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# COST OF THE MOTHER BABY PACKAGE IN BOLIVIA

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## Preface

Given the scarcity of funds available to the health sector, it is of great importance to study the distribution and use of those funds.

The purpose of this report is to detect the principal obstacles encountered in the allocation of resources in the health sector. Once identified, the aim is to provide better services to more clients, reducing maternal and infant mortality and improving our country's standard of living. To this end, this report presents the results from a study of the cost of providing maternal and neonatal health care in the five MotherCare districts of Bolivia and compares these with the assessment carried out by the Seguro Nacional de Maternidad y Niñez, the new Bolivian insurance program for maternl and child health.

The health interventions costed in this study are based on the Mother-Baby Package, developed by WHO in 1994, which defines a package of interventions for mothers and newborns essential for the reduction of maternal and neonatal mortality and morbidity in countries such as Bolivia.

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## Glossary

| | |
|---|---|
| **DEASS** | Central de Abastencimientos y Suministros en Salud (Center for Supply and Provision) |
| **ENDSA** | Encuesta Nacional de Demografia y Salud (National Demographic and Health Survey) |
| **IEC** | Information, Education, and Communication |
| **MBPCS** | Mother-Baby Package Costing Spreadsheet |
| **MBP** | Mother-Baby Package |
| **MCB** | MotherCare Bolivia |
| **PHR** | Partnerships for Health Reform |
| **PROISS** | Proyecto Integrado de Servicio de Salud |
| **SNMN** | Seguro Nacional de Maternidad y Niñez (National Mother Child Insurance) |
| **SNS** | Secretaria Nacional de Salud (Ministry of Health) |
| **WHO** | World Health Organization |



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## I. Introduction

The health sector is currently faced with problems such as increasing costs and the inefficient allocation of resources. New ways must be found to achieve greater efficiency in the utilization of health resources, particularly in developing countries that are currently implementing reforms in the sector.

Bolivia has recently decentralized its health system, in an attempt to bring providers and users closer together and generate greater efficiency and quality within the system. Under this new system, the government allocates a certain percentage of national funds to the local governments, which can use them to support recurrent costs or fund infrastructure/capital investments in the social sector.

Given that the decentralization effort is very recent and that almost no data exist on the health sector in Bolivia in general, or on cost in particular, it is very important to analyze the resource allocation in this sector. As economic considerations have become more important in the effort to achieve optimal levels of quality and greater efficiency, new studies should be undertaken to measure the cost of providing services.

The Mother-Baby Package (MBP) was developed by the World Health Organization (WHO) in 1994. It defines a cluster of ten essential health interventions that must be implemented in developing countries in order to reduce maternal and neonatal mortality and morbidity. The package comes with a costing model, the Mother-Baby Package Costing Spreadsheet, that can be used by health planners and managers to assess the cost of such an endeavor.

Since Bolivia has the highest maternal mortality rate in South America (390 maternal deaths per 100,000 live births[1]) and very limited resources in the health sector, it was decided that MotherCare Bolivia, in collaboration with WHO and the Partnerships for Health Reform (PHR), would study the feasibility of the package in the five districts in which MotherCare was operating (Tables 1 and 2). This was done by applying the Mother-Baby Package Costing Spreadsheet (MBPCS) and analyzing and interpreting the results.

The study sought to encourage the use of new instruments like the MBPCS, which can help health planners and local authorities obtain a general idea of the cost of providing the ten basic health interventions for reducing maternal and neonatal mortality and morbidity identified in the MBP. The costing model can also be used by technical and administrative staff to easily and rapidly obtain cost estimates for the maternal-neonatal package at the district, municipal, or departmental level.

[1] National Demographic and Health Survey (ENDSA), 1994. WHO estimates this number to be as high as 650/100,000 live births.

**Table 1. Main Characteristics of the Five MotherCare Bolivia Districts**

| District | Population | Municipalities per District | Communities per District | Health Posts (no.) | Health Centers (no.) | Hospitals (no.) |
|---|---|---|---|---|---|---|
| El Alto | 150,000 | 1 | 1 | 2** | 7 | 1 |
| Santiago de Machaca | 90,882 | 4 | 259 | 20 | 8 | 1 |
| Valle Bajo (Quillacollo) | 270,118 | 8 | 583 | 13 | 17 | 5 |
| Sur Oeste (Capinota) | 44,041 | 3 | 50* | 6 | 5 | 1 |
| Valle Puna | 106,700 | 2 | 302 | 4 | 5 | 2 |
| Total | 661,741 | 18 | 1,195 | 45 | 42 | 10 |

Source: MotherCare baseline study, March 1997
* Estimate using information provided by the National Population and Housing Census, 1992
** The two facilities were actually health centers, but met only health post standards in terms of equipment, staff, treatment provided, etc., and were therefore, categorized as such in this study.

**Table 2. Demographic Indicators of the MotherCare Districts**

| District | Population | Reproductive-Age Women | Pregnancies | Births | Children under 5 |
|---|---|---|---|---|---|
| El Alto | 150,000 | 36,381 | 4,138 | 3,793 | 21,564 |
| Santiago de Machaca | 90,882 | 22,993 | 3,127 | 2,866 | 11,107 |
| Valle Bajo (Quillacollo) | 270,118 | 65,639 | 12,995 | 10,997 | 43,341 |
| Sur Oeste (Capinota) | 44,041 | 10,702 | 1,916 | 1,756 | 6,968 |
| Valle Puna | 106,700 | 25,928 | 5,317 | 4,874 | 18,299 |
| Total | 661,741 | 161,643 | 26,493 | 24,286 | 101,279 |

Source: MotherCare Bolivia baseline study, March 1997

This study evaluates whether the introduction of the MBPCS by municipal governments would give policymakers a better understanding of the funds needed to provide maternal and neonatal health services. In order to determine the costing model's effectiveness, it was necessary to gain a deeper understanding of its strengths and limitations.

The costing model was applied in five districts, El Alto, Santiago de Machaca, Valle Bajo, Sur Oeste, and Valle Puna. For each district, two models were used, one to assess the cost of maternal-neonatal health services currently provided (the "Current Package") and the other to assess the cost of providing care according to the treatment and coverage standards set in the Mother-Baby Package (also called the "Standard Package").

To evaluate the current package, a survey was designed and administered in the five districts in which MotherCare operates. The study also used data from the Ministry of Health and Social Welfare (formerly the National Health Secretariat or SNS), the

Comprehensive Health Services Project (PROISS), and the Annual Operating Plans of the municipalities.

The standard model was based on a Bolivian version of the Mother-Baby Package, using treatment guidelines[2] and standards recently developed by MotherCare Bolivia, the Ministry of Human Development, and the former National Health Secretariat. For interventions not covered by the national treatment protocol, WHO treatment guidelines were used. IEC and training were modeled after existing MotherCare Bolivia programs.

## II. Methodology

Field Work for the costing study was carried out in April and May of 1997.

Cost estimates were generated for the following package of health interventions:

- **Maternity care**, which includes basic antenatal care, normal delivery, and postpartum care;
- Diagnosis and treatment of **pregnancy complications,** such as anemia and STDS, syphilis, and gonorrhea;
- **Essential obstetric care**[3], which covers the management of complications such as eclampsia, sepsis, hemorrhage, obstructed labor, and complications or abortion; and
- **Neonatal care,** which covers infections, pneumonia and asphyxia in newborns.

The Mother-Baby Package Costing Spreadsheet is an Excel-based model that calculates the cost associated with the provision of the above interventions. It consists of eight worksheets, as follows:

1. Demographics sheet
2. Referral sheet
3. Fixed Costs
4. Variable Costs
5. Health Post
6. District Hospital
7. Summary sheet

The first four sheets require the user to enter various data that is then used to generate cost estimates on the last four sheets.

The **Demographic Sheet** contains information about the population and birth rate in the district, estimates for the incidence/prevalence of pregnancy-related complications, and information about the number and capacity of the district's health facilities.

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[2] National Health Care Standards for Women and Newborns (Normas nacional de salud en atencion a la mujer y al recien nacido)

[3] The cost estimates for delivery-related complications do not include the cost of the preceding delivery, which is covered under maternity care.

The **Referral Sheet** contains information on where women are entering the health system, referral patterns, and the average number of client contacts for each of the interventions.

The **Fixed Costs Sheet** estimates the fixed costs associated with the provision of maternal and neonatal health care. These include, building and equipment costs, salary costs of medical and administrative staff, communications, emergency transportation, training, IEC, and social marketing expenditures.

The **Variable Cost Sheet** contains information on the cost of the different treatment inputs required for each of the interventions, such as drugs and medical and lab supplies.

The **Health Post, Health Center, and Hospital Sheets** summarize the costs for the different levels of the health system.

The **Summary Sheet** calculates the total cost of the package. It also provides cost estimates by intervention, input, type of facility, per client, per capita, and per birth.

The costing model was applied in the five MotherCare districts. Current treatment practices were assessed by administering questionnaires at selected health facilities in the five districts. The option of carrying out a census was rejected in favor of sampling, which provided the advantage of fast data collection at a much lower cost. However, since most districts had fewer than 30 facilities, random sampling would have produced results that were unrepresentative. Therefore, the health facilities were selected according to a sample of convenience, and were chosen by experts familiar with the districts to be representative of the individual districts.[4] In all, 35 percent of the health facilities in the five districts were sampled: 14 health posts, 12 health centers, and 7 district hospitals.

In order to estimate the cost of providing maternal-neonatal care according to the new Bolivian treatment protocols, the generic WHO treatment guidelines and standards contained in the model were replaced by the national treatment guidelines and standards.[5]

The following steps were taken in developing the survey:

- Sample selection,
- Questionnaire design,
- Questionnaire pilot test at the health center in El Alto,
- Field work, and
- Data analysis and interpretation.

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[4] See: Meyer, Probabilidad y aplicaciones estadisticas, Pp. 259-60, and W. Stevenson, Estadisticas para administracion y economia, Concetos y aplicaciones, Pp. 185-215

[5] The authors are grateful for help provided by MotherCare staff members Gloria Metcalfe and Dr. Stanley Blanco, as well as by Dr. Jose Antonio Seoane, former director of the Hospital del Niño, and Dr. Alberto Suarez, former director of the Hospital de la Mujer.

The first part of the cost study was a comparison between the cost of maternal-neonatal health services as they were provided at that time (current) and the cost of providing the same interventions according to the new national treatment standards. The cost estimates obtained for the different interventions (current and standard treatment practices) were then compared against the reimbursement rates set by the National Insurance for Maternal and Child Health Program. El Alto II District was chosen for this comparison because it was deemed most representative. Graphs and tables were produced to facilitate the comparison of the different packages studied.

The main differences between the two packages (current and standard) were as follows:

1. *Coverage Rates:* The current model assumed that 60 percent of all pregnant women would receive maternal care services, while the standard used a coverage rate of 90 percent.
2. *Treatment:* The current model was based on treatment practices for the ten interventions as assessed in the surveys, while the standard model used the new national treatment guidelines developed by MotherCare and the Bolivian government.

Table 3 shows the different data sources used for the study. As can be seen, data came from a wide range of sources, which made the data collection process difficult and quite time consuming.

**Table 3. Information Used in the Two Models**

| Information | Current | Standard |
|---|---|---|
| Demographic and epidemiological information | ENDSA, MotherCare baseline study | ENDSA, MotherCare baseline study, WHO |
| Coverage rate | 60% | 90% |
| Treatment practice | Surveys conducted at health facilities | National treatment guidelines |
| Referral rates | Surveys conducted at health facilities | WHO guidelines |
| Salaries | National payrolls | National payrolls |
| Drug and medical supply prices | SNMN, CEASS, and private pharmacies | SNMN, CEASS, and private pharmacies |
| Training | — | MotherCare training budget |
| IEC | — | MotherCare IEC budget |

## III. Analysis of Mother-Baby Package Costing Results

This section begins with the analysis and interpretation of the cost results for the current standard package in the five districts in which MotherCare operates. The results are then broken down by district and briefly compared with the cost assessment of the SNMN.

### *1. Number of Visits per Client and Referral Rates*

The number of maternal and neonatal health-related visits in the five districts at the time of the study was 44 percent lower than the number of visits projected by the standard model (using the new Bolivian treatment and coverage standards). This was mainly due to the envisioned 50 percent increase in coverage (from 60 percent to 90 percent of all pregnant women) and the increased number of visits recommended for some of the interventions under the new treatment standard. The number of 'current' visits per intervention often fell short of the number of visits required to provide optimal care. This was either a consequence of a lack of knowledge on the physicians' part or the unwillingness of the patient to return for further treatment once she felt better.

The difference in the number of total visits between the two packages differed from intervention to intervention. For maternity care, the difference was very large. This was mainly a consequence of the proposed increase in coverage, as well as the increased number of visits per client (the new national treatment guidelines suggest a minimum of four antenatal care visits per pregnant woman and a mandatory postpartum checkup). The differences are small for some of the other interventions, such as the management of neonatal problems, sepsis, and anemia. In the case of neonatal problems, the increase in the number of newborns treated is compensated by a decrease in the average number of visits required for treatment under the new standard.

The survey provided the following data on where pregnant women first seek care. (Table 4)

**Table 4. First Contact with the Health System**

| | Health Post | Health Center | Hospital |
|---|---|---|---|
| Total (all five districts combined) | 15% | 35% | 50% |

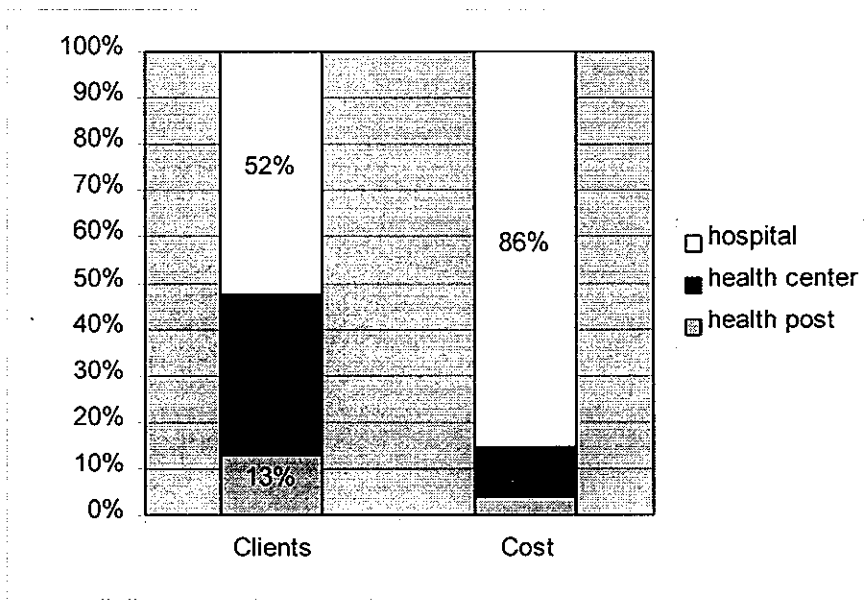
Source: MotherCare cost study

These numbers show that even though the majority of maternal health problems may not require treatment at the hospital level, most women in Bolivia choose to seek care at that level, and thus, bypass health posts and health centers.

Graph 1 shows the relationship that exists between the total number of clients and the total cost of the package for all five districts combined. While only 52 percent of all clients are treated at the hospital level, 86 percent of all costs are incurred at this level. This is due to two factors. One is the high fixed cost (infrastructure, equipment, personnel) a hospital has in comparison to a health post or health center. In addition,

hospitals usually treat the more complicated cases that can not be handled at the primary care level and require greater use of medical staff time, drugs, and other inputs. The health post level, which treats 13 percent of all clients, only represents 4 percent of total costs.

**Graph 1. Number of Clients and Cost by Type of Facility in Percentages (all five districts combined)**




## 2. *Total Cost of the Package*

To provide the 'current' level of maternal-neonatal care in the five districts cost US$1,876,8331 or US$2.84 per capita. In order to provide maternal-neonatal health care according to the new national standards, an additional annual investment of US$2.6 million, or an additional $3.99 per capita, would have to be made.

This is comparable to the figure cited in the 1993 *World Development Report* (World Bank), which found a $US4 per capita investment for maternal care to be among the most cost-effective investments in health, in terms of disability-adjusted life years (DALY) saved. Another estimate can be found in *Making Motherhood Safe*[6], in which the estimated cost of reducing maternal mortality ranged from $2 in a weak health system to just above $6 in a more developed health system.

Tables 5 and 6 show the cost of the current and standard packages for the five districts. The following analysis concentrates mainly on the per capita cost, since the districts' widely varying population sizes made a comparison of total cost impractical.

[6] A. Tinker, Koblinsky, M., *Making Motherhood Safe*, World Bank Discussion Paper No. 202, 1993

(Quillacollo with a population of 20,000 is almost six times as large as Capinota, the smallest of the districts).

**Table 5. Summary of Current, Standard, and Additional Costs by District**
(US$)

| | Current cost of maternal-neonatal care | | Cost of providing maternal-neonatal care according to standard | | Cost difference between current and standard package | |
|---|---|---|---|---|---|---|
| District | Total cost | Cost per capita | Total cost | Cost per capita | Total cost | Cost per capita |
| El Alto | 413,914 | 2.76 | 830,541 | 5.54 | 416,627 | 2.78 |
| Santiago de Machaca | 238,706 | 2.63 | 666,194 | 7.33 | 427,488 | 4.70 |
| Valle Bajo | 827,050 | 3.06 | 2,088,408 | 7.73 | 1,261,358 | 4.67 |
| Sur Oeste | 150,568 | 3.42 | 334,817 | 7.6 | 184,249 | 4.18 |
| Valle Puna | 246,593 | 2.31 | 595,123 | 5.58 | 348,530 | 3.27 |
| Total | 1,876,831 | 2.84 | 4,515,083 | 6.83 | 2,638,252 | 3.99 |

**Table 6. Average Cost per Client by Facility per District**
(US$)

| District | Health Post | Health Center | Hospital |
|---|---|---|---|
| El Alto | 15.98 | 10.22 | 62.64 |
| Santiago de Machaca | 4.60 | 5.20 | 68.00 |
| Valle Bajo | 2.31 | 4.00 | 18.85 |
| Sur Oeste | 8.77 | 30.38 | 42.34 |
| Valle Puna | 6.23 | 5.59 | 37.90 |

While Capinota shows the lowest total cost for the current package of maternal health services, on a per capita basis it actually spends the most (US$3.42). One reason for this is that Capinota has a very dispersed population and poor infrastructure, and thus, 12 facilities for a population of 45,000. Sacaba, which has a population that is 2.4 times as large as Capinota's, only has 11 facilities and spends the least, at US$2.31 per capita.

What would happen if these districts provided care according to the specifications of the new guidelines? Quillacollo would have to spend the most, both in absolute terms and per capita. It also would have the largest additional cost. This is because the district, which already provides health services to the largest population, would be most affected by the proposed increase in coverage rate, from 60 percent to 90 percent of all pregnant women. In order to provide services to all the new clients, it would be necessary to greatly increase the number of facilities, leading to a large increase in the fixed costs.

## 2.1 *Current cost of providing maternal and neonatal health care*

In the five districts, at all levels of the health system, the greatest demand is for maternity care, family planning, and management of neonatal problems. The majority of costs are incurred for maternity care 55% percent), management of neonatal problems (18 percent), and abortion complications (8 percent). Maternity care, which includes antenatal care, delivery, and postpartum care, makes up a large proportion of total costs, mainly due to the high utilization of these services. The other two are costly because they require a large amount of drugs and supplies. A woman with abortion complications might require a large amount of drugs and supplies, i.e., oxygen and a blood transfusion, while a neonate might need to be incubated for a prolonged period of time. There are also a large number of women and newborns who require the interventions.

The most expensive inputs were salaries, (48 percent of total expenses), drugs (13 percent), and medical supplies (12 percent).

## *2.2 Cost of providing maternal and neonatal health care according to new national treatment standards*

The standard model projects the greatest demand for the same interventions: Maternity care, family planning, and management of neonatal problems. The most expensive interventions are maternity care (52 percent of total cost), neonatal problems (10 per cent), and abortion complications (9 percent). In terms of inputs, salaries make up 46 percent, infrastructure and depreciation, 11 percent, and drugs 9 percent.

The per capita costs of maternity care, treatment of neonatal problems, and hemorrhage as they were provided at the time of the study, were $1.56, $0.51, and $0.23, respectively. Treatment of eclampsia and gonorrhea had the lowest per capita costs at $0.10 each, mainly due to their low prevalence (0.5 percent and 1 percent, respectively), and in the case of gonorrhea, the lowest treatment cost per case.

If the above interventions were provided according to the new national treatment standards, the cost per capita for each of the interventions would increase. The cost of maternity care, for instance, would increase to $3.57, the treatment of abortion complications to $0.98, and family planning, to $0.66 per capita.

The largest increase in cost would be for maternity care. This was mainly because it was the most comprehensive intervention in the package, encompassing antenatal, delivery, and postpartum care, and also because there was the largest demand for this intervention. Treatment of abortion complications, family planning, and hemorrhage would also require large additional investments if they were to be provided according to the new standard.

Salaries, infrastructure, and supplies were the most expensive input categories on a per capita basis. This was due to the fact that a large proportion of the funds the government put into the health sector were spent on the salaries of clinical and administrative

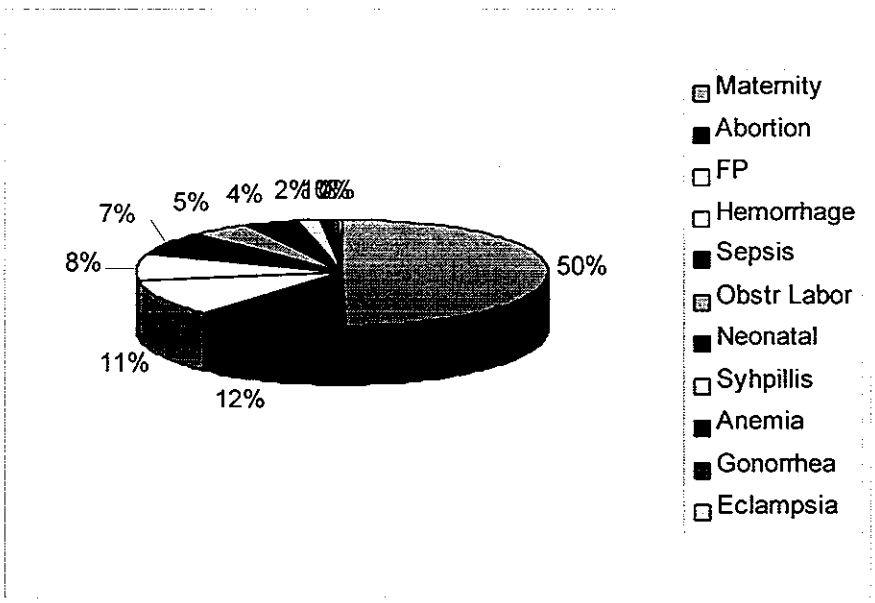
personnel, the purchase of land, and the construction of facilities, and not on drugs and lab supplies. The standard package proposed an increase of 52 percent in salaries, 9.8 percent in infrastructure, and 9.1 percent in drugs.

### *2.3 Additional cost*

Maternity care would require the largest additional investment if it was to be provided according to the new standards, due to the large increase in coverage (from 60 percent to 90 percent of all pregnant women) and the improved quality of the services (at least four antenatal visits, delivery attended by skilled personnel, and a postpartum check-up for every woman). Fifty percent of the total additional cost was be incurred in the provision of maternity care (Graph 2). For some interventions such as gonorrhea treatment and the management of eclmapsia, the adoption of the new coverage rate and treatment standards did not result in major cost increases, since the incidence of these complications was very low.

Eleven percent of the additional funds needed would go towards family planning (mainly because the proposed increase in contraceptive prevalence, from around 15 percent to 25 percent, would lead to a large increase in the number of women who required family planning services). Sepsis (9 percent of the total increase) and the treatment of abortion complications (12 percent) would require more funds mainly because current treatment was substandard.

**Graph 2. Additional Cost by Intervention**

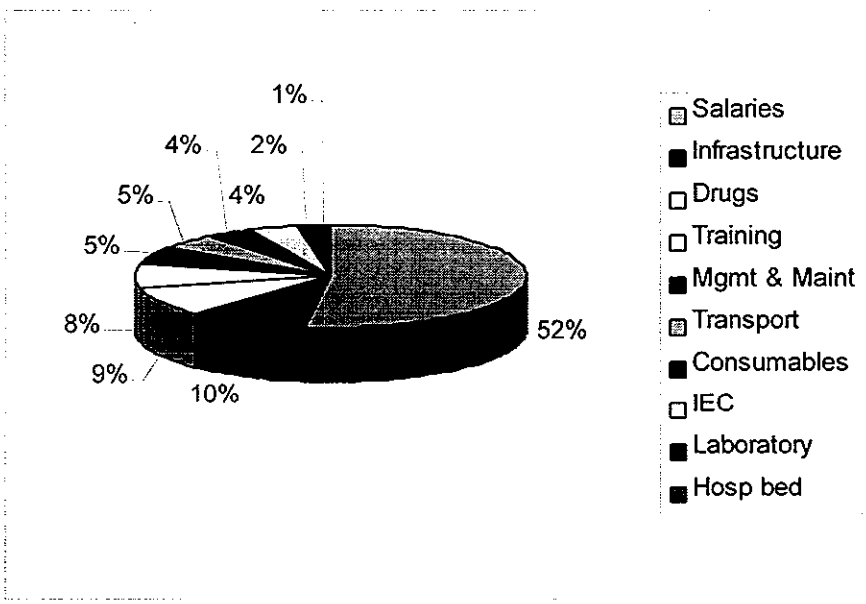


In terms of input, salaries made up 52 percent of the additional cost, mainly because it was assumed that the increased coverage, from 60 percent to 90 percent, would make it necessary to increase medical staff providing maternal and neonatal health services. (Graph 3)

The model assumes that facilities are currently working close to 100 percent capacity. In order to accommodate a 50 percent increase in the number of clients, new facilities would have to be built and new staff hired and trained. It is probable that this assumption was not correct and the health system was actually able to absorb a large percentage of the new clients without having to hire new staff or build new facilities.

Since infrastructure costs made up a substantial part of the additional cost, a sensitivity analysis was performed, which assumed that existing facilities were able to deal with the increased client load. For the district of El Alto, this led to a decrease in cost from US$5.54 to $5.19.

**Graph 3. Additional Cost by Input**
(percent)




If one assumes that current facilities *and* current staffing levels were sufficient to absorb the increased number of clients, costs would be reduced even further.

### *2.3a Strengths of the Mother-Baby Package Costing Spreadsheet*

The model allows for the fast and easy generation of cost estimates. The cost estimates generated reflect the level at which the complications were treated, i.e., whether treatment was provided at the health post, health center, or hospital level. For this reason, the

model is a very useful tool for program planners in the health sector, enabling them to allocate resources and skilled personnel more efficiently.

### *2.3b Limitations of the Model*

Some of the information that is required to run the model is difficult to obtain. This is especially true for some of the epidemiological information. Information on capital and maintenance costs of health facilities and the salaries of medical staff may also be difficult to obtain.

## *3. Sensitivity Analysis*

The analysis was based on the assumption that coverage would increase by 50 percent, from 60 percent to 90 percent of pregnant women. Given that this goal is not easy to achieve, Tables 7 and 8 show how the cost estimates would change if one assumed a smaller or no increase in coverage.

**Table 7. Cost of the Mother-Baby Package by Coverage Rate**
(US$)

| Treatment | Current Practice | New Standard Practice | | |
|---|---|---|---|---|
| Coverage Rate | 60% | 60% | 75% | 90% |
| El Alto | 2.76 | 3.62 | 4.09 | 5.54 |
| Santiago de Machaca | 2.63 | 4.55 | 5.48 | 7.33 |
| Quillacollo | 3.06 | 5.22 | 6.19 | 7.73 |
| Capinota | 3.42 | 5.82 | 6.78 | 7.60 |
| Sacaba | 2.31 | 3.95 | 4.42 | 5.58 |
| Total | 2.84 | 4.60 | 5.37 | 6.85 |

**Table 8. Cost Difference**
(US$ per capita)

| District | New treatment only, same coverage (60%) | New treatment, 25% increase in coverage to 75% | New treatment, 50% increase in coverage to 90% |
|---|---|---|---|
| El Alto | 0.86 | 1.33 | 2.78 |
| Santiago de Machaca | 1.92 | 2.85 | 4.70 |
| Quillacollo | 2.16 | 3.13 | 4.67 |
| Capinota | 2.40 | 3.36 | 4.18 |
| Sacaba | 1.64 | 2.11 | 3.27 |
| Total | 1.76 | 2.53 | 4.01 |

## IV. The Mother-Baby Package and the *Seguro Nacional de Maternidad y Niñez*

Recognizing that excessive centralization lies at the heart of the inefficiency of the national health system, Bolivia recently began a series of reforms in the health sector.

Perhaps the most important reform was the introduction of the Population Participation Law (*Ley de Participacion Popular – LPP*) in 1994, which led to a revenue sharing arrangement by which 20 percent of national treasury revenues are now controlled by municipal governments. The municipalities are allowed to set their own social service priorities and to allocate the LPP funds according to those priorities, within a general framework established by the law. The most restrictive aspect of the law is the requirement that 85 percent of the LPP revenues be used for infrastructure/capital expenditures, leaving 15 percent which may be used to support recurrent costs in the social sector.

Another decree that went into effect in early 1997 stipulates that roughly 3 percent of the funds that are controlled by the municipalities be used to support the costs of a maternal and child health insurance scheme, the *Seguro Nacional de Maternidad y Niñez (SNMN)* (National Insurance for Maternal and Child Health). The ambitious stated goals of the insurance plan are "to reduce maternal mortality by 20 percent and under-five mortality by 25 percent in two years." In order to achieve this, the insurance plan provides a free package of maternal and child health care to all pregnant women and children under five in Bolivia. Under the Seguro, facilities are reimbursed by the municipalities for costs incurred in the provision of maternal and child health services, which enables the facilities to provide the services to clients free of charge.

Critical to the success of such an insurance scheme is that it is self-sustaining, i.e., that the reimbursement rates adequately reflect the costs of the facilities that are providing the services. For this reason, the current SNMN reimbursement rates were compared with the cost estimates obtained for the different interventions.

While there is considerable overlap in the type of interventions provided by the two packages, there are also some differences. The SNMN, which has a wider focus, includes, for example, management of childhood illnesses such diarrheal and acute respiratory infections, interventions. These are not included in the Mother-Baby Package, which only includes treatment for newborns up to the first week. The Mother-Baby Package, on the other hand, contains some interventions, such as management of abortion complications, severe anemia, and STDs, as well as family planning services, which are not covered under the SNMN.

The SNMN reimbursement rates were calculated to only cover variable treatment costs, such as the cost of drugs, supplies, and hospitalization. Facilities do not receive any reimbursement for fixed costs, such as infrastructure expenses and salaries.

For this reason, the comparison includes only the variable costs of the intervention that were part of both packages, as follows:

- Maternity care (antenatal, delivery, and postpartum care),
- Cesarean section (obstructed labor),
- Eclampsia,
- Hemorrhage,
- Sepsis, and
- Neonatal complications.

**Table 9. Comparison of SNMN and Mother-Baby Package**

| National Insurance for Maternal and Child Health | Mother-Baby Package |
|---|---|
| Includes health care provided to pregnant women and children up to age 5 | Includes only care provided to pregnant women and newborns (up to 1 week) |
| Interventions covered include acute diarrheal and respiratory infections, but not abortion complications, severe anemia. or family planning | Excludes management of childhood diseases such as ARI and ADD, but includes management of abortion complications, severe anemia, STDs, and family planning |
| Calculates costs on a per case basis | Calculates costs on a per case basis, as well as at the facility and district levels |
| Does not include fixed costs such as infrastructure and salaries | Includes infrastructure and salary costs |
| Assumes same treatment cost at the different levels of the health system | Differentiates treatment costs at the different levels |
| Lab costs costed separately | Lab costs included in treatment cost |

Source: Ministry of Health, *Boleitn Salud Informativo* No 18, 1997 and MotherCare

**Graph 4. Difference between Actual Treatment Costs and Reimbursement Rates**

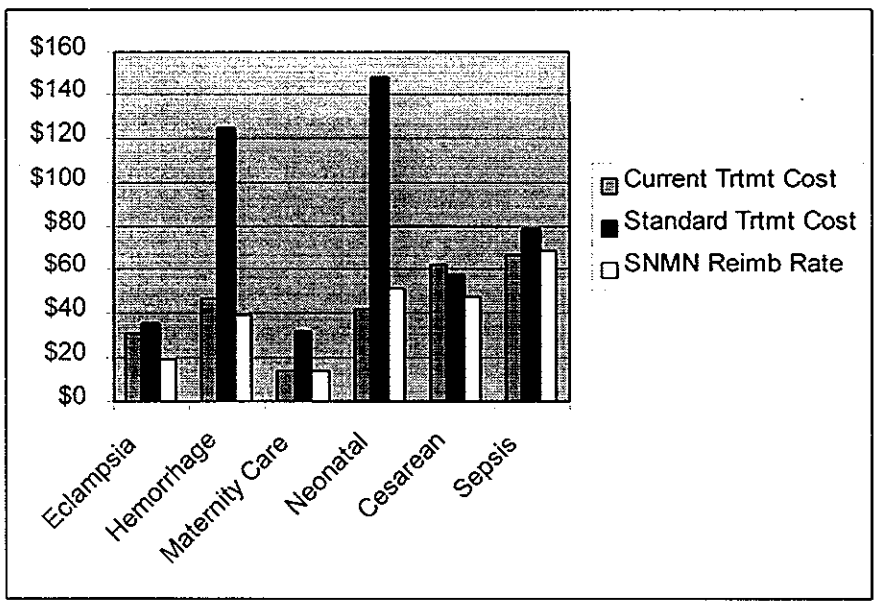


Table 10 reinforces the points made above. The treatment of eclampsia, for instance, is reimbursed at only $19, while the cost of current treatment was $31, and the cost of treating eclampsia according to the new treatment standards is even higher, at $39. A Cesarean section will cost the hospital $58 or $62, but is only reimbursed at $48. The fact that the reimbursement rates do not cover the actual cost of treatment to the hospital has negative effects on the patient. Most hospitals do not have enough drugs and supplies on hand, forcing patients to purchase items at private pharmacies, which should normally be covered and paid for by the National Insurance. Administrative and bureaucratic problems, such as hospital pharmacies that are only open at certain hours, aggravate this problem.

**Table 10. Difference between Costs and Reimbursement Rates**

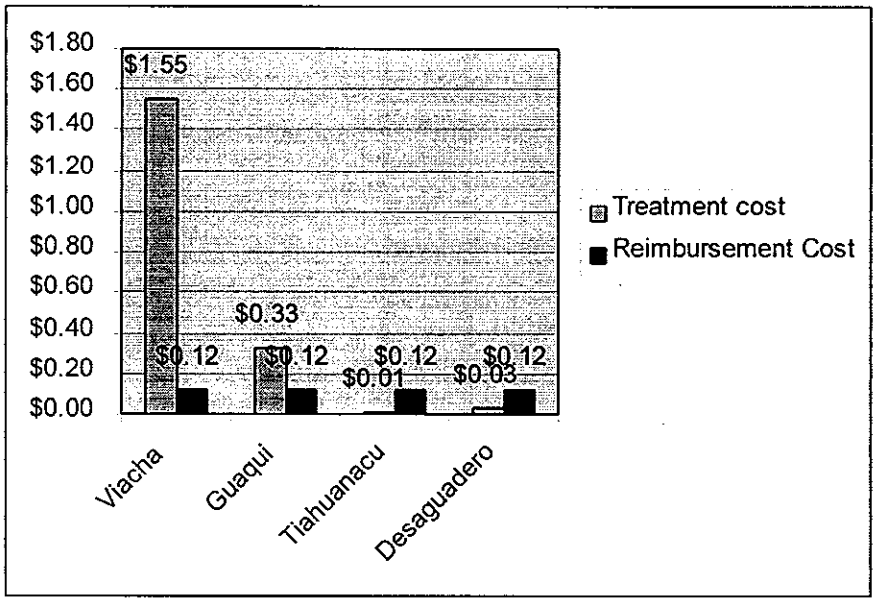
| Intervention | Avg. Cost per Client (current treatment practice) | Avg. Cost per Client (standard treatment practice) | SNMN Reimbursement Rate | Difference SNMN – Current Treatment Practice | Difference SNMN – Standard Treatment Practice |
|---|---|---|---|---|---|
| Eclampsia | $31 | $ 36 | $19 | -$12 | -$17 |
| Hemorrhage | $47 | $124 | $39 | -$ 8 | -$85 |
| Maternity care | $14 | $ 32 | $14 | -- | -$ 8 |
| Neonatal | $42 | $148 | $51 | +$ 9 | -$97 |
| Cesarean | $62 | $ 58 | $48 | -$14 | -$10 |
| Sepsis | $67 | $ 79 | $69 | +$ 2 | -$10 |

Source: Ministry of Health, *Boletin Salud Informativo* No. 18, Pp. 4-10 and MotherCare

A comparison of costs and reimbursement rates was also done at the municipal level. For the district of Santiago de Machaca a comparison was undertaken between the current package and the valuation of the intervention as determined by the SNMN (Graph 5).

The funds that the municipalities receive from the national government to pay for the insurance scheme are allocated to them on a per capita basis. In 1996, the four municipalities in the district of Machaca were allocated $0.12 per capita for expenses related to maternal and child health.

**Graph 5. Difference between Costs and Reimbursement Rates by Municipality**
(US$ Per Capita)




Based on SNMN data and cost study data

Graph 5 shows a comparison between the reimbursement received through the SNMN and the actual cost incurred in the provision of the package in the different municipalities. For the municipalities of Guaqui, Tiahuanacu, and Desaguardero, reimbursement funds exceed actual cost. However, there is a large gap between the reimbursement funds received by Viacha and the cost incurred in providing maternal and child health services. This is because the first three municipalities only have first level health facilities. Any complicated (and therefore, resource-intensive and costly) cases are referred to Viacha, which is the only municipality in the district with a hospital. While Guaqui, Tiahunacu, and Desaguardero only have a few, or in the case Desaguadero, only one health facility, Viacha has 16 health posts, 5 health centers, and 1 hospital. Since SNMN funds are allocated based on the population of the district, districts that attract a large number of health care clients from other districts due to their superior health system are at a disadvantage when it comes to reimbursement.

The Mother-Baby Costing Model should be used by policy makers in the Ministry of Health to arrive at better estimates of the fixed and variable costs that are incurred at the individual facilities, and thus, be able to assign funds in a more efficient manner.

## V. Conclusion

The study led to the following conclusions:

- For developing countries such as Bolivia, the Mother-Baby Package Costing Spreadsheet can be a useful tool in the allocation of scarce sector resources.

- The fact that the model provides cost estimates for the different levels of the health system, i.e., that it takes into account whether the interventions are provided at the health post, health center, or hospital level, makes it even more useful to health planners. In a fast and simple manner, it provides cost estimates for maternal and newborn health services at the different levels of the health system, enabling planners to allocate resources more efficiently.

- Most of the costs were incurred providing maternity care, management of neonatal complications, and hemorrhage. A large part of the money spent in the health sector goes towards salaries of medical and administrative staff, as well as the construction of facilities. Smaller shares go toward the purchase of drugs and lab supplies, training, and IEC.

- In 1996, the funds that the municipalities were allocated for maternal and newborn health care costs through the SNMN insurance scheme amounted to approximately US$0.80 per capita. This fell far short of covering the cost of maternal and child health care in the districts. For this reason, it is necessary that new forms of financing be found.

The application of the Mother-Baby Package Costing Spreadsheet led to the following conclusions:

- At the time of the study, the five districts were spending about $2.84 per capita on maternal and neonatal health care. To provide care according to the new treatment standards developed by MotherCare Bolivia and the Ministry of Health would cost about 2.4 times as much ($6.83), or an additional annual expenditure of $3.99 per capita.

- Maternity care presents the largest cost factor (due to the comprehensiveness of the intervention, which includes antenatal, delivery, and postpartum care, and the large number of women requiring this intervention). Up to 64 percent (Machaca) of the additional cost are incurred in the provision of maternity services. In terms of inputs, salaries represent the largest share of additional cost, up to 59 percent (El Alto) of the total cost.

- For several of the interventions, the reimbursement rates set by the SNMN are not even high enough to cover 'current' treatment costs, despite the fact that in some cases the treatment did not meet minimum quality standards. The difference between the reimbursement rates and the cost of treatment provided according to standard treatment guidelines is even larger. (This study only looked at the cost incurred at the basic district hospital. It can be assumed, however, that the treatment costs at hospitals at the tertiary level are even higher.)

- The variable treatment costs differ substantially between the different health facility levels, but SNMN reimbursement rates are the same for health posts, health centers, and hospitals. This means that hospitals and municipalities with a larger number of higher-level facilities (such as Viacha) are the ones that lose the most money. The

difference between incurred costs and reimbursement is much smaller for health posts, health centers, and municipalities that have only primary care facilities (like Guaqui, Tihuanacu, and Desaguadero).

- The Mother-Baby Package Costing Spreadsheet could be a helpful tool for the SNMN to set priorities, and thus, realize a better allocation of resources.

- The Mother-Baby Package Costing Spreadsheet should be applied at the central, as well as local government level, in order to help technical and administrative personnel simply and rapidly obtain cost estimates for maternal and neonatal health services at the district, municipal, and departmental levels.