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**A STUDY OF COSTS AND COVERAGE
OF LOW-COST "INTEGRATED" HEALTH SERVICES**

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I. OBJECTIVES

In recent years there has been a growing realization that the expansion of modern health services to the bulk of the population in developing countries probably could not take place through the replication of the physician and hospital-based system which serves much of the urban population. This has been reflected in the health plans of many countries which have announced decisions to move toward extending care to the rural masses based largely on medical auxiliary services by community-based and supported workers. This concept, usually termed primary or integrated low-cost health care, has definitions and specifications which vary from country to country, and there is perhaps even more variation in implementation.

While there is general agreement that replication of high technology personal health care systems is impractical or inappropriate or too expensive for mass coverage in low-income countries, there remain the issues of what should be done. One dispute is between proponents of a comprehensive approach to primary care and those who suggest that such an approach is too expensive and difficult at this time but that categorical disease control programs, such as tuberculosis or schistosomiasis or malaria control, could be handled with known technology at low cost and would have a considerable impact on disability and mortality.

Thus, part of the argument over emphasis in health policy of developing countries has hinged on the estimation of future costs of bringing more people into health service coverage. While there have been many projects labeled low-cost integrative health services, little analysis has gone into measuring their costs relative to their effective coverage of the population. Experimental studies have been conducted to determine what the health effects might be of varying interventions in medical care, nutrition, and family planning, but these were not designed to test the relationships between extending coverage and cost consequences. A study of a number of these experimental interventions is reported in Davidson Gwatkin et al., Can Interventions Make a Difference? The Policy Implications of Field Experiment Experience, A Report to the World Bank, Overseas Development Council, March 1979.

The Office of Health of USAID sought, in the preparation of budgets to support health activities overseas, to establish through a quick and rough survey of existing projects and programs what the relationships have been between costs and coverage. It was recognized that projects varied with respect to how they were organized, the kinds of targets, the scale, scope and mix of services, and the types of information recorded. It was hoped that, while the projects and programs were not comparable, a rough understanding of the costs and coverage experience might answer the question of whether it has been possible to deliver some forms of modern primary health care to populations at costs which might be considered "affordable" costs by low-income countries.

The American Public Health Association was asked to assist in data collection and analysis, with the understanding that only existing information could be used, and that brief surveys in the field or from research projects

could be made. In a real sense, the study was to be exploratory, and it was understood that a significant result might be a firmer understanding of the difficulties of cost and coverage measurement together with recommendations for how to go about securing better information.

This report begins with a general description of the approaches used and the findings. Table 1 presents a summary of cost and coverage estimates, and in Section VII is noted the bases for their derivation. Appendices B through H contain the notes of the analysts for each of the programs and projects studied.

While estimates have been made, there are substantial difficulties in comparability among these, both with regard to costs and to the services provided and received. There was no uniformity of definition in project records of the meanings of costs and coverage. Records varied with respect to whether items of cost, such as training, were included at all. Analysts who developed information in the field or from university or corporate records were in agreement (see Appendix A) as to what information was sought, and effort has been made to come as close as possible to these objectives. But using data which was collected with other purposes in mind meant that at best we have rough approximations whose comparability, certainty and completeness leave much to be desired.

Believing that insight into cost and resource requirements of primary care and other health activities is a vital input into health sector policy formulation and program design, we suggest that research in this direction be undertaken as a continuing and well-structured responsibility, rather than inferences from project accounts. In Section VI we have indicated some of the ingredients of such an activity.

II. SAMPLE SELECTION AND DATA COLLECTION METHODOLOGY

As originally conceived, small teams were to visit about ten country projects. The study was planned to begin with one or two visits as pretests to determine the feasibility of quick (one-two week) acquisition of relevant data, to identify and perhaps solve conceptual and measurement problems, and to assure as much comparability as possible among the country studies.

For various reasons, the arrangements that were possible to make with AID Country Missions limited the visit schedule to only three countries. It was possible to utilize data provided by universities which had conducted experiments or demonstrations in primary care systems and by Management Sciences for Health, Inc., which had designed training programs and a village drug distribution system in Afghanistan. This brought to seven the total number of projects analyzed.

The selection of projects and programs, then, was based on accessibility of information within a time constraint and is not a representative sample. University projects did not set about to test methods of large scale expansion of health services coverage by governments and communities, and thus did not examine many critical management, logistic, and training questions which would confront programs aimed at substantial coverage expansion.

The project sites visited were the Montero District in Bolivia, the rural health centers and dispensaries of Tanzania, and communities served by local health workers in the Dominican Republic. Data on Afghanistan were made available by Management Sciences for Health, on the Narangwal project in India by Johns Hopkins University, on PRIMOPS in Colombia by Tulane University, and on the Danfa project in Ghana by the University of California, Los Angeles.

The International Development Research Centre of Canada made available reports on primary care services in Kavar, Iran^{1/} and the "simplified" services of Venezuela.^{2/} The material in these reports, however, was not sufficient to permit estimates of costs and coverage of reasonable enough completeness for inclusion in this study.

^{1/} S. Mohammad Taghi Ayatollahi, "Cost-Effectiveness Analysis of Kavar Auxiliary Village Health Workers' Project, Iran, "Master's thesis in Biostatistics, Pahlavi University, Shiraz, Iran, July 1978.

^{2/} "Research on Simplified Medicine in Venezuela," study carried out by the School of Public Health of the University of Venezuela with the collaboration of the Ministry of Health and Social Welfare, and partially funded by the International Development Research Centre, Canada; Caracas, Venezuela, 1973-75.

Data on Korean health delivery experiments were also studied ^{3/}, and discussions were held in Ann Arbor with a staff member of the Korean Development Institute responsible for evaluation of the experiments. Again, the material was too incomplete for inclusion in the current review.

The analysts who gathered the information and performed the analysis under APHA guidance include faculty and staff of the Department of Health Planning and Administration of the School of Public Health of The University of Michigan, and Robert Robertson of the Department of Economics of Mount Holyoke College.

The projects and programs reviewed varied markedly. The University projects were small, ranging in population coverage from about 5,000 to 25,000. The PRIMOPS Project in Colombia was addressed only to women and children, and was sited in a section of a large city which already had health centers and hospitals used by the target population. Project activities in the Dominican Republic were also aimed primarily at women and children, but those in rural areas who had extremely limited access to other types of health services. The other projects were rural and generally targeted on the general population.

The project in Bolivia was aimed at a district with a rural population of about 120,000, but had arranged for services to communities whose combined population was less than 11,000. It suffered from a logistic failure in supplying drugs which may account for its difficulties and might make projections based upon its past results unreasonable. In Tanzania, we examined a rural health program which covered almost all of the country, while for Afghanistan we are looking at a program which was large and growing but has accomplished only the beginnings of what was projected to be a national program of rural health services.

In the Latin American projects, home visits were emphasized. In the others, patients sought services at fixed facilities. Services offered varied from outpatient medical care to digging latrines and organizing health committees. In Afghanistan, extension of geographic coverage was sought by supplying training and kits or drug inventories to health workers who became private practitioners, while in other projects workers were part of civil service structure.

The availability and structure of records and reports varied among projects and even within projects, as there were sometimes multiple sources of funding. There has been little time or capacity to check the validity of the data. Where possible, data were tested for internal consistency. The estimates

^{3/} Joint AID/ROK Mid-Term Review of the Korea Health Demonstration Project (AID Loan No. 489-U-092), Korea Health Development Institute, Seoul, Korea July 20-28, 1978; Consultant Contractor: The American Public Health Association, Washington, D.C.

Ha Cheong Yeon, "The First-Round Evaluation of the Health Demonstration Project," Health Loan Project No. 489-U-092 (U.S. Agency for International Development), National Health Secretariat, KDI, Working Paper 7905, August 1979.

presented in this study were derived from analysis of the reports of others, who used varying concepts and methods of accounting and budgeting and of recording services performed. The quantitative measures presented are a resultant of the concepts employed, the data available, and the differing ways in which selected services have been provided. During data gathering the measures displayed in Appendix A were used whenever possible.

III. CONCEPTS AND MEASUREMENT OF COVERAGE

In estimating the numbers in the population covered, we focused on accessibility, the number of people who could reach and use the services. This is a geographic or locational approach. Where trained health workers were positioned in small villages, we assumed that the population of these villages were covered. Where health centers had responsibility for a number of rural villages, or rural residents who did not live in organized communities, rough estimates of population density and distances from the health centers were made. From those who lived within a few kilometers, it was assumed that they all had access. As distances increased, declining percentages of the population were estimated to be covered based upon previous surveys of relationships between distance and utilization in developing countries and on discussions with project managers.

This assumed diminution of coverage with distance changes the concept of coverage from which might be termed *purse accessibility* to something approaching "contact coverage," which has been defined as the number of people who actually use the service.^{3/} This melding of the two concepts reflects that access is not an all or nothing device which can be measured by applying a "cookie-cutter" to a map, but changes gradually with distance. Those further away would find the time, trouble and cost of utilizing services reducing the number of situations in which they would use the services relative to those who live closer. Perhaps visits would be limited to more serious cases. It is also possible that utilization from a distance would be more sensitive to differences in ability to take the time for travel.

There is interest not only in how many are covered by the health services, but also in the relationship of the covered population to the target population.

For a national program which has already been put into place, as in Tanzania, the target population is clearly understood to be the total rural population. One could then estimate population with access and compare the two figures. For developing programs, such as in Afghanistan and Bolivia, the target population might be thought of as also including those living in areas where the program has not yet been established. Or the target population might include only villages in which trained health workers are already functioning.

With regard to the University demonstrations, which are focused on small areas, there seems little difference between target population and population with access, although there is a distinction between the numbers who have access and those who actually avail themselves of the services.

Where information is available and the concept meaningful, estimates of the target population are given in the project discussions below.

^{3/} T. Tanahashi, "Health service coverage and its evaluation," Bulletin of the World Health Organization, 56(2):295-303(1978), identifies five stages and definitions of coverage, namely, availability, accessibility, acceptability, contact and effectiveness.

IV. CONCEPTS AND MEASUREMENT OF COSTS

The costs which we wished to estimate would measure the value of all resources "sacrificed" as a consequence of the decisions to provide health services to the covered population. These include:

- . One-time costs related to type and volume of the activities (variable investment)
- . One-time costs independent of the volume of activities ultimately to be achieved (fixed investment)
- . Operating costs related to the duration (years) of activities, but not to their volume (fixed operating)
- . Operating costs related to the duration and the volume of activities (variable operating)

We also tried to identify sources of funding or resources in kind.

The general objective of the study is to supply a part of the information required to determine if it is feasible to cover a substantial part of the population of developed countries with health services at what has been termed "affordable cost."

While affordable cost is a subjective concept, especially when applied to only one aspect of a society's consumption, it has usually been taken to mean costs not substantially higher than those currently being allocated to the governmental health sector, either in dollars per capita, local currency per capita, or as a percentage of GNP or governmental expenditures.

Per capita governmental health expenditures in developing countries are usually quite low by any of these measurements as compared with expenditures in most other sectors or with those of the more developed countries.^{4/} These outlays in most low-income countries have been concentrated on a relatively small proportion of the population, generally those in the larger urban areas and on the governmental and sometimes industrial work force. As it is unlikely that significant reductions in services to those already receiving them would take place, increasing the coverage of the population with health services would probably require an increase in total health expenditures over current levels.

Inter-country comparisons in monetary terms are of dubious validity, especially when calculations rely on rates of currency exchange which may have little to do with relative purchasing power for services which are not traded internationally. Inflation, differences in relative prices, and exchange

^{4/} While little precise data exist, it is frequently suggested that private health expenditures for drugs and private practitioners (both modern and traditional) may greatly exceed governmental health expenditures.

controls may further obscure the meaning of cost estimates. The costs in Table 1 have been converted to dollars using conventional rates of exchange, and the per capita health expenditures as a percentage of per capita GNP are also shown. In the case of Ghana, the variability and artificiality of exchange rates should preclude any reliance on dollar per capita data, and it is suggested that the ratio on a per capita basis between health and GNP is more likely to have meaning.

A critical step in cost measurement is to determine what are the specific health services whose costs should be estimated. One approach is to examine only those costs which occurred because of the innovative or experimental health services. But in a number of instances these services are additional to those which were already in place and continued functioning.

In the cases of the PRIMOPS program in Cali, Colombia, estimates of the utilization by the population of pre-existing health centers and hospitals in the city were made, and rough costs of such utilization were calculated. In the villages of the Narangwal project in India, cost estimates for existing governmental health centers and charges for private practitioners were provided. In each of these cases, these additional costs have been included, identified separately from the project costs

Similar costs may have been incurred by the "directly covered" populations in the Montero project in Bolivia, but these were not obtained. As the process of selection of sites tended to favor those communities which had had little experience with governmental health services, this may not be a significant omission. As the costs of the Montero project as estimated are the highest of those which were studied, sharpening the number in an upward direction may add little useful information.

AID's Office of Health emphasized their primary interest in operating rather than investment costs. It is presumed that this was because some of the burden of investment costs are more likely to be assumed by donor nations or multilateral agencies, and because the operating costs become, when a system has been fully established, the only costs. Cost analyses and sources of funding are described in the country reports; the summary in Table 1 only distinguishes one-time initial investments from annual operating costs.

In most cases, the operating costs are those associated with the level of population coverage in the latest year for which data were obtainable. Investment costs try to sum (in constant dollars) the value of the fixed assets, initial stocks and initial training. No attempt was made in the study to amortize or depreciate investments.

The general problem of cost estimation is the identification and measurement of all relevant costs. What are relevant costs depends upon the purpose for which the cost information is desired.

For example, if we are interested in the cost of extending health service accessibility coverage to additional population in an area, we would be interested in variable investment and operating costs, and not in fixed operat-

TABLE 1
POPULATION COVERAGE AND COSTS

COUNTRY - PROJECT	Population Covered (Thousands)	Visits (Thousands)	Annual Operating Costs (Thousand \$)	Investment Costs (Thousand \$)	Visits Per Capita Per Annum	Annual Operating Costs Per Capita	Investment Per Capita	Percent Operating Costs Per Capita of GNP Per Capita
<u>Large Scale Programs:</u>								
AFGHANISTAN								
55 Basic Health Centers	963	935	622	474	1.0	.7	.5	
130 Village Health Workers	} 100	94	54	172	.9	.5	1.7	
130 Dais		N.A.	—	} 142	N.A.	—	} 1.1	
300 Dais		N.A.	—					
Total	1,155		675	786		.6	.7	0.3
DOMINICAN REPUBLIC (Women and Children)	651	2,735	1,726	1,220	4.2	2.7	1.9	0.4
TANZANIA								
Rural Health Centers	12,000	66,000	11,880	57,400	5.5	1.0	4.8	0.6
Rural Dispensaries								
<u>Demonstration Projects:</u>								
BOLIVIA-MONTERO Promoters and Auxiliary Nurse 1's	11	17	167	1,400	1.6	15.4	129.0	3.9
COLOMBIA-PRIMOPS (Women and Children 5)								
House Visits and Posts	22	113	37	N.A.	5.1	1.7		
Centers	22	8	25	N.A.	.4	1.1		
Hospitals	22	16	150	N.A.	.7	7.0		
Total	22	137	217		6.2	9.8		1.6
INDIA-NARANGMAL								
FP-NS-CC-Villages - JIRU		11	14	32	1.9	2.4	5.4	
FP-NS-CC-Villages Government and Private Practice		N.A.	17	N.A.	N.A.	2.8	N.A.	
Total	6		31			5.2		3.4
FP-CC-Villages - JIRI		26	13	30	5.3	2.5	6.0	
FP-CC-Villages Government and Private Practice		N.A.	18	N.A.	N.A.	3.6	N.A.	
Total	5		31			6.1		4.1
ZAMBIA								
Manfa Area I	20	29	170	655	1.5	8.5	32.8	1.5

ing costs, as these latter will not change as a consequence of the decision to increase coverage. In the country report on Montero, Bolivia, alternative increment investment estimates are provided for extension of coverage contiguously in the district and for extension of the program elsewhere in Bolivia. In the case of Afghanistan, a large part of training costs consisted of preparation of manuals, which would be necessary for additional training in the future (assuming no change in the nature of the program).

The distinction between operating or recurring costs and one-time costs is not necessarily a matter of the commodity or service purchased. We need to distinguish, for example, with regard to drugs and other supplies, between those required as initial stocks and those consumed in a time period. Similarly, some training costs are to build up an initial staff, while there are recurring costs for replacement occasioned by personnel turnover.

The costs presented in the summary table, the notes and the country reports should be regarded as information of varying certainty and completeness which can be used to develop approximate answers to questions about costs. They are not invariant answers in themselves.

V. FINDINGS

Table 1 presents a summary of the quantitative estimates. While the cases studied are not a representative sample, some generalizations might be essayed.

The two largest projects, Tanzania and Afghanistan, with coverage of a million or more, have costs which seem low by almost any criteria. The operating costs per capita are less than one percent of gross national product per capita. Annual operating costs appear to be one dollar or less per capita. Investment costs are less than five dollars per capita in Tanzania and less than one dollar in Afghanistan. The two systems do vary considerably in utilization, with about one visit per person in Afghanistan and five per person in Tanzania. The Afghan system is newer, has relied more on retraining existing personnel than in large scale expansion, and is addressed to a population whose women are significantly less likely to visit health centers or village health workers than men.

The other large project, covering 650,000 women and children in the Dominican Republic also has operating costs well under one percent of gross national product per capita. It has somewhat higher dollar cost for operations per capita, \$2.65, and a reasonably high utilization, an average annual 4 visits per capita by the covered population which seems reasonably high.

Operating costs per capita are substantially higher in the small scale University demonstration areas, running between five and ten dollars per capita per year. In Ghana and Colombia this amounts to between one and two percent of GNP per year, while in the Narangwal villages the percentage of per capita GNP is higher as the income per capita in India (but not necessarily in the specific area) is much lower.

The project in Bolivia appears to have had markedly higher costs than the others in terms of both operating and investment costs per capita. This may reflect logistical difficulties, peculiarities of accounting practices, or a much richer array of services. It seems clear that costs above the community level absorbed most of the available resources.

The projects and programs reviewed showed responsibility in recording costs, and were cooperative in sharing their knowledge. Yet substantial uncertainty and incompleteness with respect to costs remain, as well as variations in inclusions, definitions, and calculations among the projects. This problem is not peculiar to the low-cost integrative or primary health care projects. It is a recurring problem throughout the health sector (and in many others). But it is especially critical where the approaches are designed and evaluated as means to accomplish health objectives at minimal or affordable costs. The solution to developing cost analysis capability probably begins with careful thinking about what is wanted and why.

The analysts in this study found themselves without real capacity either to secure information on what generated costs or to apply independent information to test the validity of reported costs.

Costs, of course, have little meaning independent of what they are being expended to achieve. While recorded costs may not change as we change our concept of population coverage from availability to accessibility to contact to effectiveness, the costs of bringing about increases in one or the other may be vastly different. Recorded costs, or cost estimating relationships derived from records and reports, may be deployed in developing cost estimates in an analysis, they are not themselves the answers.

The incompleteness of data in some of the projects studied, and uncertainties in most of the others reflects the concerns and emphases of these projects when they were designed. Further, it may be possible that, as in many other fields, officials in public health believe that cost questions are easily answered and can be dissociated from other aspects of research or project design.

While not a substantive finding, a major conclusion of the study is that the field of health services cost analysis seems inadequately understood and practiced. This is not a matter that can be rectified by the design of forms and instructions for field managers, although this may play a useful role.

Cost analysis is the organization of information so that the resource implications of alternative future decisions can be reasonably projected. Relevant costs are those which would flow as the consequence of a decision. Estimating these requires an understanding of the "world" with and without a particular set of decisions, or under alternative decisions. What to include or exclude, how to set values, the use of "shadow prices," treatment of capital expenditures, indirect costs, discounting, inflation and international comparisons, variations of costs with the scale or duration of the activity, all these questions and more need to be addressed explicitly and with care.

VI. A SUGGESTION

Where resources are scarce and there are alternative social objectives for which they might be used or alternative ways of allocating resources to accomplish a given set of objectives, the measurement of resource requirements is a crucial input into decision-making. Severe limitations on the availability of skilled personnel, foreign exchange, financial and other resources are characteristic of and may even define an underdeveloped, less developed, developing, or poor country. It is essential when making policy choices about resources to have reasonably accurate estimates of the relevant costs of decisions.

The prediction of economic (or social) costs is not a simple extrapolation of accounting records, even assuming that these have been well conceived and accurately kept. Cost analysis consists of the ability to take a set of program specifications in terms of physical descriptions of people, things, activities, and schedules and apply cost estimating relationships to these to translate them into budgetary implications.

Apart from issues of relevance and completeness, costs must be sorted according to time of impact, source of funding, spending agency, and sometimes beneficiaries or targets of expenditures. These require careful analysis of fixed and variable and one-time and recurrent costs.

We believe it would be most helpful if a project were to be implemented for the purpose of formulating appropriate cost analysis methodology, developing cost estimating relationships, designing systems and procedures for reporting, and estimating costs on request as parts of analyses and studies performed by or for USAID.

A number of prototypes for such an activity exist in the Cost Analysis Department of the Rand Corporation, the Economics and Costing Department of the Research Analysis Corporation, as well as in the staffs of other research institutes and federal departments.

It would be desirable to start the health sector cost analysis project at a minimal effective size and let its output, problems and future demand for services determine what if any further manpower might be required.

The major outputs of such a project would be:

1. Development of concepts and methods
2. Research on cost-estimating relationships linking physical and system specifications to financial requirements.
 - training of personnel
 - medical care (personnel, drugs, equipment, facilities)
 - sanitation and water supply
 - nutrition
 - health education
 - family planning

- 3. Systems and procedures**
 - instructions and formats for recording cost data and design of reports
- 4. Cost estimation**
 - using specifications of health sector systems and cost estimating relationships, projections of costs in relevant classifications
- 5. Production of training materials and the transfer of methods**

VII. PROJECT NOTES

Individual country reports by the visiting teams are appended to this summary, but it may be of some use to explain the bases for the specific estimates in Table 1 and note the sources of information.

A. Afghanistan

All the data used were developed from materials provided by and in conversations with analysts of Management Science for Health.

The program in Afghanistan is aimed at increasing the capabilities and the utilization of Basic Health Centers by retraining their staffs in primary care, and in extending the coverage beyond the reach of the health centers by training village health workers who are to provide drug packages for specific ailments and dais (traditional birth attendants) who were given kits for deliveries. The Basic Health Center assumed responsibility for the work of the village health worker, but that seems to have been largely limited to drug supply. Information from these workers is obtained by the center as to utilization both by reports and by drug turnover. The population covered by dais and village health workers was generally considered not to duplicate that of the centers. No data have been received as to the amount of activity by dais, who while supposed to be teamed with a village health worker in a village have been working on their own as their training has proceeded much faster. In many cases, dais have reported doing considerable MCH work in addition to services.

The estimates of population coverage were based on consideration of only those areas in which Basic Health Centers have received retraining. Centers exist in other areas, and the retraining program was supposed to continue. We believe this has stopped on orders from the new regime. It is estimated that each health center is accessible to about 17,500 people. The average size of villages where workers are assigned is 770. As dais do serve as MCH workers, we have assumed that 40% of the population of the villages where they are located alone are women and children who have access to the dais services.

Village health workers report about 60 contacts per month; health centers where retraining has taken place see about 17,000 people per year. There is some evidence from drug turnover that the village health workers may be seeing as many as 100 people per month, but we have used the reported 60, which may be a conservative estimate.

Operating costs of the centers are actually dominated by the distribution of supplies provided by the World Food Program. We have omitted these costs partly because they are almost totally borne by donor agencies and partly because they are not directly viewed by the government as a health service. The shipments of food serve as an inducement to visit the centers, but in practice seem to result in wild chaos for a brief period each month.

As the existing health centers have rented their buildings, we have used the rental charges as part of operating costs. It is likely that future centers would require new buildings, cost estimates for which are given in the country report.

Dais, provided with training and kits, perform their services for a fee. We have no information about the fees charged by trained dais, nor the actual frequency of their services. The costs of these services, borne by the users, have not been included in our cost estimates.

The investment costs include a fixed amount for preparation of manuals for the various types of health workers in the centers, the village health workers, and the dais, plus variable costs associated with other training expenditures, initial stocks of drugs for village workers and kits for dais.

B. Bolivia - Montero

The Montero District, whose total population is 175,000, has a rural population of 120,000. The "1978 Report of Services" noted 19 "coverage units" in communities averaging 218 in population, and 10 "Basic Health Units" in communities averaging 665 population each. The "Evaluation" noted direct coverage of 1,932 households and a population directly covered of 10,820.

If we assume the target as its rural population, then less than 10 percent of the District is covered. Somewhat less than 11,000 people live in rural communities in which there is a health promoter or auxiliary nurse I. Those populations are termed by project supervisors as "directly covered".

The remainder of the 120,000 rural residents are classified either as "indirectly covered" or "not covered". The "indirectly covered" live in communities without promoters or auxiliary nurses, but are within administrative areas which have some communities directly covered. As the reported frequency of personal services rendered was quite low, about 1.6 per capita per year based on the numbers directly covered, we judged that "coverage" was limited to those directly covered alone. That communities with health promoters or auxiliary nurse I's are receiving most of the services is further assured by the process of selecting such communities according to their demonstrated cohesiveness and willingness to participate in project activities. 5/

The services rendered by the health workers of the project are more varied and intensive than in most of the other projects. Table 2, below, presents the recorded services during the first six months of 1978. Personal services include those delivered during household visits, and may be underreported. It is this figure (expanded to 12 months) that we have used on Table 1.

5/ John M. Donahue, Health Delivery in Rural Bolivia, Paper presented to the American Anthropological Society's 77th Annual Meeting, Nov. 1978.

Table 2

Services delivered during the first 6 months of 1978

Personal Services	8,478
Household visits (Many personal services rendered here)	3,977
Latrines constructed	629
Health-related community meetings	551
Vaccinations	9,444

Expenditures analyzed were those reported by USAID, Ministry of Health, Counterpart Development Committee of Santa Cruz, Methodist Church, UNICEF, and the local communities during 1975-78. Each of these agencies took responsibility for different parts of the program, and by discussions of these roles, the nature of purchases and the specifications of the program we were able to identify fixed, variable, investment and operating costs. We also made an estimate of the investments required to expand the program to cover more communities, separately for communities contiguous to the area and for those further away. These estimates and the procedures used are described in the country report.

C. Colombia - PRIMOPS

In addition to existing services available from health centers and hospitals in the city of Cali, selected neighborhoods had trained health workers making regular house visits and maintaining posts for patient visits for women and children. The covered population was taken as the numbers of women, 13,259 and children, 8,945 in the target population, a total of 22,197. Data were provided by reports of Tulane University, primarily from the draft report, "Evaluation of PRIMOPS Program - Cost Analysis of PRIMOPS", Study 2E, Tulane University International Program, Robert E. Robertson, et al. (Revised Feb. 1979). Supplementary information was provided by Prof. Bernardo Barona of the Universidad del Valle.

It was estimated that 85-90 percent of the population in the area used the program's services during the study period. Visits to centers and hospitals have been underreported - only M.D. visits (8,322) to Center Narino have been counted; visits to other health workers at the center were not identified to neighborhood residents. This reduced the cost estimates also, as they were based on the average cost per visit to a center (or hospital), multiplied by the estimated number of visits.

Costs for the 1977 PRIMOPS activities include personnel, drugs, supplies, general expenses and an amortized estimate of buildings and equipment. No estimates of training costs or initial stocks of drugs were included.

As a detailed evaluation of PRIMOPS has been recently prepared by Tulane University for AID's Office of Health, no country report has been appended.

D. GHANA - DANFA PROJECT

All data for the Danfa Project were provided by the University of California at Los Angeles. Of the four study areas, the numbers used in this report are for Area One, where one health center provides medical care, health education, family planning and regular immunizations. Other areas supply fewer or none of these services.

Area One has 61 villages, whose population increased from 12,000 in 1971 to 17,243 in 1976. The population using the health services has increased from about 35 percent at the start of the project to 85 percent in 1976. In addition, about 2,000 patients from outside the Area One villages also used the services. This increase in population contact was largely the result of adding three satellite sites once a week each with half the center staff attending.

The number of recorded visits to the center and satellites in 1976 was 29,000. Well child visits are probably underreported.

Operating costs in the table are for 1976, and include the rural health center, health education, family planning, anti-malarial program, immunization program and traditional birth attendant program. Annual replacement training costs of \$60,000 were added to recorded operating costs. Initial training and facilities costs were the bulk of investment costs. Facility costs were raised by a factor of five, from \$100,000 to \$500,000 to reflect current construction costs. Research costs were not included.

E. INDIA - NARANGWAL

All population coverage, utilization and cost estimates were derived from conversations with Robert L. Parker, M.D., at the School of Hygiene and Public Health, The Johns Hopkins University, January 31 through February 2, 1979. Our analysis of these data separated capital costs from recurring. We also used Table III.4, page III-23 (see below) of Integration of Family Planning and Health Services: The Narangwal Experience (draft manuscript submitted to the World Bank, November 1978), to derive cost factors for estimating costs of government health services and private practitioners serving the experimental populations in addition to the project services.

TABLE III.4

ESTIMATED ANNUAL PER CAPITA EXPENDITURE ON HEALTH
 BY SOURCE OF CARE FOR EACH EXPERIMENTAL GROUP
 AND CONTROL VILLAGES (RUPEES)

	<u>FPWSCC</u>	<u>FPWS</u>	<u>FPCC</u>	<u>FP-ED</u>	<u>Control</u>
Government and Other Services	1.5	2.9	1.5	3.4	6.3
Private Practitioners	13.2	15.7	16.5	22.9	15.9
Subtotal	14.7	18.6	18.0	26.3	22.2
Project Services*	12.2	13.5	12.8	8.7	-
TOTAL	26.9	32.1	30.8	35.0	22.2

*Excluding nutrition supplementation

Note: Cost for government, other services, and private practitioners were estimated using data from the functional analysis project(1) and the 1973-1974 sample household survey.

F. Dominican Republic

The rural component of the Basic Health Services project was reviewed for the years 1976-79. This project trained and deployed promoters to provide preventive and first aid services to women and children. Services included nutrition education regarding breast feeding and supplements, referral to treatment centers for malnourished children, prenatal care, immunizations, oral rehydration, treatment for upper respiratory ailments, and referral for more complex respiratory problems. The promoters, who receive three or four weeks of training, were originally supervised by nurse auxiliaries, but in a recent program change the supervision structure consists of community health educators. It is estimated that about 650,000 women and children live in the regions where promoters have been selected and trained. Operating costs appear to run about \$1,725,000 in 1979, a per capita operating cost of about \$2.65. Investment costs, including developmental costs of AID of about \$350,000, amounted to about \$1,000,000. Visits per capita were estimated at slightly more than four per year.

G. Tanzania

Six thousand seven hundred Ujama villages have contracted for governmental service delivery including health services. Villages averaged about 1,500 people each. This would imply over 10,000,000 covered, but there is some coverage of rural people other than through village general contracts. Twelve million is a rough and probably low estimate to eliminate urban residents and those living in areas of very low density. Government estimates that about 90 percent of rural people are covered. Urban population is about 7 percent of total population of 16,500,000.

Operating costs were estimated for the full year 1977-78. Investment costs for 1976-1977 through 1977-1978 are also from Table 1b. Estimates of the current value of capital installed and training of personnel prior to 1975-1976 are given in Note 11, Table A of draft country report. Estimated \$27,194,000 of assets in 1975.

APPENDIX A
GENERAL GUIDELINES ON THE ASSESSMENT OF
COSTS AND COVERAGE-AID PRIMARY HEALTH CARE
PROJECTS

17 JAN 79
ANN ARBOR
R.N. GROSSE AND STAFF

GENERAL GUIDELINES ON THE ASSESSMENT OF COSTS AND COVERAGE

AID PRIMARY HEALTH CARE PROJECTS

THE FOLLOWING IS NOT INTENDED TO BE A FORM FOR USE IN A FILL-IN-THE-BLANKS FASHION, BUT A GUIDE AND CHECKLIST FOR A THOUGHTFUL APPROACH TO A DIFFICULT AND COMPLEX TASK.

A. COST ASSESSMENT

THE FOLLOWING IS A TENTATIVE LIST OF RESOURCES USED IN PRIMARY HEALTH CARE PROJECTS FOR WHICH ESTIMATION OF COST IS DESIRABLE (SEE NOTES FOLLOWING).

FOR EACH CATEGORY, ESTIMATION SHOULD BE MADE OF:

- THE VALUE OF EACH RESOURCE (IN CURRENCY OR IN THE FORM OF IN-KIND PAYMENTS).
- THE QUANTITY OF EACH RESOURCE USED.

RESOURCES	EXAMPLES OF:	
	ONE-TIME COSTS	RECURRENT COSTS
<p>1. PERSONNEL - <u>THIS CATEGORY SHOULD BE REPORTED IN AS DISAGGREGATED A MANNER AS POSSIBLE</u></p>		
<ul style="list-style-type: none"> ● PERSONNEL DIRECTLY RELATED TO THE PROVISION OF SERVICES (SEE #4) 		
<p>PHYSICIANS NURSES MIDWIVES VILLAGE HEALTH WORKERS TRADITIONAL HEALTH WORKERS OTHER</p>	<p>INITIAL TRAINING</p>	<p>SALARIES ALLOWANCES REPLACEMENT TRAINING</p>
<ul style="list-style-type: none"> ● ADMINISTRATIVE AND PLANNING-RELATED 		
<p>ADMINISTRATORS AND PLANNERS (CENTRAL AND LOCAL GOV'T, CLINIC SUPERVISORS) EXPATRIATE PERSONNEL SUPPORT STAFF OTHER</p>		
<p>2. FACILITIES</p>		
<ul style="list-style-type: none"> ● HEALTH CENTERS ● CLINICS ● HOUSING FOR PERSONNEL ● OTHER 	<p>EXISTING FACILITIES NEW PURCHASES CONSTRUCTION</p>	<p>RENT OPERATION MAINTENANCE</p>

RESOURCES (CONT'D)

EXAMPLES OF:

	ONE-TIME COSTS	RECURRENT COSTS
3. LAND	EXISTING OWNERSHIP NEW PURCHASES	RENT
4. RESOURCES SPECIFIC TO SERVICE CATEGORIES	FOR RESOURCES OF MORE THAN ONE YEAR e.g. EQUIPMENT, ONE-TIME COSTS ARE, FOR EXAMPLE, EXISTING STOCKS AND NEW PURCHASES.	FOR RESOURCES OF A LONG USEFUL LIFE, RECURRENT COSTS ARE, FOR EXAMPLE, RENT, OPERATION AND MAINTENANCE.
<ul style="list-style-type: none"> ● HEALTH, MEDICAL, NUTRITIONAL <ul style="list-style-type: none"> TEACHING MATERIALS VACCINES DRUGS FOOD SUPPLEMENTS WEIGHT SCALES LABORATORY EQUIPMENT AND SUPPLIES ● FAMILY PLANNING <ul style="list-style-type: none"> TEACHING MATERIALS CONTRACEPTIVES OTHER ● SANITATION <ul style="list-style-type: none"> TEACHING MATERIALS WATER PUMPS, PIPES, CEMENT OTHER 	<p>FOR RESOURCES WHICH ARE RAPIDLY USED UP, e.g. VACCINES, ONE-TIME COSTS ARE INITIAL STOCKS.</p>	<p>FOR RESOURCES WHICH ARE RAPIDLY USED UP, RECURRENT COSTS ARE NEW AND RECURRENT PURCHASES.</p>

RESOURCES (CONT'D)	ONE-TIME COSTS	RECURRENT COSTS
4. RESOURCES SPECIFIC TO SERVICE CATEGORIES (CONT'D)		
• ADMINISTRATIVE		
OFFICE EQUIPMENT		
RECORDS		
OTHER		
• OTHER SERVICE CATEGORIES AND THEIR RESOURCES		
5. TRANSPORTATION AND COMMUNICATION RESOURCES		
• VEHICLES		
• FUEL		
• TELEPHONE		
• OTHER		
6. UTILITIES		
7. OTHER RESOURCES		

SAME RATIONALE
AS PREVIOUSLY

NOTES ON THE ESTIMATION OF RESOURCES AND COSTS:

1. AS A GENERAL PRINCIPLE, THE OBJECTIVE OF THIS COSTING EXERCISE IS TO ESTIMATE THE COSTS OF ALL RESOURCES USED IN THE DEVELOPMENT AND IMPLEMENTATION OF THE PROJECTS. THESE MAY BE RESOURCES EXPLICITLY PLANNED FOR IN THE PROJECT DESIGN, AS WELL AS THOSE USED ON AN INCIDENTAL BASIS, SUCH AS VOLUNTEER ASSISTANCE, OR DONATED OR PRE-EXISTING FACILITIES FOR WHICH THE PROGRAM ITSELF INCURRED NO EXPENSE. THIS PROCESS SHOULD INCLUDE A DETAILED DESCRIPTION OF ALL SERVICES PROVIDED, AS WELL AS THE HUMAN, MATERIAL, AND PHYSICAL RESOURCES REQUIRED TO PROVIDE THOSE SERVICES.
2. WE WISH TO DISTINGUISH ONE-TIME COSTS - e.g. COSTS ASSOCIATED WITH THE PURCHASE OR CONSTRUCTION OF A FACILITY OR PROVIDING INITIAL TRAINING OF PERSONNEL - WHICH WILL NOT BE DUPLICATED, FROM THOSE COSTS WHICH ARE RECURRENT.
3. COSTS WHICH ARE RELATIVELY INDEPENDENT OF THE SCALE OF THE PROGRAM, e.g. FOR BUILDINGS WHICH WILL NOT BE REPLICATED, GOVERNMENT BUREAUCRATS WHO ARE INVOLVED WITH THE PROGRAM BUT WHOSE POSITIONS DO NOT EXIST SOLELY BECAUSE OF THE PROGRAM, ETC., SHOULD BE CONSIDERED AS DISTINCT FROM THOSE WHICH DEPEND ON THE SIZE OF THE PROGRAM, e.g. THE NUMBER OF CLINICS CONSTRUCTED, VILLAGE HEALTH WORKERS EMPLOYED, ETC.
4. IN ASSESSING COSTS ASSOCIATED WITH RESOURCES, IT IS DESIRABLE TO ESTIMATE THE UNIT COST OF RESOURCES AND TO APPLY THESE ESTIMATES TO TOTAL UNITS OF RESOURCES USED. THIS PROCEDURE SHOULD BE EMPLOYED IN GENERAL TO SUPPLEMENT EXISTING RECORDS OF EXPENDITURE, AND SUBSTITUTE FOR SUCH RECORDS WHERE THEY DO NOT EXIST.
5. FOR PERSONNEL WHO DO NOT SPEND FULL TIME ON THE PROGRAM BUT WHO HAVE IT AS PART OF THEIR REGULAR RESPONSIBILITY, AN ESTIMATE SHOULD BE MADE OF THE PROPORTION OF THEIR TIME REGULARLY SPENT ON THE PROGRAM, AND THE VALUE OF THIS TIME.

6. WE WISH TO INCLUDE COSTS BORNE BY ALL SOURCES OF FUNDS AND TO DISTINGUISH PAYMENTS BY SOURCE - WHETHER FROM THE RECIPIENTS OF CARE, FROM THE HOST GOVERNMENT (OR THE LOCAL GOVERNMENT), FROM A DONOR, OR FROM ANOTHER SOURCE.
7. THE ATTRITION RATE OF PERSONNEL SHOULD BE ESTIMATED.
8. IF POSSIBLE, A HISTORICAL RECORD OF COSTS (BY CATEGORY) SHOULD BE GIVEN, PREFERABLY BY YEAR.
9. RESOURCES WHICH ARE PARTICULARLY ASSOCIATED WITH THE RESEARCH ASPECTS OF A PROJECT BUT WOULD NOT CONSTITUTE REGULAR ELEMENTS OF ON-GOING PROGRAMS SHOULD BE DISTINGUISHED AS SUCH.

B. POPULATION COVERAGE

SERVICES PROVIDED SHOULD BE RELATED TO A POPULATION IN ORDER TO ESTIMATE WHAT IS THE EXTENT OF "COVERAGE" BY THE PROGRAM/CLINIC. IF INFORMATION IS AVAILABLE ON HEALTH, NUTRITIONAL, OR FERTILITY CHARACTERISTICS OF THE POPULATION, WHICH MIGHT BE USED TO INFER ANY CONCEPT OF THE "NEED" OF THE POPULATION FOR SERVICES, THIS INFORMATION SHOULD ALSO BE REPORTED, BUT IS NOT AS HIGH A PRIORITY ITEM AS BASIC DEMOGRAPHIC INFORMATION.

THE FOLLOWING IS A RECOMMENDED LIST OF FACTORS USEFUL FOR ESTIMATING COVERAGE.

1. BASIC DEMOGRAPHIC INFORMATION ON THE TARGET POPULATION - POPULATION SIZE, AGE, AND SEX DISTRIBUTION
2. TYPES AND QUANTITIES OF SERVICES PROVIDED, BY WHOM, WHEN (ON A YEARLY OR MONTHLY BASIS IF POSSIBLE), AND WHERE (AT THE CLINIC, IN THE HOME, IN THE FIELD ...). QUANTITY MAY BE MEASURED IN VARIOUS FORMS, MOST PREFERABLY IN TERMS OF THE NUMBER OF INDIVIDUALS WHO RECEIVED A GIVEN SERVICE. MORE AGGREGATED MEASURES SUCH AS TOTAL NUMBER OF PEOPLE SERVED ARE LESS DESIRABLE, BUT VALUABLE IN THE ABSENSE OF CATEGORICAL FIGURES. IF NOTHING ELSE IS AVAILABLE, THE NUMBER OF CONTACTS WITH SERVICE PROVIDERS SHOULD BE REPORTED.
3. INCLUDE INFORMATION ON THE MORBIDITY AND MORTALITY CHARACTERISTICS OF THE POPULATION.
4. CONSIDERATION SHOULD BE GIVEN TO DISTINGUISHING THE PROPORTION OF THOSE IN THE TARGET GROUP WHO ACTUALLY USE THE SERVICES FROM THOSE WHO DO NOT. PROBLEMS OF ACCESSIBILITY EXIST. REASONS FOR INACCESSIBILITY ARE MANY, VARYING FROM INABILITY TO REACH THE CLINIC OR BE SEEN BY THE HEALTH WORKER, TO INABILITY TO PAY FOR SERVICES, TO CULTURAL INCOMPATIBILITY WITH THE WAY SERVICES ARE PROVIDED. AN EFFORT SHOULD BE MADE TO DESCRIBE AND QUANTIFY THESE ISSUES. FURTHER, ACCORDING TO THE MOST RELIABLE INFORMATION AVAILABLE, AN ANSWER SHOULD BE GIVEN TO THE QUESTION:

"WOULD EXPANSION e.g. REPLICATION, OF THE PRESENT PROGRAM SUBSTANTIALLY INCREASE COVERAGE?"

(YES, NO, EXPLAIN)

5. ARE THERE OTHER PROVIDERS OF RELATED SERVICES TO THE SAME POPULATION?
IF SO, WHAT IS THE RELATIONSHIP OF THE PROGRAM BEING STUDIED TO THESE
OTHER PROVIDERS, AND HOW DOES THIS EFFECT COVERAGE?

ESTIMATION OF THESE FACTORS REQUIRES INGENUITY AND WILLINGNESS TO ESTIMATE.
OF ASSISTANCE MAY BE:

- CENSUS INFORMATION
- A MAP OF THE SERVICE AREA
- POPULATION DENSITY INFORMATION
- INDICATION OF THE LOCATIONS OF FACILITIES AND WORKERS IN RELATION
TO THE POPULATION. THIS IS PARTICULARLY IMPORTANT IN REGARDS TO
DETERMINING WHAT POPULATION THE PROGRAM/CLINIC SHOULD BE SERVING
AND SHOULD BE ACCESSIBLE TO.
- INFORMATION WHICH CAN BE GATHERED FROM REPUTABLE SOURCES WITH PREVIOUS
EXPOSURE TO THE PARTICULAR AREA BEING STUDIED.

APPENDIX B
COST ANALYSIS OF LOW COST HEALTH CARE
DELIVERY IN AFGHANISTAN

REPORT
ON
COST ANALYSIS OF LOW COST HEALTH CARE DELIVERY
IN
AFGHANISTAN
AS DEVELOPED BY
THE GOVERNMENT OF AFGHANISTAN
AND
MANAGEMENT SCIENCES FOR HEALTH

BY
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4 April 1979

APHA Project: Cost-analysis of selected projects on Low Cost
Health Care Delivery assisted by U.S.A.I.D.

I. Introduction:

The development of low cost health care delivery services in Afghanistan has been conducted in an admirably purposeful manner, starting with collection of minimum relevant data, conduct of a trial for increase of health services through a few Basic Health Centers, expansion of training of staff of Basic Health Centers and the subsequent development of a Village Health Worker program with drug distribution followed by a training program of Traditional Birth Attendants (Dai's). Throughout these activities managerial levels at the Ministry of Health received on the job training while manuals were developed for all activities and all personnel in Basic Health Centers, as well as for Village Health Workers and Dai's.

There are inevitably obstacles impeding the continuation of the initial high level of results mainly originating in the firmly established administrative procedures in the Ministry of Health. Even so, the collaboration between the Ministry of Health and Management Sciences for Health resulted towards the end of 1978 in a country wide distribution of drugs to Basic Health Centers and Village Health Workers for 1979, securing drug availability at peripheral health services at a level not achieved earlier.

Untoward effects generated outside the project have resulted in an untimely cessation of the very fruitful collaboration between the Government of Afghanistan and Management Sciences for Health with regard to the country wide implementation of the purposefully developed methodology. *It would be a great loss for international health cooperation if the methodology as developed would not be catalogued and published in a manual format for the logical steps required for the development of low cost health care services in a very cost-effective method,*

particularly with regard to the sequencing of data-collection, manual development for individual health workers, training and operational procedures including drug distribution and actual supervision. Moreover, a considerable body of data generated by the project deserves further analysis, particularly with regard to the evaluation of the impact on utilization patterns of the training of the staff of the first group of Basic Health Centers.

The authors cannot avoid expression of great appreciation for the very constructive and collegial open discussion held with Drs. O'Conner and Hartman and Mr. Rouselle and the ready availability of all information and data necessary for the present cost-analysis, made possible by the well established management information in the collaborative activities between the Government of Afghanistan and Management Sciences for Health.

II. Coverage:

From the discussions and the document review at MSH/Boston it became clear that there is negligible if any overlap in coverage by Basic Health Center, Village Health Workers and trained Dai's (Traditional Birth attendants) not only because VHW's provide different categories of services than Dai's do, but also because the villages from which VHW's and Dai's are recruited are located beyond the villages with "potential access" around the BHC in the woleswali's (=districts).

As a result the review of coverage is reviewed per health facility and health care provider.

II. 1. Coverage by BHC:

II. 1.1. Population coverage:

The basis for estimation of coverage by BHC by the project is the section on population coverage and the appendix A on methodology of the Evaluation Report

of the Parwan Basic Health Center Pilot project of March 1976 (pp. 52-54 and pp. 76 and 77 respectively). Through this methodology, which considers a 6KM radius for potentially 100% coverage and includes a reducing percentage from 95% to 5% of more distant villages relevant to distance, an average population of 17,500 is postulated as population with potential access. There is an expected relationship between the distance patients were recorded as travelling to a BHC and the population density probably based on varying distance concepts and an understandable difference between summer and winter for some areas. However, for a review of the overall project, an average figure of 17,500 population covered does appear realistic, all the more so as the population density on the arable land is quite high compared to national figures.

II. 1.2. Utilization:

The team's expectation that an approximation of utilization patterns could be established through the number of births assisted compared to total births in the catchment area's were dashed, as the BHC were only beginning to be staffed by ANM (Assistant Nurse Midwives) and those thus staffed did not report much MCH activity yet.

The excellent health surveys conducted in 1974 and 1976 by the Government in collaboration with MSH, have only preliminarily been reported and the extensive material available deserves certainly more attention than MSH can devote to it.

From the 1976 survey the total of illness episodes during a two week recall period occurred in 21.6% of members of surveyed households (A Preliminary Report, January 1977, by U.M. Denny and T.N. Warner, page 13). This would suggest a frequency of illness episodes of 5.6 per person per year. From the same survey (page 14) 37.7% of respondents reported home treatment as primary treatment while

16.7% reported the Basic Health Center as the primary treatment source. It should be noted that the sample area for the second survey included BHC's both trained and untrained by the project, while from the earlier mentioned report the median number of patients per day at a BSC increased after BHC staff training had declined after the initial enthusiasm, mainly because of severe limitations in the resolution of administrative bottle-necks at BHC level encountered by the BHC training teams. If we assume that the home treatment is a reasonable representation of minor illness episodes among the total and reduce the illness episodes accordingly with 38%, a population 17,500 would experience in a year a total of some 60,000 illness episodes for which care outside the home is sought. Now if we, albeit not quite realistically, assume the level of patients per day visiting BHC's after the training in the pilot project as applicable for all BHC's after training, we arrive at a total number of patient visits per working year (12 months, 270 days) of 26,460, or a utilization rate of 43% for the 60,000 illness episodes referred to above.

This is undoubtedly a too high estimate, as the continuing BHC staff training cannot be expected to reach the same results as during the pilot project, while the rural population has been used to seek health care from a rather wide variety of providers. Also no cross tabulation on kinds of illness and category of providers is yet available, while the information on most serious illness does not relate to period or population.

It would appear all the same realistic to estimate the utilization rate between the lowest level for BHC's (of 31 patients per day) or 13% before the BHC staff training and the highest estimate of 43% offered above.

On the other hand it is to be expected that there is also a range of utilization rates by severity of illness, with the more severe illness generating higher utilization rates for the more important and possibly more effective health interventions.

II. 2. Coverage by V.H.W.'s:

II. 2.1. Population coverage:

Again the experience with the Village Health Worker program is short and only limited information is available from the project mainly based on an evaluation made of the learning and work experience during a 3 day retraining course of the first batch of VHW's 4 months after the initial training.

As there is no indication that VHW's see patients from outside their village it is assumed that the average village population of 770 constitutes the target population.

II. 2.2. Utilization:

As the VHW appear to receive mainly male adult patients there is no relationship between coverage, utilization and birthrates. The list of health problems elicited by the 1976 survey does not include problems of pregnancy and delivery, and the total number of illness episodes in an average village would be $770 \times 5.6 = 4312$ episodes of illness per year. Again discounting for home treatment the number of illness episodes for which health care outside the home is sought would be 2673 per year.

Without considering repeat visits, the VHW's reported seeing on the average 60 patients per month (less than expected by the project and probably an underestimate as the VHW's report on income on drugs sold of 200 afgh. per month or 100 patients per months, the mark up per treatment regimen being 2 afgh. per regimen irrespective of the costs of the drugs involved). On the basis of 60 patients seen per month, the VHW could account for 25% of estimated demand, while 45% of estimated demand could be met if the drug consumption is taken as expression of utilization.

Utilization patterns are bound to change over time, depending on the villagers' perception of drug costs (initially reported as so low that efficacy was in question) and drug effectiveness (oral drugs are initially considered less effective than injections which are purposely not provided to VHW's) while the continuity of drug flow will remain an essential requirement.

On the other hand, the health of the village population will depend more on improvements in health behavior, self care and the sanitary environment of the home and the village. While the program is far too short to have any measureable effect in these important components, the retraining course and VHW program evaluation has indicated the importance of active involvement of the village health committees, who appear to have a "wait and see" attitude with respect to the persistence of the government (BHC) support.

That in spite of these initial mitigating factors the VHW's achieved the estimated utilization is remarkable.

By the end of December 1978 a total of (130) VHW had been trained, providing a coverage of a target population of $130 \times 770 = 100,100$ population, which again is a remarkable achievement for the relatively short duration, even though the VHW's take care of a proportion of illness episodes in the village.

II. 3. Coverage by Trained "Dai's":

II. 3.1. Population coverage:

While the population coverage per dai is probably less than that for VHW's, more than one dai being trained in larger villages, the services rendered by trained Dai's should be even more restricted as the trained Dai's receive only a Traditional Birth Attendant delivery kit (UNICEF) and no drugs at all.

On the other hand, the first reports available on the activities by the trained Dai's indicate that 40% of their patients seen are children indicative of the trained Dai's wider involvement than just pre- and post natal care.

Again there is no straight forward figure or figures available on the population covered by Dai's, the estimates varying from 250 to 1000, the latter figure being the latest estimate from the project staff for the Dai training program in Kabul.

Thus the estimated total population covered by the much faster developing Dai training program ranges with 430 Dai's trained, from the lowest of 107,500 through the average village size of 770 is 331,000 to the highest estimate of 480,000 population.

II. 3.2. Utilization:

No reports on utilization or workloads of trained Dai's are available yet. From the 1976 survey it appears that Dai's are only present in 43% of the villages, while some 50% of female respondents reported using the services of Dai's. There is no direct way to relate this information, though collateral information suggests that if Dai's are present in the village they are in general used for all deliveries. The mean charges of Dai services are, according to this 1976 survey, 100 afghs. while the median charges are 50 afghs. (or 1 U.S. \$).

The average workload for trained Dai's in an average village of 770 people would be with a CBR of 41.5/00 around 30 pregnancies and deliveries per year, not an excessive load. It is however, important to note that preliminary reports indicate that 40% of patients attended to by trained Dai's are children, indicating that trained Dai's provide services to others well complementing the VHW's service activities.

III. Costs:

Costs are estimated on a per basic health center (BHC) basis. This artificial concept is used only for purposes of estimation since the way the basic health care system in Afghanistan is conceived, BHC's will work as discrete units, each ideally associated - but not in direct collaboration with - approximately 15 village health workers (VHW's) and 15 trained midwives of Dai's. As discussed in the coverage section, the amount of overlap between the population groups served by the field personnel (VHW's and Dai's) and that served "potentially" by the BHC is considered to be slight. We estimate costs for this unit - 1 BHC, 15 VHW's and 15 Dai's. This unit serves an estimated total population of 29,000 (17,500 for the BHC and 770 for each VHW - Dai pair. The VHW's and Dai's in fact do not usually work in pairs, but cover the same territory.)

Using this organizational format and cost information provided by MSH, we estimate that the total recurrent cost (Table 1) per person per year was \$0.65 in 1977 and \$0.60 in 1978. This decline is attributable entirely to estimated economies of scale in the provision of vaccinations. Estimated total initial costs (Table 2) per person are approximately \$18.00. This figure is an overestimate however, since it includes all fixed costs for the development of training manuals, costs which would be distributed over the whole system, were the whole system being considered.

Estimation was necessary in almost all cases due to many factors, particularly the types of information which were available. Some reports, particularly the Parwan Project Report, provided very specific and useful information, as did budgetary reports for the Ministry of Public Health. The rapid state of flux

of the Afghanistan public health system during the past few years made it somewhat challenging to arrive at a comprehensive picture of costs related specifically to BHC's, VHW's and Dai's. Due to the only recent systematic introduction of what are considered herein as elements of a primary care system, e.g., the VHW, Dai, and BHC as set up by MSH, et al, Tables 1 and 2 only deal with recent years where a reasonably complete set of data could be found.

Notable pieces of missing cost information pertain to the establishment of a school for ANM's. This school was developed under the guidance of U.C. Santa Cruz. Cost figures were not readily obtainable.

Table 1 - Afghanistan Costs

Recurrent Costs for 1 BHC, 15 VHW's
and 15 Dai's, Covering an Estimated 29,000 People

(afs 57 = \$1)

	1356 (1977)			1357 (1978)		
	MOPH	UNICEF/API (2)	TOT	MOPH	UNICEF/API	TOT
BHC						
Salaries (3)	5,069		5,069	5,069		5,069
Drugs (4)	720	400	1,120	1,200	662	1,862
Vaccines (6)	4,200		4,200	2,200		2,200
Lab (7)	45	305	350	45	305	350
Rent (9)	1,320		1,320	1,320		1,320
Vehicle Maint. (7)	100		100	100		100
Retraining (10)	60		60	60		60
Print Training Manuals		24	24		24	24
Other (7,8)	340		340	340		340
Total BHC	11,854	729	12,583	10,334	991	11,325
VHW (13)						
Drugs (5)		5,700	5,700		5,700	5,700
Transport (12)	270		270	270		270
Retraining (11)	200		200	200		200
Print Training Manuals		75	75		75	75
Total VHW	470	5,775	6,245	470	5,775	6,245
DAI						
Entirely Self-supporting Print Training Manuals		75	75		75	75
GRAND TOTAL	12,324	6,579	18,903	10,804	6,841	17,645
Est. Cost/Person/Year			\$0.65			\$0.61

1. Figures for earlier years are incomplete and inappropriate since they do not deal with the primary care system as conceived in recent years.
2. API (government pharmaceutical supplier), independent of UNICEF.
3. Assuming the following staffing and average salary levels for each BHC:

	<u>Average Salary Per Person (afs)</u>
1 M.O.	31,500
1 M. Nurse	28,250
1 Sanit.	28,250
2 ANM	28,250
1 Lab Tech.	25,500
2 Vaccinators	14,200
1 Driver	17,160
5 Misc.	14,576

Table 1 - Afghanistan Costs, continued

Overall salary estimates so obtained are slightly higher than government budgets per BHC (\$5,069 versus \$3,084), probably due to the consideration above of an "ideally" equipped BHC.

4. "Studies in 1974 and 1976 agree that about as much money is spent on drugs in Afghanistan as on the total expenditures for all other health activities combined." (Financial Analysis of Health Programs, 26 January 1977, MOPH-MHS)

The MOPH budget for all Basic Health Services does not distinguish a drug category. The MOPH budget for Village Health Workers allocates 900,000afs in 1356 and 3,600,000afs in 1357 to drugs. These figures are not expenditures and the number of VHW's to be supplied is unclear.

Estimates of the value of drugs shipped to each Basic Health Center per year are as follows:

1353	\$ 420 (57afs = \$1)	Figure reported in the Parwan evaluation obtained from the Standard List (see attached) from 1353. This was <u>pre</u> -MSH involvement and before the use of a three-tiered system based on the Hospital, BHC and VHW.
1355	\$ 605	This and all subsequent figures are based on recorded amounts of drugs shipped from Central Stock, acquired from API (a government-associated pharmaceutical supplier) and UNICEF (donated). UNICEF amounts and value were estimated by the logistics person in charge of drug shipments (see attached).
1356	\$1,123	
1357	\$1,862	

These are drugs used by the BHC, not the VHW's.

5. The value of the initial three-month supply of drugs to each VHW distributed through the BHC is approximately \$95, implying the expected monthly consumption of drugs through each VHW to be approximately \$32 or 1,824afs (57afs = \$1, pre-VHW mark up). The number of packets of drugs this would represent is uncertain since packets differ in content and thus cost, and we do not have this information. Estimates of the number of packets dispensed by the VHW per month average 75 (Financial Analysis Appendix 5.2 indicated 50; in our meeting with MSH it was said that they make a profit of 200afs per month selling 100 packets at a 2af mark up per packet). Thus, recipients of drugs (patients) probably pay about 2,000afs/month [$1824 + (2 \times 75) = 1974$] per VHW, or 24,000afs (\$421/year). This is very close to what would be expected based on the above.

Families spend roughly 300afs (\$5.00) per year on drugs (Financial Analysis Appendix 5.2).

Table 1 - Afghanistan Costs, continued

6. A separate budget for immunization appears in the Financial Analysis paper, Appendix I. This function is in part provided through the Basic Health Centers, though we do not have an estimate of the costs associated with immunization services that are performed solely at the BHC. In this system, the estimated cost/contact is:

	cost/contact	
1356	48afs = \$0.84	(57afs = \$1)
1357	25afs = \$0.44	(approximately the same for the next four years)

The long run objective of the MOPH (as of 1356) was to have immunization provided through BHC's.

Costs for vaccination in Table 1 are estimates based on these figures, assuming a coverage of 29,000 for the BHC (includes VHW villages, to which the BHC should be providing vaccination services since the VHW's do not have the equipment (supplies to do so themselves), and assuming that this population has a hypothetical maximum demand for 5,000 vaccinations per year (14+ per day at the BHC and in the field for 1-2 vaccinators). This cost estimate does not include the vaccinators' salaries.

7. From Parwan study.
8. Fuel, local travel, miscellaneous supplies, and other operating expenses, not including building amortization.
9. The majority of BHC's have been rented to date, at an estimated cost of \$110/month, based on amortization from Parwan Report.

	Year (March-March)					
Number of BHC's	1352	1353	1354	1355	1356	1357
	<u>(73-74)</u>	<u>--</u>	<u>(75-76)</u>	<u>(76-77)</u>	<u>(77-78)</u>	<u>(78-79)</u>
Number on Paper	95				138	148
Number Operational (i.e., receiving shipments of drugs or estimate from Ron O'Connor)	60			111	122	122+
Estimated Number Rented			111	111	122	116

10. Each BHC staff is given two to three days of retraining by a team from the MOPH each year. Other recurring staff costs, e.g., turnover, could not be estimated and were said to be low in our discussions.
11. One day each month at the BHC. Little is yet known of the need for retraining due to turnover.
12. Calculated from VHW budget.
13. VHW's are given no salary. They are expected to gain sufficient income from the community from providing services and selling drugs.

TABLE 2

Investment Costs for 1 BHC, 15 VHW's and 15 Dai's
Covering an Estimated 29,000 people

(1977-1978 Prices)

	MOPII	UNICEF et al	ATD	Total
BHC				
-Construction Cost	(\$26,350) ¹		\$51,000 ²	\$51,000
-Equipment ¹				
-Lab	1,000			1,000
-Refrig/Furniture	453			453
-Vehicle	2,000			2,000
-Training ³				
-Manual Prep			150,000 ⁴	150,000
-Other Expatriot			97,000 ⁴	97,000
-Field Training of staff ⁵			665	665
TOTAL	3,453		298,665	302,118
VHW's				
-Training ⁶				
-Manual Prep			75,000	75,000
-Other Expatriot			75,000	75,000
-Field Training ⁷			1,000	1,000
-Initial Drug Supply		1,425		
TOTAL		1,425	151,000	152,425
Dai's⁸				
-Training				
-Manual Writing			75,000	75,000
-Training of 1 Training Team		750		750
-Training of 15 Dai's		1,200		1,200
-Kits		375		375
TOTAL		2,325	75,000	77,325
TOTAL	3	1.75	524	53.8

Notes to Table 2

1. Parwan report. Unsure why this does not agree with AID figure (see next note).
2. AV. construction costs per BHC for 12 BHC's obtained verbally from AID (includes 11 BHC's and 1 Training Center). (Construction begun on 12 in 1976, expected completion this year.) For total numbers of BHC's, see note 9, Table 1.
3. Not including original professional training of the instructors.
4. These are one time costs for the entire BHC program, but are in this table assigned to only 1 BHC.
5. Including initial training of the training teams, recruitment of BHC staff and initial training of each BHC staff during a one-week session. Retraining expenses are mentioned in Table 1.
6. 130 VHW's have been trained since January 1978. If the program had continued as planned, 350-400 would have been trained on a yearly basis in subsequent years.
7. Includes preparation, recruiting, and a three week training program.
8. Dai training facilities were developed but no cost figures were available to us. Nevertheless, many dai's were trained in the field, at the BHC. Dai's have been trained for only one year at present.

APPENDIX I
MANUAL COSTS, SALARIES AND STAFFING PATTERNS

A. BEC MANUAL COST

BEC MANUAL	NUMBER PRODUCED			Cost	Total
	English	Dari	Total	Each	Cost
DOCTOR	85	180	265	Afs. 366*	Afs. 94,695
ANM	-	280	280	270	75,600
MALE NURSE	-	115	115	189	21,735
SANITARIAN	-	105	105	169	17,745
VACCINATOR	-	255	255	103	26,265
LAB. TECHNICIAN	-	65	65	67	4,355
MALARIA MICROSCOPIST	-	55	55	51	2,805
CLERK	-	120	120	45	5,400
DRIVER	-	120	120	51	6,120
STOREKEEPER	-	120	120	51	6,120
TOTAL					260,840

* . English version cost 339 Afs.
 Dari version cost 366 Afs.

Current exchange rate is Afs. 40 = U.S. \$1.00

VILLAGE HEALTH WORKER MANUALS	Number Produced	Cost Each	Total Cost
Reference Manual	160	105	16,800
Field Manual	160	160	25,600
Summary Book	160	35	5,600
TOTAL			48,000

B. STAFFING PATTERNS AND SALARIES

BHC Training/Supervisory Team

Number	Personnel	Annual Salary Totals	
		From	To
1	Physician	26,400	36,600
1	Sanitarian	22,800	33,700
2	Nurse Midwife (Afs. 22,800 to 33,100 ea.)	45,600	67,400
1	Driver	17,160	17,160
		<u>111,960</u>	<u>154,860</u>
	Allowances (@15%)	16,794	23,229
		Afs. 128,754	Afs. 178,089

Basic Health Center

Number		Annual Salary Totals (a)	
		From	To
1	Physician (Rank 4-7)	26,400	36,600
1	Male Nurse (Rank 5-8)	22,800	33,700
1	Sanitarian (Rank 5-8)	22,800	33,700
Avg. 2 (b)	ANM (Grade 8-10)	25,800	31,200
1	Lab. Technician (Rank 6-9)	21,000	30,000
1	Clerk (Rank 6-8)	22,800	30,000
1	Driver (Grade 7)	17,160	17,160
1	Storekeeper (Grade 8)	15,600	15,600
3	Messenger/Cleaner (Grade 11)	33,840	33,840
2	Vaccinator (Rank 7-10)	38,200	52,800
		<u>246,400</u>	<u>314,600</u>
	Allowances (@15%)	37,000	47,200
		Afs. 283,400	Afs. 361,800
	Dollar Total (Afs. 40 = \$1.00)	(\$7,085)	(\$9,045)

Note: (a) Salaries vary according to ranks of civil servants and grades of contract personnel.

(b) The number of ANM's varies from 1 to 3 per BHC.

VHW Department Staffing

1. Director rank 4	Afs.	36,600
2. Deputy Director rank 5		33,700
3. Sanitarian trainers (2) rank 6 (30,000)		60,000
4. Vaccinator (1) rank 8		22,800
5. Drivers (2) grade 7 (17,160)		34,220
6. Nurse-Midwife (1) rank 6		30,000
7. Pill Packagers (2) grade 8 & 9 (15,600 & 14,200)		29,800

A VHW training team normally consists of:

1. Either the Director or Deputy Director	33,700 to	36,600
2. 1 Sanitarian trainer	30,000	30,000
3. Vaccinator	22,800	22,800
4. Driver	<u>17,160</u>	<u>17,160</u>
	103,660	106,560
Allowances @15%	<u>15,549</u>	<u>15,984</u>
	Afs. 119,209	122,544

APPENDIX C
THE MONTERO RURAL HEALTH DELIVERY SYSTEM

The Montero Rural Health Delivery System

Established as a pilot project for delivering basic health care services to rural populations, the Montero project is now seen as the model for expanding health services to rural areas throughout Bolivia. The bases for its acceptance are the beliefs that both basic preventive and curative services have been delivered effectively and at low cost through project activities and that the delivery system developed there can be duplicated in other districts.

Organization of Service Delivery

The structure of the rural health delivery system operating in Montero excluding U.S.A.I.D. participation is represented in the following table. U.S.A.I.D. participants are not included since their participation in the project is supposed to be temporary and aimed primarily at project initiation and not at on-going operations.

<u>Level</u>	<u>Institution</u>	<u>Location</u>	<u>Major Participants</u>
National	Ministry of Planning and Coordination Ministry of Social Welfare and Public Health	La Paz	
Regional	Regional Health Office	Santa Cruz	Regional Project Coordinator
District	District Project Office Rural Health Training Center	Montero	District Outreach Team
Area	Health Center Hospital		Auxiliary Nurse II
Basic Health Unit	Health/Medical Post		Auxiliary Nurse I
Coverage Unit	Rural Community		Promoter/Health Committee

Starting from the lowest level of the organizational structure, the rural community constitutes the focal point for project activities. Communities are selected at least partially on the basis of both previous organizational experience and geographical and cultural cohesiveness following a general hierarchical scheme which was used for establishing a rural school system in the area. Community meetings are convened to discuss the concept of a rural health delivery scheme. If the community expresses interest in participating in the health system, over the course of several meetings a health committee is elected and the committee selects a community member to be trained as a health promoter. After initial training the promoter functions as an employee of the community with the committee serving as an overseer and financial administrator for community health affairs. Communities in which promoters are the key health service providers are referred to as "coverage units". Coverage units currently number 19; they range in size from 80 to 419 persons with an average of 218.

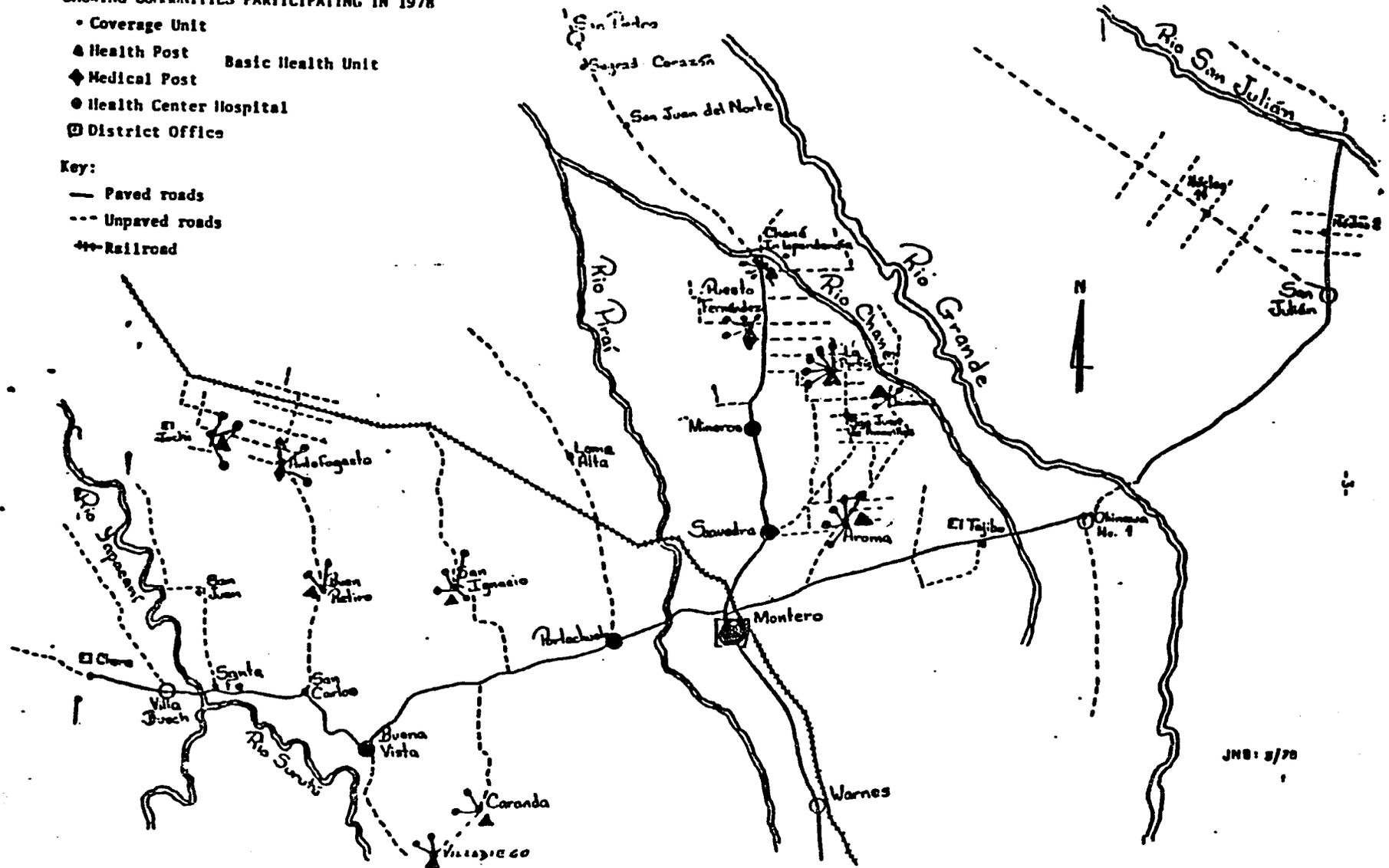
The next organizational level is the "basic health unit" which is a community ranging in size from 215 to 1625 persons. There are 10 basic health units serviced by the project with an average population of 665. Basic health units select their own health committees to deal with community health concerns. These committees then work with government salaried nurse auxiliary I's who are assigned to the community. Auxiliary I's are expected to make household visits but also to deliver treatment from community health posts. In several cases health posts were already located in a designated basic health unit; where no health post existed one was established utilizing community resources - in the form of a pre-existing structure or materials and labor donated by the community. In addition to providing services to their immediate community, auxiliary nurse I's are expected to supervise the work of the promoters in the coverage units closest to them. A map of the Montero district appears on the following page, showing

**MAP OF MONTERO RURAL HEALTH PROJECT
SHOWING COMMUNITIES PARTICIPATING IN 1978**

- Coverage Unit
- ▲ Health Post Basic Health Unit
- ◆ Medical Post
- Health Center Hospital
- ☐ District Office

Key:

- Paved roads
- - - Unpaved roads
- ⚡ Railroad



JMB: 8/78

the basic health units and coverage units which were reported to be operating by the beginning of 1979. It should be noted that the one worker to one community concept presented here is a generalized pattern but does not apply to all communities serviced by project personnel. In two of the larger communities the health posts are manned by doctors plus more than one auxiliary I and, at least in one case, a promoter as well.

Based on the Health Center Hospital, the auxiliary nurse II is expected to supervise the activities of the promoters and auxiliary nurse I's within his/her area. The four communities in which Health Center Hospitals are located have an average population of 6,020 people. Since they are considered urban rather than rural centers their inhabitants are not included in considerations of project coverage. It is hoped that the hospital health centers can be used for referral care but mechanisms for service payment from the project have not been established. So those who feel they can afford it seek hospital services, while others must forego such services.

The Outreach Team includes a doctor, nurses including those involved in teaching the promoters and auxiliaries, a sanitary technician, a biostatistician, a warehouse attendant and other staff. These workers reside in Montero, the district center of 30,000 people which, like other towns in the district, is not included as part of the project's target population. Their function is to provide technical, logistical and administrative support to the auxiliaries and promoters and their communities.

The regional level project staff consists of A.I.D. advisors plus coordinator personnel who provide technical support to the project and liaison with the Ministry and the A.I.D. Mission in La Paz. La Paz personnel both within government ministries and within A.I.D. are responsible for over-all budget formulation and fund dispersal plus technical assistance as required.

Project Services

Through a combination of visits to households and individual or group consultations in a worker's home or health post, promoters and auxiliary I's deliver preventive and curative care to their communities. Since community participation is a crucial aspect of project activities, workers are expected to be involved in meetings of community groups concerned with health-related issues and to organize such groups where appropriate.

The four basic areas for preventive activities are maternal-child health, nutrition, communicable disease control and environmental sanitation. Households are rated by auxiliaries or promoters on the basis of perceived risks, such as pregnancies, number of pre-school children and sanitation indicators and a certain number of monthly visits to the home is allocated according to risk level-zero for no risk, one for medium risk and two for high risk.

Drug availability within the communities is important for auxiliaries and promoters to carry out their curative tasks. The design for drug distribution within the project is based on a system of revolving funds. An original allotment of drugs was granted to each community on the condition that once the original drugs were sold, the monies collected from their sale would be used to purchase new drugs at less than market value through a centralized distribution network centered in Montero. The system was thus intended to be self-sustaining. Drugs would be ordered and sold by the auxiliaries and promoters who would pass the funds on to the community health committee for allocation. A series of checks had been established to prevent anyone from misusing drug payments. The situation in February 1979 was that the original allotments had been received and monies for their sale collected. Requests for new drug shipments had been made but not met. The system had been slowed, if not halted, not because of

failure by the communities but because of inability of the project to make drugs available for communities willing and able to pay for them. It is hoped that once a new warehouse has been completed and drug supplies can be readily stored and distributed that the system will be able to function as intended. The proper operation of the drug supply system appears to be an important element for continuing credibility and overall coordination of project efforts.

An early evaluation of the project listed the service mix of personnel as follows:

The promoter after eight weeks of training returns to his community to spend 40% of his/her worktime on attention to families through household visits, 40% of the time participating in group sessions and 20% of the time in other activities, including assisting in latrine construction and vaccination programs. Promoters often set up hours for visitation at their own homes as well. The general pattern for promoter health care delivery is half-time work; average compensation from the community amounts to approximately \$20 (U.S.) per month. At least 40 had been trained by January 1979 but only half of those were reported to be working at that time.

Auxiliary I's receive six months of training before being hired by the government to work in the project. They then receive an additional two-week training course oriented especially toward rural health service delivery and community organization. Of the 100 who graduated from the Montero Training Center between 1976 and 1978, 21 were reported to have been hired by the project and 12 were working as of January 1979. In their own communities and those of the promoters which they supervise they are expected to spend 40% of their work time on supervision and household visits, 20% on group talks, and 40% on personal

attention given at a health post.

The auxiliary II is an auxiliary I with three months of additional training who is expected to spend his/her time supervising the work of the promoters and auxiliary nurses. Four were working for the project in 1979 though twice that many had been trained.

Population Coverage

Total population of the Montero District is estimated at approximately 175,000 persons; 30,000 of these live in Montero, another 25,000 live in the Area Centers mentioned earlier. Thus, total rural population in the district is approximately 120,000. Of these 15% are estimated to be receiving health services from some type of non-project government source.

The project chose to focus its activities in the health regions closest to Santa Cruz. These regions number 52,171 persons. Within these regions 44 communities were selected by district and regional personnel and advisors for project participation. These communities were selected: 1) to represent a variety of types of ethnic groups and settlement patterns; 2) to avoid those which had received other health services and those which were socially divided into groups not willing to cooperate with one another; 3) to include communities which were most accessible geographically; 4) to be organized to receive project services within the initial 18 months.

According to the mid-1978 project evaluation, 14,046 persons were in communities organized for the delivery of project services and receiving them through auxiliary I's and/or promoters. These people were said to be "directly" covered. The evaluation also considered the other 38,125 persons living with the health provinces in which some communities were receiving services to be "indirectly" covered. Persons in the "indirectly" covered category are those

outside of "directly" served communities who are reasonably accessible by foot, horseback or truck to a promoter or auxiliary I's respective home or health post and could utilize the latter's services during hours of personal service delivery. Additionally, these people are close enough to both hear of vaccination campaigns and to bring their children to vaccination sites if motivated to do so. The number of people covered either "directly" or "indirectly" by the project amounted to 51% of the district's rural population.

Actual service delivery as part of the project began in 1977 but until 1978 the only available data is number and types of cases handled by project personnel, with no indication of household visits or other community activities. Data available from 1978 gives further indications of household visits made, latrines constructed, community health groups met and vaccinations given. Total figures available for both years are shown in the following tables. Reports for 1978 come from 29 communities, so apparently only the 10,820 persons in these communities would fall into the category of "directly" covered as of the end of 1978; this amounts to about 21% of the population of the regions initially selected for inclusion in project activities. Reports for 1977 come from only four communities, all of which had health posts.

It may be noted that 29 communities receiving services fall short of the 44 selected to be "directly" included in project activities. Various observers, both inside and outside of the project, have suggested the numerous reasons for lack of participation by selected communities including: 1) Perceived duplication of activities offered by promoters and nurse auxiliaries has meant several promoters were never paid. 2) Promoters selected during non-peak agricultural seasons returned to agricultural labors upon their return from training. 3) The district's population includes large numbers of migrants. While

the diversity of populations was originally a reason for selecting Montero District as a pilot project area, the lack of a stable, settled population and the continuing population movements have frustrated attempts to maintain project activities in some of the District's communities.

These difficulties with promoting project activities within selected communities suggest that there is probably very little involvement on the part of "indirectly" covered communities.

TABLE 1

Coverage Indicators

1) Total District Population	175,000 (1)
2) District Rural Population	120,000 (1)
3) Rural Population in Initial Project Health Regions	52,171 (1)
4) Population "Indirectly" Covered	41,351
5) Population "Directly" Covered	10,820 (2)
6) Population in Basic Health Units	6,653 (2)
7) Population in Coverage Units	4,167 (2)
8) Estimated Number of Children Under Five Within District Rural Population	11,128 (4)
9) Estimated Number of Households in "Directly" Covered Communities	1,932 (1)
10) Reported Number of Personal Services *	8,478 (2)
11) Reported Number of Household Visits *	3,977 (2)
12) Reported Number of Latrines Constructed *	628 (2)
13) Reported Number of Health-related Community Meetings *	551 (2)
14) Reported Number of Vaccinations Given	9,444 (5)

Sources:...

- (1) U.S.A.I.D. Evaluation of Montero Project, Bolivia, 1978, mimeo.
- (2) 1978 Report of Services for Montero Rural Health System. Unpublished.
- (3) 1978 Report of Vaccinations for Montero Rural Health System. Unpublished.
- (4) Jim Becht, Preliminary information from Household Survey. Personnel communication, February, 1979.

* Services delivered in "directly" covered communities over an average period of 6 months.

SERVICES REPORTED IN THE MONTERO DISTRICT
(For 1978)

TYPE OF COMMUNITY*	NUMBER OF COMMUNITIES	POPULATION	MONTHS REPORTING	PERSONAL SERVICES															
				TOTAL	DIARRHEAS	RESPIRATORY INFECTIONS	SIX INFECTIONS	MALNUTRITION AND AEMIAS	OTHERS	WELL CHILD CARE	PREGNANT CARE	POSTPARTUM CARE	BIRTHS ATTENDED	MEDICATION GIVEN	THERAPIES PRESCRIBED	LATINES CONSTRUCTED	HOME VISITS	CAPACITY SURPLUS	VACCINATIONS
U.S.B.	Antofagasta	398	11	345	29	29	33	22	28	85	36	6		9	25	192	212	26	339
U.C.	Majillones (Paño Rojo)	178	4	124	27	13	13	11	11	31	3			6	13	13	53	19	217
U.C.	Tecunilla (Patalla)	114	4	55	20	12	6	6	9	20	3			6	11	55	19	232	
	3	692	19	524	76	54	52	39	48	66	12			21	35	320	284		
U.S.B.	Jochi	343	11	750	175	62	85	53	135	0	15	6		171	41	87	307	22	311
U.C.	San de Ancha	304	8	483	76	51	38	39	67	13	5			69	8	70	146	6	233
	2	647	19	1,233	251	113	123	92	202	13	20	10		240	49	157	453	28	
U.S.B.	San Ignacio	445	12	524	68	38	25	6	219	7	5			93	20	35	277	39	407
U.C.	Barrag Grande	245	7	332	64	32	22	2	13	15	19			67	21	19	664	16	190
	2	694	19	856	132	70	47	8	232	22	24			160	41	54	1,328	55	
U.S.B.	Corona	1300	5	681	78	91	51	31	231	26	47	7	9	106	12	5	29	32	208
U.C.	Riolo Alto	120	3	17		3		2	6		1			4	1		4	10	70
U.C.	San Miguel	252	1	12					3					2	3				101
	3	1,672	9	710	78	94	51	33	237	26	48	7	9	108	16	7	33	42	
U.S.B.	Villalmeja	213	5	441	74	30	35	12	40	163	29	9	1	41	19	21	116	31	
U.C.	Lofo	88	3	11					7					2		4	19	3	
U.C.	Ballatal	138	3	51		2			12	1				15		3	13	3	
	3	439	11	503	84	32	35	12	67	164	29	10	2	58	21	28	150	45	
U.S.B.	La Fortia	628	12	1,125	82	135	87	55	209	50	39	22	12	306	68	42	437	95	236
U.C.	San Lorenzo	130	5	68	15	15	7	1	8					17		2	43	3	92
U.C.	San de Agudo	187	4	79	11	9	6	7	9		1			20		4	103	3	88
	3	945	21	1,272	115	159	100	63	226	50	40	23	12	343	68	48	583	107	
U.S.B.	Puerto Fervientes	1,625	11	673	79	39	41	27	136	0	13	7	5	302	16	45	417	34	1334
U.C.	Allanqui	439	6	135	33	16	18	6	20	3				57	3	4	72	4	176
	2	2,064	17	808	112	55	59	33	156	3	13	11	6	359	19	49	489	40	
U.S.B.	Chad Independencia	689	12	1,099	121	116	175	65	206		9	7		347	77	25	95	20	461
U.C.	Fior del Valle	400	5	67	9	15	13	5	11		3			27	4	4	29	2	87
U.C.	Chad Magillones	406	1	27					6					15		1	8		133
	3	1,495	18	1,293	130	131	188	70	223		12	7		389	84	30	128	22	
U.S.B.	Calmanco	647	12	657	110	57	61	16	230	12	13	15	3	104	18	3	118	42	427
U.C.	Chad Bolivia	358	3	75	28	16	9	1	21		2			2		1	74	5	262
	2	1,005	15	732	138	73	70	17	251	12	15	15	3	106	18	4	192	47	
U.S.B.	Colonia Arona	533	8	315	87	27	43	13	87	1	18	16	2	27		76	199	29	312
U.C.	Paño Toreros	191	2	29	12	8	8	3	4						5	3	39		
U.C.	Calles de Atarce	202	6	344	32	39	47	13	62	4				344	18	6	139	4	204
U.C.	San Pablo	236	7	72	17	6	8	4	19	1	1			4	13		81	8	186
U.C.	Lofo Reyes	163	5	82	18	11	7	1	10					21	12	7	51	18	213
U.C.	San Juan de Santa Barbara	131	4	43	14	7	4	1	11					4	2	11	235	9	223
	6	1,458	32	849	170	100	111	35	172	1	19	16		208	45	105	745	68	
	23	10,620	180	8,478	1,195	699	806	391	1,991	350	238	107	39	2,074	368	628	3,977	332	4,066

*U.S.B. = Basic Health Unit
U.C. = Coverage Unit

U.S.B.
U.C.

Services Reported in the Montero Rural Health Delivery System
for the Year 1977

Basic Health Unit	Months	Total*	Respiratory	Diarrhea	Anemia	Skindis	Furuncles	Conjunctivitis	Wounds	First Aid	Mumps	Measles	TB	Medication Applied	Other	Pregnancies	Postpartum	Births	Obstet.	Therapies Performed	Vaccinations
Chas. Independencia	12	532	91	64	27	106	21	3	42	26	1	21	18	4	91	12	4	1	12	1	263
Caimanes	8	266	34	49	6	41	9	23	16	4	1	1	1	1	43	1	1	1	1	6	1
San Ignacio	7	375	50	40	4	30	6	1	35	21	6	1	1	1	108	1	1	5	1	1	38
La Perla	9	439	128	61	23	32	10	23	16	6	1	1	1	16	33	1	1	3	1	18	109
TOTALS	36	1511	303	214	62	209	39	51	109	43	3	21	18	20	254	12	7	10	12	21	418

* Excluding vaccinations

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VACCINATIONS GIVEN IN THE MONTERO DISTRICT
 1978 AND 1977

TYPE OF COMMUNITY	NAME OF COMMUNITY	D.P.T. (45)			POLIO (45)			(45)	(45)	TOTAL
		1 st	2 nd	Ref.	1 st	2 nd	Ref.	B.C.C.	MEASLES	
U.S.	San Ignacio	61	43	12	61	43	12	140	35	400
U.C.	San Miguel	13	12	7	16	12	7	59	14	140
U.C.	San Gonzalo	24	21	4	24	21	4	76	16	150
U.C.	San Jose	15	9	5	15	9	6	30	14	94
U.C.	Riquelme	12	5	5	12	5	5	21	10	35
		126	90	33	126	90	34	316	89	600
U.S.	Coronada	40	19	16	40	19	16	40	18	217
U.C.	San Luis	17	12	2	17	12	2	-	10	79
U.C.	Agua Caliente	12	3	1	12	3	1	-	10	42
U.C.	San Riquelme	26	19	-	25	19	-	-	12	161
		95	83	18	94	55	18	40	50	421
U.S.	Independencia	38	19	21	39	19	24	150	40	359
U.C.	San Miguel (2 ^{da} vez)	27	10	29	39	10	21	96	38	277
U.C.	Luzuriaga (3 ^{ra} vez)	16	13	20	24	16	12	87	12	200
U.C.	Trocadero (1 ^{ra} vez)	24	11	19	23	11	14	90	14	259
		125	53	35	161	56	64	423	104	1097
U.S.	Justi	22	21	33	32	17	37	120	29	311
U.C.	San de Agosto	38	17	10	39	22	10	91	19	253
U.C.	Turija	2	3	10	2	3	10	41	-	71
	Agua Blanca	11	5	7	11	5	7	37	15	92
	Calles de Buen Rulio	8	2	1	2	2	2	31	-	65
		91	48	61	91	49	63	381	63	725
U.S.	Poma	28	22	16	28	22	16	64	16	312
	San Felix	31	21	8	31	21	9	63	3	154
	Gallegos Plaza	31	19	10	31	19	10	79	5	204
	San Diego	33	18	11	33	18	11	85	4	213
	San Roque	32	23	6	32	23	6	110	-	302
	San Juan de Santa Fe	29	17	30	29	17	20	91	-	255
		374	180	71	374	180	71	512	28	1477
U.S.	Casas	31	52	-	31	52	-	121	20	427
	El Quente	63	26	-	53	26	-	31	12	241
	Chano Pedago	50	21	-	50	21	-	111	16	264
	Quinta Puma	21	14	-	21	14	-	37	3	79
		215	113	-	215	113	-	340	51	1312
U.S.	La Perla	18	31	-	18	31	-	-	32	216
	Calles	11	36	3	11	36	3	742	9	111
	San de Agosto	11	11	9	11	11	12	-	16	63
	San Salvador	6	31	2	9	31	5	34	-	111
	San Lorenzo	4	25	4	13	17	7	-	22	61
		50	184	18	59	160	30	56	84	441
U.S.	Pueblo Sanamir	244	192	22	116	144	19	428	109	1517
	Alfonso	39	20	3	45	10	2	30	75	176
		283	212	25	264	154	21	458	184	1693
U.S.	Chano Independencia	122	39	-	122	29	-	110	49	465
	Chano Independencia	30	7	-	34	6	-	58	4	135
	Humala	27	22	-	31	22	-	34	22	155
	San Esteban	64	43	11	42	35	-	22	21	209
	San Lorenzo	40	28	7	17	-	-	42	17	157
	San Lorenzo	44	13	-	31	13	-	30	22	153
	Yunari	15	5	-	15	5	-	33	9	72
	Calles de Horizonte	19	6	-	19	6	-	32	8	90
	Flor del Valle	19	8	-	14	7	-	35	4	82
		381	161	18	321	183	-	386	136	1522
TOTAL - 1978		1629	1034	341	1557	916	330	2868	769	9444
TOTAL - 1977		658	53		684	58		648	194	

REF = BOOSTER SHOTS

Impact of the Project

Ideally to examine a project's effectiveness we would like to look at how it changed the health status of the target population. Since this information is not available for the Montero project area, nor is it likely that changes in health status would be evident after only a year and one half of experience, certain measures have been selected for discussion which might serve as an indicator of the project's impact on those communities "directly" covered. These include: personal services, household visits, community meetings, latrines constructed and children vaccinated.

Personal services is a generalized category presumably indicating the types of cases which were seen during visitation at a deliverer's home or health post. As far as could be ascertained, these services were not those delivered during home visits which are reported separately. If personal services are related to the "directly" covered population, .78 services were delivered per person over the average reporting period of six months. If this figure is doubled for a year's time, the number of visits per person would be about 1.6 per year.

Vaccination figures are interesting in that comparison of 1977 figures with 1978 figures shows that tremendous advances were made in 1978, particularly in the numbers of children who received second doses of serial vaccinations. Since children under five are estimated to constitute 21.4% (or 11,128 children) of the district's rural population according to a recent household survey, the percentage of children who were given complete DPT vaccination jumped from less than 1% of the total in 1977 to over 9% in 1978. Percentage vaccinated in "directly" covered populations appear to be much higher than over-all percentages. The lower 1977 response is considered to be typical of the situation throughout most of rural Bolivia. It would thus appear that having workers based in the communities with direct household contacts was effective in motivating mothers to bring

their children in for complete series of vaccinations.

Number of household visits in 1978 was estimated to be 3,977. If households average 5.6 as is estimated for the Montero region, there are around 1932 households in the communities directly covered. Since average time of coverage reported is 6.2 months, this could be projected to mean an average of about 4 visits per household per year, or an even higher number per those houses actually visited. We have no estimates of how many families were considered to be at risk and thus to receive visits from promoters or auxiliaries.

Another figure, that of latrines constructed, is difficult to interpret definitively but also gives an indication of project-related action within the communities. Using the earlier figure of 1932 households, it would appear that the 628 latrines constructed are providing excreta disposal sites for almost 33% of households in the "directly" covered communities. Most, if not all, of these latrines are pit type and thus their ability to reduce sources of contamination and their longevity are open to question. Still it is hoped that their existence marks a positive impact of the project.

Finally, the number of meetings held in the communities related to health issues is impressive. The total of 551 meetings for the 29 communities gives an average of 19 meetings per community over 6.2 months. In larger communities there are several groups considered to be health related which meet regularly. Groups such as Mothers' Clubs generally meet weekly which over 6.2 months time would mean about 25 meetings per group. Additionally, it was the feeling of project advisors that many more community meetings were held at the beginning of a community's organization than during its ongoing operations. Like other indicators mentioned, we do not know how these figures would have compared to those for earlier years, but we believe that project activities greatly influenced the current numbers.

While these numbers give an indication of the kinds of activities going on within the communities "directly" covered, they do not allow for much discussion of "indirect" coverage (including which project services if any that population receives). Future projections of the project's activities call for increasing the number of communities "directly" served both within "indirectly" covered populations and in health regions currently unserved by the project. Thus, both "direct" and "indirect" coverage will expand but the information system used will probably restrict future as well as present observations to "directly" covered communities.

APPENDIX D
COST ASPECTS OF THE MONTERO RURAL HEALTH
SERVICES PROJECT IN SANTA CRUZ, BOLIVIA

COST ASPECTS OF THE MONTERO RURAL HEALTH SERVICES PROJECT IN SANTA CRUZ, BOLIVIA

There are several factors that have affected the identification and collection of pertinent and reliable cost data of the Montero Project.

These are:

First, there exist four major and three minor sources of funds that contribute resources to the Project. The interactions and interrelationships among these agencies are largely uncoordinated and often inconsistent with respect to each other. Although anticipated costs are budgeted in a somewhat orderly fashion, no single agency seeks and/or retains knowledge on first, the amounts actually spent by all agencies, and second, the specific methods employed by the Bolivian Ministry of Health (MOH) in determining labor costs incurred at the MOH level. Budgeting—as a function—is undertaken under the supervision of the AID Mission personnel (specifically the Health Officer's Office). Inconsistency is manifested in the way costs are shifted to various agencies. For example, in the transportation area, AID purchases vehicles, parts are paid by the MOH, maintenance by the Development Corporation of Santa Cruz, while oil and gas by counterpart funds and the MOH. Motorbikes and bicycles obey an entirely different system that reverses the above process.

These agencies are the following:

1. The U.S. Agency for International Development (AID)
2. The Ministry of Health (MOH)
3. Counterpart funds
4. Development Corporation of Santa Cruz (Comité)
5. The Methodist Church
6. UNICEF
7. Local communities

Food for Peace funds are occasionally brought into this system. Perhaps, the only modicum of order present in this system is provided by the fact that different agencies specialize—in a very broad sense—with distinct functions. For instance, AID funds cover technical assistance costs, the MOH covers labor costs of permanent employees, while counterpart funds and the Comité specialize in maintenance charges and special services respectively.

Second, payments made by AID, and particularly those covering technical assistance activities, appear to have a lag between obligations and expenditures of about one year. Toward the end of 1978, this lag has been reduced to less than six (6) months. This lag is due to administrative delays in securing and approving the appropriate personnel and to the fact that AID has secured three extensions involving supplemental funds which (extensions) were staggered chronologically in such fashion that contributed further to the formation of this time lag. The implication of the above to the costing activity performed is that the indicated annual sums for TA activities contain an unspent portion that is continuously shifted forwards in time. As indicated above, TA funds will be largely depleted by the end of June 1979.

Third, lack of coordination, consistency and central control of expenditures have introduced considerable uncertainty concerning the portion of labor costs that accurately reflect the actual operations of the Project. This uncertainty stems from the MOH's practice of charging personnel expenses to the Project for the time and efforts invested by Ministry staff in La Paz. While we are not questioning the appropriateness of these charges, we do not know the method employed by the MOH of arriving at these charges which has complicated our task of separating recurring from one time type of labor costs. Related to

the above cited problems is the additional practice of sifting over and under budgeted cost categories as well as sources of funds in a way designed to accommodate fund shortages to possible surpluses. For instance, some travel costs may be disguised as technical assistance and vice versa. This practice is fortunately not pervasive and any distortion can be said to affect the Project only marginally.

Table 1 is a detailed summary of all costs by all agencies involved for the life of the Project. The total project cost may be exaggerated by about \$70,000 reflecting the carry over sum from TA that will be allocated by the middle of 1979. The accuracy and reliability of the figures in Table 1 are assessed to be very high and well within an acceptable plus or minus of 1%. All figures were cross checked against a minimum of two sources. Occasional discrepancies were discussed and resolved with both AID and MOH staff persons.

Table 2 shows annual expenditures by source of funding. Costs peaked in 1976 with a noticeable decline in subsequent years. This of course reflects the decline in TA, a large part of training, and an even larger part of "special services" costs. Beginning with 1978 total project costs move closer to operating costs and it is assumed that in the post-1978 period these costs will be extremely close to operating expenses.

Table 3 shows the division between investment and operating costs. Few, if any, assumptions were necessary in the development of this information which are discussed in the description of each entry in Table 3. It should be noted that investment costs decline both in absolute and relative terms starting with 1977. This decline is accompanied by an increase in operating costs relative to total project costs. Technical assistance and wages and salaries are the largest cost categories for investment and operating expenses respectively.

1. Technical Assistance

This is purely an investment type of cost. It covers expenditures involved in the design, operation, and planning of the project as well as basic research (health survey) functions. It includes living expenses for long term consultants and sizeable travel costs for the short term consultants.

2. Wages and Salaries

Wages and salaries for 1975 and 1976 are considered totally investment costs since no field personnel was in place prior to 1977.* Moreover, no field services were provided during this period. These costs were incurred at the MOH level reflecting time and effort expended at that level for planning, administration, and coordination activities. Field payroll expenses rose to \$61,396 in 1977 and \$76,175 in 1978. Both figures include bonuses and social security contributions by the Bolivian government estimated at \$68,997 in 1977 and set at zero in 1978 having assumed that the MOH's planning, administration, and coordination functions run their course by 1978 so that any expenses incurred at that level are specifically related to the field operations of the project. Having made the above assumption for 1978, we used the difference between field payroll expenses (\$76,175) and total labor costs for this year (\$118,643) which is equal to roughly \$40,000, as the approximate figure for field-related activities by the MOH in 1977. Therefore, the operations parts of labor costs in 1977 is \$61,396—which is the field payroll figure—plus \$40,000—which is the MOH's field-related labor cost share—yielding a total of \$101,396. The remaining \$68,997 is considered an investment type of labor cost wholly incurred at the MOH level. Finally, wages and salary costs include per diem, travel costs,

*The \$10,000, funded from counterpart funds, supported temporary secretarial (nonprofessional) activities.

and in-kind contributions by the government of Bolivia to permanent employees. The latter includes food and housing allowances.

3. Training

Training activities commenced in 1976. Conceptually, we view training activities as investment kinds of costs since they take place up to a point where permanent employees of the Project are properly trained into various roles and tasks. Since, however, individuals (mostly auxiliary nurses and health promoters) leave the Project upon completion or thereafter of the training period for a variety of reasons, additional training is undertaken on recurring basis to replenish the ranks. The latter portion is assumed to be part of the Project's operating costs. In the investment component we have included all teaching equipment and material with prolonged life. We have estimated that the turnover of trained individuals is about 30% with which we have estimated the operating cost portion of this activity.

4. Drugs, Vaccines, and Biologicals

Drugs have circulated only once and the communities have not been re-supplied. The initial sale was of course gradual with communities' being supplied at various points in time. The initial shipments contained dated drugs with most having expired dates, which largely explains the delay in securing more drugs. Presently, all communities have considerable funds (generated from the initial sale of drugs) that are idle while the Mission and the MOH are deciding how to handle this problem. The most immediate implication of this problem is that given that drugs have not had a reasonable number of turnovers, they have been assigned to investment costs. The more serious aspect of this problem is, of course, that first, an important function of the Project has ceased to function, and second, the promoters' forays into the

communities have diminished both in number and significance.

5. General Services and Spacial Projects

General services, i.e.; utilities, telephone and telex costs, rental fees, etc., are operating costs. Special projects and research are, of course, one time type of costs.

Section 1
EXPENSES AND REVENUES CHART FOR BUREAU OF REVENUE
COMMERCIAL AND INDUSTRIAL - DOMESTIC
 (In U.S. & P.M. Holdings Transactions - 19 U.S.C.)

Department Code	1977 - 1978 Fiscal Year				1978 - 1979				1977 - 1978				1978 - 1979			
	400	Other	UNCLASSIFIED	TOTAL	400	Other	UNCLASSIFIED	TOTAL	400	Other	UNCLASSIFIED	TOTAL	400	Other	UNCLASSIFIED	TOTAL
Selected Training of Personnel																
400 Project																
Travel Expenses	600,000			600,000				600,000				600,000				
Supplies	500,000			500,000				500,000				500,000				
Telephone	100,000			100,000				100,000				100,000				
Transportation	10,000			10,000				10,000				10,000				
Miscellaneous	40,000			40,000				40,000				40,000				
Federal Reserve Bank	10,000			10,000				10,000				10,000				
Business Training for	20,000			20,000				20,000				20,000				
Construction	20,000			20,000				20,000				20,000				
Education	10,000			10,000				10,000				10,000				
Staff Salaries	2,000			2,000				2,000				2,000				
Total Exp. of 400 Training Project	10,000	2,170,000		2,180,000	110,000	1,110,000	3,000	1,220,000	110,000	1,070,000	300,000	1,110,000				
Construction & Planning		672,000		672,000				672,000				672,000				
Operating Expenses								1,000,000				1,000,000				
Construction and Equipment	2,100,000			2,100,000				2,100,000				2,100,000				
GR		1,100,000		1,100,000				1,100,000				1,100,000				
GR		670,000		670,000				670,000				670,000				
Staff Expenses								1,000,000				1,000,000				
Transportation								200,000	170,000		370,000					
Travel Expenses								200,000	170,000		370,000					
Supplies								200,000	170,000		370,000					
Telephone								200,000	170,000		370,000					
Transportation								200,000	170,000		370,000					
Miscellaneous								200,000	170,000		370,000					
Federal Reserve Bank								200,000	170,000		370,000					
Business Training for								200,000	170,000		370,000					
Construction								200,000	170,000		370,000					
Education								200,000	170,000		370,000					
Staff Salaries								200,000	170,000		370,000					
Total Exp. of 400 Training Project	2,100,000	2,170,000	2,170,000	6,440,000	1,100,000	1,110,000	3,000	2,213,000	1,100,000	1,070,000	300,000	2,470,000				
Construction - Total								1,000,000				1,000,000				
400 Project								1,000,000				1,000,000				
Construction								1,000,000				1,000,000				
Operating Expenses								1,000,000				1,000,000				
Construction and Equipment								1,000,000				1,000,000				
GR								1,000,000				1,000,000				
GR								1,000,000				1,000,000				
Staff Expenses								1,000,000				1,000,000				
Transportation								200,000	170,000		370,000					
Travel Expenses								200,000	170,000		370,000					
Supplies								200,000	170,000		370,000					
Telephone								200,000	170,000		370,000					
Transportation								200,000	170,000		370,000					
Miscellaneous								200,000	170,000		370,000					
Federal Reserve Bank								200,000	170,000		370,000					
Business Training for								200,000	170,000		370,000					
Construction								200,000	170,000		370,000					
Education								200,000	170,000		370,000					
Staff Salaries								200,000	170,000		370,000					
Total Exp. of 400 Training Project	2,100,000	2,170,000	2,170,000	6,440,000	1,100,000	1,110,000	3,000	2,213,000	1,100,000	1,070,000	300,000	2,470,000				
Construction - Total								1,000,000				1,000,000				
400 Project								1,000,000				1,000,000				
Construction								1,000,000				1,000,000				
Operating Expenses								1,000,000				1,000,000				
Construction and Equipment								1,000,000				1,000,000				
GR								1,000,000				1,000,000				
GR								1,000,000				1,000,000				
Staff Expenses								1,000,000				1,000,000				
Transportation								200,000	170,000		370,000					
Travel Expenses								200,000	170,000		370,000					
Supplies								200,000	170,000		370,000					
Telephone								200,000	170,000		370,000					
Transportation								200,000	170,000		370,000					
Miscellaneous								200,000	170,000		370,000					
Federal Reserve Bank								200,000	170,000		370,000					
Business Training for								200,000	170,000		370,000					
Construction								200,000	170,000		370,000					
Education								200,000	170,000		370,000					
Staff Salaries								200,000	170,000		370,000					
Total Exp. of 400 Training Project	2,100,000	2,170,000	2,170,000	6,440,000	1,100,000	1,110,000	3,000	2,213,000	1,100,000	1,070,000	300,000	2,470,000				
Construction - Total								1,000,000				1,000,000				
400 Project								1,000,000				1,000,000				
Construction								1,000,000				1,000,000				
Operating Expenses								1,000,000				1,000,000				
Construction and Equipment								1,000,000				1,000,000				
GR								1,000,000				1,000,000				
GR								1,000,000				1,000,000				
Staff Expenses								1,000,000				1,000,000				
Transportation								200,000	170,000		370,000					
Travel Expenses								200,000	170,000		370,000					
Supplies								200,000	170,000		370,000					
Telephone								200,000	170,000		370,000					
Transportation								200,000	170,000		370,000					
Miscellaneous								200,000	170,000		370,000					
Federal Reserve Bank								200,000	170,000		370,000					
Business Training for								200,000	170,000		370,000					
Construction								200,000	170,000		370,000					
Education								200,000	170,000		370,000					
Staff Salaries								200,000	170,000		370,000					
Total Exp. of 400 Training Project	2,100,000	2,170,000	2,170,000	6,440,000	1,100,000	1,110,000	3,000	2,213,000	1,100,000	1,070,000	300,000	2,470,000				
Construction - Total								1,000,000				1,000,000				
400 Project								1,000,000				1,000,000				
Construction								1,000,000				1,000,000				
Operating Expenses								1,000,000				1,000,000				
Construction and Equipment								1,000,000				1,000,000				
GR								1,000,000				1,000,000				
GR								1,000,000				1,000,000				
Staff Expenses								1,000,000				1,000,000				
Transportation								200,000	170,000		370,000					
Travel Expenses								200,000	170,000		370,000					
Supplies								200,000	170,000		370,000					
Telephone								200,000	170,000		370,000					
Transportation								200,000	170,000		370,000					
Miscellaneous								200,000	170,000		370,000					
Federal Reserve Bank								200,000	170,000		370,000					
Business Training for								200,000	170,000		370,000					
Construction								200,000	170,000		370,000					
Education								200,000	170,000		370,000					

TYPE OF COST	1976				MINISTRY OF HEALTH				CHRYSTOPHY				DEVELOPMENT COMMITTEE OF SACSIA CODE				MINISTRY OF DEFENCE				TOTAL	
	1975	1976	1977	1978	1975	1976	1977	1978	1975	1976	1977	1978	1975	1976	1977	1978	1975	1976	1977	1978		
I. SALARIES & BENEFITS A. Long Term B. Short Term	121100 77300	131000 17900	90000 17000	115000																		661,000 110,000
II. SUPPLIES, MATERIALS, CONTRACTS, ETC.	19000	3030	25000	25600				5000														60,330
III. UTILITIES Rents, Maintenance and Construction		3000	13000	15000							7750	5932		27000		4000		4000				70,000
IV. MISCELLANEOUS Materials, per diem, travel expenses, etc.		10500	7030	10000		6000	10200	3070		10000	5320	4237				2000						90,000
V. TRAVEL & SALARIES*		1000	10000	7500		212075	141003	100070	100000	2100	17750	17714				112000					40000	530,000
VI. EQUIPMENT & SUPPLIES A. Transportation (Includes parts & maintenance) B. Office Equipment, Furniture and Materials (Includes auto- mobiles, repairs & fuel)		15000	3030	15000		5000	2000	7250				250		3000	3000	3000						60,000
VII. GENERAL SERVICES AND SPECIAL PROGRAMS**		19000	10000	2000		7000	61300	17700		40700	13300	15077		17000								200,000
TOTAL, BY SOURCE AND YEAR	232500	250000	242500	194000		229075	210073	130700	100000	60700	46370	30325		42000	4100	9750		16400	7000	40000		1,700,000

*This category includes compensation for temporary employees, living and housing allowances for regular ministry employees as well as their fringe benefits and in-kind payments.

**This includes research and special projects for example, maps, graphics, aerial photography also publicity costs, mass invitation cards, and utility expenses. Fund for Peace has contributed 200,000 to the UNRWA whose allocation is not specified.

***Multiple documents, contracts, budget estimates, and expenditure vouchers obtained from the Mission Office in La Paz, the Controller's Office, and the Field Operations in Santa Cruz. All documents have been discussed and analyzed with mission and UNRWA personnel at various stages of their preparation. The error seen to be less than one percent. Note that the UNRWA expenditures are liquid by roughly one year and affecting about 25% of their total. This essentially means that this sum, although obligated in previous years, will be spent by about May or June of 1979.

TABLE 2. ANNUAL TOTALS OF PROJECT COSTS BY SOURCE OF FUNDS

SOURCE OF FUNDING	TIME					Σ
	1975	1976	1977	1978	TOTAL	
1. USAID,	233,530	258,200	243,900	194,600	930,230	51.7
2. MOM	-	229,875	218,293	129,116	577,284	32.1
3. Counterpart	10,000	60,900	46,270	50,325	167,295	9.3
4. Development Committee	-	45,000	4,100	9,750	58,850	3.3
5. Methodist Church/ UNICEF	-	16,600	7,060	-	23,660	1.3
6. Community	-	40,800	-	-	40,800	2.3
TOTAL	243,530	651,175	519,623	383,791	1,798,119	100.0
Σ of TOTAL	13.5	36.2	28.9	21.3	100.0	100.0

Sources: Table 1

TABLE 3. INVESTMENT AND OPERATING COSTS OF THE MONTERO HEALTH SERVICES PROJECT IN BOLIVIA
(in U.S. dollars)

<u>INVESTMENT COSTS</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>TOTAL</u>	<u>%</u>
1. Technical Assistance						
a. Long Term	124,100	133,200	91,000	115,000	463,300	33.1
b. Short Term	77,300	17,948	42,000	-	137,248	9.8
2. Wages and Salaries	-	271,275	68,997	-	340,272	24.3
3. Training	-	47,100	22,691	15,213	85,004	6.1
4. Drugs, Vaccines, Biologicals	19,800	5,830	25,000	30,600	81,230	5.8
5. Equipment, Furniture, Materials	12,330	38,622	39,100	18,950	109,002	7.8
6. Special Projects	-	60,200	23,300	1,500	85,000	6.1
7. Buildings Construction	-	31,000	13,100	19,000	63,100	4.5
8. Transportation	-	15,000	1,850	18,000	34,850	2.5
% of Annual TOTAL	95.9	95.3	62.9	56.7	79.0	
TOTAL	233,530	620,175	327,038	218,263	1,399,006	100.0
<u>OPERATING COSTS</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>TOTAL</u>	<u>%</u>
1. Wages and Salaries	10,000	-	101,396	118,643	230,039	57.5
2. Training	-	-	7,645	2,064	9,709	2.4
3. Buildings, Maintenance & Repairs	-	3,000	7,250	5,932	16,182	4.0
4. Equipment, Furniture, Materials	-	-	-	1,300	1,300	0.3
5. General Services	-	17,600	70,200	29,271	117,071	29.3
6. Transportation	-	10,000	6,100	9,500	25,600	6.4
7. Drugs, Vaccines, Biologicals						
% of Annual TOTAL	4.1	4.7	37.1	43.3	21.0	
TOTAL	10,000	30,600	192,591	166,710	399,901	100.0
GRAND TOTAL	243,530	650,775	519,629	384,973	1,798,907	

INVESTMENT COST ASPECTS IN EXPANDING THE MONTERO RURAL HEALTH PROJECT

In this section we consider the level and type of investment costs required in expanding the rural health services project in the Montero district. This activity is premised on the realization that a special class of investment costs will not be incurred should the coverage of the project expand.

Two key assumptions have been employed in the appropriate set of calculations: first, expansion decisions occur in stages equal to the present coverage of the project (about 11000 people), and second, that expansion is of two varieties: either contiguous or non-contiguous.

The first assumption is not crucial to the analysis but expedient in affording a computational facility. That is, since our cost information (see Table 3 above) has been structured on the basis of the actual coverage of approximately 11000 people it may not be appropriate to suggest—and possibly difficult to estimate—that several kinds of investment costs would have been lower with a smaller coverage. The sensitivity of these costs is probably high to half of the actual coverage but considerably lower to a 10 or 20% fluctuation in coverage.

The second assumption is relatively more crucial to the magnitude of investment costs. A contiguous expansion in coverage should require marginal investments in such investment costs as technical assistance, transportation, land and buildings, special projects, and district supervisory staff inputs. This suggests the likely presence of scale economies involved in extending operations within an area which are not available if similar operations are initiated in a non-contiguous area.

Table 4 below presents the results of these estimates. Several explanations follow this table.

TABLE 4

ESTIMATED INVESTMENT COSTS INVOLVED IN EITHER A CONTIGUOUS OR NON-CONTIGUOUS EXPANSION OF THE MONTERO PROJECT

<u>COST CATEGORY</u>	<u>CONTIGUOUS CASE</u>	<u>NON-CONTIGUOUS CASE</u>
1. Technical Assistan	15,000	50,000
2. Training	75,000	75,000
3. Equipment, Furniture, Material	64,000	109,000
4. Drugs, Vaccinations	81,000-	81,000
5. Special Projects	42,000	85,000
6. Wages & Salaries	69,000	97,000
7. Transportation	20,000	35,000
TOTAL	366,000	532,000

DISCUSSION

1. Technical Assistance. The only TA component appropriate to any expansion decision is the administration of the survey to the additional population to be covered. The design cost as well as that of the evaluative methodology are sunk cost in the sense that they have been already paid for. The \$15,000 figure for the contiguous case covers per diem, transportation, and processing expenses only since the existing outreach team is rated as perfectly capable of administering the already developed survey. Moreover, the lower cost in the contiguous case also reflects the fact that the extensive aerial photography project undertaken in the Montero area provides ample

lues as to feasible paths of expansion, a case not easily argued for the non-contiguous case which at \$50,000 is clearly more expensive.

2. Training. Training material and courses have already been designed and paid for. Both cases are estimated at \$75,000 reflecting primarily per diem, transportation, and living expenses of trainees, material costs, and teaching costs.

3. Equipment, Furniture, Materials. The difference between the two cases reflects land and new building costs incurred in the non-contiguous case.

4. Drugs, Vaccines. This figure reflects our knowledge (see Table 31) of what it takes to supply 11,000 with drugs and at least one extensive vaccination campaign.

5. Special Projects. The \$85,000 figure for the non-contiguous case covers the cost (material and processing) of the aerial survey, which is necessary for project location and identification of services users. The latter is also a prerequisite for the administration of the survey.

6. Wages and Salaries. In both cases we have assumed that labor costs incurred at the MOH level will be equal to the 1977 level of the Montaro project. In either expansion case, additional time spent in planning, coordination and supervision by MOH personnel should increase, say, in the second or third year of the expanding activity. It should subsequently drop to zero. In the non-contiguous case, we have priced the cost of maintaining a "skeleton" supervisory crew. This should consist of the following:

- a. Project Coordinator (1)
- b. District Medical Coordinator (1)
- c. Stenographer (1)
- d. Administrative Accountant (1)
- e. Secretary (1)
- f. Administrative Assistant (1)
- g. Messenger (1)
- h. Drivers (2)
- i. Porter (1)

The presence of the above staff is not of course directly related to the volume of services or size of coverage so it is not part of operational costs.

7. Transportation. The higher cost in the non-contiguous case reflects the purchase of vehicles and motorbikes to numbers equal to those existing presently in the Montero project.

APPENDIX E
INTERIM REPORT ON COST ANALYSIS OF LOW COST
HEALTH CARE DELIVERY IN THE TANZANIA PROJECT

INTERIM REPORT
ON
COST ANALYSIS OF LOW COST HEALTH CARE DELIVERY
IN THE
TANZANIA PROJECT

BY

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4 April 1979

**APHA Project: Cost-analysis of selected projects on Low Cost
Health Care Delivery assisted by U.S.A.I.D.**

I. BACKGROUND

Rural health services have been developed in Tanzania for quite some time in different directions. While by 1967 the number of Rural Dispensaries had increased to about 1200, their staffing had been limited to Dispensary Assistants, or more often than not dressers with limited training in outpatient care in hospitals.

Subsequently the Government of Tanzania, through the "Arusha declaration" put further development of rural health services as first priority, declaring availability of medical care to the whole population as its objective. To this end a pattern of training was developed aiming at improved staffing of a considerably expanded network of Rural Dispensaries and Health Centers. The training of nurses, rather diverse in many hospitals, was standardized in 17 Grade B nursing schools (3 years of training after Primary school), 3 Grade A Nursing Schools (4 years of training for Secondary school students having completed 4 grades in Secondary Schools and Grade B Nurses for 18 months).

For the team leaders of the health team in Rural Dispensaries a category of Rural Medical Aid was established and gradually 11 Schools for 3 year train-after Primary School were established to be further expanded to 16 such schools.

For the Health Centers, a category of Medical Assistants was established, trained in 7 M.A. schools for 4 years after 4 grades in Secondary Schools, while further upgrading of Medical Assistants was made possible to Assistant Medical Officers in 3 A.M.O. schools for 18 months training of M.A.'s. In addition the category of Health Auxiliary was developed for environmental and sanitary development of wards (groups of 5 villages within the district) for which 6 schools were established for 2 year training after primary school.

Before 1975, the M.C.H. services, such as were provided in a limited number of rural dispensaries and in all hospitals, were staffed by "Village Midwives" and "Nurse-Aids", both variably trained in hospitals. The hospitals

which trained these categories kept a considerable proportion of the trainees in the hospitals and the recognition that the MCH service required a much more concerted effort in staff development led to the establishment of the USAID assisted project for the training of MCH Aids in eventually 19 schools for 1 1/2 year training after primary school.

Table 1 lists the various categories of workers for primary health care with an additional category of village medical worker, a program started but temporarily suspended, in which young literate villagers were trained for 3-6 months. The trainees were not however, adequately supported by the villages and many sought employment elsewhere. It is the Government's intention to reactivate this program directing its training to a more established category of villagers.

During the same time that this thoroughly constructed pattern of health manpower was being developed, the existing health facilities - many established by Voluntary Agencies (Missions) - were ordered in a pattern of echelons of medical care, with the Rural Dispensaries, rapidly expanding in number at the bottom. The Rural Health Centers with up to 15 beds supervising 6 Rural Dispensaries as the first referral level, 76 District Hospitals, many so designated and assisted with government funding among the Voluntary Agency Hospitals. Twenty Regional Hospitals also serving the district of their location and 3 Referral Hospitals eventually to be expanded to a total of 6 zonal Referral Hospitals constitute the highest referral level. The earlier emphasis of the Ministry of Health budget in hospitals as 80% was gradually reduced to 60%.

**PRIMARY HEALTH WORKER
BASIC QUALIFICATIONS, DURATION OF TRAINING AND SCOPE OF ACTIVITY**

<u>Category</u>	<u>Basic Qualifications</u>	<u>Duration of Training</u>	<u>Scope of Activity</u>
1. Village Medical Worker	Primary School	3-6 months	Help villagers in prevention of common diseases, to treat minor elements and provide first-aid.
2. MOH Aids	Primary School	18 months	Run MOH services, conduct normal deliveries and provide health activities.
3. Health Auxiliaries	Primary School	2 years	Work in rural health centers and dispensaries to assist with provision of general health education, to visit homes, school and other centers to promote environmental health, to trace defaulting outpatients and to participate in campaign of specific diseases.
4. Rural Medical Aids	Primary School	3 years	Administering outpatients of simple diseases at dispensary; give initial treatment of serious illness pending referral to a rural health center or hospital, after care of patients discharged from hospital and participate in immunization and community health programs.
5. Medical Assistants	Secondary Education	3 years	In charge of health centers.

Tanzania (Mainland) with a land area of 957.062 km² and a population of 16.5 million has a very dispersed population. Overall population per region density of 17.5 km² ranging from 8 to 69 per km² with Dar es Salaam having a population density of 707 km².

Even so the concentration of the population, originally very disperse by individual households, into Ujama villages subsequent to the "Arusha" declaration of 1967, has generated some 7,500 to 8,000 villages of which 6,700 villages have contracted for incorporation in the overall development process for government service delivery in education, water supply and health services. Each Ujama village of around 1,500 population is organized through blocks of ten households with a Chief of Ten Houses while in the average 5 to 6 villages are organized in Wards, each level with their committees and Executive Secretaries. Each Ward has by now a Rural Dispensary for health care and will have in increasing numbers a Health Auxilliary assigned to the ward committee for environmental improvement. Four to five wards are organized in Divisions, each with a Rural Health Center, and 3 Divisions in a District with a District Hospital. The District Medical Office supervised all health activities in the District and is responsible to the District Area Commissioner. Each of the 20 regions consist of 3-4 districts and has a Regional Health Officer responsible to the Regional Commissioner, supervising both the Regional Hospital and all other health services in the Region. Since 1977 the administration of the country has been decentralized, leaving technical advisory services to the Central Ministry of Health while the Regional Commissioner, with assistance from the Regional Health Officer operates quite independently, though within the frame of the Central Party guidelines and directives.

At all these echelons the MCH services were increased and increasingly staffed by MCH aids as they became available while an MCH directorate was established at the Ministry of Health and MCH Supervisors, 29 Nurses and 11 M.D.s were trained abroad through the AID project, established at zonal (6 zones), Regional and District levels. Also, some of these trainees are working in the Ministry of Health.

Further impetus to the development of MCH services was provided by the establishment of a nationwide Expanded Programme of Immunization with assistance from WHO, UNICEF and several bilateral donors. The actual utilization of MCH service activities was greatly enhanced by establishing a pattern of service delivery at the various echelons by which all women of fertile age and children below 6 years reporting for medical care are first routed through the MCH section of each echelon for control of child development, immunizations and pre and post-natal care. The policy was adopted in late 1975.

From the above it is all too apparent that the increase of earlier established MCH service delivery, as well as the total of service categories in the low cost primary health care project, is caused by many factors and developments both in health manpower and health facility expansion and a range of sponsorships from government through International (WHO, UNICEF) to multilateral ECC, Scandinavian group, to bilateral developmental cooperation and voluntary agency assistance.

It is thus not possible to isolate the contribution of any particular development assistance to a particular sector or category of the health services or other development sectors (water supply, primary education) except through detailed study of a well circumscribed area; where individual assistance projects cover exclusively one or more development sectors. Such detailed studies were not within the charge of this mission.

On the other hand, it is possible to relate the overall development of health service utilization and coverage of specific (MCH) aspects relative to reported needs to overall investment costs of facility and health manpower development and the recurrent costs of the first two echelons of the health care system e.g. the Rural Dispensary and the Rural Health Center.

The Health Care Needs

The available Health Indicators are a crude death rate of 22, a crude birth rate of 47, a crude rate of population increase of 2.5%, an infant mortality rate of 167 and a life expectancy at birth of 44 years. In spite of the already well established reporting system, no information is available on the major causes of death in the first year of life.

On the other hand, the frequency of diarrhea among the MCH 1st attendances (0-6 yrs) varied from 19% in Jan-June 1976, to 31% in July-Dec. 1976 and 25.7% in Jan-June 1977. (Ref. Annex...) The range of malnutrition diagnosis as underweight (excluding kwashiorkor and marasmus) among these first MCH attendance varied from 18.7% in the first half of 1976 to 26.8% in the second half of 1976 and 27.2% in the first half of 1977. (Ref Annex...) These frequencies are not necessarily additive.

While with good rainfall the country is reported as self-sufficient in food, it is likely that the load of infantile and childhood diarrhea; and common childhood infections constitute a heavy burden on child development, making the strengthening of MCH services all the more relevant to the improvement of health of the rural childhood population. Furthermore three of the communicable diseases (measles, tetanus and tuberculosis) were responsible for 17% of all causes of deaths in hospitals in 1976 (Table II), while deliveries and complications of pregnancy and puerperium accounted for 19.22% of all causes of admission

to governmental voluntary agency hospitals in 1976 (Table III).

Measles accounted for 4.2% of all first MCH attendance below 6 years in 1976 and 8.75% in the first half of 1977 (Annex...).

Health Service Utilization

The reported number of outpatient services of rural dispensaries and rural health centers increased from 55 million in 1974 to 66 million in 1977 with a reported number of outpatient visits to hospitals of 5.5 million in 1976.

It is not unreasonable to assume a total of 70 million OPP visits in 1977, or a total number of health service contacts of 4 contacts per person per year, an unusually high rate of health service utilization for most developing countries (except Sri Lanka and Malaysia and a few other smaller countries) indicative of the high degree of accessibility and utility to the population of the health services network.

The target population for a dispensary is defined as the population living within 2 hours walking distance or a 10km radius. With the widely varying population density reported above average values have a limited use. However, for the national average, population density for an area of 10 km radius would contain around 5,000 population. With an average of 4 health service contacts per person per year, we would expect 70 visits per day per Rural Dispensary covering a population of 5,000, a figure observed in one of the Rural Dispensaries visited by the Mission.

On the other hand, the Mission observed a rather wide variation in visits to the few dispensaries visited, while the variation in population density must cause a wider variation in Rural Dispensary attendance further varying through the seasons per dispensary. Finally the population density must vary considerably within regions making an overall assessment of general health service utilization more hazardous.

MOST COMMON CAUSES OF DEATH IN HOSPITALS
1973 - 1976 (TANZANIA MAINLAND)

CAUSES	TTT	NO OF DEATHS CAUSED BY DISEASES IN HOSPITALS				% TO THE TOTAL NUMBER OF... DEATHS IN HOSPITALS			
		1973	1974	1975	1976	1973	1974	1975	1976
1. Pneumonia (all forms)		2,973	3,923	861	328	14.1	13.4	11.09	12.70
2. Gastroenteritis (all forms)		1,317	704	88	162	9.0	10.2	2.70	2.40
3. Malaria (all forms)		659	274	71	138	4.5	3.9	2.18	2.80
4. Tuberculosis (all forms)		663	338	126	417	4.5	4.8	3.87	6.30
5. Diphtheria (all forms)		1,005	554	167	486	6.9	7.8	5.13	7.40
6. Anaemia (all forms)		722	312	255	400	4.9	4.5	7.83	6.10
7. Condition of Early Infancy		495	552	32	431	3.4	7.9	0.98	6.60
8. Measles		1,628	620	860	562	11.1	8.9	26.41	8.60
9. Tetanus		552	134	430	132	3.8	1.9	13.21	2.00
10. Disease of the Heart		659	315	151	301	4.5	4.6	4.64	4.60
11. Meningitis		210	39	11	156	1.5	0.6	0.34	3.00
	TOTAL	9,998	6,904	2,551	4,105	60.1	68.5	78.38	62.90

MOST FREQUENT CAUSES OF ADMISSION TO GOVERNMENT AND V.A. HOSPITALS

1973 - 1976 (TANZANIA MAINLAND)

CAUSES	ADMISSIONS				% TO ALL ADMISSIONS			
	1973	1974	1975	1976	1973	1974	1975	1976
1. Deliveries - complication of Pregnancy and Puerperium	107,189	69,289	57,137	87,995	18.3	16.0	18.50	19.22
2. Malaria - all forms	49,241	29,162	28,922	34,789	8.4	6.7	9.36	7.59
3. Pneumonias	39,450	28,417	26,840	36,423	6.8	6.6	8.69	7.96
4. Gastroenteritis and other diarrhoeal diseases	36,160	10,952	10,561	9,473	6.2	2.5	3.42	2.07
5. External causes of Injuries	11,646	13,507	5,874	7,536	2.0	3.1	1.90	1.67
6. Ankylostomiasis	15,846	13,887	7,635	11,291	2.7	3.2	2.47	2.47
7. Measles	23,620	11,567	14,651	22,073	4.0	2.7	4.74	4.82
8. Iron - deficiency Anaemias	11,268	18,509	4,758	9,631	1.9	4.3	1.54	2.10
9. T.B. all forms	9,922	5,670	6,321	8,454	1.7	1.3	2.05	1.85
10. Bronchitis emphysema and asthma	15,444	17,385	8,149	11,184	2.6	4.0	2.64	2.44
11. Mucoplasma - all forms	3,831	4,136	4,899	2,798	0.7	1.0	1.58	0.61
12. Ascariasis	11,377	9,975	4,688	7,199	1.9	2.3	1.52	1.57
13. Other Anaemias	11,196	3,148	6,093	8,790	1.9	0.7	1.97	1.92
14. Acute respiratory infections	8,964	4,413	2,606	6,688	1.5	1.0	0.84	1.46
15. Dysenteries	9,624	3,909	1,798	3,673	1.6	0.9	0.58	0.80
16. Infection of skin & Subcutaneous tissue	9,989	4,693	5,212	5,152	1.7	1.1	1.69	1.13
17. Bilhazia	7,526	6,307	2,880	5,491	1.3	1.5	0.93	1.19
18. Hernias	5,642	5,227	6,905	4,786	1.0	1.2	2.24	1.05
19. Protein Malnutrition	6,864	4,171	945	5,887	1.2	0.9	0.31	1.29

- 2 -

CAUSES	ADMISSIONS				% TO ALL ADMISSIONS			
	1973	1974	1975	1976	1973	1974	1975	1976
20. Other Nutritional diseases	5,819	2,625	2,464	2,172	1.0	0.6	0.80	0.47
21. Whooping Cough	5,902	2,514	1,735	3,197	1.0	0.5	0.56	0.69
22. Nutritional Marasmus	3,777	3,790	2,928	4,389	0.6	0.9	0.95	1.00
23. All other causes 66	170,927	160,153	94,921	167,980	29.0	3.70	30.72	36.69
TOTAL	584,224	433,406	308,912	457,774	100.0	100.0	100.0	100.0

With regard to utilization of MCH service, the information is indicative of the relatively recent expansion of these services, at best half completed, another change-over from specific days for MCH services to daily clinics in the Rural Dispensaries and Rural Health Centers so staffed and equipped (in a recent sample of 200 Rural Health facilities, only 40% were staffed with an MCH aid and by two provided immunizations).

Coverage

The target population for the MCH services would be the women of fertile age (15-44 years) and the children of 0-4 years together according to the 1975 data 40.6% of the total population. If applied to the 1977 estimated population of 16.5 million this target population of 6.7 million.

If we assume that the utilization pattern of this target population relates to regular immunization of infants (4 visits per year of children under one year - Ref. Table IV), partial attendance for infant and childhood diarrhea (25% attendance for a generally assumed incidence of 2-3 diarrhea attacks in children under 4 or 2-3 visits per child 1-4 yrs), limited attendance 10% for common childhood diseases (respiratory infections and skin diseases of minimal (2 incidents per year for 0-4 yrs or 1 visit per child 0-4 years) and antenatal care of 2 visits per pregnant women or roughly 4 visits for all women in the fertile age group. One would arrive at a total attendance by the target population of 4.5 visits per person per year, which is close to the old attendance of the total population.

The total attendance to MCH service increased from 3.1 million in 1976 to an estimated 7 million in 1978, or slightly more than one visit per person per year for the target population of the MCH services. With the estimated Expanded Programme of Immunization, aiming at an immunization schedule through four visits per child in the first year of life (Ref. Table IV). That this

TALBE IV

IMMUNIZATION SCHEDULE

	<u>Tetanus</u>	<u>BCG</u>	<u>Smallnox</u>	<u>DPT</u>	<u>Polio</u>	<u>Measles</u>
Before Birth	3 injections					
At Birth		X	X			
1 st visit 1-2 months		(X)	(X)	X	X	
2 nd visit 2-3 months				X	X	
3 rd visit 1-4 months				X	X	
4 th visit 6-9 months						X

utilization rate is so much lower than the overall utilization is puzzling, certainly indicating that neither a regular immunization schedule for the new-born nor the likely frequent attacks of infant and childhood diarrhea have yet been generally recognized as reason to attend the available services.

From the Mission field visits, it was obvious that the MCH aids, village maternity and nurse aids in the Rural Dispensaries were fully occupied with the MCH attendances already, though obviously the major workload for the Dispensaries and health centers must be outside the MCH target population. If the Rural Dispensaries teamwork would generate better utilization of the MCH services only for regular immunization decided upon by the government the staffing of the Rural Dispensaries as planned at present should be quite adequate to cope with a projected workload. For immunizations only, this would consist of 4 visits for infants or 4 visits for 350 newborn (total po. of 7500) or not more than 5 immunization visits per day on the average.

From the above reported MCH attendance of 1 visit per person per year for the target population, one would fear a too low average of immunization. That the Evaluation Report of the Expanded Programme in Immunization by the Government, DANIDA, WHO and UNICEF of 1978 (Ref. Table V) reports for one district (Urumeru) a close to satisfactory immunization level, for the 2nd district surveyed (Iringa) about a 60% satisfactory level and for the third district a definitely unsatisfactory immunization level accounting for the prevailing targets (which may be unnecessarily high for some immunizable diseases considering the level of naturally acquired immunity in the population) is thus surprising and difficult to reconcile.

It is possible that the immunization units are under-reported among the MCH attendance reports because the E.P.T. evaluation report should carry more weight as it is based on actual surveys. On the other hand, a previous survey (1974) reported an even lower attendance by children under 5 years (Ref. Table VI) which even considering a doubling of attendance from 1974 to 1978 cannot be reconciled with the EPG evaluation reported immunization coverage.

TABLE V

AN EVALUATION REPORT OF THE EXPANDED PROGRAMME ON IMMUNIZATION
MINISTRY OF HEALTH, UNITED REPUBLIC OF TANZANIA
 A JOINT MOH, DANIDA, WHO, UNICEF REPORT JUNE 1978

Figure 6. Results of the coverage evaluation in 3 districts June 1978

	* Arumeru	District Iringa	Kisarawe
Estimated total population	** 150,000	269,000	255,000
Estimated population children 12-16 months	1,500	2,690	2,359
Children 12-16 months examined	216	207	212
% of children 12-16 months examined	14.4	7.7	8.9

Coverage (in %)

BCG	63	63	42
Smallpox	57	61	38
DPT I	70	54	34
DPT II	64	43	24
DPT III	54	36	17
Polio I	40	53	33
Polio II	70	43	23
Polio III	53	34	17
Measles	46	36	17

Cluster Distribution by % Coverage of Measles Vaccinated

0-20%	6	11	21
21-40%	9	9	2
41-60%	8	6	6
61-80%	1	0	1
81-100%	6	4	0
TOTALS	30	30	30

* No impact noticed from rural dispensaries in Arumeru (Arusha) District with different situation in Iringa and Kisarawe

** More recent estimates reveal higher figures than reported
 Arumeru 240,517 Iringa 290,101 Kisarawe 222,455

TABLE VI

Frequency of Units to Dispensary for Children <5 Years
By Number of Interviewed Mothers

	District 1		District 2		District 3		Total		
	Strat 1	Strat 2	Strat 1	Strat 2	Strat 1	Strat 2			
Unknown	155	133	353	144	300	284	1399	40.3%	48.5
None	46	39	26	54	50	70	285	8.2	
One	27	23	15	20	21	28	134	3.9	16.5
2-3	107	84	51	66	72	66	446	13.	
4-6	104	93	49	32	72	68	418	12.	
7-11	80	64	35	15	68	50	313	9	35.
12+	104	56	132	68	60	61	476	14.	
	623	487	662	429	643	627	3471	100.4	

Child Protection Baseline Survey. March 1974. Community Medicine Department, Medical College. University of Dar es Salaam.

Districts: Bajamoyo, Dodoma, Moshi.

Introduction to Costing - Tanzania

The following presentation outlines investment and recurrent costs associated with rural dispensaries (R.D.s) and Rural Health Centers (RHCs), the two lowest functioning tiers in the Tanzanian Health Care System. It is through these facilities that the bulk of primary health care - both curative and preventive - is delivered to the Tanzanian population. Below the dispensaries is a tier composed of village medical helpers. This contingent of personnel and their respective offices/clinics is not yet implemented on a scale sufficient to allow reasonable estimation of costs or coverage, and so is not dealt with here. Within the system of RHCs and RDs more information has been obtained regarding the maternal and child health aide training program than any other element. This reflects primarily greater availability of detailed information on the A.I.D. sponsored program. Figures for discrete categories of costs, e.g., for construction of schools for rural medical aids or for drugs used in Rds, were not available. Overall figures, occasionally estimates, were available however and were readily provided.

All parties contacted in this study were most open and helpful, often going out of their way to search out information or interrupt busy schedules in order to accommodate our many requests.

Table 1b

SUMMARY OF SELECTED INVESTMENT,
RECURRENT AND TOTAL COSTS - TANZANIA

	<u>1975-1976</u>	<u>1976-1977</u>	<u>(1977-1978)¹</u>	<u>Estimated full year 1977-1978</u>
MCHA Training				
Investment ²	1,099,700	1,915,100	(1,113,600)	2,672,640
Recurrent ³	1,149,800	2,333,300	(1,038,500)	2,492,400
Total	2,249,500	4,248,400	(2,152,100)	5,165,040
# MCHAs graduated	164	328		540 ⁷
Cost per MCHA	13,716	12,952		9,565
MCH Services				
Investment ⁴	997,600	997,600	1,506,133	1,506,133
Recurrent ⁵	< 200,000	446,970	(516,220)	640,749
Total	< 1,197,600	1,444,570	(2,022,353)	2,146,882
Total all MCH	< 3,447,100	5,692,970	(4,174,453)	7,311,922
Overall RHC & RD Services				
Investment	7,753,433	13,119,493		9,329,473
Recurrent	7,000,000	7,810,000		11,880,000
Total ⁶	14,753,433	20,929,493		21,209,473

1. Figures for MCHA training and recurrent MCH Services cost (which are dependent on training costs for estimation of the cost of retraining) based on data from 5 months rather than 1 year, due to delays in processing invoices within the government.
2. School construction, durables, vehicles, plant and maintenance (mostly vehicles), initial domestic training of school staff and overseas training of coordinators.
3. Nondurables, transportation (not vehicles), utilities, orientation seminars, student allowance and staff salaries.

4. One-third of construction costs for new RHCs and RDs, and full cost of MCH kits.
5. All MCH - related salaries, vaccines (estimated at 2/3 of what UNICEF has budgeted for 1980-82 - the only available figure on vaccine costs), and 1/3 of estimated replacement training costs.
6. These figures should be regarded as upper limits since government budgets were used in some cost categories, and these budgets include an undetermined amount of international assistance, leading to double-counting since international assistance played a large role particularly in investment costs which have been added in. A reasonable estimate of the range of double counting is 10 to 30%. However, this is not an issue in regards to MCH training or services.
7. There were only 40% of students who passed the final exam in 1978 due largely, it is thought, to a change in the background of the student body - that was the first class of non-experienced young women and they took an exam previously designed for experienced village midwives who subsequently went to MCHA school. This situation is not indicative of long-term trends and has been ignored in estimating cost per student, even though the effective cost per graduate in 1978 was closer to $5,165,040/216 = 23900$ ($216 = 40\%$ of 540).

1. As close as possible using available data. One notable exception is the case of MCEA schools for which the yearly period Nov. - Oct. was generally employed for funding by AID. A sliding scale was used (100% first year of operation, 80% second year, 60%...), which would have made estimation of cost by normal budget year very difficult. In this year are also
 - 2a. E.G., food, uniforms, misc. supplies
 - 2b. Educational supplies and equipment
3. These represent primarily the contributions of the Scandinavian countries.
4. These figures for 5 months only.
5. Estimates of staff salary requirements are made from expected staff patterns, available staff, and from salary scales for individual workers, as follows:

5. Table A

ESTIMATION OF THE NUMBER OF PERSONNEL BY TYPE REQUIRED FOR RURAL HEALTH CENTERS (RHCs) and RURAL DISPENSARIES (RDs)

Personnel Type	RHC		Staff Req.	RD		OVERALL	
	Av. RHC Staff	RHCs 1977		Av. RD Staff	RDs 1977	Total Staff Req. 1977	Total Staff Avail. for health system - 1977
		161			2088		
AMO	1		161			161	233
RMA	1.5		241	1	2088	2329	1393
Nurse B	1		161			161	?
MCHA	2		322	1 (or N.M. or V.M.)	2088	2410	1400 ^a
L.A.	1		161			161	?
P.A.	1		161			161	?
N.A.	1		161	.5	1044	1205	?
Driver	1		161			161	?
Sweeper	1		161				?
Tot AMO, RMA, Nurse B and MCHA Required =						5061	5061
Tot AMO, RMA, Nurse B and MCHA Available =							> 3026

a. MOE figure including village midwives and MCEAD. As of 1977, a total of 492 MCEADs had been trained in MCEA schools.

5. (continued)
 Assuming at least 20% of the available stock of workers does not work in RHC's or RD's, this implies that the number actually working in RHC's and RD's is equal to 2420. Staff salary requirements are calculated assuming that $\frac{2420}{5061} = 50\%$ of RHC's and RD's are staffed as indicated above using the salary table noted below. As evidenced in table 1, the estimates thus obtained are roughly 1/2 of the estimates given by the MOH (Mr. Dhalia) on a per RHC and per RD basis. The true figure probably lies between these two estimates since his admittedly very hypothetical estimate includes drugs, supplies and other resources.

NOTE 5 TABLE

CATEGORIES OF PERSONNEL - TANZANIA RURAL HEALTH CENTERS AND RURAL DISPENSARIES
YEARS OF TRAINING, and PRELIMINARY EDUCATION AND SALARY

	Years of Training	Preliminary Education	Salary
M.D. ¹	6	2°	\$3050
A.M.O. Asst. Medical Office	4	2°	\$1900
M.A. Medical Assistant	3	2°	\$1500
PHNA Public Health Nurse A a grade A nurse who has spent one year studying in the US in preparation for a position as an MCH coordinator	4	2°	\$2000
Nurse A	3	2°	\$2000
PHN - B A grade B nurse with 1½ years subsequent training in public health	4 1/2	1°	\$1500
NM Nurse Midwife	4	1°	\$1200
Nurse B	3	1°	\$1840
RMA Rural Medical Aid	3	1°	\$ 840
HA Health Auxilliary	2	1°	
LA Lab Assistant	2	1°	\$ 700
MCHA Maternal and Child Health Aid	1 1/2	1°	\$ 700

¹ Provided for reference.

6. These represent the sum of all costs of construction for schools completed in the year indicated. Six schools were opened in 1975, 8 in 1976, and 3 in 1977. One more is planned.

TABLE 6

CONSTRUCTION COSTS - MCHA TRAINING SCHOOLS, TANZANIA

1. Njombe	\$ 126,900	Rate of Exchange of
2. Tukuyu	124,800	Bill Submitted
3. Mwambani	127,900	
4. Same	88,800	Billed Through Treasury
5. Korogwe	89,800	Not in MOH Bills
6. Nzega	104,500	
7. Kahama	122,600	12 Contractors, 4 African
8. Morgoro	91,800	1 Built 3
9. Singida	78,500	
10. Kondoa	83,100	Ministry of Works
11. Nachingwea	130,700	Reimbursed Extra 16
12. Mtwara	125,200	Percent on Some Aspects
13. Mbulu	134,600	
14. Tunduru	123,900	
15. Geita	143,700	
16. Bagamoyo	108,340	
17. Kibondo	132,000	
18. Tarime	140,700	

7. Table 3 includes figures on the cost of construction of particular schools and of training specific personnel. Operating expenses paid through bilateral agencies probably support the bulk of costs associated with training --- categories of personnel for RHCs and RDs other than MCHAD. They do not however, indicate costs incurred in the past. These are also estimated in Table 3.
8. Estimated based on the present estimated cost of training each category of worker, assuming that each school which started operation in the designated year had a principal, a tutor (each A nurse-A), and a warden (A nurse-B).
9. Figure from MOH recurrent health budget (see attached). This table excludes the costs of training and salaries for supervisory personnel aside from those in the MCHA program, e.g., district medical officers. This is primarily because these personnel have many obligations aside from those to the system of RHC's and RD's. This was not the case with MCH coordinators at the zonal, regional, and district levels. Also not mentioned are programs at the village level for which little information could be found.
10. This figure combines a part-year expenditure with a budgeted figure and thus is not an accurate estimate of yearly cost.

NOTE 11, TABLE A

Estimates of Selected Assets Existing
Relevant to the Costing of RHC's & RD's
Tanzania, as of 1975

Type	Est Unit cost	Est # in 1975	Est # used in RHC or RD area	Total Assets Relevant to RHC, RD at approx. 1977 prices
I. Facilities				
	\$			
RMA school ^{1,2}	200,000	13	13	\$ 2,600,000
RHCs	79,000	130	130	10,270,000
RDs	6,000	1700	1700	10,200,000
II. Personnel training				
AMO	5,800	160	80	464,000
Nurse A	2,700			
NM	3,600	4465	800	2,400,000
Nurse B	2,700			
	(av. \$3000)			
RMA	1,800	790	700	<u>1,260,000</u>
				<u>27,194,000</u>

¹Cost for MCHA schools (past 1975) was an average of \$115,430 per school.

²Other categories of personnel are trained in either hospitals or in the field. No figures were obtained on these.

12. Estimated from the assumption that much of the network of MCH coordination was yet to be established, and that nurses returning from overseas training in public health constitute the bulk of the coordination force at present. Twenty-nine such nurses have been or are completing such training.
13. Estimated as 15% of the recurrent expenses of all training programs in a given year.

TABLE 13

NATIONAL HEALTH TRAINING PROGRAMME, 1972-1977 TANZANIA MAINLAND

Type of Training	No. of Tr. Institutions (1977)	1972 ¹	1973	1974	1975	1976	1977
1. Graduate Doctors	1	90/47	71/60	71/53	80/58	96/41	90/45
2. Asst. Medical Officers	3	-/22	22/-	22/24	-/-	41/33	33/35(a)
3. Medical Assistants	7	146/48	200/72	191/86	206/140	261/171	272/160
4. Rural Medical Aides	13	146/40	338/43	489/85	347/94	454/259	542/347
5. Nurse Tutors	1	-/-	18/-	18/15	19/18	17/21	20/17
6. Nurse/Midwives 'A'	3	126/39	130/37	129/59	129/81	122/96	150/136
7. Nurse/Midwives 'B'	21	530/270	500/331	488/355	474/423	492/360	500/400
8. Public Health Nurses	1	-/-	-/-	-/-	-/-	-/30	35/25(b)
9. Maternal & Child Health Aide	14	-/-	-/-	-/-	172/-	460/163	611/410
10. Health Officers (Sanitarians)	1	26/20	20/24	12/16	16/18	16/13	16/8
11. Health Auxiliaries	1	63/31	35/30	45/34	45/45	44/45	45/45

1. 1972 is the year of the 'big push' in Rural Development.

(a) Excluding 5 Resits who will complete in 1978.

(b) Excluding 7 Failures who will resit in February, 1978.

TABLES FOR COSTING AND COVERAGE

TABLE 19

MEDICAL FACILITIES /S AT 1ST JANUARY 1977TANZANIA (MAINLAND) - RURAL DISPENSARIES

Region	Estimated Population (1976)	Density of Pop. ² Per Km ²	Rural Dispensaries		Population Per Dispensary
			Existing	Under construction	
Arusha	801,000	9	109	5	7,349
Coast	475,000	17	95	-	5,000
Dodoma	945,000	23	133	3	7,100
Dar es Salaam	576,000	707	34	8	16,941
Iringa	913,000	17	134	11	6,310
Kigoma	586,000	16	77	7	7,610
Kilimanjaro	876,000	66	100	9	8,760
Lindi	522,000	8	89	4	5,365
Mara	757,000	35	101	2	7,495
Mbeya	821,000	16	119	3	6,893
Morogoro	850,000	17 ¹	158 ¹	4	5,250
Mtwara	816,000	49	88	11	9,272
Mwanza	1,340,000	69	151	23	8,079
Rukwa	371,000	9	56	4	6,625
Ruvuma	535,000	8	77	2	6,948
Shinyanga	1,172,000	24	137	6	8,562
Singida	596,000	13	77	9	7,740
Tabora	783,000	8	87	6	8,988
Tanga	1,187,000	42	171 ¹	4	6,942
West Lake	954,000	33	95	12	10,042
Grand Total	15,855,000	17	2,088	133	7,593

¹ Note: Shows an increase of 35 because Private, Parasital, Military dispensaries have been included from figures of 1976.

TABLE 20
MEDICAL FACILITIES AS AT 1ST JANUARY 1977
TANZANIA (MAINLAND) - RURAL HEALTH CENTRES

Region	Estimated Population (1976)	Density of Pop ₂ Per Km ²	Rural Health Centres		Population Per R.H.C.
			Existing	Under construction	
Arusha	801,000	9	10	1	80,100
Coast	475,000	17	5	2	95,000
Dodoma	945,000	23	12	2	78,750
Dar es Salaam	576,000	707	5(a)	2(a)	115,200
Iringa	913,000	17	7	4	130,425
Kigoma	586,000	16	5	3	117,277
Kilimanjaro	876,000	66	7	6	125,142
Lindi	522,000	8	6	3	87,000
Mara	757,000	35	8	3	94,625
Mbeya	821,000	16	9	4	91,111
Morogoro	830,000	17	9	3	92,222
Mtwara	816,000	49	7	4	116,571
Mwanza	1,340,000	69	18	4	74,444
Rukwa	371,000	9	4	2	92,750
Ruvuma	535,000	8	8	2	66,875
Shinyanga	1,173,000	24	10	6	117,300
Singida	596,000	13	6	3	99,333
Tabora	783,000	8	6	2	130,500
Tanga	1,187,000	42	12(b)	1	98,917
West Lake	954,000	33	7	3	136,297
Grand Total	15,855,000	17	161	60	98,478

Note: (a) Urban Health Centres
(b) 2 of these are Urban Health Centres

TABLE 21

MEDICAL FACILITIES AS AT 1ST JANUARY 1977
TANZANIA (MAINLAND) - HOSPITALS

Region	Estimated Population (1976)	Density of pop. ² Per Km ²	Number of Hospitals (Govt. V.A. Ind. etc.)	No. of Hosp. Beds ¹		Population per Hosp. Bed.
				Existing	Under constr.	
Arusha	801,000	9	9	1,019	-	786
Cosco	475,000	17	5	409	39	1,161
Dodoma	945,000	23	4	858	-	1,101
D'Salaam	576,000	707	5	1,429	-	405
Iringa	913,000	17	9	1,092	-	836
Kigoma	585,000	16	5	620	26	945.1
Kilimanjaro	876,000	66	12	1,394	26	628.1
Lindi	522,000	8	7	707	-	736
Mara	757,000	35	4	582	46	1,300
Mbeya	821,000	16	12	1,333	-	615
Morogoro	830,000	11	9	1,308	70	634.5
Mtwara	816,000	49	7	1,122	26	727
Mwanza	1,340,000	69	7	1,267	52	1,057
Mulwa	371,000	9	3	225	52	1,648
Ruvuma	535,000	8	7	1,215	104	440
Shinyanga	1,175,000	24	6	439	210	2,671.9
Singida	596,000	13	4	593	13	1,005
Tabora	783,000	8	5	853	-	917
Tanga	1,187,000	42	12	1,950	-	609
West Lake	954,000	33	9	1,555	-	613
Grand Total	15,855,000	17	141	19,970	664	795

1. Special Hospitals like Leprosaria, Mental Hospitals and Parasital TB Centres have been excluded.

TABLE 23KEY HEALTH PERSONNEL INVENTORY AS AT END OF YEAR

	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
1. Medical Doctors*	494	533	603	637	683	727			
National	195	231	278	324	356	400			
2. Assistant Medical Officers	140	140	160	160	193	233			
3. Medical Assistants	335	405	485	605	770	930			
4. Rural Medical Aids	578	621	706	790	1,049	1,393			
5. Nurses/Midwives	3,259	3,264	4,000	4,465	4,820	5,658 >			
6. Village Midwives/MCHA	700	775	850	910	960	1,400(a)			
7. Health Officer	78	98	122	138	156	170			
8. Health Auxiliaries	290	325	370	410	455 ^a	500			
9. Dentists	n.a.	n.a.	n.a.	12	15	18			
10. Assistant Dental Officers	27	27	27	27	27	27			
11. Dental Assistants	n.a.	n.a.	n.a.	15	21	27			
12. Pharmacists	n.a.	n.a.	n.a.	n.a.	11	25			

*Excluding 34 Cuban and 64 Chinese doctors.

(a) Village Midwives up-graded to Maternal and Child Health Aids.

TABLE 24

GOVERNMENT RECURRENT HEALTH BUDGET BY TYPE OF ACTIVITY

1971/72 - 1977/78

<u>Type of Activity</u>	<u>1971/72</u>		<u>1974/75</u>		<u>1977/78</u>		<u>% Change 1971/72-1977/78</u>
	<u>Shs '000</u>	<u>%</u>	<u>Shs. '000</u>	<u>%</u>	<u>Shs '000</u>	<u>%</u>	
1. Administration	2,210.0	1.4	2,631.8	0.9	2,892.5	0.5	30.9
2. Hospital Services	121,964.0	78.9	181,792.5	60.2	351,223.5(a)	65.5	188.0
3. Rural Health Centres	8,538.0	5.5	22,416.1	7.4	38,357.9	7.3	349.3
4. Rural Dispensaries	8,300.0	5.4	35,328.8	11.7	59,690.9	11.1	619.2
5. Preventive Services	5,965.0	3.9	37,499.7	12.4	47,098.2	8.8	689.6
6. Training and Manpower	4,767.0	3.1	18,875.5	6.3	27,570.4	5.1	478.4
7. Medical Production and Supplies	2,776.0	1.8	3,338.2	1.1	9,370.7	1.7	237.6
Total	154,520.0	100.0	301,882.4	100.0	536,204.1	100.0	247.0

(a) Shs.80 m. for Muhimbili Medical Centre 50% of which is for training of undergraduate doctors, pharmacists and post-graduate doctors. This has a distorting effect on the structure of expenditure.

. TShs. 7.9 = US \$1.00 1973

The Government Health capital expenditure over the past 6 years reflects the drive towards the implementation of the rural health, training and preventive programmes.

The following table shows the structure of the Health capital expenditure over the past few years:

TABLE 25

GOVERNMENT HEALTH CAPITAL EXPENDITURE

1971/72 - 1977/78

<u>Type of Programme</u>	<u>1971/72</u>		<u>1974/75</u>		<u>1977/78</u>	
	<u>Ss '000</u>	<u>₹</u>	<u>Ss '000</u>	<u>%</u>	<u>Ss '000</u>	<u>₹</u>
1. Hospital Services ¹	2,280.2	52.0	8,860.0	22	23,454.0	19
2. Rural Health Centres and Dispensaries	1,447.1	33.0	17,727.0	24	43,160.0	36
3. Preventive Services	87.7	2.0	5,787.0	8	28,109.0	24
4. Training Programmes	570.0	13.0	39,635.0	55	23,999.0	20
5. Manufacturing and Supplies	-	-	360.0	1	1,070.0	1
	4,385.0	100	72,369.0	100	119,792.0	100

¹Line item reflects the de-escalation of Government's involvement in hospital construction.

OMHS
Table 1

INVESTMENT AND OPERATIVE COSTS FOR RURAL HEALTH
CENTERS AND DISPENSARIES - GUATEMALA
(In U.S. \$, 0.75 Guatemalan Quetzales = 1 U.S.)

Investment Costs	1975 - 1976 Fiscal Year ¹					1976 - 1977					1977 - 1978					1978 - 1979					
	WH	AID	Other	UNICEF/ Other UN	TOTAL	WH	AID	Other	UNICEF/ Other UN	Total	WH	AID	Other	UNICEF/ Other UN	TOTAL	WH	AID	Other	UNICEF/ Other UN	TOTAL	
Initial Training of Personnel																					
WH Project																					
School Construction ²		897,000					812,000					760,000									
Supplies ³		679,000					7,312,000					672,000									
Books ⁴		197,700					349,700					34,000									
Publics Plant Mater.		60,100					300,000					100,000	200,000								
Transportation		13,000					85,000					26,700									
Utilities		60,000					170,700					85,200									
Initial In-service Training ⁵ School Staff	12,300					60,000					20,100										
In-service Training For Coordinators	23,500	86,000				60,000	118,000	5,000			60,000	202,000				60,000	100,000				
Relocation Expenses		17,100					22,000														
Student Allowance		9,300					101,200					11,100									
Staff Salaries		600,000					600,000					150,000									50,000
Total Cost of WH Training Project	75,300	2,115,000			2,190,300	118,000	7,412,000	5,000		2,270,200	270,100	1,017,000			2,152,100						
Other Training Programs ⁶																					
Construction & Equipment			872,000					1,010,000													
Operating Expenses								800,000													
Construction and Equipment	2,100,000 ⁷				2,100,000 ⁸					3,000,000											
WH			1,700,000					1,802,000													
WH			600,000					1,802,000													
Staff Quarters																					100,000
Transportation																					170,000
Other Utilities																					100,000
Supplies																					100,000
WH Site		101,311	55,000	60,500		101,311	55,000	60,500			101,311	55,000	60,500								60,000
Utilities Site																					60,000
Workshops			100,000					100,000													100,000
WHAL INVESTMENT COSTS	2,220,000	2,115,000	1,072,000	60,500	7,467,011	2,270,000	8,281,011	1,860,000		11,100,000	330,000	1,147,000	110,000	1,257,000	1,200,000	100,000	60,000	60,000	60,000	1,317,000	200,000
Operating Costs - Total																					
Salaries For WH Coordinators																					200,000
Salaries For WH Coordinators																					200,000
In-service Training (Instructors)																					50,000
Relocation Training																					50,000
Transportation																					50,000
Utilities and Maintenance																					50,000
Supplies																					50,000
Workshops																					50,000
Total Operating Costs																					1,000,000
WH Tot. Inv. Cost per WH																					200,000
per WH																					200,000
WHAL INVESTMENT COSTS	2,220,000	2,115,000	1,072,000	60,500	7,467,011	2,270,000	8,281,011	1,860,000	1,270,000	11,100,000	330,000	1,147,000	110,000	1,257,000	1,200,000	100,000	60,000	60,000	60,000	1,317,000	200,000

APPENDIX F
INTERIM REPORT ON COST ANALYSIS OF LOW COST HEALTH
CARE DELIVERY IN THE DANFA PROJECT

INTERIM REPORT
ON
COST ANALYSIS OF LOW COST HEALTH CARE DELIVERY
IN THE
DANFA PROJECT

BY
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4 April 1979

APHA Project: Cost-analysis of selected projects on Low Cost Health Care
Delivery assisted by U.S.A.I.D.

I. INTRODUCTION

Originally constructed in 1968, initial staffing and operation of the Danfa Rural Health Center began in January 1969. The following year saw the start of a joint research undertaking at the center. Funded primarily by the United States Agency for International Development (USAID), the University of California at Los Angeles (UCLA) School of Public Health joined with the University of Ghana Medical School (UGMS) in what became the Danfa Comprehensive Rural Health and Family Planning Project. As in many similar USAID projects, the major purpose was that of researching and designing a cost-effective approach to the delivery of rural health services in a lesser developed country (LDC).

The Danfa Rural Health Center is one of more than 60 such centers established by the Ghanaian Ministry of Health (GMOH). It is near the village of Danfa, north of Accra (the capital), approximately 25 miles. At the project's beginning, the area was described as being decidedly rural, having a slow growing network of pipe borne water with little or no electricity and having vehicle passable roads.

The Danfa project has been described frequently, in numerous publications, as well as the usual reports to USAID. Reported in this paper are cost and coverage elements for purposes of providing an overview regarding the possible low-cost aspects of rural health service delivery in a LDC. Overall management of the Danfa project appeared to be very well organized and thought of as evidenced by the unusual wealth of data gathered. Although currently available only as raw data, most of the project information is now being analyzed, particularly with regard to the utilization and possible health effects of the health center and satellite services in the project areas.

II. PROJECT SUMMARY

Health services delivery was only a small part of the joint project. While this paper is primarily concerned with the aspects of primary service delivery, an overview of the major objectives is provided below, for a more complete understanding of the project's context.

Project Purpose I.

Investigation of the state of the rural Ghanaian community, concentrating on factors associated with health and family planning behavior. The main emphasis was on research and evaluation field surveys of a varied nature were performed. Annual censuses, vital events registration, village and household health-related surveys were conducted as well as performing a family planning follow-up and an overall target population longitudinal survey. Special epidemiologic studies were conducted to identify major health problems, detect age groups at special risk and clarify factors affecting the distribution of disease. Some socioeconomic analyses were also performed.

Project Purpose II.

Strengthening the institutional capability of the Ghana Medical School to conduct research and train physicians and other health workers in the delivery of health and family planning services. Beyond the incremental transfer of responsibilities for research, teaching and training from the UCLA staff to the UGMS, there was an extensive development of training and procedure manuals. This also was to strengthen the infrastructure of the Ghana Ministry of Health and the UGMS through staff training, both in Ghana and abroad.

Project Purpose III.

Demonstration of several cost-effective health care system models to include family planning as an integrated component suitable to the Ghanaian context. This encompassed the health services delivery programs, health education and program evaluation which was oriented to generate epidemiological and other information for health planning by the Ghanaian Ministry of Health.

Project Purpose IV.

Transfer of information derived from the projects. In addition to usual information sharing, writing and publishing, this accounted for inter-organizational and inter-governmental public relations plus project visitors.

For the pursuit of these objectives, the project was established in the rural health training areas of the UGMS Department of Community Health. This training area, established in the early nineteen-sixties by Professor F. Seye, consisted of four geographic areas in the Danfa region. Originally thought of as separate and distinct, they were subsequently found to allow less comparison and evaluation than planned. Of the four geographic areas, three were to be provided with different degrees of health care services and the fourth was to serve as a control area. Differences were established using various service

components as follows:

Area I: One health center providing medical care, health education, family planning and regular immunizations.

Area II: The provision of only health education and family planning services.

Area III: Just family planning services were provided.

Area IV: None of the above services were provided to this as the control area.

For the objective of the present investigation, only Area I is relevant since it is the locale of the Danfa Rural Health Center. Since the project provided continual training, plus research and evaluation of the four areas, for both the Ministry of Health and the UGMS, the allocation of investment costs to Area I was a judgemental decision made by the UCLA project management. In addition to serving as a training point for the UGMS students, national officials of the Ministry of Health, numerous international visitors and many U.S. Government officials received training from the project as well. Since the costs of orienting and training the international visitors and U.S. Government officials cannot be discounted from the operational costs of the Danfa project health services delivery operations, they are considered to be an external product.

III. PROJECT COSTS

Collection and evaluation of cost elements for the Danfa Rural Health Center was complicated by numerous inter-organizational objectives and responsibilities unrelated to the actual delivery of health care services. UCLA was primarily responsible for research, evaluation and some training activities. It also was the only available source of cost data. The UGMS was responsible for supervising actual service delivery and partial staffing as well as training activities but none of its costs data was available. The National Ministry of Health and the Greater Accra Region Ministry of Health were also responsible for some staffing, administrative support and resources, while Korle Bo Hospital also supplied various drugs and medical supplies. No cost data were available concerning these activities. Work done by the center's health education teams in villages used materials and labor provided by village development committees and the Ministry of Rural Development.

In summation, cost elements and accountability are lacking for the following activities: planning; manpower recruitment, distribution and maintenance; supply procurement and distribution; capital construction; plus contribution of various national and international organizations. UCLA project staff and their reports were the primary data sources for all cost elements presented herein.

Fund sources are the USAID, the Government of Ghana and UNICEF. No means of relating these monies to project activities is provided since such a cost accounting capacity apparently has not been developed due to the varied organizational roles mentioned above. As can be seen in Table 1, Danfa Project Funds Summary, Fiscal Years 1970-1979, over nine million dollars have been budgeted or spent for the ten year life of the project. The official exchange rate of a U.S. dollar for a Ghanaian cedi (¢) used throughout this paper is \$1.00 - ¢1.15 or ¢1.00 - \$.087.

Table 1

DANFA PROJECT FUNDS SUMMARY
Fiscal Years 1970 - 1979

	<u>U.S. \$</u> <u>(000)</u>	<u>Cedi</u> <u>(000)</u>
U.S., FY 1970-1979	\$6,388	¢7,345
G.O.G., FY 1970-1979	2,598	2,988
UNICEF, FY 1977-1979	<u>300</u>	<u>345</u>
TOTAL	\$9,286	¢10,678

All of the monies in Table 1 can not presently be accounted for in terms of what they were expended for. However, as best can be done from existing sources, the following discussion of project costs will indicate what is currently known about the apparent cost per capita of providing health care services in Danfa Area I, Ghana.

A. Health Care Costs

Health services delivered from the Danfa center include health education and family planning components as well as general medical services. While activities are carried on at three satellite locations in addition to the center, cost allocations for these activities are currently unavailable. Operational costs were in an aggregated form for 1973-1976 and can be seen in Table 2.

Table 2
 DANFA AREA I HEALTH SERVICES OPERATING COSTS
 (In Dollars)

	1973	1975	1975	1976
Danfa Rural Health Center¹				
Staff	\$16,423	\$28,263	\$34,530	\$38,743
Drugs & Medical Supplies	10,510	28,414	30,019	35,098
Non-Medical Supplies	4,301	3,993	4,451	4,747
Transportation ²	<u>1,877</u>	<u>3,625</u>	<u>4,759</u>	<u>5,754</u>
SUB-TOTAL	33,111	64,295	73,759	84,342
Health Education				
Staff	5,118	6,102	7,616	8,167
Materials	261	261	478	435
Transportation ²	<u>1,864</u>	<u>1,999</u>	<u>1,863</u>	<u>7,363</u>
SUB-TOTAL	7,243	8,362	9,957	10,963
Family Planning				
Staff	1,310	2,007	2,570	2,517
Contraceptives & Supplies	570	1,310	1,632	1,692
Transportation ²	1,317	1,936	2,637	3,557
(allocated from Health Education costs)	(1,195)	(1,398)	(1,991)	(2,193)
(allocated from DRHC costs)	<u>--</u>	<u>--</u>	<u>--</u>	<u>(2,070)</u>
SUB-TOTAL	2,002	3,855	4,848	3,503
Anti-Malarial Program ³	459	1,385	1,664	1,950
Immunization Program ⁴	---	2,910	3,470	4,049
TBA Program ⁵	<u>299</u>	<u>767</u>	<u>935</u>	<u>1,082</u>
TOTAL ⁶	\$43,114	\$81,574	\$94,633	\$105,891

- 1 This also includes the operation of three satellite clinics, one day per week for each clinic.
- 2 While the transportation system is reported to be atypical of Ghana in terms of poor roads, the assignment of one vehicle, a 1968 Land Rover, to the Center is considered typical. Also included in transportation costs are the operating and depreciation costs of one Land Rover from the UCLA project which cannot be separated out.
- 3 This includes staff and materials.
- 4 The immunization program was a mobile unit of UCLA staff based in Accra. Immunizations were provided only to children.
- 5 The traditional birthing attendant costs include a supervising nurse from the UGMS, transportation plus packaging and the delivery of materials to replace TBA costs.
- 6 In-service training done by supervisory personnel is included throughout the cost data and cannot be segregated.

1. Personnel Costs

Whereas personnel costs should include initial training, salaries, allowances and replacement training, only salaries and allowances for 1975 were obtainable. Included are such elements as social security, transportation and cost of living as well as a government stipend paid to physicians in lieu of private practice. The medical officer is a part-time position, 15% of full-time, with the remaining time allocated for duties in the UGMS Department of Community Health. Table 3 depicts 1975 monthly staff costs for the Danfa Center only. The costs have not been totalled because information is not available for all slots.

Table 3

MONTHLY STAFF COSTS, 1975
(In Dollars)

<u>Staff Category</u>	<u>Monthly Cost</u>
Medical Officer (15% of full-time)	\$ 87.15
Health Center Superintendent	266.67
Community Health Nurse	113.82
Nurse Midwife	141.08
Midwifery Assistant	88.29
Sanitary Assistant	244.00
Dispensary Assistant	135.50
Records Clerk	117.75
Driver	99.54
Craftsman/Laborer	80.00

Health center staff are employed by the UGMS and the GMOH. Since Ministry staff are paid significantly less than UGMS staff, Ministry staff receive additional compensation from the UGMS as an equalizer for performing the same tasks while employed by different agencies with unequal pay scales. Cost data presented in this report originated from UGMS accounts and cannot be broken down to show pay scales and compensation differences for both agencies concerned.

Staff costs for family planning volunteer village health workers are not estimable in terms of the value of the alternatives or other opportunities forgone. The same holds true for the volunteer program usually at the satellites. This utilizes one or two teenagers used as messengers and for menial kinds of work. Also excluded is the cost of using a fourth year UGMS student at the health center during summers.

Personnel costs for 1971 totalled \$13,300. By 1975, for the total staff complement, total costs were \$32,370. This was an overall increase of 143 percent in personnel costs. While part of the rise was the result of increased staff at the health center, a significant portion came from considerable increases in salaries and wages as part of Ghanaian Government attempts to adjust for inflation averaging 33 percent per year during 1970-1975. As examples of the personnel cost increases, the salary of the health center superintendent rose by 121 percent, the community nurses by 82 percent and the clerk by 191 percent. The government was attempting to maintain constant standards of living from year to year for government employees.

Personnel costs for staff housing are not isolated. Except for the medical officer, the health center staff live in seven bungalows on the health center complex grounds. A small percentage of their pay is deducted for this. Additionally, housing maintenance and repairs are provided as part of the total health center operation. These are included in personnel and non-medical supply costs but cannot be isolated or estimated.

Initial and replacement training costs were unobtainable for any staff. These costs are assumed to be considerable as attrition was estimated by the UCLA project to be as high as 100 percent annually for all health staff. No attrition estimates exist for clerks, drivers, craftsmen, laborers or volunteers, almost all of whom require some form of training.

As best as it can be determined from the fragmented information provided for this report, Table 4 is an inventory of the total staff.

Table 4
TOTAL STAFF COMPLEMENT
1976

<u>Staff Category</u>	<u>Number of Staff</u>
Medical Officer (15%)	1
Clinic and Satellites	
Health Center Superintendent	1
UGMS Student ¹	1
Community Health Nurse	2
Nurse Midwife	1
Midwifery Assistant	2
Sanitary Assistant ²	1
Dispensary Assistant	1
Storekeeper	1
Clerk ³	2
Driver	2
Craftsman/Laborer ⁴	15
Satellite Volunteer ⁵ (two per satellite)	6
Health Education Teams (two)	
Community Health Nurse (team leader)	2
Nutrition Assistant	2
Family Planning Field Worker (female)	2
Family Planning Worker/Sanitary Assistant (male)	2
Family Planning Team	
Family Planning Nurse	1
Family Planning Assistant (nurse's aid)	1
Clerk	1
Volunteer Village Health Workers ⁶	not available

- 1 A fourth year medical student is assigned to the center during the summer.
- 2 Serves as a sort of district sanitarian.
- 3 This is above standard for district health centers. The extra clerk at Danfa is to afford coverage at both the center and the satellites three times a week.
- 4 These staff provide the physical maintenance of the health center complex and includes carpenters, common laborers and two engine attendants to operate the diesel generator. Whereas the necessity for some of these staff may be questioned, it is understood that this is one of the means of general employment utilized by the GOG.
- 5 This is not a paid position, not an official title.
- 6 A part of the family planning service delivery objective was to train and supervise these workers.

2. Facility Costs.

Construction of the health center and seven staff and student bungalows on the complex grounds was completed in 1968 at a total cost of \$101,790. Project staff estimated that it would have cost five times as much to construct the same complex in 1972, but were unable to provide a more current estimate of replacement costs.

Free facilities are utilized for the three satellite clinics. One criterion for locating the clinics was that each village chosen had to be willing and able to provide, cost free, a site for use once a week which could be either a village communal building or one belonging to an individual. Therefore, no direct rent costs are incurred by the health center in operating the satellite clinics.

Operation and maintenance costs are of an indirect nature. They are included in staff and non-medical supply cost categories in a manner that does not lend itself to being able to further identify or isolate operating and maintenance costs.

3. Land Costs.

While the health center and bungalows occupy some land, no dimensions, cost or ownership information is available to include in this report. All land use for the satellite clinics is donated in conjunction with village-provided building utilization.

4. Drug and Medical Supply Costs.

Korle Bo Hospital, as the teaching facility of the UGMS, has responsibility for obtaining and providing all drugs and treatment materials. Drug costs are paid for by the GOG. UCLA project staff indicated drug and medical supply costs increased from \$17,834 to \$35,098 by 1976. Itemized expenditures were unavailable to analyze how much of this cost increase might have been due to inflation and how much might have been due to consumption patterns.

In addition to drugs, bandages, cotton, gauze, towels, syringes, tinned milk and other nutrition supplements, cloth for nurses aprons, prescription pads and disinfectant are among the medical supplies consumed by the center. No data was available for analysis of these supply costs.

Oral contraceptives, intrauterine devices, Pregnosticon (pregnancy) tests, scales to weigh babies, an ophthalmoscope and other unspecified medical supplies are utilized by the health center without any inventory or cost data being available for this project review.

Some data was available concerning actual drug consumption during 1975 and is presented as reported in Table 5.

Table 5
 REPORTED DRUG CONSUMPTION
 1975

<u>Category (type...quantity)</u>	<u>Percent of Total Drug Costs</u>	<u>Percent of Total Operating Costs</u>
Antimalarials	25%	10%
(chloroquine tablets...240,000)		
(chloroquine syrup...690 liters)		
(injectable chloroquine...5,500 ml)		
(pyrimethamine tablets...36,000)		
Analgesics	14%	6%
(aspirin...155,000 adult doses)		
(acetaminaphen & APC...68,000 adult doses)		
(oral codeine...12,000 adult doses)		
(pulverized aspirin...50 kilos)		
(other items...no data)		
Antibiotics	16%	7%
(sulfa tablets...4 per patient visit, or 114,716)		
(penicillin tablets...41,000)		
(penicillin...4,000 adult dose injections)		
(Chloromycetin syrup...25 liters)		
(other items...no data)		
Vitamin Preparations (no data)	10%	4%

5. Non-Medical Supply Costs.

While no costs or inventory data were available, it is known that paint, wood, cement, fuel for the generator, light bulbs and flashlight batteries were consumed.

6. Transportation Costs.

A 1968 Land Rover was purchased at a cost of \$3,480. The only operation cost currently available was for 1975 when \$3,095 was spent on gasoline, maintenance and insurance. UCLA project fleet vehicles were utilized when the Land Rover could not be. Out-of-service time ranged from two weeks for a lubrication and oil change to six months for a major repair. Furthermore, the health center also utilized a vehicle from the project research fleet to transport staff to and from the satellite clinics three times a week, which was estimated to cost \$1,262 in 1975.

While it is assumed that transportation costs were incurred by the health education and family planning teams, no data or estimates were available. These costs were a part of the UCLA project.

7. Electricity Costs.

The generator on the health center complex grounds is the sole source of electrification. Supply, maintenance and operating costs are included elsewhere and cannot be isolated for this report. Nothing is known about the age, specifications or initial costs of the generator.

8. Other Health Care Resource Costs.

While the discussions and documents reviewed in this paper have been gone through for completeness and comprehensiveness of resource categories and costs, it is assumed that due to the lack of central coordination, consistency and accountability of resources, some elements may have been neglected that are important from either a developmental or an operational perspective. Continuing education or in-service training costs were unobtainable. No indications existed regarding donated materials, if any, that are consumed. Reportedly, there is very little equipment at the health center.

B. Training and Research Costs.

Training and research occurred with dual objectives. The first was to further the development of the Danfa Comprehensive Rural Health Center. The second was to build the capacity of the national health care delivery system. Nine primary health center staff were trained each year for five years. A total of 90 other Danfa staff also received training of some kind. Classes of 50 medical students received training at the center each year for seven years. Approximately 300 MOH staff received some kind of training at the center. Also, uncounted traditional birth attendants (TBAs) were trained at the center. Cost data was estimated by UCLA project staff so that investments in the health center could be isolated from those in the national system. Research costs are presented in Table 6 and training program costs are presented in Table 7.

Table 6
RESEARCH COSTS
1969 - 1979
(Thousands of Dollars)

Category (Years)	Danfa Investment	National Investment	Total Costs
Longitudinal Survey (1972, 75, 77)	17.3	\$328.3	\$345.6
Village Health Survey (1972, 75, 77)	202.7	67.6	270.3
Census-Vital Events	324.2	108.1	432.3
Health Center Operations Research (1971, 76, 77)	57.4	3.0	60.4
Health Center Records & Evaluation	143.3	--	143.3
Health Related Behavior Surveys (1973, 74, 76)	92.0	30.6	122.6
Family Planning Records & Evaluation	94.0	31.3	125.3
Family Planning Follow-Up Studies (1975, 77)	56.9	19.0	75.9
Polio Survey	9.3	9.3	18.6
Immunization Surveys (1973, 77)	29.4	9.8	39.2
Guinea Worm	15.1	5.0	20.1
Malaria Surveys	67.0	22.4	89.4
TBA KAP Study	<u>117.8</u>	<u>17.7</u>	<u>35.5</u>
TOTAL RESEARCH COSTS	\$1,126.4	\$652.1	\$1,778.5

Table 7
 TRAINING COSTS
 1969 - 1979
 (Thousands of Dollars)

Category	Danfa Investment	National Investment	Total Costs
Overseas	\$66.8	\$200.5	\$267.3
Local			
TBA	5.1	5.0	10.1
Danfa Rural Health Center	52.0	---	52.0
Health Education Assistance Teams	64.9	21.6	86.5
Family Planning Team	61.1	---	61.1
Village-Based Primary Care Workers	18.1	---	18.1
Manual Production	<u>26.2</u>	<u>78.8</u>	<u>105.0</u>
TOTAL	\$294.2	\$305.9	\$600.1

Differences between initial and replacement costs are unknown. However, in some cases they can be estimated. TBAs were trained in equal groups annually for seven years. Therefore, it is estimated that \$729 are investment costs and the same expenditure re-occurs annually. Health center staff investment costs are estimated at \$10,400 with the same expenditure occurring annually. Health education team investment costs are estimated to be \$32,980 with the same recurring annual expenditure. Family planning team investment costs are estimated at \$12,220 with the same recurring annual expenditure. Primary care workers investment costs are estimated to be \$3,620 with the same recurring annual expenditure. Total investment costs for training, including overseas training and manual production, are \$152,949. Recurring costs are estimated to be \$59,949.

C. Funds Sources.

A review of USAID documents provided the only information on fund sources included in this paper. Once again, the fragmented budgeting and accounting of these monies prohibits any analysis or discussion of these expenditures. No itemization exists for the \$4,117,000 spent during the early stages of development during the 1970-1975 fiscal years. However, Table 8 provides some cost details on fiscal year expenditures from 1976 through 1979.

Table 8
FUNDS SOURCES
Fiscal Years 1976 - 1979
(Thousands of Dollars)

<u>Source</u>	<u>Cost Category</u>	<u>FY '76</u>	<u>Interim Quarter</u>	<u>FY '77</u>	<u>FY '78</u>	<u>FY '79</u>	<u>Totals</u>
U.S.							
	Personnel						
	UCLA salaries:						
	at UCLA	\$128	\$ 44	\$140	\$244	\$127	\$683
	in Ghana	161	34	117	15	-	327
	Local hire						
	in Ghana	<u>6</u>	<u>2</u>	<u>7</u>	<u>1</u>	<u>1</u>	<u>17</u>
	Sub-total	295	80	264	260	128	1,027
	Personnel allowances, fringe benefits	<u>135</u>	<u>29</u>	<u>110</u>	<u>50</u>	<u>21</u>	<u>345</u>
	Total Personnel	430	109	374	310	149	1,372
	Equipment, Supplies	59	-	41	24	1	125
	Travel, Household Storage & Removal Expense	49	-	55	47	53	209
	Local Currency Costs*	56	15	95	85	25	276
	Other Direct Project Costs	109	34	92	123	76	434
	Participant Training	30	8	20	50	50	158
	Indirect Costs	<u>143</u>	<u>34</u>	<u>125</u>	<u>111</u>	<u>49</u>	<u>472</u>
	Total U.S. Funds	<u>876</u>	<u>205</u>	<u>802</u>	<u>750</u>	<u>403</u>	<u>3,036</u>
GOG							
	Community Health Staff	109	-	113	122	130	474
	Recurring Operations	251	-	261	270	304	1,086
	Maintenance and Transport	<u>68</u>	-	<u>72</u>	<u>77</u>	<u>56</u>	<u>273</u>
	Total GOG Funds	<u>428</u>	-	<u>446</u>	<u>469</u>	<u>490</u>	<u>1,833</u>
UNICEF							
	In-Service Training	-	-	50	75	100	225
	Commodity Support	-	-	<u>25</u>	<u>25</u>	<u>25</u>	<u>75</u>
	Total UNICEF	-	-	<u>75</u>	<u>100</u>	<u>125</u>	<u>300</u>
	TOTAL	<u>\$1,304</u>	<u>\$205</u>	<u>\$1,323</u>	<u>\$1,319</u>	<u>\$1,018</u>	<u>\$5,169</u>

* Travel, gas, equipment, maintenance, etc.

D. Costs Summary.

Before presenting any discussion of costs and coverage, it must be emphasized that Ghana experienced tremendous inflation during the life-time of the Danfa project to date. As such, Table 9 is included, both to indicate total Ghanaian health expenditures from 1970-1978 and to show their consumer price index where the Danfa project services were actually paid for, regardless of funding sources.

Table 9

MINISTRY OF HEALTH EXPENDITURES
ADJUSTED FOR COST OF LIVING AND POPULATION GROWTH
1971 - 1978

Fiscal Year	Total Expenditures*	Consumer Price Index ¹	Total Expenditures Adjusted for Cost of Living*	Per Capita Expenditure Adjusted ²
1970-1971	34,505	197.3	34,505	¢4.03
1971-1972	34,026	216.4	31,023	3.51
1972-1973	41,965	246.6	33,575	3.68
1973-1974	71,223	290.9	48,306	5.14
1974-1975	103,279	362.1	56,274	5.80
1975-1976	112,095	534.0	41,416	4.13
1976-1977 (budget)	128,414	750.0 (est.)	33,781	3.27
1977-1978 (budget)	183,745	n.a.	n.a.	n.a.

* In cedi, 000 omitted.

¹ Consumer price index based on March 1963 = 100. This was adjusted to equate all years in this table to 1970-1971 as the base year. Figures shown are the average of the two years listed.

² Adjusted to 1970-1971. Based on 1970 census of 8,559,000 increased at an annual average rate of 3.2% for the subsequent years.

It can be seen in Table 10 that economies of scale exist. Costs per visit, when adjusted for inflation, were reduced from \$0.97 per visit in 1974 to \$0.68 per visit in 1976 where an average of 29,000 visits occurred for three consecutive years.

Table 10

COSTS SUMMARY STATISTICS

Area population	17,243
Population covered	19,657
Patient visits	29,000
Visits per area population	1.68
Visits per population covered	1.48
Annual operating costs	\$105,891
Operating cost per capita	\$6.14
Operating cost per covered person	\$5.39
Operating cost per visit	\$3.65

Investment Costs

Facilities	\$ 101,790
Vehicle	3,480
Research	1,126,400
Training	<u>152,949</u>
Total Investment Costs	<u><u>\$1,348,619</u></u>

E. Costs Observations

As is evidenced throughout the cost portion of this paper, current reporting leaves much to be desired. All sources of funds should be identified from the perspective of which organization pays for each health center resource consumption activity. The Danfa Center should develop a manually

operated, integrated financial management information system. Without becoming a very elaborate activity, this should enable the center, and in turn the MOH, to record and maintain knowledge on the amounts spent by all funding agencies as well as on what resources the funds were spent.

Staff data should include the following cost elements by personnel title: training -- initial, in-service and replacement; salary; social security; transportation pay; cost-of-living adjustments; housing allowances; stipends in lieu of private practice; additional compensation for MOH staff paid less than the same UCMS staff; plus any other pertinent cost elements that may be significant to continued operations.

Drug, medical and non-medical supply, transportation, electricity, land, facility and equipment costs should be identified by element, useful life, plus one-time and recurring need requirements. Initial, replacement, fixed and variable costs should be identified in an aggregated form by cost element as well as on a per unit cost basis.

IV. COVERAGE

The target population for the present evaluation includes only the Area I population in 61 villages, which increased from 12,000 in 1971 to 17,243 in 1976, an increase partly due to a surplus immigration. Though the original selection of the areas assumed a relatively stable population, the careful follow-up of the population in all four areas revealed a far greater mobility. This in itself would be of interest for detailed review, particularly with regard to the planning of immunization programs in rural Ghana. The age and sex distribution of the Area I population as of 1 August 1976 is provided in Table 11.

Table 11
AGE AND SEX DISTRIBUTION OF POPULATION OF AREA I
As Of August 31, 1976

Age	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
0	326	3.6	276	3.3	602	3.5
1	300	3.3	261	3.2	561	3.3
2	275	3.1	238	2.9	513	3.0
3	297	3.3	337	4.1	634	3.7
4	526	5.8	587	7.1	1113	6.5
0-4	1724	19.2	1699	20.6	3423	19.9
5-9	1319	14.7	1196	14.5	2515	14.6
10-14	1352	15.0	1108	13.4	2460	14.3
15-19	891	9.9	814	9.9	1705	9.9
20-24	681	7.6	657	8.0	1338	7.8
25-29	475	5.3	429	5.2	904	5.2
30-34	400	4.4	367	4.5	767	4.4
35-39	335	3.7	318	3.9	653	3.8
40-44	327	3.6	348	4.2	675	3.9
45-49	269	3.0	239	2.9	508	2.9
50-54	243	2.7	234	2.8	477	2.8
55-59	220	2.4	211	2.6	431	2.5
60-64	190	2.1	148	1.8	338	2.0
65+	512	5.7	416	5.0	928	5.4
UNKNOWN	58	0.6	63	0.8	121	0.7
TOTAL	8996		8247		17,243	

Source: Danfa Comprehensive Rural Health and Family Planning Project: Ghana.

A. Utilization of Health Services.

Initially, health care was provided by the one health center in Danfa itself. Patient origin studies indicated that 90 percent of the visits originated from an area of a four mile radius around the health center which, together with the demographic information established by the project, indicated that only 35 percent of the target population used the health service at that time. By the establishment of a satellite program, holding a clinic in three different sites each for one day a week by half the health center staff, brought the population using the health services up to 85 percent of the target population or, for 1976, a population of 14,656. Fifteen percent of the population use traditional practitioners exclusively. For 1976, a total of 29,000 visits were recorded, or two visits per person per year of the population reached and slightly less than 1.7 visits per person per year for the actual target population for 1976. The Danfa service delivery system provided care to about 5000 persons from villages outside the project boundaries until 1976, after which a new clinic in one of those areas reclaimed most of these people.

The arrangements for individual categories of services, such as well-child work, family planning services and immunization surveys by special teams from Accra (for family planning and immunizations) or special workers stationed in villages (health education) make it impossible to evaluate quantitatively the actual utilization of well-child services as the recording of such services by the health center and its satellite clinics and the health education workers is not integrated on a regular basis.

On the other hand, Figure 1 represents the distribution of patient visits by age and sex, indicating a high utilization in the first five years for all children and a higher utilization for females in the fertile years.

B. Coverage by Immunizations.

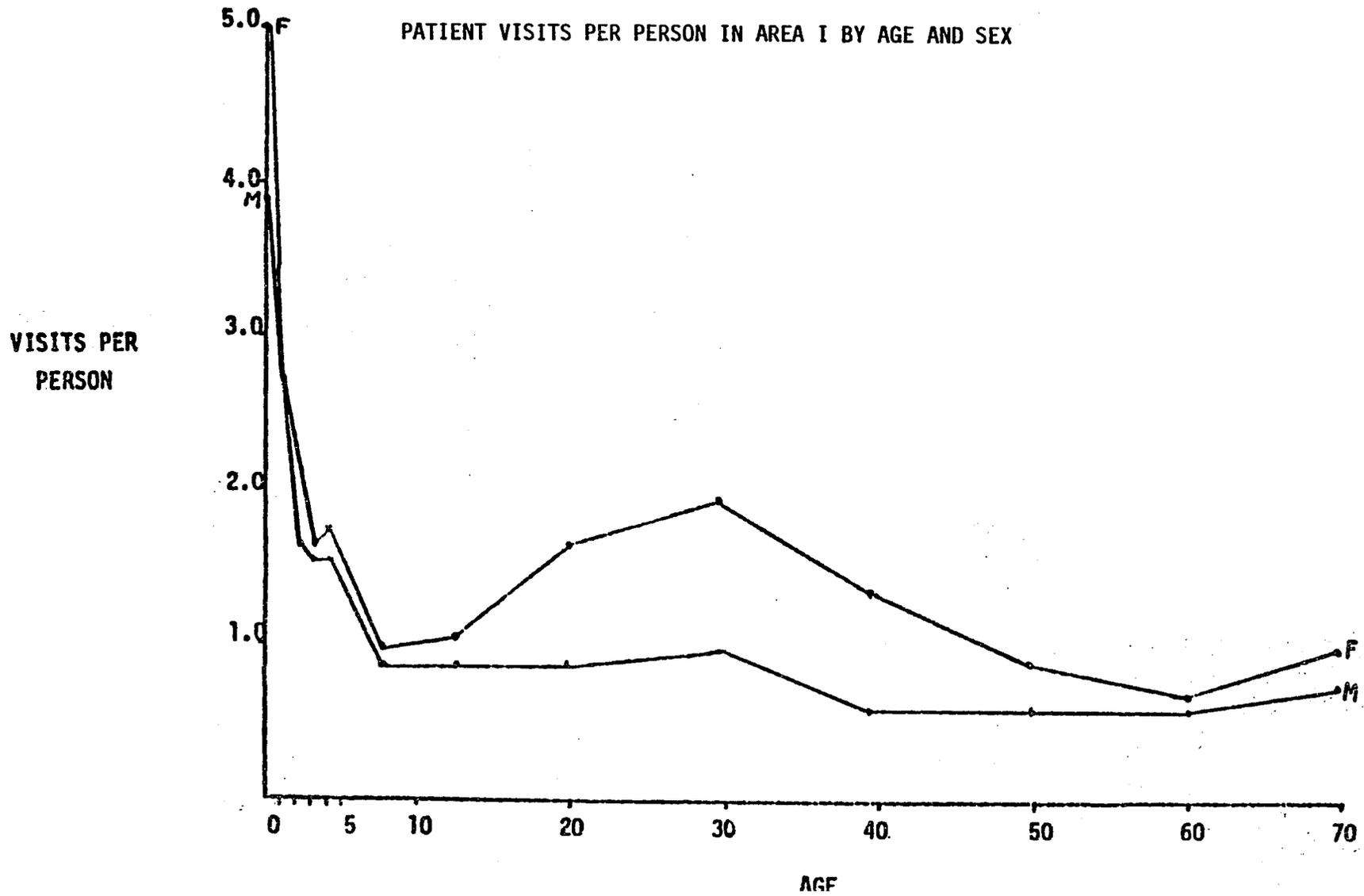
The DPT, smallpox, BCS, oral poliomyelitis and measles immunizations are carried out in the Danfa areas by special immunization teams from the project's resource group in Accra through annual immunization surveys. The actual coverage reached by these surveys in 1974 to 1976 as reported by the project in January 1979, was 51 percent of children below two years of age. (in Area II and Area III in 1979, only 36 percent and 18 percent respectively were reached).

The adequate protective level of these immunizations under the endemic conditions prevailing in rural areas in developing countries is not at all clearly established, though assumptions of 80 percent coverage are widely promoted and accepted. Experience gained so far might suggest that for some of these immunizations, a lower level might be quite adequate, but then only longer experience or simulation with epidemic models can provide more reliable answers.

For pertussis, again an immunization level of 80 percent of effective vaccine application is assumed on the basis of experience in the developed

Figure 1

PATIENT VISITS PER PERSON IN AREA I BY AGE AND SEX



countries, which have quite a different epidemiological environment.

Of the infectious diseases against which immunizations are practiced, one would consider measles and pertussis possible "tracer" diseases for early evaluation of adequacy of immunization coverage. For pertussis, the annual reported diagnoses at the Danfa Health Center, with the population aged zero to four, is provided in Table 12.

Table 12 illustrates the inadequacies inherently involved in disease reporting from medical services. The trend in pertussis incidence as reported is determined by disease awareness in the population, expectations of relief to be obtained by seeking care, diagnostic specificity of the health center staff, underreporting of the disease, as well as changes in actual incidence. However, in spite of all these reservations it is clear that the immunization program as applied in the Danfa Area I does not reach an adequate level of protection for pertussis. This cannot be extrapolated to immunizations against other diseases.

Table 12

REPORTED PERTUSSIS DIAGNOSIS AT HEALTH CENTER
WITH POPULATION IN SUSCEPTIBLE AGE GROUP

<u>Year</u>	<u># of Pertussis cases reported</u>	<u>Population in age group</u>	<u>Reported incidence/ per thousand children</u>
1971	10	1886	6.0
1972	24	7493	3.2
1973	68	7433	9.0
1974	40	7601	5.2
1975	124	7687	16.1
1976	74	6291	11.7

B. Summary of Coverage

Except for immunizations, it is in general nearly impossible to evaluate the effectiveness of the coverage of health services (health being affected by many other socio-cultural factors). The patient origin studies in the Danfa Area I, indicating utilization by 85 percent of the population, with inadequate coverage by pertussis immunization, suggests that the comprehensive health service pilot area in the Danfa project is less than the level aimed at. Whether the alternatives to be considered for a more adequate coverage include only the medical care organization or should include health education or quite different approaches, can hopefully be elucidated by further analysis of the elaborate data base available for the other three areas studied over the last nine years.

APPENDIX G
NOTES ON THE NARANGWAL PROJECT

5 February 1979

NOTES ON THE NARANGWAL PROJECT

Thomas K. Belding

Enclosed is a brief summarization of information conveyed to me during meetings with Robert L. Parker, M.D., at the School of Hygiene and Public Health, Johns Hopkins University, 31 January through 2 February 1979. This is based on discussions as well as several books, articles, and tables, some of which have been copied and referenced as indicated below:

"The Functional Analysis of Health Needs and Services - JHV, Department of International Health" (referenced in this report as I).

"Integration of Family Planning and Health Services: The Narangwal Experience - submitted to the World Bank, 1978, JHV, International Health (referenced as II).

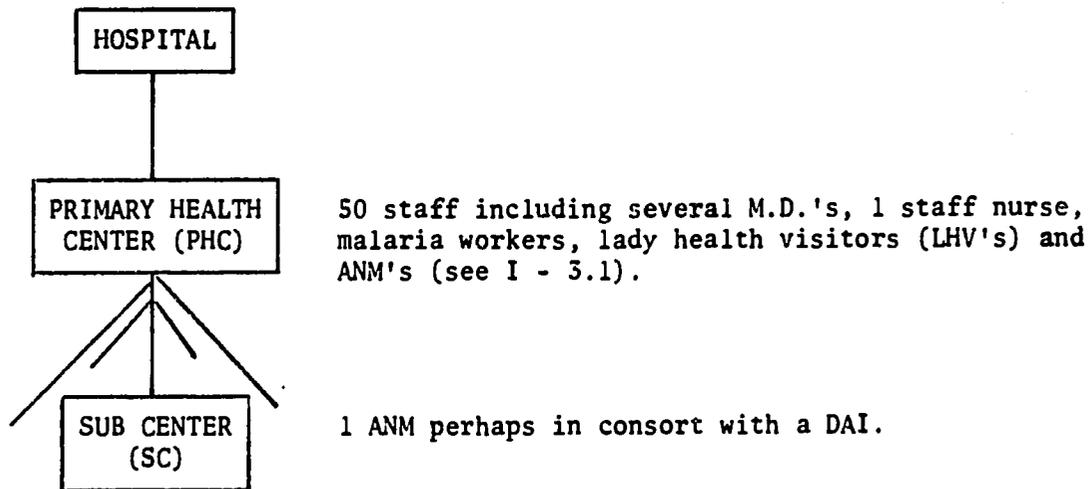
"Narangwal Population Study: Integrated Health and Family Planning Services," Rural Health Research Center (RHRC), Narangwal (referenced as III).

"A Preliminary Assessment of the Intensive Multipurpose Village Health Service Campaign in Punjab," June 1972, Directorate of Health and Family Planning, Punjab (referenced as IV).

I. Introduction and Coverage

As mentioned in our earlier meeting, the Narangwal experimental project attempted to employ a system of delivery of primary health services distinct from that used to provide services through the government. These systems may be modelled as follows:

Government Primary Care System

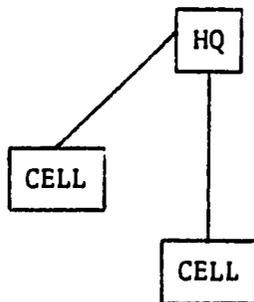


Overall, 8-10 ANM's. Each ANM at a SC supposedly covers 10,000 people, but in fact reaches approximately 2,000. Each PHC works with 6 SC's, together serving a 100 square mile area with an average population of 85,000, with approximately 25% effective coverage for curative services. The implication of this system is that each person has a PHC within 10 miles, or an average of within 5 miles. PHC's are placed at centers of population averaging roughly 4,000 persons. Staff from the PHC do not go out to the SC's, and work essentially on a referral basis. An estimate of the effective coverage of this system is 19% (6 SC's @ 2,000 each, 1 PHC @ 4,000 relative to the population of one development block of 85,000 - one PHC and 6 SC's per development block.) A study of this system in the Punjab found an overall

52% deficit between needs and services provided in this system (I - 4.4). In villages more than 5 miles distant from the PHC, the percent of episodes of illness which were not treated by a practitioner (of any kind) varied from 57% to 72% (I - 2.47). In these same households, the percent of episodes treated at the PHC were 0-5%. In a survey of utilization (I - 2.35), the PHC and its associated SC's or other governmental providers (e.g., hospitals) were consulted for 31% of episodes versus 69% for all other providers.

Overall expenditures for provision of medical-related services, MCH, family planning, communicable disease control, and environmental sanitation at the PHC and in the field - including the ANM's - was 159,728 Rs. or \$21,300 per health center in the Punjab in 1968 (I - 3.22). 97% of this figure or \$20,614 (154,585 Rs) represents recurrent expenditures and salaries when the costing system then employed is used. This figure should be equated roughly with the coverage of 16,000 people out of 85,000.

Project Primary Care System



1 M.D. who goes to the SC once per week to provide curative services and supervision.
 1 Public Health Nurse (PHN) and Support Staff.
 These staff relate to 2 experimental cells.

4 villages (one experimental cell). Each village has one ANM each working from an SC, serving an average of 1,500 people. Thus, each experimental cell dealt with approximately 6,000 people. For the two cells considered in the subsequent discussion, coverage is roughly 6,000 for FPWSCC and 5,000 for FPCC. Each set of 4 ANM's is accompanied by one lady health visitor (LHV).

Patients are infrequently referred from the SC to the HQ for limited services, or to the government-run PHC for more sophisticated care. The ANM provides 80% of curative care. The PHN is responsible for preparing manuals for training ANM's and also serves certain supervisory functions.

Funding for this project was from many sources and changed over time. Most came from sources outside the Indian government, such as AID, PL 480, NIH, and WHO. Bob Parker and I did not attempt to figure out percentages or amounts from different sources. The unflappable attitude he assumed in approaching most issues we discussed contrasted distinctly with his approach toward the funding problem, and we agreed not to spend our time on this problem, with no guarantee of a reliable outcome.

II. Note on the estimation of hypothetical government programs analogous in structure and function to the FPCC and FPWSCC cells (see attached reference pages V):

The basic assumption as noted in our meeting was that government coordination would be accompanied by economies of scale amounting to roughly 50% for major cost categories. Obviously, there are difficulties here since the same levels of motivation, supervision, and intensity of effort cannot be assumed; nor of coverage and utilization. Discussion of these hypothetical costs has been eliminated below as the result is roughly a 50% drop in all costs. For detailed information, see last pages attached labelled GOV'T (10 pages).

Table 1 - FPWSCC

Summary of Table 1b in \$US Where 1 \$US = Rs 7.5

(a)

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>Total</u>
Initial Investment	27,292	965	1,287	1,417	1,357	32,318
Recurrent Costs	11,128	13,959	16,351	15,143	14,151	70,732
Total Costs	38,420	14,924	17,638	16,560	15,508	103,050

Table 1 - FPCC

(b)

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>Total</u>
Initial Investment	24,327	764	1,282	1,456	2,083	29,914
Recurrent Costs	9,943	10,987	15,248	14,821	12,688	63,687
Total Costs	34,270	11,751	16,530	16,277	14,771	93,419

(a) represents costs per 4 villages or approximately 6,000 population

(b) represents costs per 5,000 population

Table 1b
 Narangwal - Initial Investment, Recurrent and Total Costs for
 Experimental Cells (Each 4 Villages, 6,000 Population) in Rupees
 (FPWSOC = Family Planning, Women Services and Child Care; FPCC = Same Less Women Services)

	1969		1970		1971		1972		1973		Total	
	FPWSOC	FPCC	FPWSOC	FPCC	FPWSOC	FPCC	FPWSOC	FPCC	FPWSOC	FPCC	FPWSOC	FPCC
1. Initial Investment												
All Capital ⁽¹⁾	72,967	50,733	7,235	5,729	9,652	9,621	10,629	10,923	10,175	15,625	110,658	92,631
Personnel												
Initial Professional Training ⁽²⁾	36,725	36,725	-	-	-	-	-	-	-	-	36,725	36,725
Initial In-Service Training												
Manual ⁽³⁾	90,000	90,000	-	-	-	-	-	-	-	-	90,000	90,000
Other	5,000	5,000	-	-	-	-	-	-	-	-	5,000	5,000
Total Initial Investment	204,692	182,458	7,235	5,729	9,652	9,621	10,629	10,923	10,175	15,625	242,383	224,356
2. Recurrent Costs												
Personnel												
Administration	8,121	6,715	8,553	6,933	9,348	10,767	9,446	10,666	8,014	7,334	44,082	42,415
Service Delivery ⁽⁵⁾	34,679	28,668	40,216	32,599	50,493	54,655	47,733	53,336	35,366	34,169	207,087	203,427
Turnover ⁽⁴⁾	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	10,000	10,000
Recurrent In-Service Training ⁽³⁾	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	12,000	12,000
Transportation	2,856	1,859	5,123	3,443	4,776	4,810	5,271	5,738	10,992	10,433	29,018	26,283
Food	17,842	23,357	18,800	21,944	21,531	19,472	22,368	24,407	17,010	19,956	97,551	109,136
Drugs	8,852	4,861	10,626	5,738	20,890	12,286	16,099	7,248	19,828	12,546	76,205	42,679
Lab	823	408	1,913	663	1,013	493	285	167	147	69	4,181	1,800
Other ⁽⁶⁾	5,287	3,853	14,146	5,594	7,814	6,120	6,595	3,646	8,326	4,714	47,168	23,927
Building Maintenance	604	453	916	1,078	1,768	1,358	1,964	1,548	2,052	1,539	7,394	5,986
Total Recurrent Costs	83,464	74,574	104,693	82,402	122,633	114,361	113,571	111,156	106,135	95,160	530,496	477,653
Grand Total:	288,156	257,032	111,928	88,131	132,285	123,982	123,200	122,079	116,310	110,785	772,879	702,009

Notes to Table 1b on the following page

Notes to Table 1b

1. Includes value of donated buildings and land, rural health research center costs attributable to each experimental cell, all equipment, vehicle purchase, and administrative capital (see accompanying table, "Unamortized Values of Capital").
2. Assuming 1 M.D. per 8 villages or 2 experimental cells, 1 PHN per 2 cells, 1 LHV and 1 FPW per cell, 4 ANM's per cell. This gives an underestimate since there are many other personnel not involved directly with the cell who have inputs in the project outcome (see accompanying notes, "Estimation of Professional Training Costs").
3. There was only one manual written for all cells, thus FPWSCC and FPCC are here considered as distinct activities, with costs attributed to them as if they were to be continued as discrete programs (see accompanying notes, "In-Service Training Costs").
4. Turnover Costs. No data available for in-service or retraining of other categories of workers in the program. ANM turnover was approximately 2 per cell per year or 1/2 per village of 1,500 per year, replacements being trained primarily through meetings as required. If we assume the same cost as for the regular training, this implies a cost of Rs 750 per village per year.
5. Selected Salaries (1972):

MD	Rs 2,000/month	=	Rs 24,000/year
PHN	Rs 1,000/month	=	Rs 12,000/year
LHV	Rs 500/month	=	Rs 6,000/year
ANM	Rs 400/month	=	Rs 4,800/year
6. Referral expenses, records, and supplies.

Unamortized Values of Capital (in Rupees)

	1969		1970		1971		1972		1973	
	(3)	(2)	(3)	(2)	(3)	(2)	(3)	(2)	(3)	(2)
Constr./Purchase										
Cl. (1)	44,556	33,417	3,440	2,580	4,336	3,252	3,556	2,667	2,792	2,094
FC (1)	9,348	7,011	456	342	1,468	1,101	528	396	884	663
E.g Cap. (10 Yr. Life)	16,170	8,450	800	1,140	1,860	2,460	3,120	3,060	1,940	3,660
Trans. Cap. (5 Yr. Life)	2,570	1,640	2,000	1,400	1,695	2,605	3,275	4,660	4,367	9,015
Lab Cap. (4)	157	78	364	126	193	94	55	32	28	13
Admin. Cap. (4)	166	137	175	141	100	109	95	108	164	150

(1) includes value of donated buildings and land and rural health research center costs attributable to each experimental cell. Cl. = Clinic; FC = Feeding Center.

(2) FPWSCC

(3) FPCC

(4) Originally unamortized.

Estimation of Professional Training Costs

MD Data from two governmental medical colleges in Punjab as follows from Punjab Health Department budget synopsis for 1969-1970: 1968-1969 non-plan (ordinary) expenditures (versus planned amounts for the next year)

Med. College, Amritsar 2,077,050

Med. College, Patiala 2,059,870

These figures probably do not include fixed costs. If fixed costs account for an additional 10%, the combined cost for both schools, based on available information, is roughly Rs 4.4 million. Each school graduates roughly 80 students per year (4-year schools), implying for 160 students total a cost of Rs 27,500 apiece or \$3,700.

ANM 18 months of schooling past high school (estimated cost Rs 3,500).

PHN (Public Health Nurse) Approximately 2 x ANM = Rs 7,500.

LHV (Lady Health Visitor) 2 years past high school,

$4/3 \times \text{ANM} = \text{Rs } 4,700 - \text{Rs } 5,000.$

FPW (Family Planning Worker) One-week in-service training approximately Rs 375.

In-Service Training Costs

ANM

Manual development by PHN and MD

Fixed Initial Cost	2 PHN - 1/4 time over 5 years = Rs 30,000	
	2 MD - 1/4 time over 5 years = <u>Rs 60,000</u>	
		Rs 90,000

(This manual was used for only 16 ANM's who were in the project, but could be used with a larger project at great potential economies of scale.)

8 Week Initial In-Service Training of 8 ANM's

4 Week Formal	1 PHN full-time = Rs 1,000	
	1 MD 1/4 time = <u>Rs 500</u>	
		Rs 1,500

4 Weeks in Field Following at no extra cost another ANM

Salary for 8 ANM's for 8 weeks in training

$400 \times 2 \times 8 = \text{Rs } 6,400$

Transport and administrative overhead at 30% of salaries

Rs 1,920

Total Rs 9,800 - Rs 12,000 or Rs 1,200 - Rs 1,500/ANM exclusive of manual and materials.

Retraining is mixed with support services one day per week, alternating between the HQ and the SC. If we assume that 2/3 of this time is actually in retraining, the cost per year would be roughly

$\text{Rs } 400/\text{mo} = 20/\text{day} = 80/\text{mo retraining} \times 12 = 960 \times 2/3 = \text{Rs } 600/\text{yr}/\text{ANM}$

LEGEND
FOR FOLLOWING TABLES

B & L = buildings and land

CAP = capital

C = costs

FC = feeding center (feeding centers were usually rooms adjacent to the subcenters and were considered distinct herein for costing purposes)

F = fixed

CL = clinic

EQ = equipment

V = variable

TRANS = transport costs relative to all categories

REF = referred

MTG = meeting

REC = recurrent

SWEEP = sweeper

N = (unknown)

FHW = family health worker = AHM

FHS = family health supervisor = LHY

PHN = public health nurse

FPW = family planning worker

FP+WS+CC
PROJECT
8/31
1969

	TOTAL	ILL CHILD (3)	ILL CHILD (3)	WELL CHILD (3)	WELL CHILD (3)	ILL WOMAN (50)	ILL WOMAN (50)	ROUTINE WOMEN	MATER- NITY	FP	NUT	CCC FVY	MALE	DIRECT SUPP. SERVICE	NTF
1 REL CAP C (FC)		166	113	56	4	226	53	25	157	62	43	9	12	468	423
REC P CL (FC)	484	90	61	30	2	173	29	17	69	33	73	5	6	98	89
2 REC CAP (FC)	120										120			63	57
3 SUPP REC V CL (FC)	1,846	343	234	114	7	469	111	44	264	176	89	18	24	1,617	1,846
4 TRANS PHV (FC)	923										923				923
4 TRANS PHV (FC)	1,313	246	167	83	5	334	79	32	188	89	63	13	17		1,313
(FC)	447	50	34	25	1	64	14	9	120	30	64	15	4		447
(FC)	341	26	18	62	4	15	9	35	19	74	38	51	7		341
(FC)	903	107	39	29	8	275	64	5	113	141	79	64	10		903
(FC)	356	57	21			146	34		71	27					356
SUB-TOTAL	3,360	485	278	198	18	857	201	70	560	321	194	143	32		3,360
(SUB-TOT CAP)		73	42	30	3	129	39	10	84	48	29	21	5		504
(REC-P)	1,142	163	74	68	6	232	68	24	171	109	66	49	11		1,142
(REC-V)	1,714	247	142	101	9	457	103	36	286	164	99	73	10		1,714
5 PHV (FC)	17,842										17,842				17,842
6 RECORDS CL (FC)	708	78	35	42	5	230	54	37	92	94	7	2	2	372	336
(FC)	50										50			26	24
7 DRUGS (FC)	8,852	1,815	1,237	513	29	2,748	645		368	1,382			115	8,852	
8 REFERRALS (FC)	2,683	432	156			1,103	258		534	201				2,683	
9 LAB SUB-TOT (CAL)	380	469	124			127	14		157	94				980	
(CAL)	157	75	20			29	2		24	15				157	
(REC-P)	626	333	88			70	10		108	67				626	
(REC-V)	127	61	16			17	2		20	12				127	
10 ADMIN SUB-TOT (CAL)	8,247	1,014	612	442	40	1,653	390	150	1,111	1,747	1,034	407	169		8,247
(CAL)	245	70	12	9	1	13	8	3	22	25	21	8	3		166
(REC-P)	6,464	791	477	345	31	1,289	303	117	467	788	807	317	132		6,464
(REC-V)	1,657	203	122	98	8	331	78	30	222	253	207	81	34		1,657
11 MERP CL (R)	287	54	37	18	1	73	17	7	41	20	14	3	4	152	137
(FC)	65			45	3			17						35	31
(FC)	2,578										2,578			1,464	2,234
(PHV)	11,841	2,574	1,757	872	55	3,528	411	132	1,190	742	665	178	180	6,440	5,817
(PHS)	3,733	418	244	205	12	557	124	78	1,185	254	538	127	70	418	2,667
(PHS)	2,971	157	117	143	21	256	57	151	273	209	215	312	13	216	1,378
(DOCTOR)	8,116	764	343	240	73	2,367	574	41	1,113	1,216	510	574	89	1,420	5,251
(PHV)	3,579	64	21	61		68	14		100	2,316	18	427	358	787	1,926
(PHV/SS)	351	6	2	6		7	1		10	233	2	49	35	102	249
(SUB-TOT)	34,675	6,241	2,541	1,951	147	8,114	1,421	426	4,150	5,320	4,124	1,701	766	10,933	10,684
(GRAND TOTAL)	93,501	2,413	5,277	3,352	174	14,911	1,471	451	11,159	6,179	2,111	2,302	1,067	44,188	34,259
(CAP)	7,522	514	102	102	14	211	101	4	464	119	567	55	41	2,240	1,287
(REC-P)	43,541	1,429	1,112	2,075	206	4,717	2,075	714	1,114	6,497	5,244	2,074	815	11,946	26,578
(REC-V)	36,492	1,279	2,022	841	57	5,194	1,252	247	1,245	2,117	19,217	175	191	29,202	6,500

* Less transport costs.

FP+WS+CC
PROJECT
1970

	TOTAL	ILL CHILD <3	ILL CHILD 3+	WELL CHILDS <3	WELL CHILDS 3+	ILL WOMAN <50	ILL WOMAN 50+	ROUTINE VISITS	MATER-NITY	FP	NOT	CDC FRY	MALE	DIRECT SERVICE	SUPP. SERV.	NTP
1 (B&L CAP C)	960	179	172	60	6	247	55	23	137	65	46	10	12	504	456	
(FC)	398															
(REC-P CL)	744	138	94	47	3	191	42	10	106	51	36	7	10	391	353	
(FC)	172													90	82	
2 (EQ CAP)	1,697	316	216	107	7	436	97	41	243	115	81	17	22	1,697		
3 (SUPP REC-V CL)	2,645	492	316	167	11	680	151	63	378	180	177	26	34		2,645	
(FC)	1,323															
4 (TRANS FNU)	1,320	227	155	77	5	314	70	29	174	83	59	12	16		1,320	
(FNS)	554	62	42	30	2	85	19	12	141	38	80	19	4		1,220	
(PNS)	1,102	83	57	202	12	115	25	79	126	110	123	164	6		554	
(DR)	1,631	194	70	52	15	507	109	0	240	254	52	116	10		1,102	
(REF)	1,139	189	68			486	107		233	55					1,631	
(NTG)	376	17	11	66	4	23	5	26	156	50	0	11	1		1,139	
(FP)	5														376	
(SUB-TOTAL)	6,027	771	604	427	37	1,525	335	154	1,093	535	321	327	45		6,027	
(SUB-TOT CAP)	904	116	61	64	6	227	50	23	164	89	48		7		904	
(W C-F)	2,049	262	137	145	13	518	114	52	371	207	109	109	15		2,049	
(REC-V)	3,074	393	206	218	19	778	171	77	556	303	164	164	23		3,074	
5 (FOOD)	(36,774)															
6 (RECORDS CL)	708	78	95	42	5	200	54	37	92	94	36,774	2	2	372	336	
(FC)	50														50	
7 (DRUGS)	10,626	2,420	1,650	783	44	3,441	755		689	703	50			26	24	
8 (REFERRALS)	9,420	1,544	545			4,022	801		1,411	452			161	10,626		
9 (LAB SUB-TOT)	2,277	746	343			590	46		344	254				9,420		
(CAP)	364	117	55			74	7		61	25			14	2,277		
(REC-P)	1,617	510	244			411	31		271	104			2	364		
(REC-V)	296	77	45			77	6		50	20			10	1,617		
10 (ADMIN SUB-TOT)	8,727	1,671	643	491	44	1,781	392	167	1,176	1,010	452	174		8,727		
(CAP)	175	21	13	10	1	36	8	3	24	27	20	9		175		
(REC-P)	5,760	797	425	324	29	1,174	217	110	774	875	666	298	115	5,760		
(REC-V)	2,773	341	254	157	14	570	151	53	376	424	323	146	56	2,773		
11 (SLEEP CL)	76	144	77	47	3	143	44	19	111	13	17	8	10	497	369	
(S)	66													35	31	
(FC)	2,534															
(FNU)	15,271	2,840	1,939	742	61	3,924	879	247	2,184	1,029	2,548	153	149	1,364	1,234	
(FNS)	4,061	455	361	223	12	625	218	85	1,182	276	585	138	37	455	2,895	1,756
(FNS)	3,212	242	144	591	36	316	74	213	348	504	367	482	16	333	2,127	772
(DOCTOR)	9,875	1,175	425	156	43	3,041	667	49	1,477	1,140	116	701	103	1,718	6,389	1,750
(FNU)	1,917	71	47			24	11		111	2,114	10	447	144	866	2,118	953
(FNU/SS)	450	7	2			4	2		11	24	7	54	46	114	284	
(SUB-TOT)	49,214	4,315	2,944	2,241	204	4,314	1,000	773	4,414	2,111	4,401	2,044	840	12,404	21,861	5,950
(GRAND TOTAL)	122,547	12,710	7,414	4,145	158	21,120	4,004	2,273	11,544	5,441	4,401	2,044	840	44,782	41,927	5,950
(CAP)	4,214	751	465	241	17	1,242	217	95	1,028	504	392	44	47	2,118	1,628	
(REC-P)	50,554	6,572	3,844	2,777	244	10,514	2,214	119	6,344	2,144	4,145	2,497	949	14,563	30,105	5,950
(REC-V)	67,739	5,187	3,103	1,367	71	2,362	2,267	241	4,073	2,277	21,768	337	278	57,514	10,194	

FP+WS+CC
PROJECT
1971

	TOTAL	ILL CHILD	ILL CHILD	WELL CHILD	WELL CHILD	ILL WOMAN	ILL WOMAN	PHYSICIAN	MATER- NITY	FF	NET	CRC ENV	MALE	DIRECT SERVICE	SUFF. SERV.	NTP
1 (D&L CAP C)	1,047	195	133	66	4	260	63	15	170	71	10	10	14	450	497	
(FC)	225															
(REC-P CL)	1,417	253	179	87	6	350	91	34	200	96	225	14	18	118	107	
(FC)	356										64			747	671	
2 (EQ CAP)	1,403	335	229	114	7	447	119	43	259	173	356			187	169	
3 (SHR REC-V CL)	2,844	529	361	177	11	705	189	58	407	173	173	18	23	1,803		
(FC)	1,422										173	28	37		2,844	
4 (TRANS PHN)	436	81	55	27	2	108	29	10	42	30	1,422				1,422	
(PHS)	68	8	5	4		10	3	1	20	5	21	4	6		436	
(PHN)	540	40	28	99	6	54	15	39	62	54	30	2	1		68	
(DR)	2,007	239	86	64	18	574	159	13	255	313	64	80	3		540	
(REF)	1,555	244	89			409	162	13	312	111	64	142	27		2,007	
(MTC)	218	40	24	162	2	53	14	63	41	122	64	26	3		1,555	
(FF)	95									25					918	
(SUB-TOTAL)	5,619	853	291	356	35	1,428	380	124	1,121	768	174	255	34		95	
(SHR-TOT CAP)	843	78	44	53	5	214	57	13	108	115	26	18	5		5,619	
(REC-F)	2,135	248	211	135	13	342	144	47	426	292	66	97	13		843	
(REC-V)	2,441	307	137	187	17	671	179	58	527	361	82	120	16		2,135	
5 (FOOD)	21,531														21,531	
6 (RECORDS CL)	708	78	95	42	5	200	54	37	42	94	21,531				372	336
(FC)	50										7	2	2		26	24
7 (DRUGS)	20,890	4,629	3,155	1,831	106	6,247	1,847		1,028	1,041	50				20,890	
8 (REFERRALS)	2,790	436	159			1,091	273		541	271			306		2,790	
9 (LAB SUB-TOT)	1,205	305	77			482	41		170	68					1,205	
(CAP)	193	49	16			77	13		27	11					193	
(REC-P)	856	217	67			342	59		171	48					856	
(REC-V)	157	40	13			63	11		22	9					157	
10 (ADMIN SUB-TOT)	10,048	1,238	719	538	54	2,065	550	177	1,363	1,588	1,023	535	202		10,048	
(CAP)	100	17	7			21	6		2	16					100	
(REC-P)	6,230	766	446	334	33	1,280	341	110	845	983	634	332	125		6,230	
(REC-V)	3,718	457	266	199	20	764	204	66	504	547	279	198	75		3,718	
11 (SLEEP CL)	625	129	84	44	3	172	66	11	94	47					365	330
(N)	116														61	55
(FC)	2,681										2,681				1,408	1,273
(PHN)	10,135	3,373	2,307	1,143	73	4,477	1,107	435	2,593	1,233	870	181	236		8,433	7,617
(PHS)	4,654	521	354	256	14	673	182	98	1,354	316	670	158	37		521	3,318
(PHN)	3,243	243	169	593	36	324	88	233	370	324	363	483	16		324	2,114
(DOCTOR)	15,505	1,843	667	476	140	4,549	1,275	78	2,279	2,419	436	1,101	171		7,713	10,037
(FFW)	5,166	93	11	48		93	26		145	3,430	26	718	517		1,137	2,779
(FFWS)	274	5	7	5		5	1		8	148	1	41	30		84	212
(SUB-TOT)	50,473	6,210	3,613	2,795	270	10,375	2,764	891	6,849	7,264	5,142	2,690	1,015		15,058	27,750
(SPAND TOTAL)	122,443	14,879	7,032	5,725	494	24,350	6,412	2,450	12,191	12,573	36,271	3,554	1,651		65,271	49,487
(CAP)	4,211	689	424	214	17	1,019	264	89	617	336	398	72	44		2,664	1,548
(REC-F)	61,442	7,704	4,418	3,267	322	12,970	3,402	1,082	8,443	9,187	6,216	3,133	1,172		16,841	36,955
(REC-V)	58,750	6,478	4,186	2,419	159	10,441	2,772	229	3,121	2,556	23,607	349	436		45,766	10,985

FP+WS+CC
PROJECT
1972

	TOTAL	ILL CHILD <3	ILL CHILD 3+	WELL CHILD <3	WELL CHILD 3+	ILL WOMAN <50	ILL WOMAN 50+	ROUTINE WOMEN	MATER- NITY	FP	KUT	CDC EXY	HALE	DIRECT SERVICE	SUPP. SERV.	HTP
1 (B&L CAP C)	1,110	208	142	70	4	274	77		27	160	76	54	11	15	587	531
(FC)	238														124	112
(REC-P CL)	1,580	314	214	108	7	414	116		41	241	115	81	17	22	886	802
(FC)	376														197	179
2 (EQ CAP)	1,929	359	245	122	8	473	133		46	276	131	93	19	25	1,929	
3 (SUPP REC-V CL)	1,505	280	191	95	6	369	104		36	215	102	72	15	20		1,505
(FC)	752															752
4 (TRANS FHV)	674	125	88	42	3	165	47		16	96	46	32	7	9		674
(FNS)	624	70	47	34	2	92	26		13	102	42	90	21	5		624
(FHW)	485	35	24	85	5	46	13		33	55	47	52	69	2		465
(DR)	2,402	286	103	77	22	704	197		12	353	375	77	171	26		2,402
(REF)	1,177	205	74			564	141			253						1,177
(MTC)	1,070	47	32	188	11	61	17		74	444	141	21	30	3		1,070
(FP)	16															16
(SUB-TOTAL)	6,428	768	367	427	42	1,571	440		149	1,301	667	273	296	46		6,428
(SUB-TOT CAP)	1,157	138	88	77	8	283	79		27	249	120	49	54	8		1,157
(REC-P)	2,350	269	128	149	15	550	154		52	483	233	95	104	16		2,350
(REC-V)	3,021	361	172	201	20	739	267		70	649	313	128	140	21		3,021
5 (FOOD)	22,368															22,368
6 (RECORDS CL)	708	78	95	42	5	200	54		37	92	94	7	2	2		372
(FC)	50															26
7 (DRUGS)	18,009	3,647	2,486	792	46	5,448	1,536		803	1,019						24
8 (REFERRALS)	3,580	623	236			1,532	430		770					232	16,009	
9 (LAB SUB-TOT)	344	179	44			42	5		18	3				52	344	
(CAP)	55	29	7			7	1		3					8	55	
(REC-P)	244	127	31			30	4		13	2				37	244	
(REC-V)	45	23	6			5	1		2					7	45	
10 (ADMIN SUB-TOT)	9,541	1,160	887	494	48	1,888	530		163	1,235	1,495	1,168	482	195		9,541
(CAP)	95	12	7			19	5		2	12	15	12	5	2		95
(REC-P)	6,965	847	498	361	35	1,178	387		119	922	1,091	853	352	147		6,965
(REC-V)	2,481	302	177	128	13	471	138		42	321	389	304	125	51		2,481
11 (SHEEP CL)	723	134	92	46	3	177	50		17	103	49	35	7	9		343
(H)	115			80		5			30							60
(FC)	3,625															55
(FHV)	17,894	3,328	2,273	1,127	72	4,384	1,235		479	2,443	1,217	419	178	233	1,903	1,722
(FNS)	3,410	404	274	177	11	511	149		56	311	245	173	74	84	8,721	7,515
(FHW)	2,600	176	116	477	21	279	73		184	297	261	292	189	13	404	2,574
(D.L.OB)	13,397	1,544	572	426	127	3,722	1,071		67	1,954	2,074	424	245	140	2,279	1,716
(FHV)	5,056	71	30	46		92	25		547	3,364	25	704	507	1,115	2,726	2,369
(FHV/OS)	283	5	2	5		5	1		8	188	1	39	28	82	201	1,228
(SUB-TOT)	47,233	5,743	3,379	2,445	233	9,344	2,624		907	6,116	7,445	5,783	2,396	945	14,862	25,463
(GRAND TOTAL)	113,865	13,358	8,071	4,543	405	21,556	6,249		1,306	11,309	11,107	31,312	3,230	1,571	61,285	45,672
(CAP)	4,590	745	467	274	20	1,255	294		127	722	443	443	81	54	2,444	1,846
(REC-P)	54,756	7,217	4,251	3,071	235	11,712	3,355		2,324	7,771	8,000	2,104	2,041	1,140	34,440	25,449
(REC-V)	59,519	5,141	3,820	1,472	44	9,300	2,894		24	2,433	2,603	2,402	282	114	4,400	9,110

FP+WS+CC
PROJECT
1973

	TOTAL	ILL CHILD	ILL CHILD	WELL CHILD	WELL CHILD	ILL WOMAN	ILL W. MAN	ROUTINE MONEX	MATER-NITY	FP	NUT	CDC ENVY	HALF	DIRECT SERVICE	SUPP. SERV.	NTP
1 (B&L CAP C)	1,174	113	113	92	6	311	114	36	243	121	101					
(FC)	254										754		27	490	684	
(REC-F CL)	1,596	153	153	174	5	423	155	49	195	144	137		37	106	148	
(FC)	458										458		47	666	930	
2 (EQ CAP)	2,034	195	195	150	6	530	197	63	248	210	175		42	190	266	
3 (SUPP REC-V CL)	1,811	174	174	141	5	480	176	56	221	187	156			2,034		
(FC)	905										905				1,811	
4 (TRANS PHU)	1,466	141	141	114	4	398	142	45	179	151	124					
(PHS)	1,516	99	99	115	5	271	99	45	358	325	67		34		1,466	
(PHS)	642	31	32	91	3	88	32	37	87	198	41		24		1,516	
(DN)	2,867	20	20	40		1,279	140	77	430	654	43		8		642	
(REF)	4,663	709	233			1,749	201		1,367	309			103		2,867	
(NTG)	2,090	71	71	63	2	199	73	25	303	1,183	100				4,663	
(FP)															2,090	
(SUB-TOTAL)	13,244	1,071	779	423	14	3,974	687	220	2,673	2,028	377		168		13,244	
(SUB-TOT CAP)	2,251	132	132	72	2	676	117	34	458	481	64		29		2,251	
(REC-F)	4,238	343	249	135	6	1,772	270	74	867	905	121		54		4,238	
(REC-V)	6,754	546	397	218	7	2,027	359	117	1,374	1,442	192		46		6,754	
5 (FOOD)	17,010															
6 (RECORDS CL)	708	78	95	42	5	200	54	37	92	94	7		2	2	17,010	
(FC)	50										50				295	413
7 (DRUGS)	19,828	2,578	2,594	988	34	6,892	3,542		1,024	1,602					21	29
8 (REFERRALS)	4,852	738	243			1,822	223		1,417	370					4,852	
9 (LAB SUB-TOT)	174	6	22			44	10		6	6					80	174
(CAP)	28	1	4			7	2		1	1					13	28
(REC-F)	124	4	16			31	7		4	4					57	124
(REC-V)	73	1	3			6	1		1	1					10	73
10 (ADMIN SUB-TOT)	8,177	430	550	449	16	1,949	507	217	894	1,720	1,334					
(CAP)	164	9	11	9		39	10		18	34	27				7	164
(REC-F)	5,397	284	383	296	10	1,286	338	143	590	1,135	880				72	5,397
(REC-V)	2,617	138	176	144	5	624	163	69	286	550	427				35	2,617
11 (SHEP CL)	830	80	80	65	2	220	41		24	131	85				71	
(S)	241			168	6				67						10	340
(FC)	6,041														100	444
(PHU)	19,549	1,502	1,502	1,221	47	4,147	2,112	444	1,908	1,612	1,346				1,465	2,256
(PHS)	2,440	159	159	185	7	437	159	73	576	539	107		360	5,245	8,309	1,393
(PHS)	1,377	67	69	194	6	189	69	74	176	424	86		39	532	1,610	298
(DOCTOR)	7,708	54	547	108		3,438	378	208	1,107	1,757	116		17	83	1,026	280
(FPV)	2,989		21							2,900					1,919	4,239
(FPV/SS)	101		1							94					757	855
(SUB-TOT)	35,164	1,852	2,378	1,741	49	8,413	2,112	447	3,444	2,447	1,764				1,616	2,256
(GRAND TOTAL)	107,617	7,379	7,236	4,344	117	20,042	7,657	1,011	10,997	14,024	5,715		2	1,657	17,010	46,203
(CAP)	5,725	509	455	111	12	1,572	440	147	647	647	101				117	2,257
(REC-F)	47,174	2,644	3,159	2,417	28	11,442	2,112	1,011	5,425	4,941	2,204				1,944	32,337
(REC-V)	54,554	4,221	3,602	1,827	89	12,047	4,445	240	4,472	4,181	18,747		2	646	42,019	12,529

FP+CC
8/31
1969

	TOTAL	ILL CHILD (4)	ILL CHILD (3)	WELL CHILD (4)	WELL CHILD (3)	ILL M.MAR (5)	ILL WOMAN (5)	ROUTINE WOMEN (5)	MATER-NITY	FP	NUT	CDC ENV	MALE	DIRECT SERVICE	SUPP. SERV.	HTP
1 (REL CAP C)	668	324	33	77	3	33		21	45		58	7	7	282	386	
(FC)	340										146			59	61	
(REC-F CL)	324	176	53	42	1	26		11	25		12	4	4	153	210	
(F)	90										50			38	52	
2 (REC CAP)	845	410	117	21		42		24	57		74	9	8	645		
3 (SHEP REC-Y CL)	1,240	601	172	143	5	62		38	84		108	14	12		1,240	
(FC)	1,239										1,239				1,239	
4 (TRANS FHW)	1,100	534	153	127	6	55		34	75		96	12	11		1,100	
(FHS)																
(FHW)	254	77	22	16	1	8		4	24		96	4	2		254	
(DR)	611	284	75	17	3	46		1	54		44	45	18		611	
(REF)	222	176	96												222	
(MCS)																
(FF)																
(SUB-TOTAL)	2,187	1,070	276	160	8	123		40	167		236	61	31		2,187	
(SUB-TOT CAP)	328	160	44	24	1	19		8	24		35	9	5		328	
(REC-F)	744	364	101	54	3	42		13	55		80	21	11		744	
(REC-V)	1,115	546	151	82	4	63		20	83		120	31	16		1,115	
5 (FOOD)	23,357										23,357			23,357		
6 (RECORDS CL)	248	96	66	37	4	28		28	25		2		1	122	166	
(FC)	50										50			21	29	
7 (DRUGS)	4,861	3,059	874	441	16	308			78				65	4,861		
8 (SERIALS)	1,036	819	217											1,036		
9 (LAD SUB-TOT)	496	403	19			12			32					486		
(CAP)	78	64	6			2			5					78		
(REC-F)	345	286	28			9			23					345		
(REC-V)	63	52	5			2			4					63		
10 (ADMN SUB-TOT)	6,852	2,814	623	488	26	421		118	540		1,228	225	109		6,852	
(CAP)	137	58	14	10	1	8		7	11		25	5	2		137	
(REC-F)	5,345	2,257	426	387	21	376		107	421		958	176	85		5,345	
(REC-V)	1,370	579	182	99	5	84		24	168		246	45	22		1,370	
11 (SHEP CL)	126	61	18	14	1	6		4	9		11	1	1	53	73	
(H)	28			21	1			6						12	16	
(FC)	1,988										1,988			839	1,149	
(FHW)	13,109	6,358	1,822	1,528	52	655		406	691		1,140	144	131	4,824	6,620	1,665
(FHS)																
(FNS)	3,363	1,922	233	215	7	130		57	313		1,275	54	24	242	2,657	464
(DOCTOR)	10,054	4,665	1,227	242	50	555		30	1,046		724	744	302	1,036	6,927	2,091
(FIW)																
(FHWISS)																
(SUB-TOT)	28,668	12,106	3,359	2,640	111	1,761		483	2,258		5,138	843	458	7,006	17,442	4,220
(GNARD TOTAL)	72,370	21,959	6,285	3,544	178	2,802		777	3,367		31,751	1,265	695	38,266	29,884	4,220
(CAP)	2,146	1,017	277	208	8	104		55	149		332	30	22	1,264	932	
(REC-F)	35,554	15,149	4,166	2,917	115	2,158		626	2,762		8,298	1,144	557	7,542	23,792	4,220
(REC-V)	34,670	5,753	1,744	1,200	14	547		111	382		25,122	90	116	29,460	5,160	

FP+CC
PROJECT
1970

	TOTAL	ILL CHILD <3	ILL CHILD 3+	WELL CHILD <3	WELL CHILD 3+	ILL WOMEN <30	ILL WOMEN 30+	ROUTINE WOMEN	MATER- NITY	FP	NUT	CDC ENV	MALE	DIRECT SERVICE	SUPP. SERV.	NTP
1 (D&L CAP C)	720	343	100	83	3	36		22	42							
(FC)	147										63	8	7	304	416	
(REC-F CL)	550	271	78	64	2	28		17	38		147			62	85	
(FC)	129										49	6	6	735	323	
2 (EQ CAP)	959	465	173	110	4	48		30	85		229			54	75	
3 (SUPP REC-V CL)	1,749	848	243	201	7	87		54	119		83	11	10	959		
(FC)	1,748										152	19	17		1,749	
4 (TRANS PHN)	913	443	127	105	4	46		28	67		1,748				1,748	
(PHS)											79	10	9		913	
(PHN)	608	185	53	39	1	19		10	57		230	10	4		608	
(DN)	1,493	893	182	42	7	148		4	155		307	110	45		1,493	
(REF)	726	574	152												726	
(MTG)	282	65	19	98	4	7		27	21		10	32	2		282	
(PF)	29														29	
(SUB-TOTAL)	4,051	1,969	532	282	16	219		68	225	29	428	162	60		4,051	
(SUB-TOT CAP)	608	274	80	42	2	33		19	44	4	64	24	9		608	
(REC-F)	1,377	664	181	96	5	74		23	190	10	145	55	70		1,377	
(REC-V)	2,066	999	271	144	8	112		35	151	15	218	83	31		2,066	
5 (FOOD)	21,944										21,944				21,944	
6 (RECORDS CL)	288	96	66	37	4	28		29	25		2		1	122	166	
(FC)	50										50			21	29	
7 (DRUGS)	5,738	3,243	927	988	35	333		244					70	5,738		
8 (REFERRALS)	1,759	1,391	368											1,759		
9 (LAB SUB-TOT)	789	451	62			101	2		173					789		
(CAP)	126	72	10			16			78					126		
(REC-F)	560	320	44			72	1		173					560		
(REC-V)	103	59	8			13			22					103		
10 (ADMIN SUB-TOT)	7,074	2,959	819	479	27	441		114	575		1,798	246	116		7,074	
(CAP)	141	59	16	10	1	9		2	12		24	5	2		141	
(REC-F)	4,669	1,953	540	316	18	221		75	380		857	162	77		4,669	
(REC-V)	2,264	947	262	153	9	141		37	184		415	79	37		2,264	
11 (SWEEP CL)	160	78	22	18	1	8		5	11		14	2	2	68	92	
(FC)	1,989			21	1			6						12	16	
(PHN)	12,729	6,304	1,807	1,495	52	650		403	884		1,988			839	1,149	
(PHS)											1,131	143	130	4,783	6,564	1,651
(PHN)	5,191	1,578	452	332	10	161		88	483		1,967	83	36	374	4,101	716
(DOCTOR)	12,234	5,677	1,493	343	61	1,211		24	1,272		821	905	367	1,260	8,428	2,545
(PPN)																
(PPW/SS)																
(SUB-TOT)	37,573	13,636	3,773	2,709	125	2,030		528	2,650		5,981	1,133	535	7,335	20,352	4,912
(GRAND TOTAL)	89,307	25,670	7,101	4,452	223	3,351	2	811	4,123	29	32,073	1,585	622	39,323	36,067	4,912
(CAP)	2,701	1,240	340	245	19	142		65	298	4	393	48	28	1,451	1,250	
(REC-F)	39,972	16,844	4,618	2,696	159	2,475	1	642	3,231	10	2,160	2,357	637	8,185	26,795	4,912
(REC-V)	37,708	7,584	2,145	1,521	63	714		555	645	15	24,510	181	156	29,686	8,022	

FP+CC
PROJECT
1971

	TOTAL	ILL CHILD *3	ILL CHILD 3+	WELL CHILD *3	WELL CHILD 3+	ILL WOMAN *50	ILL WOMAN 50+	ROUTINE WOMEN	WATER- TIGHT	PP	BUT	CDC ENV	MALE	DIRECT SERVICE	SUPP. SERV.	NTP
1 (B+L CAP C)	785	345	79	82	3	35		22	48	73	62	8	7	331	454	
(FC)	169										169			71	98	
(REC-P CL)	1,059	466	133	110	4	48		30	66	98	84	11	10	447	612	
(FC)	267										267			113	154	
2 (EQ CAP)	1,091	480	137	113	4	49		31	68	101	86	11	10	1,091		
(SUPP REC-V CL)	1,874	737	211	174	7	75		47	104	156	132	17	15		1,674	
(FC)	1,574										1,574				1,674	
4 (TRANS PHW)	463	204	58	48	2	21		13	29	43	37	5	4		463	
(PHW)																
(PHW)	977	259	74	55	2	26		35	79	125	122	14	6		977	
(DR)	2,010	404	107	74	4	86		2	10	1,140	62	64	26		2,010	
(REF)	1,100	835	220								52				1,100	
(MTC)	689	114	32	187	6	12		46	37	198	18	56	3		689	
(FP)	412									412					412	
(SUB-TOTAL)	3,659	1,818	492	274	14	145		76	235	1,970	439	138	39		3,659	
(SUB-TOT CAP)	849	272	74	44	2	22		11	15	255	65	21	6		849	
(REC-P)	2,150	610	187	112	5	55		27	87	748	167	53	13		2,150	
(REC-V)	2,660	853	231	138	7	68		16	111	926	206	65	18		2,660	
5 (FOOD)	19,472															
(RECORDS CL)	362	96	66	37	4	28		29	25	74	2		1	153	209	
(FC)	50										50			21	29	
7 (DRUGS)	12,286	7,063	2,018	1,058	38	184		172	403				152	12,286		
(REFERRALS)	2,360	1,779	470						111					2,360		
9 (LAB SUB-TOT)	588	475	78			29		10	5					588		
(CAP)	84	76	12			3								84		
(REC-P)	417	317	55			14		2	1					417		
(REC-V)	76	62	10			3		1	2					76		
10 (ADMIS SUB-TOT)	10,875	2,759	778	533	26	405		126	531	3,989	1,251	299	180		10,875	
(CAP)	103	28	8	5		6		1	5	40	13	3	2		109	
(REC-P)	6,743	1,710	483	330	18	251		78	329	2,473	776	185	112		6,743	
(REC-V)	4,029	1,021	288	197	9	130		47	195	1,476	463	111	67		4,029	
11 (SWEEP CL)	219	96	28	23	1	19		6	14	20	27	2	2	92	127	
(FC)	67					2								67	29	
(FC)	2,940													2,940		
(PHW)	17,967	7,976	2,244	1,497	72	873		161	1,114	1,671	1,420	180	162	6,613	9,074	2,282
(PHW)																
(PHW)	5,974	1,583	454	315	12	161		90	444	765	1,971	84	36	430	4,719	824
(DOCTOR)	21,019	4,225	1,114	242	42	734		21	944	11,918	652	473	273	2,165	14,482	4,372
(PHW)	7,043	42	49	241		148			256	5,451	141	542	416	1,557	3,134	2,352
(PHW/ISS)	284	2	2	8		6			6	279	6	22	17	94	190	
(SUB-TOT)	54,655	13,862	3,911	2,678	129	2,037		634	2,617	29,245	6,286	1,502	905	11,857	32,967	9,831
(GRAND TOTAL)	113,027	29,878	8,174	5,075	229	3,778		734	2,624	27,425	24,475	1,584	1,314	48,799	54,406	9,831
(CAP)	1,077	1,201	322	245	10	151		61	113	151	156	43	25	1,588	1,509	
(REC-P)	65,732	17,065	4,767	3,228	154	2,439		710	3,119	23,319	7,580	2,751	1,041	12,674	42,627	9,831
(REC-V)	44,618	11,611	3,274	1,847	65	1,304		118	609	3,546	22,050	192	253	24,368	10,270	

FP+CC
PROJECT
1972

	TOTAL	ILL CHILD <3	ILL CHILD 3+	WELL CHILD <3	WELL CHILD 3+	ILL WOMAN <19	ILL WOMAN 19+	ROUTINE WOMEN	WATER-SITY	FP	SUT	CDC KRY	MALE	DIRECT SERVICE	SUPP. SERV.	NTP
1 (B+L CAR C)	838	369	106	87	3	38		23	57	78	66	8	8	354	484	
(FC)	177										177			75	102	
(REC-P CL)	1,266	557	160	132	5	57		35	78	118	100	13	11	534	732	
(FC)	282										282			119	163	
2 (KQ CAP)	1,151	506	145	170	5	12		32	71	107	71	12	10	1,151		
3 (SUPP REC-V CL)	1,023	450	179	106	6	44		29	63	95	82	10	9		1,023	
(FC)	1,023										1,023				1,023	
4 (TRANS PHN)	759	334	96	73	3	34		21	47	73	60	8	7		759	
(PHN)																
(PHN)	1,021	271	78	57	2	28		15	83	131	337	14	6		1,021	
(DR)	2,406	484	128	29	5	103		2	108	1,364	75	77	31		2,406	
(REF)	1,498	765	204							579					1,498	
(MTG)	803	132	38	195	7	14		14	43	220	21	65	3		803	
(FP)	511									511					511	
(SUB-TOTAL)	6,998	1,986	542	340	27	179		93	281	2,836	492	164	47		6,998	
(SUB-TOT CAP)	1,260	357	98	65	3	37		17	51	510	89	30	8		1,260	
(REC-P)	2,449	635	170	126	6	43		32	98	893	172	57	17		2,449	
(REC-V)	3,289	933	255	149	8	84		44	132	1,333	231	77	22		3,289	
5 (FOOD)	24,407										24,407				24,407	
6 (RECORDS CL)	362	96	66	37	4	28		29	25	74	2		1	153	209	
(FC)	50										50			22	29	
7 (DRUGS)	7,248	3,616	1,034	674	24	585		302	947				71	7,248		
8 (REFERRALS)	1,188	607	162						412					1,188		
9 (LAB SUB-TOT)	198	177				16			5					198		
(CAP)	32	28				3			1					32		
(REC-P)	141	126				11			4					141		
(REC-V)	26	23				2			1					26		
10 (ADMIN SUB-TOT)	10,774	2,786	788	568	26	397		138	517	3,738	1,352	287	179		10,774	
(CAP)	108	28	8	6		4		1	5	37	14	3	2		108	
(REC-P)	7,865	2,034	578	413	19	299		19	377	2,730	987	210	131		7,865	
(REC-V)	2,801	724	205	147	7	101		15	146	972	355	75	47		2,801	
11 (SLEEP CL)	371	241	40	33	1	24		4	20	30	25	3	3	135	186	
(N)	101			77	3			21						43	58	
(FC)	2,810										2,810				1,624	
(PHN)	19,764	8,697	2,491	2,058	79	889		553	1,225	1,838	1,562	198	178	7,274	9,982	2,510
(PHN)																
(PHN)	4,806	1,274	365	249	10	130		72	189	615	1,186	67	29	346	3,747	663
(DOCTOR)	18,042	3,624	956	217	36	276		28	812	10,240	549	577	225	1,858	12,431	2,753
(FP)	7,721	51	51	144		111		124	1,144	144	515	44	1,196	3,713	2,412	
(FVS)	243		7	5		4		4	24	4	21		16	89	180	
(SUB-TOT)	53,116	13,721	3,225	2,492	129	1,211		673	2,519	10,110	6,672	1,422	846	12,127	11,471	9,338
(GRAND TOTAL)	119,121	24,241	7,014	4,494	217	1,114		1,241	3,254	14,118	34,815	1,426	1,222	47,275	53,064	9,338
(CAP)	3,565	1,241	356	277	11	124		74	145	733	436	52	28	1,111	1,954	
(REC-P)	65,339	17,402	4,810	3,473	154	2,144		841	3,117	22,150	8,733	1,702	1,045	12,122	42,680	9,338
(REC-V)	41,417	6,430	1,853	1,134	67	448		137	650	3,834	26,146	162	110	33,043	8,374	

FP+CC
PROJECT
1973

	TOTAL	ILL CHILD 4-3	ILL CHILD 3+	WELL CHILD 4-3	WELL CHILD 3+	ILL WOMAN 4-30	ILL WOMAN 30+	PURCHASE WOMEN	WATER- RITY	FP	MUT	CDC ENV	MALE	DIRECT SERVICE	SUPP. SERV.	NTP
1 (B&L CAP C)	880	341	118	99	3	59	5	24	40	144	40		6	378	502	
(FC)	191										191			82	109	
(REC-P CL)	1,197	464	180	135	4	80	7	32	54	196	55	8	515	682		
(FC)	342										342			147	195	
2 (EQ CAP)	1,211	470	162	137	4	81	7	33	54	199	56	8	1,211			
3 (SUPP REC-V CL)	1,530	594	205	173	5	103	9	41	69	251	70	11		1,530		
(FC)	1,530										1,530			1,530		
4 (TRANS PHU)	2,284	886	308	258	7	153	14	62	103	375	105	16		2,284		
(PHS)																
(PHN)	1,124	138	48	218	6	75	7	52	194	393	67	2		1,124		
(DR)	2,277	849	84	32	48	175			98	1,018	194			2,277		
(REF)	5,146	2,588	1,045			545						98		5,146		
(MTG)	1,567	202	71	53	2	34	3	13	227	887	75			1,567		
(FP)	172										172			172		
(SUB-TOTAL)	12,570	4,464	1,533	559	62	933	19	128	622	3,714	421	116		12,570		
(SUB-TOT CAP)	2,137	759	261	95	11	159	3	71	106	631	72	20		2,137		
(REC-P)	4,022	1,428	491	179	20	279	6	40	199	1,109	135	37		4,022		
(REC-V)	6,411	2,277	782	285	32	476	10	64	317	1,894	215	59		6,411		
5 (FOOD)	19,956													19,956		
6 (RECORDS CL)	362	88	88	37	4	28		29	25	74	2	1	156	206		
(FC)	50										50			21	29	
7 (DRUGS)	12,546	6,120	2,110	852	24	1,548	138		532	1,118		104	12,546			
8 (REFERRALS)	1,242	625	252			132				210		26	1,242			
9 (LAB SUB-TOT)	82					28			54				82			
(CAP)	13					4			9				13			
(REC-P)	58					20			38				58			
(REC-V)	11					4			7				11			
10 (ADMIN SUB-TOT)	7,484	1,905	542	688	50	378	27	139	372	2,502	937	29	7,484			
(CAP)	150	38	11	17	1	8		3	7	50	19	1	150			
(REC-P)	4,939	1,257	358	400	33	250	15	92	246	1,651	618	19	4,939			
(REC-V)	2,395	610	174	174	16	121	7	45	119	801	300	9	2,395			
11 (SWEET CL)	545	211	73	62	2	37	3	15	25	84	25	4	234	311		
(P)	184			145	4			35					79	115		
(FC)	2,754										2,754		1,184	1,570		
(PHU)	15,116	5,865	2,026	1,708	45	1,013	71	408	680	2,429	645	106	6,107	8,087	922	
(PHS)																
(PHN)	3,893	478	187	748	19	85	8	178	672	1,359	163	8	258	2,586	1,041	
(DOCTOR)	7,318	2,143	211	105	158	575			323	3,761	618		1,970	4,375	1,173	
(PHN)	4,033					14				4,031		16	718	1,879	1,436	
(PHN/SS)	136					1				135		1	38	98		
(SUB-TOT)	34,169	8,697	2,478	2,766	228	1,739	102	636	1,700	11,424	4,277	134	10,586	18,012	4,571	
(GRAND TOTAL)	95,342	23,776	7,625	5,364	382	5,101	310	1,061	3,122	19,812	27,927	442	46,922	43,848	4,571	
(CAP)	4,582	1,608	552	343	14	112	14	41	214	1,024	377	35	1,685	2,897		
(REC-P)	44,728	11,847	3,485	3,450	285	2,175	130	841	2,277	14,460	5,427	199	11,306	28,851	4,571	
(REC-V)	46,032	10,321	3,589	1,541	88	2,411	164	179	1,049	4,348	22,123	208	33,932	12,100		

FP+CC
1969
GOVERNMENT

TOTAL	ILL CHILD CL	ILL CHILD 30	WELL CHILD CL	WELL CHILD 30	ILL W/MAN CL	ILL W/MAN CL	ADMITTING W/MAN	MATERN- ALITY	FP	MJT	COC [4V]	MALE	DIRECT SERVICE	SUPP. SERV.	MFP

1 (ICL CAP C)															
(FC)															
(RFC-F CL)	130	47	25	21	1	4		6	12		16	2	2	76	104
(FC)	30										50			21	29
2 (ICL CAP)	427	254	58	48	2	21		13	29		37	5	4	420	
3 (SUPP ICL-V CL)	620	401	66	71	2	11		19	42		54	7	6		620
(FC)	620										620				620
4 (TRANS FHM)															
(FMS)															
(FHM)	710	216	62	45	1	22		12	66		269	11	5		710
(FMS)	1,817	747	196	45	0	159		3	167		116	119	48		1,610
(FHF)															
(MFC)	250	58	17	85	3	6		24	19		9	28	2		250
(FP)															
(SUM-TOTAL)	7,570	1,021	775	176	13	147		39	252		394	159	55		2,570
(SUM-TOT CAP)	463	146	49	32	2	34		7	45		71	29	10		463
(RFC-F)	468	317	91	58	4	67		17	83		130	52	18		848
(RFC-V)	1,259	500	135	86	6	92		19	124		193	78	27		1,259
5 (RFOG)	7,940														
6 (RFOG CL)	140	47	32	18	2	14		14	12		7,940				7,940
(FC)	30										1				31
7 (RFOG)	2,430	1,929	437	230	0	156			39		30				17
8 (ICL SPECIALS)	410	376	86										32		2,430
9 (ICL SUB-TOT)	280	232	22												410
(CAP)	45	37	4						18						280
(RFC-F)	199	165	16						3						45
(RFC-V)	16	30	3						13						199
10 (SUMIN SUB-TOT)	1,200	507	141	85	5	74			2						36
(CAP)	74	10	3	2		1		21	95		215	39	19		1,200
(RFC-F)	916	395	110	67	4	58		14	74		4	1			24
(RFC-V)	260	101	28	17	1	15		4	19		168	31	15		916
11 (ADFP CL)	130	63	18	15	1	7			9		43	8	4		240
(F)	31			23	1						11	1			75
(FC)	1,990														17
(FHM)	10,730	4,962	1,422	1,176	41	512		317	696		1,990				1,150
(FMS)											890	113	102	3,765	5,166
(FHM)	3,130	967	277	204	6	99		54	296		1,205	51	22	229	2,512
(DIRECTOR)	2,460	1,141	300	69	12	244		5	254		177	102	74	255	1,695
(FHM)															
(SUM-TOT)	14,070	7,133	2,017	1,487	61	860		386	1,756		4,274	347	200	5,154	10,616
(SUM-TOT CAP)	34,910	11,384	3,179	2,137	93	1,357		498	1,756		13,610	559	319	16,803	15,857
(CAP)	951	635	114	32	4	57		20	79		112	34	14	465	487
(RFC-F)	20,233	4,117	2,258	1,432	69	993		421	1,438		4,637	432	234	5,450	12,533
(RFC-V)	13,776	2,833	807	423	20	306		56	238		8,881	93	70	10,888	2,838

FP+CC
1970
GOVERNMENT

	TOTAL	ILL CHILD (C)	ILL CHILD 30	WELL CHILD (C)	WELL CHILD 30	ILL MUMMAY (C)	ILL MUMMAY 506	NONMUMMAY MUMMAY	WATER- MUMMAY	FP	MUT	CDC ENV	MALE	DIRECT SERVICE	SUPP. SERV.	MTP
1 (REL CAP C)																
(FC)																
(RFC-F CL)	280	136	39	32	1	14		9	19		24	3	3	118	162	
(FC)	40										63			25	35	
2 (FO CAP)	480	233	67	99	2	24		19	33		42	5	5	480		
3 (SIMD RFC-V CL)	870	422	121	100	3	66		27	59		76	10	9		870	
(FC)											870				870	
4 (TRANS FINE)																
(FMS)																
(P-1)	710	215	62	45	1	22		12	66		269	11	3		710	
(P)	1,610	767	196	45	8	159		3	167		116	119	48		1,610	
(RFF)																
(MTG)	250	58	17	85	3	6		7	19		9	28	2		250	
(P)																
(SIM-TOTAL)	2,970	1,071	275	176	13	187		39	232		396	159	95		2,570	
(SIM-TOT CAP)	463	196	49	32	2	36		7	45		71	29	10		463	
(R-C-F)	348	137	91	99	4	67		13	81		170	52	18		848	
(RFC-V)	1,259	503	115	86	6	92		17	126		193	78	27		1,259	
5 (RCC)	7,460															
6 (RCC BUS CL)	140	47	32	18	2	14		14	12		7,460			7,460		
(FC)	30										1			59	81	
7 (RCCS)	2,870	1,622	454	493	18	167			72		35		35	2,870		
8 (RCCS ALSS)	700	556	166											700		
9 (RCC SIM-TOT)	460	263	34			59	1		101					460		
(CAP)	74	42	6			9			16					74		
(RCC-F)	177	187	24			47	1		72					327		
(RCC-V)	40	34	5			8			13					63		
10 (RCC SIM-TOT)	1,200	502	137	81	5	75		19	98		220	42	20		1,200	
(CAP)	24	10	3	2		1			2		4	1		24		
(RCC-F)	792	331	92	56	3	49		13	64		145	28	13		792	
(RCC-V)	384	161	44	28	1	28		4	31		70	13	6		384	
11 (SHEEP CL)	160	78	22	18	1	8		5	11		14	2	2	68	92	
(H)	17			23	1				6					13	17	
(FC)	1,910										1,970			840	1,150	
(RCC)	10,770	5,271	1,447	1,239	43	517		334	737		937	118	138	3,963	5,439	1,368
(RCCS)																
(RCCS)	3,350	1,014	291	214	7	104		57	312		1,278	54	23	241	2,648	662
(RCCS)	2,970	1,207	316	73	13	258		3	249		184	192	78	267	1,785	550
(RCCS)																
(SIM-TOT)	18,440	7,921	2,127	1,967	66	977		437	1,926		6,127	369	210	5,391	11,133	2,369
(SIM-TOT CAP)	36,410	12,320	3,465	2,571	107	1,673	1	510	1,973		11,574	584	337	17,577	16,939	2,369
(CAP)	1,930	547	129	71	4	54		22	54		117	39	15	554	487	
(RCC-F)	21,177	8,512	2,176	1,711	71	1,174	1	641	1,967		6,747	468	244	5,881	12,987	2,369
(RCC-V)	14,641	5,147	747	721	11	1,17		64	111		4,750	101	77	11,162	3,462	

FP+CC
1971
GOVERNMENT

	TOTAL	ALL CHILD (C)	ALL CHILD (A)	WELL CHILD (C)	WELL CHILD (A)	ALL MENTAL (C)	ALL MENTAL (A)	ADJUTANT WIFE'S (C)	ADJUTANT WIFE'S (A)	SP	MIL	CDC (C)	MALE	DIRECT SERVICE	SUPP. SERV.	WTP
1 (FEL CAP C)																
(FEC-F CL)	510	213	67	55	2	20		15	33	69	62	5	5	224	396	
(FEC)	130										130			55	75	
2 (FEO CAP)	551	242	60	57	2	25		15	36	51	53	6	5	550		
3 (FEO REC-V CL)	460	170	106	87	1	18		26	52	78	66	8	8		860	
(FEC)	840										840				860	
4 (TRANS Fwd)																
(FMS)																
(FMS)	910	228	65	59	2	23		13	70	111	264	12	5		860	
(FMS)	1,000	1,000	1,000	1,000	1,000	1,000		7	1,000	1,111	61	63	25		1,000	
(FMS)																
(FMS)	100	49	14	73	3	5		20	16	86	8	24	1		320	
(FMS)																
(SUM-TOT)	3,170	671	183	149	4	111		33	176	1,307	352	99	32		3,120	
(SUM-TOT CAP)	562	121	33	28	2	25		8	31	234	63	18	6		562	
(FEC-F)	1,123	242	66	42	3	41		13	63	471	177	16	11		1,123	
(FEC-V)	1,615	319	86	67	4	52		16	70	601	162	46	15		1,615	
(FEC)	6,627										6,627					
5 (FEC)	140	64	33	18	2	10		14	12	37	1			6,620		
(FEC)	10										10			76	106	
(FEC)	6,147	3,531	1,029	528	19	492		86	401		30			13	17	
(FEC)	960	709	187							46				76	6,140	
6 (FEC)	360	275	45			12				3				940		
(CAP)	54	44	7			2				1				340		
(FEC-F)	241	195	37			8				4	2			54		
(FEC-V)	44	36	6			2				1				241		
(FEC)	1,200	304	16	59	3	45		14	59	440	138	33	20	44	1,200	
(FEC)	17	3	1							4	1				12	
(FEC-F)	764	149	53	36	2	28		9	36	273	86	28	12		744	
(FEC-V)	446	113	32	22	1	17		5	22	163	51	12	7		446	
7 (SUM-TOT CL)	270	87	28	23	1	10		6	14	20	17		2		93	127
(FEC)	73			56	2			14							30	40
(FEC)	2,090										2,090			878	1,202	
(FMS)	11,160	6,990	1,629	1,179	45	533		318	753	1,355	896	113	102	4,133	5,727	1,443
(FMS)																
(FMS)	3,439	715	258	198	7	75		33	286	452	1,165	49	21	254	2,789	487
(FEC-F)	2,710	563	155	113	5	117		3	173	1,448	85	87	35	281	1,881	368
(FMS)	2,690	17	17	50		52			37	1,927	50	197	147	550	1,108	832
(FMS/SS)	320	2	2	6		7			5	248	6	25	19	106	214	
(SUM-TOT)	22,790	6,692	1,849	1,442	61	792		394	1,368	5,750	4,299	469	326	6,365	13,048	3,327
(SUM-TOT)	46,240	12,772	3,670	2,697	101	1,553		511	1,623	7,661	12,562	678	472	21,322	19,591	3,327
(CAP)	1,178	510	110	86	4	47		22	67	291	128	24	11	604	574	
(FEC-F)	25,569	7,669	2,137	1,676	68	172		430	1,306	6,065	4,483	530	355	6,885	15,337	3,327
(FEC-V)	17,513	5,113	1,656	722	29	413		99	253	1,325	7,771	66	106	13,833	3,681	

FP+CC
1972
Government

	TOTAL	ILL CHILD (C)	ILL CHILD 30	WELL CHILD (C)	WELL CHILD 30	ILL WOMAN (C)	ILL WOMAN 30	PURCHASE WOMEN	WATER- METER	FP	NUT	CDC ENV	MALE	DIRECT SERVICE	SUPP. SERV.	NTP
1 (HEAL CAP C)																
(FEC)																
(FEC-F CL)	630	277	79	46	3	79		18	19	59	50	6	6	266	364	
(FEC)	140										140			59	81	
2 (FO CAP)	541	255	73	60	2	76		16	36	54	46	6	5	580		
(FEC)	510	274	64	53	2	73		14	32	47	40	5	5		510	
4 (TRANS FUND)											510				510	
(FEC)																
(FEC)	1,370	270	78	57	2	71		15	83	131	337	14	6		1,020	
(FEC)	2,351	466	123	74	5	101		2	104	1,315	72	74	30		2,370	
(FEC)																
(FEC)	363	59	17	87	3	6		24	19	113	9	29	1		360	
(FEC)																
(SUB-TOTAL)	3,700	796	217	177	10	133		42	206	1,549	418	118	38		3,700	
(SUB-TOT CAP)	451	183	50	40	2	31		10	47	356	96	27	9		851	
(FEC)	1,114	255	70	55	3	43		13	66	476	134	30	12		1,184	
(FEC-V)	1,665	171	98	78	4	60		19	93	647	188	53	17		1,665	
5 (FEC)																
6 (FEC) (CL)	170	45	31	17	2	13		14	12	35	1			8,220		
(FEC)	10										1			72	98	
7 (FEC) (SS)	3,521	1,316	516	337	12	297			151	470	30			13	17	
8 (REFUNDALS)	440	245	65							169			35	3,620		
9 (FEC) (SUB-TOT)	110	99							3					460		
(FEC)	18	16												110		
(FEC-V)	74	70							2					10		
(FEC-V)	14	13												78		
12 (FEC) (SUB-TOT)	1,200	310	19	63	3	44		15	58	416	151	32	20		1,200	
(FEC)	12	1	1	1					1	4	2				12	
(FEC-F)	676	227	44	46	2	32		11	42	374	117	23	15		676	
(FEC-V)	312	81	23	16	1	12		4	15	108	39	8	5		312	
11 (SWEEP CL)	170	141	40	33	1	14		9	20	30	29	3	3	135	185	
(FEC)	150			76	3			21						42	58	
(FEC)	2,410										2,610			1,186	1,424	
(FEC)	11,940	5,254	1,504	1,262	48	537		334	743	1,117	943	119	137	4,394	6,330	1,916
(FEC)																
(FEC)	3,720	786	283	208	7	109		56	351	476	1,228	52	22	268	2,939	513
(SUB-TOT)	2,470	577	157	34	4	123		3	129	1,427	89	92	37	296	1,977	597
(FEC)	2,670	18	18	52		56			39	2,078	52	202	155	579	1,166	815
(FEC/SS)	340	2	2	7		7			5	263	7	26	20	113	227	
(SUB-TOT)	24,723	6,978	2,309	1,653	65	838		423	1,235	5,935	5,154	494	345	7,012	14,206	3,502
(SUB-TOT TOTAL)	44,620	11,036	3,115	2,522	99	1,437		541	1,771	8,315	14,760	661	454	20,432	20,687	3,502
(CAP)	1,461	47	124	101	5	54		26	84	414	143	33	14	598	863	
(FEC-F)	27,527	7,415	2,213	1,873	73	767		465	1,384	4,343	5,588	542	377	7,415	16,711	3,502
(FEC-V)	15,531	2,772	797	501	21	431		51	302	1,578	9,028	66	63	12,419	3,113	

FP+CC
1973
Government 8/31

	TOTAL	ILL CHILD <3	ILL CHILD 3+	WELL CHILD <3	WELL CHILD 3+	ILL WOMAN <50	ILL WOMAN 50+	ROUTINE WOMEN	MATERN- KITTY	FP	NUT	CDC ENV	MALE	DIRECT SERVICE	SUPP. SERV.	NTP	
1 (D&E CAP C) (FC)																	
(REC-F CL)	600	233	80	88	2	40	4	16	27	98	28		4	258	342		
(FC)	170										170			73	97		
2 (KJ CAP)	610	237	82	69	2	41	4	16	27	100	28		4	610			
3 (SUPP REC-V CL) (FC)	770	299	103	87	2	52	5	21	25	124	35		5		770		
(FC)	770										770					770	
4 (TRANS PHV) (FNS)																	
(FNS)	1,650	203	71	317	8	34	3	74	285	578	69		3	1,650			
(DR)	3,750	1,069	105	53	79	209			161	1,674	319			3,750			
(REP)																	
(MIG)	580	75	26	20	1	13	1	5	84	124	28			580			
(FI)																	
(SUB-TOTAL)	5,740	1,347	207	187	88	338	4	81	511	2,542	424		3	5,980			
(SUB-TOT CAP)	1,176	269	40	78	18	68	1	16	106	516	81		1	1,176			
(REC-F)	1,854	417	83	171	27	105	1	25	165	810	179		1	1,854			
(REC-V)	2,930	660	99	191	43	186	2	39	260	1,285	704		2	2,930			
5 (FOOD) (FC)	6,790										6,790			6,790			
6 (RECORDS CL) (FC)	180	48	33	18	2	14		14	12	37	1			77	103		
(FC)	30										30			13	17		
7 (UNUGS)	6,270	3,059	1,054	424	17	774	69		244	557			52	6,270			
8 (REFERRALS)	500	252	101			53				84			10	500			
9 (LAB SUB-TOT) (CAP)	50					17			33					50			
(REC-F)	8					3			5					8			
(REC-V)	36					12			23					36			
(REC-V)	7					2			4					7			
10 (ADMIN SUB-TOT) (CAP)	1,200	305	87	97	8	81	4	27	60	401	150		5	1,200			
(REC-F)	24	6	2	2		1			1	8	3			24			
(REC-V)	772	207	57	64	5	49	3	15	19	265	93		3	772			
(REC-V)	384	78	29	31	3	17	1	7	17	128	48		2	384			
11 (SWEET CL) (R)	550	213	74	67	2	37	3	15	25	93	25		4	236	314		
(FC)	180			142	4			34						77	103		
(FC)	2,750										2,750			1,182	1,568		
(PHV)	15,635	6,066	2,095	1,747	47	1,048	94	477	704	2,564	719		109	6,317	8,365	954	
(FNS)																	
(FNS)	2,572	716	111	494	13	57	5	118	445	933	108		7	170	1,713	689	
(DOCTOR)	2,050	524	57	27	43	159			87	924	174			537	1,193	320	
(FIV)	2,010					4								8	258	937	716
(FIV/SS)	250					1				214				1	72	188	
(SUB-TOT)	26,077	7,189	2,337	2,414	124	1,119	102	543	1,261	4,703	1,777		128	8,949	14,379	2,678	
(GRAND TOTAL)	47,927	12,258	4,080	3,448	224	2,437	171	740	2,252	10,711	12,145		211	23,591	23,658	2,678	
(CAP)	1,814	512	124	147	21	122	5	31	144	424	114		5	618	1,220		
(REC-F)	29,458	8,032	2,517	2,744	142	1,505	110	645	1,114	7,896	4,722		136	9,216	17,464	2,678	
(REC-V)	18,611	4,414	1,417	753	61	1,671	57	42	174	2,232	7,476		70	13,657	4,974		

APPENDIX H
STUDY OF COVERAGE AND COSTS OF
THE RURAL BASIC HEALTH SERVICES
PROGRAM IN THE DOMINICAN REPUBLIC

APPENDIX H

STUDY OF COVERAGE AND COSTS

OF THE RURAL BASIC HEALTH SERVICES PROGRAM

IN THE DOMINICAN REPUBLIC

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STUDY OF COVERAGE AND COSTS
OF THE RURAL BASIC HEALTH SERVICES PROGRAM
IN THE DOMINICAN REPUBLIC

PREFACE

This is one of a series of case studies under a project financed by the Office of Health of USAID administered through the International Health Programs division of the American Public Health Association and conducted through a directorate at the University of Michigan headed by Professor Robert Grosse. The project is limited in scope to population coverage and program costs, plus relevant descriptive information. Other aspects of health service delivery, such as effects on health status, are excluded. The case sites are scattered over several continents having countries of the developing world. Most, but not all, of the programs covered by the project are AID-supported ones. All place some emphasis on primary care, often through so-called "low-cost integrative health services". A final overall report of the project is expected to be prepared at Michigan within a year.

This Dominican Republic study covers a service delivery period from early in 1976 through the middle of 1979. The two full years of operation (at progressively higher levels of activity) are 1977 and 1978. The entire study (with this report) has been conducted during a period of less than two weeks, including about 10 days spent in the Dominican Republic. The investigators (report authors) represent specialties in Health Planning and Administration and in Economics.

Cooperation was generously provided to the investigators by the staff of the Health and Nutrition unit of the AID Mission in Santo Domingo, especially Dr. Oscar Rivera and Sra. Olga Cruz de Menendez, and by Dominican program officials. At the risk of slighting the assistance of others, the authors wish to acknowledge gratefully the help they received from: Dr. José M. Herrera, Coordinator for all activities under the AID health sector loans; Dr. Amiro Pérez Mera, whose ideas led to the creation of the Basic Health Services program (SBS); and Lic. Miguel A. Martínez, Administrative Official in the SBS central office.

I. BACKGROUND

This is a report of a short study of the innovative program of primary health services in the Dominican Republic which began in 1976 after the signing of a loan agreement between the U.S. Agency for International Development (called "AID" below) and the national government of the Dominican Republic (called "the Government" below) in October of 1975. ^{1/} That was the first (number "I") of two health sector loans from AID to the Government; activities under the second loan are not covered in the report. The loan provided for cooperative AID-Government funding for a planned total of \$11.6 million* over three years, with AID's share at \$4.8 million. The time period was extended for about a year and the disbursements rearranged slightly in a revision to the loan agreement ("Annex I Revision No. II") signed in March, 1979.

Loan I provided for three separate components or programs: special Basic Health Services ("Servicios Básicos de Salud" in Spanish; called "SBS" below); nutrition; and administrative reform of the national Secretariat of Health and Social Assistance ("Secretaría de Estado de Salud Pública y Asistencia Social"; called "SESPAS" below). Only the SBS component -- originally budgeted at a level of \$6.4 million, and increased to nearly \$6.7 million by the revision -- is examined in this study. It, in turn, has consisted of two largely separate health programs, for rural and urban areas. Only the much larger rural program is studied here for its costs and its coverage of the target population. (The urban one has been discontinued.) It should be noted that the Dominican Government, in cooperation with the AID Mission in Santo Domingo, already has conducted at least three evaluative studies of loan activities, including examination of SBS. Those studies were considered in preparing this report.

The health of its rural poor had been a major concern of the Government before the loan arrangements were made. In 1974, when a review of the national health sector was conducted, investigators reported numerous indicators of poor health status in rural areas. Examples of these indicators are an infant mortality rate of 130; high incidence of malnutrition among preschool children, which is clearly related to the large number of deaths in this age group attributable to diarrhea and respiratory infections; and high fertility rates, which appear to compound the problems.

SESPAS had built a number of rural clinics and also operated hospitals, but they were not readily available to many of the country's rural inhabitants. In 1975, there were about 1.8 million rural and urban residents who were not being served effectively by those facilities, according to the basic loan agreement ("Annex I", p. 6). Nor did the existing public health system offer the preventive services which could have had great positive effects on many of the major causes of morbidity and mortality in those areas.

^{1/} USAID Loan No. 517-U-028, Project No. AID/DLC/P2089, dated October 1, 1975.

* The U.S. Dollar and Dominican Peso nominally exchange at par, and are covered interchangeably in the report.

In an effort to bridge the gap between need and services the Government sought the assistance of AID to implement a new plan for delivery of basic types of health services which led to the creation of the SBS program. The original loan agreement referred to administration of that program by the national malaria eradication service ("Servicio Nacional de Erradicacion de la Malaria", or "SNEM"). However, arrangements were changed (for reasons unknown to the authors) in order to permit a newly created, separate branch of SESPAS to handle that function instead. (It usually is referred to as the SBS office in this report.) Additional details on the new program, including its organization, are contained in the next part ("II")

II. THE PROGRAM

Organization

As originally conceived, the Basic Health Services (SBS) program was to provide preventive and first aid services to underserved areas through a system of community workers supervised by nurse auxiliaries.

Services were to be provided to both urban communities and rural communities. Since problems encountered in the urban setting eventually led to a discontinuation of these services, discussion here will be focused on the rural communities included in the program. Rural communities of sizes between 400 and 2,000 persons, which were receiving no services at the time the program began, were to receive basic health services from workers, called promoters, selected from among community members. These workers were to receive training from the program and, under the supervision of auxiliary nurses, to provide services to community members in their homes.

Figure 1 shows the organizational structure of the program as it was begun in 1976. Several changes in the structure have occurred since the program started being implemented, but these will be discussed later.

The highest ranking position allocated full-time to SBS activities was that of Medical Director of SBS. The SBS office functioned as a quasi-- autonomous section of SESPAS under the Division of Program Operations. The Loan Coordinator's Office also functioned in a nearly autonomous fashion as part of that division. Responsibilities of the Loan Coordinator included overseeing the three areas of the AID health loan activities, including SBS as well as administrative reform and nutrition. The Loan Coordinator worked closely with AID advisors in addition to SBS personnel.

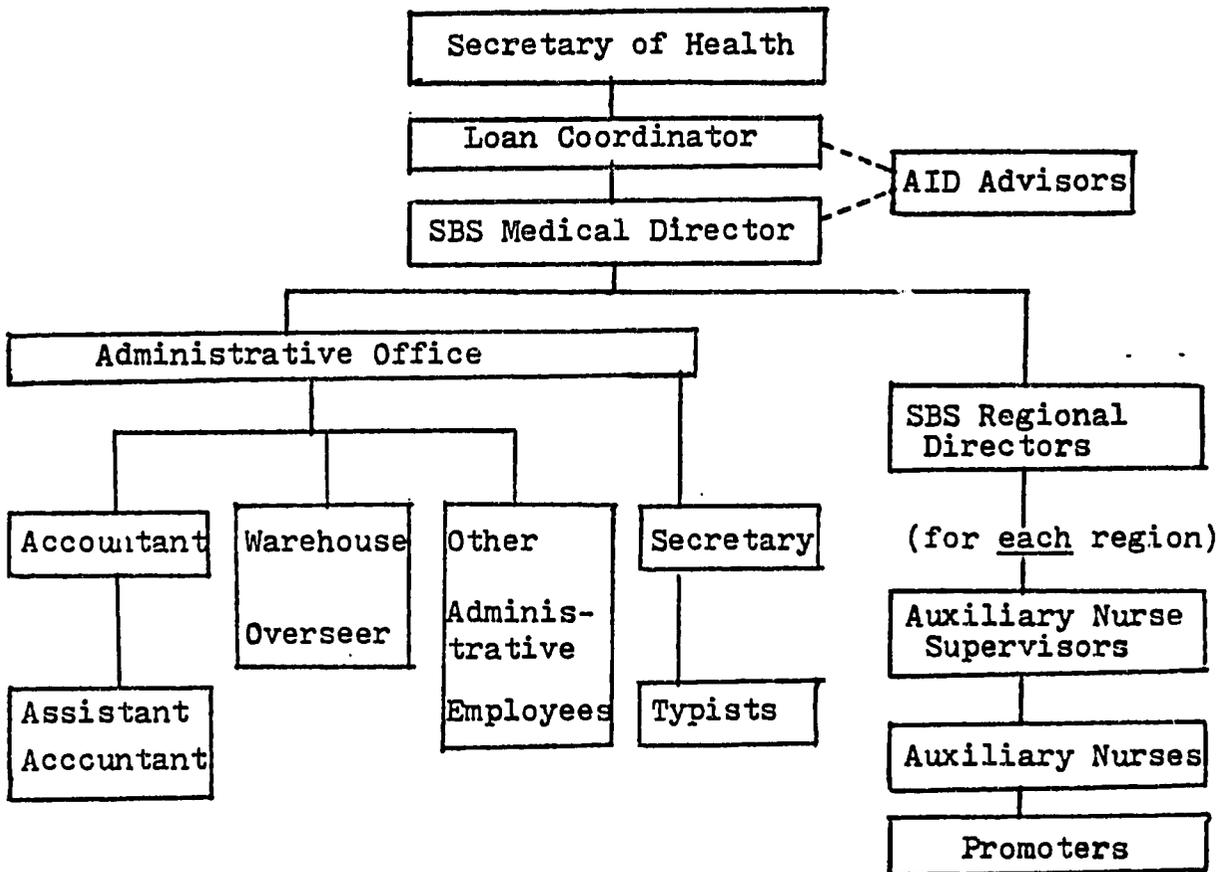
The SBS office handled much of the program administration, including disbursing program funds and keeping accounts, over-seeing drug supplies and distribution, and compiling periodic reports of program activities.

In each of the health regions of the country the program was directed by a "graduate" nurse, the Dominican equivalent of a registered nurse. This nurse was to oversee the activities and provide for on-going training of the lowest three levels of personnel: promoters, auxiliary nurses, and auxiliary nurse supervisors. A further description of each of these three types of personnel, the actual providers of basic health services, follows.

The promoter was a woman (or, much less often, a man) selected by a health committee made up of community members. The only requirements she (he) had to meet were that 1) she lived in the community which she was to serve and 2) she could read and write. Nearly 95% of those chosen were women, often with families of their own. The community health committee, organized with assistance from SBS or other government health personnel, was to have responsibility for selecting one promoter for every 400 persons in the community, and for requesting that she be retrained or be discontinued if services were less than satisfactory once she began working.

FIGURE 1

Organizational Chart of the Basic Health Services (SBS) Program
within the Secretariat of Public Health and
Social Assistance (SESPAS)
1976



After being selected by the community, a promoter would receive three weeks of training from the SBS staff before she returned to the community to begin delivery of services. An additional one week of training at a nutrition recuperation center also was given to promoters, though often after they had spend time working in the community. Assigned to approximately 70 households, each promoter was first to make a census of her delivery area (with assistance from supervisory personnel), and then to begin delivery of services in the homes on a bi-weekly basis. Notes about each visit were kept on a family record ("ficha familiar"), one of which was allocated to each household visited by the promoter. In addition to her "fichas", each promoter was provided with a small black bag, a thermometer, a thermos, simple medications, and a manual, which was to assist in recognizing certain symptoms and in treating or referring persons with them.

Auxiliary nurses, recruited from the training programs at five Dominican schools, were hired to supervise promoter activities. Salaries were set at a slightly higher than average level so that positions could be filled relatively easily. Ease of recruitment was increased by the fact that in 1975 the number of trained auxiliary nurses exceeded the number of jobs available to them. The SBS program provided one week of training to these workers and then supplied them with the same manual provided the promoters to help them "to recognize and to treat minor illnesses, to provide first aid, and to refer to a physician or a hospital those cases which require more extensive care". ^{2/} In addition to these basic treatment functions each auxiliary nurse was to oversee the work of ten promoters, reviewing and compiling their monthly reports and ordering supplies and medicines as needed.

Twenty auxiliary nurses were supervised by each auxiliary nurse supervisor. This last category of personnel consisted of experienced auxiliary nurses who were based in area health centers and involved in continuing training as well as supervision of promoters and auxiliary nurses.

Under this basic scheme, the health personnel assigned to field positions in 1978 were to number the following:

<u>Type of Personnel</u>	<u>Total</u>
Graduate Nurses	5
Supervisory Auxiliary Nurses	22
Auxiliary Nurses	396
Promoters	3957

Source: "Capital Assistance Paper", p. 60.

^{2/} USAID, "Capital Assistance Paper" (AID/DLC/P-2089, 5/23/75), p. 48. (This is cited below as "Capital Assistance Paper".)

Filling the positions of the original staffing pattern was actually begun in late 1975, and it continued according to schedule for the first 1½ years of the program (1976-1977). A central office was established in 1976, and graduate nurses were hired to direct regional activities in three of the regions. In one community after another, health committees were formed, promoters chosen and trained, and nurse auxiliaries and nurse auxiliary supervisors recruited to support the promoters' work.

The map (Figure 2) on the following page shows the health regions of the country. Region "0" is the area surrounding the capital, and is referred to as the Central Nucleus. No Basic Health Services infra-structure was planned for rural areas of this region within the scope of loan activities.

Regions I, II, and IV were the three regions in which field activities were begun in 1976. By the end of 1977, Regions I and IV were completely staffed and Region II was well on its way.

However, by mid-1977, problems had become evident. Contributions from the Dominican government did not increase as scheduled, preventing expansion of the program from continuing as planned. Additionally, the enthusiasm for delivery of basic health services expressed by promoters did not seem to be shared by their immediate supervisors. ^{3/} Nurse Auxiliaries, trained to work in urban clinical settings, appeared to have difficulties with the logistical and supervisory assignments they were given in their SBS positions.

Consequently, negotiations between AID officials and the Dominican Secretariat of Public Health led to revisions in the overall organization of Basic Health Services. SESPAS agreed to supply financial support to implement these changes beginning early in 1979. The major revision made was to change responsibility for program implementation from medically-oriented personnel to health educators. The resulting organizational structure is shown in Figure 3.

Actions following immediately upon the combination of increased Dominican funding for the program and organizational changes included: 1) the hiring of assistant health educators at both national and regional levels to assist SESPAS health education personnel carry out their new responsibilities and 2) the rapid expansion of hiring and training of basic service delivery personnel (that is, promoters and their immediate supervisors). Immediate supervisors of promoters hired after the changes are no longer auxiliary nurses, but instead are community health educators, a new personnel category in the system. Community health educators are persons recruited from communities in which they are to work who have at least a high school education. Once hired by the SBS, they are given six weeks of training, and assume tasks formerly assigned to the program's nurse auxiliaries. Supervisors of community health educators, who are referred to as field supervisors, have the same background as

^{3/} Gladys de Guzman, et al., "Evaluation of the Health Sector Loan Program for the Dominican Republic", (Santo Domingo: AID Mission, Dominican Republic, October 13, 1977); and conversations with Dr. Oscar Rivera, August 14-23, 1979.

FIGURE 2

Map of Public Health Regions of the Dominican Republic

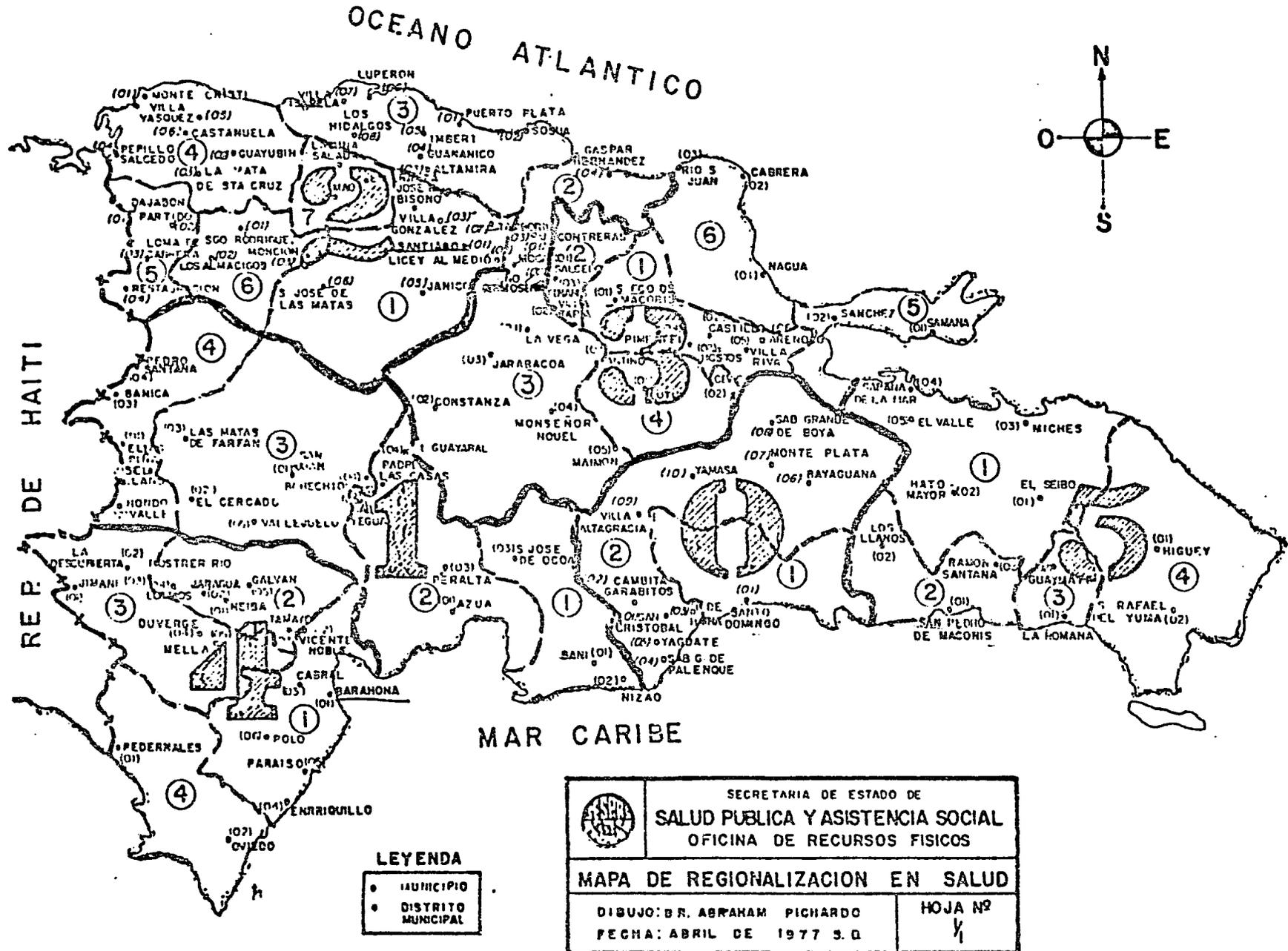
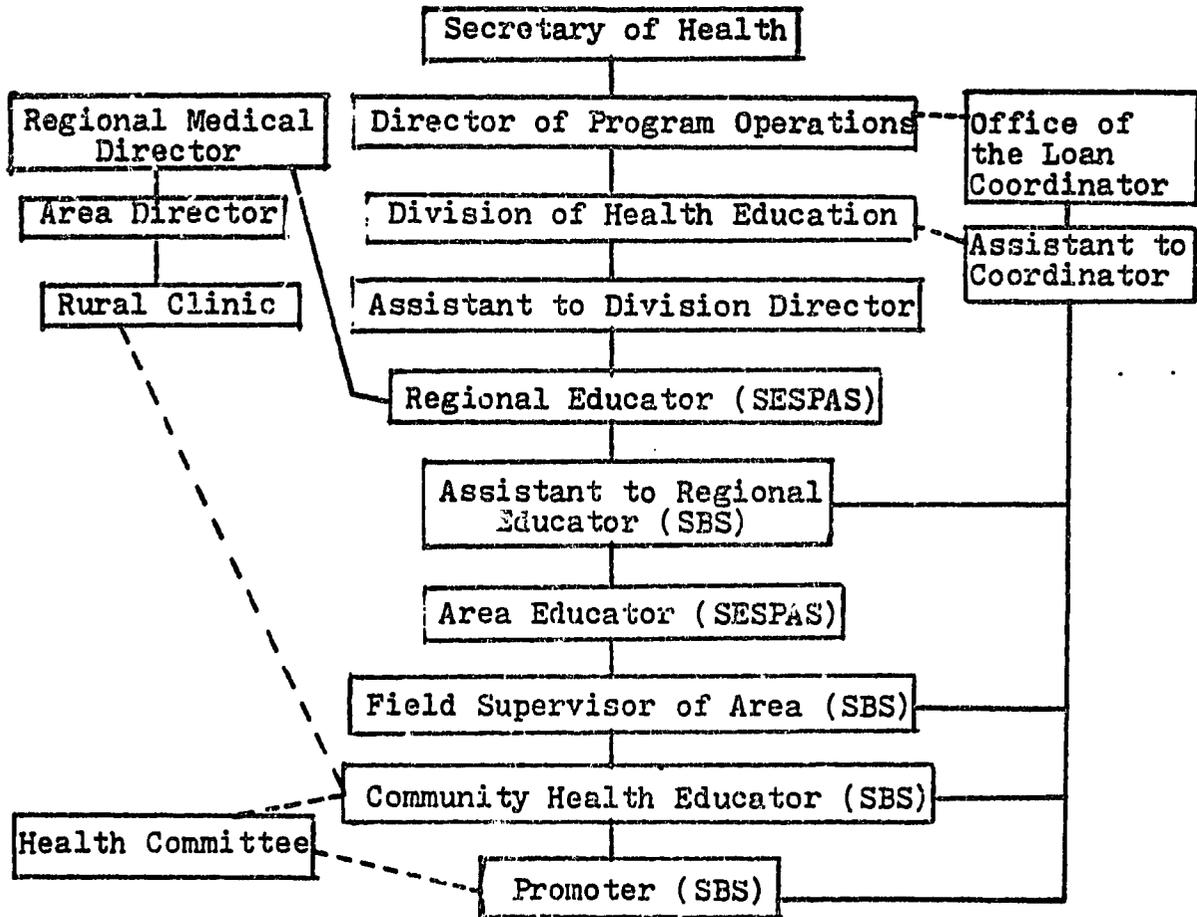


FIGURE 3

Organizational Chart of the Basic Health Services Program (SBS)
within the Secretariat of Public Health and
Social Assistance (SESPAS)
1979



community health educators, with the addition of more training specifically related to supervision. In the future, they will presumably have had more experience as community health educators than those entering the community health education positions. Community health educators are gradually filling the promoter supervisor role throughout the country. As such, they are taking over positions vacated by nurse auxiliaries and assuming newly created positions. For at least a while, however, promoters in different communities will be supervised by different communities will be supervised by different types of personnel.

At the central level, with the exception of the Assistant to the Director of Health Education, personnel have remained nearly the same, despite the reorganization, while at the community level, promoters have continued to offer the primary health Services.

Services

As noted, the most important services to be offered by the SBS program are preventive in nature. The primary deliverers of these services are the promoters. Supporting and reinforcing promoter activities are the tasks of the promoters' immediate supervisors and, ultimately, of the entire SBS organization.

Basic health services provided through the program include:⁴

1) The collection of basic demographic data -- Promoters obtain basic census data through a household survey as soon as they have completed their initial training; thereafter they report all births and deaths by age and sex. These data are then compiled by promoters along with migrations into and out of the community. To do this they are provided with forms for each family they serve. The results go to supervisors and are sent to the central office where they are tabulated and reported on a regional basis. Also collected are numbers of services provided, including household visits and particular conditions, such as pregnancies and cases of diarrhea, observed. Unfortunately, due to numerous changes in the record-keeping system, including a switch from manual to computerized data compilation, very little information on promoter activities has yet become available.

2) Nutrition -- The major nutritional functions of promoters are the promotion of breast feeding during the first year of life and the supplementation of that diet with solid foods at six months of age, plus the identification of malnourished children for referral to treatment centers.

3) Prenatal care -- Pregnant women in covered areas are provided with iron tablets. Additionally, promoters check for certain risk factors, such as bleeding and high parity, in order to refer such women for medical observation and/or care.

⁴"Capital Assistance Paper," pp 46-47; and other AID information.

4) Immunization -- Promoters immunize children against tetanus, whooping cough, diphtheria, measles, and polio, and inoculate women of reproductive age with tetanus toxoid.

5) Oral rehydration of children with diarrhea -- Children with diarrhea are treated by oral rehydration, and mothers are taught to prepare simple sugar and salt solutions to administer to their children. Severely dehydrated children are referred by promoters for further medical attention.

6) Treatment of respiratory infections -- Promoters provide symptomatic treatment for simple, upper respiratory infections. They give aspirin for fever and medicine to control coughing. More severe infections are referred to promoter supervisors or other personnel.

7) Family planning -- Condoms and pills are made available to families who request them, as is information on forms of contraception.

III. COVERAGE

The ideal measurement of a health program's success would reveal the effects of that program's services on the health of the people served by it. Such measurements require good baseline data, and even then are easily confounded by factors outside of the program itself. Since such baseline data were not initially collected for the population served by the Dominican Basic Health Services program, no objective claims can be made about the program's impact on the health of the people it serves. However, it is possible to estimate the number of people "covered" by the program and to comment on the types and quantities of some of the services they are receiving.

First, it should be noted that the major emphasis of SBS activities is on the health of the mother and child, and thus the program may have little, if any, impact on the health of male adults and older community members. Arguments for including the entire population include the following: healthier children and women, hopefully, will continue to be healthier as they age; improved health and nutrition behavior, hopefully, will benefit the entire community; and tetanus inoculations can be provided to anyone in the serviced areas. Despite these possible impacts on other members of the communities served by promoters, the "covered" population for purposes of this report will be conservatively defined in terms only of the primary targets, that is, women of child-bearing age and children under age 15.

No data were readily available to estimate the total population residing in the communities which providers were serving, much less the numbers of mothers and children in them. Therefore, an effort was made to obtain a reasonable figure for the total population within communities served by promoters (called "serviced communities" below). Information on population in serviced communities is not yet available for all regions, because of the difficulties in compiling census data already mentioned and because many promoters have not been working long enough to prepare census reports for their communities. Therefore, the number of persons in serviced communities has been calculated by assuming that the average number of persons in households reached by each promoter -- 400, according to program officials -- holds across regions and through time. The SBS has maintained close records of promoters employed by the program so that at least these numbers are available for each year of program operation. Table 1 presents numbers of promoters reported by year and region along with corresponding populations (determined by multiplying numbers of promoters by 400).

The population figures shown in the table have been cross-checked as much as possible. First, the population figures from promoter censuses which were available and had been compiled by region were compared with the figures appearing in Table 1. Results are shown below. All figures are for 1978.

<u>Region</u>	<u>Census Reports</u>	<u>Table 1 Results</u>
I	281,598	255,200
II	229,694	239,600
IV	<u>85,064</u>	<u>84,800</u>
Totals	596,356	579,600

Source: Figures for regions I and IV were compiled by Statistics Division of SESPAS; those for Region II were computed from SBS data by province within the region.

The two sets of figures are definitely of the same order of magnitude, and for purposes of this paper are adequate to use in obtaining a sense of how large the population covered is and what per capita costs are (as presented in Part IV below).

Another crude check was made by taking 60% of the estimated rural population for 1979, i.e., the target population, and comparing it with total population estimates for serviced communities. As of August 17, 1979, promoters had been trained for all communities expected to be covered by the project. Though the total number of promoters at work as of August 20, 1979, lacked a few of the total trained due to attrition, that number was multiplied by 400 to estimate the total population expected to receive services from the project. The population figure of 1,622,000 (for 4,055 promoters) was compared with the 60% estimate which came to 1,595,186; the two seemed to be of reasonably similar magnitudes.

On the assumption that the population figures of Table 1 are within a reasonable range of actual values, an attempt was made to estimate population coverage by year. These results and the method of deriving them can be found in Table 2. The figures, representing mid-year coverage, give an idea of the pace at which the program was expanding during a given year, and are used to derive the "covered" population, that is, mothers (or women of child-bearing age) and children under the age of 15 of serviced communities, to whom most project activities were addressed.

Analysis of the 1970 census data revealed that, at that time, 47.5% of the total population was under 15 years of age while slightly over one-half of

¹Rural population estimate provided by Statistics Division of SESPAS.

TABLE I
 NUMBER OF PROMOTERS AND CORRESPONDING SIZE OF
 POPULATION IN SERVICED COMMUNITIES BY REGION AND YEAR
 1976 - 1979

<u>Region</u>	<u>1976</u>		<u>1977</u>		<u>1978</u>		<u>1979</u>	
	<u>Pro- moters</u>	<u>Popu- lation</u>	<u>Pro- moters</u>	<u>Popu- lation</u>	<u>Pro- moters</u>	<u>Popu- lation</u>	<u>Pro- moters</u>	<u>Popu- lation</u>
I	653	261,200	649	259,600	638	255,200	633	253,200
II	0	---	372	148,800	599	239,600	1,191	476,400
III	0	---	0	---	0	---	632	252,800
IV	214	85,600	221	88,400	212	84,800	207	82,800
V	0	---	0	---	0	---	607	242,800
Total	867	346,800	1,242	496,800	1,449	579,600	3,270	1,308,000

Sources:

Promoter data by region were extracted from the following sources: For 1976, files of the Office of Basic Health Services through December 30; for 1977, the annual report of the SBS to the Secretary of Public Health and Social Assistance, "Memoria Anual, 1977," with data reported as of November 30; for 1978, "Memoria Anual, 1978," with data reported as of December 15; for 1979, table prepared by the Health and Nutrition office of the AID Mission, "Personnel on Board--SBS as of June 22, 1979."

Population was computed as = 400 x Promoters.

The total population was female.¹ Multiplying the female half of the population by 43.2 -- the percentage of females reported to be between the ages of 15 and 44² yields the estimate that 21.6% of the total population was women of child-bearing age -- the sum of children and mothers who constitute the SBS program's targeted population. This is around 69% (i.e., 47.5 + 21.6%) of the total population. On the assumption that these figures do not vary significantly from current conditions in rural areas of the country, the right hand column of the table below shows the population "covered" by SBS activities for the program's four years of operation. The "covered" population (mothers and children) figures are determined by taking 69% of the mid-year national total population estimates from Table 2 -- which is presented and explained below.

<u>Year</u>	<u>Total Population in Serviced Communities</u>	<u>Mother and Child Population in Serviced Communities</u>
1976	173,400	119,646
1977	421,800	291,042
1978	538,200	371,358
1979	943,800	651,222

Sources: "Total Population" -- Table 2, "National Total";
 "Mother and Child" -- "Total" X 0.69

Having estimates of the population within the communities that receive promoter services does not, of itself, assure that these people are benefiting in any way from the promoters' presence. Again, measures of health effects of the program are not available. However, other data, though limited, may provide some indication of the program's impact on the "covered" population.

The number of visits by promoter per household should give an indication of the promoters' contact with the population. SBS reports from individual provinces, which are subdivisions of regions, indicate that, based on the number of household visits reported, the number of visits per household per month is between one and two. The range depends on assumptions about average size of household and average number of households served per promoter. The number of visits per month anticipated by program officials was two, but even the lower figure of one visit per household per month would still reflect a relatively high level of activity by promoters in their communities and of contacts of the people with the SBS service program. The total number of visits recorded may include a small number of visits of community members to the promoters' homes as well, since once it is known that a promoter can provide medicines, people will sometimes seek one out when ill despite discouragement of this practice by the program.

¹ K.E. Lashman and J.A. Daly, Syncrisis: The Dynamic of Health: Vol. IX: Dominican Republic (Washington, D.C.: USDHEW, Office of International Health, DHEW Publication No. (OS)74-50005, June 1974), pp 20-22.

² Ibid, p 69.

TABLE 2

POPULATION IN COMMUNITIES SERVED BY SBS RURAL PROGRAM
BY REGION FOR MID-YEAR 1976 - 1979

<u>Region</u>	<u>1976</u> <u>(April-December only)</u>	<u>1977</u>	<u>1978</u>	<u>1979</u> <u>(January-June only)</u>
I	130,600	260,400	257,400	254,200
II	---	74,400	194,200	358,000
III	---	---	---	126,400
IV	42,800	87,000	86,600	83,800
V	---	---	---	121,400
National				
Total	<u>173,400</u>	<u>421,800</u>	<u>538,200</u>	<u>943,800</u>

Note:

Basic population data are derived from those of Table 1. (See its sources and method of estimating population served.) Unlike that table, which applies to dates near the end of each period, this table, contains estimates of mid-year (mid-period) population coverage. It requires the following assumptions and other steps in estimation: Assume that all dates of the population data from Table 1 are at the end of the year, so the following minor shifts are made: 1976 -- 12/30 to 12/31; 1977 -- 11/30 to 12/31; 1978 -- 12/15 to 12/31; 1979 -- 6/22 to 6/30 (for end of half year period). Assume that promoters entered or left the SBS system continuously, i.e., smoothly, so that the population served changed accordingly. With those assumptions, the calculations are as follows:

1976 -- Regions I & IV: Take $\frac{1}{2}$ the population number at end of the year for the mid-year estimate.

1977 -- Regions I & IV: Take the middle value between the end of 1976 and the end of 1977 (e.g., for Region IV: middle value between 85,600 and 88,400 is 87,000, the estimate for mid-1977); Region II: Take $\frac{1}{2}$ the number at the end of the year.

1978 -- Regions I, II, & IV: Take the middle value between the end of 1977 and the end of 1978.

1979 -- Regions I, II, & IV: Take the middle value between the end of 1978 and the end (June) of the 1979 period for the mid-period estimate; Regions III & V: Take $\frac{1}{2}$ the number at the end of the period.

Region IV is the only region for which total household visits made by promoters have been tabulated, and that information is available for only six months of 1977. Dividing the number of household visits (162,588) by the number of promoters reported to be working as of November 30, 1977 (221), an average number of household visits per promoter for the six-month period is produced. On a monthly basis, each promoter made an average of 122 household visits. If this figure represented two visits per month per household, the average number of households assigned to each promoter was 61. If, on the other hand, the number of households assigned to each promoter was close to the original program estimate of 70,² the number of visits per household was slightly less than two per month (that is, 1.7).

Indicators selected by Dominican and AID evaluators for use as measures of the program's impact were the percentage of children and pregnant women immunized against particular communicable diseases by promoters and the percentage of women using some form of contraception due to promoter intervention. The first three evaluations of SBS, which used sample surveys of areas receiving services, produced the coverage figures shown below.

<u>Age Group and Intervention</u>	<u>Coverage in Percentages</u>		
	<u>March 1977 (Region IV)</u>	<u>August 1977 (Regions I, IV)</u>	<u>August 1978 (Regions I, II, IV)</u>
Children 5 years; 2 doses DPT	50.5	42.6	68.6
Children 10; 1 dose measles	14.7	24.9	46.9
Women 15-49; 2 doses tetanus toxoid	21.4	33.7	56.0
Women 15-49; Active contraceptive users	8.2	5.8	14.3

Sources: USAID Mission to the Dominican Republic, Health and Nutrition Division reports: D.W. MacCorquodale and D. Rivera, "Initial Evaluation of the Basic Health Services Program (Low-Cost Health Delivery System), Region IV, Dominican Republic, "March 1977, p 3; G. de Guzman, et al., "Evaluation of the Health Sector Loan Program for the Dominican Republic," October 13, 1977, p 9; D.W. MacCorquodale, "Evaluation of the Basic Health Services Program," August 1978, pp 1-2.

¹"Actividades Realizadas por las Promotoras del S.B.S. Segun Comunidad, Region IV, Julio-Diciembre 1977," table provided by the Loan Coordinator.

²"Capital Assistance Paper," p 46.

As noted, the sample surveys were drawn from areas receiving promoter services at the time of the evaluations, and thus the areas evaluated changed from survey to survey. The numbers shown, therefore, represent percentages of different population bases. In any event, they do reflect a concerted effort by promoters to provide vaccinations and contraceptives to their communities. The 1978 statistics are particularly impressive since the coverage percentages rise substantially even though a much larger population base is being evaluated.

The indicators mentioned here -- plus the very close working relationships among the central SBS office, the Loan Coordinator's Office, and AID personnel as well as within the entire SBS system -- give reason to believe that SBS is fulfilling its assignment of providing basic preventive services to the communities it covers.

Another measurement which could be very crudely estimated, if one wished to indicate some sort of per capita delivery of services, would be to calculate the number of household visits in an area and examine it on a per capita basis. Here estimates of the percentage of the population considered to be covered by the program (mothers and children in serviced communities) could be used. Additionally, the average number of households, considered by the staff to be between 60 and 70 per promoter, could be employed. Multiplying 65 (for the number of households) by one and one-half (as a conservative average number of times each household is visited per month) yields a total of about 97 visits per month; that value multiplied by 12 yields an average total of annual household visits per promoter of 1,162. Since the average total population assigned to one promoter is 400, 69% of the total is 276, the number of mothers and children who would be covered by each promoter. When the total household visits (1,162) for a community is divided by the number of women and children (276) in that community, the resulting per capita number of visits is 4.2 per year. Since each household visit can represent a wide range of specific services provided, including those offered by promoter supervisors as well as those by promoters, this figure again supports the contention that rural areas covered by the SBS program are at least in active contact with a part of the country's health system. The outcome of this contact in terms of changes in health status is yet to be measured, but if preventive services delivered in the home by community workers with very little training have any chance of making an impact on the health of that community, then they must be making some difference in the Dominican Republic's rural communities.

IV. COSTS

Concepts and Measures of Costs

Basically, the "cost" of producing a health service is equal to the value of the best alternative services (or products) which cannot be produced when resources are devoted instead to the service in question. Economists refer to this concept as "opportunity costs". It is reflected, more or less well, in the prices which must be paid for the resources used: labor (of all kinds), equipment, materials, and so forth.

Beyond that basic idea, costs can be broken down in many ways. It is especially useful to distinguish between one-time and recurrent (or "operating") costs. In practice in the health field, it usually is possible to make a rough division between the two, while other distinctions from economics are not often so feasible. This study is no exception, so the only broad separation of the data below is between one-time and operating costs. Even for that, approximations must be made. Equipment purchases, including for vehicles, clearly are one-time matters until replacement becomes appreciable -- not an important concern for the study period covering about the first three years of the Basic Health Services program. On the other hand, costs of operating equipment, including vehicles, obviously are recurrent. Training costs also are classified here as "one-time", though that is less accurate. It has not been feasible to determine which training is for replacement personnel (incurring a recurrent cost) instead of for initially hired people, especially in a growing program like SBS. All other types of expenditures are considered to be "operating" (recurrent) ones. The most troublesome aspect of that decision involves medicines and vaccines. Theoretically, the health promoter's initial stock of medical supplies is similar to her training, a one-time expense. Here, too, a simplifying decision has been necessary; in the case of medicines and vaccines, more of the costs are likely to be recurrent ones, so all are considered as such.

There is no doubt that expenditures on resources should be considered as costs regardless of source of funding. No matter whose budget is involved, resources are used when health services are produced. Another consideration with respect to sources of funds is the relation of a specific source to particular types of expenses. For example, according to the plans for the program -- as outlined in AID's "Capital Assistance Paper" and other documents related to the loan -- certain resources (e.g., training, per diem allowances, and administrative support) are to be financed by AID, while others (e.g., most personnel and vehicles) are to be paid for by the Government. In the actual operation of the program, it appears that there have been temporary (or perhaps permanent) transfers of funds from both sources among types of expenditures. Therefore, the only useful breakdown by source of funds would be for total expenditures (and, thus, total costs) of the full program. For operations up to June 30, 1979, SBS reports (especially the "Ingresos", or "Recibidos", of its now-quarterly "Estado de Operaciones") indicate the following distribution of total revenues (excluding a small loan), which are slightly above accumulated expenditures for the same period:

AID (in Dollars and Pesos) -- 738,243, or 18%

Government (in Pesos) -- 3,345,531, or 82%

(These figures include the urban program, as well as the rural, because revenue data are more easily available with it).

For expenditures, the same SBS reports can be used: "Desembolsos", or "Consumidos", can be rearranged easily into the desired categories of costs. The results of that are seen in the findings below.

Problems of completeness, though not of categorization of expense types, exist because resources have been used for the health program beyond those covered in SBS reports. These include at least the following: the major part of the operation of the Loan Coordinator's Office for the sector loan (carried on AID's and other books but not for SBS alone); training of health promoters in nutrition recuperation centers (in the accounts of SESPAS' Office of Nutrition); other resources contributed by various units of SESPAS and carried on their books, such as some medicines and family planning materials and space in facilities for the Coordinator and for SBS' regional offices; central office space contributed to SBS by the national agricultural bank ("banco agricola"); continual and varied uses of the time of AID personnel, especially in the Mission's Health and Nutrition unit (on AID's books); and other contributions to program development before operations began (in various accounts, if recorded at all). Under the "opportunity cost" principle, all of these should have their costs attributed to the program. As shown below, only some of them could be quantified in practice.

One final set of considerations should be noted before the findings are presented. They concern ways of measuring costs, and they cut across the one-time/recurrent division. In this study, total costs (with several breakdowns) are well covered. However, the familiar average cost measure has not proved practical in the absence of reliable figures on specific services provided which could be related to particular amounts of costs. (A promoter "visit" appears to involve too diverse activities to be the unit for computing average costs).

In the health field, there are two other measures that can add perspective to the costs of a program. One of them relates the cost of the total program (and perhaps also of some of its types of resources used) to the size of the population served or potentially served. The resulting per capita costs, thus, are based on "coverage", which is treated in the previous part of the report. The second measure relates total program cost to one or more national aggregative economic values -- for example: total or per capita Gross National Product (GNP); total central government budget; and total budget of the public health secretariat. All of these measurements are presented below.

Findings on Costs

Data on the costs of the SBS rural program are plentiful and of seemingly good quality. The authors spent considerable time examining reports and talking with national office and loan officials to clarify their data.

(As previously stated, the regular SBS reports are the principal source of cost information). In addition, reports of the AID Mission (and some projections made by it) -- which are derived independently through the Mission's own accounts -- were used as cross checks on certain totals (and, less effectively, on types of expenditures. The correspondence between the two sources of figures is encouraging. The best illustration of that is through a comparison of total program costs (again, lumping urban and rural activities for convenience) accumulated through June 30, 1979:

AID data (total "Disbursed") -- \$4,066,697

SBS data (total "Desembolsos") -- \$4,044,959

Difference -- \$21,738, or 0.5% of SBS figure.

The difference of only one-half of one percent is very low. It should be observed in passing that, fortunately, both sets of values pertain to expenditures actually made instead of to less useful budgeted or programmed ones.

In addition to double checks of total costs, there was some verification of the internal consistency of the SBS expenditures, by type and time period. The results again were satisfactory. Therefore, as far as the data go in completeness and detail, they appear to be good. One variety of detail which they fail to provide is distribution by regions. Although some basic files might contain the ingredients for that breakdown, the regular reports of SBS (and AID) do not. The values which follow are largely rural health program aggregates.

Table 3 presents a summary of costs (as evidenced by expenditures) of the SBS rural program for all regions together, in Pesos or Dollars. It divides them by type of expenditure (resource) and by year since the official start of the service program on April 1, 1976. Although the first half of 1979 is included in the table, caution must be taken in using it. As described in previous parts of this report, the scope of the health program increased markedly in 1979 and its staffing structure underwent substantial changes. Its costs are placed alongside those of the earlier years, mostly for completeness and for some possible perspective on the changes. Only annual values are tabulated here, but certain monthly or quarterly details also have been obtained and are used to help interpret the results.

The heart of the table is the set of expenditures incurred and reported by the SBS office (those labeled "Within SBS' Budget" in the table). However, provision is made also for costs attributable to the program ("Contributions") but incurred by other organizations.

Discussion of Costs

First, some simple descriptive comments can be made concerning the summary table of costs. For one thing, the growth of the SBS program is evident in the cost figures. There was a large increase from 1976 to 1977

(continued on p. 26)

TABLE 3

Summary of Costs (Expenditures Made) of Rural Program
of Basic Health Services ("SBS") in All Regions

During April, 1976 - June, 1979
(in Pesos Dominicanos = Dollars U.S.)

<u>Expenditure Category</u> (*One-Time only)	<u>4/76-12/76</u>	<u>1977</u>	<u>1978</u>	<u>1/79-6/79</u>	<u>Total</u>
<u>Within SBS' Budget:</u>					
Personnel ¹	\$213,712 ²	\$ 664,638	\$740,602	\$ 663,547	\$2,282,499
Travel & Per Diem ³	29,246	51,725	34,137	43,134	158,242
*Training ⁴	58,828	53,955	14,250	158,211	285,244
Materials	12,922	16,788	10,938	43,569	84,217
*Equipment	89,362	131,473	16,430	154,466	391,731
Vehicle Opera- tion ⁵	9,599	34,049	39,357	26,623	109,628
Medicines & Vac- cines	61,314	318,231	118,701	83,366	581,612
Other ⁶	150	754	602	2,578	4,084
<u>Sub-Total SBS' Budget</u>	<u>\$475,133</u> (for 3/4 year)	<u>\$1,271,613</u>	<u>\$975,017</u>	<u>\$1,175,494</u> (for 1/2 year)	<u>\$3,897,257</u>
<u>SBS' Oper- ating Costs</u>	\$326,943	\$1,086,185	\$944,337	\$ 862,817	\$3,220,282
<u>SBS' One- Time Costs</u>	\$148,190	\$ 185,428	\$ 30,680	\$ 312,677	\$ 676,975

TABLE 3 (cont'd.)

<u>Expenditure Category</u> (*One-Time only)	<u>4/76-12/76</u>	<u>1977</u>	<u>1978</u>	<u>1/79-6/79</u>	<u>Total</u>
<u>Contributions to Program from Sources Outside of SBS; Budget:</u>					
Office of Loan Coordinator ⁷	\$ 22,500	\$ 30,000	\$ 30,000	\$ 15,000	\$ 97,500
Other SESPAS & Related:					
Division of Nutrition					56,230
Division of Health Educ.					(Small or 0)
General Public Health					(Small)
Family Planning ⁸					(Unknown)
Agricultural Bank ⁹	4,500	6,000	6,000	3,000	19,500
*USAID ¹⁰					330,000-390,000
*Other Development Costs					(Unknown--prob. small)
<u>Sub-Total, Contributions</u>					(Not possible to sum all of these by year or overall.)
<u>Total, SBS & Contributions</u>					(Not possible to sum them due to gaps in "Contributions" estimates.)

Footnotes to Table 3:

1. Personnel costs are those of the SBS office only, including pay of occasional teachers employed by SBS for training.
2. The Personnel cost figure for 1976 includes approximately \$19,000 incurred by SBS earlier in the year than April 1.
3. During the study period, Travel & Per Diem costs included travel allowances to service personnel for use of cars, and so forth. It excludes the travel of staff for training. In any event, no travel costs are double-counted between it and another category.
4. Training costs are those of SBS staff only. Contributions of other offices and organizations are listed separately or omitted. Costs include an initial kit of supplies provided to promoters for use in the field after their training.
5. Vehicle Operation covers fuel, maintenance, parts, and other costs of use of vehicles, except for certain personal costs incurred by service personnel (See note 3 above).
6. Other category includes a variety of minor expenditures, such as costs related to banking, small rentals, and inventories. A very small amount of cost in it might be one time in nature (e.g., office reconditioning).
7. The Loan Coordinator's role is explained in the text. Values represent 70% of the full cost of the office; the remaining 30% is for the other programs covered by the AID health sector loan. The limited amount of office space and utilities used by this office are contributed by SESPAS, and not estimated here.
8. The family planning unit of SESPAS has provided some training at its expense to auxiliary nurses of SBS. It also has contributed, from its own or international agency resources, some supplies to SBS. The total value of these contributions is unknown; it is not likely to represent an appreciable part of total resources used by the program.
9. The Agricultural Bank has contributed the full office space, but not the equipment, for the SBS central office in Santo Domingo as a loan or gift. The equivalent rental value of such space has been estimated on the basis of rent and utilities to be paid in a new arrangement which will cover this office and others when completed. Such a basis creates an overestimate of past expenses, but has been used here.
10. USAID contributions over several years beyond its payments for the income of SBS include numerous consultants and temporary staff members, notably Dr. Oscar Rivera, covered by sources other

than the loan. Most of these contributions have been for initial development of the program. The value of all, including a lesser amount for operating purposes, was estimated (perhaps overestimated) by the authors in consultation with Dr. Rivera and Mr. Frank Miller of the Mission in Santo Domingo.

Sources of Table 3

SBS -- computed from monthly and quarterly reports of SBS central office, labeled "Estado de Operaciones" (previously "Estado de Situacion"), for April 1976 through April-June 1979.

Non-SBS --miscellaneous documents and conversations in Santo Domingo.

(even allowing for the partial year experience of the former); then came a relatively small decline in 1978; then, a great expansion in 1979 (whose costs for the first half of the year nearly matched those for all of 1977).

It is apparent, also, that personnel costs account for the majority; about 59 percent of the all years' total. That proportion varied somewhat from year to year, but was always appreciable. Actually, a personnel value of nearly 60 percent is not unusually high for a program of primary health care. (The percentage would be higher, of course, if only recurrent costs were considered). It is likely that the low compensation paid to health promoters -- who are seen by some officials almost to be "volunteers" -- is the main reason why the percentage is not still greater.

Several other types of resources used, as revealed by expenditures made, are notable, although none is nearly so great as personnel. The value of medicines and vaccines, which (if properly recorded) probably is a good indicator of activities within the program, is the next most important. Its proportion of all expenditures varied across the years; overall, it represents 15 percent. Vaccines alone could not be distinguished from other medical supplies for analysis. Following that category in size are equipment and training, with 10 and 7 percent, respectively, of the all years' sum. No other category has a percentage exceeding four.

The division of types of costs between one-time and operating ones warrants brief attention. The two categories in the SBS budget that are classified as one-time, training and equipment, incur 17 percent of the all years' cost. Their relative size varies from year to year, being higher in the two periods with the most components of new services, 1976 and the first half of 1979, as is to be expected. The category of medicines and vaccines also shows wide fluctuations from month to month, but is left to the operating cost class. Additional costs of a largely non-recurrent nature were incurred by others' budgets. They are discussed subsequently.

There are many possible ways of examining these cost data further in order to make explanations and some kind of assessment of SBS. They might be summarized in the form of questions to be answered or issues to be examined. The summary of those to be covered in the remainder of the report is as follows:

- 1) What is revealed by variations from month to month in costs of the full program or its specific expenditure categories? How does staff turnover appear to influence costs?
- 2) What more is shown by the addition of estimates of the value of contributed resources, including for program development?
- 3) Is there anything that can be said about differences among regions in the costs of the program?

- 4) How do cost variations (aggregative or specific) relate to changes in personnel employed, especially promoters (and, thus, to effective coverage of the population)?
- 5) What computations can be made of total and per capita program costs in relation to the entire economy or its public sector?

Question or issue "1" above raises the point of variations in costs from month to month (or by quarter, as recorded by SBS since late in 1978) for specific categories or the program as a whole. Such details of the data are available, although not tabulated in this report. Many of those monthly and quarterly changes are predictable, reflecting the growth of the overall program. For example, personnel costs, among others, were comparatively low in absolute amounts during 1976 but showed a gradual increase over its months as more promoters and others were added to the program. (Pay rates for promoters and most other personnel did not rise during the study period). After further growth early in the next year, there was stability in the category until near the end of 1978 -- (except for the aberrant month of September, when a shortage of funds caused most payments to personnel to be deferred to the final quarter). Then large rises in the account occurred from the end of 1978 through mid-1979.

Some expense categories are exceptions to the rule of growth that parallels the overall experience; most of these are readily understandable. Such types of expenditures are training, materials, equipment, and medicines and vaccines. Obviously, they tend to resemble, at least in part, one-time costs more than recurrent ones, despite the fact that two of the four categories have been classified as operating ones due to the recurrent nature of the greater part of their components. Although pay to personnel did not vary sharply over time, staff training was concentrated in certain periods shown by the monthly figures. Relatively intensive training activities can be seen in the values for some of 1976, the first half of 1977, August and September of 1978, and all of 1979 to date. Materials costs were highest at the start of the program and at sporadic intervals, with large rises in 1979. Equipment purchases naturally experienced wide variations. There were big expenditures for vehicles in two months of 1976 and three of 1977, and in the first quarter of 1979, while the stable service period of 1978 had none. Other equipment costs varied somewhat similarly, though June of 1978 was a special (high) case.

A final example of a category with irregular costs is medicines and vaccines, the second highest one for the full time period. Relatively heavy purchases were made approximately in alternate months for about the first 12 months of program operation. Then, June of 1977 showed an unusually high figure, and most of the rest of that year's months continued to have measurable values. Unlike the case of equipment, the year 1978 also had bursts of expenditures on medical supplies. They held at a fairly high level in 1979. There is an additional factor which confounds interpretations of changes in

expenditures on all medical supplies by SBS. At irregular intervals, SBS and the general public health program of SESPAS have made loans to each other, especially of vaccines. Monthly costs to SBS, thus, are unreliable.

A subsidiary issue under point "1" on the list above is the effect of staff attrition, or its rate of change ("turnover") on costs. The higher the rate of turnover, the greater the need for training, per diem allowances, and new materials and medicines. Productivity in providing care probably would be reduced, but total personnel costs would not necessarily rise, due to greater turnover. Actually, it is doubtful if the turnover experience of the SBS program can be very closely related to the level of program costs or variations in it over time. The impression of officials of SBS and the AID Mission, backed by rough checks by AID of its records, is that health promoters had a fairly steady 10 percent turnover rate. Information is not precise enough to permit tying that value directly to such costs as those of training in each period. Impressions vary concerning the turnover rates of other SBS personnel, especially at the level of auxiliary nurses who were immediately above the promoters; therefore, new or expanded costs caused by changes in such personnel cannot be analyzed. Of course, the shift to the new organization, emphasizing health educators at levels beyond the promoters, has been influencing (presumably, inflating) costs in 1979 due to the greater training expenditures required.

Issue "2" depends on more refined cost accounting than is done very often for health programs. It refers to the value of resources contributed to the program -- and, hence, to the real cost of SBS. There unquestionably have been some such contributions; they are worth mentioning, though their probable value has not been nearly so great as that of the costs recorded by the SBS staff. For example, the Office of the Loan Coordinator (who oversees all activities under the AID sector loan and has a special interest in the operation of the SBS program) has been an important factor in the progress of the health program. Yet the office's expenses are carried separately by both AID and the government. Based on figures supplied by the coordinator, who attributes about 70 percent of his costs to the SBS program (while administrative reform and nutrition components consume the rest), the values found in the "Contributions" part of Table 3 have been estimated by the authors. They should be added into the cost figures for a complete picture, but it is worth noting that the addition (totaling \$97,500) represents only about 2½ percent of the previously recorded program costs of nearly \$4 million.

Similar allowances should be made for other resources used but charged to budgets outside of SBS' own. They will be briefly summarized below, and are included in the table. Units of SESPAS besides SBS have contributed various amounts and types of resources. The Division of Nutrition provides each promoter with a week's training at a nutrition recuperation center. A global estimate of that division's contributions over the full life of the program was provided by the Loan Coordinator's Office to the study: \$56,230. (Some of that might have been provided before the time, April of 1976, when expenses began to be reported formally by SBS). That figure is less than 2 percent of the SBS-recorded total of expenditures. Other assistance from SESPAS has taken the form of such things as the following: training in the

Division of Health Education, which might become important in the future under the new organizational structure but has been negligible to date; a variety of types of low cost assistance from the general public health program like office space; and a small amount of general overseeing in the secretary's office.

Another source of resources not appearing in the SBS budget is the agricultural bank of the nation, which provides the space and utilities used by the central office of the health program. No information could be obtained by the authors for the equivalent rental value of the exact facilities used. However, there will be a move soon of that office, the coordinator's office, and some others to newly rented space in another location. When utilities as well as room are considered, the new quarters might cost as much as \$1,000 per month. About one-half of that ought to be attributed to the SBS central office. When a value of \$500 per month -- surely, a generous allowance for past years -- is assigned to the bank's contribution, the figures shown in Table 3 are obtained. Their all years' total is only \$19,500. That should be viewed against a recorded aggregate for SBS of close to \$4 million; when so viewed, it appears small.

Two types of contributions remain to be considered: the support provided by funds from AID outside of those under the loan; and other assistance for program development. To investigate, decide upon, and implement a new health program, many people and some other resources are likely to be involved. The Dominican SBS has its origin in studies by Dominican and visiting teams of needs and possible service delivery modes. Most of these, including the 1974 AID Health Sector Assessment, were supported in large measure by AID funds. Continuing support by the AID Mission staff also has been provided without direct charge to SBS or the loan. Much of it has been of a one-time nature, though some of it more closely resembles operating costs. A rough estimate of the range of its value to SBS, based on Mission records, would be at the most a total (for all years) of \$330,000-\$390,000. The highest estimate is equal to no more than 10 percent of the full value of SBS-budgeted expenditures. During the same period of several years, organizations besides AID -- especially SESPAS -- contributed to the development of the basic health services program in ways not charged to SBS. The total value of such contributions cannot be determined, but is thought by AID officials to be considerably lower than AID's cost cited above.

The remaining questions or issues on costs listed earlier can be covered in considerably less detail than the foregoing ones. Issue "3" points to differences among regions in their costs incurred for SBS. No doubt there have been substantial differences due not only to different levels of activity -- there was no such program at all in regions III and V before 1979 -- but also to efficiency of organizing and dispensing services. Unfortunately, no cost data exist in a form readily obtainable for the individual regions. The most that can be tried is to examine the personnel employed and populations served by SBS in the several regions. That brings us to issue "4".

That issue suggests that costs in the aggregate and for specific types of expenses might be related analytically to the number of personnel employed,

especially promoters, and their resulting coverage of the population. The rate of promoter turnover mentioned above could be an additional factor here. The growth of the SBS program in terms of staff and coverage has been reported above in Part III. While the general relationship over time between total cost (and its personnel component) and promoters employed or people served is positive, it is not necessarily uniform -- as will be seen more precisely below when per capita costs are considered (as part of issue "5"). Regional cost variations inevitably parallel the placement of promoters by regions; but in the absence of a uniform cost-to-promoter (or, equivalently, cost-to-population) ratio, it is not possible to make good estimates of costs by region from the existing information on total national costs. That will remain as a challenge to officials in operating and evaluating their program, considering the desirability of comparing regions for efficiency, as indicated by relative costs.

The fifth (and final) issue is dealt with in two steps: the computation of per capita costs of the SBS program and the relation of its total or per capita costs to certain economic aggregates, such as the Gross National Product (or GNP). The relevant data are summarized in Table 4; the methods of computing some of them plus the published sources of others are given in notes to the table.

A comparison of costs per person served by SBS with per capita GNP serves to show the program's size with respect to the nation's economy. In terms of the burden on the country of maintaining such a program or applying it elsewhere once its one-time costs have been incurred, the appropriate measure is per capita operating costs. They show a range from \$2.54 to \$3.74 per year in the period of 1976-1979. As a proportion of GNP per capita, they represented only from 0.42% to 0.45%, or much less than 1%, in the two years (1976 and 1977) for which GNP data were available. These values do not appear to be especially high; they will be presented in comparison to those of other programs in the final summary report of this project.

To judge the relative magnitude of SBS' expenditures in the public sector, one might compare the sum of operating and one-time costs each year with the corresponding spending levels of SESPAS and of the total central governmental budget. For the latter, the ratios in 1976 and 1977 translated into 0.11% and 0.20%, respectively. That is, SBS was no bigger than one-fifth of 1% of the public central budget. SBS' spending was only from 1.87% to 3.51% as large as SESPAS' over a three-year span, with the percentage showing appreciable variation during that period. On this measure, as on others, each observer is left to judge independently how large or how costly the Basic Health Services' rural program appears to have been in the Dominican Republic. Beyond making judgments on the basis of the results to date, it could be very interesting in the near future to extend the study of costs -- as well as of coverage -- forward from 1979 in order to assess the new organizational arrangements and broader geographic scope of the SBS program.

Table 4

COMPARISON OF ANNUAL OPERATING COST PER CAPITA OF SBS RURAL PROGRAM
IN ALL REGIONS WITH GNP PER CAPITA, AND COMPARISON OF ANNUAL
TOTAL COST OF SBS WITH TOTAL CENTRAL GOVERNMENT EXPENDITURES
AND TOTAL SESPAS EXPENDITURES⁺,
For 1976 (April-December, projected to full year),
1977, 1978, 1979 (projected)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>
Annual Operating Cost Per Capita of SBS ¹	\$ 3.64	\$ 3.74	\$2.54	\$2.65
GNP Per Capita ²	\$813.86	\$897.28	(not available)	(not available)
Annual Operating Cost Per Capita of SBS as Percentage of GNP Per Capita	0.45%	0.42%	(not available)	(not available)
Annual Total Cost of SBS ³	\$ 633,511	\$ 1,271,613	\$ 975,017	\$2,350,988
Total Central Government Expenditures ⁴	\$580,627,800	\$631,345,300	(not available)	---
Total SESPAS Expenditures ⁵	\$ 33,807,500	\$ 36,187,500	\$38,669,632*	---
SBS as Percentage of Total Central Government	0.11%	0.20%	(not available)	---
SBS as Percentage of SESPAS	1.87%	3.51%	2.52%*	---

⁺ All monetary measures in Pesos Dominicanos = Dollars U.S.

Notes and Sources for Table 4

* = Estimated expenditures, not confirmed as actually executed.

1. Annual Operating Cost Per Capita of SBS (rural program) is computed by dividing total operating (recurrent) costs of SBS by the number of persons served by the program during the same period. One-time costs are excluded from "operating" ones. For the year 1976, costs from Table 1 have been multiplied by four-thirds to convert nine months' experience to 12. For 1979, the multiple is two to convert six months to 12. The population served is discussed at greater length in Part*III of this report. It includes only women and children. Estimates of it for each year have been made by assuming that health promoters entered or left the system continuously, so the number of persons served increased or decreased smoothly. The estimate used for annual population is that for the middle of the year.
2. GNP Per Capita is computed by dividing the Dominican Republic's reported GNP by its estimated national population for the same year. GNP values are not yet available (except in an unreliable early form) for 1978 or 1979; their source for 1976 and 1977 is: Banco Central de Republica Dominicana, Cuentas Nacionales: Producto Nacional Bruto: 1973-1977 (Santo Domingo: Banco, n.d.), p 2. Population projections since the 1970 census vary according to source. The one used here is: Republica Dominicana, Secretariado Tecnico de la Presidencia de la Republica, Oficina Nacional de Estadistica, Republica Dominicana en Cifras 1978 (Santo Domingo: Oficina, Vol. VIII, Noviembre 1978), p 10.
3. Annual Total Cost of SBS includes both operating and one-time costs. Its basic source is Table 3. Values for 1976 and 1979 have been expanded to a full year basis as described (for operating costs) in Note No. 1.
4. Total Central Government Expenditures are the executed expenditures of the Dominican central government for all its functions. Their source is Republica Dominicana en Cifras 1978, p 135.
5. Total SESPAS Expenditures are the total executed expenditures (estimated instead of executed for 1978) of SESPAS. Their source for 1978 is: Republica Dominicana, Secretariado Tecnico de la Presidencia de la Republica, Oficina Nacional de Presupuesto, Presupuesto de Ingresos y Ley de Gastos Publicos del Gobierno Central, 1979 (Santo Domingo: Oficina, Diciembre 28, 1978), p 207-10.