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**THE COST OF THE BREASTFEEDING PROMOTION PROGRAM
IN THE GUILHERME ALVARO HOSPITAL OF SANTOS, BRAZIL**

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ACRONYMS

AIDS	Acquired Immuno-deficiency Syndrome
BFPP	Breastfeeding Promotion Program
HGA	Hospital Guilherme Alvaro
INAN	National Institute of Food and Nutrition
MOH	Ministry of Health
SUS	Unified and Decentralized Health System

EXECUTIVE SUMMARY

The breastfeeding program at the Hospital Guilherme Alvaro (HGA) in Santos, Brazil is one of the best examples of breastfeeding support services in the Latin American region and perhaps the world. This report describes the breastfeeding promotion program at HGA and presents cost estimates of the breastfeeding activities at HGA and a comparison or "control" hospital. Differences in the types, quantities and costs of resources used in maternity services of the two hospitals are identified and evaluated with the aim of isolating and quantifying the incremental costs of HGA's breastfeeding promotion program, compared with maternity services in a typical hospital. Components of the program at HGA that are compared include breastfeeding activities in prenatal care and counseling, labor and delivery, and post-partum services. A range of cost estimates for HGA have been developed which reflect different program scenarios, including a non-medical school model in which nurses provide some services currently provided by medical residents.

The specific activities of the HGA program include:

- Daily group discussions with mothers in the prenatal care waiting room,
- Early initiation of breastfeeding while the mother is still on the birthing table,
- Education and discussions with small groups of mothers in the hospital shortly after they have delivered, and
- Postnatal ("Thursday afternoon") breastfeeding clinic.

The estimated costs of the breastfeeding activities (in US dollars) are as follows: \$8.74 per birth in the control hospital, and between \$11.09 to \$11.94 at HGA. The major cost component in both hospitals' breastfeeding programs is labor (95 and 92 percent, respectively). The distribution of resources across prenatal, in-hospital and postnatal activities shows the greatest emphasis in both hospitals is on activities in maternity wards, although relatively more emphasis is placed on postnatal activities at HGA. Taking into account savings attributable to the HGA breastfeeding program as compared with the control hospital program, the net incremental costs at HGA range from \$1.63 to \$2.48 per birth. Sixty percent of these additional resources are devoted to the postnatal clinic (80 percent for labor and 20 percent for space and pamphlets).

When estimates are made of savings generated from changes made in practices at HGA since 1975 (a year when approximately half of all infants were given formula), the net incremental costs of the breastfeeding program at HGA are around \$-0.01 (net savings) to \$0.84 per birth.

This study is part of a larger series of analyses on the costs, quality, coverage and cost-effectiveness of breastfeeding promotion in maternity services in Latin America (Sanghvi et al., 1995).

I. INTRODUCTION

The Latin America and Caribbean Health and Nutrition Sustainability contract sponsored by the United States Agency for International Development has conducted a set of studies of hospital-based breastfeeding promotion programs in three Latin American countries--Brazil, Mexico and Honduras. One of the main purposes of these studies was to measure the cost, quality, coverage, and effectiveness of hospital-based breastfeeding promotion interventions.

This report presents a description of the breastfeeding program of the Hospital Guilherme Alvaro (HGA) of Santos, Brazil. The report also compares the provision of prenatal care and counseling, labor and delivery, and post-partum services at HGA to those provided at a control hospital, Hospital dos Estivadores, which does not have an organized breastfeeding promotion program. The central purpose of comparison is to identify and evaluate differences in the types, quantities and costs of resources used to provide these services in the two hospitals, with the aim of isolating and quantifying the costs of HGA's breastfeeding promotion program. Hospital dos Estivadores was selected as the control hospital because it is similar to HGA in terms of size and the socio-economic characteristics and health status of its clientele.

II. HOSPITAL GUILHERME ALVARO

A. Overview of the study setting

Hospital Guilherme Alvaro is a public hospital located in the City of Santos, in the State of São Paulo in southern Brazil. The hospital is owned and operated by the Government of the State of São Paulo. The hospital has a total of 160 beds, 24 of which are in the Maternity Department. In 1992 HGA had nearly 6,000 admissions, provided about 120,000 ambulatory visits and had about 1,600 deliveries. Recent service provision and performance statistics are provided in Table 1.

The original structure of HGA was a home and surrounding farm which were donated to the City of Santos in 1911 to serve as an isolation facility for the treatment of yellow fever and tuberculosis. Several additional buildings have been added to the original complex in the past 20 years.

TABLE 1
HOSPITAL GUILHERME ALVARO
SELECT SERVICE PROVISION AND PERFORMANCE STATISTICS

	1992	1991	1990	1989	1988
Ambulatory Visits	122,385	91,484	118,770	108,944	59,995
Hospital Admissions	5,898	5,655	7,370	6,878	6,114
Average Length of Stay (# of Days)	7.0	7.1	6.6	7.0	8.0
Occupancy Rate (%)	74.8	64.7	79.0	80.7	74.5

In 1967 the hospital was transformed into a general hospital, with maternity, general medicine, surgical and pediatric departments. In 1970, HGA became one of two clinical sites in Santos for training students in pediatrics. In 1973, the Faculdade de Ciências Médicas de Santos was established, and since that date HGA has been a teaching hospital with clinical sites for training residents and for teaching medical students in obstetrics, general medicine, surgery, and pediatrics.

Since its founding as a yellow fever and tuberculosis isolation center, HGA has always provided care free of charge to all patients. This has resulted in the hospital's historically being regarded as a hospital for the poor. The hospital retains this reputation even today, as HGA is said to still provide care to the poorest segment of the population in the Santos region.

Within the State Government health care system, HGA is a regional referral hospital serving an 8-county region which includes 18 maternity hospitals, with a total of 397 maternity beds. From its inception as a general hospital, HGA's pediatric and maternity departments have served as regional referral centers, though the hospital also handles non-referral, non high-risk pregnancies. There was a two-year hiatus (1988-1990), however, when the hospital's case load was restricted to high-risk cases.

The City of Santos has one of the highest rates of prevalence of Acquired Immuno-deficiency Syndrome (AIDS) in a country which has the third most reported cases of AIDS in the world. HGA is recognized as having one of the leading AIDS treatment programs, and AIDS specialists from around the world, including the U.S., have visited the facility. Twenty-three of HGA's beds are presently dedicated to AIDS patients, and a new building which is to be exclusively dedicated to AIDS patients is currently under construction.

B. The Organizational Structure of HGA

The organigram of HGA is presented in Annex 1. Although HGA has had a breastfeeding program for more than 17 years, it was only 3 years ago that the hospital developed a formal structure, the Lactation Center, for coordinating the majority (but not all) of the Hospital's breastfeeding-related activities. Prior to development of the Center, the Breastfeeding Program's activities were developed, coordinated and carried out by the Pediatrics Department.

The Lactation Center was founded in 1990. The Center is sponsored by the Fundação Lusiada, the Unified and Decentralized Health System (SUS), the National Institute of Food and Nutrition (INAN) of the Ministry of Health (MOH) and the Pan American Health Organization/World Health Organization.

The Lactation Center is officially staffed by three physicians, all of whom are pediatricians, and a secretary. Two of the physicians are assigned to the Center on a full-time basis; the third has a half-time appointment. The Center is housed in space that formerly was allotted to the Pediatrics Department to use as a conference/seminar room. The fact that the Department agreed to allow its space to be used to house the Center testifies to the very close identification and working relationship that all members of the Pediatrics Department, physicians and non-physicians alike, have with the Center. The Department continues to use the Center's space to meet its seminar room needs as well.

As the organigram demonstrates, the Center has yet to become part of the formal structure of HGA. Functionally, the Center crosscuts several different areas of the Hospital; it is involved in the provision of some inpatient services, some outpatient general pediatric services and some outpatient specialty pediatric services, the most distinct being the Thursday afternoon breastfeeding outpatient clinic.

Brazilian law states that the official organigram of all State agencies must be established by, and can only be changed by, national or state law (depending upon which jurisdiction the facility is in). The most recent official organigram for HGA does not contain any mention of the Lactation Center.

The Maternity Department of HGA consists of 28 beds organized into 7 distinct functional areas. There are 4 general wards, each containing 4 beds; a surgical ward with 5 beds; an isolation ward for patients with infectious diseases, including AIDS, that has 4 beds; and a critical care unit with 3 beds.

Although the Maternity Department accounts for only 18 percent of HGA's total beds, in 1992 it accounted for more than twice that share of total hospital admissions and had an occupancy rate that exceeded the HGA total by 16 percent. Other indicators of the relative significance of the Maternity Department to HGA covering the 1987-1992 period are presented in Table 2.

More general statistics on the number and types of births and deliveries for the 1984-1992 era are presented in Table 3.

TABLE 2
HOSPITAL GUILHERME ALVARO
INDICATORS OF HOSPITAL SERVICE PRODUCTION
(TOTAL HOSPITAL AND THE MATERNITY DEPARTMENT)

	1992	1991	1990	1989	1988	1987
ADMISSIONS						
Hospital Total	5,898	5,655	7,370	6,878	6,114	
Maternity Dept.	2,289	1,672	2,245	1,961	1,586	1,447
Maternity as % of Hosp. Total	39%	30%	30%	29%	26%	
AVERAGE LENGTH OF STAY						
Hospital Total	6.99	7.14	6.661	7.04	7.96	
Maternity Dept.	4.05	3.94	3.68	4.34	4.91	4.39
Maternity as % of Hosp. Total	58%	55%	56%	62%	62%	
OCCUPANCY RATE						
Hospital Total	74.77	64.68	79.04	80.71	74.50	
Maternity Dept.	86.56	62.02	78.44	80.02	63.93	52.35
Maternity as % of Hosp. Total	116%	96%	99%	99%	86%	

C. The HGA Breastfeeding Promotion Program

Dating from the year it was transformed into a general hospital, HGA has had a rooming-in policy. The following year, 1975, it initiated a more comprehensive breastfeeding program, which included all of the major services/activities that still characterize the Breastfeeding Promotion Program (BFPP) today. The program was, and remains, a pioneer in the field.

TABLE 3

**HOSPITAL GUILHERME ALVARO
BIRTH AND DELIVERY CHARACTERISTICS, 1987-1992**

	1992	1991	1990	1989	1988	1987	1986	1985	1984
A. Total Number of Births									
Newborns	1,553	1,142	1,572	1,417	1,237	1,102	1,266	1,218	1,516
Stillborns	50	47	54	51	57	37	29	33	44
Neonatal Deaths	20	37	42	24	18	28	25	18	22
Totals	1,623	1,226	1,668	1,492	1,312	1,167	1,320	1,269	1,582
B. Percentage Distribution of Births by Year									
Newborns	95.7%	93.1%	94.2%	95.0%	94.3%	94.4%	95.9%	96.0%	95.8%
Stillborns	3.1%	3.8%	3.2%	3.4%	4.3%	3.2%	2.2%	2.6%	2.8%
Neonatal Deaths	1.2%	3.0%	2.5%	1.6%	1.4%	2.4%	1.9%	1.4%	1.4%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%
C. Annual Growth Rate in Total Number of Births									
	—	-26.5%	37.7%	-9.9%	-12.7%	-10.9%	14.9	-3.8%	24.5%
D. Annual Total Number of Births Relative to 1984									
	102	75	104	93	82	73	84	80	100
E. Distribution of Deliveries by Type									
Normal	1,046	758	945	808	686	609	739	645	810
Cesarean	348	295	453	468	388	421	338	329	429
Forceps	195	109	210	170	151	148	217	245	289
Total	1,589	1,162	1,608	1,446	1,225	1,178	1,294	1,219	1,528
Normal	65.8%	65.2%	58.8%	55.9%	56.0%	51.7%	57.1%	52.9%	53.0%
Cesarean	21.9%	25.4%	28.2%	32.4%	31.7%	35.7%	26.1%	27.0%	28.1%
Forceps	12.3%	9.4%	13.1%	11.8%	12.3%	12.6%	16.8%	20.1%	18.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

The specific activities of the program introduced in 1975 included:

- Daily group discussions with mothers in the prenatal care waiting room,
- Early initiation of breastfeeding while the mother is still on the birthing table,
- Education and discussion with small groups of mothers in the hospital shortly after they have delivered, and
- The Thursday afternoon breastfeeding clinic.

Only one major element of the BFPP was introduced subsequent to 1975. This component consists of a series of norms designed to facilitate and promote the breastfeeding of children wherever they or their mothers are being treated within the hospital. Annex 2 of this report contains a copy of all of HGA's norms pertaining to breastfeeding practices and standards.

Two common and prominent themes in the HGA BFPP are positive reinforcement and the effort to work whenever possible with groups of mothers. The program has a "group" philosophy: it believes that there is a "culture of mothers" and that culture can and should be taken advantage of to provide mothers with positive reinforcement and to make the program's efforts more effective. In part, this approach is thought to be important because many of the physicians are males and have never experienced pregnancy and childbirth, and cannot, therefore, fully understand or empathize with the women. The group approach provides mothers with time to interchange ideas and experiences to make the information they are picking up more acceptable to them. The mothers can show one another directly and in a very straightforward manner how to breastfeed or resolve problems they are encountering and come to constitute role models for one another. This, in turn, is something of an empowering experience, as it reduces the mothers' reliance on physicians and other medical care professionals: the mothers learn that they can obtain good, solid advice and assistance from one another and not just from health professionals. In addition, by mixing women and babies of different ages and different experiences, the group approach provides hope to women who are having some difficulties--whether they be emotional or physical problems. Finally, the group discussion meetings have something of a festival atmosphere. They become an important social event for the mother, which encourages her to attend the clinic regularly and provides her with emotional support. The BFPP philosophy maintains that it is critical not to just provide technical support, but also emotional support, to pregnant women and new mothers. The group approach, supplemented with positive reinforcement, is the key mechanism for doing so.

1. Rooming-in

Even before the BFPP began, HGA established a policy of keeping babies with their mothers as soon after birth as was feasible. Unlike in some hospitals, however, babies are not exclusively kept in the mothers' beds. Instead, the use of bassinets was continued. A bassinet is kept next to each bed in each of the Maternity Department wards, and while the babies spend a considerable amount of time with the mother in the mother's bed, the mother has the option of putting her baby in a bassinet whenever she chooses to do so.

In 1988 a national law was passed in Brazil promoting the policy and practice of rooming-in. Dr. Jayme Murahovschi, Director of the Lactation Center of Santos, played an important role on the expert committee that drafted the law for the Brazilian National Congress. Rooming-in is now the norm in hospitals throughout Brazil.

2. Daily Group Discussions with Mothers in the Prenatal Care Waiting Room

Each day in the outpatient department of HGA there is a prenatal care clinic. Each day, one of the non-physician, professional staff of the BFPP leads a one-half hour group discussion about breastfeeding. At the particular discussion I attended, there were 26 pregnant women, 3 husbands and 3 "other support" persons. The atmosphere was very informal, relaxed and supportive. Nine of the women actively participated in the discussion. Virtually all of the women present chatted with their neighbor about some aspect of the discussion. The number of prenatal consultations provided by HGA in each of the last 6 years is presented in Table 4.

TABLE 4
HGA PRENATAL VISITS

	1992	1991	1990	1989	1988	1987
First Visits	783	232	697	1,210	377	1,270
Return Visits	2,400	1,711	2,440	2,846	1,498	1,011
Total Visits	3,183	1,943	3,137	4,056	1,875	2,281
Average No. Of Visits/Person:	4.1	8.4	4.5	3.4	5.0	1.8

3. Early Initiation of Breastfeeding While the Mother is Still on the Delivery/Birthing Table

Generally, babies born in HGA--whether they are vaginal or Cesarean-section deliveries--are put to the breast while the mother is still on the delivery table. The only exception to this rule is when either the mother or the baby is ill. Relative to other hospitals which have not adopted this practice, HGA has experienced a significant reduction in the need for and use of oxytocin. This reduction has been realized, despite the fact that 50-60 percent of HGA births are to high-risk mothers referred to HGA from other facilities. Only about 30 percent of HGA births involve the use of oxytocin, compared with the 70 percent rate reported at Hospital dos Estivadores.

At HGA, after the delivery and the initial breastfeeding of the infant, the baby is usually separated from its mother for a period of about one hour. This separation occurs in order to enable cleaning of the baby and to provide the mother with some time for rest and recuperation. Thereafter, absent health problems, the mother and baby are reunited for the remainder of their stay in HGA.

According to HGA staff, the average length of stay for an obstetric case in the Guilherme Alvaro Hospital is from 2 to 4 days, with a normal, vaginal delivery usually slated for a 48-hour stay and a Cesarean section for a 72-hour stay.

HGA staff estimate that roughly 20-25 percent of all births are by Cesarean section. This, the staff reports, is low by Brazilian standards, which, according to other documentation is commonly as high as 50 percent and runs as high as 87 percent (the control Hospital dos Estivadores has a 45 percent rate). According to HGA staff, the major reason the Cesarean rate is as high as it is in their facility is that Guilherme Alvaro is a regional referral center, and a disproportionately large share of its obstetric cases involve high-risk women. Staff report that between 50 and 60 percent of HGA obstetric cases are referred to the hospital from the surrounding 8-county region.

4. Leading Group Discussions of Mothers in the Hospital Shortly after They Have Delivered

Usually the day after they have delivered, small groups of from 2 to 5 mothers meet with a non-physician professional (generally a nutritionist or a social worker) in one of the rooms within the maternity department that also doubles as a supply and student teaching room. The meeting is very informal; the new mothers are in their hospital gowns, some of them are usually breastfeeding, most of them usually have their babies with them or the baby may be sleeping, and the staff person is generally attired in shorts and a sleeveless blouse. The purpose of the meeting is to discuss in an informal, open and mutually supportive setting, their first experiences breastfeeding their new baby and to talk about problems they should anticipate and what to do about them should they be encountered. The sessions last from 15

minutes to one-half hour.

5. The Postnatal (Thursday Afternoon) Breastfeeding Clinic

Every Thursday afternoon the Pediatrics Department holds what is referred to as the "breastfeeding clinic". The clinic is open to only those mothers with children who are less than 6 months of age and who were born at HGA. The clinic is limited to children less than 6 months old and only those born at HGA because the clinic sees between 80 and 100 patients during this 3-4 hour period and that, according to Department staff, approximates its capacity. Children who are less than 6 months of age who were born elsewhere are treated in the general pediatric outpatient clinic, which is held daily.

This clinic focusses on and strongly advocates exclusive breastfeeding. The Thursday afternoon clinic, however, is more than just a breastfeeding clinic. The afternoon commences with a pediatrician and one or more of the non-physician professionals of the BFPP leading a group discussion of breastfeeding which readily evolves (as intended) into a discussion of a wide variety of specific problems being encountered by the mothers. This group discussion takes place in a 10 by 15 meter classroom in which the chairs have been rearranged into something approximating a circle.

Following the discussion, which generally lasts one-half hour, all of the mothers together with their babies are seen in consultations. Prior to the consultation, each baby's length and weight are measured and plotted on their growth chart, and their diapers are checked to determine whether or not they are being exclusively breastfed. The staff does not inform those mothers who are not exclusively breastfeeding that it is aware of their using some or only breast milk substitutes. The staff (specifically one of the two pediatricians) does, however, target these mothers, and it spends more time explaining the advantages of exclusively breastfeeding their baby during its first 6 months of life. The staff maintains that it does this very tactfully, without "bullying" the mother and without even letting onto the mother that they know that she is not exclusively breastfeeding her child.

There is a grouping of six consultation rooms which are used for the Thursday afternoon clinic. All of the 5th year medical students who are in the pediatric rotation participate in the Thursday afternoon clinic. Four students and two residents are assigned to each consultation room, and mothers, together with their babies, are seen in pairs (part of the "positive mutual reinforcement" discussed below). Each mother and baby is seen by 2 students and one resident, with one student performing the examination, the other student recording observations on the baby's medical record charts, and the resident supervising. In addition, two pediatricians circulate throughout the afternoon to oversee the entire process, to troubleshoot and to provide encouragement and simply to help out.

The students compute the height and weight gain since the baby's last visit, to see if growth and development have been adequate; perform a standard physical examination; provide

vaccinations; assess and discuss any health problems the child may have or may have been having since its last visit; and discuss breastfeeding with the mother. The average consultation--beyond the initial weighing and measuring of the babies which is performed by personnel in the waiting room just prior to the individual consultation--last about 15 minutes. About two-thirds of the consultation, roughly 10 minutes, is devoted to breastfeeding.

The Thursday breastfeeding clinic, however, is much more than "just" a breastfeeding clinic; it is a combination of well-baby clinic and a sick-baby clinic, with particular emphasis on growth and development, vaccinations, and especially breastfeeding. In addition, with the intention of providing the mother with an opportunity for "complete, one-stop-shopping," a family planning clinic is held just prior to the breastfeeding clinic. Thus the Thursday afternoon clinic includes all 6 of the services that the World Health Organization recommends be provided to newborns and their mothers.

After all of the mothers and babies have been seen at the Thursday breastfeeding clinic, all of the students, residents and the pediatricians get together to discuss their experiences of the afternoon. The purpose is to broaden the experiences, learning, assessment skills and understanding of the students.

The BFPP staff feel that the Thursday afternoon clinic is a very important teaching forum where fifth year medical students doing their pediatric rotation are inculcated with the role, value and importance of breastfeeding, and particularly with the reliance on exclusive breastfeeding. The BFPP staff believe that the Thursday afternoon breastfeeding clinic experience has played an indispensable role in shaping the breastfeeding-related policies and practices of the hospitals throughout the Santos health region where the graduates of HGA have gone on to work as professionals. An estimated 90 percent of the 18 hospitals in the region have now adopted policies based on the HGA model.

The recommended schedule of visits for post-partum visits is once per week during the first month, once every 2 weeks for the second and third month and once a month for the fourth month and thereafter. In 1991-1992, an average of 44 percent of the mothers giving birth at HGA attended at least one Thursday afternoon breastfeeding clinic. As may be seen in Table 5 below, in 1992, those who attended at least one breastfeeding clinic attended an average of 3.7. Given that 50-60 percent of the deliveries at HGA are to high risk mothers who have been referred from other facilities and that it is thought that most of these mothers return to the referring facility (despite the lack of records to substantiate this), these service provision averages are high. Unfortunately no comparable data are available for women delivering at other hospitals, including the control, Hospital dos Estivadores.

TABLE 5
HGA AMBULATORY BREASTFEEDING CLINIC VISITS

	1992	1991	1990	1989
First Visits	658	531	1,141	317
Return Visits	1,794	1,233	1,945	617
Total Visits	2,452	1,764	3090	934
Average No. Of Visits/Person:	3.7	3.3	2.7	2.9

BFPP staff estimate that 50 to 60 percent of all children seen at the Thursday afternoon clinics live outside of the City of Santos, again reflecting the fact that this is a regional, referral hospital.

6. Hospital-Wide Breastfeeding Norms

The BFPP has established norms to promote the breastfeeding of children wherever they or their mothers are being treated within the hospital. The areas in the hospital most effected by these norms are reported to be the emergency room and particularly the Pediatrics Department. Within the Pediatrics Department this promotion consists of informing patients of the policy, verbally encouraging them, and providing accommodations for the mothers which are amenable to breastfeeding, including smaller rooms with at most three beds and including one large, comfortable chair (not a straight backed office chair) per bed for breastfeeding their children.

In addition, the BFPP attempts to identify all children who are less than 6 months of age and who are not being breastfed and encourages their mothers to begin re-lactating. The re-lactation efforts have been most successful with the very youngest children. The HGA success rate is reported to range between 10 and 20 percent.

D. The HGA Medical School Affiliation

Over the course of their fifth year of medical school, medical students at HGA participate in four different clinical areas: obstetrics, general medicine, surgery, and pediatrics. The students are divided into roughly equal groups of 25-30 persons, and each group works in each of the 4 clinical areas for about 3 months. The pediatrics group breaks down into 3 groups of 7-10 students each, with one group working in the polyclinics, another working in the HGA Pediatrics Department, and the third working with newborns in the maternity ward.

The presence of the medical school at HGA means that the staff-to-patient ratio is considerably higher than it would otherwise be, and is considerably higher than the average hospital.

E. The Evolution of the Breastfeeding Promotion Program

There have been only relatively minor changes in the BFPP of HGA over the course of the program's life span. Most of what currently constitutes the BFPP dates from the inception of the program in 1974. One important reason that there has been so little change is that the program has benefitted from a prescient and very stable core of dedicated professionals.

For more than 20 years, the Pediatrics Department of HGA consisted of a core of 6 persons who had been with the hospital since 1970, very shortly after it became a general hospital. All but one of this core group continues to work at HGA. This continuity of personnel is uncommon in hospitals in Brazil, particularly in public sector hospitals. This remarkable continuity of core staff has probably been a critical factor in the development and continuity of the HGA Breastfeeding Promotion Program. It has resulted in the development and maturation of an institutional philosophy and, given the personalities involved, has been an important contributory factor in shaping the way in which the hospital and the Breastfeeding Promotion Program have developed, have functioned and have continued to mature. The long-term cohesiveness of the program and its key personnel are probably significantly related to the program's being set within a medical school. These are distinguishing characteristics of HGA that have conditioned the HGA BFPP.

HGA had a general nursery for only a few years, from 1968 until 1970. The general nursery was eliminated 23 years ago, with the advent of the practice of rooming-in, prior to the initiation of the BFPP. There still exists, however, a special high-risk nursery for premature and sick babies which contains 8 incubators. The space that was formerly dedicated to the general nursery (an area that measures approximately 20 square meters) is now used as an office and meeting place for teaching students, discussing cases and as a general storage area.

Like most maternity hospitals in Brazil, HGA does not have a milk bank and has never had one. Although several years ago the Government offered HGA's Pediatrics Department support to purchase the equipment resources required to establish a milk bank, the Department turned down the offer. The basis for the Pediatrics Department's decision was its belief that it could not guarantee the safety of the milk without the services (and equipment required) of a microbiologist due to the relatively high and rapidly increasing number of AIDS cases the Department encounters.

One of the changes in the health system introduced by the 1988 Constitution was the regionalization of services. With the establishment of regionalization in 1988, HGA became a regional obstetric referral facility for the Santos region and thereafter, for a period of about two years, saw only high-risk referral cases. The practice of limiting the HGA obstetric caseload to high risk referrals was discontinued in 1990.

1988 also saw the introduction of significant changes in the *Licença Maternidade*, a set of laws establishing the work site-related rights of women who are pregnant or have just given birth. Prior to 1988, all of the training was conducted by and the discussions were led by the three pediatricians. It was not until 1988 that the multi-disciplinary team approach was introduced. The introduction of multi-disciplinary teams was one of several changes introduced in response to changes in the *Licença Maternidade*. Among its various stipulations, the *Licença* ensures women the right to stay home with pay for 4 months following delivery. Thereafter, for another 4 months the *Licença* allows new mothers to take up to 2 hours per workday to perform various tasks directly associated with caring for their newborn (e.g., expressing breastmilk). In addition, the *Licença* establishes new mothers' rights to the services of a social worker, a psychologist, a nutritionist and a speech therapist.

Dating from these changes in the *Licença*, HGA's BFPP has had a team comprised of these 4, non-physician professionals who have been affiliated with the program. They have taken over some of the responsibilities of the pediatricians who were up until that time the only professionals involved in the BFPP. They largely took over responsibility, for instance, of the group discussions with pregnant women seeking prenatal care at the HGA prenatal clinic and the group discussions in the hospital with new mothers shortly after they have given birth.

In 1990 a newly constructed ambulatory care clinic building was opened. According to the head of the Statistics Department of the Hospital, a type of "needs assessment" was performed to determine how best to restructure the outpatient department. This assessment consisted primarily of disaggregating service provision data and analyzing the level of activity by type of clinic/service. On the basis of the breastfeeding clinic's consistently high level of activity--which had gone largely unnoticed up until that time--the site of the breastfeeding clinic was moved to the new facility. Prior to the 1990 move, the daily breastfeeding group discussions in the prenatal clinic were held in a hallway. The former facility (which has since been razed) was an old, dilapidated structure in which the clinic had been held in 3 consultation rooms. The change in the site of the clinic to the much more spacious, well lit and pleasant quarters with 6 consultation rooms facilitated seeing more patients.

Two of the members of the Lactation Center attended the WELLSTART workshop in San Diego in 1990 for 6 weeks. The Lactation Center has since adopted some of the materials obtained from WELLSTART for its own presentations in its programs for training health professionals of other hospitals, medical schools and from other countries. For the BFPP, the biggest impact of the WELLSTART experience on the program is reported to have been the exposure to recent research findings providing further scientific justification for preferring breastfeeding over reliance on breast milk substitutes. These studies, together with the general camaraderie of other participants, renewed the enthusiasm of the BFPP staff who attended.

III. HOSPITAL DOS ESTIVADORES (CONTROL HOSPITAL)

A. Introduction

This study was designed as a comparative analysis of two hospitals, one which has a breastfeeding promotion program, Hospital Guilherme Alvaro, and one which does not, Hospital dos Estivadores. The central purpose of comparing the two hospitals is to identify and evaluate differences in the two hospitals' prenatal care counseling, labor and delivery, and post-partum services that are attributable to the presence/absence of the breastfeeding promotion and thereby to isolate and quantify the costs of the breastfeeding promotion program.

Hospital dos Estivadores was selected as the control hospital because it was thought to be very similar to HGA, particularly in terms of size and the socio-economic characteristics and health status of its clientele.

While the two hospitals have similarities, each retains distinct characteristics. In addition, while both provide birthing services, the content and quality of those and related services--including prenatal care and post-partum care--together constitute a package of delivery-related care which appear to vary substantially across the hospitals. To the extent that these factors and services vary across the two study hospitals, we are comparing the costs incurred to produce different types of services, which undermines the direct comparison of the costs of the two programs, for we are comparing apples to oranges. It is important, therefore, to identify and be cognizant of the differences in the two hospitals. Thus, an effort is made in this study to point out and to discuss such differences, and to note their implications for the cost analysis.

B. Overview of Hospital dos Estivadores

The Hospital dos Estivadores was originally established by the Port of Santos' stevedores' union to provide health care to its members. The hospital encountered severe financial problems in the late 1980s and closed its doors for several months in 1991, subsequently reopening under different ownership and management. The hospital is now owned by the State of São Paulo and is open to the public. The hospital now provides both public and private care, though it is reported that the clientele has yet to change significantly. While there is a significant share of outpatient consultations which are provided on a private basis, the bulk of inpatient care is publicly provided. The principal differences in private and public care are that the private patient is able to choose his/her physician (as they are also able to do at HGA) and that he/she must pay the physician for the care provided.

C. Comparing the Control and Study Hospitals

It was exceedingly difficult to obtain a profile of the Hospital dos Estivadores in terms of the types of patients it treats, the numbers and types of services provided at the hospital, the numbers and types of physicians practicing at the hospital, and the treatment regimens and protocols followed by hospital personnel. For the most part, this difficulty owed to the dearth of systematic information about the hospital, together with several other organizational characteristics of the facility, including:

- its mixed private-public character,
- the absence of treatment protocols and procedure norms, and
- the existence of only highly aggregated service provision statistics.

These characteristics and conditions reflect the lack of organization and quality control at Estivadores and therefore merit elaboration.

The mixed private-public character of Hospital dos Estivadores makes it very difficult to identify the total number of physicians practicing at the facility. The chief of the Maternity Department reported he did not know how many different obstetricians had delivered babies at the hospital in the past year.

Hospital Estivadores has norms for the use of medicines, but there are no treatment or procedure norms. Thus there are no standard treatment protocols or procedures: the way in which a specific patient is treated depends only upon the judgment and practices of his/her particular physician.

While service provision data are maintained for all physicians providing care at Estivadores, ambulatory care visits are simply counted, with no differentiation by type of care provided, by type of physician, or by any characteristic of the patient. Thus, it is not possible to determine the number of women obtaining at least one prenatal or at least one postpartum care consultation, or even the total number of prenatal or postpartum care consultations provided. Moreover, while the ambulatory visit data are maintained on a clinic by clinic basis, they are not even aggregated by month. To obtain the data presented below on Estivadores' total ambulatory care provision required a special request and extraordinary efforts by administrative staff of the hospital.

As a result, it is virtually impossible to compare many aspects of the Estivadores and Guilherme Alvaro Hospitals. The discussion which follows attempts to establish the degree of comparability of the hospitals, but the inherent limitations of this analysis, owing to the

organizational structure of Estivadores--which cannot but be reflected in its continuity and quality of care--should be borne in mind throughout this analysis.

1. Size and Service Delivery

The Hospital dos Estivadores is larger and provides more ambulatory and inpatient care than the Guilherme Alvaro Hospital. Estivadores has 278 beds, nearly 40 percent more than HGA's 160. In Table 6, one can see that since the hospital re-opened, Estivadores' obstetric services delivery has been steadily increasing and appears to have begun leveling out in the past few months, suggesting its service provision level has returned to its normal operating capacity. Because this same pattern is reported to characterize nearly all of the Hospital's services we use linear extrapolations of the last 3 months' data to estimate the Hospital's annual service delivery totals.

**TABLE 6
HOSPITAL DOS ESTIVADORES:
GENERAL SERVICE PROVISION STATISTICS**

	DEC	JAN	FEB	MONTHLY AVERAGE	ANNUALIZED
Ambulatory Care	13,788	18,107	19,620	17,172	206,064
Inpatient Admissions	1,028	822	882	911	10,932
Deliveries	102	122	99	107	1,284

Based on these extrapolations, Hospital dos Estivadores provides approximately 40 percent more ambulatory care and roughly 45 percent more inpatient admissions compared to the Guilherme Alvaro Hospital. While Estivadores is larger and provides more care in general, it is smaller relative to HGA in terms of its obstetric services delivery. Estivadores has about one-third fewer births (1,188 vs 1,589) than HGA, and the proportion of all hospital admissions attributable to women giving birth is one third that of the share of births at HGA (12 percent and 39 percent, respectively). Clearly, labor and delivery are numerically relatively more important activities for HGA.

2. Organization

The organigram of the Hospital dos Estivadores is presented in Annex 3.

3. Obstetric Services

The labor and delivery section of the Maternity Department consists of 6 beds for labor and 3 birthing rooms. Two of the birthing rooms are dedicated to normal births (vaginal deliveries) and the third is dedicated to Cesarean sections.

The average length of stay in the Hospital dos Estivadores for birth varies by type of delivery. Normal deliveries average about 3 days (comparable to HGA), while Cesarean sections have an average stay of 5 days--roughly 2 days longer than the average reported by HGA staff.

Obstetric services are provided by both hospital staff and private physicians. On weekdays, the Maternity Department has 4 staffed positions; 3 obstetrics-gynecology specialists, one of whom is dedicated to providing inpatient care, with the other two providing obstetrics-gynecology ambulatory care, and a single pediatrician. All four of these positions are staffed by *plantonistas*, i.e., physicians who work one day a week for 24 hours. Each of the *plantonistas* splits their single day of work each week between Maternity and one other department.

According to one obstetrician interviewed, physicians typically deliver the babies of about half of the mothers to whom they provide prenatal care. The other half are delivered by whomever is on duty. In light of the lack of treatment norms and protocols, this suggests that the consistency of the advice a mother is likely to receive from physicians regarding breastfeeding may be highly variable. This contrasts sharply with the uniformity of the approach and the message which is the hallmark of the HGA program.

Two Estivadores' Maternity Department physicians reported that they split their outpatient care about evenly between obstetrical and gynecological patients. One physician who was interviewed reported that she devotes an average of about 10 minutes of her typical prenatal consultation (which lasts a total of between 15 and 20 minutes) to breastfeeding.

All 4 of the physicians working in the maternity ward at any particular moment are paid 15,000,000 cruzeiros per month to work 1 day per week for 24 hours. There are 28 such positions for a total of 420,000,000 cruzeiros per month (in mid-February 1993, this was the equivalent of US\$19,091). Absent treatment norms and protocols, the large number of staff physicians working in the Maternity Ward suggests that there may be little consistency in the messages and advice mothers may be receiving from whomever happens to be working at the time the mother comes for prenatal care or when she delivers.

There are a total of 9 non-physician staff who work in the Maternity Department (all shifts included): 2 nurses, 2 auxiliaries and 5 attendants or aides. Their average monthly salaries are: 9,500,000 cruzeiros for the nurses, 5,300,000 for the auxiliaries, and 4,300,000 cruzeiros for the aides (exclusive of their 13th monthly salary).

4. Birth-related and Breastfeeding Practices

As is shown on the following table, a significant proportion of Hospital dos Estivadores' births are by Cesarean section; 45 percent over the past roughly one and one-half years, compared to HGA's rate which is half this level (see Table 7).

Rooming-in is a universal practice in Hospital dos Estivadores, with the exception of cases in which there is a sick baby or mother. Babies who are vaginal deliveries begin rooming-in with the mother about 4 hours after delivery. Those that are Cesarian sections generally begin rooming-in about 6 hours after birth.

While most babies delivered at Estivadores are reported to be breastfed, the use of breastmilk substitutes is still substantially greater at Estivadores compared to HGA. The breastfeeding of an infant at Hospital dos Estivadores is also likely to start significantly later than at HGA. In Estivadores generally the first time a newborn is breastfed is 4 to 6 hours after the birth, usually coinciding with the baby's beginning rooming-in with the mother. HGA's relatively smaller level of purchases of breastmilk substitutes and the associated costs of preparing and distributing them constitute savings generated by the HGA BFPP.

Just as in Hospital Guilherme Alvaro, the use of methergin (ergotrate) is standard with all deliveries at Estivadores. The use of oxytocin (syntocinon), however, is more than twice as common at Estivadores, where it is used in an estimated 70 percent of all births, compared with 30 percent at HGA. The reduced use of oxytocin in HGA is primarily due to the practice of immediately putting the newborn to breast while the mother is still on the delivery/birthing table. The value of the lower average level use of oxytocin, therefore, is an HGA cost savings generated by the BFPP.

TABLE 7
HOSPITAL DOS ESTIVADORES
NUMBER OF BIRTHS BY TYPE AND MONTH

	NORMAL	CESAREAN	FORCEPS	TOTAL
1991				
AUG	3	3	0	6
SEP	2	1	0	3
OCT	17	15	2	34
NOV	25	19	0	44
DEC	16	11	0	27
TOTAL	63	49	2	114
%DIST.	55.3	43.0	1.8	100.0
1992				
JAN	16	11	1	28
FEB	13	13	1	27
MAR	33	15	0	48
APR	37	27	0	64
MAY	22	34	0	56
JUN	30	36	3	69
JUL	24	31	0	55
AUG	44	33	0	77
SEP	42	33	1	76
OCT	31	37	1	69
NOV	34	36	1	71
DEC	50	51	1	102
TOTAL	376	357	9	742
% DIST.	50.7	48.1	1.2	100.0
1993				
JAN	76	46	0	122
FEB	62	36	1	99
TOTAL	138	82	1	221
%DIST.	62.4	37.1	0.5	100.0
AUG 91 - FEB 93				
TOTAL	577	488	12	1,027
% DIST.	53.6	45.3	1.1	100.0

IV. ANALYSIS OF THE COSTS OF THE HOSPITAL GUILHERME ALVARO BREASTFEEDING PROMOTION PROGRAM

Annex 5 presents a discussion of the approach adopted in addressing three less than straightforward methodological issues in developing the cost estimate of the BFPP. A certain amount of judgment calls was involved in designing the particular methodological approach adopted in: (1) identifying the quantities of inputs actually used, (2) in valuating the physical clinic space used in providing BFPP services, and (3) in valuating the time input of the medical students in the Thursday afternoon breastfeeding clinic. By way of brief summary, these issues were addressed in the following manner: (1) reported practices rather than purchase data were used to estimate the quantities of inputs (e.g., formula) actually used, (2) the physical space occupied by BFPP activities that had no alternative use value was assumed to have an opportunity cost of zero, and (3) the value of the time of the fifth year medical students participating in the Thursday afternoon breastfeeding clinic was assumed to be zero. Annex 5 describes the methodological considerations and the rationale involved in selecting the particular approach adopted in addressing each of these issues.

A. Estimating the Labor Costs Involved in the Breastfeeding-related Activities of HGA

Two distinct estimates of labor costs are presented here. The first estimates are comprehensive and include estimates for the costs of all labor involved in breastfeeding-related activities, whether or not they constitute components of the breastfeeding promotion program. The purpose of presenting these more comprehensive estimates is to provide more complete information that is likely to be useful for making international comparisons of the cost of breastfeeding promotion in health systems that are substantially different from that of Brazil. Evaluated in cruzeiros of mid-February 1993 when the exchange rate was 22,000 cruzeiros to US\$1.00, the annual value of these labor costs total 390,696,135 cruzeiros or US\$17,759. The derivation of this estimate is presented in Table 8. The annual and hourly salaries used for each type of personnel are shown in Annex 4.

The second set of estimates includes only those breastfeeding promotion activities that in Brazil--as judged by the control Hospital dos Estivadores--are beyond standard obstetric and pediatric care, and that together constitute the Breastfeeding Promotion Program of Hospital Guilherme Alvaro. In the Brazilian context, it is these second estimates that are the relevant ones for determining the costs of the BFPP. Evaluated, again, in cruzeiros of mid-February 1993 when the exchange rate was 22,000 cruzeiros to US\$1.00, the annual value of these labor costs total 94,316,536 cruzeiros or US\$4,287. The derivation of this estimate is presented in Table 9.

**TABLE 8
HOSPITAL GUILHERME ALVARO
LABOR COSTS OF ALL BREASTFEEDING-RELATED ACTIVITIES**

1. PRENATAL CARE

A. Group Meetings

Daily morning prenatal care outpatient clinic discussions about breastfeeding are held in the outpatient waiting room. The discussions are led by a pediatrician twice a week and by a non-physician professional staff member 3 days per week.

Labor costs/position/hour (cruzeiros) * number of positions * number of hours/day * number of days/week * number of weeks/year = annual costs

Pediatrician costs:	$74,397/\text{hour} * 2 * 1 * 0.5 * 50 = 3,719,850$
Non-physician costs:	$48,405/\text{hour} * 3 * 1 * 0.5 * 50 = 3,630,375$
Group Meetings Subtotal:	7,350,225

B. Individual Patient Consultations

It is estimated that the 10 pediatricians on average each spend about 2 hours/week of their total time devoted to prenatal care advising pregnant mothers about breastfeeding:

$$74,397/\text{hour} * 10 * 2 * 50 = 74,397,000$$

It is estimated that resident obstetricians devote about 2 hours per week discussing breastfeeding in the general outpatient department:

$$74,397/\text{hour} * 2 * 2 * 50 = 14,879,400$$

Individual Patient Consultations Subtotal:	89,276,400
PRENATAL SUBTOTAL:	96,626,625

TABLE 8
HOSPITAL GUILHERME ALVARO
LABOR COSTS OF ALL BREASTFEEDING-RELATED ACTIVITIES
(Continued)

2. IN-HOSPITAL CARE

A. Delivery Room

7 *plantonistas* devote approximately 7 hours per week to initiation of breastfeeding while mothers are still on the delivery table:

$$74,397/\text{hour} * 7 * 1 * 50 = 26,038,950$$

B. Rooming-in

(1) Individual patient consultations

2 pediatricians devote 5 hours per week each for a total of 10 hours/week:

$$74,397/\text{hour} * 5 * 2 * 50 = 37,198,500$$

(2) Mothers' Groups Discussions

1 pediatrician devotes 0.5 hours per week discussing breastfeeding with groups of 3-5 mothers and their babies:

$$74,397/\text{hour} * 0.5 * 1 * 50 = 1,859,925$$

4 non-physician, professional staff members devote 0.5 hours per week discussing breastfeeding with groups of 3-5 mothers and their babies:

$$48,405/\text{hour} * 0.5 * 4 * 50 = 4,840,500$$

(3) 10 auxiliary nurses spend 12 hours per week each working with mothers and their child breastfeeding:

$$26,969/\text{hour} * 12 * 10 * 50 = 161,814,000$$

Rooming-In Subtotal:

$$205,712,925$$

IN-HOSPITAL SUBTOTAL:

$$231,751,875$$

TABLE 8
HOSPITAL GUILHERME ALVARO
LABOR COSTS OF ALL BREASTFEEDING-RELATED ACTIVITIES
(Continued)

3. POSTPARTUM OUTPATIENT CLINIC

A. Thursday Breastfeeding Clinics

(These totals are pro-rated since they include a variety of activities other than breastfeeding which take up 30 percent of the time.)

(1) Individual Consultations

2 pediatricians devote 4 hours per week each:

$$0.7 * 74,397/\text{hour} * 2.5 * 2 * 50 = 13,019,475$$

6 medical residents devote 4 hours per week each:

$$0.7 * 74,397/\text{hour} * 6 * 2.5 * 50 = 39,058,425$$

Individual Consultations Subtotal: 52,077,900

(2) Mothers' Groups

1 pediatrician devotes 0.5 hours per week to lead the Thursday group discussions:

$$0.7 * 74,397/\text{hour} * 1 * 0.5 * 50 = 1,301,948$$

1 non-physician professional devotes 0.5 hours per week jointly leading the group discussions:

$$0.7 * 48,405/\text{hour} * 1 * 0.5 * 50 = 847,088$$

Mothers' Group Subtotal: 2,149,035

Thursday Breastfeeding Clinic Subtotal: 54,226,935

TABLE 8
HOSPITAL GUILHERME ALVARO
LABOR COSTS OF ALL BREASTFEEDING-RELATED ACTIVITIES
(Continued)

3. POSTPARTUM OUTPATIENT CLINIC (Continued)

B. General Outpatient Visits

2 nurse auxiliaries devote 3 hours per week each to discussing breastfeeding issues/problems with mothers:

wages/hour * 6 hours per week * 50 weeks per year =

$$26,969/\text{hour} * 2 * 3 * 50 = 8,090,700$$

POSTPARTUM OUTPATIENT SUBTOTAL: 62,641,263

GRAND TOTAL: 390,696,135

US\$: 17,759

TABLE 9
HOSPITAL GUILHERME ALVARO
LABOR COSTS OF THE BREASTFEEDING PROMOTION PROGRAM

1. PRENATAL CARE

A. Group Meetings

Daily morning prenatal care outpatient clinic discussions about breastfeeding are held in the outpatient waiting room. The discussions are led by a pediatrician twice a week and by a non-physician professional staff member 3 days per week.

Labor costs/hour (cruzeiros) * number of days * number of hours per day * number of weeks per year = annual costs

Pediatrician costs: $74,397/\text{hour} * 2 * 0.5 * 50 = 3,719,850$

Non-physician costs: $48,405/\text{hour} * 3 * 0.5 * 50 = 3,630,375$

PRENATAL CARE SUBTOTAL: 7,350,225

2. IN-HOSPITAL CARE

A. Delivery Room

7 *plantonistas* devote approximately 7 hours per week to beginning breastfeeding while mothers are still on the delivery table:

$74,397/\text{hour} * 7 * 1 * 50 = 26,038,950$

B. Rooming-in

(1) Mothers' Groups Discussions

1 pediatrician devotes 0.5 hours per week discussing breastfeeding with groups of 3-5 mothers and their babies:

$74,397/\text{hour} * 0.5 * 1 * 50 = 1,859,925$

4 non-physician, professional staff members devote 0.5 hours per week discussing breastfeeding with groups of 3-5 mothers and their babies:

$48,405/\text{hour} * 0.5 * 4 * 50 = 4,840,500$

Rooming-In Subtotal: 6,700,425

IN-HOSPITAL SUBTOTAL: 32,739,375

TABLE 9
HOSPITAL GUILHERME ALVARO
LABOR COSTS OF THE BREASTFEEDING PROMOTION PROGRAM
(Continued)

3. POSTPARTUM OUTPATIENT CLINIC

A. Thursday Breastfeeding Clinics

(These totals are pro-rated since they include a variety of activities other than breastfeeding which take up 30 percent of the time.)

(1) Individual Consultations

2 pediatricians devote 4 hours per week each:

$$0.7 * 74,397/\text{hour} * 4 * 2 * 50 = 13,019,475$$

6 medical residents devote 4 hours per week each:

$$0.7 * 74,397/\text{hour} * 6 * 4 * 50 = 39,058,425$$

Individual Consultations Subtotal: 52,077,930

(2) Mothers' Groups

1 pediatrician devotes 0.5 hours per week to lead the Thursdays group discussions:

$$0.7 * 74,397/\text{hour} * 1 * 0.5 * 50 = 1,301,948$$

1 non-physician professional devotes 0.5 hours per week jointly leading the group discussions:

$$0.7 * 48,405/\text{hour} * 1 * 0.5 * 50 = 847,088$$

Mothers' Groups Subtotal: 2,149,036

POSTPARTUM OUTPATIENT CLINIC SUBTOTAL: 88,892,621

GRAND TOTAL: 94,316,536
or US\$: 4,287

B. Estimating the Cost of the Physical Space Used by the HGA Breastfeeding Promotion Program

The only physical space used by the BFPP that has a non-zero opportunity cost are the 6 consultation rooms and the waiting room used in the Thursday afternoon clinic. The waiting room is roughly 110 square meters, and each of the clinical examination rooms measures 3 by 4 meters. Since only 70 percent of the 4-hour Thursday afternoon clinic is devoted to breastfeeding, only 70 percent of this total area of 182 square meters, or 127.4 square meters, constitutes a cost of the BFPP.

The Government of Brazil's estimated cost of constructing a square meter on April 1, 1993 was 35 million cruzeiros. This number was deflated by 30 percent to obtain an estimate of 26,923,077 cruzeiros per square meter in mid-February, to make it comparable in terms of timing to all of the other cost estimates developed in this study. The cost of constructing a 127.4 square meter clinic was estimated at 3,429,990,200 cruzeiros. The clinic, however, only uses this area for 4 hours per week, or 208 hours per year. It is assumed that this space would normally be used for 12 hours a day, Monday through Friday, and for 4 hours on Saturday, for a total of 64 hours per week. Thus the BFPP clinic is estimated to account annually for 6.25 percent of the total available time. If it is further assumed that the building has a useful lifespan of 20 years, and that it annually depreciates by 5 percent of the cost of its construction (replacement cost), it can be estimated that annually the breastfeeding clinic "consumes" 0.3125 percent of the value of the clinic. In other words, the estimated annual value of the space used by the Thursday afternoon clinic is 10.7 million cruzeiros or US\$487.

C. Estimating the Cost of Educational Materials

Data from the exit interviews with mothers (Lutter et al., 1993) were used to estimate the number of brochures/pamphlets distributed. For example, the incremental costs at HGA are calculated by multiplying the number of additional pamphlets distributed at HGA due the program with unit costs of the pamphlets. This equals 63.6% - 40.3% (women who reported receiving pamphlets at HGA and control hospitals, respectively) or 378 women, multiplied by 22,000 cruzeiros (cost per pamphlet), for a total of 8,316,000 cruzeiros. The unit costs of the brochure--22,000 cruzeiros each--were provided by HGA from MOH information. The MOH prints and supplies all public hospitals with these materials.

D. Estimating the Savings at HGA

1. Savings From Breast Milk-Substitute-Related Costs of the HGA

To develop an estimate of the savings related to averted use of breast milk substitutes that HGA was realizing as a result of its BFPP, we first attempted to estimate these costs at Hospital dos Estivadores to obtain an estimate of what such costs would be at HGA, absent the BFPP. The methodological approach used in developing these cost estimates in Estivadores

was prompted by the absence of systematic information about the number of babies breastfed in Hospital dos Estivadores, together with the large and fluid corps of private and public obstetricians and pediatricians providing care in the Maternity Ward which effectively precluded identifying and interviewing all of them in the time available for this study. The approach adopted was to obtain data about the kinds and quantities of breast milk substitutes purchased in the past month and to interview the staff that prepared and distributed the substitutes. Large errors are potentially possible from inaccurate attributions of staff time to a small proportion of bottles prepared for maternity wards. Because exit interviews with mothers reflect more accurately the extent of formula use, and unit costs from HGA are far more reliable than at the control hospital, the estimate was finally developed from HGA unit costs and extent of formula use at the control hospital. This accurately reflects what it would have cost HGA to implement the control hospital's practices. The derivation of this estimate is presented in Table 10.

2. Estimating the Savings of Oxytocin Costs of the HGA

HGA obstetricians interviewed estimated that oxytocin is used in about 30 percent of the births at HGA. Two obstetricians interviewed at Hospital dos Estivadores estimated that oxytocin was used in 65 percent of Estivadores' births. In both hospitals, an average of 2-3 ampoules are used in each birth. In February 1993, a single ampoule of oxytocin cost 5,204.69 cruzeiros. Thus for the average birth (averaged across all births, those involving oxytocin and those without it), the cost of oxytocin is:

At HGA: $0.30 \text{ births} * 2.5 \text{ ampoules/birth} * 5204.69 = 3,903.52 \text{ cruzeiros}$

At Control: $0.65 \text{ births} * 2.5 \text{ ampoules/birth} * 5204.69 = 8,457.62 \text{ cruzeiros}$

Thus the cost savings per birth at HGA average 4,554.10 cruzeiros

Total 1992 oxytocin-related cost savings at HGA were (# of births * savings/birth):

7,236,465 cruzeiros or US\$329

Savings were estimated at each hospital (HGA and control) for changes in program practices since the initiation of breastfeeding programs as well as cross-sectionally, by comparing practices at HGA versus those at the control hospital. In summary:

Current HGA hospital costs for formula and medicated births = $(0.004 * 1623 \text{ births} * \$4.07) + (.3 * 1623 \text{ births} * \$0.98) = 26.4 + 477 = \$ 503.4$

Costs at HGA if control hospital practices are followed = $(0.097 * 1623 \text{ births} * \$4.07) + (.65 * 1623 \text{ births} * \$0.98) = 640.7 + 1033.8 = \$ 1674.5$

Costs at HGA with pre-1975 program hospital practices at current unit costs = $(0.50 * 1623 \text{ births} * \$4.07) + (.65 * 1623 \text{ births} * \$0.98) = 3302.8 + 1033.8 = \$ 4336.6$

Current control hospital costs for formula and medicated births = $(0.097 * 1188 \text{ births} * \$4.07) + (.65 * 1188 \text{ births} * \$0.98) = 469 + 756.8 = \$ 1225.8$

Costs at control with pre-1975 program hospital practices = $(0.50 * 1188 \text{ births} * \$4.07) + (.65 * 1188 \text{ births} * \$0.98) = 2417.6 + 756.8 = \$ 3174.4$

Savings were calculated as follows:

- Comparing current HGA with control practices = $\$1674.5 - \$503.4 = \$1171.1$ or \$0.72 per birth
- Comparing current HGA with pre-1975 HGA = $\$4336.6 - \$503.4 = \$3833.2$ or \$2.36 per birth

Components of savings are as follows: at HGA, materials contribute 82 percent of all savings; at the control hospital, materials contribute 86 percent of all savings.

TABLE 10
SAVINGS FROM HGA'S BREASTFEEDING
PROMOTION PROGRAM

(Compared with practices currently followed at control hospital and compared with practices historically followed at HGA)

Coverage and unit cost assumptions:				
	% Formula use ¹	Cost/infant of formula feeding ² US\$	% Drug use in delivery	Cost/case of medicated del. ³ US\$
Control (current)	9.7		65	
Control (pre-1975)	50.0		65	
HGA Program (current)	0.4	4.07	30	0.9
HGA Program (pre-1975)	50.0		65	

¹ "Current" based on exit interviews with mothers, percent of responses to whether the infant was given formula; "don't know" is treated as formula fed (source: Sanghvi et al., 1994). Pre-1975 based on interviews with HGA staff (neonatology and pediatrics) who worked at the hospital prior to 1975.

² See Table 11; annual breast milk substitute-related costs = US \$ 26.41, and number of infants fed formula per year = 0.4% * 162 births/year = 6.49. Includes materials (formula, bottles) and labor.

³ The cost of medication = US \$ 0.59 (2.5 ampoules * 5204.69 cruzeiros/22,000 cruzeiros per dollar) is from section D.2 p. 29. 40 of the total is added for related materials (syringes, cotton, alcohol) based on Honduras estimates (Phillips, 1994).

**TABLE 11
COMPUTING HGA'S BREAST MILK SUBSTITUTE-RELATED
COST SAVINGS**

SAVINGS:

Comparing current HGA with control practices = $\$1674.5 - \$503.4 = \$1171.1$ or \$0.72 per birth

Comparing current HGA with pre-1975 HGA = $\$4336.6 - \$503.4 = \$3833.2$ or \$2.36 per birth

Comparing current control with pre-1975 control = $\$3174.4 - \$1225.8 = \$1948.6$ or \$1.64 per birth

HGA BREAST MILK SUBSTITUTE-RELATED COSTS

5 bottles per month are used in the nursery. Every day an average of 55 bottles are prepared for the entire hospital = $55 \times 30 = 1,650$ /month. The nursery's share of total bottles prepared each month is: 0.003 or 0.3 percent.

1. LABOR COSTS

It takes two auxiliaries 2 hours each day to prepare and distribute all of the bottles. In February 1993, an auxiliar de servicios earned US\$0.84 per hour, thus the daily total milk preparation costs are: \$3.36

And the daily share of the nursery in these costs is:	\$0.01
which comes to a monthly cost of:	\$0.31
or an annual cost of:	\$3.67

2. MATERIALS COSTS

A. Formula

18 mamadeiras can be prepared from a single can of formula so the monthly preparation of 5 bottles for the nursery costs $5/18 \times$ price per can: 30,555.56 cruzeiros or US\$1.39 thus the annual costs of formula are: 366,666.67 cruzeiros or US\$16.67

TABLE 11
COMPUTING HGA'S BREAST MILK SUBSTITUTE-RELATED
COST SAVINGS
(Continued)

2. MATERIALS COSTS (continued)

B. Baby Bottles

Using the Estivadores' ratio of purchases of bottles to cans of formula dispensed (6 bottles/8 cans), which is the equivalent of $\{6/(8*18)\} = 0.042$ bottles purchased for every 1 bottle feeding dispensed:

Each month the 5 bottle feeding of formula are dispensed in the nursery which requires the purchase of $(0.042 * 5) = .21$ bottles. Thus HGA spends a total of:

	0.21 * 53,000 cruzeiros/bottle:	11,130 cruzeiros or	US\$0.51
Annual bottle costs:		133,560 cruzeiros or	US\$6.07
TOTAL ANNUAL MATERIALS COSTS:		500,227 cruzeiros or	US\$22.74
TOTAL ANNUAL BREAST MILK SUBSTITUTE-RELATED COSTS OF HGA (LABOR AND MATERIALS):			US\$26.41

E. Total Costs and Net Costs of the HGA Breastfeeding Promotion Program

The BFPP has three types of direct costs: labor, which constitute the vast majority of the total, materials (brochures), and the use value of the physical space in which the program is housed. Total direct costs of the BFPP are:

Labor Costs:	US\$4,287
Materials:	US\$ 378
Physical Space Costs (of the Thursday afternoon clinic):	US\$ 487

TOTAL DIRECT COSTS:	US\$5,152

Table 12 provides a detailed estimate of these costs. Table 13 provides a breakdown by input and activity. Table 14 shows the results of the sensitivity analysis using two different estimates for the Thursday clinic's space and salaries.

These costs do not capture the full financial impact of the program, however. As measured by the performance of the control hospital, the BFPP is responsible for reducing some of the costs of its host institution, HGA, which would otherwise have been incurred in the course of providing obstetric services. The two sources of savings identified in this study are the reduced expenditures on breast milk substitutes and the reduced expenditures on oxytocin. **The value of these savings (or cost offsets) is US\$1,171.** Taking into account these savings lowers the overall costs of the BFPP and results in what may be termed its net costs.¹ The mid-February 1993 estimated net total costs of the **Breastfeeding Promotion Program of the Hospital Guilherme Alvaro** are **88,550,880 cruzeiros or US\$4,025.** Table 15 provides the estimated total and net incremental costs of the HGA Breastfeeding Promotion Program.

TABLE 12
TOTAL AND INCREMENTAL COSTS OF HGA BREASTFEEDING ACTIVITIES

	Total Costs Control			Total Costs HGA			Incremental Costs HGA		
	Labor	Mat/space	Total	Labor	Mat/space	Total	Labor	Mat/space	Total
I. Prenatal									
Group mtgs.	0	0	0	7350225		7350225	7350225	0	7350225
Consults.	65348344	0	65348344	89276400		89276400	0	0	0
Subtotal	65348344	0	65348344	96626625	0	96626625	7350225	0	7350225
II. In-hospital									
Delivery room	0	0	0	26038950	0	26038950	26038950	0	26038950
Mat. wards ed.	145672736	0	145672736	205712925	0	205712925	6700425	0	6700425
Pamphlets	0	11594000	11594000	0	24970000	24970000	0	8319498	8319498
Subtotal	145672736	11594000	157266736	231751875	24970000	256721875	32739375	8319498	41058873
III. Postnatal									
Thur. clinic(labor)	0	0	0	54226935	0	54226935	54226935		54226935
Thur. clinic(space)	0	0	0	0	10718718	10718718	0	10718718	10718718
Outpatient	5922213	0	5922213	8090700	0	8090700	0	0	0
Subtotal	5922213	0	5922213	62317635	10718718	73036353	54226935	10718718	64945653
Total Costs/Year:									0
Cruzeiros	616943293	11594000	228537293	390696135	35688718	4263848553	94316535	19038216	113354751
US \$ (@22,000:1)	9861	527	10388	17759	1622	19381	4287	865	5152.5
Total Births/Year	1188	1188	1188	1623	1623	1623	1623	1623	1623
\$/Birth/Year	8.30	0.44	8.74	10.94	1	11.94	2.64	0.53	3.17

TABLE 13
HGA BREASTFEEDING PROGRAM COSTS BY INPUT AND ACTIVITY

	Control	HGA Total	HGA Incremental
Input Breakdown (%)			
Labor	94.9	91.6	83.2
Materials/Space	5.1	8.4	16.8
Total	100.0	100.0	100.0
Activity Breakdown (%)			
Prenatal	28.6	22.6	6.5
In-hospital	68.8	60.2	36.2
Postnatal	2.6	17.1	57.3
Total	100.0	100.0	100.0

TABLE 14
HGA PROGRAM COSTS: IMPACT OF TYPE OF STAFF AND
PROPORTION OF POSTNATAL CLINIC COSTS ATTRIBUTED TO
BREASTFEEDING PROGRAM ACTIVITIES

Assumptions: Value of resident's time equals:	Scenario A Nurses' (51,422/hr)	Scenario B Nurses' (51,422/hr)	Scenario C Physicians' (74,397/hr)	Scenario D Physicians' (74,397/hr)
% time in thursday clinic dedicated to BF activities:	50%	70%	50%	70%
Prenatal	9662625	96626625	96626625	96626625
In-Hospital	256721875	256721875	256721875	256721875
Postnatal				
Th. clinic (labor)	26771704	37480386	38733124	54226935
Th. clinic (materials)	7656227	10718718	7656227	10718718
Outpatient	8090700	8090700	8090700	8090700
Subtotal	42518631	5689804	54480051	73036353
TOTAL (cruzeiros)	395867131	409638304	407828551	426384853
TOTAL (US \$)	17993.96	18619.92	18537.66	19381.13
Cost/birth (US \$)	11.09	11.47	11.42	11.94

TABLE 15
SUMMARY OF UNIT COSTS, INCREMENTAL COSTS
AND NET INCREMENTAL COSTS
(US \$ 1992)

	Scenario A	Scenario B	Scenario C	Scenario D
Current annual control hospital costs/birth (Table 12)	8.74			
Current annual HGA costs/birth (Table 12)	11.09	11.47	11.42	11.94
Compared with hospital practices at control hospital:				
HGA incremental costs/birth ¹	2.35	2.73	2.68	3.20
HGA incremental savings/birth (from Table 10)	0.72	0.72	0.72	0.72
HGA net incremental costs/birth ²	1.63	2.01	1.96	2.48
Compared with pre-1975 practices at HGA:				
Incremental costs/birth ³	2.35	2.73	2.78	3.20
HGA incremental savings/birth (from Table 10)	2.36	2.36	2.36	2.36
HGA net incremental costs/birth (savings) ⁴	(-0.01)	0.37	0.42	0.84

¹ Current annual HGA costs per birth for each scenario (from Table 14) minus current annual control hospital costs per birth (from Table 12).

² HGA incremental costs per birth minus HGA incremental savings per birth.

³ The incremental cost of the breastfeeding program is assumed to be the same as the difference between current control and current HGA costs.

⁴ Incremental costs minus incremental savings.

ANNEXES

ANNEX 1: ORGANIGRAM OF THE HOSPITAL GUILHERME ALVARO

ANNEX 2: BREASTFEEDING NORMS AND ROUTINES OF HOSPITAL GUILHERME ALVARO

ANNEX 3: ORGANIGRAM OF THE CONTROL HOSPITAL DOS ESTIVADORES

ANNEX 4: FEBRUARY 1993 ANNUAL SALARIES, INCLUDING THE 13TH SALARY

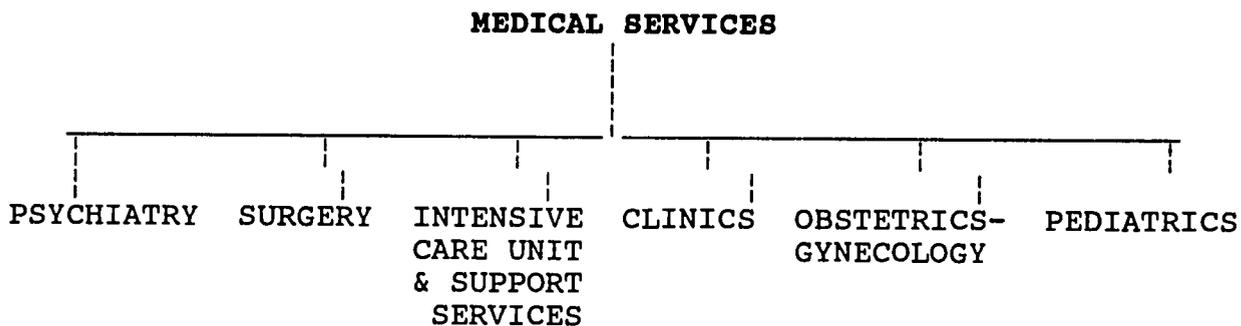
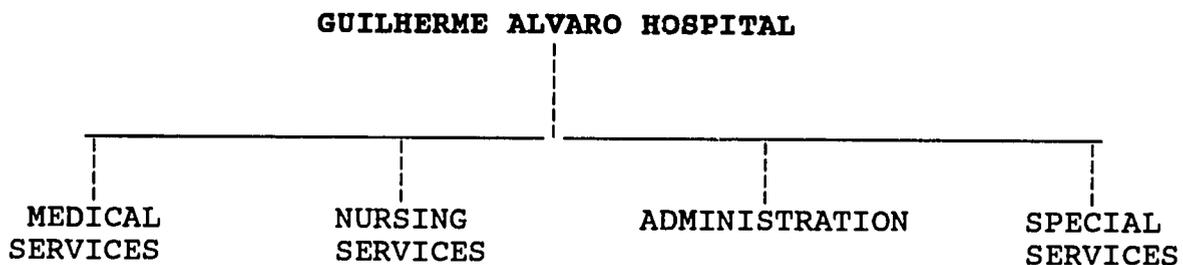
ANNEX 5: SOME OF THE LESS STRAIGHTFORWARD METHODOLOGICAL ISSUES

ANNEX 6: SENSITIVITY ANALYSIS, PROGRAM COSTS AND CAPACITY, SUSTAINABILITY, AND REPLICATION ISSUES AND LESSONS

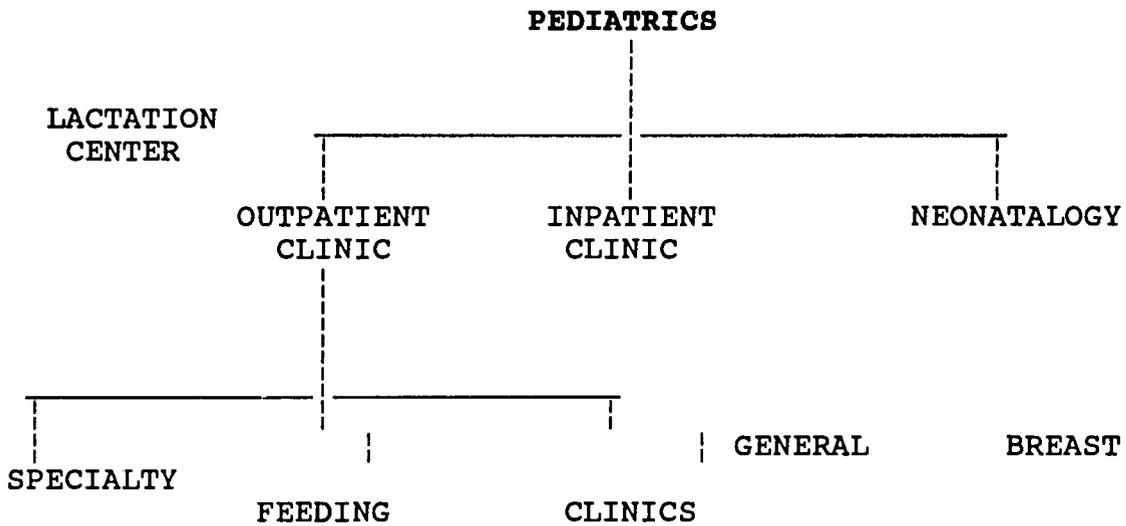
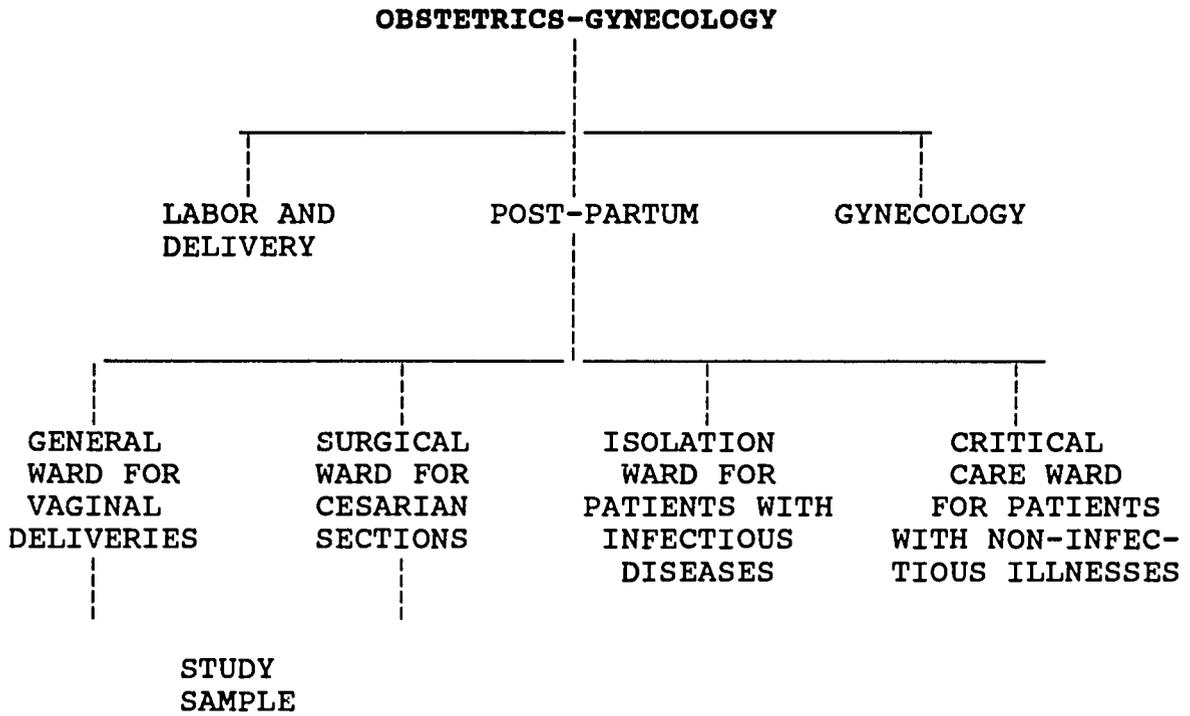
ANNEX 1

ORGANIGRAM OF THE HOSPITAL GUILHERME ALVARO

ORGANIGRAM OF THE GUILHERME ALVARO HOSPITAL



ORGANIGRAM OF THE GUILHERME ALVARO HOSPITAL
(Continued)



ANNEX 2

BREASTFEEDING NORMS AND ROUTINES OF THE HOSPITAL GUILHERME ALVARO

LUSIADA FOUNDATION
SANTOS BREASTFEEDING CENTER

PRENATAL

NORMS

1. In order to prepare themselves for breastfeeding, pregnant women should be given guidance and training in the following areas:
 - a. The advantages of breastfeeding for the mother, the baby and the family, and the consequences of premature weaning.
 - b. The production of milk, maintenance of lactation, manual expressing of breast milk, and conservation and preparation of the expressed milk.
 - c. Preparation of the breasts for breastfeeding.
 - d. Nourishment of the pregnant woman and of the breastfeeding mother.
 - e. The use of drugs and breastfeeding.
 - f. Breastfeeding in the delivery room.
 - g. The importance of rooming in.
 - h. Problems and difficulties in breastfeeding.
 - i. The rights of the mother during breastfeeding.

ROUTINES

1. Obstetricians and/or obstetric nurses should conduct a monthly breast exam of the pregnant woman, following the initial prenatal consultation, to observe the anatomical formation of the nipples and detect adverse formations as well as to guide and train the woman individually with respect to the exercises, techniques and massages necessary to prepare the nipples for breastfeeding.
2. The members of the multidisciplinary team (social workers, psychologists, nurses, pediatricians, obstetricians, nutritionists and phono-audiologists) should evaluate, beginning with the initial contacts with the pregnant woman and as part of her medical history, the attitudes, beliefs, knowledge and experience of the future mother

with regard to child feeding and provide her with individual counselling as regards the promotion and maintenance of natural breastfeeding.

3. The multidisciplinary team should conduct daily meetings, having an average duration of 30 minutes, with the pregnant women in the waiting room of the obstetric clinic to discuss with the future mothers the topics included in the above listed norms.

In these meetings, the health professionals should facilitate the exchange of knowledge and experiences with the pregnant women and stimulate a similar exchange [missing text...].

LUSIADA FOUNDATION
SANTOS BREASTFEEDING CENTER

DELIVERY ROOM

NORMS

1. Within the first half-hour of its existence, every healthy newborn child should be placed together with its mother to suckle, thus promoting "eye-to-eye" and "skin-to-skin" contact between the two.
2. It is desirable for the father to be present in the delivery room during the birth of the baby.

ROUTINES

1. The health professionals present in the delivery room should maintain an atmosphere of support and physical and emotional comfort that will facilitate the intimate contact between the mother and her child immediately following delivery.
2. Sedatives, analgesics and/or anesthetics should be given to a woman about to give birth only after a careful individual evaluation of need and of the consequences for both mother and baby.
3. Clean and dry the healthy newborn child, allowing him to remain together with his mother in the delivery room so that she can hold him and breastfeed him, with the assistance of the team of health professionals.
4. Silver nitrate should be applied [to the eyes of] the newborn child only after establishment of mother-child contact.
5. The baby should be taken to rooming in with the mother.

LUSIADA FOUNDATION
SANTOS BREASTFEEDING CENTER

ROOMING IN

NORMS

1. Every healthy newborn child should remain in the same room with her mother, providing the mother is lucid and able to interact with her baby.
2. Breastfeeding for the newborn child should be made available on the basis of free demand. The first week should be monitored by a trained professional.
3. The use of bottles or other foods, including water and tea, is contraindicated in rooming in.
4. The puerperal woman should be continuously supported and informed about breastfeeding-related matters during her hospital stay.
5. Upon discharge, the mother should receive counselling with regard to the importance of breastfeeding maintenance and be referred for timely counselling during the first week in the breastfeeding clinic until the baby has reached age six months.

ROUTINES

1. The puerperal woman and the newborn child should be taken from the delivery room directly to their room, with the baby to remain at the side of her mother, under the supervision of trained maternity personnel.
2. The team of health professionals should inform the mother that, whenever necessary, the baby should be placed at the breast to suckle with the aid of the nurse auxiliary, whenever she cries, whether during the day or at night. No other bottle or food should be given to the baby.
3. The team of health professionals should be available to provide information, whenever requested, with regard to breastfeeding, the reduced milk reflex, the lactation mechanism, breastfeeding techniques, care of the breasts and manual extraction of milk.
4. The obstetrician or the pediatrician will discharge the mother, and it will fall to a multidisciplinary team, through the participation of the mothers in group dynamics, to strengthen the counselling provided with regard to breastfeeding, by giving her a support pamphlet and a guide for early counselling during the first week in the

breastfeeding clinic or a polyclinic in her neighborhood. The distribution of bottles is prohibited.

LUSIADA FOUNDATION
SANTOS BREASTFEEDING CENTER

BREASTFEEDING CLINIC

NORMS

1. Every newborn child from rooming in should be accompanied from the initial weeks in the hospital clinic up to the age of six months, in order to promote exclusive breastfeeding on demand.
2. All mothers of breastfeeding babies should be supported and counselled so that they will continue to breastfeed until the baby has reached age six months, and should receive guidance with respect to the following topics:
 - The advantages of breast milk.
 - The physiology of lactation.
 - Clarification of taboos.
 - Contraception.
 - Management of breastfeeding.
 - Problems involving babies and mothers
 - Extraction, storage and preparation of breast milk.
3. The growth and development of breastfeeding babies, accompanied in the clinic, should be monitored up to age six months, and the mother should receive the guidance necessary to ensure that the indicators to remain within normal limits.
4. Health problems should be prevented in the babies registered in the breastfeeding clinic by means of appropriate guidance and vaccination and/or by timely detection and treatment.
5. Upon the discharge of the baby, at age six months, mothers should receive guidance with respect to the weaning diet.

ROUTINES

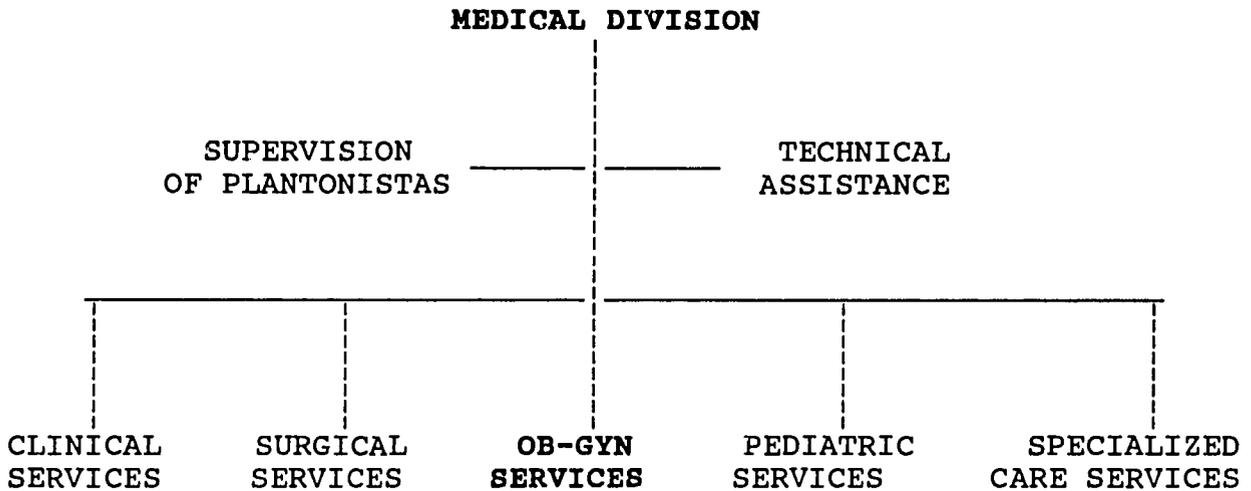
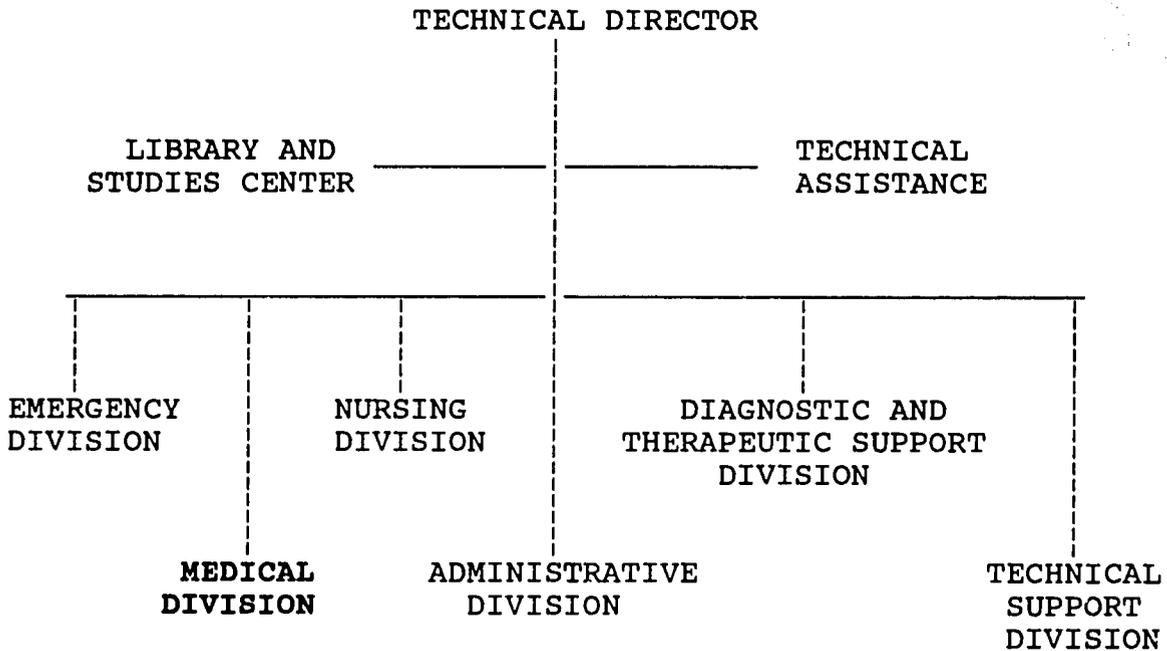
1. In the preconsultation visit, the health professionals should make arrangements for groups of mothers to carry out the "mothers helping mothers to solve problems" activity, where during a period of approximately 30 minutes a series of discussions, debates and exchanges of experiences should take place with regard to the various aspects of breastfeeding promotion and the topics listed under norm 2 above. The members of the multidisciplinary team should be available to coordinate the [missing text...].

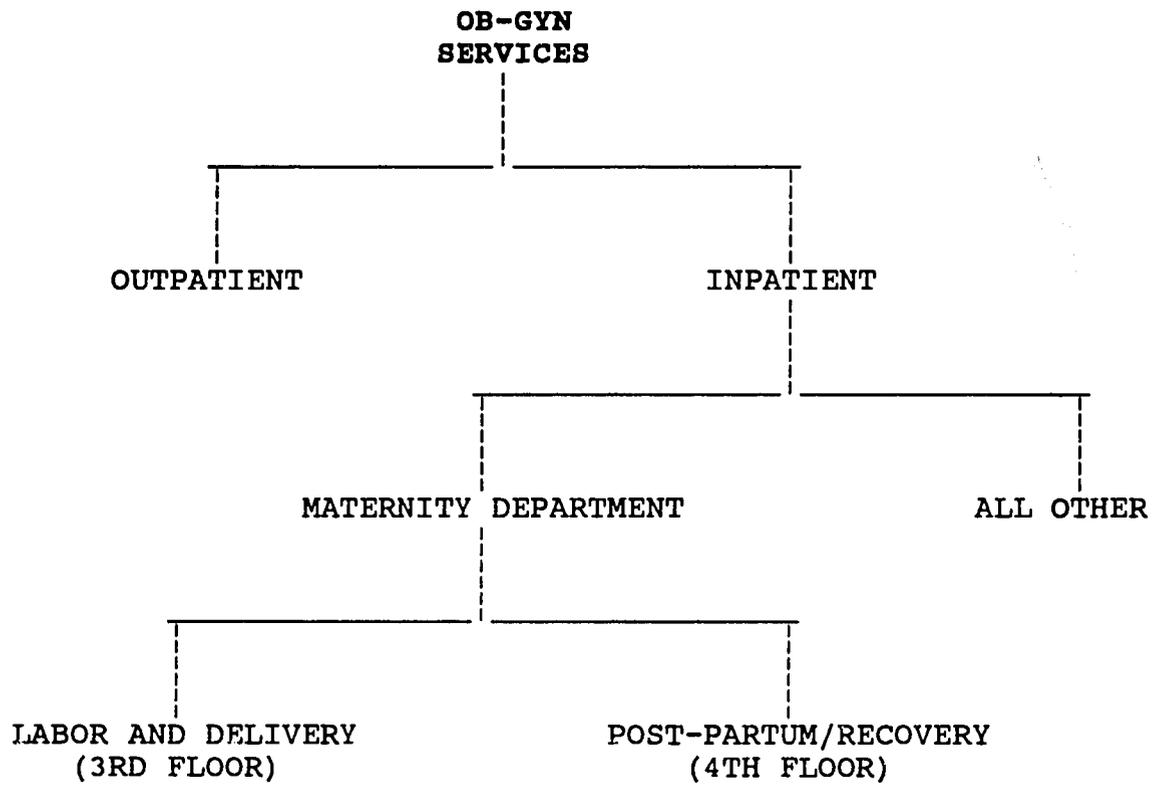
2. Consultations should take place when the baby has reached the age of 7, 14, 21, 28, 45, 60, 75, 90, 120, 150 and 180 days. If during any of these consultations indications of weaning are observed, the consultations should return to a weekly basis until the problem is resolved. The mothers should be informed in addition that they may, and should, return to weekly consultations whenever they experience difficulties in maintaining exclusive breastfeeding.
3. The consultation should take place in an atmosphere of empathy, free from recriminations, in order to anticipate and resolve problems involving breastfeeding and promote the strengthening of attitudes. The consultations may be conducted on an individual basis or with two or three pairs of mothers-babies at the same time, and should include the following:
 - Growth monitoring using growth curves that are appropriate for breastfed children, followed by the interpretation of the results with the mother, so that she will be aware of the nutritional status of her child and its relationship to breastfeeding.
 - Monitoring of vaccinations, as well as information with regard to the corresponding pathology.
 - Indirect evaluation of breastfeeding by means of informal talks with the nurse auxiliary or the physician, with an attempt to be made to evaluate the adequacy of the attitudes and knowledge of the mother with regard to breastfeeding.
 - Breast examination, with an attempt to identify any alterations that might interfere with successful breastfeeding, such as engorgement, fissures, etc.
 - Direct observation of breastfeeding in order to verify posture, adhesion, and the dynamics of suction, with the health personnel to make any necessary corrections and provide the required guidance.
 - Direct observation of the stool of the baby in order to verify compatibility with exclusive breastfeeding.
4. Routine meeting of the entire team following the closing of the clinic in order to discuss any difficulties, identify solutions and standardize behavior.

ANNEX 3

ORGANIGRAM OF THE HOSPITAL DOS ESTIVADORES

ORGANIGRAM OF THE HOSPITAL DOS ESTIVADORES





ANNEX 4

**FEBRUARY 1993 ANNUAL SALARIES, INCLUDING THE 13TH SALARY
(For 40 hours per week)**

IN CRUZEIROS OF MID-FEBRUARY 1993

	MONTHLY	ANNUAL	HOURLY	HOURLY US\$ -
SOCIAL WORKER	7,148,983	92,926,779	48,405	2.20
PSYCHOLOGIST	7,148,983	92,936,779	48,405	2.20
NUTRITIONIST	7,148,983	92,936,779	48,405	2.20
MEDICAL RESIDENT	10,987,816	142,841,608	74,397	3.38
PHYSICIAN	10,987,816	142,841,608	74,397	3.38
NURSE	7,594,705	98,731,165	51,422	2.34
NURSE AUXILIARY	3,983,084	51,780,092	26,969	1.23
SERVICE AUXILIARY	2,723,887	35,410,531	18,443	0.84

ANNEX 5: SOME OF THE LESS STRAIGHTFORWARD METHODOLOGICAL ISSUES

1. Identifying The Quantities Of Inputs Actually Used: Purchase Data Versus Reported Practices

One common approach to identifying the quantity of an input used to produce a good or a service is to rely upon the quantity of that input that is purchased as a proxy for the quantity actually used. The quantities of a particular input that are purchased, however, can deviate significantly from the actual amount that is used to produce the good or service in question. Factors that might account for such deviation include: losses due to waste, pilferage, or expiration; net changes (increases or decreases) in the stock levels of the input; changes in standard practices involving the use of the input (e.g., changes in medical treatment regimens or protocols); or changes in technology-- which, e.g., produce improved efficiency in the use of the input, resulting in a reduction in the quantity of the input needed per unit of output.

Each of these possible sources of deviation between purchased quantities of inputs and actual quantities of inputs used is a very real possibility in this particular study and militated against using historical purchase records of the hospitals as proxies for the actual use of resources.

Another factor that corroborated the decision not to rely on historical purchase records was the fact that the routine purchasing behaviors of the two hospitals in this study are significantly different, and result in quantities purchased and quantities used varying substantially over time. Estivadores purchases most of its inputs on a biweekly basis, while the HGA makes most of its purchases much less frequently, quarterly; i.e., once every 3 months. The timing of the much larger and much less frequent purchases of HGA, therefore, can result in large apparent fluctuations in use that may or may not, in fact, be large, depending upon their previous stock levels and changes therein overtime.

The large fluctuations in services delivered at both hospitals due to important, exogenous factors further complicates the simple equation of purchases with use. For instance, the two year period during which HGA became exclusively a high risk regional referral hospital with more mothers and babies who were more likely not to be able to breastfeed due to complications, would distort the estimated cost differences of the two hospitals since the relatively smaller number and proportion of mothers who were breastfeeding would drive up the estimated unit costs of a breastfeeding mother.

Another consideration in deciding to adopt this methodological approach to quantifying inputs was due to the fact that the accounting departments of both hospitals did not maintain their

records on a department, activity or program specific basis. For instance, in attempting to quantify the use of breast milk substitutes, both hospitals could tell how much their total purchases of formula had been over a particular time period. These totals included purchases that were subsequently allocated to the Pediatrics Department to be fed to children who may or may not have been born at the hospital--in the case of HGA, many were not. These children had been admitted to the hospital for some reason independent of their being born, i.e., for the treatment of some health problem. Thus it was decided that for purposes of this study, that only the portion of the formula used in the Maternity Department could legitimately be regarded as a cost of (or potential savings to) the BFP, and only that portion, therefore, was of interest.

In both Hospital do Estivadores and HGA the allocation of breast milk substitutes to the Pediatric Department accounted for the vast majority of these products. In both hospitals the only means by which to ferret out the portion of the formula that was used by the Maternity Department was to interview the staff who prepared and distributed the formula. In light of the substantial number of children treated in HGA's regional referral Pediatric Department who were not born at the Hospital, had this procedure not been followed, the amount of breast milk substitute used at HGA would have been seriously overestimated.

To obviate these various potential distortions it was decided that estimates of the actual use of different inputs would be developed from information obtained in interviews with staff about their current practices. Since the practices of staff members (and the staff members themselves) at HGA are reported not to have changed appreciably since the program's inception 18 years ago, current practices serve as a good estimate for past practices in attempting to determine the costs of the breastfeeding promotion program over time.

In the case of Hospital do Estivadores, since the ownership, administration and management of the Hospital has just recently changed, and a new accounting system has been introduced, there is little choice but to assume that current practices approximate those of the past. Moreover, there is little reason to think that these practices have changed appreciably in the past few years.

2. Should All Resources Used In The Provision Of A Particular Service Be Accounted For And Included In The Cost Analysis, Or, Should The Opportunity Cost Of Resources Be Taken Into Account?

A decision was made to take into account the opportunity cost of resources. This decision affected only the valuation of space used in the BFPP of HGA.

In HGA, the breast-feeding group counseling/discussion session with expectant mothers takes place in the prenatal care waiting area; that is, the area within the hospital where the obstetric outpatient clinic patients wait to see the physician. This space is used simply as a waiting area when there are other-than-prenatal, obstetric clinics. Moreover, this space would be used whether or not the prenatal clinic's breast-feeding group session were held. Thus the opportunity cost of using this space for the breast-feeding group session is zero. The area measures 8 by 10 meters. Three 15 foot long benches accommodate the waiting mothers. The area and the furniture are virtually identical for the other outpatient clinics of HGA.

The space within the Maternity Department of HGA where a group counseling/discussion session with new mothers is held daily is also used as an office and storage area. This area, which measures roughly 6 square meters, is assumed to have an opportunity cost of zero in its use as a site for the daily half hour sessions.

The classroom that is used for the Thursday afternoon "breast-feeding clinic" is used primarily as a classroom for teaching the medical students, and has an opportunity cost of zero in its use as a site for the Thursday afternoon, breast-feeding clinic's group discussion with new mothers. The class room measures 10 by 15 meters.

The only physical space used by the BFP that has a non-zero opportunity cost are the 6 consultation rooms and the waiting room used in the Thursday afternoon "breastfeeding" clinic; this space could be used to provide other clinic services during this time. The value of these resources, therefore, are included in the cost calculations.

3. Determining the Value of the Time of the Fifth Year Medical School Students Who Participate in the Thursday Afternoon Breastfeeding Clinic

As noted in Chapter III, section C.5., the Thursday afternoon breastfeeding clinic involves the participation of all 24 of the fifth year medical students who are in the pediatric rotation. From a combination of first hand observation and discussions with Center staff, it was concluded that the role of the medical students in the Thursday clinic was not an indispensable ingredient or a net addition to the services that were provided to mothers and children in the clinic. Indeed in December when the medical school students are on break and at other times during the course of the school year when the students are on vacation/holiday, the Thursday afternoon breastfeeding clinic goes on as usual, with only the residents and regular staff who, when the students are present, usually serve in a supervisory capacity.

The major change that is made in the actual care and counselling provided to mothers when students are not present, is that the clinic operates somewhat more efficiently (i.e., faster) from the patient's perspective. This is due to the absence of the teacher demonstrations and didactic discussions that characterize a usually Thursday clinic when the students participate. Since the amount of time that is involved in the Thursday clinics is somewhat greater when students are involved, the staff-time cost estimates of the clinic are probably slightly inflated relative to a "bare bones-essential inputs" cost estimate. However, because the amount by which these two time inputs varied is not considered great and is difficult to quantify, it was decided not to try to adjust the cost estimates downward to take this difference into account.

ANNEX 6

**SENSITIVITY ANALYSIS, CAPACITY, SUSTAINABILITY AND REPLICABILITY
OF THE PROGRAM**

SENSITIVITY ANALYSES

In light of the lack of precision in measuring several key components of the BFPP's costs a single point estimate of its costs may be somewhat misleading. Two sensitivity analyses were undertaken in order to establish a range of estimated program costs, as well as to identify the significance of some of the key assumptions underlying the estimates. This activity also aided better understanding of the most crucial aspects of the program and raised important issues about the replicability of the program.

The sensitivity analyses alter two of the key assumptions regarding the costs of the program, and more specifically, the costs of the Thursday afternoon clinic, which is the most distinct and most costly component of the HGA BFPP, constituting 57 percent of total program costs.

(1) Assuming 50 (Rather than 70) Percent of the Thursday Afternoon Breastfeeding Clinic is Devoted to Breastfeeding

In developing the initial estimates it was assumed that 70 percent of the Thursday post-partum clinics was devoted to breastfeeding (and thus attributable to the BFPP), with the remainder of the time dedicated to other, more general post-partum activities. The 70 percent figure is a rough estimate provided by BFPP staff. The first sensitivity analysis alters this assumption, and posits that only 50 percent of the total Thursday clinic session is devoted to breastfeeding.

This alternative assumption results in reducing the cost of the clinic that is attributable to the BFPP (including both labor and physical space/building costs) by 29 percent. Since the clinic is such an important part of the total cost of breastfeeding-related activities, a 29 percent reduction in the cost of just the clinic--one of the three components of the BFPP--reduces the total direct cost of the program by 16 percent, to 84,172,000 cruzeiros (US\$3826), while total net costs of the program fall to 10,854,126 cruzeiros (US\$493).

(2) Substituting Lower Paid Nurses for Medical Residents in the Thursday Afternoon Breastfeeding Clinic

Another important component in the development of the estimated costs of the BFPP also relates to the Thursday afternoon clinics. From discussions with BFPP staff, it was learned that 6 nurses could substitute for the 6 medical residents who supervise the medical students in each of the 6 individual consultation rooms of the Thursday afternoon breastfeeding clinic. Medical residents are used primarily because of the contribution they

make in their role as teachers of the 5th year medical students, and are not essential as care providers. (Recall that there are also 2 pediatricians circulating among the 6 consultation rooms throughout the afternoon, providing general backstopping services and encouragement to the students.)

In mid-February 1993, the average nurse's hourly compensation package totalled 51,422, 69 percent of that of a medical resident. Substituting nurses for the medical residents results in a 22 percent reduction in the total labor cost of the Thursday clinic (a decrease of 13 percent in the total labor cost of the BFPP), which constitutes an 11 percent drop in the total direct costs of the program. Under this scenario, BFPP direct costs total 92,972,000 cruzeiros (US\$4,226).

(3) Ranges of BFPP Cost Estimates Per Woman Delivering at HGA and Per Woman With at Least One Prenatal or Post-Partum Visit

The two extreme estimates of the total direct costs of the breastfeeding promotion program are US\$3435 and US\$4774. The lowest estimate is derived from assuming that nurses are substituted for the 6 medical residents who supervise and teach the 5th year medical students in the Thursday afternoon clinic and that 50 percent of the Thursday afternoon clinic is spent on breastfeeding-related topics. The highest cost estimate comes from assuming that the participation of medical residents in the Thursday afternoon clinic is essential (and lower cost nurses cannot be substituted for the residents) and further assuming that 70 percent of the Thursday afternoon clinic is dedicated to breastfeeding issues and concerns. The total net costs of these two extreme estimates are US\$102 and US\$1441.

Using the number of women who delivered at HGA in 1992 (1,623) as the denominator, the direct program costs are estimated to be in the range between US\$2.17 and US\$2.94 per woman covered. Using the same denominator, the total net program costs are estimated to be within the range from US\$0.06 to US\$0.89.

Alternatively, if the denominator is the average of the number of women with at least one prenatal care consultation and the number of women with at least one post-partum care visit (721 women), average total direct program costs per woman covered more than double, and are estimated to range between US\$4.76 and US\$6.62, with total net program costs ranging between US\$0.14 and US\$2.00.

PROGRAM COSTS AND CAPACITY

A second, and distinct, type of sensitivity analysis involves assessing the degree of coincide of the observed scale (size) of a program--as measured the number of participants--and its capacity. If the current size of a program is significantly

below what it could be (i.e., what its capacity is), it is likely that the observed or measured costs of the program are higher than they would be if it were possible to increase the size of the program. In such cases, it would be possible to increase the size of the program and to increase its efficiency, as measured by the unit cost of the program. Indeed, depending on the value of the benefits produced by the program, it might be rationale to spend money recruiting additional participants.

Many of the various activities and services provided by the BFPP appear to be provided to less than the maximum number of women who could be benefitting from them. For the most part, this is because these activities and services are being provided to groups of mothers. This orientation toward groups of mothers reflects the Program's philosophy of promoting the "culture of mothers," and has important actual and potential cost implications. By spreading costs--in particular, the cost of staff time--over more than a single mother, this approach acts to reduce the program costs per participant.

In addition, it appears that some of these services, especially those involving counseling, training and education services, could be provided to larger groups of mothers, without diminishing their effectiveness or effecting their costs. For many of these services the number of women who are involved is not the result of a conscious planning and recruitment effort. Rather, it is usually the entire universe of women who are at a particular place or activity in the course of their care and/or pregnancy. This is the case, for instance, with the number of women attending the prenatal care group counselling and discussion session, and the new mothers group discussions provided in the hospital to the small groups of new mothers who have just given birth and who are still being hospitalized.

Increases in the number of participants in other aspects of the program, however, would require corresponding (though not necessarily proportionate) increases in costs. This is true of: (1) the practice of putting the baby to the breast while the mother is still on the delivery/birthing table, and, as already noted, (2) the Thursday afternoon breastfeeding clinic.

Since the Thursday clinic is the most expensive component of the program (representing 52 percent of total direct costs), the fact that it has largely reached its capacity (according to BFPP staff) suggests that it would act as a bottleneck to efforts to increase the size of the program without increasing costs. Depending upon how additional mothers and babies were accomodated, however, the Thursday afternoon clinic's capacity could be substantially augmented while adding little to the costs of program. The bottleneck to expanding service at present is that the large room in which the mothers' group discussions are

held is at capacity. Trying to increase the number of mothers participating in the Thursday clinic mothers' group discussion would require finding another larger room, or an additional location, or alternatively having two back-to-back sessions or a morning session.

The introduction of back-to-back sessions would entail one of two possible changes in staffing or staff practices. One option would be to have the pediatricians who currently lead the discussions and thereafter circulate among the 6 consultation rooms would now lead the proposed second round of mothers' group discussions, and become unavailable or less available for backstopping the individual consultations during the half hour when they are leading the group discussion. This option would not entail additional costs, but would involve compromising the quality of the individual consultations.

The second option would involve an additional pediatrician or two being brought in to the Thursday clinic to lead the group discussion or to backstop the individual consultations. Two additional pediatricians for one-half each would cost a total of an additional 74,397 cruzeiros or US\$3.38.

The effect of trying to increase the number of participants in the other portion of the Thursday clinic, the individual consultations, would require having some additional clinic hours. Although it would be possible for the students and residents to see some more new mothers within the current structure of the program, any substantial increase in the number of patients to be seen would require either extending service hours or holding a morning session.

At present the BFPP using the 6 consultation rooms sees roughly 90 women in the typical Thursday session. Each individual consultation is reported to average about 15 minutes. If it is assumed (1) that it takes about 5 minutes for one patient to leave and the next patient to enter the office and increase average consultation by 5 minutes (to 20 minutes) to take these patient flow considerations into account, and further assume (2) that 1.5 hours of the 4 Thursday afternoon clinic hours is devoted to set-up, mothers' group discussions and the students' wrap-up discussion, and 2.5 hours are devoted to providing individual consultations, then the capacity of the program can be identified as:

$$(6 \text{ rooms}) \times (3 \text{ consultations per hour per team}) \times (2 \text{ teams per room}) \times (2.5 \text{ hours per Thursday session}) =$$

90 consultations per Thursday afternoon clinic session

The individual consultation component of the Thursday clinic would also appear to be running at roughly full capacity. Assuming these facilities would be available in a 4 hour block on another day of the week, if the attendance of this second clinic were about the same (roughly 90 mothers with their babies), the total direct costs of this component of the BFPP would double, while unit costs (i.e., program costs per mother participating in the clinic would be constant).

It appears, however, that the quantity of services demanded-- i.e., the number of mothers attending the Thursday clinics--is the key factor restricting the size of the program--at least the Thursday clinic portion of the program. The fact that demand is the limiting factor is reflected in the fact that the number of births at Guilherme Alvaro Hospital is more than twice as large as the number of women receiving their prenatal care and the number of women receiving their post-partum care at the hospital; i.e., only about half of the eligible women are actually participating in the Thursday clinic. This incongruence between the number of women delivering and the number of women receiving prenatal and post-partum care, it should be noted, reflects the referral center status of HGA.

In conclusion, the observed and measured unit cost of the Lactation Center's Breastfeeding Promotion Program per covered woman appears to be a reasonably stable estimate even if an effort is made to expand the number of program participants. For both demand and cost-cum-capacity reasons, however, the current size of the program appears to be within the optimal range.

SUSTAINABILITY OF THE PROGRAM

Although as already noted, the long term continuity of key personnel in the BFPP was a critical factor in the establishment of a well-organized, well structured and effectively functioning program, the Guilherme Alvaro program is now institutionalized, and would probably survive the loss of its key personnel. This is the result of several important contextual factors, as well as several program-specific factors.

(1) Important Contextual Factors Conditioning Sustainability

The Brazilian Government has passed laws that have given legal recognition and support to several of the most basic tenets of the program, and that have convincingly demonstrated to the people of Brazil the importance of breastfeeding. These include the Licencia Maternidade and the rooming-in law previously cited.

In addition, the Santos Mayor's Office publishes and distributes free of charge to all hospitals in the City of Santos a pamphlet extolling the virtues of breastfeeding and encouraging new

mothers to breastfeed. These are sent by the Mayor's Office to each hospital, where they are distributed to new mothers. The commitment reflected in these government actions bode well for the sustainability of the program.

(2) Important Program-Specific Factors Conditioning Sustainability

At another level, the medical school at HGA has long promoted and provided training in understanding the role and significance of breastfeeding in maternal and infant health. These teachings are now a well-established and integral part of the core curriculum. In addition, the founder and director of the Lactation Center at Santos, Dr. Jayme Murahovschi is the author of the most widely used pediatric textbook in Brazil. His reknown has added to the national visibility and stature of the HGA program, and has given credibility to the program's efforts, activities and philosophy, which has facilitated the acceptance of various aspects of the program within HGA itself, in Santos and more generally throughout much of Brazil. The result within HGA has been the development of a set of norms that reorganize and restructure the hospital--physically and procedurally--to provide a staff and an institutional setting that are both more consistently amenable to, and more consistently provides support and encouragement for, breastfeeding.

The medical school affiliation of HGA better assures the continuity and sustainability of the program by making it more likely that the rationale for the program will not be lost sight of, as easily as might otherwise happen in the high technology world of a tertiary care facility where the division of labor is great and holistic health and health promotion measures are often neglected. The medical school affiliation ensures that the rationale for the program will be regularly reviewed, explained and reaffirmed, which is likely to reinvigorate the program and its efforts.

The medical school affiliation--particularly given the program's national visibility--reinforces the breastfeeding promotion mission of the schools' students and graduates, further enhancing the likelihood of the program's being continued and replicated elsewhere. The affiliation also means the training costs of the program are less readily visible and thus probably less subject to being cut. The teachers train the students and train/retrain the hospital staff concurrently.

REPLICATION ISSUES AND LESSONS

How easy would it be to replicate the Centro de Lactacao's Breastfeeding Promotion Program? As noted earlier, because the Centro de Lactacao's Breastfeeding Promotion program was started

more than 15 years ago, it was not possible to estimate the program's start-up costs.

The medical school affiliation is an important factor shaping the structure and the costs of the Center's BFPP. This affiliation would seem to reduce the likelihood of being able to replicate this program. However, graduated HGA students have taken the BFPP approach to the institutions they have begun to work at as new, young professionals. In addition, many graduated HGA students have invited the Center to come to their institutions to help them establish a BFPP.

One of the other-than breastfeeding promotion activities of the Lactation Center--indeed the major activity of the Center--consists of replicating the program in other hospitals. The model that the Center strives to develop elsewhere, however, is somewhat different because these other non-school affiliated hospitals do not have medical students. With several years of experience in providing training and other support to start BFPPs, the staff of the Lactation Center reports that in these other non-medical school affiliated hospitals, that nurses and nurse auxiliaries carry out the activities that the medical students in the HGA program perform.

It would be useful to case study the Center's efforts to start promotion programs in other hospitals both so as to better understand replicability potentials and issues, and to investigate the possibility of developing a prototype for other countries. Such an effort would also, no doubt, be useful to the Center, as it would constitute a type of non-threatening review and evaluation of its training and program development efforts that could provide important feedback to the Center.

(1) The Significance of Aspects of the Brazilian Context to Replicability

The success of the Lactation Center's BFPP is due to some unmeasurable extent to the encouragement and support that the Government of Brazil has provided--in a generic sense--to breastfeeding via its passage of the previously cited laws. National laws can play an important role in sparking highly visible, national level discussions of the benefits of such programs, and can help to overcome institutional inertia that might otherwise prove to be an insurmountable obstacle to their development.

The medical school affiliation, together with the longstanding nature of the BFPP and the Government of Brazil's commitment to breastfeeding, also mean that the start-up and on-going training costs of the HGA BFPP, are exceedingly difficult to measure, less visible, and generally not regarded as "belonging to" the BFPP.

Training costs would be a much more significant consideration-- particularly the program's start-up training costs--in attempting to replicate this program in other parts of Brazil and even more so in another country, especially one in which where there is no medical school affiliation and where the government is less supportive.

Two important replication strategy lessons can be drawn from the Brazilian experience. First, the social-political context is important in conditioning the degree of sensitivity of hospital staff (including administrators) and the general public to the importance of breastfeeding. The degree of sensitivity, in turn, is likely to affect the hospital's and the public's receptivity to the notion of developing a breastfeeding promotion program and will shape the role and degree of stature accorded programs which are established. Thus, promoting public awareness and knowledge about, and fomenting public discourse about, the benefits of breastfeeding, and pursuing changes in laws which are more accomodating of breastfeeding, are important elements of a strategy of promoting breastfeeding in general. Moreover, these activities are important in helping to facilitate the adoption of new, specific breastfeeding promotion programs, such as the HGA BFPP.

Second, the medical school affiliation of HGA may provide a good model for other countries to develop hospital-based breastfeeding promotion programs. By starting in a teaching hospital, it is easier to bring together a critical mass of committed professionals, at the same time that they-- in their roles as professors--produce more of like-minded persons.