

**A STUDY OF THE RECURRENT UNIT COSTS OF PRIMARY
HEALTH CARE SERVICES IN A SAMPLE OF BOLIVIAN
MINISTRY OF HEALTH FACILITIES, 1990-1991**

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FINAL REPORT

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Latin America and Caribbean Health and Nutrition Sustainability (LAC HNS) is a regional technical assistance contract funded by the Office of Health, Population and Nutrition of the U.S. Agency for International Development's Bureau for Latin America and the Caribbean.

The contract, which is based in Washington, D.C., has as its primary objective to advise A.I.D. Washington, USAID Missions, and, as requested, Governments in the region, on policy dialogue and the design and evaluation of more effective projects in Health Management, Financing and Nutrition.

The four-year contract is administered by the consulting firms University Research Corporation of Bethesda, Maryland, and International Science & Technology Institute of Washington, D.C.

LAC HNS activities in health management, financing, nutrition and policy analysis span the provision of short and long term technical assistance; the implementation of special studies; the organization of workshops; and information exchange and dissemination.

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PREFACE

A primary objective of the Health, Population and Nutrition Office of the Latin American and Caribbean (LAC) Bureau of the U.S. Agency for International Development (A.I.D.) is to provide technical assistance to the countries of the region to enhance the efficient and effective use of national health resources. The Latin America and Caribbean Health and Nutrition Sustainability contract (LAC HNS) was developed to assist A.I.D. in this pursuit. LAC HNS has been tasked with the implementation of cost analyses such as the present study to facilitate the development of strategies for cost containment and for improving efficiency, the evaluation of alternative financing schemes, and the generation of basic information on health expenditures, all elements which contribute to the process of policy dialogue with national governments.

LAC HNS has carried out such cost studies in diverse countries of the LAC region, adapting the research to the specific circumstances in each country. In general, these studies have had to overcome informational limits due to the fact that government accounting systems are not designed to allow Ministries of Health to determine costs by facility or by type of service performed. Alternative means to develop this information do, nonetheless, exist. A.I.D. has sponsored numerous theoretical and field-based studies in various countries to estimate cost data.

In conducting the present study and other recurrent cost analyses, LAC HNS applied a costing method which draws on the aforementioned research as well as the costing method used by the Pan American Health Organization. The LAC HNS costing methodology was developed by Mr. Ricardo Meerhoff, long-term Health Financing Advisor, and adapted to local conditions in Bolivia by two short-term LAC HNS consultants, Dr. Manuel Olave (Team Leader) and Mr. Dante Gimenez (Cost Analyst), who in turn were assisted by local officials led by the Ministry of Health's study counterpart, Ms. Hayde Valenzuela (Financial Auditor), and by local consultant Ms. Zulma Montaña. The draft report in Spanish prepared by Dr. Olave and Mr. Gimenez was reviewed and then revised in English by LAC HNS consultant Dr. Jack Fielder, with assistance from LAC HNS long-term Health Management Advisors Mr. Jack Galloway and Mr. John Holley.

It should be noted that the Bolivia study was carried out under difficult conditions. Because the primary data available were not always reliable or complete, the costing methodology developed by LAC HNS could not be fully applied. Furthermore, the Bolivia study examined only a sample of facilities and for these, analyzed service production and expenditure data for only two quarters from different fiscal years. Nevertheless, even given these restrictions, the results presented herewith provide local authorities with valid findings and recommendations that can improve both policy and management decisionmaking.

ACRONYMS

ADD	Acute Diarrheal Diseases
ARI	Acute Respiratory Infections
AS	Altiplano Sur District
BGC	(Bacillus of Calmette and Gueria) Vaccine to prevent Tuberculosis
CDD	Control for Diarrheal Diseases
DPT	Diphtheria, Pertussis and Tetanus Vaccine
IMR	Infant Mortality Rate
LAC HNS	Latin American and Caribbean Health and Nutrition Sustainability
MOH	Ministry of Health
PAHO	Pan American Health Organization
PROSALUD	Acronym for private health care organization based in Santa Cruz
TB	Tuberculosis
USAID	United States Agency for International Development
VC	Valles Cruceños District

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EXECUTIVE SUMMARY

INTRODUCTION

This report represents the results of an intensive effort by a team of international and local consultants to estimate recurrent costs for services provided by a sample of health facilities of the Bolivian Ministry of Health (MOH). It was performed on behalf of USAID/Bolivia as part of the activities of the Latin America and Caribbean Health and Nutrition Sustainability Contract (LAC HNS).

The purpose of this study was to:

1. facilitate institutional strengthening and greater efficiencies in the Child Survival Project districts;
2. provide accurate information on health care delivery costs and cost recovery efforts in the sample facilities;
3. demonstrate a methodology by which this analysis might be extended to other facilities and geographical areas; and
4. provide a tool for policy dialogue and management control which will enhance MOH decision-making on the allocation of resources and the design of cost recovery programs.

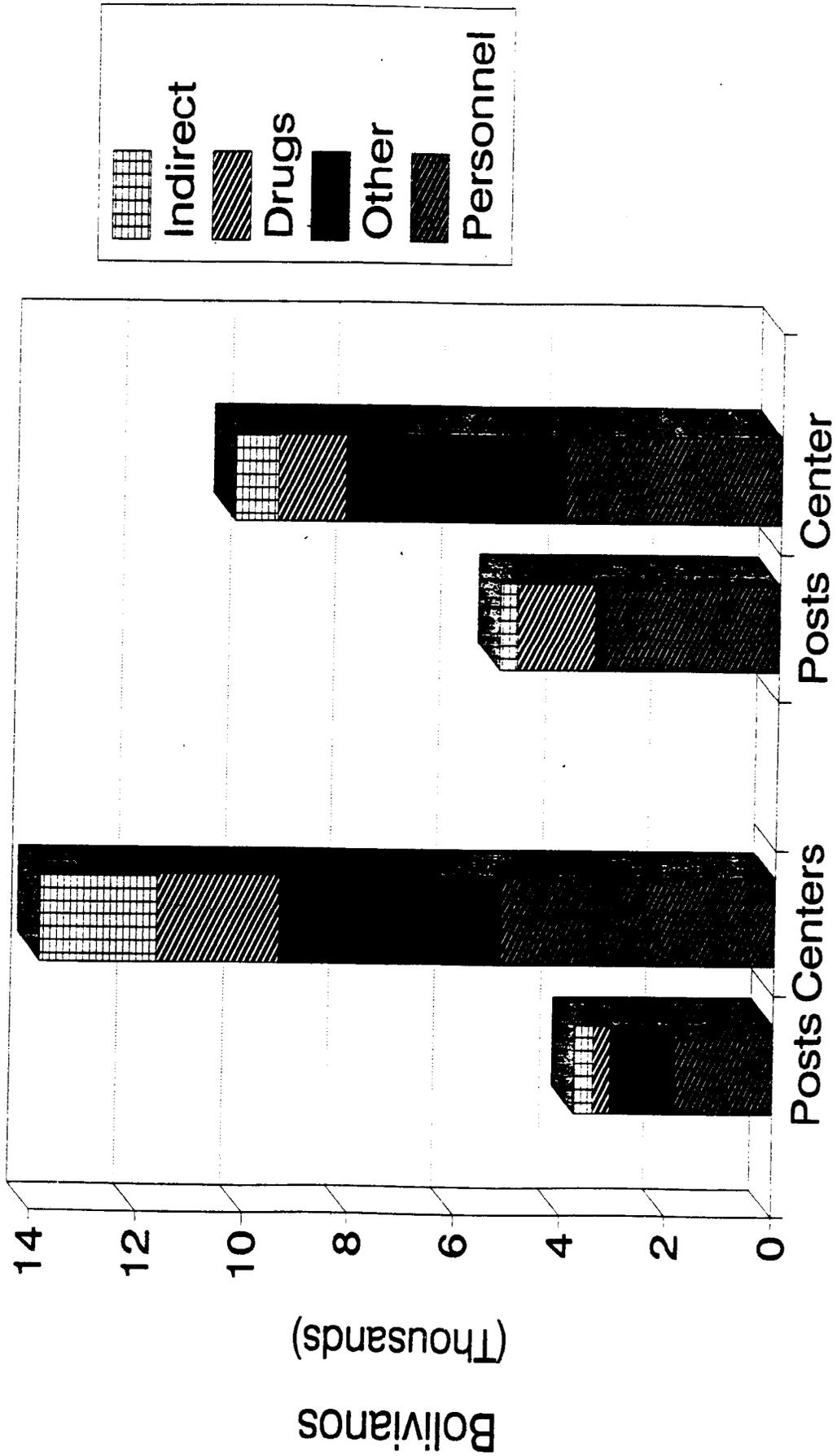
METHODOLOGY

Two Districts were selected on the basis of population size and geographical coverage, **Altiplano Sur** in the Department of La Paz (AS), and **Valles Cruceños** in the Department of Santa Cruz (VS). Within the AS District, the only Health Center and 5 of 22 Health Posts were studied. All four Health Centers and 8 of 23 Health Posts were studied in the VC District.

The study involved two 3-month samples permitting a comparison between costs in 1990 and 1991, to a degree, demonstrating trends. Two urban Health Centers in Santa Cruz, one from the MOH, and the other from PROSALUD were also studied, allowing a limited comparison between urban health centers.

Data were collected using 4 questionnaires, and total costs were allocated according to 6 major programs which were in turn sub-divided into principal activities within those programs. Within each program and activity, costs were estimated for 4 major cost categories: personnel, medicines, other direct, and indirect.

Figure 1
Average Total Costs by Cost Category
3rd Quarter, 1991



Valles Cruceños

Altiplano Sur

To estimate personnel costs, staff were asked to indicate the percentage of time spent on each activity, and total personnel costs were distributed according to that stated distribution. The general overhead/indirect costs for support activities from the District such as supervision and administration were also distributed in direct proportion to the personnel costs. In some cases, where costs were unavailable or understated due to volunteer work, adjustments using shadow prices were made to reflect the most realistic estimates possible.

As the personnel cost distributions were dependent on subjective data as reported by MOH staff; and data was not always available for specific cost factors such as pharmaceuticals, the results lack absolute precision, but still represent the general range and trends of costs within the sample.

GENERAL FINDINGS

The following table summarizes total costs found in the sample¹:

# Estab.	District	Level	Average Costs for One Quarter		% Increase
			1990	1991	
5	Altiplano Sur	Health Post	4,644	5,395	14.5%
8	Valles Cruceños	Health Post	3,246	3,810	17.4%
7 ²	Valles Cruceños	Health Post	1,732	2,362	36.4%
1	Altiplano Sur	Health Center	8,948	10,377	16.0%
4	Valles Cruceños	Health Center	11,917	13,904	16.7%

Logically, the total costs of the Health Centers are significantly greater than those of the Health Posts as demonstrated in Figure 1. This is due to the increased volume and complexity of services, and other factors. These are, of course, averages, and disguise some variations within each category. Nevertheless, the sample suggests that these average increases are reasonably representative of each District.

While individual facilities demonstrate a range of cost increases between 1990 and 1991, the general increase was remarkably uniform at between 14%-18%. The only exception in the sample were the smaller Health Posts in the Valles Cruceños District which had considerably lower costs than their Altiplano Sur counterparts in 1990 as shown in the table above and Figure 1.

¹ All financial figures in this study are in Bolivians.

² Without "Los Negros"

From Figure 1, it is interesting to note the differences between the two Districts, suggesting variations in the mode of service delivery. Supporting this observation is the fact that for each service provided at a VC Health Post, 5.3 are provided at a VC Health Center; while in Altiplano Sur, the opposite tendency is observed: for each service provided at the Health Post level, only 1.7 services are offered in the sample Health Center. This helps explain why the VC Health Centers registered significantly higher costs than the AS Health Center.

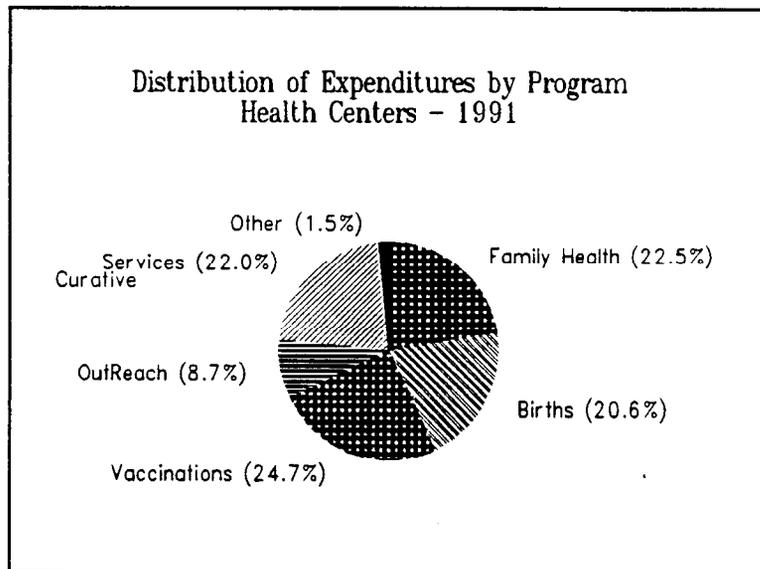


Figure 2

The structure of costs also reflect these differences. For example, each type of facility in each District had a different indirect cost rate. This suggests that evaluations of costs must take into consideration the mode of service delivery.

One of the factors which accounts for the cost differentials between Health Posts and Health Centers is the mix of services provided at each level as observed in Figures 2 and 3. In 1991, the sample Health Posts spent 41% of all their resources providing vaccinations, while the equivalent

figure for Health Centers was only 25%. This differential is in part a function of volume of services, but may also reflect differences in efficiency of service delivery.

The VC Health Centers are providing vaccinations at a lower unit cost than the average Health Posts which demonstrate relatively similar costs. On the other hand, it costs almost 2 1/2 times more per vaccination in the single AS Health Center than in the VC Health Centers, although the number of vaccinations given were in the same approximate range.

Furthermore, the two different types of facilities provide different shares of each type of immunization: BCG immunizations, for example, are

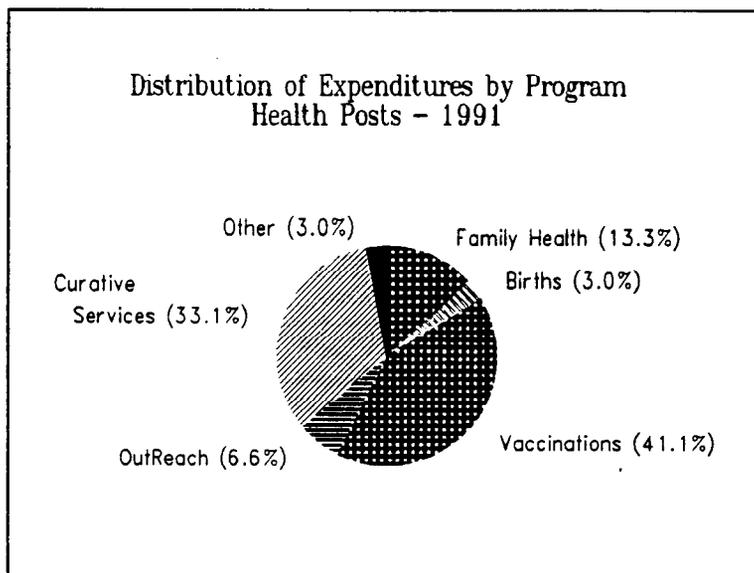


Figure 3

overwhelmingly provided in the Health Centers, while a larger share of measles vaccinations are provided in the Health Posts. This could suggest that there is inadequate integration of the immunization program; an uneven emphasis on specific types of immunizations at the different types of facilities; that supplies of antigens are limited and irregularly distributed to facilities; or that BCG is given primarily to newborns. The cause of this differential could be the subject of further investigation.

EFFICIENCY ISSUES

The following findings summarize the study results of the sample facilities:

1. The organization, structure, and operation of the **Sica Sica Health Post** in AS should be examined as a model of efficiency.
2. The **Calamarca Health Post** in AS is the least efficient facility with higher unit costs for nearly all of the primary care service categories.
3. There is far more variability among the efficiency performance of the Valles Cruceños Health Posts than among those of Altiplano Sur. The two most efficient Altiplano Sur Health Posts, **Sica Sica** and **Caracato**, are relatively comparable to the two most efficient Valles Cruceños posts, **Pucara** and **Cuevas**, with the Altiplano Sur facilities performing slightly better.
4. The two least efficient VC posts, **Santiago de Moro Moro** and **Los Negros**, however, have unit costs that are much higher than those of even the worst AS performer, the **Calamarca Health Post**. *Los Negros, in particular should be the focus of a detailed management improvement effort.*
5. As the most expensive producer of nearly every primary health care service, the operations of the **Santiago de Moro Moro Health Post** *need to be much more closely studied to determine if there are any extenuating circumstances that help justify its inefficient performance in delivering those services. Particular attention should be paid to its provision of immunization services* which are 4-5 times more expensive than the other 12 Health Posts analyzed.
6. Two of the VC health centers, **Florida** and **San Martín de Porres**, have substantially lower unit costs than the other health centers studied; and two, **Señor de Malta** and **Mairana**, have substantially higher unit costs for nearly all primary health care services. On the average, the two centers with higher costs have unit costs which are about double those of the more efficient pair.
7. As is the case with the VC health posts, *the least efficient AS facilities are the ones which account for a significantly larger proportion of all resources expended, and should be examined* to determine what can be done to improve their organization, patient flow, the

division of labor among providers, the community's relationship with the facility, and other factors possibly contributing to their inefficiencies.

USER FEE REVENUES

While the average revenues collected by the AS health post increased by 33% between 1990 and 1991, they were still only about 40% of the average revenues of the VC health posts, even excluding the **Los Negros** health post which is responsible for nearly 75% of all revenues collected by VC health posts. Several factors contribute to the relatively lower revenues of the AS health posts:

1. Population of the AS District is considerably poorer than that of the VC District, and thus, the MOH providers are less likely to require payment of fees.³
2. There is a different service mix between the two Districts, with a much larger proportion of AS services directed toward immunizations for which there is no charge.
3. Revenue generating consultations constituted only 10% of the AS post activities while in the VC posts it was 23%. This will also affect the revenues collected from medicines.

The revenues collected by the AS health posts relative to their total costs were less than 4% as compared with more than 20% collected at the VC posts. This difference is in part attributable to the fact that total costs of the AS posts are considerably higher than the VC posts.

Several of the health posts studied showed significant increases in revenues between the two years. Those include **Cuevas**, **Quirucillas** and **Santiago Moro Moro** in the VC district; and **Patacamaya** and **Calamarca** in the AS district. *The mechanisms utilized by these posts should be examined for possible means of increasing revenues in other health posts throughout the country.*

Because of differences in the volume and mix of services, *revenue data for health centers are not comparable to health posts, and should be examined separately.* All four health centers for which there is data registered higher revenues in 1990 than in 1991. The reason for this is not clear, and *should be examined.*

Nevertheless, the proportion of revenues of health centers compared to total costs was significant in some cases, particularly at **Florida** with 85% in 1991. Two of the others, **San Martín de Porres** and **Sisa** collected revenues valued at more than half of their total costs.

³ It is, however, not clear whether a standard means test has been applied - a factor which should be the subject of further investigation.

The exception was **Señor de Malta** which collected only about 12% of costs in 1991. This performance should be examined more closely to seek the means of increasing revenues.

It should be noted that revenues were generally not registered by service, making further in-depth analysis of revenue source extremely difficult.

THE URBAN AREA

The urban component of this study included just two facilities: the **MOH Virgen de Cotoca Health Center** and the **PROSALUD clinic La Madre**, both located in the city of Santa Cruz. This study component therefore represents a small focus and sample as compared with the rural facilities.

The activities of the **Virgen de Cotoca Health Center** focus overwhelmingly on primary care with most secondary and tertiary care provided at the referral hospital. The number of services increased by a dramatic 80% between the two study periods, primarily due to major increases in well-baby visits, immunizations, and curative consultations. The increase in services also resulted in fewer outreach services.

The staff of the facility believes that most of the increase in the activity level is attributable to the *public's perception that the quality of care had improved*. This, in turn, is attributable to an increase in the number and quality of staff, and a greater emphasis on health promotion than in the previous year, particularly by one of the physicians.

As might be expected, the increased level of services also resulted in a three-fold increase in total costs. The increase, however, was not uniform, with personnel costs increasing 600%. Reductions in unit costs were registered for those services provided in increased volume.

In contrast, **La Madre** was already operating at a high level of activities in 1990, and experienced a slight contraction of activities during the 3-month period studied in 1991. Its cost structure did not change radically between the two years. A 6% increase of total costs, accompanied by a 5% decrease in services logically resulted in increased unit costs.

In any case, *La Madre remained considerably more efficient than Cotoca*, and actually improved its relative efficiency in providing many services. In 1991, **Cotoca** had lower unit costs than **La Madre** for only two services, prenatal care and tetanus vaccinations.

An effort should be made to determine the extent to which the changing relative efficiencies with which these two facilities produce different services is primarily a result of changing numbers of services provided, as opposed to different managerial practices. To the extent that they are attributable to different managerial practices, to the extent possible, those efficiency-enhancing practices should be adopted.

CONCLUSION

The study demonstrates the usefulness of a costing methodology for determining the relative efficiency and cost-effectiveness of service delivery.

The breakdown of total costs into major cost categories is particularly helpful in demonstrating how staff spend their time. Analysis of the appropriateness of that distribution provides supervisors with a useful monitoring tool. In the case of Health Centers, the cost breakdown also provides an important indicator of the cost-effectiveness of allocation of responsibilities among staff members.

The distribution of costs among major programs is also very useful in analyzing the relative importance of each program in terms of resources utilized. This may help suggest modifications in strategies of health care delivery.

The further breakdown of programs into principle activities and the allocation of costs to those activities provides another level of useful cost information. This step in the analysis is particularly important in order to identify the reasons behind apparent inefficiencies, and thus suggest the design of appropriate program modifications.

Comparisons between facilities is also useful, but as the study indicates, care must be taken to ensure that the units and programs being evaluated are truly comparable which is not always the case between Districts, or even among the same category of facilities.

Unit costs may be useful indicators of relative efficiency, but care must be taken in interpreting them since they are heavily influenced by the volume of the service they attempt to measure. Nevertheless, differences in unit costs between facilities with a similar volume of services may be very instructive, and suggest that less-efficient facilities emulate some of the practices and procedures of the more efficient units.

One important factor which this analysis does not address is quality of care. Very little can be implied about quality of services directly from the cost data, and other indicators must be applied.

In utilizing this analysis, it is important to recognize that the data raise as many questions as they answer. Cost indicators are helpful in identifying potential problems and trends, but they do not necessarily suggest the reasons contributing to those results. The real usefulness of the financial indicators is to facilitate dialogue among decision-makers and to signal areas which should then be thoroughly explored with program staff.

Indeed, a useful exercise resulting from this study might be for district and facility staff to extend the analysis related to their own institutions, as an even more exhaustive analysis could be done with the data collected for this analysis.

In terms of cost recovery, it is useful to know the general performance of each health facility in terms of income, as well as the programmatic source, and the percentage of exemptions. This information can be obtained by means of a simple continuous information system rather than a periodic spot-check evaluation.

Finally, since there is often little relation between costs and cost recovery, it is not necessary to combine both components in future studies. Districts interested in analyzing the performance of their health facilities using cost indicators need not include a cost recovery component in the analysis.

I. INTRODUCTION

This report presents the findings of a recurrent cost study of primary health care in Bolivia. This is one of several such studies being conducted in a number of countries in the Latin America and Caribbean (LAC) region under the direction of LAC Health and Nutrition Sustainability (LAC HNS). The objective of LAC HNS is to assist the United States Agency for International Development (AID) to engage in policy dialogue and to design and develop more effective projects in health management, financing and nutrition.

This report presents the general context of the study--a very brief description of Bolivia and its medical care system, the objectives of the study, an account of the methodologies employed in implementing it, and the findings, conclusions and recommendations.

The main purpose of this study was to provide information which would serve as a vehicle for policy dialogue, as well as a management tool to enhance the MOH's ability (1) to more efficiently utilize its resources and (2) to design an effective cost recovery program within primary health care-providing facilities.

II. BACKGROUND

A. General

Bolivia covers 1.1 million square kilometers and has an estimated population of 7.1 million persons. The Bolivian population is young and more rural than that of most Latin American Countries. Persons less than 15 years of age constitute 41 percent of the total population, and half of Bolivians still reside in rural areas.

Bolivia is an Andean country comprised of three distinct regions; the Altiplano, the Valleys and the Plains (Llanos). The Altiplano region covers 21 percent of the national territory, and is made up primarily of the western portion of the country. The Altiplano contains 53 percent of the total population, and is overwhelmingly comprised of Amer-Indians. The Valleys region in the central portion of the country contains 16 percent of the total area, 27 percent of the population, and has more of a mixed Indian and non-Indian composition. The eastern portion of the country, the largest of the 3 regions, is known as the Plains. Although the Plains region contains 62 percent of total national territory, only about 20 percent of Bolivians, primarily non-Indians, resides here.

The scarcity of adequate communication and transportation networks has reinforced the divisive effects of the Andes Mountains and the cultural differences between the Indian and non-Indians, which have kept Bolivia a relatively isolated country internationally and one which remains largely unintegrated internally.

B. Health Conditions

The health status of the people of Bolivia is among the poorest of (any people) in the western hemisphere. The infant mortality rate, often regarded as the single best measure of a people's health status, is estimated to be 101 in Bolivia. The infant mortality rate of neighboring Peru--a country which is historically, culturally and bio-geo-climatically very similar to Bolivia--stands at 81, 20 percent lower. Throughout the past two decades Bolivia's infant mortality rate has been among the highest in the hemisphere, rivaled only occasionally by Ecuador, Honduras and Haiti.

The life expectancy of Bolivians is 54, ranking it among the lowest of all countries in the Americas, and substantially below neighboring Peru's 63 years of age. The maternal mortality rate in Bolivia is 48 per 10,000 births, more than 50 percent higher than Peru's rate of 30.

While health status indicators for Bolivia as a whole are not high, it is important to note that these national totals mask significant variations across the 3 regions of the country. This is a direct result of a high IMR. For instance, some isolated segments of the country have an infant mortality rate that is estimated to exceed 150 per 1000 live births, 50 percent higher than the national average. The following table, containing the infant mortality rates (IMR) of 8 departmental capital cities, further underscores the significance of regional variation in Bolivians' health status.

CITY	1983-84 IMR	REGION
Potosi	171.3	Altiplano
Oruro	149.9	Altiplano
Cochabamba	147.6	Valles
Santa Cruz	135.6	Llanos
La Paz	133.5	Altiplano
Sucre	108.1	Valles
Trinidad	97.9	Llanos
Tarija	82.4	Valles

Here, as with generally most health status measures, the Indian-dominated Altiplano region has the poorest health status.

Morbidity patterns in Bolivia are those characteristic of very poor countries; infectious diseases predominate. According to the Ministry of Health's General Directorate for Epidemiology, the three primary causes of illness throughout the 1985-1988 era were acute diarrheal disease, respiratory infections, and malaria. The chief causes of mortality mirrored these leading causes of morbidity. A recent Pan American Health Organization (PAHO) study of the leading causes

of death among children less than 3 years of age found that acute diarrheal disease and respiratory infections accounted for 60 percent of all deaths.

C. Macroeconomic Conditions

Bolivia is one of the poorest countries in the western hemisphere. The international economic crisis of the past few years, particularly the fall in the prices of primary materials, has had serious repercussions on the country's economy, which has long been predominantly based on the extraction and exportation of minerals.

Bolivia experienced high rates of economic growth during the 1970s, largely as a result of high international prices for tin and petroleum products. As the prices of these commodities began to fall toward the end of the decade of the 1970s, so too did Bolivia's short-lived period of relative prosperity. Along with the macroeconomic slump came political instability which culminated in the re-establishment of democracy in the early 1980s. The resulting populist government, however, was besieged by various pressure groups and proved unable to muster the political will to adequately address the economic crisis. The rate of inflation and unemployment rose, the external debt soared, the country's ability to service the external debt faltered, and the standard of living of Bolivians fell.

From the start of the decade of the 1980s, up until 1987, Bolivia's annual economic growth rate was generally negative. The situation reached a crisis in mid-1985 when the annual rate of inflation came to exceed 24,000 percent. Since then, Bolivian governments have successfully implemented a series of policies of macroeconomic stabilization and adjustment. These policies have reduced public sector expenditures and have stimulated the private sector.

Although the stabilization policies have been an economic success--reducing inflation to single digit rates and restoring confidence, investment and economic growth--they have done so at the cost of exacerbating social problems. Average family incomes have fallen. Open unemployment has grown, exceeding 20 percent of the economically active population in 1986, as has under-employment, and Central Government expenditures on social programs--especially education and health--have fallen. One local, decentralized response to the ensuing financing crisis in the publicly-funded social sectors has been the introduction of user fees for what were previously free-of-charge public health care services.

D. Health Care Services

Health care services in Bolivia may be classified into three general subsectors: the public subsector in which the major institution is the Ministerio de Previsión Social y Salud Publica or Ministry of Health (MOH), the Social Security subsector, and the private subsector.

The largest of the 3 subsectors is the MOH. Officially, the MOH is charged with providing health services to 75 percent of Bolivians. Most Bolivian health care analysts maintain, however, that the MOH provides coverage to less than half this amount, to about 30 percent of the population. Another 20-25 percent is covered by the Caja de Seguro Social, which actually consists of more than 20 highly segmented, individual Social Security Systems, each with its own administrative and health care delivery system. The third subsector, the private sector, is responsible for another 5-10 percent of the Bolivian population. Approximately 30 percent of all Bolivians do not have access to modern health care.

1. The Ministry of Social Provision and Public Health

The titular head of the health sector in Bolivia is the Ministry of Health. The MOH is administratively centralized and headed by the Office of the Minister. A number of advisory offices together with the subsecretaries of social security and public health form the top tier of policymakers.

The MOH's administrative structure was designed to be functional for managing and providing services. The national administration is regionalized and there are various levels of administration and of services. As one moves up the administrative level, the domain and the complexity of service delivery units increases. The first level is comprised of the Health Areas. The Health Areas are defined geographic areas that constitute programming units for MOH activities. The service delivery units at the level of the Health Area are the health posts and the health centers which are located in the capital cities of each Health Area.

The Health Areas are grouped into administrative units called Sanitary Districts which constitute the second organizational level of the MOH. The service delivery units at this level are the District's Health Center-Hospital (Centro de Salud Hospitalario del Distrito), which contain up to 50 beds.

The next level is the Sanitary Unit. There are 12 Sanitary Units in the country. They are: Cochabamba, Chuquisaca, La Paz, Oruro, Potosi, Riberalta, Santa Cruz, Tarija, Tupiza, Beni, Pando and El Alto. As their names suggest, the Units' domains generally coincide with Bolivia's departments (states). The facility type functioning at this third level is the regional hospital.

The highest level is the national level. Organizationally this fourth level is made up of the MOH Central Administration and the most highly specialized, national referral hospitals.

2. Public Health Care Financing in the 1980s

(a) Crisis and Response. The economic crisis of the 1980s and the fiscal crisis of the state set into motion forces which fundamentally restructured the financing of public health care in Bolivia. The primary source of MOH funding has traditionally been general budgetary allocations from the General Treasury of the Nation (Tesoro General de la Nación, TGN).

Other, traditionally much less significant sources of funds have been external assistance and user fees (i.e., charges for services provided) as well as other (less important) cost recovery mechanisms.

The relative rates of growth of these three principal funding sources have been very different since the early 1980s. Although on a year-by-year basis the level of TGN funding has oscillated, it has generally followed a steady and steep downward trajectory. On average, from 1980 until 1985, it fell 16 percent year. Then, after posting a modest 8 percent gain in 1985, it fell by an alarming 38 percent in 1986, only to make up most of that decline in 1987 with a 44 percent increase. The long term picture, however, has been disturbing: in real terms (i.e., adjusted for inflation) TGN funding of the MOH subsector in 1987 stood at less than half (46 percent) its 1980 level. Moreover, in per capita terms, the situation is worse: in 1987 MOH per capita expenditures were 38 percent of their 1980 level.

To a significant extent the growing resource gap left by declining TGN allocations have been offset by rapid growth in user fees and external assistance. Prior to 1985, 90-95 percent of MOH subsector funding came from national government resources (primarily the TGN). Since 1985, however, that share has fallen markedly. From 1985 until 1989, national government resources constituted an annual average of 55 percent of total MOH financing, while external aid came to account for an annual average of 21 percent, and user fees and other cost recovery mechanisms generated 24 percent.

The approach to user fees is decentralized and idiosyncratic. Personnel at individual facilities determine what fees they will charge and how they will use their user fee revenues. In most facilities, an overwhelming proportion of revenues are used to purchase much needed additional medicines and other supplies. In most facilities, the revenues are also used to provide an "incentive" payment or bonus to health care providers. The most common pattern is for all of the employees working in the facility to receive a bonus, which is a fixed amount of money generally equal to 5 to 10 percent of the employee's salary.

(b) Other Potential Strategies to Ease the Financial Crisis and The Purpose of This Study. Potential strategies for easing the MOH's financial constraint given the marked reduction in its absolute level of TGN funding include: (1) recovering costs by implementing charges for care, (2) mobilizing additional resources, (3) improving the efficiency of the public health care delivery system, and (4) altering the traditional organization of the health sector by encouraging the growth of the private sector. To date, the principal response has been the first of these strategies: stepped-up efforts to recover some of the costs of providing care. Bolivia has also sought to alter the traditional organization of the health sector by encouraging the growth of the private sector, specifically private, non-profit organizations, such as PROSALUD.

This report, however, is primarily concerned with another strategy: improving the operational efficiency of the MOH system. The operational efficiency of a health care system is gauged by the productivity of all of the resources used in the system: all of the doctors, nurses, nurse auxiliaries, drugs, bandages, buildings, x-ray machines, centrifuges, microscopes and so on.

The productivity of the resources employed in the production of health care is inversely related to the cost of providing that health care: the greater the productivity of resources used to produce health care, the lower the cost of providing that care; the lower the productivity of resources used to provide health care, the higher the cost of producing that care.

The efficiency strategy seeks to ease the financial constraint confronting the MOH by identifying variations in the efficiency of use (cost and productivity) of its resources, and then using that knowledge to craft and implement changes in the structure and operations of the MOH that will enable it to provide more and/or better services with the same level of resources. In sum, this strategy seeks to improve the managerial capacity and the managerial performance of the MOH.

It is important to recognize that this is a two-part strategy. First, managerial capacity must be developed or enhanced. Managerial capacity consists of identifying and understanding how resources are used, which entails a knowledge of productivity and costs. Second, having developed this managerial capacity--this knowledge of the efficiency of the system--the question becomes what to do with it; how to improve the efficiency of the system? This is what better management and managerial performance are all about.

III. OBJECTIVES

As just noted, the purpose of this study was to begin the process of developing a systematic approach to improving the managerial performance of the MOH. Improving management requires developing and/or improving tools by which to assess and increase the efficiency of the MOH. This study focuses on the development of one such tool; cost estimates for an important subset of MOH activities in a limited number of MOH facilities. More specifically, the principal objectives of this study are:

1. To estimate and analyze the unit operating costs of primary health care activities and the fees collected for specific services in a select number of health facilities in two rural districts, the Altiplano Sur District of the Sanitary Unit of La Paz and the Valles Cruceños District of the Sanitary Unit of Santa Cruz.
2. To estimate and analyze the unit operating costs of primary health care activities and the fees for specific services in two urban health centers in the city of Santa Cruz, one belonging to the Ministry of Health and one belonging to the highly successful private, non-profit, organization, PROSALUD.
3. To provide MOH District and Sanitary Unit level officials with unit cost information to enable them to compare the relative efficiency of particular health posts and health centers so as to be able to take the measures necessary to improve their efficiency.

IV. METHODS

A. The Facility Sample

This study has a rural and an urban component. The rural component consists of an analysis of the operations of a sample of facilities that includes 13 health posts and 5 health centers. The facilities that were studied are located in two rural districts, Altiplano Sur and Valles Cruceños, belonging to the MOH Sanitary Units of the departments of La Paz and Santa Cruz, respectively.

These two districts were selected by USAID/Bolivia as the sites of this analysis, in part, because the Agency hoped to generate information that would be useful for improving the effectiveness and efficiency of its Community and Child Health (CCH) Project which is being implemented in these same districts. Other criteria used in selecting the particular facilities in the study group were the general representativeness of the facility's catchment area population size and the geographic dispersion of the facilities.

In the Altiplano Sur District in the Department of La Paz the team gathered data in the District's only health center and in six of its 22 health posts. The six posts selected represent 5 of the District's 7 distinct geographic areas. The 7 selected facilities together provide services to 47 percent of the District's total population of 96,600.

In the Valles Cruceños District, the facilities included in the study group included all 4 of the District's health centers and 8 of its 23 health posts. All 4 of the District's distinct geographic areas were represented in the Valles Cruceños facility sample. The 12 selected facilities together provide care to 71 percent of the District's population of 60,400.

The two urban facilities studied were both located in the city of Santa Cruz. The MOH facility, the Virgen de Cotoca Health Center, was selected because it was specifically requested by the Director of the Sanitary Unit of Santa Cruz. The private, non-profit organization, PROSALUD's clinic, La Madre, was selected because it was the PROSALUD center most closely matching both the location and the socio-economic status of the MOH clinic clientele, thereby providing some control in the analysis for several potentially confounding variables and thus ensuring more directly comparable results.

TABLE 1
THE STUDY SAMPLE OF FACILITIES TO BE ANALYZED

FACILITY NAME	FACILITY TYPE	SERVICE AREA POPULATION	LOCATION
<u>RURAL FACILITY STUDY</u>			
Santiago de Moro Moro	Puesto	657	Valles Cruceños
Cuevas	Puesto	796	Valles Cruceños
Pucara	Puesto	1,155	Valles Cruceños
Chilon	Puesto	1,330	Valles Cruceños
Valle Abajo	Puesto	2,190	Valles Cruceños
Quirucillas	Puesto	2,343	Valles Cruceños
El Trigal	Puesto	2,343	Valles Cruceños
Los Negros	Puesto	3,901	Valles Cruceños
Florida	Centro	3,548	Valles Cruceños
Señor de Malta	Centro	7,000	Valles Cruceños
Mairana	Centro	12,073	Valles Cruceños
San Martín de Porres	Centro	7,204	Valles Cruceños
Calamarca	Puesto	6,955	Altiplano Sur
Patacamaya	Puesto	11,357	Altiplano Sur
Sica Sica	Puesto	4,090	Altiplano Sur
Caracato	Puesto	6,704	Altiplano Sur
Sapahaqui	Puesto	5,390	Altiplano Sur
Micro Hospital de Ayo Ayo, Bartolina Sisa	Centro	6,704	Altiplano Sur
<u>URBAN FACILITY STUDY</u>			
Virgen de Cotoca (MOH)	Centro	11,800	Santa Cruz
La Madre (PROSALUD)	Centro	8,712	Santa Cruz

B. The Cost Study Methodology

The cost estimates prepared in this study were developed using the "step-down" methodology. This approach uses expenditures of budget allocations as a proxy for actual resources expended in providing primary health care.

In Bolivia's MOH, as in most MOHs throughout the world, financial monitoring and analysis is generally limited to accounting for how central government budgetary funds have been used. Such systems are rudimentary and generally are not structured around program or functional activity cost centers which have much greater potential usefulness for managing the organization and improving its efficiency.

The development of cost estimates of specific primary health care services--the charge of this study--requires disaggregating data on budget expenditures down to the individual facility level and from there, breaking them down to the specific services of interest. Each of these disaggregation steps--hence the name of the methodological approach, "step-down" costing--involves judgments as to how to weigh different activities.

The single most important break-down and weighing procedure in this study involved the determination of the personnel costs of providing each primary health care activity. This was the single most important step-down in the analysis because personnel costs generally constitute over 50% of the total costs of producing primary health care services. The technique used here was, first, to identify each MOH employee in each of the facilities of the study sample. Then, to determine each identified person's total remuneration, and finally to have each of them report how they used their time--how they distributed their total time between the different types of primary health care activities. In other words, the individual MOH employees working in the study facilities, themselves, determined how to "step-down" their personnel costs.

Personnel costs were comprised primarily of salaries. They also included any "incentive" payments that were paid to the individual out of user fee revenues. Both the amount of user fee revenues generated and the proportion of these revenues that were distributed to facility personnel varied dramatically across the facilities, as can be seen in Table 2.

The exact methodology employed in estimating the other major cost categories in this study--medicines, other (direct) expenditures and indirect costs--are presented in Section C below.

C. Development and Application of Data Collection Forms

Four data collection forms were developed to ensure that the information on which the unit cost estimates of primary health care activities were to be based would be uniformly defined and systematically collected. The forms were designed in order to fulfill the following specific objectives:

- a) to determine the number of primary health care activities undertaken in the fourth quarter of 1990 and the third quarter of 1991;
- b) to collect income and expenditure data classified by 4 distinct categorical breakdowns for the same time periods;
- c) to enable completing the forms with a minimum of effort and personnel; and
- d) to enable directly entering the collected information from the data collection form into an electronic spreadsheet format.

1. Data Collection Form #1: The Activities Report

The way in which MOH providers are required to track and report their activities does not coincide perfectly with the way in which we are interested in classifying activities in this study of primary health care. The purpose of data collection form #1 was to provide a crosswalk between the specific primary health care activities of interest in this study and the established program classification scheme of the MOH.

The MOH's primary care programs include: family health, partum care, vaccinations, community care, pediatric consultations for acute respiratory infection (ARI), acute diarrheal disease (ADD), tuberculosis, and reproductive health. The component parts and specific activities undertaken in these programs include:

- a) **Family Health:** Includes prenatal care consultations and well baby visits
- b) **Partum Care:** Includes delivery/birthing and perinatal care (but not home births, which are included in Community Care)
- c) **Vaccinations:** Includes vaccination doses for specifically identified antigen types: polio, BCG, measles, tetanus and DPT
- d) **Community Care:** All visits to the community, including home births, other consultations provided in the home or at facilities other-than the MOH facility, visits for education and promotion activities (most significant of which are programs to fight alcoholism, drug addiction and sexually transmitted diseases)
- e) **Consultations:** Includes all ambulatory curative care. Records are maintained for care provided specifically for ARI, ADD, and TB, as well as general (all other) consultations for children and adults.
- f) **Reproductive Health:** Family Planning consultations (the information is aggregated, there are no breakdowns by method)

2. Data Collection Form #2: Staff Interviews

This form was used to determine the amount of each facility staff person's time that was devoted to each specific primary health care activity. These time assignments were obtained from interviews with each staff person directly involved in the provision of primary health care services in each of the study facilities. The form includes data on the following:

- a) number and type of personnel at the facility
- b) number of hours of work for each person working at the facility
- c) total payments made to each person, including: salary, incentive payments (paid out of user fee revenues), and per diem payments
- d) percentages of time assigned to each activity for each type of personnel (physicians, nurses, and auxiliaries) at each facility.

3. Data Collection Form #3, Supplies and General Expenditures: The Algorithms for Determining the Cost of Medicines, Indirect Costs and "Other Expenditures"

This form was used to compile information on the quantity and costs of the supplies and medicines used in providing services. The total cost of medicines and all other supplies includes the value of those provided by the MOH and those purchased with the facility's own user fee revenues.

The providers and directors of each facility were interviewed to identify the actual quantities of medicines dispensed during the two study periods. In the majority of facilities it proved too difficult and time consuming, and in some cases impossible, to obtain adequate data. In such instances, it was assumed that the quantity of medicines actually dispensed were those established in MOH treatment norms. The unit cost of medicines and supplies was obtained from the MOH central warehouse, Central de Abastecimiento de Suministros (CAES), which is in charge of purchasing and distributing all medicines to the MOH Sanitary Units. In the case of vaccines, unit prices were obtained from the Pan American Health Organization (PAHO).

Rather than simply assume that all medicines distributed and used were medicines dispensed to patients, an attempt was made to estimate the amount of medicines which were distributed and used by the facility but not dispensed to the patient. A shrinkage or loss factor was developed for each individual medicine. The proportion of each drug which was "lost" was estimated by the head of each facility. The estimated loss was used to construct a correction coefficient. The correction coefficient is equal to 1.0 if there was no loss, or is greater than 1.0 in the event of some loss. The amount by which the correction coefficient exceeds one is the equivalent of the proportion of the total supply which was lost. For example, if the correction coefficient was equal to 1.05, 5 percent of the supply of that particular drug was lost or wasted.

In the specific case of vaccinations, the method used to calculate the correction coefficient was slightly different. The difference between the number of immunizations provided and the potential maximum that could have been provided (appropriately), given the number of vials and doses distributed to each facility, was identified as the loss.

Data collection form #3 was also used to register general supplies costs (all those other than medicines) which are referred to here as "other expenditures," the administrative costs incurred by the District Office in supervising the facility, as well as the revenues generated from the sale of medicines and service fees. Many of the facilities maintained no records detailing the type of good or service for which payment was received. Thus the revenue data collected was not disaggregated by source; only a single figure was obtained. In the case of the health centers, facility personnel were interviewed to determine what proportion of total medicines and total "other expenditures" costs were incurred providing primary health care and what proportion providing secondary care.

Similarly no breakdowns of the expenditures of these monies-- which were used to pay incentive bonus to MOH employees and, more important financially, to purchase medicines and other supplies-- which are reportedly in short supply. While the value of these payments and purchases are included in the 3 different direct cost categories, we cannot distinguish between them and the cost incurred and paid for directly by the MOH Central Administration.

The indirect costs consist of the remuneration of District Office personnel who supervise the facilities in the district, plus the transportation costs incurred in their supervising. These transportation costs include the salary of drivers and payments for gasoline and oil. It was assumed that these costs vary across the facilities within the district in direct proportion to the level of personnel costs of a particular facility: the greater the personnel costs of a particular facility, the greater the cost the district incurs supervising that facility. A district's total indirect costs, therefore, were distributed across the facilities in the district in direct proportion to each facility's share of the sum of the facility personnel costs of all facilities within that district.

The resulting distribution of indirect costs to each facility was then assigned to the particular primary health care activities undertaken by that facility. The indirect costs of a particular activity were assumed to vary in direct proportion to that activity's share of the facility's total personnel expenditures. Within each facility, an activity was assigned a share of the facility's total indirect costs that was equal to its share of the facility's total personnel costs.

These costs were distributed across the facilities within the district in direct proportion to the level of each facility's total staff remunerations. These facility totals are then distributed to particular primary health care activities in a manner identical to the distribution of total personnel costs over the different primary health care activities.

Data on the value of each facility's "other expenditures" were obtained from the personnel of each facility. Each facility's total of other expenditures was distributed across (assigned to) the primary health care activities in the same manner as were the indirect costs; i.e., they were

distributed to the various primary health care activities in direct proportion to the share of total personnel remunerations accounted for by the particular activity in question. Although most of the medicines and the other expenditures cost categories were paid for by MOH funds and were provided to the individual facility in-kind, an undetermined portion of both categories consisted of the use of supplies which were purchased with user fee revenues generated by that particular facility.

4. Data Collection Form #4: The Summary Table

The information collected on the 3 data collection forms just described was then summarized and entered into summary tables which are presented in the Annex to this report. The tables include:

- a) the number of each type of activity undertaken in the study period
- b) the total cost by activity disaggregated into 4 component parts: personnel, medicines, other expenditures, and indirect costs
- c) unit cost by activity, disaggregated into the same 4 component parts: personnel, medicines, other expenditures, and indirect costs
- d) the proportion of direct costs (expressed as a percent) consisting of personnel, medicines, and other expenditures
- e) the income and total costs of the time period, and income as a percent of total costs

D. The Period of Analysis

Initially it was intended that service delivery and cost data for one entire year would be analyzed. However, after collecting the required information for a sample of facilities, it was determined that the most data that could be collected and analyzed in the 7 week period available to the study team was half a year.

It was decided that the period of analysis would consist of two quarters, the final quarter of 1990 and the third quarter of 1991. The third quarter 1991 was selected because it was the most recent quarter for which data was available. Fourth quarter 1990 was included because it enabled undertaking a longitudinal analysis while simultaneously providing USAID/Bolivia with the opportunity to piggy-back the evaluation of another project onto the cost analysis. The USAID/Bolivia Child and Community Health Project began to manage the Altiplano Sur and the Valles Cruceños Health Districts in 1991. By selecting the final quarter of 1990 and quarter three of 1991 as the timeframe for the cost analysis, AID would be able to use the cost estimates developed in the recurrent cost study to identify any changes in efficiency attributable to (i.e., the impact of) the management project.

E. The Intended Target Audience

The information produced in this study is the first step in developing a systematic approach to understanding the efficiency of various organizational/managerial levels, facilities and services of the MOH. The eventual aim is to use this information to improve the productivity and the effectiveness of the MOH. The principal targeted users of the information generated in this report are:

1. the persons responsible for improving the technical and administrative performance of each facility studied,
2. the District Director of the studied facilities, who will be able to develop resource allocation tools more closely tied to performance and efficiency, and thereby improve the budgetary planning and monitoring of the facilities under his direction, and
3. the Sanitary Unit-level officials, who will be able to use the information to establish management and performance norms and standards for the facilities in their jurisdiction and can tie resource allocation criteria to fulfillment of those norms and standards so as to better motivate MOH providers.

F. Shortcomings of the Study

1. There is Information on Only Some of the Determinants of Costs

Average costs are determined by five distinct sets of variables:

- 1) the prices and quantities of fixed inputs used; i.e., inputs whose quantity does not change as the level of output increases (decreases), such as the facility, equipment and the staff;
- 2) the prices and quantities of variable inputs used; i.e., inputs whose quantity increases (decreases) as the level of output increases (decreases), such as medicines, bandages and x-ray plaques;
- 3) the use or management of those fixed and variable inputs (which determines the productivity of the inputs used and the quality of the care provided);
- 4) the volume of service provision (or utilization); and
- 5) the types of services provided, or alternatively viewed, the disease mix of clientele (including the severity of illnesses treated).

An important shortcoming of the study is that we do not have information about all of these cost determinants. In particular, there is no information about the quality of care, only very general information about the disease mix, and nothing about the severity of illnesses. As a result, we do not know the extent to which observed variations in the average cost of care reflect variations in the severity of illness or the quality of care provided.

To a certain extent such limitations are inevitable and characteristic of all cost studies of health care services. Cost analysis involves implicitly identifying a production function; i.e., the way in which inputs are combined to produce an output. In analyzing the production of some goods or services, such as much of health care, however, the output produced is not homogeneous. Rather, it is as idiosyncratic and heterogeneous as the individual patients being served. Comparing the unit costs of non-standardized outputs, therefore, involves a certain amount of comparing apples to oranges. Information about the quality of care and the severity of illnesses would enable us to better control for, and thereby standardize, outputs (i.e., the very specific types of goods and services being produced).

It should be noted, however, that in an analysis of primary care--where many services are preventive in nature and the diagnostic protocols and treatment regimens are standardized (e.g., immunizations, and to a lesser degree prenatal care and well baby visits)--these considerations are likely to be far less important compared to the role they would likely have in a study of either secondary or tertiary care. Nevertheless, they play a potentially significant, but unknown, role here, as well. This limitation of the analysis must be borne in mind throughout the following discussion.

2. The Treatment of Personnel "Down-Time"

It is noteworthy that the approach makes an important assumption about personnel costs and the accounting for personnel time when the demand for care is inadequate to fully occupy the MOH providers working at a particular facility. Inadequate demand results in what may be termed "down-time." The methodology employed--assigning percentages of total time to different activities--implicitly assumes that all personnel "down-time" is spread evenly across all activities. Thus if activity levels of a particular facility are low, the non-productive time of the category of inputs with the highest total cost, personnel, will be spread over all of the services provided by that facility, thereby inflating the cost of all of the services. In short, all of the facility's services will be characterized by high costs.

3. Implications of the Assumptions Concerning the Supply and Cost of Medicines

As noted earlier, the assumptions that have been made with regard to the supply and cost of medicines were made because there were few data readily available about actual supplies. There are three important implications of assuming that the supply of medicines is not a bottleneck in the delivery system. First, it overstates the costs of care. Thus to the extent that MOH norms for dispensing medicines are not adhered to (for whatever reason--be it inadequate supply or non-adherence to MOH norms) costs are over-estimated and quality diminished. The extent to

which non-compliance with norms varies by facility, type of facility and/or district, undermines the accuracy of the cost estimates and efficiency comparisons made in this report, because it results in unaccounted for variation in costs.

Second, the assumption that medicine supplies are always adequate and medicines are always prescribed in accordance with MOH norms assumes away the possibility that variations in the supplies of medicines effects the consumers' perceived quality of care, and thereby, their utilization. In light of the fact that most of the costs of providing health care are personnel costs that are fixed (i.e., do not change as the quantity of output changes), decreasing utilization means higher unit costs. Having to rely on the assumption that supplies of medicines are adequate, therefore, precludes analysis of how variations in the supply of medicines is likely to influence utilization and thereby effect costs. Does, for instance, the 42 percent increase in utilization of the Valles Cruceños health centers in 1991, while that District's health posts' utilization contracted by 9 percent reflect Bolivians substituting the services of better stocked centers vis-a-vis posts? We can only speculate.

Third, having assumed away the potential problem of inadequate supplies or inappropriate use (including over-prescribing) of medicines, we are unable to analyze the facilities' efficiency in the use of medicines.

V. EMPIRICAL FINDINGS I: THE RURAL CLINICS

A. Preliminary Considerations: Cost Analysis as a Problem-Identification, Management Tool

Because cost analysis is primarily a descriptive, rather than a prescriptive, tool, quantifying the cost of a particular service, type of personnel, facility or region is not an end in itself. Cost analysis is an aid in the identification of cost-cutting/efficiency-enhancing strategies; it provides information about the relative efficiencies of different services, different personnel types, different facilities and/or different regions.

In this study we are concerned with the product of a cost analysis; i.e., a list of the absolute amount of money required to provide a unit of a particular type of health care service.

Efficiency analysis, however, implies comparisons: for the most part, it is not the absolute numbers, but their relative levels which are of interest. Cost analysis identifies where there are significant variations in the efficiencies with which resources are used, but, in and of itself, it does not explain why this variation exists.

Furthermore, while the cost analysis informs us about widely varying efficiencies, it does not tell us what, if anything, to do about them. That is the next analytic step. It requires developing and testing hypotheses to explain these variations. Then, the next step is to determine if the variations that exist are acceptable, or, if management should try to improve the performance of the less efficient units. Often this judgment requires applying other criterion that may embody more subjective evaluations. For example: When is the increase in costs incurred by the MOH in maintaining a health post in an isolated, sparsely populated region of a country--in accordance with the government's commitment and effort to promote access to care--too expensive?

In short, estimates of unit costs are not an end in themselves: they are but a tool. Once we have developed estimates of unit costs, what can or should we do with them? How can this information be useful for managers? Which unit costs and which services should be looked at most closely in order to determine how to improve the efficiency of service delivery? How large do differences in unit costs have to be in order to be considered important?

Initially, attention should turn not directly to the unit cost estimates, but to total costs. Variations in unit costs, in and of themselves, are not necessarily of interest. We can gain some guidance in determining which variations in unit costs are significant and warrant further examination by seeing the relative importance in terms of total cost of the specific service types. If a particular health center has a particular service that it produces very inefficiently it is not necessarily an item of interest if it represents only a small proportion of the center's total cost.

In sum, in order to identify which of the unit costs that are high should have their production processes examined in greater detail, one needs to determine whether that particular cost has strategic importance in terms of the total cost of operation. In assessing the importance of variations in the unit cost of a specific type of service, the volume of that services is an important consideration, but one which must be jointly considered with the share of total cost involved in the production of that service. There are no clear cut quantitative guidelines, however, as to when to define a particular service as "important"--i.e., exactly how many service units need to be provided, or what proportion of all service units--or what share of total costs a particularly inefficient service needs to comprise in order to justify more in-depth analysis.

B. Organization of the Chapter

In order to provide a greater understanding of the nature and causes of the average cost estimates, rather than turning directly to the unit cost estimates of the primary health care activities, the discussion proceeds by first looking at the total costs of the facilities, including the composition of those costs. Next, the magnitude of costs per inhabitant will be investigated. Then, the level and composition of the services provided will be examined. Finally, having gained an understanding of the context and operations of the facilities, which will enable gaining greater insight into some of the reasons for and causes of the observed levels and variations in costs, the unit cost estimates of the primary health care activities will be analyzed.

This cost study is ultimately concerned with the allocation of resources. There are, of course, a number of different resource allocation decisions made by different actors at different organizational levels within the Bolivian MOH.

Throughout the following discussion, whenever markedly different and, given the limited information available in this study, seemingly inexplicable variations in resource allocation patterns are observed, specific questions for the managers involved in making the resource allocation decisions reflected in these variations will be highlighted.

The intent is to prod the decisionmakers into examining and explaining the criteria and the procedures they use in making decisions, with the aim of improving their decisions and thereby the effectiveness and the efficiency of the MOH.

C. Total Costs and Average Total Cost per Service Area Inhabitant

Each of Valles Cruceños' 8 health posts' total costs, service area population, and average cost per service area inhabitant are presented in Table 2. The top portion of the table contains the fourth quarter 1990 data, and the bottom portion contains the data for the third quarter of 1991. The identical information is provided for Valles Cruceños' 4 health centers in Table 2A on the following page. Table 3 and 3A contain the same data for Altiplano Sur's health posts and centers.

TABLE 2
THE STRUCTURE OF RECURRENT COSTS
VALLES CRUCEÑOS DISTRICT
PUESTOS DE SALUD

PERIOD: 10/90-12/90

FACILITY	TOTAL COST	SERVICE AREA POPULATION	COST PER INHABITANT	CONSULTATIONS	
				TOTAL NUMBER	PER PERSON
Stgo. Moro Moro	1,873	657	2.85	269	0.41
Cuevas	1,254	796	1.58	90	0.11
Pucara	1,905	1,155	1.65	95	0.08
Chilon	1,934	1,330	1.45	66	0.05
Valle Abajo	2,088	2,190	0.95	120	0.05
Quiricillas	1,836	2,343	0.78	77	0.03
El Trigal	1,234	2,343	0.53	47	0.02
Los Negros	13,848	3,901	3.55	459	0.12
AVERAGE:	3,246	1,839	1.67	153	0.11
AVERAGE EXCLUDING PS LOS NEGROS:	1,732	1,545	1.40	109	0.11

PERIOD: 7/91-9/91

FACILITY	TOTAL COST	SERVICE AREA POPULATION	COST PER INHABITANT	CONSULTATIONS	
				TOTAL NUMBER	PER PERSON
Stgo. Moro Moro	5,001	657	7.61	251	0.38
Cuevas	1,557	796	1.96	172	0.22
Pucara	2,443	1,155	2.12	101	0.09
Chilon	2,159	1,330	1.62	43	0.03
Valle Abajo	1,997	2,190	0.91	100	0.05
Quiricillas	2,115	2,343	0.90	107	0.05
El Trigal	1,263	2,343	0.54	87	0.04
Los Negros	13,946	3,901	3.57	429	0.11
AVERAGE:	3,810	1,839	2.40	161	0.12
AVERAGE EXCLUDING PS LOS NEGROS:	2,362	1,545	2.24	123	0.12

TABLE 2A
THE STRUCTURE OF RECURRENT COSTS

**VALLES CRUCEÑOS DISTRICT
CENTROS DE SALUD**

PERIOD: 10/90 – 12/90

FACILITY	TOTAL COST	SERVICE AREA POPULATION	COST PER INHABITANT	CONSULTATIONS	
				TOTAL NUMBER	PER PERSON
Florida	3,948	3,548	1.1	299	0.08
Señor de Malta	19,539	7,000	2.8	822	0.12
Mairana	14,887	12,073	1.2	462	0.04
San Martín de Porres	9,295	7,204	1.3	889	0.12
AVERAGE:	11,917	7,456	1.6	618	0.09

PERIOD: 7/91 – 9/91

FACILITY	TOTAL COST	SERVICE AREA POPULATION	COST PER INHABITANT	CONSULTATIONS	
				TOTAL NUMBER	PER PERSON
Florida	4,629	3,548	1.30	409	0.12
Señor de Malta	21,467	7,000	3.07	822	0.12
Mairana	15,877	12,073	1.32	508	0.04
San Martín de Porres	13,642	7,204	1.89	902	0.13
AVERAGE:	13,904	7,456	1.90	660	0.10

1. Variations In Total Costs Across and Within Facility Types and Districts

Both within and across the two types of facility and the two districts, the total costs of the facilities studied varies significantly. Looking first at the health posts, the facility with the lowest total costs, El Trigal, and the one with the highest total costs, Los Negros, are both located in the Valles Cruceños District. Their costs vary by a factor of more than 11 in both years.

From Table 2 it is apparent that Los Negros is a qualitatively different type of facility--at least with respect to its total costs. With Los Negros included in the analysis, the Valles Cruceños District's average total costs per post were 3,246 bolivianos in 1990, and 3,810 bolivianos in 1991. Excluding Los Negros, these averages fall substantially; by 47 percent to 1,732 bolivianos in 1990, and by 32 percent to 2,362 bolivianos in 1991.

What accounts for the marked variation in the total costs of the 8 health posts in the Valles Cruceños District? Why, specifically, does the Los Negros health post have total costs which are 8 times the level of the average of the other 7 health posts in Valles Cruceños?

It should be noted that the Los Negros Health Post has two physicians, two auxiliary nurses and one administrative staff member, and that it provides services not only to its immediate catchment area, but also supports the other health posts in its area of influence. Los Negros even has a vehicle and radio equipment to facilitate this support role. Leaving aside that Los Negros would be more appropriately classified as a health center, its level of productivity, which should be higher, is surprising. Los Negros shows costs between 6 and 8 times higher than the average, looking at both 1990 and 1991, while its productivity is only between 3.5 and 4.5 times the average ($459/109 = 4.5$ times more consultations than the average in 1990 and $429/123 = 3.5$ times more consultations than the average in 1991).

Within the Altiplano Sur District, the health posts' total costs do not deviate nearly as much as they do in Valles Cruceños. The largest-to-smallest total costs exceeded a 4-to-1 ratio in 1990, and were even less, 3.3:1, in 1991. From a total cost perspective, it would appear that health posts are not a homogeneous entity in Bolivia, or even within either one of the two study districts, and thus in terms of managerial improvement should probably be rated individually.

In the fourth quarter of 1990, the average health post studied in Valles Cruceños had total costs that were about 70 percent those of the average health post studied in Altiplano Sur. If Los Negros is excluded from the comparison, the proportion falls to 37 percent; i.e., the average Altiplano Sur post had costs that were nearly 3 times the level of the Valles Cruceños average. In 1991, this difference decreased slightly.

Why did the average Altiplano Sur health post have total costs in 1991 that were nearly 3 times¹ those of the average Valles Cruceños health post?

The great variation in the costs of VC facilities is not restricted to its health posts. As Table 2A shows, the total costs of the 4 VC health centers included in the study varied markedly as well; by a factor of about 5-to-1 in both 1990 and 1991. It is interesting to note that the Los Negros health post had larger total costs than two of the health centers in both years.

2. Variations in the Rate of Change in Total Costs Over Time

The following table summarizes total costs found in the sample:

# Estab.	District	Level	Average Costs for One Quarter		% Increase
			1990	1991	
5	Altiplano Sur	Health Posts	4,644	5,395	14.5%
8	Valles Cruceños	Health Posts	3,246	3,810	17.4%
7 ²	Valles Cruceños	Health Posts	1,732	2,362	36.4%
1	Altiplano Sur	Health Center	8,948	10,377	16.0%
4	Valles Cruceños	Health Center	11,917	13,904	16.7%

Logically, the total costs of the Health Centers are significantly greater than those of the Health Posts as demonstrated in Figure 1. This is due to the increased volume and complexity of services, and other factors. These are, of course, averages, and disguise some variations within each category. Nevertheless, the sample suggests that these average increases are reasonably representative of each District.

While individual facilities demonstrate a range of cost increases between 1990 and 1991, the general increase was remarkably uniform at between 14%-18%. It should be kept in mind that costs have been reported in current Bolivianos, i.e., without correcting for inflation, which was approximately 14% between the two time periods. Consequently, the real value of operating costs remained stable over the study period. The only exception in the sample were the smaller Health Posts in the Valles Cruceños District which had considerably lower costs than their Altiplano Sur counterparts in 1990 as shown in the table above and Figure 1.

¹ Excluding Los Negros Health Post.

² Excluding Los Negros Health Post.

In quarter 3, 1991 compared to quarter 4, 1990, the average Valles Cruceños post experienced a 17.4 percent increase in its costs, while the average Altiplano Sur post had a 14.5 percent increase. In 1991, the average Valles Cruceños' health post had costs that were 71 percent those of the Altiplano Sur average. If Los Negros is excluded the proportion falls to slightly less than 44 percent; that is, the average Altiplano Sur post had costs approximately 2 times the level of the average Valles Cruceños (VC).

3. Taking Into Account Variations in The Facilities' Service Area Populations

One way in which the facilities vary both within and across districts is in the size of their clientele. The Bolivian MOH defines the service area and service area population of each of its facilities. These areas and populations, however, may vary markedly from what the actual number of clientele of a facility may be for a number of reasons: e.g., some of the catchment area population may use alternative providers in the same geographic area; or persons in different service areas may have very different predispositions to using health care, and particularly modern health care; there may be wide variation in border crossing behavior (i.e., people residing in one service area using facilities in another service area); or there may be large migratory seasonal population as is the case in areas of Santa Cruz. While being cognizant of its shortcomings, it is still useful to explore the role that variations in the size of the service population may have on facility service provision and costs: it provides a less than perfect tool for controlling for the size of the facility's assigned population.

Some, but by no means all, of the greater costs of the Los Negros clinic can be attributable to the larger population with which it is charged with providing care. As can be seen in Table 2, the service area population of Los Negros is 2.1 times the average of the remaining 7 VC clinics. The Los Negros average total cost per service area inhabitant was 2.0 times that of the other 7 VC clinics' average in either year.

Why are the costs per service area inhabitant of the Los Negros facility about two times higher than the average of the other 7 Valles Cruceños health posts?

On average, the Altiplano Sur (AS) posts have service area populations which are nearly 4 times those of VC. Although absent other pertinent information, such as the health status of the different populations, their proclivity to seek health care, the degree of border crossing and the number, type and utilization of alternative providers in the area, the much larger service area populations of the AS posts is probably one important reason they have much greater total costs, on average, than the VC posts. Indeed, when total costs are divided by the number of service area inhabitants, we see that the AS posts have an average level of costs per inhabitant which are about one-third that of the VC posts in 1991.

Why is the cost per service area inhabitant in Valles Cruceños health posts three times as high as in Altiplano Sur health posts?

The average cost per service area inhabitant of the VC health posts exceeded that of the VC centers in both years. Generally, it is expected that the services provided at health centers are somewhat more complex and the patients somewhat more severely ill; both of which are likely to make the care provided at centers relatively more expensive. Thus the findings here are contrary to a priori expectations.

Why are the costs per service area inhabitant of VC health posts greater than those of their health centers?

The nominal total costs of the health centers in both districts increased by nearly the same proportion between the two observations; by 16 percent in AS and 17 percent in VC.

D. The Composition of Costs

All direct costs were classified into one of three categories: personnel, medicines, and (all) other (direct) expenditures. In addition, the indirect costs of supervision by district office personnel were identified. These 4 categories of costs constitute the total (direct and indirect) costs of the facilities analyzed in this study.

1. The Structure of Costs

As a comparison of Tables 4 and 5 show, the structure of the recurrent costs of the health posts and the health centers of Valles Cruceños, are very similar in 1990 and 1991. The rank order of the 4 cost categories is the same in both types of facilities, with personnel accounting for the largest share of total costs (37 to 45 percent), followed by other expenditures ((30 to 32 percent), medicines (9 to 17 percent) and finally indirect expenditures (9 to 16 percent). Even the shares of each category are in the same general range. Although the changes in these cost structures which in 1991 are not huge, they may provide some insight into what was occurring with utilization levels over the same period.

Tables 6 and 7 present the recurrent cost structure of the health posts and centers of Altiplano Sur. There is substantial variation in both of these structures relative to their Valles Cruceños counterparts. One-third more of the total costs of the AS posts are comprised of personnel costs, and nearly twice as large a share of total costs consists of medicines. Other expenditures in the AS posts, however, are only about one-tenth their VC level, while the indirect cost share is two-thirds its AS level.

These significant differences suggest (1) that the technology of health care, that is, the way in which personnel time, medicines and other supplies are being used to provide care in the health posts of AS are quite different from that of VC, and/or (2) that the mix of services, quality of care, clientele or severity of illness is substantially different at the two sets of posts, or that medicines and other supplies are in short supply.

Have several of the health posts of both districts suffered severe shortages of medicines during one of the two study quarters?

In Valles Cruceños, in 1990 Chilón had medicine costs totaling 36 bolivianos. Also in Valles Cruceños, El Trigal had medicine costs of only 117 bolivianos for the total half year study period, all of which were in quarter 4 1990. In Altiplano Sur, the Sapahaqui and Calamarca posts appear to be inadequately stocked with both medicines and other supplies. In 1990, Sapahaqui's medicines and other expenditures constituted a mere 6 percent of its total costs, and totaled less than 100 bolivianos.

Within the Altiplano Sur District there are even more marked variations in the composition of total costs. In the Altiplano Sur health posts, other expenditures constitute a much smaller fraction of total expenditures; averaging less than 4 percent compared to 36 percent in Valles Cruceños posts. This would seem to suggest that the distribution of other expenditures (i.e., all supplies, other than medicines) is not routinized and is not tied to levels of service provision/utilization.

TABLE 3
THE STRUCTURE OF RECURRENT COSTS

**ALTIPLANO SUR DISTRICT
PUESTOS DE SALUD**

PERIOD: 10/90–12/90

FACILITY	TOTAL COST	SERVICE AREA POPULATION	COST PER INHABITANT	CONSULTATIONS	
				TOTAL NUMBER	PER INHABITANT
Sica Sica	6,419	4,090	1.6	215	0.05
Sapahaqui	1,501	5,390	0.3	122	0.02
Caracato	5,387	6,704	0.8	135	0.02
Calamarca	3,896	6,955	0.6	151	0.02
Patacamaya	6,015	11,357	0.5	259	0.02
AVERAGE:	4,644	6,899	0.7	176	0.03

PERIOD: 7/91–9/91

FACILITY	TOTAL COST	SERVICE AREA POPULATION	COST PER INHABITANT	CONSULTATIONS	
				TOTAL NUMBER	PER INHABITANT
Sica Sica	8,165	4,090	2.00	468	0.11
Sapahaqui	2,437	5,390	0.45	112	0.02
Caracato	5,412	6,704	0.81	144	0.02
Calamarca	4,638	6,955	0.67	189	0.03
Patacamaya	6,322	11,357	0.56	336	0.03
AVERAGE:	5,395	6,899	0.90	250	0.04

TABLA 3A
ESTRUCTURA DE COSTOS OPERATIVOS

**DISTRITO ALTIPLANO SUR
CENTRO DE SALUD**

ESTABLECIMIENTO	COSTO TOTAL	POBLACION DE COBERTURA	COSTO POR HABITANTE	CONSULTAS	
				NUMERO TOTAL	POR HABITANTE
Sisa/Ayo Ayo					
PERIODO:					
10/90 – 12/90	8,947.5	6,704	1.33	347	0.052
7/91 – 10/91	10,377.2	6,704	1.55	366	0.055

TABLE 4
THE STRUCTURE OF RECURRENT COSTS

PUESTOS DE SALUD OF THE VALLES CRUCEÑOS DISTRICT
Quarter 4, 1990

A. In Bolivianos

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Santiago Moro Moro	1,062	302	297	212	1,873
Cuevas	822	81	187	164	1,254
Pucara	857	661	216	171	1,905
Chilon	1,089	591	36	218	1,934
Valle Abajo	822	543	558	164	2,088
Quirucillas	1,000	245	391	200	1,836
El Trigal	885	55	117	177	1,234
Los Negros	5,152	5,901	1,765	1,030	13,848
AVERAGE:	1,461	1,047	446	292	3,246

B. Facility Distribution of Each Cost Category (%)

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	AVERAGE
Santiago Moro Moro	9.1	3.6	8.3	9.1	7.5
Cuevas	7.0	1.0	5.2	7.0	5.1
Pucara	7.3	7.9	6.0	7.3	7.1
Chilon	9.3	7.1	1.0	9.3	6.7
Valle Abajo	7.0	6.5	15.7	7.0	9.1
Quirucillas	8.6	2.9	11.0	8.6	7.8
El Trigal	7.6	0.7	3.3	7.6	4.8
Los Negros	44.1	70.4	49.5	44.1	52.0
TOTALS	100.0	100.0	100.0	100.0	100.0

C. Cost Category Distribution of Total Costs by Facility

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Santiago Moro Moro	56.7	16.1	15.8	11.3	100.0
Cuevas	65.6	6.5	14.9	13.1	100.0
Pucara	45.0	34.7	11.3	9.0	100.0
Chilon	56.3	30.6	1.9	11.3	100.0
Valle Abajo	39.4	26.0	26.7	7.9	100.0
Quirucillas	54.5	13.3	21.3	10.9	100.0
El Trigal	71.7	4.5	9.4	14.3	100.0
Los Negros	37.2	42.6	12.7	7.4	100.0
AVERAGE:	53.3	21.8	14.3	10.7	100.0

TABLE 4A
THE STRUCTURE OF RECURRENT COSTS

PUESTOS DE SALUD OF THE VALLES CRUCEÑOS DISTRICT
Quarter 3, 1991

A. In Bolivianos

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINES	INDIRECTS	TOTAL
Santiago Moro Moro	2,093	2,035	454	419	5,001
Cuevas	1,036	69	245	207	1,557
Pucara	1,135	717	364	227	2,443
Chilon	1,128	598	208	226	2,159
Valle Abajo	1,037	450	303	207	1,997
Quirucillas	1,271	431	158	254	2,115
El Trigal	885	201	0	177	1,263
Los Negros	6,292	5,298	1,097	1,258	13,946
AVERAGE:	1,860	1,225	354	372	3,810

B. Facility Distribution of Each Cost Category (%)

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINES	INDIRECTS	AVERAGE
Santiago Moro Moro	14.1	20.8	16.1	14.1	16.3
Cuevas	7.0	0.7	8.7	7.0	5.9
Pucara	7.6	7.3	12.9	7.7	8.9
Chilon	7.6	6.1	7.3	7.6	7.2
Valle Abajo	7.0	4.6	10.7	7.0	7.3
Quirucillas	8.5	4.4	5.6	8.5	6.8
El Trigal	5.9	2.0	0.0	5.9	3.5
Los Negros	42.3	54.1	38.8	42.3	44.4
TOTALS	100.0	100.0	100.0	100.0	100.0

C. Cost Category Distribution of Total Costs by Facility

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINES	INDIRECTS	TOTAL
Santiago Moro Moro	41.9	40.7	9.1	8.4	100.0
Cuevas	66.5	4.4	15.7	13.3	100.0
Pucara	46.5	29.4	14.9	9.3	100.0
Chilon	52.2	27.7	9.6	10.4	100.0
Valle Abajo	51.9	22.5	15.2	10.4	100.0
Quirucillas	60.1	20.4	7.5	12.0	100.0
El Trigal	70.1	15.9	0.0	14.0	100.0
Los Negros	45.1	38.0	7.9	9.0	100.0
AVERAGE:	54.3	24.9	10.0	10.9	100.0

TABLE 5
THE STRUCTURE OF RECURRENT COSTS

CENTROS DE SALUD OF THE VALLES CRUCEÑOS DISTRICT
Quarter 4, 1990

A. In Bolivianos

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Florida	1,643	1,393	583	329	3,948
Señor de Malta	8,485	3,230	3,431	4,393	19,539
Mairana	5,289	6,103	1,783	1,712	14,887
San Martín de Porres	2,795	4,192	1,749	559	9,295
TOTALS	18,212	14,918	7,545	6,993	47,668

B. Facility Distribution of Each Cost Category

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Florida	9.0	9.3	7.7	4.7	7.7
Señor de Malta	46.6	21.7	45.5	62.8	44.2
Mairana	29.0	40.9	23.6	24.5	29.5
San Martín de Porres	15.3	28.1	23.2	8.0	18.7
TOTALS	100.0	100.0	100.0	100.0	100.0

C. Cost Category Distribution of Total Costs by Facility

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Florida	41.6	35.3	14.8	8.3	100.0
Señor de Malta	43.4	16.5	17.6	22.5	100.0
Mairana	35.5	41.0	12.0	11.5	100.0
San Martín de Porres	30.1	45.1	18.8	6.0	100.0
AVERAGE	37.7	34.5	15.8	12.1	100.0

TABLE 5A
THE STRUCTURE OF RECURRENT COSTS

CENTROS DE SALUD OF THE VALLES CRUCEÑOS DISTRICT
Quarter 3, 1991

A. In Bolivianos

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Florida	1,702	1,393	1,145	390	4,630
Señor de Malta	9,366	4,001	3,279	4,821	21,467
Mairana	6,248	6,159	1,582	1,888	15,877
San Martín de Porres	3,446	5,169	3,345	1,682	13,642
TOTALS	20,762	16,722	9,352	8,781	55,616

B. Facility Distribution of Each Cost Category

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Florida	8.2	8.3	12.2	4.4	8.3
Señor de Malta	45.1	23.9	35.1	54.9	39.8
Mairana	30.1	36.8	16.9	21.5	26.3
San Martín de Porres	16.6	30.9	35.8	19.2	25.6
TOTALS	100.0	100.0	100.0	100.0	100.0

C. Cost Category Distribution of Total Costs by Facility

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Florida	36.8	30.1	24.7	8.4	100.0
Señor de Malta	43.6	18.6	15.3	22.5	100.0
Mairana	39.4	38.8	10.0	11.9	100.0
San Martín de Porres	25.3	37.9	24.5	12.3	100.0
AVERAGE	36.3	31.4	18.6	13.8	100.0

TABLE 6
THE STRUCTURE OF RECURRENT COSTS

PUESTOS DE SALUD OF THE ALTIPLANO SUR DISTRICT
Quarter 4, 1990

A. In Bolivianos

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Sica Sica	3,275	287	2,530	328	6,419
Sapahaqui	1,280	22	71	128	1,501
Caracato	3,163	58	1,847	319	5,387
Calamarca	3,160	62	358	316	3,896
Patacamaya	3,189	230	2,277	319	6,015
AVERAGE	2,813	132	1,417	282	4,644

B. Facility Distribution of Each Cost Category

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Sica Sica	23.3	43.5	35.7	23.2	31.4
Sapahaqui	9.1	3.3	1.0	9.1	5.6
Caracato	22.5	8.8	26.1	22.6	20.0
Calamarca	22.5	9.4	5.1	22.4	14.9
Patacamaya	22.7	34.9	32.1	22.6	28.1
TOTALS	100.0	100.0	100.0	100.0	100.0

C. Cost Category Distribution of Total Costs by Facility

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Sica Sica	51.0	4.5	39.4	5.1	100.0
Sapahaqui	85.3	1.5	4.7	8.5	100.0
Caracato	58.7	1.1	34.3	5.9	100.0
Calamarca	81.1	1.6	9.2	8.1	100.0
Patacamaya	53.0	3.8	37.9	5.3	100.0
AVERAGE	65.8	2.5	25.1	6.6	100.0

TABLE 6A
THE STRUCTURE OF RECURRENT COSTS

PUESTOS DE SALUD OF THE ALTIPLANO SUR DISTRICT
Quarter 3, 1991

A. In Bolivianos

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Sica Sica	3,854	287	3,639	385	8,165
Sapahaqui	1,506	229	551	151	2,437
Caracato	3,737	89	1,212	374	5,412
Calamarca	3,717	78	471	372	4,638
Patacamaya	3,781	350	1,436	378	5,945
AVERAGE	3,319	207	1,462	332	5,319

B. Facility Distribution of Each Cost Category

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Sica Sica	23.2	27.8	49.8	23.2	31.0
Sapahaqui	9.1	22.2	7.5	9.1	12.0
Caracato	22.5	8.6	16.6	22.5	17.6
Calamarca	22.4	7.6	6.4	22.4	14.7
Patacamaya	22.8	33.9	19.6	22.8	24.8
TOTALS	100.0	100.0	100.0	100.0	100.0

C. Cost Category Distribution of Total Costs by Facility

FACILITY NAME	PERSONNEL	OTHER EXPENSES	MEDICINE	INDIRECT	TOTAL
Sica Sica	47.2	3.5	44.6	4.7	100.0
Sapahaqui	61.8	9.4	22.6	6.2	100.0
Caracato	69.1	1.6	22.4	6.9	100.0
Calamarca	80.1	1.7	10.2	8.0	100.0
Patacamaya	63.6	5.9	24.2	6.4	100.0
AVERAGE	64.4	4.4	24.8	6.4	100.0

**TABLE 7
THE STRUCTURE OF RECURRENT COSTS**

**THE CENTRO DE SALUD OF THE ALTIPLANO SUR DISTRICT
Quarter 4, 1990 and Quarter 3, 1991**

DISTRICT: ALTIPLANO SUR
CENTRO DE SALUD

FACILITY	PERSONNEL	OTHER EXPENSES	MEDICINES	INDIRECTS	TOTALS
Bartolina Sisa/Ayo Ayo					
PERIOD:					
10/90-12/90	3,794.6 42.4%	3,999.4 44.7%	441.6 4.9%	712.0 8.0%	8,947.6 100.0%
7/91-10/91	4,091.3 39.4%	4,166.0 40.1%	1,301.7 12.5%	818.3 7.9%	10,377.3 100.0%

Why do the Altiplano Sur health posts have "other expenditures" costs of only half the absolute level and one-ninth the level of those of Valles Cruceños? What accounts for the very different allocations of other supplies across the two districts?

2. Changes in the Structure of Costs Over Time

In 1991, the Valles Cruceños health centers' cost structure was virtually the same as in 1990. At first glance, it appears that the experience of the health posts was largely the same: little change. However, upon closer inspection one can see that the seemingly modest reduction of 4.4 percent in medicines' share of total cost amounts to a decline of one-third, reflecting a 21 percent reduction in the absolute level of the costs of medicines. (If information about inflation were available, this reduction would have been even more.) Chilón health post reported only 36 bolivianos of medicine costs in fourth quarter 1990, and El Trigal reported none (zero) for the entire third quarter 1991, suggesting that no drugs were available.

The widespread reports of shortages of medicines throughout the MOH system, suggest that these reductions in, and low levels of, expenditures on medicines were not attributable to an improvement in the efficiency of use of medicines, but rather to an erosion in the quality of care provided in the health posts. It may be that consumers' perceptions of the compromise in the quality of care, attributable to shortages of medicines in 1991, is one contributing factor to the reduction in the activity level of the Valles Cruceños' health posts in 1991. This would also help explain the rising level of unit costs in providing care. It might also be a contributing factor in the increase in the share of Valles Cruceños' provided care accounted for by the relatively better stocked health centers.

In reviewing the individual health post cost structures, the unique character of the Los Negros facility is again readily evident: in 1990, it accounted for 44 percent of the 8 VC health posts' personnel costs, 70 percent of their other expenditures, 50 percent of their total cost of medicines, and 44 percent of their indirect costs. Although the domination of Los Negros was attenuated somewhat in 1991, it still accounted for a disproportionately large share of all expenditures in each of these four cost categories, and continued to account for over half of "other expenditures."

Why does Los Negros receive such a disproportionately large share of other expenditures and, though to a lesser extent, of medicines?

In 1991, the degree of primacy of Los Negros declined, but did so only because of the rapid absolute and relative growth in the financial importance of Santiago de Moro Moro. From its less than average position, Santiago suddenly became the next to highest cost puesto in the Valles Cruceños sample, well ahead of the third most financially significant puesto in each of the three direct expenditure categories. In 1991, Los Negros together with Santiago de Moro

Moro accounted for 56 percent of personnel expenditures, 75 percent of other expenditures and 55 percent of expenditures on medicines.

Why did the "other expenditures" of Santiago de Moro Moro increase by nearly 7-fold in 1991?

Changes in the levels of service provision during these eras provide no clue as to why these changes in expenditure patterns occurred. While Valles Cruceños health posts' service provision slipped in 1991 compared to 1990, its health centers' service provision grew by 42 percent and was able to offset the post decline, leaving the combined post and center total with a 23 percent expansion. Both Santiago de Moro Moro and Los Negros were sub-average performers. Santiago de Moro Moro experienced a meager 4 percent growth in 1991 over its 1990 service provision record, while Los Negros' total service activities fell by a very substantial amount, 28 percent. It would appear that in the case of these two posts, that the magnitude of "other expenditures" is not directly related to the level of services provided, or, if it is, that the service provision record of these quarters were aberrations from the general record. It may be that these variations reflect a different quality of care and/or a different disease mix and/or a different severity of illnesses treated.

More generally, "other expenditures" fluctuated greatly across facilities and over space and time for no apparent reason.

Although the absolute level of other VC health posts' other expenditures increased between October-December 1990 and July- September 1991 by 17 percent, two puestos experienced reductions in the absolute level of their other expenditures. Valle Abajo's fell from 543 to 450, a fall of 17 percent, and Los Negros fell 603 Bolivianos, a fall of 10 percent. Over the same period, the activity level of these puestos also fell, by 27 and 28 percent, respectively, which would seem to account for some of the reduction in expenditures/costs. Still, the much larger drops in activity levels experienced by Quirucillas and El Trigo (30 and 42 percent, respectively), were not matched by any comparable changes in their "other expenditures" levels.

The structure of the total costs of the VC health posts remained relatively constant over the two periods of observation, as the last portion of Table 4 show. And yet, these totals mask substantial variation in the oftentimes very different cost structures of the individual facilities over time.

Again, it is evident that there is considerable heterogeneity even among the facilities of a particular type, which in turn suggests that the averages of a particular facility type mask substantial variation. This should not be surprising as total costs are the outcome of a complex and dynamic interaction of characteristics of both the supply of and the demand for health care services. The policy implications of this observation is that developing a single lump sum

allocation for all facilities within a particular category of facility even though appealing because of its simplicity is not likely to be a very desirable resource allocation criterion.

E. The Total Number of Activities/Primary Health Care Services

As may be seen in Table 8, the health posts of Valles Cruceños, as a group, experienced a 9 percent contraction in the number of services they provided in 1991 compared to 1990. Only 4 of the 8 posts, however, had declining service provision totals over this period. It is only because two of the posts that had declining use were the two largest providers in 1990 and had such large reductions in their use that produces a reduction for all of the health posts when they are analyzed together. The changes in service provision of the posts from quarter 4, 1990 to quarter 3, 1991 ranged from -42 percent to +88 percent.

Among the health centers of VC, only one experienced a reduction in service provision in 1991 compared to 1990. The fluctuations in their utilization ranged from -25 percent to +131 percent, and averaged a 42 percent gain.

Why do the facilities of Valles Cruceños experience such marked variations in use/service provision between 1990 and 1991?

Does the decline in VC health post use and the significant expansion in VC health center use over the same period reflect a substitution of center-based services for post-based services?

As Table 8 also shows, in Altiplano Sur there is a similarly high degree of variation in the fluctuation of total activities provided by the posts, ranging from a low of -21 percent to a high of +185 percent, and averaging a 29 percent increase. The single health center in AS posted an impressive increase of 127 percent in its total number of activities.

What accounts for the magnitude of these fluctuations in the activity levels of the study facilities? Are they due to:

- o the absence of established routines for providing care, particularly in the provision of primary health care services--for it is this type of services that fluctuate the most,
- o the facilities' clientele not using the facilities as their major or a regular source of care,
- o seasonal fluctuations in health status or seasonal fluctuations in the demand for health care due to some other determinant of demand?
- o changes in the consumers' perceptions of the adequacy of supplies or quality of care?

TABLE 8
ACTIVITY LEVELS OF INDIVIDUAL FACILITIES BY DISTRICT

	1990	1991	90-91 GROWTH RATE
VALLES CRUCEÑOS			
A. Puestos			
Moro Moro	673	698	4%
Cuevas	396	507	28%
Pucara	420	648	54%
Chilon	228	429	88%
Valle Abajo	798	580	-27%
Quirucillas	423	294	-30%
El Trigal	321	185	-42%
Los Negros	1930	1383	-28%
TOTAL	5189	4724	-9%
AVERAGE	649	591	
B. Centros			
Florida	855	1978	131%
Señor de Malta	2929	3955	35%
Mairana	2313	1746	-25%
San Martín de Porres	2240	4181	87%
TOTAL	8337	11860	42%
AVERAGE	2084	2965	
GR. TOTAL	13526	16584	23%
ALTIPLANO SUR			
A. Puestos			
Sica Sica	3067	3101	1%
Sapahaqui	263	749	185%
Caracato	1987	1688	-15%
Calamarca	728	574	-21%
Patacamaya	1302	3333	156%
TOTAL	7347	9445	29%
AVERAGE	1469	1889	
B. Centro			
Bartolina Sisa	1138	2588	127%

TABLE 9
1991 TOTAL COSTS BY ACTIVITY:

A COMPARISON OF THE HEALTH POST AND HEALTH CENTER AVERAGES

ACTIVITY	ALL HEALTH POSTS	ALL HEALTH CENTERS
1. FAMILY HEALTH	585.98	2965.06
1.1 Prenatal care	378.64	613.22
1.2 Well baby care	207.33	2351.84
2. PARTUM CARE	133.34	2714.94
3. VACCINATIONS	1818.12	3262.17
3.1 Polio	502.77	793.68
3.2 BCG	78.07	546.16
3.3 Measles	572.72	352.55
3.4 Tetanus	296.49	909.87
3.5 DPT	368.08	659.90
4. COMUNITY	289.64	1149.81
4.1 Home visit	138.53	487.52
4.2 Home delivery	45.36	32.50
4.3 Education	105.75	629.79
5. CONSULTATION	1461.80	2909.62
5.1 ARI	302.86	542.75
5.2 ADD	168.98	273.27
5.3 TBC	10.09	352.00
5.4 General	979.86	1741.60
6. REPRODUCTIVE HEALTH	19.77	
7. OTHER	111.10	196.81
TOTAL	4419.75	13198.41

TABLE 10
1991 TOTAL COSTS BY ACTIVITY:
PERCENTAGE DISTRIBUTIONS OF THE SUM OF ALL OF THE FACILITIES STUDIED
BY TYPE OF FACILITY

ACTIVITY	ALL HEALTH POSTS	ALL HEALTH CENTERS
1. FAMILY HEALTH	13%	22%
1.1 Prenatal care	9%	50%
1.2 Well baby care	5%	18%
2. PARTUM CARE	3%	21%
3. VACCINATIONS	41%	25%
3.1 Polio	11%	6%
3.2 BCG	2%	4%
3.3 Measles	13%	3%
3.4 Tetanus	7%	7%
3.5 DPT	8%	5%
4. COMUNITY	7%	9%
4.1 Home visit	3%	4%
4.2 Home delivery	1%	0%
4.3 Education	2%	5%
5. CONSULTATION	33%	22%
5.1 ARI	7%	4%
5.2 ADD	4%	2%
5.3 TBC	0%	3%
5.5 General	22%	13%
6. REPRODUCTIVE HEALTH	0%	0%
7. OTHERS	3%	1%
TOTAL	100%	100%

F. Total Costs of Primary Health Care Activity

Tables 9 and 10 contain the distribution of the total costs of all health posts and all health centers by type of activity, in Bolivianos and percentages, respectively. The distributions of the centers and posts vary considerably, suggesting that the posts and centers provide a substantially different mix of services. In 1991, health posts spent 41 percent of all of their resources providing vaccinations. This is 60 percent more than the share of total costs devoted to vaccinations by the centers. Immunizing against just polio and measles accounts for nearly one-quarter of all health post costs. The comparable figure for the centers is 9 percent.

Even though the posts devote a much larger proportion of their resources to vaccinations, as Table 10 shows, the average health post spends only 56 percent of what the average health center spends producing immunizations. Furthermore these two different types of facilities provide different shares of each type of immunizations: BCG immunizations, for instance, are overwhelmingly provided in centers, while more measles immunizations are provided in the posts. This could suggest that there is inadequate integration of the immunization program, uneven emphasis on specific types of immunizations at the different types of facilities, or that supplies of antigens are limited and irregularly distributed to facilities.

All of the health posts together spend one-third of their resources providing consultations, two-thirds of which are general consultations provided to both children and adults. The posts devote a relatively larger share of their total resources to the production of consultations, and especially general consultations.

These two sets of services--vaccinations and general consultations--alone, consume nearly three-quarters of the entire value of the health posts' resources, compared to just less than half of those of the centers.

The centers' distribution of costs is much more equitable across the different types of activities. Compared to the posts, the centers devote a much larger share of their resources to births/deliveries, 21 versus 3 percent. The centers also spend nearly twice the share of their total resources on family health, most of which is accounted for by well baby visits.

The rank order of the different primary health care activities by their shares of total costs, may be interpreted as a ranking of the relative importance that the MOH ascribes to those services.³ According to this measure, immunizations are the top priority of the MOH, followed closely by consultations, and then family health. Of the 8 different general categories of primary health care services, these three account for three-quarters of the facilities' total costs.

³ Although, because of the role that demand plays in influencing the number of each type of service provided, these relative rankings are not unequivocal or altogether unambiguous indicators of the MOH's priorities. Still, from a public policy perspective, this is a useful way to conceptualize the issue of how the facilities are spending their resources.

TABLE 11

**1991 HEALTH POST TOTAL COSTS BY ACTIVITY:
COMPARISON OF DISTRICT CLINIC AVERAGES**

ACTIVITY	VALLES CRUCENOS 8 POST AVERAGE	ALTIPLANO SUR 5 POST AVERAGES	VC AVERAGE AS A % OF AS AVERAGE	ALL HEALTH POST AVERAGE
1. FAMILY HEALTH	806.59	233.00	346%	585.98
1.1 Prenatal care	576.91	61.32	941%	378.61
1.2 Well baby care	229.69	171.57	134%	207.34
2. PARTUM CARE	84.04	212.23	40%	133.34
3. VACCINATIONS	729.15	3560.48	20%	1818.12
3.1 Polio	134.90	1091.36	12%	502.77
3.2 BCG	71.98	87.81	82%	78.07
3.3 Measles	210.49	1152.29	18%	572.72
3.4 Tetanus	182.60	478.72	38%	296.49
3.5 DPT	129.19	750.31	17%	368.08
4. COMUNITY	340.67	208.00	164%	289.64
4.1 Home visit	159.56	104.89	152%	138.53
4.2 Home delivery	50.32	37.43	134%	45.36
4.3 Education	130.79	65.69	199%	105.75
5. CONSULTATION	1706.70	1069.95	160%	1461.80
5.1 ARI	219.73	435.88	50%	302.86
5.2 ADD	138.91	217.11	64%	168.99
5.3 TBC	14.04	3.77	372%	10.09
5.5 General	1334.04	413.19	323%	979.87
6. REPRODUCTIVE HEALTH	32.13			19.77
7. OTHERS	111.12	111.06	100%	111.10
TOTAL	3810.40	5394.72	71%	4419.75

1. District Breakdowns of the Health Posts Total Costs by Activity

Table 11 shows the district breakdown of the Health Post average costs. Altiplano Sur spends two-thirds of all of its resources on vaccinations and 42 percent on providing just two types of immunizations, polio and measles. The Caracato post is the extreme case: in Annex 5 you will note that 85 percent of its total costs are attributable to vaccinations. Sica Sica is the next to highest, with immunization accounting for about three-quarters of its total costs. Refer to the Annexes for facility specific tables containing the total cost and the percent of a facility's total cost by activity, as well as the facility distribution of an activity's total costs.

The highly skewed distribution of Altiplano Sur's health posts' total costs--with two-thirds of their total costs being incurred providing immunizations, and 42 percent attributable to providing just polio and measles vaccinations--suggests that these facilities provide very few other health care services, and are generally not regarded as credible sources of care.

What role does inadequate supplies of medicines and other materials play in discouraging the use of these facilities for other health care needs?

Immunizations are far less financially important in Valles Cruceños. The VC posts incurred about 20% of their total costs providing immunizations, and 9 percent immunizing against polio and measles. It appears, however, that this may be due to lack of availability of antigens or other necessary supplies. This is suggested by the observation that two of VC posts, Quirucillas and El Trigal, provided no vaccinations of any type in the third quarter of 1991.

In several of the posts in both districts while some vaccinations were provided there were some specific types of antigens for which no immunizations were given. This is especially true of BCG. As judged by the wide variations in costs incurred in providing different types of vaccinations it appears that there is not an integrated immunization program in the health posts of either district.

Whether this is an organizational problem at individual Health Posts (e.g., immunizations are provided only on certain days of the week, or MOH employees do not educate or otherwise encourage the service), a public education problem (people ignorant of the benefits, and thus not seeking the service), a lack of supplies or some combination of these possible causes cannot be ascertained without additional information.

In 1991, the average Altiplano Sur health post had total costs that were 42 percent higher than the average post of Valles Cruceños. The amount of money spent by the average Altiplano Sur post on immunizations was 3,560 bolivianos, the equivalent of 93 percent of the total cost of the average Valles Cruceños post.

TABLE 12
ALTIPLANO SUR DISTRICT
1991 UNIT COSTS OF HEALTH POSTS
(In Bolivianos)

ACTIVITY	PATACAMAYA	CALAMARCA	CARACATO	SAPAHAKUI	SICA SICA	5 POST AVERAGE
1. FAMILY HEALTH						
1.1 Prenatal care	1.57	9.50	2.83	2.82	3.35	4.01
1.2 Well care baby	1.83	8.77	3.12	3.28	3.54	4.11
	1.53	10.27	2.75	2.79	3.28	4.12
2. PARTUM CARE	24.34				41.98	33.16 *
3. VACCINATIONS						
3.1 Polio	5.03	8.97	3.47	2.78	2.53	4.56
3.2 BCG	4.59	8.76	2.90	2.54	1.59	4.08
3.3 Measles	5.40	7.91				6.66 *
3.4 Tetanus	6.69	9.37	5.03	4.38	3.75	5.84
3.5 DPT	5.05		2.91	2.40	2.04	3.10 *
	4.50	9.35	3.53	2.91	2.18	4.49
4. COMUNITY						
4.1 Home visit	4.31	8.80	2.33	4.80	1.76	4.40
4.2 Home delivery	4.34	8.80	2.32	4.81	1.77	4.41
4.3 Education	22.65			5.96		14.31 *
	4.25	8.80	2.35	4.73	1.76	4.38
5. CONSULTATIONS						
5.1 ARI	4.32	10.28	2.89	4.63	1.69	4.76
5.2 ADD	7.03	10.64	2.89	6.23	2.12	5.78
5.3 TBC	6.50	11.68	5.32	6.65	2.30	6.49
5.5 General	3.28	8.43	2.56	3.14	1.53	3.14
				3.38		3.84
6. REPRODUCTIVE HEALTH						
7. OTHER	1.90	1.27	0.32	19.85	3.26	5.32

* Average of the posts providing the service, not all five posts.

TABLE 13
ALTIPLANO SUR DISTRICT
1991 UNIT COSTS OF HEALTH POSTS
COMPARING THE INDIVIDUAL POSTS' UNIT COSTS TO THE 5 POST DISTRICT AVERAGE
(5 post average = 100)

ACTIVITY	PATACAMAYA	CALAMARCA	CARACATO	SAPAHQUI	SICA SICA	5 POST AVERAGE
1. FAMILY HEALTH	39	237	71	70	83	100
1.1 Prenatal care	45	213	76	80	86	100
1.2 Well baby care	37	249	67	68	80	100
2. PARTUM CARE	73				127	100
3. VACCINATIONS	110	197	76	61	56	100
3.1 Polio	113	215	71	62	39	100
3.2 BCG	81	119				100
3.3 Measles	114	160	86	75	64	100
3.4 Tetanus	163		94	77	66	100
3.5 DPT	100	208	79	65	49	100
4. COMUNITY	98	200	53	109	40	100
4.1 Home visit	98	200	53	109	40	100
4.2 Home delivery	158			42		100
4.3 Education	97	201	54	108	40	100
5. CONSULTATION	91	216	61	97	35	100
5.1 ARI	122	184	50	108	37	100
5.2 ADD	100	180	82	102	35	100
5.3 TBC				100		
5.5 General	86	220	67	88	40	100
6. REPRODUCTIVE HEALTH						
7. OTHER	36	24	6	373	61	100

This helps explain the difference in total costs between the two Districts. In Altiplano Sur, a single health center spends a large (85%) proportion of its total resources on vaccinations. In both facility types, two-thirds of all costs were incurred providing vaccinations. The Bartolina Sisa Centro of AS manifests a structure of costs and a service mix which are much more similar to that of the health posts than it is to the other health centers.

G. Average Costs of Primary Health Care Activities

1. Altiplano Sur

Table 12 contains the unit costs of providing specific primary health care services in each of the 5 health posts of Altiplano Sur District. The right hand column of the table presents the 5 posts' average unit cost of each of the services. The average costs vary markedly: for the average primary health care activity the ratio of the highest to the lowest cost facility is about 4 to 1.

Table 13 presents the information in Table 12 in a different manner intended to facilitate making cross-facility comparisons. An index of the 5 health posts' average unit cost for each primary health care service is developed and each post's level of average costs relative to that index is calculated. Since the index is set equal to 100 for all services, each clinic's measure may also be interpreted as its percent of the 5 post average unit cost of producing the particular service in question. For instance, Patacamaya provides family health services at 39 percent of the 5 post average, while Calamarca produces them much less efficiently, at 237 percent of that average.

As becomes readily apparent in Table 13, the Calamarca facility is the least efficient health post in the Altiplano Sur District. The unit costs of nearly all of its primary health care services are about twice as high as the average health post in the district. At the other end of the efficiency spectrum is the Sica Sica post. The vast bulk of Sica Sica's services are immunizations, which it provides at a unit cost that is about half (56 percent) of the 5 posts' average. Its second most important service in terms of its level of activity is consultations. Sica Sica provides consultations at about one-third of the 5 posts' average unit cost. It produces both of these services more efficiently than any of the other posts in the AS district. It should be regarded as the model from which Calamarca and Patacamaya (the next least efficient facility) have much to learn. It would be worthwhile to bring the key personnel of these facilities together to discuss these findings, to try to determine the causes of their markedly different levels of efficiency, and to develop remedial courses of action.

TABLE 14
 ALTIPLANO SUR DISTRICT
 1991 AVERAGE UNIT COSTS OF HEALTH CENTERS AND POSTS

ACTIVITY	5 POST AVERAGE	BART. SISA CENTER	POST AVERAGE COSTS AS A % OF CENTER'S
1. FAMILY HEALTH	4.01	3.24	124%
1.1 Prenatal care	4.11	3.60	114%
1.2 Well baby care	4.12	3.22	128%
2. PARTUM CARE	33.16 *		
3. VACCINATIONS	4.56	5.10	89%
3.1 Polio	4.08	4.64	88%
3.2 BCG	6.66 *	6.04	110%
3.3 Measles	5.84	6.64	88%
3.4 Tetanus	3.10 *	4.68	66%
3.5 DPT	4.49	4.97	90%
4. COMUNITY	5.05	6.31	80%
4.1 Home visit	4.41	5.77	76%
4.2 Home delivery	14.31 *	40.79	35%
4.3 Education	4.38	5.79	76%
5. CONSULTATION	4.76	4.53	105%
5.1 ARI	5.78	8.55	68%
5.2 ADD	6.49	5.16	126%
5.3 TBC	3.14 *		
5.5 General	3.84	4.00	96%
6. REPRODUCTIVE HEALTH			
7. OTHER	5.32	0.43	1237%

* Average of the posts providing the service, not all five posts.

TABLE 15
VALLES CRUCEÑOS DISTRICT
1991 UNIT COSTS OF HEALTH POSTS
(In Bolivianos)

ACTIVITY	SANTIAGO MORO MORO	CUEVAS	PUCARA	CHILON	VALLE ABAJO	QUIRUCILLAS	EL TRIGAL	LOS NEGROS	8 POST AVERAGE
1. FAMILY HEALTH	14.00	3.60	6.10	9.96	3.10	5.68	19.73	74.38	17.07
1.1 Prenatal care	17.88	4.59	6.53	5.18	3.15	8.21	19.53	74.38	17.43
1.2 Well baby care	12.18	3.39	5.74	10.15	3.09	4.93	19.83	0.00	8.47
2. PARTUM CARE	90.85		36.45	0.00	0.00	0.00	0.00	76.25	67.85
3. VACCINATIONS	19.67	2.94	1.99	4.46	1.31	0.00	0.00	2.02	5.40
3.1 Polio	18.37	2.59	1.86	4.06	0.93	0.00	0.00	1.73	4.92
3.2 BCG		4.01	2.53	6.22	2.08	0.00	0.00	2.78	3.52
3.3 Measles	20.34	4.96	3.10	4.68	2.68	0.00	0.00	4.08	6.64
3.4 Tetanus	0.00	2.64	1.89	4.07	0.95	0.00	0.00	1.68	2.25
3.5 DPT	17.77	2.96	1.89	4.21	1.33	0.00	0.00	1.94	5.02
4. COMUNITY	41.37	4.69	12.23	4.43	3.55	7.10	7.52	6.06	10.87
4.1 Home visit		4.32	13.50	4.30	2.42	3.33	3.76	3.33	4.99
4.2 Home delivery	114.05	31.99	0.00		0.00	35.02	0.00	93.24	68.58
4.3 Education	23.20		7.00	5.97	4.62	6.88	11.27	3.33	8.90
5. CONSULTATIONS	9.01	2.76	6.31	6.26	8.03	9.30	6.05	17.92	8.21
5.1 ARI	10.29	2.89	11.91	6.61	16.32	9.49	6.14	20.81	10.56
5.2 ADD	11.11	4.21	9.77	7.38	9.71	14.41	0.00	20.69	11.04
5.3 TBC	18.61	0.00	0.00	0.00	0.00	0.00	0.00	25.03	21.82
5.5 General	8.67	2.68	5.65	5.53	6.78	8.41	6.03	17.29	7.63
6. REPRODUCTIVE HEALTH	46.39			0.00		17.55			
7. OTHER	0.30	1.02	1.51	1.14	8.45	1.14	4.19	4.36	2.76

TABLE 16
VALLES CRUCEÑOS DISTRICT HEALTH POSTS
1991 UNIT COSTS
COMPARING THE INDIVIDUAL POSTS' UNIT COSTS TO THE 8 POST DISTRICT AVERAGE
(8 Post Average = 100)

ACTIVITY	SANTIAGO MORO MORO	CUEVAS	PUCARA	CHILON	VALLE ABAJO	QUIRUCILLAS	EL TRIGAL	LOS NEGROS	8 POST AVERAGE
1. FAMILY HEALTH	82	21	36	58	18	33	116	436	100
1.1 Prenatal care	103	26	37	30	18	47	112	427	100
1.2 Well baby care	144	40	68	120	36	58	234	0	100
2. PARTUM CARE	134	0	54	0	0	0	0	112	100
3. VACCINATIONS	364	54	37	83	24	0	0	37	100
3.1 Polio	373	53	38	82	19	0	0	35	100
3.2 BCG	0	114	72	177	59	0	0	79	100
3.3 Measles	306	75	47	70	40	0	0	61	100
3.4 Tetanus	0	118	84	181	42	0	0	75	100
3.5 DPT	354	59	38	84	27	0	0	39	100
4. COMUNITY	381	43	113	41	33	65	69	56	100
4.1 Home visit	0	86	270	86	48	67	75	67	100
4.2 Home delivery	166	47	0	0	0	51	0	136	100
4.3 Education	261	0	79	67	52	77	127	37	100
5. CONSULTATION	110	34	77	76	98	113	74	218	100
5.1 ARI	97	27	113	63	155	90	58	197	100
5.2 ADD	101	38	88	67	88	131	0	187	100
5.3 TBC	85	0	0	0	0	0	0	115	100
5.5 General	114	35	74	72	89	110	79	227	100
6. REPRODUCTIVE HEALTH	145	0	0	0	0	55	0	0	100
7. OTROS	11	37	55	41	306	41	152	158	100

It should be noted that the Sica Sica post has, by far, the highest level of total costs of the Altiplano Sur posts. It had quarter 3 1991 expenditures of about 8,200 bolivianos, about 55 percent greater than the 5 post average of about 5,300. Obviously more expenditures does not necessarily mean higher unit costs. The Sica Sica post is a model of efficiency for the Altiplano Sur health posts, warranting closer examination of its organization, structure and operations.

The single Altiplano Sur health center is the Bartolina Sisa facility of Ayo Ayo. The unit costs of Bartolina Sisa primary health services range from being nearly the same as, to generally higher than, those of the health posts of the district (see Table 14), even though its activity mix is very similar to the posts and distinct from the other health centers studied.

The unit costs of Bartolina Sisa compared to those of each of the 5 health posts of Altiplano Sur reveals that only the least efficient post, Calamarca, has higher unit costs for nearly any one of the primary health care service categories. Given the activity mix of Bartolina Sisa, which is overwhelmingly concentrated on the provision of immunizations, which it provides at a higher cost than the average health post in the district, it appears very difficult to justify the level of support provided to this center. In particular, its very high costs due to what appear to be inflated "other expenditures" should be scrutinized and explained.

2. Valles Cruceños

Tables 15 and 16 contain the 1991 unit costs of the primary health care services of the health posts of the Valles Cruceños District and each clinic's efficiency performance relative to the 8-clinic average index, respectively.

There is far more variability among the efficiency performance of the Valles Cruceños posts than among those of Altiplano Sur. With only one exception, tetanus immunizations, as a group, the Altiplano Sur District posts have lower unit costs for every one of the 14 primary health care services analyzed compared to Valles Cruceños.

The two most efficient Altiplano Sur health posts, Sica Sica and Caracato, are relatively comparable to the two most efficient Valles Cruceños posts, Pucara and Cuevas, with the Altiplano Sur facilities performing slightly better.

The two least efficient VC posts, Santiago de Moro Moro and Los Negros, however, have unit costs that are much higher than those of even the worst AS performer, the Calamarca post.

Recommendation: Given that the total costs of Los Negros are equal to the sum of the total costs of 6 of the other 7 health posts studied in Valles Cruceños, its high level of inefficiency is unacceptable. Los Negros must be the focus of a detailed management improvement effort.

TABLE 17
ALTIPLANO SUR AND VALLES CRUCEÑOS DISTRICTS
1991 UNIT COSTS OF HEALTH CENTERS
(In Bolivianos)

ACTIVITY	FLORIDA	SEÑOR DE MALTA	MAIRANA	SAN MARTIN DE PORRES	BART. SISA	5 CLINIC AVERAGE
1. FAMILY HEALTH	1.36	7.59	8.65	3.18	3.24	4.80
1.1 Prenatal care	1.77	13.81	11.05	3.42	3.60	6.73
1.2 Well baby care	1.28	6.86	8.19	3.08	3.22	4.53
2. PARTUM CARE	30.46	133.67	126.45	58.62		87.30
3. VACCINATIONS	2.63	1.02	4.31	1.83	5.10	2.98
3.1 Polio	2.38	0.85	3.80	1.55	4.64	2.64
3.2 BCG	2.97	2.09	5.26	1.96	6.04	3.66
3.3 Measles	3.54	3.19	6.23	2.41	6.64	4.40
3.4 Tetanus	2.56	0.80	3.93	1.75	4.68	2.74
3.5 DPT	2.73	0.97	4.18	1.95	4.97	2.96
4. COMUNITY	4.36	21.37	4.52	26.93	6.31	12.70
4.1 Home visit	4.67	16.80	2.52	29.27	5.77	11.81
4.2 Home delivery	80.95				40.79	60.87
4.3 Education	2.54	47.82	4.88	24.93	5.79	17.19
5. CONSULTATIONS	3.59	5.59	7.01	3.49	4.53	4.84
5.1 ARI	3.88	6.08	7.79	6.35	8.55	6.53
5.2 ADD	5.12	13.79	8.55	6.37	5.16	7.80
5.3 TBC	11.06	9.97	23.58	6.45		12.77
5.5 General	2.80	4.66	5.11	2.62	4.00	3.84
6. REPRODUCTIVE HEALTH						
7. OTHER	0.61	0.51		0.22	0.43	0.44

TABLE 18
ALTIPLANO SUR AND VALLES CRUCEÑOS DISTRICTS
1991 UNIT COSTS OF THE HEALTH CENTERS
COMPARING THE INDIVIDUAL CENTERS' UNIT COSTS TO THE 5 CENTER AVERAGE
(In Bolivianos)

ACTIVITY	FLORIDA	SEÑOR DE MALTA	MAIRANA	SAN MARTIN DE PORRES	BART. SISA	5 CLINIC AVERAGE
1. FAMILY HEALTH	28	158	180	66	67	100
1.1 Prenatal care	26	205	164	51	53	100
1.2 Well baby care	28	152	181	68	71	100
2. PARTUM CARE	35	153	145	67	0	100
3. VACCINATIONS	88	34	145	61	171	100
3.1 Polio	90	32	144	59	175	100
3.2 BCG	81	57	144	53	165	100
3.3 Measles	80	72	142	55	151	100
3.4 Tetanus	93	29	143	64	171	100
3.5 DPT	92	33	141	66	168	100
4. COMUNITY	34	168	36	212	50	100
4.1 Home visit	40	142	21	248	49	100
4.2 Home delivery	133	0	0	0	67	100
4.3 Education	15	278	28	145	34	100
5. CONSULTATION	74	115	145	72	94	100
5.1 ARI	59	93	119	97	131	100
5.2 ADD	66	177	110	82	66	100
5.3 TBC	87	78	185	51	0	100
5.5 General	73	121	133	68	104	100
6. REPRODUCTIVE HEALTH						
7. OTHER	138	115	0	50	97	100

**TABLE 19
VALLES CRUCEÑOS DISTRICT
1991 AVERAGE UNIT COSTS OF HEALTH CENTERS AND POSTS***

ACTIVITY	4 CENTER AVERAGE COST	8 POST AVERAGE COST	7 POST* AVERAGE COST	POSTS' AVERAGE UNIT COSTS AS A % OF CENTERS' AVERAGE	
				8 POST	7 POST
1. FAMILY HEALTH	5.20	17.07	7.77	328%	149%
1.1 Prenatal care	7.51	17.43	8.13	232%	108%
1.2 Well baby care	4.85	8.47	8.47	175%	175%
2. PARTUM CARE	87.30	67.85	42.43	78%	49%
3. VACCINATIONS	2.45	5.40	5.06	220%	207%
3.1 Polio	2.15	4.92	4.64	229%	216%
3.2 BCG	3.07	3.52	2.97	115%	97%
3.3 Measles	3.84	6.64	5.96	173%	155%
3.4 Tetanus	2.26	2.25	1.91	100%	85%
3.5 DPT	2.46	5.02	4.69	204%	191%
4. COMUNITY	14.30	10.87	10.11	76%	71%
4.1 Home visit	13.32	4.99	4.52	37%	34%
4.2 Home delivery	20.24	68.58	45.27	339%	224%
4.3 Education	20.04	8.90	8.42	44%	42%
5. CONSULTATION	4.92	8.21	5.97	167%	121%
5.1 ARI	6.03	10.56	7.96	175%	132%
5.2 ADD	8.46	11.04	8.08	130%	96%
5.3 TBC	12.77	21.82	9.31	171%	73%
5.5 General	3.80	7.63	5.47	201%	144%
6. REPRODUCTIVE HEALTH	0.00	31.97	31.97		
7. OTHER	0.34	2.76	2.22	812%	653%
TOTAL					

* The 8-post average includes all of the posts that were studied in Valles Cruceños District. The 7-post average excludes the Los Negros facility.

Santiago de Moro Moro, the next to least efficient post, spends the next to highest amount of total resources providing primary health care. It spends 2 to 3 times more providing care than 6 of the other posts in the district.

Recommendations: The operations of the Santiago de Moro Moro health post need to be much more closely studied to determine if there are any extenuating circumstances that help to justify its inefficient performance in delivering virtually all types of primary health care services--it is the most expensive producer of nearly every service. Particular attention should be paid to its provision of immunization services, which are 4 to 5 times more expensive to provide compared to the other 12 health posts analyzed.

Tables 17 and 18 present the individual health center unit costs and an efficiency index for all 5 of the health centers that were studied. Two of the Valles Cruceños health centers, Florida and San Martin de Porres, have substantially lower unit costs and two, Señor de Malta and Mairana, have substantially higher unit costs for nearly all primary health care services. On average, the two centers with higher costs have unit costs that are about double those of the more efficient two.

As was the case with the Valles Cruceños health posts, so too here, the least efficient facilities are the ones that account for a significantly larger proportion of all resources expended. In the case of the centers, the two least efficient performers spent more than twice as much as the two most efficient performers.

Recommendations: It would be worthwhile to call a meeting of the directors of the Señor del Malta and Mairana to discuss these findings and to try to determine what can be done to improve the organization of the facilities, patient flow, the division of labor among providers, the community's relationship with the facility, and to discuss the inter-facility variation in the severity of illness, and the adequacy, mix and timing of supplies, as well as any other factors that might help account for their inefficiencies.

One indication of the degree to which the Valles Cruceños facilities are less efficient compared to the Altiplano Sur's is that the Bartolina Sisa Health Center which, as was seen earlier, is much less efficient than the average health post in Altiplano Sur performs with roughly the same level of efficiency as half (two) of Valles Cruceños' health centers. Furthermore, even these two worst performing VC centers on the whole, outperform the average health post in the district.

Table 19 contains the average unit costs by type of facility for the Valles Cruceños sample of facilities. Even when the worst performing health post, Los Negros, is excluded from the calculations, VC posts' unit costs are generally much higher than those of VC centers.

TABLE 20
USER FEE REVENUES OF THE HEALTH POSTS

FACILITY	USER FEE REV.		USER FEE REVENUE AS A % OF TOTAL COSTS		'91 AS % OF '90	
	1990	1991	1990	1991	Absolute Revenues	Revenues as % of TC
<u>ALTIPLANO SUR DISTRICT</u>						
Sica Sica	111	74	1.7%	0.9%	67%	54%
Sapahaqui	74	74	4.9%	3.0%	100%	61%
Caracato	200	200	3.7%	3.7%	100%	100%
Calamarca	129	200	3.3%	4.3%	155%	130%
Patacamaya	216	413	3.5%	6.7%	191%	191%
Promedio	146	192	3.4%	3.7%	132%	109%
<u>VALLES CRUCEÑOS DISTRICT</u>						
Moro Moro	429	1225	22.9%	24.5%	286%	107%
Los Negros	6052	5958	43.7%	42.7%	98%	98%
El Trigal	302	267	24.5%	21.1%	88%	86%
Pucara	388	390	20.4%	15.9%	101%	78%
Quirucillas	182	247	9.9%	11.7%	136%	118%
Valle Abajo	656	399	31.4%	19.9%	61%	63%
Chilón	573	588	29.6%	27.2%	103%	92%
Cuevas	50	159	3.9%	10.2%	318%	262%
Average	1079	1154	23.3%	21.7%	107%	93%
Average w/o Los Negros	369	468	20.4%	18.6%	127%	92%
ALTIPLANO SUR'S AVERAGE AS A PERCENT OF VALLES CRUCEÑOS:						
With Los Negros	14%	17%	15%	17%	123%	117%
w/o Los Negros	40%	41%	17%	20%	104%	119%

H. User Fee Revenues

The MOH has established a set schedule of fees for some of the curative care services it provides, which includes:

general consultation	5 bolivianos
partum care/deliveries	120 bolivianos
injections	2 bolivianos
medicines (curaciones)	3 bolivianos

With the exception of partum care/deliveries, preventive services are provided to the patient free of charge.

The level of fees is uniform, regardless of whether the services are provided in a health post or a center. The general schedule is periodically revised to maintain a relatively constant real value. The revenues obtained are used by the facility that collects them to purchase additional supplies of medicines, to pay general expenditures, and to pay incentives, bonuses, and per diems to its staff.

The health posts' user fee data is not directly comparable to that of the health centers. Recall that the health posts provide primarily preventive health services, while the centers provide a mix of primary and secondary care. The post user fee data, therefore, includes revenues earned only from the provision of primary health care services. In the health centers, however, where both primary and secondary health care are provided, it was not feasible to distinguish revenues earned from the provision of primary services from those earned from the provision of secondary services. Since it is generally thought that people are more willing to pay for secondary, as compared to primary care services, the revenues collections of these two types of facilities are not directly comparable. Simply on the basis of this differential willingness to pay, the centers' user fee revenue generating performances should be superior.

Different sized facilities serving different numbers of patients are likely to generate very different amounts of user fee revenues. Therefore, in trying to assess different facilities' user fee revenue generation performances it is useful to try to make the facilities more directly comparable by somehow standardizing the facilities' performance. This may be done (imperfectly) by calculating user fee revenues as a percent of the total costs incurred in producing the services which generated the revenues. This crude standardization is also useful for planning and budgeting purposes since it measures the degree to which the facility is self-financed.

1. The Health Posts

Table 20 presents the user fee revenues of all 13 of the health posts studied. The average facility in the Altiplano Sur District collected 146 bolivianos in 1990. In 1991, this average increased by nearly one-third to 192 bolivianos. The Valles Cruceños posts did significantly

better: on average they collected nearly 7.5 times more than the average in the Altiplano Sur District in 1990. In 1991, even though the average VC post's collections increased at a pace far slower than the AS average, (by only 7 percent), the VC average level of user fee revenues remained 6 times higher than that of the AS.

Closer examination of the individual facility totals reveals that the Los Negros post greatly distorts the VC average post picture. In both 1990 and 1991, Los Negros earned approximately three-quarters of the total user fee revenues of the Valles Cruceños' 8 health posts. Excluding it from the VC average post calculations results in an average user fee revenue generation total that is about one-third of the 8 post average. Even without Los Negros, however, the average AS post generates a level of revenues that is only about 40 percent of that of VC in either year.

When the user fees revenues' percent of total costs is computed the Altiplano Sur's health posts' performance looks even worse. On average their user fees constitute only 3.5 percent of their total costs. This is about one-sixth the share generated by the VC posts. Even if Los Negros is excluded from the calculations this ratio falls only a small amount, to about one-fifth. Although the gap between the two districts narrowed in 1991, that gap remained very large.

The combination of the Altiplano Sur's health posts having substantially higher total costs than the Valles Cruceños posts, together with the Altiplano Sur's much lower absolute levels of user fee generation results in Altiplano Sur health posts generating user fees equal to only about 3.5 percent of their total costs, about one-fifth the share generated by the Valles Cruceños District posts.

The two right hand columns in Table 20 contain two measures of the growth in user fee revenues in 1991 relative to 1990. The first provides the growth rate of the absolute number of bolivianos collected, and the second measures the growth rate of the share of user fee revenues to total costs. By both measures, the AS posts had substantially faster rates of growth in 1991 compared to the VC posts, with or without Los Negros.

The largest changes posted by single facilities, however, included those of several of the VC posts: Cuevas, Quirucillas and Santiago de Moro Moro.

Recommendation: The mechanisms used to increase revenues in the Cuevas, Quirucillas and Santiago Moro Moro health posts of the VC district; and those of Patacamaya and Calamarca of AS should be examined as possibilities for increasing revenues in other establishments throughout the country.

The much lower level of collections of fees in Altiplano Sur is the result of several factors. Most importantly, the people of Altiplano Sur are considerably poorer; many cannot afford to pay anything for the care they receive. Knowing the financial position of their clientele, MOH providers in Altiplano Sur are less likely to request payment of fees and are more likely to accept only partial payment of fees. Whether or not the means by which they determine a

TABLE 21
USER FEE REVENUES OF THE HEALTH CENTERS

FACILITY	USER FEE REVEN.		USER FEE REVEN. AS A % OF TOT. COST		'91 AS % OF '90	
	1990	1991	1990	1991	Absolute Reven.	Reven. as % of TC
<u>VALLES CRUCEÑOS DIST.</u>						
Florida	6,060	5,165	45.5	85.2	85%	187%
Sr. de Malta	5,358	4,652	16.4	12.4	87%	76%
Mairana	11,181	10,662	59.7	54.1	95%	91%
San Martín de Porres	SI	SI	---	---	---	---
Unweighted Means	7,533	6,826	40.5	50.6	89%	118%
<u>ALTIPLANO SUR DISTRICT</u>						
B. Sisa	SI	7,491	---	56.9	---	---

patient's ability to pay of their patients is regarded as adequate, or is consistently applied, are important issues that are not addressed in this study.

The lower level of collections of fees in Altiplano Sur vis-a-vis Valles Cruceños also appears to be a result of the different service mixes of the two districts (see Annex 16, 17 and 18 for facility-by- facility breakdowns). A much larger proportion of the Altiplano Sur posts' services consist of immunizations for which there are no user charges. In addition, compared to Valles Cruceños, a much smaller proportion of AS post activities consist of consultations for which fees are levied and in which medicines are prescribed and other treatments provided on which fees are also collected. 70 percent of the Altiplano Sur health posts' services consist of vaccinations, compared to just 42 percent for the Valles Cruceños. In contrast, revenue generating general consultations constituted only 10 percent of AS activities compared to 23 percent of VC's. In absolute terms, the AS posts provided only about 70 percent of the number of general consultations that the VC posts did, 739 compared to 1064. Los Negros high level of user fee revenues is largely attributable to its having provided about 20 percent of all of general consultations in all 13 of the health posts studied.

The poorer clientele of the health posts of Altiplano Sur together with the posts' distinct service mix vis-a-vis that of the Valles Cruceños posts--in particular (1) the much greater proportion of their total care which consists of free-of-charge vaccinations and (2) the much smaller absolute number and proportion of their total activities which consist of revenue generating general consultations--accounts for the much lower level of user fee revenues (in both absolute terms and as a percent of total costs) of the health posts of Altiplano Sur.

2. The Health Centers

Table 21 contains information on the user fee revenues of the health centers. Again, these data are not directly comparable to the post data, and therefore, no comparisons of the centers and posts user fee collections should be made.

In absolute terms, the level of collections of the centers varies by a factor of more than two to one. In both quarters, the largest amount of revenues was collected by the Mairana Health Center. The other centers for which there is data had relatively similar levels of total collections. All four of the facilities for which there is data had smaller revenue collections in 1991 compared to 1990. This suggests that a larger proportion of the generally higher total costs of the centers in 1991 were funded by sources other than user fee revenues. This, in turn, suggests that MOH facility personnel may have felt less pressed to levy and collect user fees--much of which goes to purchase additional medicines and supplies--because they generally received larger quantities of medicines and supplies in 1991 compared to the previous year.

As measured by their proportion of total costs, user fee revenues varied even more than the two-to-one ratio of total collections. Three of the four facilities had relatively similar performances, collecting revenues constituting about half of their total costs. The exception by this measure was the Señor de Malta Center, which collected an annual average of only about one quarter of this share, roughly 15 percent of its total costs.

TABLE 22
LEVEL AND MIX OF SERVICES BY FACILITY, 1990-1991

ACTIVITY	VIRGEN DE COTOCA			LA MADRE		
	1990	1991	% Increase	1990	1991	% Increase
1. FAMILY HEALTH	34	338	894%	1082	751	-31%
1.1 Prenatal care	23	51	122%	328	325	-1%
1.2 Well baby care	11	287	2509%	754	426	-44%
2. PARTUM CARE	2	9	350%	85	68	-20%
3. VACCINATIONS	256	600	134%	1266	1220	-4%
3.1 Polio	113	161	42%	507	490	-3%
3.2 BCG		60		123	124	1%
3.3 Measles	20	74	270%	163	99	-39%
3.4 Tetanus	48	186	288%	119	134	13%
3.5 DPT	75	119	59%	354	373	5%
4. COMUNITY	242	68	-72%	190	224	18%
4.1 Home visit	82	44	-46%	95	112	18%
4.2 Home delivery	0	0		0	0	
4.3 Education	160	24	-85%	95	112	18%
5. CONSULTATION	347	663	91%	1943	2122	9%
5.1 ARI	56	148	164%	205	205	0%
5.2 ADD	33	50	52%	97	80	-18%
5.3 TBC	12	8	-33%	7	5	-29%
5.5 General	246	457	86%	1634	1832	12%
6. REPRODUCTIVE HEALTH	0	0		85	106	25%
7. OTHER	95	75	-21%	1374	1203	-12%
TOTAL	976	1753	80%	5940	5588	-6%
Vaccines and consultations only	603	1263	109%	3209	3342	4%

TABLE 23
THE STRUCTURE OF TOTAL COSTS OF THE URBAN FACILITIES STUDIED

FACILITY AND YEAR	PERSONNEL	OTHER EXPENSES	MEDICINES	INDIRECTS	TOTAL
<u>VIRGEN DE COTOCA</u>					
1990	1,280 32%	1,121 28%	645 16%	990 25%	4,036 101%
1991	7,885 69%	1,165 10%	1,753 15%	590 5%	11,393 99%
Percent Change 1990-1991:	616%	104%	272%	60%	282%
<u>LA MADRE</u>					
1990	16,061 58%	7,046 26%	3,611 13%	771 3%	27,489 100%
1991	18,655 64%	6,379 22%	3,392 12%	849 3%	29,275 101%
Percent Change 1990-1991:	116%	91%	94%	110%	106%

VI. EMPIRICAL FINDINGS II: THE URBAN AREA

The urban area component of the study involved a considerably smaller level of effort. In contrast to the 18 rural facilities studied, the urban component of the study analyzed just two facilities; the MOH Virgen de Cotoca Center and the PROSALUD clinic La Madre, both located in the city of Santa Cruz.

A. The MOH Health Center: Virgen de Cotoca

The activities of the Virgen de Cotoca Health Center services consist overwhelmingly of primary health care. Secondary and tertiary care are provided at the referral hospital which is also located within the City of Santa Cruz.

The physical structure of the Center was provided by the Mayor's Office (Alcaldia Municipal). It consists of a reception and registration office, a waiting room, several consultation rooms, a birthing room, a ward serving exclusively obstetric patients, a small pharmacy, and the administrative office of the facility director.

In 1991, the personnel of the facility consisted of 6 paid MOH employees, and 4 persons who worked on an ad-honorem basis. The 10 person staff consisted of:

- o one general practitioner who was completing his required year of social service before becoming a graduate physician,
- o 4 nurse auxiliaries; one on the payroll of the MOH, one paid a salary from user fee revenues, and two working as apprentices without remuneration (In 1990 only the MOH paid employee and one of the apprentices worked in the clinic.)
- o two resident physicians working half-time and receiving only their transportation costs (neither of whom worked at the clinic in 1990)
- o two medical specialists, one pediatrician and a gynecologist, who each received a fixed percentage of the clinic's user fee generated income.

The clinic can provide ambulatory and partum care 24 hours a day. Its service area population consists of approximately 11,800 persons. The majority of the medications available to patients at the clinic are restricted to those provided through special programs, such as ARI and CDD.

Given the expansion of staff and high proportion of non-remunerated personnel time in 1991, it was imperative to estimate the economic costs of this important input into producing clinic services. The opportunity costs of the non-remunerated personnel were estimated as follows:

- o the shadow wage of the half-time general practitioner was assumed to be the equivalent of the average MOH budgeted salary for a general physician, 400 bolivianos per month
- o similarly, the shadow wage of the two residents was estimated as being the equivalent of an MOH budgeted intern's position,
- o and shadow prices for the two auxiliaries working ad-honorem were estimated.

These adjustments resulted in personnel costs of 7,885 bolivianos; 65 percent of which consists of physicians' pay.

1. Levels of Service Provision

As may be seen in Table 22, the level of service provision by the Virgen de Cotoca Health Center increased dramatically in the third quarter of 1991 compared to the fourth quarter of 1990. The total number of activities grew by 80 percent. The biggest gainers were family health consultations which increased 894 percent, due primarily to a major increase in well baby visits, while the total number of immunizations grew 134 percent, and total consultations nearly doubled in number. The average number of general consultations per service area inhabitant in 1990 (annualized) was 0.12. This rate increased by nearly two-fold, to 0.22 in 1991.

In both of the quarters being studied, general consultations were the most common type of consultations. They accounted for roughly 70 percent of the total, with the remainder comprised, in order of frequency, of ARI, CDD and TB consultations. There were very few births delivered at the center in either period: one in 1990 and 3 in 1991. Home visits and education activities declined considerably in 1991.

The staff of the facility believes that most of the increase in the activity level of the clinic in 1991 is attributable to the public's perception that the quality of care had improved. This improvement, the staff feels, was the result of an increase in the number and quality of staff, in new staff who were more dedicated to providing quality patient care, in the improved performance and efficiency demonstrated by the nurse auxiliaries, and in greater emphasis on home visits and health promotion in 1990, especially by one of the physicians.

2. The Structure of Costs

Table 23 presents a breakdown of the total costs of the Virgen de Cotoca Center into the same four cost categories used in the analysis of the rural clinics. The most noticeable change over the two periods of observation was in the level of total costs which grew by nearly three-fold. This increase was not uniform across the four cost categories. The largest absolute and relative gain was posted in personnel costs, which grew by 616 percent, more than doubling their share of the Center's total costs from 32 percent in 1990 to 69 percent in 1991. Although the absolute

TABLE 24
TOTAL COST OF PRIMARY HEALTH CARE SERVICES, 1990-1991

ACTIVITY	VIRGEN DE COTOCA			LA MADRE		
	1990	1991	% Increase	1990	1991	% Increase
1. FAMILY HEALTH	549.0	1,870.49	241%	3475.65	3805.81	9%
1.1 Prenatal care	293.0	222.67	-24%	2357.54	2484.56	5%
1.2 Well baby care	256.0	1,647.82	544%	1118.11	1321.25	18%
2. PARTUM CARE	560.0	991.19	77%	6437.82	6642.51	3%
3. VACCINATIONS	296.0	849.83	187%	1278.89	1390.64	9%
3.1 Polio	79.4	170.97	115%	321.01	365.22	14%
3.2 BCG		96.97		181.33	201.23	11%
3.3 Measles	53.0	182.27	244%	226.67	185.55	-18%
3.4 Tetanus	82.8	224.41	171%	198.78	240.96	21%
3.5 DPT	80.8	175.21	117%	351.10	397.68	13%
4. COMUNITY	143.0	508.97	256%	493.13	584.41	19%
4.1 Home visit	57.2	203.59	256%	261.87	307.38	17%
4.2 Home delivery						
4.3 Education	85.8	305.38	256%	231.26	277.03	20%
5. CONSULTATION	2252.0	6,414.37	185%	13131.46	14868.68	13%
5.1 ARI	391.0	1,165.05	198%	1029.33	1156.76	12%
5.2 ADD	201.0	725.71	261%	723.01	733.37	1%
5.3 TBC	1420.0	214.54	-85%	64.94	58.42	-10%
5.5 General	237.0	4,309.07	1718%	11314.17	12920.14	14%
6. REPRODUCTIVE HEALTH				130.82	149.03	14%
7. OTHER	237.0	757.75	220%	2541.50	2906.32	14%
TOTAL	4037.0	11392.60	182%	27358.45	30198.37	10%

TABLE 25
UNIT COST OF PRIMARY HEALTH CARE SERVICES, 1990–1991

ACTIVITY	VIRGEN DE COTOCA			LA MADRE		
	1990	1991	% Increase	1990	1991	% Increase
1. FAMILY HEALTH	16.10	5.53	-66%	3.21	5.07	58%
1.1 Prenatal care	12.70	4.37	-66%	7.19	7.64	6%
1.2 Well baby care	23.30	5.74	-75%	1.48	3.10	109%
2. PARTUM CARE	280.00	110.13	-61%	75.74	97.68	29%
3. VACCINATIONS	1.16	1.42	22%	1.01	1.14	13%
3.1 Polio	0.70	1.06	51%	0.63	0.75	19%
3.2 BCG		1.62		1.47	1.62	10%
3.3 Measles	2.65	2.46	-7%	1.39	1.87	35%
3.4 Tetanus	1.72	1.21	-30%	1.67	1.80	8%
3.5 DPT	1.08	1.47	36%	0.99	1.07	8%
4. COMUNITY	0.59	7.48	1168%	2.60	2.61	0%
4.1 Home visit	0.70	4.63	561%	2.76	2.74	-1%
4.2 Home delivery						
4.3 Education	0.54	12.72	2256%	2.43	2.47	2%
5. CONSULTATION	6.49	9.67	49%	6.76	7.01	4%
5.1 ARI	6.99	7.87	13%	5.02	5.64	12%
5.2 ADD	7.25	14.51	100%	7.45	9.17	23%
5.3 TBC	16.80	26.82	60%	9.28	11.68	26%
5.5 General	5.77	9.43	63%	6.92	7.05	2%
6. REPRODUCTIVE HEALTH				1.54	1.41	-8%
7. OTHER	2.49	10.10	306%	1.85	2.42	31%

level of medicine costs increased by just less than the near three-fold increase in total costs, and other expenditures also increased, their shares of total costs both slipped, owing to the pronounced increase in personnel costs.

3. Total and Unit Costs

Growth in the total cost of providing many of the different primary health care activities was due, in part, to the high rate of growth in the total number of activities. With the single exception of prenatal care, which contracted by 24 percent, all of the primary health care activities experienced increases in their total costs. (See Table 24.)

The growth in total costs was also partly due to higher levels of personnel costs, attributable to both an increase in the levels of remuneration of some of the personnel and to an increase in the number of personnel. Since the rates and total level of personnel remuneration outpaced the increase in staff productivity, the unit costs of most activities increased, with the noticeable exception of family health, and, to a lesser extent, a few other specific service types.

In summarizing the impact of the change in the service mix (Table 22) on unit costs (Table 25), one can see that the services experiencing unit cost reductions were those that were produced in significantly larger numbers in 1991. The converse is also true; those services that had the largest unit cost increases in 1991 were those that were provided significantly less frequently that year.

B. The PROSALUD Health Center: La Madre

In 1985, with the support of USAID, the non-government health care providing organization, PROSALUD, was founded in the City of Santa Cruz. The purpose of the new organizational entity was to provide self-financed primary health care services for lower and middle income families.

PROSALUD is administered by a central office or management service unit, which oversees system development, marketing, planning and overall system management, including the hiring and training of personnel and the purchase and distribution of drugs and other supplies. The major characteristics of this new model of primary health care have been described in detail elsewhere (Fiedler, 1991) and will not be repeated here.

The staff of the La Madre Health Center consists of:

- o one general practitioner
- o one pediatrician
- o one gynecologist
- o one graduate nurse
- o one nurse auxiliary during day hours

- o two nurse auxiliaries during night hours
- o a half-time laboratory technician
- o a receptionist
- o a cleaning person

1. Levels of Service Provision

As may be seen in Table 22, La Madre experienced a contraction of 5 percent in its overall activity level in the 1991 study period relative to 1990. The largest change was in the number of well-baby visits which decreased by 44 percent. In addition, the number of births fell by 20 percent, and vaccinations by 4 percent, led by a fall in measles immunizations of 39 percent.

Not all types of primary health care suffered reductions in their service levels, however. Bolstered primarily by the 12 percent increase in general consultations to children and adults, total consultations expanded by 9 percent. These gains resulted in the annualized number of consultations per inhabitant creeping up slightly in 1991, when it reached 0.97, compared to 0.89 the previous year. These levels are about double the national level for urban areas in the latest year for which such data is available, 1984.

Two other services, both of lesser numerical significance, reproductive health care and community-based services grew at the fastest rates, 25 and 18 percent, respectively.

2. The Structure of Costs

As is shown in Table 23, the cost structure of La Madre did not change radically in 1991. Its general structure became more dominated by personnel, with other expenditures and medicines, experiencing absolute and relative declines.

3. Total and Unit Costs

The right hand column of Table 24 shows that with two exceptions, the total costs of all of the 20 primary health care categories increased in 1991. The unweighed average increase was roughly 15 percent.

With total costs increasing by 6 percent and the level of services provided falling by 5 percent, it is not surprising that nearly all services had higher unit costs in 1991 (see Table 25). The two exceptions were house calls and reproductive health, the two services with the largest volume increases in 1991. The biggest changes in unit costs were in those services which experienced the largest reductions in volume; well baby visits, births, measles vaccinations, and tuberculosis consultations.

TABLE 26
**UNIT COSTS OF LA VIRGEN DE COTOCA PRIMARY HEALTH CARE SERVICES
 AS A PERCENT OF LA MADRE'S, 1990-1991**

ACTIVITY	1990	1991
1. FAMILY HEALTH	503%	109%
1.1 Prenatal care	177%	57%
1.2 Well baby care	1574%	185%
2. PARTUM CARE	370%	113%
3. VACCINATIONS	115%	125%
3.1 Polio	111%	141%
3.2 BCG		100%
3.3 Measles	191%	132%
3.4 Tetanus	103%	67%
3.5 DPT	109%	137%
4. COMUNITY	23%	287%
4.1 Home visit	25%	169%
4.2 Home delivery		
4.3 Education	22%	515%
5. CONSULTATION	96%	138%
5.1 ARI	139%	140%
5.2 ADD	97%	158%
5.3 TBC	180%	230%
5.5 General	83%	134%
6. REPRODUCTIVE HEALTH		
7. OTHER	135%	417%

C. Comparative Analysis of La Madre and La Virgen de Cotoca

The service mix of La Madre changed in 1991, becoming more dominated by consultations. Whereas in 1990, 32 percent of all of La Madre's activities were consultations, in 1991 the share of consultations had increased to 37 percent. Although the same basic trend characterized Cotoca, it was much less pronounced: consultations grew from 36 to 38 percent of all services.

La Madre's total direct costs increased 6 percent in 1991, while Cotoca's almost tripled, owing primarily to the increase in its personnel ranks. These changes in the relative magnitudes of the total costs of the two facilities, put upward pressure on the unit costs of Cotoca vis-a-vis those of La Madre. Cotoca partially offset the cost increase by almost doubling its level of service provision.

As Table 26 shows, La Madre remained considerably more efficient than Cotoca, and actually improved its relative efficiency in providing many services. In 1991, Cotoca had lower unit costs than La Madre for only two services, prenatal care and tetanus vaccinations.

Recommendation: An effort should be made to determine the extent to which the changing relative efficiencies with which these two facilities produce different services is primarily a result of changing numbers of services provided, as opposed to different managerial practices. To the extent that they are attributable to different managerial practices, to the extent possible, those efficiency-enhancing practices should be adopted.

A final note: most of the services in which La Madre suffered major reductions in 1991, were the same ones in which Cotoca posted major gains, suggesting that there may have been a substitution of Cotoca care for La Madre care. In the case of the family health services, the service totals for the year remained relatively constant, only their distribution by providing facility changed.

VII. A SUMMARY OF THE EMPIRICAL FINDINGS: CONCLUSIONS AND RECOMMENDATIONS

A. Empirical Findings I: The Rural Area

FINDING: Both within and across the two types of facility and the two districts, the total costs of the facilities studied vary significantly.

FINDING: Within the Valles Cruceños the health posts' total costs varied by a factor of 11-to-1 in both study quarters, while in Altiplano Sur they varied by factors of 4-to-1 and 2-to-1 in 1990 and 1991, respectively. The Valles Cruceños health post Los Negros has more total costs than all of the other 7 health posts studied in the same district.

CONCLUSION: From a total cost perspective, it would appear that health posts are not a homogeneous entity in Bolivia, or even within either one of the two study districts. The averages of a particular facility type mask substantial variation.

RECOMMENDATION: Developing a single lump sum allocation for all facilities within a particular category of facility type--while perhaps appealing because of its simplicity--is not likely to be a very desirable resource allocation criterion or mechanism. Such a mechanism should also take into account other criteria, for instance: level and mix of services provided; size of the service area population; cost recovery potential (indicated by the income and standard of living of the facility's catchment area population); and actual cost recovery.

FINDING: Lacking essential supplies, several of the health posts were not able to provide any vaccinations. From discussions with health facility personnel it was learned that this was not the only supply constraint affecting service delivery.

CONCLUSION: Inadequate supplies of medicines and other inputs affected total and average cost structures. These shortages reduced the number of some specific types of services that were offered, which reduced total costs from the level they otherwise would have reached, but on net probably increased the unit costs of these services (by reducing the denominator of average costs-- viz, the number of services--proportionately more than the numerator--total costs). In other words, inadequate supplies acted as a bottleneck to being able to spread the fixed cost of personnel over a larger number of units of output, thereby effectively increasing the average cost of those units of output that could still be produced.

FINDING: Some posts in VC (which collected significantly greater fees than AS posts) use a greater percent of the fees for supplies and medicines than others VC posts.

CONCLUSION: It may be that consumers' perceptions of the compromise in the quality of care, attributable to shortages of medicines and other supplies, is a factor contributing to the reduction in the activity level of the Valles Cruceños' health posts in 1991. It might also be a contributing

factor in the increase in the share of Valles Cruceños' provided care accounted for by the relatively better stocked health centers (whose activity levels jumped 42 percent in 1991).

RECOMMENDATION: Efforts must focus on expanding the availability of key supplies, while holding constant (or if politically feasible, even downsizing) the current infrastructure and personnel rolls.

RECOMMENDATION: Posts need to understand the relationship between availability of key supplies and medicines and utilization of level of services.

FINDING: In the fourth quarter of 1990, the average health post studied in Altiplano Sur had total costs that were about 1.5 times greater than those of the average health post studied in Valles Cruceños, and in 1991 this difference increased. If the Los Negros Health Post is excluded from the calculations, in 1991, the Altiplano Sur average post had total costs that were more than twice the level of the average Valles Cruceños post.

FINDING: The total activity level of the VC health posts contracted in 1991, by 9 percent, while that of AS posts increased by 29 percent.

FINDING: On average, the Altiplano Sur posts have service area populations which are nearly 5 times those of VC.

CONCLUSION: Altiplano Sur health posts had greater availability of supplies than the Valles Cruceños posts.

CONCLUSION: Some of the variation in the average total costs of the two districts' health posts is due to the AS having a much larger service area population.

FINDING: The VC health centers posted a 17 percent increase in their total costs in 1991.

FINDING: The VC health centers had a 42 percent increase in the number of their total activities in 1991.

CONCLUSION: The VC health centers were less severely supply constrained and experienced an increase in their collective general productivity level in 1991.

FINDING: There was great variation in the total costs of the VC health centers included in the study; their total costs varied by a factor of about 5-to-1 in both 1990 and 1991.

FINDING: Los Negros average total cost per service area inhabitant was about 3 times that of the other 7 VC health posts' average in both years.

FINDING: The 1991 average costs per service area population of both districts' health posts are greater than those of their health centers. Since these cost differences include user fee revenue

funded expenditures, these differences reflect even greater differences in the level of resources expended by the posts and centers that are funded by the MOH.

CONCLUSION: In Altiplano Sur, the MOH allocates more resources to a typical health post than it does to the health center studied.

FINDING: The 1991 total costs of the health centers in both districts increased by approximately the same proportion over their 1990 levels.

FINDING: The structure of the recurrent costs of the health posts and the health centers of Valles Cruceños, are very similar. The rank order and general magnitude of the 4 cost categories is the same in both types of facilities.

FINDING: In Altiplano Sur health posts, "other expenditures" constitute a much smaller fraction of total expenditures; averaging less than 4 percent compared to 36 percent in Valles Cruceños posts.

FINDING: The "other expenditures" of Santiago de Moro Moro increased by nearly 7-fold in 1991 when its activity level grew by a mere 4 percent.

CONCLUSION: These and already mentioned findings suggest that the distribution of "other expenditures" (i.e., all supplies, other than medicines) is not uniform across districts, and does not appear to be closely related to service provision levels, is an important determinant of service provision/realized demand, and should be further analyzed to identify the criterion used in determining these allocations. (It warrants noting that variations in service mix may be confounding these observations.)

FINDING: The facilities of both districts experienced marked variations in use/service provision between 1990 and 1991.

CONCLUSION: Without additional information it is not possible to ascertain what accounts for the magnitude of these fluctuations. They may be due to:

- o the absence of established routines for providing care, particularly in the provision of primary health care services--for it is this type of services that fluctuate the most,
- o the absence of key staff
- o the facilities' clientele not using the facilities as their major or a regular source of care,

- o seasonal fluctuations in health status or seasonal fluctuations in the demand for health care due to some other determinant of demand?
- o changes in the consumers' perceptions of the adequacy of supplies.

FINDING: The health posts and centers provide a substantially different mix of services. Health posts spend 41 percent of all of their resources providing vaccinations. This is 60 percent more than the share of total costs devoted to vaccinations by the centers. Immunizing against just polio and measles accounts for nearly one-quarter of all health post costs. The comparable figure for the centers is 9 percent.

Even though the posts devote a much larger proportion of their resources to vaccinations, the average health post spends only 56 percent of what the average health center spends producing immunizations. The 13 health posts studied provided 55 percent of all immunizations, but accounted for only 19 percent of total immunization costs.

CONCLUSION: Health posts provide immunizations much more efficiently than do health centers.

RECOMMENDATION: Health posts should be regarded as the preferred service delivery site for immunizations. In the event of shortages of antigens, they should be given priority over health centers in receiving a portion of the limited supplies.

FINDING: Health posts and health centers provide different shares of different immunizations. BCG immunizations, for instance, are overwhelmingly provided in centers, while most measles immunizations are provided in the posts. Some health posts did not provide any immunizations.

CONCLUSION: It appears as though there is inadequate integration of the immunization program, uneven emphasis on specific types of immunizations at the different types of facilities, and that the supplies of antigens are limited and irregularly distributed to facilities.

FINDING: All of the health posts together spend one-third of their resources providing consultations, two-thirds of which are general consultations provided to both children and adults. The posts devote a relatively larger share of their total resources to the production of consultations, and especially general consultations. Together with vaccinations, these two sets of services, alone, consume nearly three-quarters of the entire value of the health posts' resources, compared to just less than half of those of the centers.

CONCLUSION: The health posts are far more specialized than the health centers in terms of the types of services they provide and the frequency with which they provide them.

RECOMMENDATION: In light of recent findings in volume-outcome research, consideration should be given to restricting the types of services provided by health posts.

FINDING: Based on the distribution of total expenditures by service type in all of the study facilities, immunizations are the top priority of the MOH, followed closely by consultations, and then family health. Of the 8 different general categories of primary health care services, these three account for three-quarters of the facilities' total costs.

FINDING: Altiplano Sur health posts spend two-thirds of all of their resources on vaccinations, 42 percent of which are devoted to providing just two types of immunizations, polio and measles.

CONCLUSION: This highly skewed distribution of Altiplano Sur's health posts' total costs suggests that these facilities provide very few other health care services, and are generally not regarded as credible sources of care.

RECOMMENDATION: Determine the extent to which inadequate supplies of medicines and other materials plays a role in discouraging the use of these facilities for other health care needs.

FINDING: Immunizations are far less financially important in Valles Cruceños. The VC posts incurred about one-quarter of their total costs providing immunizations, and only 12 percent immunizing against polio and measles. This difference between the districts, may be due to lack of availability of antigens or other necessary supplies.

CONCLUSION: The relative availability of antigens appears to vary significantly by facility within a district and across districts.

RECOMMENDATION: A study of the adequacy and determinants of the supply of antigens in MOH facilities should be conducted.

FINDING: There are great variations in the costs incurred in providing different types of vaccinations. In Altiplano Sur posts they vary from 2.5 bolivianos to 9.0, and in Valles Cruceños posts they range from 1.3 to 19.7 bolivianos.

RECOMMENDATION: There is not an integrated immunization program in the health posts of either district. Since the cost of providing immunizations is such an important determinant of the total cost performance of the health posts it would be worthwhile to identify and bring together the two lowest immunization unit cost facilities with the 3 or 4 facilities with the highest unit costs with the aim of determining whether the poor performance of these facilities is an individual post organizational problem (e.g., immunizations are provided only on certain days of the week, or their providers not educating or otherwise encouraging the service) a service area public education problem (people ignorant of the benefits, and thus not seeking the service), a lack of supplies or some combination of these possible causes.

FINDING: The single health center in AS district, Bartolina Sisa, spends two-thirds of its total resources on vaccinations, which it provides at a higher unit cost than the average post in the district. In general this Centro manifests a service mix which is much more similar to that of the health posts than it is to the other health centers. At the same time, the unit costs of Bartolina Sisa compared to those of each of the 5 health posts of Altiplano Sur reveals that only the least efficient post, Calamarca, has higher unit costs for nearly any one of the primary health care service categories.

RECOMMENDATION: Scrutinize the performance of the Center to determine if there are extenuating circumstances (such as case mix) that warrant its continuing to receive such a large amount of resources (proxied by its total costs) relative to the posts in the same district.

FINDING: The average cost of the various primary health care services provided by the 5 health posts of Altiplano Sur District vary markedly: for the average primary health care activity the ratio of the highest to the lowest cost facility is about 4 to 1. The Calamarca facility is the least efficient health post in the Altiplano Sur District. The unit costs of nearly all of its primary health care services are about twice as high as the average health post in the district. At the other end of the efficiency spectrum is the Sica Sica post followed by the Caracato post.

RECOMMENDATION: It would be worthwhile to bring the key personnel of the Sica Sica and Caracato facilities together with the poorest performing posts of the district to discuss the findings in this report, to try to determine the causes of their markedly different levels of efficiency, and to develop remedial courses of action.

FINDING: There is far more variability among the efficiency performance of the Valles Cruceños' posts than among those of Altiplano Sur. With only two exceptions, tetanus and BCG immunizations, as a group, the Altiplano Sur District posts have lower unit costs for every one of the 14 primary health care services analyzed compared to Valles Cruceños.

FINDING: The Altiplano Sur posts are generally more efficient than posts of Valles Cruceños. Still, the two most efficient Altiplano Sur health posts, Sica Sica and Caracato, are relatively comparable to the two most efficient Valles Cruceños posts, Pucara and Cuevas, with the Altiplano Sur facilities performing slightly better. However, the two least efficient VC posts, Santiago de Moro Moro and Los Negros, have unit costs that are much higher than those of even the worst AS performer, the Calamarca post.

FINDING: Santiago de Moro Moro, the next to least efficient post in Valles Cruceños, spends the next to highest amount of total resources providing primary health care. It spends 2 to 3 times more providing primary care than 6 of the other posts in the district.

RECOMMENDATION: The operations of the Santiago de Moro Moro health post need to be more closely analyzed to determine how to improve its inefficient performance in delivering virtually all types of primary health care services--it is the most expensive producer of nearly every service. Particular attention should be paid to its provision of immunization services, which are 4 to 5 times more expensive to provide compared to the other 13 health posts analyzed.

FINDING: The Los Negros Health Post is one of the least efficient posts in Valles Cruceños.

RECOMMENDATION: Given that the total costs of Los Negros are equal to the sum of the total costs of 6 of the other 7 health posts studied in Valles Cruceños, its high level of inefficiency is unacceptable. Los Negros must be the focus of a detailed management improvement effort.

FINDING: Two of the Valles Cruceños health centers, Florida and San Martin de Porres, have substantially lower unit costs and two, Señor de Malta and Mairana, have substantially higher unit costs for nearly all primary health care services. On average, the two higher cost centers have unit costs that are about double those of the more efficient two. As was the case with the Valles Cruceños health posts, so too here, the least efficient facilities are the ones that account for a significantly larger proportion of all resources expended. In the case of the centers, the two least efficient performers spent more than twice as much as the two most efficient performers.

RECOMMENDATION: It would be worthwhile to call a meeting of the directors of these facilities to discuss these findings and to try to determine what can be done to improve the organization of the facilities, patient flow, the division of labor among providers, the community's relationship with the facility, and to discuss the inter-facility variation in the severity of illness, and the adequacy, mix and timing of supplies, as well as any other factors that might help account for the Señor de Malta and Mairana facilities' inefficiencies.

FINDING: The average facility in the Altiplano Sur District collected 146 bolivianos in 1990. In 1991, this average increased by nearly one-third to 192 bolivianos. The Valles Cruceño posts did significantly better: on average they collected nearly 7.5 times more than the average in the Altiplano Sur District in 1990. In 1991, even though the average VC post's collections increased at a pace far slower than the AS average, (by only 7 percent), the VC average level of user fee revenues remained 6 times higher than that of the AS.

FINDING: Los Negros earned approximately three-quarters of the total user fee revenues of the Valles Cruceños' 8 health posts. Excluding it from the VC average post calculations results in an average user fee revenue generation total that is about one-third of the 8 post average. Even without Los Negros, however, the average AS post generates a level of revenues that is only about 40 percent of that of VC in either year.

FINDING: On average, the Altiplano Sur health posts' user fees constitute only 3.5 percent of their total costs. This is about one-sixth the share generated by the VC posts. Even if Los Negros is excluded from the calculations this ratio falls only a small amount, to about one-fifth. Although the gap between the two districts narrowed in 1991, that gap remained very large.

FINDING: The largest improvements in user fee revenues posted by single facilities included those of several of the VC posts; Cuevas, Quirucillas and Santiago de Moro Moro.

RECOMMENDATION: How the changes in these facilities, and in Patacamaya and Calamarca of the Altiplano Sur, were orchestrated should be case studied.

CONCLUSION: Lower collection of fees in AS posts were the result of primarily two factors. The poorer clientele of the health posts of Altiplano Sur together with the posts' distinct service mix vis- a-vis that of the Valles Cruceños posts--in particular (1) the much greater proportion of their total care which consists of free-of-charge vaccinations and (2) the much smaller absolute number and proportion of their total activities which consist of revenue generating general consultations--account for the much lower level of user fee revenues (in both absolute terms and as a percent of total costs) of the health posts of Altiplano Sur.

RECOMMENDATION: In the interest of promoting horizontal and vertical equity, the means by which AS providers--and all MOH providers, for that matter--determine a patient's ability to pay, the enforcement mechanisms and the consistency with which both are adhered to are important issues which should be addressed in a more full-blown, national study of the administrative system of user fee systems.

B. Empirical Findings II: The Urban Area

FINDING: The service mix of La Madre changed in 1991, becoming more dominated by consultations. Whereas in 1990 32 percent of all of La Madre's activities were consultations, in 1991 the share of consultations had jumped to 36 percent. Although the same basic trend characterized Cotoca, it was less pronounced: consultations grew from 36 to 38 percent of all services.

CONCLUSION: This change in La Madre's service mix enabled it to essentially retain its level of self-financing even while the clinic's total level of service provision contracted by 5 percent.

FINDING: The Cotoca clinic experienced similar service provision trends, though they were not as pronounced.

FINDING: La Madre's total direct costs increased 6 percent in 1991, while Cotoca's almost tripled, owing primarily to the increase in its personnel ranks. These changes in the relative magnitudes of the total costs of the two facilities, put upward pressure on the unit costs of Cotoca vis-a-vis those of La Madre. Cotoca, partially offset the cost increase by increasing the number of services delivered by 80%.

FINDING: La Madre remained considerably more efficient than Cotoca, and actually improved its relative efficiency in providing many services. In 1991, Cotoca had lower unit costs than La Madre for only two services, prenatal care and tetanus vaccinations.

RECOMMENDATION: An effort should be made to determine the extent to which the changing relative efficiencies with which these two facilities produce different services is primarily a result of changing numbers of services provided, as opposed to different managerial practices. To the extent that they are attributable to different managerial practices, to the extent possible, those efficiency-enhancing practices should be adopted.

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ANNEX 1
VALLES CRUCEÑOS DISTRICT HEALTH POSTS
1991 TOTAL COSTS BY TYPE OF ACTIVITY
(In Bolivianos)

ACTIVITY	SANTIAGO MORO	CUEVAS	PUCARA	CHILON	VALLE ABAJO	QUIRU-CILLA	EL TRIGAL	LOS NEGROS	8 POSTS AVERAGE
1. FAMILY HEALTH	657.91	259.39	323.13	517.77	186.01	522.20	118.38	3,867.96	806.59
1.1 Prenatal care	268.21	59.66	156.76	10.36	40.92	172.34	39.06	3,867.96	576.91
1.2 Well baby care	389.71	199.73	166.36	507.42	145.09	349.86	79.31	0.00	229.69
2. PARTUM CARE	181.70	0.00	109.36	0.00	0.00	0.00	0.00	381.24	84.04
3. VACCINATIONS	1,553.95	505.94	797.98	1,093.66	408.80	0.00	0.00	1,472.89	729.15
3.1 Polio	183.65	124.12	81.72	263.76	70.34	0.00	0.00	355.61	134.90
3.2 BCG	0.00	20.06	106.16	211.55	68.71	0.00	0.00	169.32	71.98
3.3 Measles	1,139.24	69.50	37.17	149.67	80.43	0.00	0.00	207.89	210.49
3.4 Tetanus	0.00	150.29	495.41	329.84	102.74	0.00	0.00	382.52	182.60
3.5 DPT	231.06	141.97	77.54	138.84	86.58	0.00	0.00	357.54	129.19
4. COMUNITY	206.84	291.38	501.49	238.97	227.34	333.48	526.13	399.74	340.67
4.1 Home visit	0.00	259.39	445.51	215.07	75.02	43.35	131.53	106.63	159.56
4.2 Home delivery	114.05	31.99	0.00	0.00	0.00	70.03	0.00	186.48	50.32
4.3 Education	92.79	0.00	55.98	23.90	152.32	220.10	394.59	106.63	130.79
5. CONSULTATION	2,261.13	475.32	637.41	269.16	803.27	995.59	526.13	7,685.59	1,706.70
5.1 ARI	185.16	28.91	95.29	112.34	179.47	208.75	73.66	874.22	219.73
5.2 ADD	166.58	33.67	39.07	51.68	68.00	172.89	0.00	579.35	138.91
5.3 TBC	37.21	0.00	0.00	0.00	0.00	0.00	0.00	75.08	14.04
5.4 General	1,872.18	412.74	503.05	105.15	555.80	613.95	452.47	6,156.94	1,334.04
6. REPRODUCTIVE HEALTH	46.39	0.00	0.00	0.00	0.00	210.62	0.00	0.00	32.13
7. OTHER	92.79	30.52	73.86	39.83	372.02	52.65	92.07	135.25	111.12
TOTALS	5000.7	1562.5	2443.2	2159.3	1997.4	2114.5	1262.7	13942.	3810.405

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ANNEX 2
ALTIPLANO SUR DISTRICT
1991 TOTAL COSTS OF THE HEALTH POSTS BY TYPE OF ACTIVITY
In Bolivianos

ACTIVITY	PATACAMAYA	CALAMARCA	CARACATO	SAPAHQUI	SICA SICA	5 POST TOTAL	5 POST AVERAGE
1. FAMILY HEALTH	248.35	275.44	223.24	200	217.95	1164.98	233.00
1.1. Prenatal care	42.14	131.62	52.99	13.11	67.25	307.11	61.42
1.2 Well baby care	206.21	143.82	170.24	186.89	150.69	857.85	171.57
2. PARTUM CARE	389.52	0	0	0	671.64	1061.16	212.23
3. VACCINATIONS	3605.41	2116.31	4616.08	1401.02	6063.58	17802.4	3,560.48
3.1 Polio	1610.76	910.67	1225.19	524.98	1185.22	5456.82	1,091.36
3.2 BCG	280.85	158.19	0	0	0	439.04	87.81
3.3 Measles	749.12	215.45	1404.47	267.35	3125.04	5761.43	1,152.29
3.4 Tetanus	514.91	0	1057.83	349.92	470.92	2393.58	478.72
3.5 DPT	449.78	832	928.6	258.78	1282.41	3751.57	750.31
4. COMUNITY	340.32	175.99	130.62	297.8	95.29	1040.02	208.00
4.1 Home visit	91.22	87.99	71.84	211.44	61.94	524.43	104.89
4.2 Home delivery	181.2	0.0	0.0	6.0	0	187.13	37.43
4.3 Education	67.9	88.0	58.8	80.4	33.35	328.45	65.69
5. CONSULTATION	1,681.5	1,942.9	416.6	518.3	790.52	5349.74	1,069.95
5.1 ARI	983.99	595.7	132.76	280.48	186.45	2179.38	435.88
5.2 ADD	110.46	824.8	63.88	26.61	59.78	1085.53	217.11
5.3 TBC	0	0	0	18.86	0	18.86	3.77
5.4 General	587	522.37	219.92	192.38	544.3	2065.97	413.19
6. REPRODUCTIVE HEALTH	0	0	0	0	0	0	0.00
7. OTHER	56.93	127.48	25.33	19.85	325.73	555.32	111.06
TOTALS	6,321.98	4,638.09	5,411.84	2,437.00	8,164.71	26,973.62	5,394.72

ANNEX 3
1991 TOTAL COSTS OF ALL HEALTH CENTERS
In Bolivianos

ACTIVITY	FLORIDA	SR. DE MALTA	MAIRANA	S.M. PORRES	BART. SISA	5 CENTER TOTAL	5 CENTER AVERAGE
1. FAMILY HEALTH	470.63	7,365.81	3,735.93	2,508.16	744.77	14,825.30	2,965.06
1.1 Prenatal care	99.16	1,395.29	762.64	776.63	32.38	3,066.10	613.22
1.2 Well baby care	371.48	5,970.52	2,973.29	1,731.53	712.39	11,759.21	2,351.84
2. PARTUM CARE	487.31	6,282.72	3,287.77	3,516.91	0.00	13,574.71	2,714.94
3. VACCINATIONS	1,431.41	1,538.81	3,457.02	2,953.80	6,929.79	16,310.83	3,262.17
3.1 Polio	449.55	242.74	646.56	683.80	1,945.75	3,968.40	793.68
3.2 BCG	121.93	161.02	373.15	666.55	1,408.15	2,730.80	546.16
3.3 Measles	109.83	229.58	504.37	267.90	651.08	1,762.76	352.55
3.4 Tetanus	384.25	686.94	1,189.41	571.20	1,717.54	4,549.34	909.87
3.5 DPT	365.84	218.52	743.51	764.34	1,207.27	3,299.48	659.90
4. COMUNITY	431.84	1,303.76	1,834.29	1,346.32	832.85	5,749.06	1,149.81
4.1 Home visit	224.09	873.35	158.86	673.16	508.12	2,437.58	487.52
4.2 Home delivery	80.95	0.00	0.00	0.00	81.57	162.52	32.50
4.3 Education	126.79	430.41	1,675.42	673.16	243.15	3,148.93	629.79
5. CONSULTATION	1,466.76	4,713.44	3,561.72	3,149.89	1,656.27	14,548.08	2,909.62
5.1 ARI	166.84	1,300.07	225.93	679.02	341.88	2,713.74	542.75
5.2 ADD	204.86	524.19	145.27	445.60	46.43	1,366.35	273.27
5.3 TBC	243.28	249.23	1,060.93	206.54	0.00	1,759.98	352.00
5.4 General	851.79	2,639.95	2,129.59	1,818.73	1,267.96	8,708.02	1,741.60
6. REPRODUCTIVE HEALTH	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7. OTHER	340.57	262.68	0.00	167.27	213.53	984.05	196.81
TOTALS	4,628.52	21,467.22	15,876.73	13,642.35	10,377.21	65,992.03	13,198.41

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ANNEX 4
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
ALTIPLANO SUR AND VALLES CRUCENOS HEALTH CENTERS

ACTIVITY	FLORIDA	SR. DE MALTA	MAIRANA	SAN MARTIN DE PORRES	BART. SICA	TOTAL
1. FAMILY HEALTH	347	971	432	789	230	2769
1.1. Prenatal care	56	101	69	227	9	462
1.2 Well baby care	291	870	363	562	221	2307
2. PARTUM CARE	16	47	26	60	0	149
3. VACCINATIONS	545	1514	803	1611	1360	5833
3.1 Polio	189	285	170	442	419	1505
3.2 BCG	41	77	71	340	233	762
3.3 Measles	31	72	81	111	98	393
3.4 Tetanus	150	855	303	326	367	2001
3.5 DPT	134	225	178	392	243	1172
4. COMUNITY	99	61	406	50	132	748
4.1 Home visit	48	52	63	23	88	274
4.2 Home delivery	1	0	0	0	2	3
4.3 Education	50	9	343	27	42	471
5. CONSULTATION	409	843	508	902	366	3028
5.1 ARI	43	214	29	107	40	433
5.2 ADD	40	38	17	70	9	174
5.3 TBC	22	25	45	32	0	124
5.4 General	304	566	417	693	317	2297
6. REPRODUCTIVE HEALTH	0	0	0	0	0	0
7. OTHER	562	519	0	769	500	2350
TOTALS	1978	3955	2175	4181	2588	14877

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ANNEX 5
ALTIPLANO SUR DISTRICT
1991 TOTAL COSTS OF THE HEALTH POSTS BY TYPE OF ACTIVITY
PERCENTAGE DISTRIBUTION OF EACH FACILITY'S TOTAL COST

ACTIVITY	PATACAMAYA	CALAMARCA	CARACATO	SAPAHAQUI	SICA SICA	5 POST AVERAGE
1. FAMILY HEALTH	4%	6%	4%	8%	3%	4%
1.1. Prenatal care	1%	3%	1%	1%	1%	1%
1.2 Well baby care	3%	3%	3%	8%	2%	3%
2. PARTUM CARE	6%	0%	0%	0%	8%	4%
3. VACCINATIONS	57%	46%	85%	57%	74%	67%
3.1 Polio	25%	20%	23%	22%	15%	20%
3.2 BCG	4%	3%	0%	0%	0%	2%
3.3 Measles	12%	5%	26%	11%	38%	22%
3.4 Tetanus	8%	0%	20%	14%	6%	9%
3.5 DPT	7%	18%	17%	11%	16%	14%
4. COMUNITY	5%	4%	2%	12%	1%	3%
4.1 Home visit	1%	2%	1%	9%	1%	2%
4.2 Home delivery	3%	0%	0%	0%	0%	1%
4.3 Education	1%	2%	1%	3%	0%	1%
5. CONSULTATION	27%	42%	8%	21%	10%	19%
5.1 ARI	16%	13%	2%	12%	2%	8%
5.2 ADD	2%	18%	1%	1%	1%	4%
5.3 TBC	0%	0%	0%	1%	0%	0%
5.4 General	9%	11%	4%	8%	7%	8%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	0%
7. OTHER	1%	3%	0%	1%	4%	2%
TOTALS	100%	100%	100%	100%	100%	100%
VACC. AND CONSULTATIONS	83%	88%	93%	79%	84%	86%

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ANNEX 6
ALTIPLANO SUR DISTRICT
1991 TOTAL COSTS OF THE HEALTH POSTS BY TYPE OF ACTIVITY
THE FACILITY DISTRIBUTION OF THE 5 POST DISTRICT TOTAL

ACTIVITY	PATACAMAYA	CALAMARCA	CARACATO	SAPAHAKUI	SICA SICA	5 POST TOTAL
1. FAMILY HEALTH	21%	24%	19%	17%	19%	100%
1.1 Prenatal care	14%	43%	17%	4%	22%	100%
1.2 Well baby care	24%	17%	20%	22%	18%	100%
2. PARTUM CARE	37%	0%	0%	0%	63%	100%
3. VACCINATIONS	20%	12%	26%	8%	34%	100%
3.1 Polio	30%	17%	22%	10%	22%	100%
3.2 BCG	64%	36%	0%	0%	0%	100%
3.3 Measles	13%	4%	24%	5%	54%	100%
3.4 Tetanus	22%	0%	44%	15%	20%	100%
3.5 DPT	12%	22%	25%	7%	34%	100%
4. COMUNITY	22%	20%	15%	33%	11%	100%
4.1 Home visit	17%	17%	14%	40%	12%	100%
4.2 Home delivery	97%	0%	0%	3%	0%	100%
4.3 Education	21%	27%	18%	24%	10%	100%
5. CONSULTATION	28%	38%	8%	10%	15%	100%
5.1 ARI	45%	27%	6%	13%	9%	100%
5.2 ADD	10%	76%	6%	2%	6%	100%
5.3 TBC	0%	0%	0%	100%	0%	100%
5.4 General	28%	25%	11%	9%	26%	100%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	100%
7. OTHER	10%	23%	5%	4%	59%	100%
TOTALS	23%	17%	20%	9%	31%	100%

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ANNEX 7
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
ALTIPLANO SUR HEALTH POST

ACTIVITY	PATACAMAYA	CALAMARCA	CARACATO	SAPAHQUI	SICA SICA	5 POST TOTAL
1. FAMILY HEALTH	12%	5%	5%	9%	2%	100%
1.1. Prenatal care	2%	3%	1%	1%	1%	100%
1.2 Well baby care	10%	2%	4%	9%	1%	100%
2. PARTUM CARE	1%	0%	0%	0%	1%	100%
3. VACCINATIONS	55%	41%	79%	67%	77%	100%
3.1 Polio	27%	18%	25%	28%	24%	100%
3.2 BCG	4%	3%	0%	0%	0%	100%
3.3 Measles	9%	4%	17%	8%	27%	100%
3.4 Tetanus	8%	0%	22%	19%	7%	100%
3.5 DPT	8%	16%	16%	12%	19%	100%
4. COMUNITY	3%	3%	3%	8%	2%	100%
4.1 Home visit	2%	2%	2%	6%	1%	100%
4.2 Home delivery	1%	0%	0%	0%	0%	100%
4.3 Education	1%	2%	1%	2%	1%	100%
5. CONSULTATION	26%	33%	9%	15%	15%	100%
5.1 ARI	11%	10%	3%	6%	3%	100%
5.2 ADD	1%	12%	1%	1%	1%	100%
5.3 TBC	0%	0%	0%	1%	0%	100%
5.4 General	14%	11%	5%	8%	11%	100%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	100%
7. OTHER	2%	17%	5%	0%	3%	100%
TOTALS	100%	100%	100%	100%	100%	100%
% share of just immunizations and consults	81%	74%	88%	82%	92%	87%

File: Annex-7.wk1

ANNEX 8
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
ALTIPLANO SUR HEALTH POST

ACTIVITY	PATACAMAYA	CALAMARCA	CARACATO	SAPAHAQUI	SICA SICA	5 POST TOTAL
1. FAMILY HEALTH	39%	7%	20%	18%	16%	100%
1.1 Prenata care	29%	19%	22%	5%	24%	100%
1.2 Well baby care	42%	4%	19%	21%	14%	100%
2. PARTUM CARE	50%	0%	0%	0%	50%	100%
3. VACCINATIONS	14%	5%	26%	10%	46%	100%
3.1 Polio	19%	6%	23%	11%	41%	100%
3.2 BCG	0%	72%	28%	0%	0%	100%
3.3 Measles	9%	2%	21%	5%	64%	100%
3.4 Tetanus	12%	0%	43%	17%	27%	100%
3.5 DPT	9%	8%	23%	8%	52%	100%
4. COMUNITY	19%	8%	24%	26%	23%	100%
4.1 Home visit	15%	7%	22%	31%	25%	100%
4.2 Home delivery	89%	0%	0%	11%	0%	100%
4.3 Education	18%	11%	29%	20%	22%	100%
5. CONSULTATION	27%	15%	12%	9%	37%	100%
5.1 ARI	37%	15%	12%	12%	23%	100%
5.2 ADD	13%	55%	9%	3%	19%	100%
5.3 TBC	0%	0%	0%	100%	0%	100%
5.4 General	24%	8%	12%	8%	48%	100%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	100%
7. OTHER	10%	32%	26%	0%	32%	100%
TOTALS	18%	8%	23%	10%	42%	100%

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ANNEX 9
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
ALTIPLANO SUR AND VALLES CRUCEÑOS HEALTH CENTERS

ACTIVITY	FLORIDA	SR. DE MALTA	MAIRANA	S.M. DE PORRES	BART. SISA	TOTAL
1. FAMILY HEALTH	18%	25%	20%	19%	9%	19%
1.1. Prenatal care	3%	3%	3%	5%	0%	3%
1.2 Well baby care	15%	22%	17%	13%	9%	16%
2. PARTUM CARE	1%	1%	1%	1%	0%	1%
3. VACCINATIONS	28%	38%	37%	39%	53%	39%
3.1 Polio	10%	7%	8%	11%	16%	10%
3.2 BCG	2%	2%	3%	8%	9%	5%
3.3 Measles	2%	2%	4%	3%	4%	3%
3.4 Tetanus	8%	22%	14%	8%	14%	13%
3.5 DPT	7%	6%	8%	9%	9%	8%
4. COMUNITY	5%	2%	19%	1%	5%	7%
4.1 Home visit	2%	1%	3%	1%	3%	2%
4.2 Home delivery	0%	0%	0%	0%	0%	3%
4.3 Education	3%	0%	16%	1%	2%	24%
5. CONSULTATION	21%	21%	23%	22%	14%	23%
5.1 ARI	2%	5%	1%	3%	2%	4%
5.2 ADD	2%	1%	1%	2%	0%	2%
5.3 TBC	1%	1%	2%	1%	0%	16%
5.4 General	15%	14%	19%	17%	12%	15%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	0%
7. OTHER	28%	13%	0%	18%	19%	
TOTALS	100%	100%	100%	100%		
Number of just	49%	59%	60%			

ANNEX 10
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
ALTIPLANO SUR AND VALLES CRUCEÑOS HEALTH CENTERS

ACTIVITY	FLORIDA	SR. DE MALTA	MAIRANA	SAN MARTIN DE PORRES	BART. BART. SISA	TOTAL
1. FAMILY HEALTH	13%	35%	16%	28%	8%	100%
1.1. Prenatal care	12%	22%	15%	49%	2%	100%
1.2 Well baby care	13%	38%	16%	24%	10%	100%
2. PARTUM CARE	11%	32%	17%	40%	0%	100%
3. VACCINATIONS	9%	26%	14%	28%	23%	100%
3.1 Polio	13%	19%	11%	29%	28%	100%
3.2 BCG	5%	10%	9%	45%	31%	100%
3.3 Measles	8%	18%	21%	28%	25%	100%
3.4 Tetanus	7%	43%	15%	16%	18%	100%
3.5 DPT	11%	19%	15%	33%	21%	100%
4. COMUNITY	10%	6%	40%	5%	13%	100%
4.1 Home visit	17%	19%	23%	8%	32%	100%
4.2 Home delivery	0%	0%	0%	0%	0%	100%
4.3 Education	1%	0%	10%	1%	1%	100%
5. CONSULTATION	12%	24%	15%	26%	11%	100%
5.1 ARI	7%	35%	5%	18%	7%	100%
5.2 ADD	13%	13%	6%	23%	3%	100%
5.3 TBC	1%	1%	2%	1%	0%	100%
5.4 General	13%	25%	18%	30%	14%	100%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	100%
7. OTHER	24%	22%	0%	33%	21%	100%
TOTALS	13%	27%	15%	28%	17%	100%

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ANNEX 11
ALTIPLANO SUR AND VALLE CRUCEÑOS DISTRICTS
1991 TOTAL COSTS OF HEALTH CENTERS
PERCENTAGE DISTRIBUTION OF EACH FACILITY'S TOTAL COST

ACTIVITY	FLORIDA	SR. DE MALTA	MAIRANA	SAN MARTIN DE PORRES	BART. SICA	5 CENTER AVERAGE
1. FAMILY HEALTH	10%	34%	24%	18%	7%	22%
1.1. Prenatal care	2%	6%	5%	6%	0%	5%
1.2 Well baby care	8%	28%	19%	13%	7%	18%
2. PARTUM CARE	11%	29%	21%	26%	0%	21%
3. VACCINATIONS	31%	7%	22%	22%	67%	25%
3.1 Polio	10%	1%	4%	5%	19%	6%
3.2 BCG	3%	1%	2%	5%	14%	4%
3.3 Measles	2%	1%	3%	2%	6%	3%
3.4 Tetanus	8%	3%	7%	4%	17%	7%
3.5 DPT	8%	1%	5%	6%	12%	5%
4. COMUNITY	9%	6%	12%	10%	8%	9%
4.1 Home visit	5%	4%	1%	5%	5%	4%
4.2 Home delivery	2%	0%	0%	0%	1%	0%
4.3 Education	3%	2%	11%	5%	2%	5%
5. CONSULTATION	32%	22%	22%	23%	16%	22%
5.1 ARI	4%	6%	1%	5%	3%	4%
5.2 ADD	4%	2%	1%	3%	0%	2%
5.3 TBC	5%	1%	7%	2%	0%	3%
5.4 General	18%	12%	13%	13%	12%	13%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	0%
7. OTHER	7%	1%	0%	1%		
TOTALS	100%	100%	100%			
VACC. & CONSULTATIONS ONLY	63%	29%	44%			

ANNEX 12
ALTIPLANO SUR AND VALLE CRUCEÑOS DISTRICTS
1991 TOTAL COSTS OF HEALTH CENTERS
FACILITY DISTRIBUTION OF THE 5 CENTERS' TOTAL COST

ACTIVITY	FLORIDA	SR. DE MALTA	MAIRANA	SAN MARTIN DE PORRES	BART. SICA	5 CENTER TOTAL
1. FAMILY HEALTH	3%	50%	25%	17%	5%	100%
1.1. Prenatal care	3%	46%	25%	25%	1%	100%
1.2 Well baby care	3%	51%	25%	15%	6%	100%
2. PARTUM CARE	4%	46%	24%	26%	0%	100%
3. VACCINATIONS	9%	9%	21%	18%	42%	100%
3.1 Polio	11%	6%	16%	17%	49%	100%
3.2 BCG	4%	6%	14%	24%	52%	100%
3.3 Measles	6%	13%	29%	15%	37%	100%
3.4 Tetanus	8%	15%	26%	13%	38%	100%
3.5 DPT	11%	7%	23%	23%	37%	100%
4. COMUNITY	8%	23%	32%	23%	14%	100%
4.1 Home visit	9%	36%	7%	28%	21%	100%
4.2 Home delivery	50%	0%	0%	0%	50%	100%
4.3 Education	4%	14%	53%	21%	8%	100%
5. CONSULTATION	10%	32%	24%	22%	11%	100%
5.1 ARI	6%	48%	8%	25%	13%	100%
5.2 ADD	15%	38%	11%	33%	3%	100%
5.3 TBC	14%	14%	60%	12%	0%	100%
5.4 General	10%	30%	24%	21%	15%	100%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	100%
7. OTHER	35%	27%	0%	17%	22%	100%
TOTALS	7%	33%	24%	21%	16%	100%

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ANNEX 13
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
VALLES CRUCEÑOS HEALTH POST

ACTIVITY	S. MORO	CUEVAS	PUCARA	CHILON	VALE ABAJO	QUIRU- CILLAS	EL TRIGAL	LOS NEGROS	TOTAL
1. FAMILY HEALTH	11%	17%	12%	12%	14%	21%	1%	12%	100%
1.1. Prenatal care	11%	9%	17%	1%	9%	15%	1%	37%	100%
1.2 Well baby care	11%	20%	10%	17%	16%	24%	1%	0%	100%
2. PARTUM CARE	20%	0%	30%	0%	0%	0%	0%	50%	100%
3. VACCINATIONS	4%	9%	21%	13%	16%	0%	0%	38%	100%
3.1 Polio	2%	11%	10%	14%	17%	0%	0%	46%	100%
3.2 BCG	0%	3%	24%	19%	19%	0%	0%	35%	100%
3.3 Measles	29%	7%	6%	16%	15%	0%	0%	26%	100%
3.4 Tetanus	0%	8%	36%	11%	15%	0%	0%	31%	100%
3.5 DPT	3%	13%	11%	9%	17%	0%	0%	48%	100%
4. COMUNITY	1%	15%	10%	13%	16%	12%	17%	16%	100%
4.1 Home visit	0%	24%	13%	20%	12%	5%	14%	13%	100%
4.2 Home delivery	17%	17%	0%	0%	0%	33%	0%	33%	100%
4.3 Education	3%	0%	5%	3%	22%	22%	24%	22%	100%
5. CONSULTATION	19%	13%	8%	3%	8%	8%	7%	33%	100%
5.1 ARI	13%	7%	6%	12%	8%	16%	9%	30%	100%
5.2 ADD	19%	10%	5%	9%	9%	15%	0%	35%	100%
5.3 TBC	40%	0%	0%	0%	0%	0%	0%	60%	100%
5.4 General	20%	14%	8%	2%	8%	7%	7%	33%	100%
6. REPRODUCTIVE HEALTH	8%	0%	0%	0%	0%	92%	0%	0%	100%
7. OTHER	56%	5%	9%	6%	8%	6%	4%	6%	100%
TOTALS	15%	11%	14%	9%	12%	6%	4%	28%	100%

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ANNEX 14
VALLES CRUCEÑOS DISTRICT HEALTH POSTS
1991 TOTAL COSTS
THE FACILITY DISTRIBUTION OF THE 8 POST DISTRICT TOTAL

ACTIVITY	S. MORO	CUEVAS	PUCARA	CHILON	VALLE ABAJO	QUIRU- CILLA	EL TRIGAL	LOS NEGROS	8 POST TOTAL
1. FAMILY HEALTH	10%	4%	5%	8%	3%	8%	2%	60%	100%
1.1. Prenatal care	6%	1%	3%	0%	1%	4%	1%	84%	100%
1.2 Well baby care	21%	11%	9%	28%	8%	19%	4%	0%	100%
2. PARTUM CARE	27%	0%	16%	0%	0%	0%	0%	57%	100%
3. VACCINATIONS	27%	9%	14%	19%	7%	0%	0%	25%	100%
3.1 Polio	17%	12%	8%	24%	7%	0%	0%	33%	100%
3.2 BCG	0%	3%	18%	37%	12%	0%	0%	29%	100%
3.3 Measles	68%	4%	2%	9%	5%	0%	0%	12%	100%
3.4 Tetanus	0%	10%	34%	23%	7%	0%	0%	26%	100%
3.5 DPT	22%	14%	8%	13%	8%	0%	0%	35%	100%
4. COMUNITY	8%	11%	18%	9%	8%	12%	19%	15%	100%
4.1 Home visit	0%	20%	33%	16%	6%	3%	10%	8%	100%
4.2 Home delivery	28%	8%	0%	0%	0%	17%	0%	46%	100%
4.3 Education	9%	0%	5%	2%	15%	21%	38%	10%	100%
5. CONSULTATION	17%	3%	5%	2%	6%	7%	4%	56%	100%
5.1 ARI	11%	2%	5%	6%	10%	12%	4%	50%	100%
5.2 ADD	15%	3%	4%	5%	6%	16%	0%	52%	100%
5.3 TBC	33%	0%	0%	0%	0%	0%	0%	67%	100%
5.4 General	18%	4%	5%	1%	5%	6%	4%	58%	100%
6. REPRODUCTIVE HEALTH	18%	0%	0%	0%	0%	82%	0%	0%	100%
7. OTHER	10%	3%	8%	4%	42%	6%	0%	15%	100%
TOTALS	16%	5%	8%	7%	7%	7%	4%	46%	100%

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ANNEX 15
VALLES CRUCEÑOS DISTRICT HEALTH POSTS
1991 TOTAL COSTS
PERCENTAGE DISTRIBUTION OF EACH FACILITY'S TOTAL COST

ACTIVITY	S. MORO	CUEVAS	PUCARA	CHILON	VALLE ABAJO	QUIRU- CILLA	EL TRIGAL	LOS NEGROS	8 POST AVERAGE
1. FAMILY HEALTH	13%	17%	13%	24%	9%	25%	9%	28%	21%
1.1. Prenatal care	5%	4%	6%	0%	2%	8%	3%	28%	15%
1.2 Well baby care	8%	13%	7%	23%	7%	17%	6%	0%	7%
2. PARTUM CARE	4%	0%	4%	0%	0%	0%	0%	3%	6%
3. VACCINATIONS	31%	32%	33%	51%	20%	0%	0%	11%	26%
3.1 Polio	4%	8%	3%	12%	4%	0%	0%	3%	5%
3.2 BCG	0%	1%	4%	10%	3%	0%	0%	1%	3%
3.3 Measles	23%	4%	2%	7%	4%	0%	0%	1%	7%
3.4 Tetanus	0%	10%	20%	15%	5%	0%	0%	3%	8%
3.5 DPT	5%	9%	3%	6%	4%	0%	0%	3%	5%
4. COMUNITY	4%	19%	21%	11%	11%	16%	42%	3%	9%
4.1 Home visit	0%	17%	18%	10%	4%	2%	10%	1%	4%
4.2 Home delivery	2%	2%	0%	0%	0%	3%	0%	1%	2%
4.3 Education	2%	0%	2%	1%	8%	10%	31%	1%	4%
5. CONSULTATION	45%	31%	26%	12%	40%	47%	42%	55%	45%
5.1 IRA	4%	2%	4%	5%	9%	10%	6%	6%	6%
5.2 ADD	3%	2%	2%	2%	3%	8%	0%	4%	4%
5.3 TBC	1%	0%	0%	0%	0%	0%	0%	1%	1%
5.4 General	37%	27%	21%	5%	28%	29%	36%	44%	35%
6. REPRODUCTIVE HEALTH	1%	0%	0%	0%	0%	10%	0%	0%	3%
7. OTHER	2%	2%	3%	2%	19%	2%	7%	1%	3%
TOTALS	100%	100%	100%	100%	100%	100%	100%	100%	100%
VACC. & CONSULTATIONS ONLY	76%	63%	59%	63%	61%	47%	42%	66%	70%

**ANNEX 16
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
VALLES CRUCENOS HEALTH POSTS**

ACTIVITY	S. MORO	CUEVAS	PUCARA	CHILON	VALLE	QUIRU- CILLA	EL TRIGAL	LOS NEGROS	TOTAL
1. FAMILY HEALTH	7%	14%	8%	12%	10%	31%	3%	4%	9%
1.1 Prenatal care	2%	3%	4%	0%	2%	7%	1%	4%	3%
1.2 Well baby care	5%	12%	4%	12%	8%	24%	2%	0%	6%
2. PARTUM CARE	0%	0%	0%	0%	0%	0%	0%	0%	0%
3. VACCINATIONS	11%	34%	62%	57%	54%	0%	0%	56%	42%
3.1 Polio	1%	9%	7%	15%	13%	0%	0%	16%	10%
3.2 BCG	0%	1%	6%	8%	6%	0%	0%	5%	4%
3.3 Measles	8%	3%	2%	7%	5%	0%	0%	4%	4%
3.4 Tetanus	0%	11%	40%	19%	19%	0%	0%	17%	16%
3.5 DPT	2%	9%	6%	8%	11%	0%	0%	14%	8%
4. COMUNITY	1%	12%	6%	13%	11%	16%	38%	5%	9%
4.1 Home visit	0%	12%	5%	12%	5%	4%	19%	2%	5%
4.2 Home delivery	0%	0%	0%	0%	0%	1%	0%	0%	0%
4.3 Education	1%	0%	1%	1%	6%	11%	19%	2%	3%
5. CONSULTATION	36%	34%	16%	10%	17%	36%	47%	33%	28%
5.1 IRA	3%	2%	1%	4%	2%	7%	6%	3%	3%
5.2 ADD	2%	2%	1%	2%	1%	4%	0%	2%	2%
5.3 TBC	0%	0%	0%	0%	0%	0%	0%	0%	0%
5.4 General	31%	30%	14%	4%	14%	25%	41%	27%	23%
6. REPRODUCTIVE HEALTH	0%	0%	0%	0%	0%	4%	0%	0%	0%
7. OTHER	45%	6%	8%	8%	8%	12%	12%	2%	12%
TOTALS	100%	100%	100%	100%	100%	100%	100%	100%	100%
% share of just immunizations and consultations	47%	68%	78%	67%	71%	36%	47%	89%	70%

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ANNEX 17
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
VALLES CRUCEÑOS HEALTH POSTS

ACTIVITY	SANTIAGO MORO	CUEVAS	PUCARA	CHILON	VALLE ABAJO	QUIRU- CILLA	EL TRIGAL	LOS NEGROS	TOTAL
1. FAMILY HEALTH	47	72	53	52	60	92	6	52	434
1.1. Prenata care	15	13	24	2	13	21	2	52	142
1.2 Well baby care	32	59	29	50	47	71	4	0	292
2. PARTUM CARE	2	0	3	0	0	0	0	5	10
3. VACCINATIONS	79	172	401	245	312	0	0	730	1939
3.1 Polio	10	48	44	65	76	0	0	206	449
3.2 BCG	0	5	42	34	33	0	0	61	175
3.3 Measles	56	14	12	32	30	0	0	51	195
3.4 Tetanus	0	57	262	81	108	0	0	228	736
3.5 DPT	13	48	41	33	65	0	0	184	384
4. COMUNITY	5	61	41	54	64	47	70	66	408
4.1 Home visit	0	60	33	50	31	13	35	32	254
4.2 Home delivery	1	1	0	0	0	2	0	2	6
4.3 Education	4	0	8	4	33	32	35	32	148
5. CONSULTATION	251	172	101	43	100	107	87	429	1290
5.1 ARI	18	10	8	17	11	22	12	42	140
5.2 ADD	15	8	4	7	7	12	0	28	81
5.3 TBC	2	0	0	0	0	0	0	3	5
5.4 General	216	154	89	19	82	73	75	356	1064
6. REPRODUCTIVE HEALTH	1	0	0	0	0	12	0	0	13
7. OTHER	313	30	49	35	44	36	22	31	560
TOTALS	698	507	648	429	580	294	185	1313	4654

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ANNEX 18
LEVEL AND MIX OF SERVICES BY FACILITY, 1991
ALTIPLANO SUR HEALTH POSTS

ACTIVITY	PATACAMAYA	CALAMARCA	CARACATO	SAPAHAQUI	SICA SICA	5 CLINIC TOTAL
1. FAMILY HEALTH	158	29	79	71	65	402
1.1 Prenatal care	23	15	17	4	19	78
1.2 Well baby care	135	14	62	67	46	324
2. PARTUM CARE	16	0	0	0	16	32
3. VACCINATIONS	717	236	1329	503	2398	5183
3.1 Polio	351	104	423	207	745	1830
3.2 BCG	52	20	0	0	0	72
3.3 Measles	112	23	279	61	834	1309
3.4 Tetanus	102	0	364	146	231	843
3.5 DPT	100	89	263	89	588	1129
4. COMUNITY	45	20	56	62	54	237
4.1 Home visit	21	10	31	44	35	141
4.2 Home delivery	8	0	0	1	0	9
4.3 Education	16	10	25	17	19	87
5. CONSULTATION	336	189	144	112	468	1249
5.1 ARI	140	56	46	45	88	375
5.2 ADD	17	71	12	4	25	129
5.3 TBC	0	0	0	6	0	6
5.4 General	179	62	86	57	355	739
6. REPRODUCTIVE HEALTH	0	0	0	0	0	0
7. OTHER	30	100	80	1	100	311
TOTALS	1302	574	1688	749	3101	7414

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