension is measured is chosen to meet local conditions. This step includes the designation of which items are to be used to measure a dimension, how they are to be presented (e.g., the phrasing of a question), and from whom the data is to be collected.**

**In the Cono Sur analysis, items are chosen in close collaboration with the local PHC-providers in the Cono Sur. For performance dimensions, international and national norms of good performance in specific program areas are interpreted for the local reality by working groups of physicians, nurses, nurse-midwives, and health auxiliaries operating under the guidance of PRICOR Project staff. This is a highly interactive process with many iterations.**

**The Project staff's function is to ensure that the integrity of the system model and its concepts are maintained during this process, that significant deviations from the norms are limited to cases of absolute necessity, and that all accepted items are clearly defined with respect to their role as measures and unambiguous in their presentation.**

- 4) **Instruments are prepared and pilot tested in health centers other than those involved in the primary systems analysis.**
- 5) **The reliability and validity of indicators is evaluated using accepted psychometric techniques. Modifications are brought back to the working groups for their concurrence at all stages of the evaluation and final writing of the instruments.**

*In contrast to the process described in Steps 1 through 5, the large set of items used in the existing PRICOR approach (and compiled in the PRICOR Thesaurus) were produced by groups of international experts working without an explicit system model. The content validity of proposed items was usually the only theoretical criterion for their acceptance and items were expressed in terms that were deliberately kept as general as possible.*

*The items found in the PRICOR Thesaurus are conceptually isolated from one another and can only be treated as independent measures. In their current state, they cannot properly be aggregated or collapsed to generate valid indicators of the concepts usually used in discussing PHC. As a result, the product of early PRICOR country studies has been a large body of data that has been difficult to digest and summarize effectively. The early analyses have been limited to item-specific error rates and cross-tabulations that do not produce many of the hoped-for insights into the process of health care delivery. Once the tabulations are completed, there is no conceptual basis on which to proceed with an examination of possible relationships between process and outcome.*

- d. **The SAM process model assumes the participation of one or more working groups from the system under study in all phases of SAM implementation. These groups determine the goals of the analysis and the criteria to be used and actions to be taken to resolve problems should they be identified.**

**The process model is heavily committed to the rapid feedback of summary information to these working groups in order that they might advise on subsequent iterations of the systems analysis. As a**

result, many problems will be resolved during systems analysis and will not require dedicated operations research projects as a follow-up. The SAM is ultimately intended to become a routine part of the PMOH management/health information system.

*The existing PRICOR process model is closer to a traditional ad hoc evaluation team approach in which a single cycle of systems analysis is carried out. The results are then used to pinpoint aspects of service delivery needing attention, which are subsequently addressed by individual operations research projects. Client working groups, feedback loops, and structural supports for routine implementation of systems analysis are not explicitly a part of the existing PRICOR approach.*

## **THE ASSESSMENT OF PRIMARY HEALTH CARE SERVICE DELIVERY: Needs and Goals**

It is an error to believe that, since the content of PHC comprises "simple" activities, the system for delivering PHC must also be relatively simple in its basic nature. From a management perspective, nothing could be farther from the truth. Peripheral service systems that deliver PHC are highly decentralized, variable, and incentive- and resource-limited; they are anything but simple.

Rapid and superficial evaluation schemes based on output and outcome indicators are often advocated in the assessment of PHC services. The argument given is usually that of limited financial, logistic, or human resources.

Such evaluations tell us whether a program is meeting its goals or not but they reveal nothing about how a system is actually functioning or where the problems might be. For this, the importance of assessing structure and process as well as outcome must be recognized in evaluating a health care organization.

There is also a need to develop methods that adequately measure performance among systems that vary widely in their programs, resources, or environment. As a start, this calls for standardized, replicable analytical instruments that have undergone rigorous testing. The development of such instruments is a sophisticated process but the ultimate products must be relatively simple to use.

The final "kits" for system analysis should consist of proven indicators and instruments, clear step-by-step application protocols, and efficient heuristics for determining what approach to take as the analysis proceeds and problems are encountered. With such kits, a system's local operations managers would have the tools necessary to monitor the performance of their own units, identify problems, and remedy many of them without having to call on outside expert assistance. At the same time, expert evaluation teams from higher levels in the same system could use the same or more sophisticated kits to augment and monitor these management efforts.

## **SAM FRAMEWORK OF ANALYSIS**

### **LEVEL OF ANALYSIS AND CONSTITUENCY**

The level of analysis employed in the PRISM SAM is the health center, the lowest level in the PMOH system that provides integrated PHC services as an independently functioning operational unit. In general, the health center is directed by a physician and has a number of ancillary health posts (staffed by health auxiliaries) that are managed and supervised from the health center.

Even though the health center is the focus, the SAM must take into account certain relationships between the health center and its supra-organization and between the health center and the community it serves. Flow of resources to the health center and the geographical location of physical facilities are obvious examples of such relationships.

We have chosen the health center directors as the primary constituency for the PRISM SAM. Other, higher-level, managers in the PMOH system could have been chosen (they will still benefit from the information produced in any case) but keeping our perspective on the health center director's needs and desires seems most in keeping with the operations-level focus of the original PRICOR scope of work.

Effective management at the health center level is, by far, the most important determinant in successful service delivery. Furthermore, systems analysis aimed primarily at this level can be "aggregated" with relative ease to serve the needs of higher level management as well. By concentrating most of its attention on the process of service delivery, the PRISM SAM aims to provide a set of useful tools to health system managers to use in their efforts to promote better health care.

### **THE DOMAIN OF ANALYSIS AND OPERATIONAL MODEL**

As Figure 1 illustrates, the focal point of the PRISM SAM is the set of activities associated with service delivery, both Support Service Activities (Module IV) and Direct Service Activities (Module V). Support Services comprises three elements: supervision, logistics, and information system/training. Direct Services comprises two elements: care-giving and promotion/education. All **process indicators** in the PRISM SAM are contained in these two modules.

An example of a set of process indicators is that used to describe Care-giving, one of the two elements in the Direct Services module:

#### ***CONTENT KNOWLEDGE***

#### ***CLINICAL ASSESSMENT***

***Physical examination***  
***History-taking***  
***Paraclinical services***

**DIAGNOSIS**

*Theoretical reasoning ability*  
*Practical proficiency*

**TREATMENT**

*Choice*  
*Technique*

**SOCIOEMOTIVE BEHAVIOR**

*Uninvolved/Bored - Interested/Concerned*  
*Angry/Irritated - Friendly/Warm*  
*Anxious/Nervous - Calm/Relaxed*  
*Arrogant/Belittling - Egalitarian/Respectful*

**FOLLOWUP**

**MAINTENANCE OF MATERIEL**

**PREPAREDNESS**

**RECORD-KEEPING**

**COVERAGE**

*Percent of persons needing care who received it*  
*Number of persons treated*

All but the last of the indicators on the list are measures of quality. Coverage, the final indicator, is a measure of the quantity of service provided. In casual thinking about health service delivery, coverage is sometimes mistakenly treated as an outcome, perhaps because it is often measured by community survey along with true outcomes such as morbidity. Nevertheless, coverage is a measure of the quantity of service output or work done and is, therefore, a process indicator.

The specific items employed to measure each of these dimensions are specific to the PHC program under study (e.g., immunizations, control of diarrhea, growth monitoring). For example, the three dimensions which comprise "Clinical Assessment" (under Care-giving) for the Diarrhea Control Program are measured by the items listed below:

**History**

***Successfully obtained information about -***

*past diarrhea*  
*vomiting*  
*urination*  
*thirst*  
*blood or mucus in stool*  
*duration of diarrhea*

(each item a scale from 0-not done, 1-done but so poorly as to be useless, 2-done without glaring error but without getting correct data, to 3-done correctly)

**Physical exam**

***Correctly determined the state of -***

*general physical state*  
*eyes*  
*mouth and tongue*

*respiration  
skin turgor  
pulse  
fontanelle  
weight loss due to dehydration  
nutritional state  
temperature*

(each item a scale from 0 to 3; same scale as for History)

### **Paraclinical services**

#### ***Not relevant for the diarrhea program in a health center context***

These items are all given local operational definitions so they can be used as measures in the analytical instruments being developed. An example of such an operational definition would be expressing "past diarrhea" as the number of stools passed in the past 24 hours irrespective of their physical state (the norms of another country's health system may define diarrhea in terms of the excretion of liquid stool, for example). These definitions are included in the training package given to each of the raters or observers using the instrument.

Referring to the two dimensions and their measures just listed, it is obvious that error rates for individual items may be calculated, but that it is also possible to score indicators and use these scores in a variety of ways to give an in-depth picture of performance in these dimensions.

Individual health workers can, for example, be scored on how well they got a history or did a physical examination. Their performance can be compared to other workers in the same health center. Average health center performance can be compared to that of other health centers and scores can continue to be aggregated and compared at even higher levels in the health system.

Scores for a given set of process indicators can also be correlated with scores for other indicators to look for significant relationships. This is an important power of the SAM: to be able to look for factors that appear to be closely associated with noteworthy performance, either good or bad. For health center managers, such relationships would generally focus on process indicators while higher-level management in the PMOH would more likely focus on outcomes. At either level, once significant associations are identified, they can be profitably used in managing for improved performance. The same indicators can then be used to monitor performance changes in response to this effort.

The **structural indicators**, or organizational attributes, in Fig. 1 are divided among three modules: I - Organizational Functional Structure, II - Support Service Structure, and III - Direct Service Structure. Module I contains all general indicators of a unit's structural character (e.g., distribution of unit authority, number of job titles in unit). It also includes indicators of intra-unit and inter-unit relationships (e.g., intraunit communication, inter-unit resource dependence). Inter-unit relationships consider the health center as the focus in its dealing with either the supra-organization or the community.

Support or Direct Services Structure (Modules II and III) contain indicators that relate to the job design or job incumbent characteristics of the work positions

and personnel assigned to either support or direct services. The elements in these structural modules parallel those in the Activities Modules (IV and V): supervision, logistics and information systems/training elements in Support Service Structure and care-giving and promotion/education elements in the Direct Service Structure.

The same set of indicators is used to describe each of the five elements in the two modules. There are 15 dimensions overall. Examples of some of them are: job specialization, job standardization, job pressure, task difficulty, age of and job incumbent.

The **outcome indicators** contained in Module VI include only those characteristics in the population served that can be thought of as related to the direct service activities under study. Outcomes in the PRISM SAM refer strictly to what are traditionally called "impacts" (Simple coverage measures are treated above as process indicators, i.e., quantity of work done).

The arrows connecting modules in Figure 1, and their directions, indicate the **potential relationships** being hypothesized in the domain of analysis. The intention in establishing these hypotheses is to create a basis for testing associations once data is available.

In selecting items to measure the dimensions discussed above, the SAM, much like the existing PRICOR approach, starts with items that have significant content-validity based on international and local consensus criteria. The model proceeds from there, however, to create a context in which to establish the predictive validity of key indicators in the structural and process modules.

Establishing predictive validity must be done within the framework of relationships established by the theoretical model. We do not exclude the possibility of accepting empirical generalizations based on statistical associations that cannot be successfully explained by our existing theoretical model. In establishing predictive validity, process measures can function both as independent variables (to outcome indicators as dependent variables) and as dependent variables (to structural or other process indicators as independent variables).

## **METHODOLOGY OF INSTRUMENT CONSTRUCTION**

The methodology we use for constructing and applying the actual analytical instruments based on the SAM is relatively traditional and needs little explanation. A set of instruments is required for each of the specific programs included in the systems analysis. The basic structure of the instruments and their indicators is maintained for each program, but specific items employed and the operational definition of the indicators will obviously be program-dependent. The instruments mainly employed are given in the following list:

### **QUESTIONNAIRES**

*General structural (unit design, inter-unit relationships)  
Job design (for support and direct service personnel)*

**EXAMINATION OF CONTENT KNOWLEDGE AND THEORETICAL REASONING**

*Supervisory*

*Care-giving*

**SIMULATION EXERCISES (ROLE-PLAYING)**

*Supervision*

*Training*

*Care-giving*

*Promotion/Education*

**RECORD REVIEW AND INTERVIEW WORKSHEET**

*Supervision*

*Logistics Services*

*Info.Sys./Training*

*Care-giving*

*Promotion/Education*

**ACTUAL SITUATION CHECKLIST**

*Care-giving*

*Promotion/Education*

**PATIENT EXIT INTERVIEW**

**COMMUNITY MEMBER INTERVIEW**

The major innovation we have introduced in methodology is an attempt to get around the limitations imposed by observations of actual patient encounters by using a battery of instruments whose validity, individually, is less open to question. This is in contrast to the existing PRICOR approach which places heavy emphasis on the use of observation of actual encounter sessions as the source of data for performance evaluation.

While actual encounter observation has undeniable strengths, it has serious disadvantages in that: 1) observations are made in an uncontrolled and non-standard situation so comparisons between workers are difficult; 2) observing many types of encounters depends on waiting (perhaps long periods) for unscheduled clinic visits; 3) it is often impossible to collect "negative" observations of the health worker (e.g., that he/she notes that the child does not have a rash or a cough or a broken arm); and 4) procedural reactivity (the effect of the observation process on subject behavior) undercuts, to an unknown extent, the assumption that typical performance is being observed.

Our approach has been to employ simulation exercises, or role-playing, with standardized vignettes to test the performance of health service delivery personnel in basic care-giving and educational activities. The evaluation is done within a non-threatening context in which the exercise is treated as the first stage of a personalized in-service training session. It is made clear to the subject that he or she is being asked to perform as well as possible so that the observer/trainer can see what the person's real strengths and/or weaknesses are in the topic activity. Such simulation exercises carried out in this way avoid most, if not all, of the theoretical and practical weaknesses of direct encounter observation.

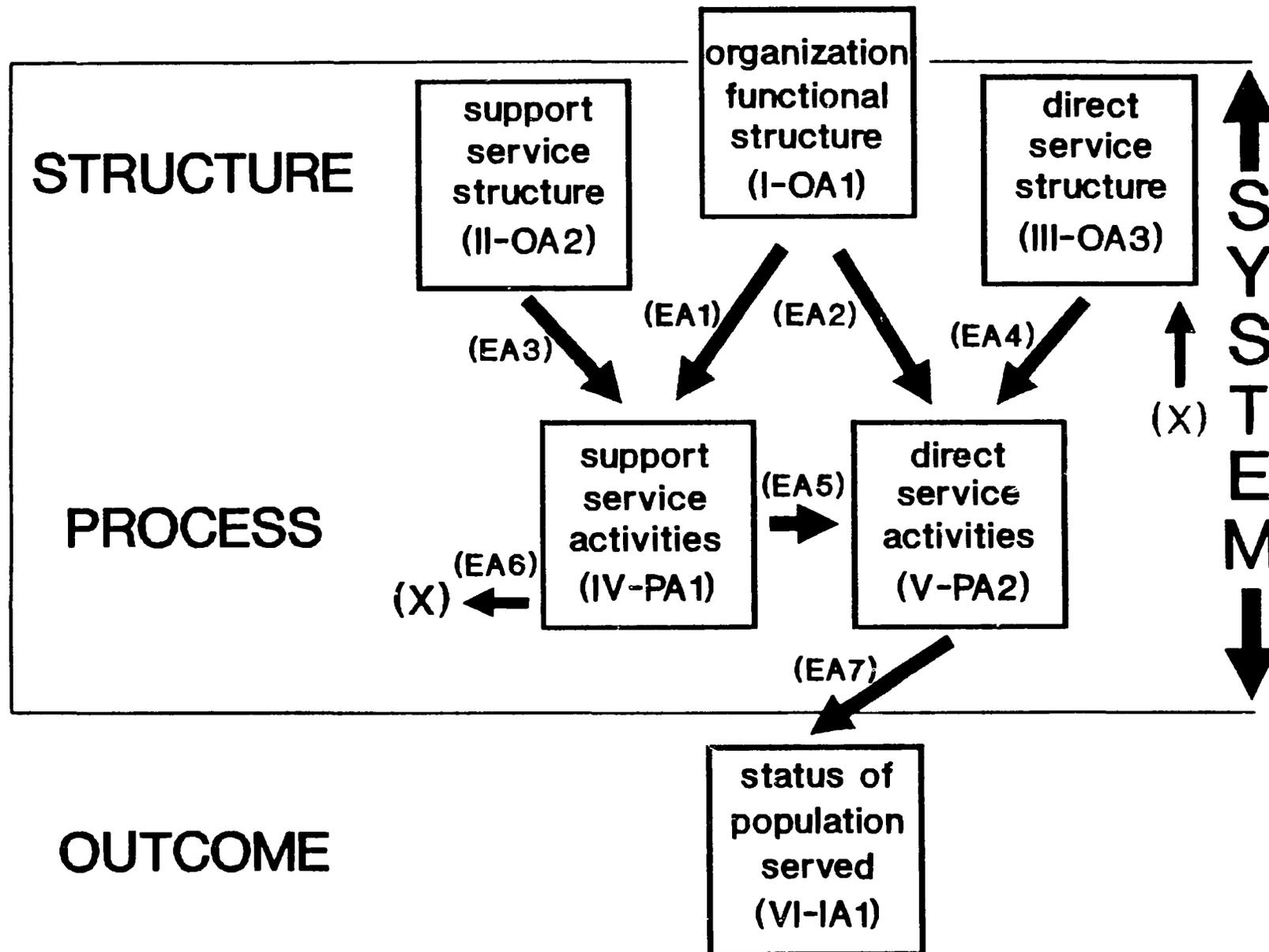
The data obtained from simulation exercises clearly represents maximal as opposed to typical performance. Two points are important, however. The first is that inadequate maximal performance (a fairly common result in our testing so far) can be taken as an excellent indicator of inadequate typical performance. This has been confirmed both by direct encounter observations and by interviews with the supervisors of these individuals. Workers who routinely fail

to do something right in their day-to-day activity are unlikely to be able to change when challenged by the reasonably fast-paced simulation exercise we have designed.

The second point is that maximal performance data is not interpreted in isolation. The complete battery of instruments for individual performance appraisal includes the simulation exercise, a verbal examination of content knowledge and theoretical reasoning ability, a record review and interview session with the worker, and the "actual situation checklist".

This last innovation is based on the principle of critical incidents monitoring. The checklist contains items that can be observed quickly and unambiguously during a short, surprise visit to the health center or health post. Each item selected also is considered as a useful measure of whether or not the health worker is able to give adequate service. Of the indicators listed on Page 6 for Care-giving, for example, "Maintenance of Materiel" and "Preparedness" are measured using an Actual Situation Checklist which would include items such as availability of necessary drugs, instruments, etc. and the state in which they were found.

Our approach to individual performance evaluation assumes that any significant failure in typical performance will show up in at least one of the measures used in the battery of instruments we employ. We believe, in fact, that the battery approach will prove far more sensitive, since many more observations can be made with the same commitment of resources.



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# BASIC MATRIX FOR FRAMEWORK OF ANALYSIS

SYSTEM ELEMENTS	ANALYTICAL GROUPINGS IN INDICATOR CLASS:					
	STRUCTURE	PROCESS			OUTCOME	
	Org.Attrib.	IMaxPerf	IActPerf	UnitPerf	IndivLink	UnitLink
<b>Functional Elements (FE)</b>						
HEALTH CENTER	(I - OA1) <b>A1(a,b)*</b>	B1	C1	D1	E1	F1
SUPER-ORGANIZAT.	<b>A2(c)*</b>	B2	C2	D2	E2	F2
COMMUNITY	<b>A3(c)*</b>	B3	C3	D3	E3	F3
<b>Program Elements (PE)</b>						
<b>Support Service (SS)</b>						
SUPERVISION	(II - OA2) <b>A4(d)</b>	(IV - PA1) <b>B4      C4      D4**</b>			E4	F4**
LOGISTICS	<b>A5(d)</b>	B5	C5	<b>D5</b>	E5	F5
INFO.SYS./TRAINING	<b>A6(d)</b>	B6	C6	<b>D6</b>	E6	F6
<b>Direct Service (DS)</b>						
CARE	(III - OA3) <b>A7(d)</b>	(V - PA2) <b>B7      C7      D7**</b>			(VI - IA1) <b>E7      F7**</b>	
PROMOTION/EDUC.	<b>A8(d)</b>	<b>B8</b>	<b>C8</b>	<b>D8**</b>	<b>E8</b>	<b>F8**</b>

**Headings:**

Org. Attrib. -

Organizational Attributes:

- (a) Macroorganizational Design
- (b) Unit Design
- (c) Inter-Unit Relations
- (d) Job Design

IMaxPerf -  
IActPerf -  
UnitPerf -

Individual Maximum Performance  
Individual Actual Performance  
Unit Performance

IndivLink -  
UnitLink -

Linked to Performance of an Individual  
Linked to Unit Performance

**Other:**

Boxes represent Modules defined in Figure 1 - Domain of Analysis. The figure in parenthesis above each box gives the Module number in Roman numerals and the type of instruments employed in the evaluation of each: OAI - Organization Assessment; PAI - Performance Assessment; and IAI - Impact Assessment.

**Redlined Groupings**

Pseudo-Groupings: indicators taken from other analytical groupings

\*

FE Indicators in Module I may be derived by aggregating PE Indicators in Modules II and III

\*\*

Unit Indicators may be derived by aggregating Individual Indicators within the same Module and Element

Small Print

Analytical Grouping is not relevant to current framework of analysis

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ANNEX 5

Bibliography

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