USING TRADITIONAL HEALERS TO DELIVER ORT

IN PACATUBA, CEARA, BRAZIL

A PRICOR PROJECT

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1) Executive Summary

In northeastern Brazil diarrhea is a major source of morbidity and mortality among infants and small children. In rural areas, traditional healers have long been the first source of medical care for children suffering from diarrhea and other illnesses. The healers are available to the community 24 hours a day and work without monetary incentives, but rather a desire to serve their community. This PRICOR study is finding that these healers are the critical frontline caretakers that can be effectively mobilized, at an unbelievably low cost, to prevent diarrhea, treat dehydration and reverse mothers' harmful health practices. Moreover, this can be done in a culturally appropriate manner WITHOUT destroying the exisiting, indigenous medical system. The objective of the study, conducted by faculty from the Federal University of Ceara, and the University of Virginia, is to determine how best to mobilize and integrate traditional healers into the official health system to clinically manage diarrheal illnesses and to deliver oral rehydration therapy (ORT). The study was conducted in Pacatuba, a rural community of about 7,000 near Fortaleza, the capital of Ceara.

In the problem analysis, the researchers sought to understand the social, cultural, and medical systems in which the traditional healers work. Data was collectd from surveys on the knowledge, attitudes, and practices (KAP) of the community regarding diarrhea and child morbidity and mortality due to diarrheal diseases. Ethnographic analyses were undertaken of the health care delivery system and utilization patterns, and interviews were conducted to reconstruct the household patterns of a diarrhea illness episode.

These analyses revealed that 1.) diarrhea/dehydration is a serious problem in Pacatuba. IMR is estimated to be 150/1000, with 50% due to diarrhea/dehydration. Villagers, too, implicate it as the most serious health problem which theatens children's lives. Of 535 childhood deaths that occured in Pacatuba between 1951 abd 1984, mothers believe 56.8% were due to diarrhea/dehydration or closely related folk illnesses; 2.) mothers adhere to such folk medical explanations and definitions of diarrhea and dehydration as fright disease, evil eye, spirit intrusion, intestinal heat, teething and fallen fontenelle; 3.) 76.9% of mothers--representing all socioeconomic strata--seek FIRST the traditional healer in cases of diarrhea; 4.) the popular healer to patient ratio is 1:150 whereas it is an overwhelming 1:2000 for physicians; 5.) the official medical system is sorely inadequate in caring for poor children with diarrhea. Long waits, rationed appointments, physician

control of free government ORT packets, costs and communication barriers result in a failed system.

During Phase II of the study, 46 popular healers were mobilized to promote, use, and teach ORT to villagers and spread five basic health messages: 1.) give ORT for diarrhea; 2.) breastfeed, especially during the diarrheal episode; 3.) continue feeding (do not withhold food) during the diarrheal episode; 4.) eliminate drug therapies; and 5.) seek the traditional healer immediately when diarrhea/dehydration attacks. Researchers worked with the traditional healers to develop a strategy to involve them in the promotion and use of ORT. Group meetings were held during which the traditional healers had their first opportunity to share ideas with one another and participate in the formulation of a strategy for incorporating ORT into their healing rituals. The healers helped to develop a tasty homemade ORT recipe that blends their medicinal teas with sugar and salt, to teach the use of simple bottle cap salt-measuring devices, to design and construct 5 "curing rooms"; simple mud and thatch room additions on healers' homes. Each of these is fully, yet simply equipped as a rehydration unit. Healers also upgraded and equipped an additional 13 exisiting rooms as ORT units; and helped us create teaching materials understandable to illiterate mothers and child caretakers. Most importantly, healers skillfully integrated ORT into their OWN healing system, often in unique, exciting, and eclectic ways.

The testing of the strategy began in October of 1984. In approximately one year, the traditional healers' impact on has been astonishing. A comparison of the responses of 204 mothers with children <5 years before PRICOR with 226 responses after the project documents the following: a highly significant ($p<.001$) 69% increase in mothers who know about homemade ORT; dramatic 54.3% increase in mothers who have USED the traditional healer's homemade ORT; a highly significant ($p<.001$) 20.5% increase in mothers who believe they should continue breastfeeding during the diarrheal episode; an 18% increase ($p<.01$) in those who believe feeding should continue, not be withheld, during a diarrheal episode. This PRICOR project decreased by 11.6% ($p<.01$) the use of expensive commerically promoted, pre-diluted ORT and even more significantly by 25.5% ($p<.0001$) the use of commerically sold ORT packets; no signficant change was found in the use of free government ORT (CEME) packets. Importantly, a highly significant ($p<.001$) 20.54% drop in the use of phamaceuticals was recorded, although the percentages of mothers who still use drug therapies for diarrhea remains alarmingly high (87.5%). The seeking of physicians first in cases of diarrhea did not change ($p>.05$); only 18.2% did before PRICOR and 17.7% afterwards.

These impressive alterations in hard-to-change mother attitudes, beliefs and practices occured because of the traditional healer's activities, we believe. Yet, we document clearly that the lay system of medicine was NOT destroyed or altered signficantly. Our introduction of ORT in a culturally-sensitive manner did not signficantly ($p>.05$) change villagers' folk medical beliefs about the causes of diarrhea (this isn't a precondition to introducing ORT) or alter signficantly ($>.05$) the well established tradition of seeking the traditional healer FIRST for diarrhea. Nor did we record a significant change ($p>.05$) in the use of widely used medicinal teas to treat diarrhea.

We also found healers, despite their illiteracy, can prepare safe electrolyte solutions using homemade measures, quickly learn ORT preparation, have no difficulty in teaching mothers ORT fundamentals using simple graphic instructions, and have a respectable command of modern medicine related to children's health. Analysis of our attitude interviews leads us to believe that any opposition to such a lay ORT program will NOT come from healers: they are (understandably) cautiously cooperative with biomedicine based on a highly pragmatic view of the benefits of modern medicine. At the same time, they express a forthrightly confident attiude in their own healing ways and, for this reason, command villager's respect. They are conscientious, dedicated, and willing to work, with certain conditions, with the modern health sector.

In comparison with the 49 healers trained and mobilized, 18 ORT units built and equipped, the 7,400 liters of ORT distributed in 12 months and the positive, documentable impact this PRICOR project has had on children's health (mortality impact not yet known) and the community spirit sparked, the cost of the program is pitifully low. The total program cost is $US 4,027, which includes the involvement of 2 physicians and 1 nurse. The average cost of constructing a "curing room" is only $US 26.22, fully equipping it for ORT, $US 43.15, and each healer's monthly sugar supply, an embarrassingly low, US$ 0.48. So much for so little!

Based on the successful experience with traditional healers in Pacatuba, the researchers are planning for the incoporation of traditional healers into a new large-scale child survival project that is being implemented in 33 municipios (counties) in Ceara with funding from Project Hope.

2) BACKROUND

2.1) Description of Target Populations

2.11) Narrative Description

Health conditions are harsh for residents of Pacatuba. Life expectancy at birth of the poor in northeastern Brazil is estimated to be only 40 years. Typically, a village woman has endured 15 to 20 pregnancies with 10 to 12 live born children, and 2 to 4 deaths. Well over half of these childhood deaths are due to diarrhea with or without malnutrition. This is followed by pneumonia, measles, and tetanus as other causes of death. Guerrant, Kirchoff, Shields, et al. in their 1983 article ("Perspective Study of Diarrheal Illnesses in Northeastern Brazil: Patterns of Disease. Nutritional Impact, Etiologies, and Risk Factors" in J. Infec. Dis. 148:986-997) report that the leading cause (50%) of childhood death in Pacatuba was diarrhea and dehydration and over 90% of childhood deaths occurred in children under 2 years of age.

The leading enteric pathogens responsible for these infections and deaths according to Guerrant, et al. are Enterotoxigenic Escherichi coli and rotaviruses. Poor children ages 6 to 11 months suffer more than 9 episodes of diarrhea per child per year, rates that are amongst the highest reported worldwide.

Thirty percent of Pacatuba's children are moderately to severely malnourished according to Gomez I and II classification. Typically children do not receive the nutritional benefits of prolonged breastfeeding. Growing numbers of babies are not breastfed at all (53.6% of wealthiest and 10% of poorest). Those who are breastfed are nursed exclusively for only a short period, about two weeks.

Parasitic infections are rampant. The two most common pathogens are Ascaris lumbricoides and Giardia lamblia. Others include Entamoeba histalytica, Irichuris trichuria, Strongyloides stereoralis, and hookworm. Indeed, infections with more than one parasite occur in approximately 29% of children under 5 years of age and in 65% of children over 5.

While the above health profiles are derived from epidemiologic data, mothers in Pacatuba report nearly identical health problems. Reporting on the causes of 535 deaths of their children less than 5 years of age occuring in Pacatuba between 1951 and 1984, mothers lay blame first on "illness of the child", a folk medical illness which includes at least symptoms of diarrhea and dehydration. They implicate next, like the

epidemiologic findings, diarrhea and dehydration. Measles and pneumonia are reported killers as well as a number of additional folk illnesses whose biomedical correlaries are yet unknown. Three hundred and thirty Pacatuba mothers interviewed in 1984 repeat the same story (Appendix 1) The most dangerous threats to children's health are diarrhea, dehydration, illness of the child, measles, pneumonia, other respiratory illnesses, and the same list of folk illnesses.

2.12) Socioeconomic Conditions

Pacatuba (population 7000), located only 32 km from the burgeoning state capital of Fortaleza (pop 1.800,000) is an ideal research site for a number of reasons. Pacatuba was a homogenous, isolated community of subsistence farmers until the 1950's when improved communication and transportation brought Fortaleza's changing ways to its doorstep. While its residents are influenced by and dependent upon the nearby capital, not all have equally reaped its benefits. The most successful are families living in the Centro (town center). Relatively high salaries (male wage 1980 $US 4-$US 40 per day: female $US 8.00) of merchants, civil servants, and teachers make affordable modern comforts: electricity, automobiles, televisions, stoves, and refrigerators. Because a fairly regular supply of running water (mean fecal coliform count = 9x10dl) from an 11-meter-deep well is piped directly into their houses and toilets flush away fecal wastes, Centro families can maintain sanitary home environments.

In view of this wealth, but just out of its reach, live the migrant wage laborers of the neighborhood of Matadouro. Promise of a cash income, albeit low and sporatic ($US 0.00-$US 4.00 male; $US 0.70 female, per day, 1980), draws them to distant jobs in construction, mining, house cleaning, and manufacturing. Matadouro, once an old slaughter yard, remains a tightly-packed maze of poor adobe and plaster houses. Scavenging dogs and pack animals roam its dusty streets. Few highly desired home conveniences are affordable. Water for in-home use is contaminated (mean fecal coliform count 4x10 to the third dl). It comes from an unprotected reservoir in the nearby mountains and must be piped to a community faucet located in the Centro and then transported by hand or on donkey's back to Matadouro where it is "rested" in clay jugs. Families defecate into crude pits dug in their backyards.

Left outside Pacatuba's headlong tumble into the

future, the poorest live in the isolated neighborhood of Sao Joao. Some have entered the migratory circuit (with males earning up to $US 1.20 per day and females up to $US 0.70 per day in 1980) while most work as subsistence farmers or sharcroppers under large landholders. They struggle to grow the beans, rice, and manioc root that barely sustains them. Drab adobe houses lack the basics: electricity, dirt floor coverings, stoves, sinks , and even pit privies. What human excrement is not eaten by pigs is washed into a nearby stream where families collect highly contaminated (mean fecal coliform counts = 1.5 x10 to the fourth dl) drinking water, bathe, and wash clothes.

2.13) Population Health Profile and Problems

Diarrhea and dehydration is the single most important health problem of young children in Pacatuba.

These epidemiologic/scientific findings do not baffle lay people, who also implicate diarrhea/dehdration, often as a symptom of various folk illnesses -- as both the most common cause of death in Pacatuba and a serious threat to young children. An intensive retrospective pre-intervention survey of all 712 households in Pacatuba, yielding a total of 535 deaths between 1951 and 1984 revealed that 304 or 56.82% of deaths were believed to be caused by "illness of the child" (21%), a folk illness which includes diarrhea/dehydration -- 17% diarrhea and 11% dehydration. Other folk illnesses which presented with diarrhea as a symptom include teething (4%), fright disease (2.8%), and evil eye (1.5%). Describing a child's death in popular terms which often escape exact codifying by epidemiologists, and a direct translation into a morbidity profile is common. Of the 535 childhood deaths in Pacatuba, 29% were described in folk lay terms; a practice most common (35%) in the poorest, most tradition-bound neighborhood (Sao Joao), and least practiced (18%) in the wealthiest, most modernized neighborhood (Centro).

Our pre-intervention community survey of 330 Pacatuba houses revealed that diarrhea/dehydration/"illness of the child" and other folk illnesses that have diarrhea as a principal symptom are considered most dangerous for small children by 34.4% of village families, followed by measles (22.1%) and pneumonia and other respiratory illnesses (18.8%). Hence, striking similarities exist between epidemological survey results and people's own ideas about the major health hazards in their lives.

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2.14) Description of Official Health Care System

The health of Brazilians is ultimately the responsibility of the Federal Government. Rather than one centralized governmental body, however, a number of autonomous institutions, under the direction of two principal ministries -- the Ministry of Social Security and Assistance (MPAS) and the Ministry of Health (MS) -- carry out national health care policy/programming. Indirectly, the Ministry of Education and Culture (MEC) also participates through the education/training of health care professionals. MPAS controls two public institutions which provide nationwide health care services: the National Institute of Medical Assistance and Social Security (INAMPS), and the Brazilian Legion of Assistance (LBA). MS controls two public institutions concerned with people's health at the national level: the Organization of Public Health Services (SESP), and Superintendency of Public Health Campaigns and Measures (SUCAM). And finally, MEC is indirectly yet importantly involved in the national health arena with their activities in various Federal Universities through their funded Centers of Health Sciences.

What kinds of services can the average Brazilian theoretically expect from these institutions? The worker eligible for a "signed Social Security card" provided by INAMPS (for urban workers) and FUNRURAL (for rural workers), and any Brazilian over the age of 65 can receive free medical care at specific INAMPS hospitals and clinics, or private and public clinics that are contracted by INAMPS nationwide, such as state health posts, mobile units etc. The problem is however, that the poorest Brazilians, those most in need of health attention are often unemployed, or semi-employed, often in highly exploitative jobs, that do not provide social security and hence free national medical coverage. Brazilians can also theoretically obtain basic medicines and vaccines through CEME's activities. Public and private pharmaceutical laboratories have contracts with MPAS to produce essential drugs. These are distributed for free with medical prescription by a physician, to INAMPS contracted health posts and hospitals as well as state health posts. Poor pre-school children can have their growth monitored by health professionals and receive food supplements through the food supplementation program (P.S.A.). LBA maintains free child daycare facilities in various locations. Mothers receive free

health education/support for breast feeding, community horticulture and training in income-generating work.

All Brazilians, not just workers, have theoretical access to free medical services provided in Health Posts and hospitals that are supported by the state secretary of health (SSE) of each respective state. Those people suffering from threatening transmissible infectious diseases -- tuberculosis, leprosy, etc. -- are provided with care from SESP and SSE. Brazilians lacking even basic sanitation and water treatment, are also entitled to assistance in constructing toilets and piped water systems through SESP. People suffering from parasitic diseases, especially malaria, schistosomiasis, and chagas -- can be protected through national treatment/eradication campaigns by SUCAM. Basic food stuffs -- rice, soy, corn, milk -- are provided to children under 5 and nursing mothers to help fortify their bodies and provide the increased food intake necessary for nursing an infant through the food supplementation programs of INAN. Besides these standardized national services, Brazilian families may also benefit from local research and service activities that stem from Federal Universities and Medical Schools. In Fortaleza, Ceara, for example, the Federal University of Ceara has numerous programs including a primary care delivery program (PROAIS) and ambulatory pediatric clinic, pharmacy projects, and home visiting projects besides maintaining a university-directed Terciary Care and Maternity Hospital. Families living nearby or in the target project areas benefit from their health services, but coverage is limited and University programs vary from region to region.

State and Regional Heath System:

The State Departments of Health (SES) (which is one department of the state government) is indirectly subordinate to the federal government and is responsible for the health of Brazilians in their respective states. SES maintains a network of health posts, centers, and hospitals. Brazilian families are entitled to free medical services -- particularly ambulatory care, medical consultations, vaccinations, infectious diseases control intervention, and health education -- at the SES facilities. Outside the state capitals, however, it is the county mayorships that are primarily responsible for the health of residents in their districts. The degree to which these regional services are effectively integrated with the State Department of Health, or national level health

Institutions is variable, county to county, depending, of course, on local material resources, finances, and manpower. The "health" of these resources directly determines the quality and quantity of regional health services, and hence the health of the local population.

Health care in Pacatuba consists mostly of services provided by the secretary of health who maintains a health center that serves as the principal source of medical care, not just for local residents but for the entire county. Any Pacatuba resident can consult general practitioners. One obstetrician-gynecologist and one dentist have appointments for about 20 to 30 people, one day a week. Rural families can have basic laboratory work -- bacteriological, parasitological, urine or hemoglobin exams performed at the Center's Clinical Analysis Laboratory.

Because Pacatuba has been earmarked as a site for the UFC's academic project, some rural families receive medical, nursing, and dental consultations on Saturdays. For the destitute mother and for the family that has no one to turn to, a source of help is the mayor who gives emergency drugs and transportation to health facilities in Fortaleza.

Members of the Syndicate of Rural Workers are covered by FUNRURAL and can receive medical and dental care at the FUNRURAL clinic -- which is located in the Central District of Pacatuba. Those with INAMPS coverage can receive care at a private clinic.

Women must go to a neighboring community, Guaiuba, to get prenatal care, administered by trained midwives housed in a UFC maternity center. Several indiginous midwives in Pacatuba have undergone training there and provide "ungraded" obstetrical/gynocologic care.

Depending on the particular day of the week, children can be vaccinated with the vaccine scheduled. Vaccinations against tuberculosis (BGG) are given once a month. Pacatuba's pregnant breastfeeding mothers and children under 6 years regardless of socio-economic conditions can receive free milk and food once a month from the INAN program. In the entire country, 1,600 are enrolled in this program. Malnourished children, ages 6 months to 3 years, those with their nutritional status verified, can receive a limited quantity of powdered milk through the LBA. Only 100 children are accepted. Theoretically those with mild first degree malnutrition are allowed to receive milk only if there are no moderate second degree or severely third degree malnourished children in need. For 200 children (in the entire county) ages 2 to 6 years, LBA and the mayorship provide free school lunches.

On occasion and with a doctor's prescription and consultation, a parent in Pacatuba can secure a package of free government produced ORT (CEME) at the State Health Center. At present there is a stock of about 40 boxes of ORS, each box containing 50 packets in the locked room in the center, some of them decomposing. Severely dehydrated children can be taken by their parents to the distant capital of Fortaleza to get help; the county does not have any oral or intravenous rehydration therapy program.

Despite the considerable efforts of PROAIS these various institutions to better rural people's health are deficient in a number of ways. A Brazilian political cartoon accurately if symbolically, portrayed the national health care system as a giant cow, insatiably eating money, and giving little milk. The system is topheavy and uncoordinated. Health care services in Pacatuba are represented by a wide array of national, state, and university services, often competing, overlapping, and contradictory. The few doctors assigned to the PIASS state posts often fail to show, private doctors are rare, and when present they care for private patients, not poor ones. DPT and measles immunizations often are lacking (polio vaccine, in contrast, is delivered efficiently through a national campaign) and follow-up well baby care is weak. Breastfeeding promotion, while recently given increased importance through the UNICEF-sponsored National Breastfeeding Promotion Campaign, is scanty in this area which, ironically, has a very low rate of breastfeeding.

Other problems include the following:

--- Doctors employed and paid by the state to attend the poor are not actually doing so. Of 4 physicians registered, only 1 actually delivers services.

--- Ineffective management of other state health employees despite their large numbers (19). Health staff are not trained in primary health care, often do not work, and are likely to be political appointees rather than interested in health care.

--- Few free consultations are available for poor families who have no insurance. Of 30 total consults available each week, only 10 are earmarked for poor patients, these are paid for by Pacatuba's mayor.

--- Free services for the poor are restricted to 3 days a week and patients must wait in line for 3 to 6 hours

to reserve a place or they are attended by University medical/nursing/pharmacy students in training once a month.

--- For a total population of 7000 only 1 physician is full time in Pacatuba; he attends 4 mornings per week for patients with FUNRURAL and INAMPS. Two additional physicians visit Pacatuba and attend only private patients on mornings each week.

--- Free food supplements have little impact because there are a limited number of openings, no official screening criteria according to nutritional or socioeconomic status, and insufficient food. In addition, each child must be registered and vaccinated in order to receive food. Poor children are often sick and can not be vaccinated or their mothers can not pay for birth registration.

-- No emergency services or clinics are available in afternoons or evenings.

-- No pre-natal, birthing, or well-child health care is available in Pacatuba.

-- Vaccination is limited because each type has an appointed day, no education is given on the value of vaccines. Negative sanctions are used instead (suspension of food supplement). Supplies are irregular, poorly stored, and subject to spoilage.

-- Distribution of medicines is faulty. No screening criteria exist. When medicines arrive, people go, but they need a doctor's consult for medicines, even ORS. The types of medicines available is restricted and poor mothers must ask the mayor's wife for financial help to buy medicines not available, a very personal and faulty procedure.

--- Transport and emergency services are not included in national services, but depend on the Mayor, the availability of care and of drivers, etc. No screening of patients by health professionals is performed before transfer: the motorist decides when and where patients are transferred.

2.15) Description of Popular Health Care System

A. In Pacatuba, at least three types of indiginous healers treated children with enteric infections: the

rezadeira or rezador (prayers); the raizeiro (herbalist); and the Mae de Santo (voodoo healer). These "doctors of the poor", however, differ significantly in their training, powers, and healing ways. Rezadeiras(-dors) the most common type of lay healer in Pacatuba, are deeply religious women and men who are endowed with the power to heal from God, a special healing force that they inherit either directly from the deity or from an elderly healer shortly before his/her death. Because most rezadeiras are illiterate, they must learn healing skills not from books but from their mothers, fathers, or elderly neighbors; they imitate a practicing healer with whom they associate, watching, reciting prayers, and learning to prepare home remedies under the expert eye of their mentor. Unlike rezadeiras, who rely primarily on God-given healing powers, the raizeiros de-emphasize the supernatural role in illness. As herbalists, they cure with chemical substances extracted from medicinal plants and, more recently, with modern pharmaceuticals. The Mae de Santo, head of the religious sect Umbanda -- a voodoo-like religious syncretization of ancient African, Brazilian, and Catholic belief -- is distinguished from the other traditional healers in several important ways. As a spirit medium, she has direct contact while in trance with supernatural beings from whom she receives the power to heal. This voodoo healer, unlike the prayers or herbalists, also has the power to cause harm in the form of sickness and even death. Because of her tremendous supernatural power, flirtation with the underworld, and demands for food and money offerings, she is feared, respected, and kept at a social distance, and is often unacceptable to more pious clients.

These healers' skills are in particular demand by village parents, since according to popular thought, diarrhea and dehydration are symptoms of a number of folk-defined illnesses including evil eye (quebranto, mal olhado), fright disease (susto), spirit intrusion (sombra, encosto), intestinal heat (quintura do intestino), and fallen fontanelle (caida da moleira). An envious glance at a beautiful child by neighbors, friends, or strangers; a sudden, unexpected fright from, say, a passing train or barking dog; intrusion of a dead person's spirit into a child's body, heat that accumulates inside the intestine and upsets the hot-cold humoral equilibrium can all result in diarrhea just as a fall or blow on the head is believed to cause the child's fontanelle to sink into its skull, a signal of grave illness and almost certain death.

B. In Pacatuba, traditional healers can maintain (theoretically) more intimate contact with their patients who are far fewer than for local doctors. The ratio of popular healers to patients is 1:150, whereas the ratio of physicians to patients is 1:2000.

C. Traditional healers are located where illness exists. Whereas 100% of biomedical services (4 health posts) are located in the town center where infants ages 7 to 12 months have less than 2 episodes of diarrhea per person per year, 71% of traditional healers, 15 rezadeiras and 7 Maes de Santo, live and practice in the poor rural periphery where diarrhea attack rates for infants ages 7 to 12 months is much higher (>9 episodes per child per year; only 29% of lay healers, 4 rezadeiras, two folk pharmacists, one orador, one herbalist, and one "lay doctor" are concentrated in the wealthier and healthier Center Town District.

D. Traditional healers are the front-line providers of care for infants with diarrhea. 76.9% of mothers, representing all socioeconomic strata sought the help of popular healers for their child's diarrhea, generally thought to be a symptom of various folk-defined illnesses. Only 17.6% sought physicians in the first place.

3. STUDY PURPOSE

3.1) Description of Operational Problem

3.11) Objectives

From the previous analysis and data is clear that the mobilization of traditional healers and their existing systems of medicine for the delivery of ORT holds the key to actually reaching poor rural families and extending PHC to the most grassroots level. Hence, the operational objectives of this PRICOR project are to: 1) determine how best to mobilize and integrate traditional healers into the official health system to clinically manage diarrheal illnesses and to deliver ORT; 2) identify the optimal health delivery structure that integrates popular and professional spheres of care for the ready distribution of ORT, especially aimed to develop a model system of ORT delivery that mobilized traditional healers, 3) integrate ORT into the popular healing system, introduce homemade ORS, and 4) reinforce behavioral modification of infant care/feeding to include continued feeding during diarrheal episodes, continued breastfeeding during diarrheal episodes, elimination of drugs for unindicated diarrheas, and quick seeking of healers at the onset of diarrhea.

3.12) Background

The roots of this project date back to 1978, when the Division of Geographic Medicine at the University of Virginia joined with MEAC/UFC under the leadership of Dr. Richard Guerrant to investigate gastrointestinal illnesses. Support was provided by the WK Kellog Foundation. PRICOR investigators Dr. Auxiliadora de Souza, Dr Marilyn Nations, and Dr Luciano Lima Corria were all part of this initial team. Dr Galba Araujo, world renouned for his work on traditional birth attendants, and MEAC chief, helped initiate and supervise the initial Kellogg Project. He was actively involved in the PRICOR project until his death in April of 1985.

3.13) History

Building on Dr Nations' doctoral research on the cultural context of childhood diarrhea in NE Brazil undertaken between 1974 and 1980, as part of the original Kellogg Gastroenteritis Project our team

became convinced of two things. First, we must free ourselves of the classic hospital/doctor-based model of delivery and seek alternative delivery strategies that are more cost effective and stand a greater chance of actually reaching the poor. Second, the optimal method to deliver ORT to children in Northeastern Brazil must involve existing traditional healers. We based our conclusion on the fact that village mothers consult healers about their children's illnesses prior to physicians, only 1.2 days after onset. Families rarely sought aid from urban rehydration centers or hospitals, and, when they did, it was relatively late in the illness at 9.6 and 12.56 days respectively. Healers are the frontline health providers in urban neighborhoods as well, of 62 poor children admitted to an urban rehydration center in the state capital, Fortaleza, 91.9% had already been treated by a healer prior to their admission for intravenous rehydration. We also observed that healers are knowledgeable about local antidiarrheal plant remedies, are skilled at preparing accurate ORS, are pragmatic, seeing value in Western-style medicine and referring patients to doctors, and share with patients a common understanding of disease; villagers believe diarrhea results from evil eye, fright, and spirit intrusion as well as other folk causes. Our belief that traditional healers hold the key to delivering PHC has been reinforced by Dr J Galba Araujo, our Brazilian collaborator who has a long history, and indeed, is a world leader in demonstrating how obstetrical care can be extended to poor rural women by enlisting the assistance of indiginous midwives.

4. METHODS EMPLOYED

4.1) Problem Analysis

4.11) Rationale For Traditional Healer/ORT Approach

Today the simple logic of using ORT and traditional healers to reduce the staggering mortality rates in northeastern Brazil is self evident. This was NOT the case several years ago. University physicians at UFC laughed out loud in 1980 when Dr. Nations presented a lecture on lay healing. What in the world did wrinkled-up old women, toothless, illiterate, poor, waving leaves, singing chants, going into trance states have to do with diarrhea and dehydration? And what did salt and sugar in a Coca-Cola cap have to do with death? The notion was ridiculous, unless you knew the facts.

Villagers defined diarrhea and dehydration in folk medical terms--evil eye, fright disease, spirit intrusion; mothers go first to them, they already recognize and treat these illnesses. Healers have the trust of the community whereas they fear distant hospitals where children "go to die". Mothers are already skillfully practiced in self-care, are able, willing and anxious to do something to save their children's lives if given the necessary technology and support. And healers are open to modern medical interventions that work. They see no conflict in diagnosing while in trance state and then walking to the pharmacy to purchase a drug afterwards. But despite the enormity of this well-intentioned healing network that exists at the frontlines, the poorest village household level, it was hidden. It was out of view of health authorities, but not of village mothers. What was out of their reach was the official health care services because of economic, social, cultural, and geographic barriers. The answer to the problem of the enormously high infant death rate, as laid out in the conclusion of Dr. Nations' doctoral thesis, "Illness of the Child: The Cultural Context of Childhood Diarrhea in Northeastern Brazil", was to go directly to the source of the cure: the lay healer using simple technology for diarrheal disease control i.e., ORT.

4.2) Solution Development

4.21) Identifing Constraints

We faced difficult realities: staggering infant

mortality in a country that has the eighth leading economy in the world. Brazil has pitiful health care services at the village level, and yet in the urban medical centers C-section rates are amongst the highest in the world. Poverty painful to see exists in the rural countryside and a skyrocketing annual inflation rate reaches well over 150%. Rampant illiteracy exists among poor women in the northeast and yet the tne national agencies of Brasilia produce sophisticated health education materials. Dire health problems are visible everywhere you turn: local village health posts are overcrowded, physicians faulting, supplies absent. Our realities, our constraints were worrisome, difficult, and at times appeared overwhelming.

Our ORT program had to challenge these problems head-on. We needed an approach that would fit with the severe economic difficulties and realities of high risk families. We needed a system that was: 1.) low cost; 2.) easily accessible by poor mothers; 3.) covered well poor areas; 4.) safe; 5.) utilized appropriate technology; 6.) understandable to illiterate people; 7.) maximized community participation; 8.) involved no costly mass media ads or health campaigns; 9.) encouraged exchange between physicians and lay healers; and finally, 10.) was replicable in other Brazilian communities.

4.22) Analytic Techniques

To analyze IF, HOW, and with WHAT CONSEQUENCES traditional healers might be mobilized to deliver ORT at the home level we needed the following information. Methods used to gather this data are briefly mentioned below and fully detailed in section 5 immediately preceeding each result subsection.

1.) Knowledge, beliefs and practices of village mothers--by socioeconomic status--related to child health, diarrhea/dehydration, ORT and traditional medicine.

A community wide survey was conducted with which to exact this information. One half of the population was with children less than five years of age was surveyed before the project; the second half surveyed afterwards. Their reponses were statistically compared to deduct PRICOR project impact on knowledge, beliefs and practices of village mothers about ORT and child health.

2.) Identification of the traditional healers, their types, subspecialities, numbers, locations, and patient coverage.

Healers of each household were identified during the community-wide survey and mapped. Healers known to researchers were asked to identify other healers. Basic demographic data, as well as in-depth interviews were conducted with all healers. Numbers identified increased steadily throughout the project, reaching 45 near the end.

3.) Traditional healer's knowledge about modern medicine, specifically childhood health.

A "health test" was administered to healers (an identical one for biomedical personnel was prepared but time constraints prohibited its administration) and scored.

4.) Traditional healers' attitudes about cooperating with biomedicine to introduce ORT into their community.

In-depth interviews were conducted with 19 healers which probed their attitudes about working with the modern medicial system.

5.) Traditional healers' ability to give ORT on a routine and supervised fashion.

Throughout the project, community health researchers and PRICOR staff supervised traditional healers in their activities. In addition to frequent meetings, healers were visited monthly in their homes, were interviewed, observed and data collected on their activities.

6.) Acceptable homemade ORT solution made with local utensils and ingredients.

Healers worked with PRICOR staff to identify locally available and readily recognizable measures and ingredients to mix homemade ORT. "Kitchen sessions" were held to mix up various ORS's with healers and children sampled their flavors until agreed-upon measures and mixtures were accepted by all. Measures were confirmed by laboratory testing.

7.) Safety of traditional healers mixing up ORT; the accuracy of their electrolytic concentrations.

Unannounced spot checks were made in healers' homes and samples of ORT they had prepared collected and tested in the UFC's laboratory to verify the electrolytic concentrations.

8.) Feasibility of integrating essential ORT educational materials and delivery into the exisiting cognitive and religious background of village healers.

9.) Cost of sustaining such a program

All costs were noted, categorized, and tallied. Research costs were subtracted from actual Project costs.

10) Impact of traditional healers on reducing childhood mortality

4.3) Solution Validation

Our solution to combat deadly diarrhea/dehydration in Pacatuba, Brazil is to:

1) Mobilize all traditional healers who customarily treat sick children to deliver ORT without undermining the indigenous healing system.

2) To implant 5 basic health messages within the existing folk healing infrastructure. They are

a) to give ORT for diarrhea/dehydration
b) to continue feeding during diarrheal episode
c) to encourage continued breastfeeding during the diarrheal episode
d) to eliminate pharmaceutical treatments (except when indicated by laboratory findings)
e) to seek TH quickly at the onset of diarrhea/dehydration

3) Implement the simplest, most readily accessible and acceptable ORT solution and methods of preparation, using technology available.

4) Construct "curing rooms" onto THs homes from locally-available materials or upgrade existing TH's rooms to serve as front-line rehydration teaching,

supply, and treatment centers.

5) To develop teaching/training materials that are culturally and cognitively appropriate for illiterate TH's.

6) To maximize the entire community's participation in the "diarrhea problem".

7) To build a solution that is, above all, low cost, sustainable by Pacatuba, and replicable in other poor Brazilian communities.

Process The process used to arrive at our solution was creative, eclectic, and by necessity, modified from our initial proposal. Initially we proposed to gather all those involved in health -- administrators, doctors, TH's etc. and, using a formal group decision process rank alternative solutions, given our constraints, and proceed to field testing. We didn't plan that healers would be intimidated by this process: that they don't read, are overpowered by health officials who hold social/economic statis drastically different from theirs, that classroom settings are unfamiliar, that papers and lists have little connection to their real life problems. We had to rethink our approach; we had to change it.

We reached our solutions through group concensus but done in a radically different way. Meetings of PRICOR staff and TH's, mothers and sometimes children were moved to the community. Active dialogue between all participants replaced a formal meeting. Status differences were lessened by PRICOR staff listening, speaking in lay language, participating in healing ceremonies, soliciting herbal cures, and showing utmost respect for healer's traditional wisdom. Verbal solicitation of each healer's opinion and nose counts replaced Delbec or other formal group discussion processes. The sharp division between solution development and testing was blurred; we created, we tested in the laboratory, in the field, we met and discussed more, we changed, we recreated. We remained flexible, letting new information flow back into our new developments/solutions.

During the solution development phase we held 13 meetings together with healers. Each carried a basic theme: what are the child health problems in Pacatuba, what can be done about them, how can we tackle them? Healers identified a wide range of folk illnesses -- evil eye, fright disease, illness of the child, teething, which threaten infants' lives; they came through discussion to also express that their folk illnesses also include diarrhea -- and that

diarrhea kills. "Dry meat" (carne seca) and "angel eyes" -- both symptoms of severe dehydration are devastating; healers learned to associate these with dehydration and thus the need for ORT. From here the meetings became even more creative and experimental. We used a participatory model as fully as possible: a wide range of props were used to stimulated discussions, to generate ideas, to help consolidate the group's position on a number of topics. For example, how would we treat "dry meat" and diarrhea? Healers were asked to bring their favorite treatment to the next meeting. A large table was set up and remedies displayed: a coconut, rice water, a wide array of medicinal teas, packaged ORT, etc. PRICOR added more: drugs, expensive diluted ORT, until the table overflowed with remedies. In turn, the merits of each was discussed. The consensus: herbal remedies work, but a child with "dry meat" and "angel eyes" needs ORT too! The commercially prepared (and only available by prescription) ORT is expensive. Children need the "things" in ORT, but they can get these "things" in ORT made at home for free like herbal teas! Hence, the birth of our homemade ORT. A "kitchen session" where each healer prepared his/her favorite medicinal tea for diarrhea, then ORT solutions resulted in a taste test with village children; they clearly preferred the delicious tasting, heavily sweetened teas. But healers clearly recognized they need the ORT too, even if it -- like many medicines -- doesn't taste good. Result: healers decided to mix homemade ORT with teas. Not only is the water boiled and biomedical treatment added, the mixture has the additional power of traditional herbal treatment! A final taste test of the "new" ORT met their approval.

Where would children, especially those severely dehydrated, be treated? Where would they be watched after when mothers are working? Where could supplies be stored? This discussion gave birth to the "curing room". Through discussions, the construction of mock models from styrofoam, nose counts, and data on the cost and availability of building supplies, the "curing room" slowly came into being: it would be located where the healers live, be made of the same material as their houses (mud and thatch), be constructed by their neighbors, be both an altar and religious center and a place to mix up ORT, to teach mothers, and an infirmary during the diarrhea season when mothers travel on foot long distances for help. It would be a simple, but dignified, sanctified room addition to the healer's house or an existing room clean up, painted and decorated with statues and pictures of her favorite saint.

How would we measure the salts? To the meetings where we discussed this, the healers brought the kitchen utensils, bottles, and containers they keep on hand. They discussed

the advantages and disadvantages of each. Results: the bottle cap won. It is easy to find and comes in only one size. Seven cups of sugar instead of 8 ws elected by healers because of the magical value 7 has in popular culture -- either measure, PRICOR found, after careful laboratory testing, gave safe electrolyte values. How would mothers be taught? These discussions gave rise to our graphic recipe and charts for illiterate people. When presented with standard health education materials about diarrhea/dehydration healers discovered nobody could understand them! If they, as experienced healers couldn't, how was a young mother going to?

Healers dedicated themselves to rewriting our materials so that they could understand them. Passing each graph around healers "read" outloud what they "saw". We all laughed because it was obvious how different the same piece of paper looked to each. Some healers redrew the designs, a local artist helped, and our educational materials were developed. Developing our solution was painstakingly slow. It required PRICOR staff to listen more than talk: to observe more than teach, to respect more than criticize. It was a dialectical process between people, between laboratory results, between experience, between data and new findings. Importantly, it was the healers' and village women's (and even children's) simple solution. For this reason, it will stay.

4.4) Timetable

Time scheduled for the extensiveness of this project was not adequate. We maintained a furious pace for the entire two years, and still have data to complete analyzing. Questionaires (for example illness episodes) were often open ended and required transcriptions and then typping, and enormous effort. The richness of our understanding of traditional medicine and ORT is worth the effort, however. To summarize:

Project initiation: March 1984

March-April 1984 Setting up infrastructure of project, hiring, training, selection of community, mapping, problem review, indentification of constraints.

May-June 1984 Contacts with community, identification of THs, hiring and training of village health workers/researchers, questionaire development.

July-Aug 1984 First 6 meetings with THs held and solution development well underway. Laboratory analysis of ORT completed. Pre PRICOR questionnaires

(illness episodes, community survey) launched.

Sept-Nov 1984 11 meetings with TH's now held. Solution development crystalized with completion of first curing room. Mortality review begun.

Nov-Jan 1985 Implementation of solution; 4 "curing rooms" completed; pre-PRICOR questionaires (episodes, mortality, socioeconomic) winding down, In-depth high risk and attitude questionaires with THs begun.

Jan-Feb 1985 Implementation of solution completed; 4 healing rooms finished, 12 TH houses upgraded and 26 healers in all trained in ORT. Village health workers trained. Concentration on training THs to administer ORT correctly.

March-April 1985 Analysis of data from Pre-PRICOR phase underway (mortality, socioeconomic survey), illness episodes. Documentary film completed for NOVA, PRICOR staff site visits.

May-June 1985 Pre-PRICOR data analysis. Transcription of tapes, implementation of new TH supervision form, in-depth interviews with THs on high risk children continue. Contact with additional types of TH -- spiritists, Umbandistas, Protestant prayers made, and healers mobilized.

July-August 1985 Revision of curing rooms, continued training of new THs, continued data analyses.

Sept-Oct 1985 Integration of PRICOR into UFC's PROAIS project, development and refinement of post-PRICOR questionnaires. Initiation of Post-PRICOR questionnaires. Presentation of preliminary (pre PRICOR) findings in National Pediatric Conference.

Nov-Dec 1985 Finishing post-PRICOR surveys international presentations in Rome and Washington. Initiation of Post-PRICOR illness episodes.

Jan-Feb 1985 Data analysis

Tasks which remain publication of findings and formal presentation to appropriate Brazilian authorities.

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RESULTS

5.1) Mothers' Attitudes, Beliefs, and Practices About Diarrhea/Dehydration and ORT: Pre and Post FRICOR

Pre/post program knowledge and practices were determined by the following methods: 50% of households with children under 5 years old were surveyed during a 3 month period from mid August 1984 until mid-Novemeber 1984. The entire city and surrounding rural area of Pacatuba was mapped. All houses with children less than 5 were identified. Four local research assistants with ample first-hand knowledge of the community and its people were trained and administered an interview which asked basic sociodemographic data as well as soliticiting mother's health attitudes, knowledge and practice. Interviews were conducted with mothers or primary child caretakers in their homes. Sample size of the pre-intervention survey was 204. The identical process was followed at the conclusion of the project during 2 months (December 85 and January 1986). The same four village health assistants performed the survey. The sample size was 226.

Questionnaires of households were then sorted by socioeconomic level. We used a combination of the 4 following criteria:

1.) Income per capita per month of the household

This is the figure calculated as the total income of the family for one month divided by the number of persons living in the household.

2.) Type of house construction.
Two factors, the type of floor (dirt or cement) and type of walls (straw with mud or brick) were considered.

3.) Type of sanitary facilities
These included don't have, running water and septic tank, and toilet with flush.

4.) Type of water source

Including river, pond, well, and piped-in.

Appendix 2 shows the cut-offs for each level. A household was assigned to a level if it met at least 3 of the 4 criteria; in the case of a 2/2 split, the house was assigned to the lower level of the two. The

pre-PRICOR survey households were classified as follows: Level 1 (poorest) 66 families; Level 2, 70; Level 3, 31; and Level 4 (least poor); 37. Post-PRICOR survey houses show nearly an identical proportion of each socioeconomic level. 71 are Level 1 (poorest); 64 Level 2; 51 Level 3; 40 Level 4 (least poor).

Data from pre- and post- questionnaires were compared using chi square analysis. The results are presented in Appendices 3 through 24 and summarized below.

The PRICOR Traditional Healer Project modified a large number of diarrhea-related beliefs and practices which we maintain are health improvements. However we did not significantly alter the core of existing traditional medical beliefs and practices which did not conflict with desired ORT medical management, or indeed reinforced it.

PRICOR'S POSITIVE IMPACT ON DIARRHEA-RELATED BELIEFS AND PRACTICES:

IMPACT ON MOTHERS' ORT ATTITUDES, KNOWLEDGE AND BEHAVIOR:

--Did not substanially increase ($p>.05$) the numbers of mothers who were aware of the existence of ORT. The numbers who had already heard about ORT was amazingly high (96.1%) before PRICOR and increased only 2.6% to 98.7% after. Post-PRICOR 100% of poorest mothers know about ORT, a 4.6% increase.

-- Increased significantly ($p<.0001$) by 69% the numbers of mothers who know about ANY type of homemade ORT; only 3% knew before PRICOR 72% did after.

-- Increased dramatically the numbers of mothers who know about the traditional healer's (PRICOR's) homemade ORT from 0% to 72%. This increased in awareness occured without any formal advertising or mass media campaigns.

--Increased significantly ($p<.001$) by 18.6% the numbers of mothers who know about free government ORT packages (CEME); the greatest increase in awareness (28%) was by poorest mothers: only 59% knew before PRICOR while 87% did after.

-- Increased significantly ($p<.05$) by 6.8% the

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numbers of mothers who have used, at least once, ORT.

--Increased significantly ($p<.001$) by 29.4% the numbers of mothers who ALWAYS use ORT when their child has diarrhea/dehydration. Only 34.2% did so before PRICOR whereas 68.6% report doing so afterwards.

--Increased signficantly ($p<.01$) by 8.8% the numbers of mothers who theoretically believe, at least, ORT MUST be given if a child has diarrhea; the high numbers (84.2%) prior to PRICOR was pushed even higher (93%).

-- Increased dramatically by 54.3% the numbers of mothers who have USED the TH's homemade ORT; the greatest increase (60%) was in the poorest homes, while even the wealthier mothers increased by 40%.

-- Increased by 28.2% the numbers of mothers who know how to prepare correctly homemade ORT. The greatest increase (30%) was reported in the poorest neighborhoods. 95.8% of those who did, learned from a PRICOR traditional healer; only 2.8% learned from doctors and 1.5% from village health workers. Still, 65-70% of mothers do not know how to MIX-UP the homemade solution themselves.

-- Increased significantly ($p<.05$) by 11.6% the numbers of mothers who know how to prepare free government packet ORS (CEME) from 55% to 67%.

--Did not change ($p>.05$) the numbers of mothers who have sugar in their homes; sugar is readily available in 88-89% of Pacatuba housholds.

IMPACT ON TRADITIONAL HEALERS' ATTITUDES, KNOWLEDGE, AND BEHAVIOR:

-- Increased the numbers of traditional healers giving ORT from 0 to 46

-- Increased the number of healers who know exact measures of homemade ORT from 0 to 46.

IMPACT ON FEEDING/NUTRITIONAL BEHAVIOR:

-- Increased significantly ($p<.001$) by 20.5% the numbers of mothers who believe they should continue breastfeeding when a child has diarrhea. The percentages of women who believed breastfeeding should continue during a diarrheal episode was already high (71.2%) before PRICOR, increased even further to 92% afterwards. The greatest increase (36%) occurred wealthiest women.

--Increased signficantly ($p<.001$) the numbers of mothers by 18% who continue to feed milk to their children during the diarrheal episode. Only 30% did before PRICOR 47% did after.

--Decreased signficantly ($p<.01$) the numbers of mothers who withold milk for dangerously long periods of time (5+ days) by 9.8%.

--Increased significantly ($p<.001$) by 25.4% the numbers of mothers who believe it possible to manage their child's diarrhea/dehydration using only ORT and dietary interventions (e.g. breastfeeding).

IMPACT ON MEDICATION BEHAVIOR:

--Decreased significantly ($p<.01$) by 11.6% the numbers of mothers who mostly use expensive commerically promoted, pre-diluted ORT.

--Did not significantly change ($p>.05$) the numbers of mothers who use free government ORT packets (CEME).

--Decreased signficantly ($p<.001$) by 25.5% the numbers of mothers who mostly use commercially promoted ORT packets. The greatest drop (44.8%) occured in the poorest neighborhoods, the same locale where TH's homemade solutions enjoyed the greatest (41.9%) increase in popularity.

--Decreased significantly ($p<.001$) by 20.54% the numbers of mothers who think they must give pharmaceuticals to their child with diarrhea/dehydration from 93% to 73%. While these numbers are still unacceptably high, PRICOR did make significant inroads in reducing indiscriminate drug use. The greatest decrease (29%) was recorded in the poorest households, those least able to afford expensive and

unindicated drugs. Before PRICOR, 92.3% of poorest mothers believed in giving drugs for diarrhea, 63.3% did after PRICOR. The smallest reduction was recorded amongst the wealthiest, 100% believed in giving drugs before and this declined only 12.5% to a still alarmingly high 87.5% post-program.

PRICOR'S NON-ALTERATION OF CORE TRADITIONAL MEDICAL WISDOM

--Did not change signficantly ($p>.05$) villagers' folk medical beliefs about the causes of diarrhea; fright disease (susto), evil eye, as well as poor food preparation or quality, worms and poor hygienic pracitices continue as explanations.

--Did not change significantly ($p>.05$) the number of mothers who they should take a child with diarrhea to the traditional healer for cure. The already high numbers (79.4%) before PRICOR climbed slightly higher to 83.3% after.

--Did not change significantly ($p>.05$) the numbers of mothers who FIRST take their children with diarrhea to pray with traditional healers; the numbers were already high before the program (79.4%) and increased slightly to 83.2% afterwards; a 3.8% increase over all.

--Did not change signficantly ($p>.05$) the numbers of mother who feed medicinal teas to children with diarrhea; the practice was common (76%) before PRICOR and increased 6.5% to 83% after PRICOR.

PRICOR'S NON-ALTERATION OF USE OF BIOMEDICINE

--Did not significantly alter ($p>.05$) villagers' utilization of doctors as the FIRST source of care their children with diarrhea/dehydration. Percentages of mothers consulting doctors first was low (18.2%) before PRICOR and remained constantly low (17.7%) afterwards.

--Did not change significantly ($p>.05$) the numbers of mothers who FIRST take their child with diarrhea to the pharmacist. The numbers were low (3%) before the program and declined to 0% after.

5.2) Traditional Healers' Attitudes, Beliefs and Practices Related to Diarrhea/Dehydration and ORT

5.21) Identification of Pacatuba's Healers Mobilized

By the conclusion of the PRICOR project in January of 1986, 46 healers had been mobilized to deliver ORT. Their primary identity is as follows: 20 prayers (rezadeiras), 7 Afro-Brazilian healers (Umbandistas), 4 spiritists, 3 popular pharmacists, 1 herbalist, 1 popular "doctor", and 10 visiting Protestant prayers. However, the initial core of healers, with whom we worked most closely and for whom we have the most data was approximately 20.

Approximately 71% of healers live and practice in the poor periphery of Pacatuba, where diarrhea is common; 29% live in the Centro wealthier area. About 2/3 are female, 1/3 male. Most are in their late 50's, although one was as young as 35 and another as old as 82 years. Healing is no new vocation; on average they have nearly 24 years of experience. All are professed Catholics, which does not preclude them practicing other religious beliefs in tandem (see Appendix 25).

5.22) Knowledge of Traditional Healers About Biomedicine

In 1985, a "health test" was administered to 18 traditional healers. The purpose of the test was to find out how much healers knew about the official biomedical system and vocabulary. Healers were asked to identify a number of types of medical professionals and hospitals by description. In addition, each healer was presented with three symptom lists to see if they could give biomedical names to the sicknesses described (diarrhea, dysentery, dehydration). Further, healers were asked to respond to a list of disease names with whetherg the diseases involve diarrhea, to a list of pharmaceutical names with whether the pharmaceutical is useful for diarrhea, and to a list of behaviors with whether the behaviors prevent diarrhea. Results are given in Appendix 26.

In general healers were better able to identify doctors (72.22%) and nurses (72.22%) by description than health agents (0%), or nursing auxiliaries (16.66%). Most healers identified the description of a health agent (a non-educated person from the community who is trained to orient people about health) as that of a traditional healer. The health agent is a recently introduced role from outside the community; traditional healers have an indigenously evolved role that has social meaning to locals.

Healers also failed correctly to identify types of doctors and hospitals, especially with gastroenterologists (a doctor who cares for intestinal or stomach sickness) which no healer was able to identify.

Most healers responded to the sickness descriptions with folk terms such as quebranto, susto, and quintura. Many stated that the descriptions involved a mixture of sicknesses, quebranto with a bit of susto as well, for example.

Healers were better able to state which diseases involve diarrhea most especially with measles which 94.44% of healers correctly associated with diarrhea. In no case did fewer than 55.56% of healers correctly identify a disease.

Healers are familiar with modern drugs, they know many by name and correctly identify their use according to local pharmacists' and doctors' recommendations. For example, they overwhelmingly recommend Colestaste for diarrhea (83.34%). Some drugs however, were unfamiliar to healers; only 16.66% correctly identified Flagyl. Unfortunately, often these drugs are judged unindicated or indeed dangerous by WHO standards.

The list of behaviors presented to healers included both biomedical recommendations and folk medical beliefs. Healers enthusiastically recommended treatment of water (83.34%), breastfeeding (83.34%), walking with shoes on (88.89%), and less strongly, boiling or filtering water (66.66%), constructing bathrooms and running water in houses (66.66%), and avoiding getting wet with dew or rain (55.56%). In this section it was clear that the biomedical suggestions were firmly accepted, whereas the folk beliefs were accepted to varying degrees, with avoiding walking barefoot the only strongly recommended folk practice.

Thus it appears that while healers are unfamiliar with some of the vocabuary of the medical system, they are familiar with pharmaceuticals, with the names of some diseases, and with biomedical hygienic instructions. Although healers were for the most part unable to respond with biomedical terms to the disease descriptions, they had their own folk medical categories and diagnoses; not a one responded "don't know" to these. Healers are most familiar with that part of the biomedical system with which they have the most contact (nurses, doctors, pharmaceuticals, hygienic prescriptions) and less with the more distant parts (hospitals, disease names, more specialized professionals). Although familiar with health agents,

healers identified themselves with the description of health agents, perhaps on indication of their opinions on the relative importance of the two professions.

5.23) Attitudes of Traditional Healers About Physicians/Biomedicine

Nineteen traditional healers were interviewed in 1985. They range in age from 35 to 82, with a mean age of 56.7 years (see Appendix 25) Twenty-six percent are male, and 74 percent are female. While all 19 (100%) profess their religion to be "Catholic", 12 (63.1%) are prayers (rezadeiras), 3 (15.7%) are Afro-Brazilian healers (Umbandistas), 1 (5.2%) is a combined prayer/spiritualist, 1 (5.2%) is an herbalist, and 1 (5.2%) is a traditional birth attendant. Interviews were conducted in the healer's home by PRICOR staff. A prepared interview schedule was used with open-ended questions. Interviews were tape-recorded and transcribed. Interviews lasted between 3 to 5 hours each, often divided into 2 to 3 sessions. The interviewer had excellent long-term rapport with healers and we believe answers are quite open and frank.

How willing are traditional healers to work with modern medical practicianers in such an ORT program? This is perhaps the most fundamental question. For if there exists a conflict between them, no program based on their mutual cooperation, no matter how technically excellent, will succeed.

Our results (Appendix 26) show traditional healers express a CAUTIOUSLY COOPERATIVE yet HIGHLY PRAGMATIC attitude towards working with physicians. They eschew the professional dominance of the physician while clearly recognizing the benefits of biomedicine. Moreover, traditional healers express a FORTHRIGHTLY CONFIDENT attitude in their own healing ways, and command RESPECT. They have a clear sense of their role, "territory", limits, and healing methods, some of which they believe to be superior to biomedical ones.

1) CAUTIOUSLY COOPERATIVE: Healers do not race to embrace everything modern medicine has to offer, nor blindly enter joint partnerships with doctors. Healers express a spirit of cooperation; however, it is tempered, cautious, and tentative. For example, while 68.4% of healers are willing to work with doctors, 26% of these agree to only if certain conditions are met, and 26.3% either refused outright to work together or were indifferent to the proposal. Healer Antonio explains, "I would like the doctors to work with me if I see that his help is equal to mine. Now if he started dividing it differently ... well, then ... I wouldn't let him work because this would complicate the cure". While 42% of healers think that the official medical system can help them in their work, a larger number (47.3%) gave biomedicine only a lukewarm response: indifference, irrelevance, or

neutrality. As Dona Beatrice sums up, "I don't take away value from the doctor, I think it is good God left the doctor to take care of the heart of creatures ... no. it doesn't bother me to work with doctors. A mother comes here to pray. I pray ... then they say they are going to the doctor ... OK .... And I say, you go because you want to but I guarantee that with my prayer and the power of God this child will escape death. Some go, some weak mothers, that don't have a lot of faith in prayer and cures. Those who have strong faith in prayers return here and are healed".

Why then are traditional healers willing to cooperate? Healers feel that doctors do good; they save lives, they attend the sick, and they prescribe effective medicines, and they have their patients' best interests at heart. Eighty-two year-old prayer, Alfredo, with over 30 years of healing experience, praises doctors saying, "they give health to so many people, so much beauty!" Another healer simply says, "Below God are the doctors". The majority (78.9%) of healers interviewed state that doctors cannot do harmful things to patients.

Moreover, doctors have powerful medicine. There are illnesses that only they can cure, according to 94.7% of our sample. These are "big sicknesses", inside sicknesses, dangerous illnesses, cut fingers, fever, cancer, pneumonia, sore throats, dehydration, and hepititis. Doctors can perform heart operations and immunize for polio. Their pragmatic ability to treat these conditions is attractive to traditional healers and draws them to modern medicine. As Mother of the Gods Dona Loura says, "The doctors take care of more serious illnesses, more complicated illnesses, things that I cannot cure with prayer ... it is things that need operations, for that we have doctors". Indeed, 68% believe that doctors can help them in their work, and nearly 60% of healers pinpoint specific things they would like to learn from doctors, including techniques for treating infections, dehydration, and children's illnesses. Medicine has some magic, such as ORT, according to healers. Healers know of ORT, 89.47% are familiar with it, 84.21% can prepare it correctly, 89.47% believe it is effective whether given orally (52.6%) or intravenously (36.8%).

Not only are the doctor's techniques awesome to many traditional healers, their training and medical language are revered. Doctors are seen as having useful and important knowledge, and 94.7% of healers are adamant that doctors need not forget their training in order to work together with traditional healers. "Doctors don'tneed to forget what they have learned," says Afro-Brazilian healer Dona Vicencia. "They only need to learn how to pray ... and thus, with the prayer, plus the modern medicine, plus pharmaceuticals it would be even better."

While recognizing that nearly half (42.5%) of patients don't understand doctors' talk, traditional healers still believe (63%) that it is important for doctors to use medical language even where mothers hold different beliefs about the causes of illness. Indeed, 68% go so far as to say that it is helpful for them to use biomedical terms in their own traditional medical practice. Traditional healers take this tolerant stance, because 73.6% believe in the biomedical causes of disease described by doctors. Even if they did not believe personally in biomedical explanations, healers respect the power of their patients' (potential) biomedical beliefs, for if people really believe in biomedical causes, they sicken (89.47%).

Yet another practical reason for traditional healers to associate with physicians is to guarantee the well-being of their patients in distant hospitals. Healers (100%) refer their patients to doctors. They (78.9%) want follow-up and feedback from doctors on their patients' condition. Says healer Beatrice, "I always try to find out what the doctor does when I refer a patient to learn and to see if my prayer or if my medicine was really strong and powerful or not."

2) CONFIDENT IN TRADITIONAL HEALING

Despite a pragmatic tolerance or perhaps we can even call it an affinity for biomedicine, healers do-not sell out traditional healing. They view themselves as the frontline "doctors of the poor". Healers are vital to their community's health and take care of anyone in distress. A 72 year old prayer, Raimundo, says, "I take care of everyone, the old, the white, the black, children, women, men, people with toothaches, headaches, body aches, this illness, that illness, what ever thing, I pray and cure". They (74%) declare that patients believe equally if not more in lay healers than in physicians; only 10% state that patients believe more in doctors. Children can be cured by seeking both doctors and healers according to 84% of healers surveyed. Moreover, if doctors work together with them, their own ability to marshal patient confidence would increase (89.5%). Healers see their powers to cure as a divine gift bestowed upon them by God. The majority of healers do not expect to receive monetary reimbursement for their labors. They view physicians' primary benefit as fiscal.

Healers do not find the prospect of working with biomedical personnel threatening; they are self-assured. The majority (84%) have no objections to doctors' entering their homes and observing their healing rituals. Healers do not object to doctors learning to cure evil eye, an illness most believe curable only by traditional methods, even if it cuts into their own practice. That healers are not

threatened by professional infighting extends to health professionals and mothers as well. One hundred percent encouraged the involvement of other non-medical health workers participating in the community's health. They unanimously support lay people learning to prevent and treat diseases at home their or doctors' intervention. All mothers, for instance, should have on hand and use homemade ORT to save their own children's lives (94%).

Traditional healers have a clearly defined sense of their own role and function. They are important to the community's health even in the face of modern medicine. A wide array of folk-defined illnesses are believed by them (89.5%) to be curable only by traditional healers. These include witchcraft, hexing, evil eye, spirit intrusion, "pain of the woman", diarrhea from evil eye, diarrhea from fright disease, fallen spine, fallen womb, fallen fontanelle, "illness of the child", "red", "twisted meat", etc. Curing these illnesses is a specialty of lay healers: 58% believe doctors don't recognize evil eye. As one healer says, " ... evil eye or fright disease, these things you can take to the doctor 3 or 4 times, give your child lots of medicines and it won't get better but if you go to the rezadeira early, you only need go once to pray and the child is well." Only one thought doctors could recognize the malady and she added, "but they can't cure it". Seventy-nine percent stated that doctors cannot cure evil eye alone. Despite their clear notion that treating these illnesses is their specialty, they do not entirely preclude doctors' involvement in such cases. They state that if doctors learn how to pray and cure (47.37%), if they know and believe in popular illnesses (21.0%), if they understand and learn about Umbanda and spiritism (15.3%), and if they master the use of herbal remedies (5.3%), they too will be able to cure folk illnesses.

Healers have an agenda for doctors, their own list of effective therapies to teach. As 56-year-old prayer Dona Nelsa asserts, "I would like to teach doctors the art of praying because doctors know how to prescribe medicine for dehydration and vomiting but there is a whole other field that he (doctor) doesn't even begin to understand. Dona Jesuina, too, wants to teach doctors traditional healing. As she states, "Reading, I don't even know. Adding, I don't even know. To say this is that much or that much, I don't even know. The only thing in this world that I learned is curing. This is what I want to teach the doctors." Given the opportunity, healers (37%) would teach doctors the secrets of healing plants that cure infections and diarrhea, powerful prayers (31.5%) that can even stop blood flow, and the art of healing children (15.8%). One healer even mentioned teaching doctors how to use pharmaceuticals. For

fewer, teaching the secrets of their trade is prohibited; they believe it will break the healing force as Dona Geralda explains, "I can't teach my prayers. I don't have permission for this .... I could teach doctors an herbal remedy or a measure ... but my prayers, no way". Can modern practicianers then utilize traditional remedies in their clinical practices? The answer is mixed; 47.7% say yes or somewhat; 42.1% say no.

Healers have a sense of the limits of medical intrusion into their work. While 47.36% state that they have no particular limits on doctors' use of their techniques, 31.57% have limits: they would not permit a doctor to receive a spirit, to achieve a point of equality with them, or to interfere with their patients. As one healer stated, they can diagnose, but they cannot cure. Healers also tend to want the last word; only 10.5% state that when working jointly they would let a doctor have the final say on treatment in case of disagreement. Healers' ultimate control of their patients' well-being may be covertly manipulated, as healer Dona Corina says, "When I reach an impasse with the doctor, I let him do what he wants. Afterwards, I call the mother and say, 'bring your child to me and I will cure her.'" Others, like prayer Dona Beatrice, assume (and demand) total responsibility. She says, "I'll give the doctors a million (lots of credit) but it s my word that must stand." Thus we see that healers, while respecting the ability of doctors to treat infectious and other biomedical diseases and perform operations, have a strong sense of their own worth and the value of their knowledge in treating those illnesses most likely to harm and kill the children in their neighborhoods. To summarize:

-- TH's are willing to enter partnerships with physicians although with reservations, concerns, and conditions.

-- TH's value modern medicine. They admire technical aspects and scientific knowledge and routinely refer unresolvable cases to doctors.

-- TH's association with physicians increased their villagers' confidence in their healing skills.

-- Physicians, however, need to pray and learn about herbal medicines.

-- TH's have a crucial role to play in their communities even if modern medicine is readily available.

-- TH's see their primary function as helping people, a service which is an act of charity and love.

-- When TH's work jointly with physicians, the healers' believe their opinion should be the final word.

Supervision of Traditional Healers

Community health agents were instructed to visit traditional healers and administer to them a questionaire about their preparation and use of ORS. This questionaire went through several versions. Until May, the questionaire asked for the name of the healer, the date of the visit, a description of the preparation and administration of ORS, of the use of the filter, consumption of sugar and salt, number of liters of ORS prepared in a three day period and the "conduct" of the healer in dehydration and diarrhea. In addition there was a space for comments. In May the questionaire was expanded. Questions added included a query as to the kinds of sicknesses treated without ORS, whether the healer had treated any very sick children or children who died, and whether the healer used any kinds of medicine, biomedical or traditional, to treat sicknesses. Surveys were administered from February 1985 through January 1986 with the exception of October 1985, during which month no surveys were administered.

In the first months, the major problem noted was with the administration of ORS. There were no reported problems with preparation of ORS, but many healers administered it according to age and dosage related formulas (see Appendix 26). In all of these incorrect administration methods there is a clear effort to control dosage and to modify it according to the age of the child. In the case of such methods as numbers 6 through 8 on the chart, the amounts of ORS adminstered are high and the attempt to control dosage may well not adversely affect a child's health, but methods such as numbers 4,5, and the popular 1 severely restrict fluid intake with consequent serious complications for dehydrated children.

After May, no further problems with administration are noted in the surveys (except for one use of method number 2 in November), although in many cases this question is simply marked "as instructed" without further elaboration, leaving open the possibility that healers are still administering ORS incorrectly. Eighteen healers reported using government-provided pre-measured packets for preparing ORS. Before May, a number of problems with filters (dirty, torn,

broken, leaky), supplies (missing filters, no sugar, ants), and curing rooms (wet floors, leaky roofs, moldy walls, untidiness) were reported. After May fewer problems were recorded with the exception of an occasional broken filter: In May agents began recording sicknesses treated without ORS; these included the ethnomedical complaints quebranto and mal olhado (evil eye), vento caido (fallen fontanelle), and susto (fright disease). A disturbing finding was that many healers regard these ethnomedical complaints which often involve diarrhea and dehydration as not needing ORS. In addition, 4 healers stated that only children with little diarrhea need ORS.

Healers prepared varying amounts of ORS (Appendix 30) ranging from 0 liters in 3 days to 18 in 3 days with an average of 4.45 liters in 3 days for all months (low of 1.1 in April 1985, high of 7.42 in January 1986).

5.25) Traditional Healers' Preparation of ORT: Laboratory Findings

Homemade and CEME ORT

We performed analyses of the ORS prepared by traditional healers. Each TH prepared homemade ORS and CEME ORS alone in her home, without the presence of researchers. They were instructed to prepare these in the same way they would for a client. The next day we took each prepared liter to the UFC laboratory in Fortaleza for analysis. These analyses were performed two months after our training program.

Our laboratory results showed no traditional healer prepared homemade ORS with dangerously abnormal sodium levels: the electrolyte concentrations of all ORS solutions were in the normal range: sodium (98-42 mEq/l), glucose (2.218 - 1.066 mg/dl), and potassium (0.7 -0.3) (Appendix 30) Unexpectedly we found greater variability in the electrolyte composition of the free government (CEME) packet when mixed with one liter of water by traditional healers. Compositions of sodium ranged from a high of 110 mEq/l to a low of 82. Glucose concentrations ranged from 1.747 to 1.057 mg/dl and potassium ranged from a high of 19 to a low of 13.2. These variations, we believe, are due not to TH error in preparation, but rather to variations in the packets themselves. From this data we conclude that TH's are eminently capable of preparing safe, effective ORS at home and that at least in some cases, homemade ORS may even be preferable to the government packages.

Analysis of Teas and Rice Water

We also performed analyses of the traditional medicinal teas for diarrhea and rice waters. See Appendix ces 31 and

32 for results. Eight healers prepared medicinal teas at home in the same way as they would for a client of a year of age. In contrast to the preparation of ORS, researchers observed the preparation of teas because we wanted to record the methods of preparation. Appendix 30 shows results. Glucose concentration compare favorably with WHO ORS; concentrations varied between 2.096 mg/dl and 1.464 mg/dl. However, the teas contain no sodium.

Healers also use rice water as an indiginous treatment for diarrhea. We selected one healer, Vicente, who specializes in the preparation of rice waters, for analysis. She was asked to make rice water, in the same way she makes it for a child: approximately 100 grams of rice with outer shell boiled in 1 liter of water for 15 to 20 minutes. The water is fed to the child after it cools. No other ingredients are used. Sodium and glucose concentrations are low in comparison to our TH homemade ORS. See Appendix 30 for results. This could be increased by the addition of salt and sugar after the preparation of the water. Potassium concentrations are much higher than either TH homemade ORS (very low) and lower than WHO ORS. The principal advantage of rice water is the concentration of protein (14.6 mg/dl) which could be further increased by mashing the cooked rice. In Pacatuba, where rice is harvested, rice water ORT offers a tantalizing option.

5.26) Educational Materials For Illiterate Traditional Healers

In our project we used educational materials appropriate for illiterate people because most of our target population is illiterate. In order to design the best possible material, we performed tests of different versions with TH to see how they interpreted our illustrative materials. We began by designing a series of illustrations in our office in Fortaleza and then we bought this material to the TH in Pacatuba. We found that they interpreted the material completely differently than expected. An example is Appendix 33, figure 1. This figure shows popularly-believed causes of diarrhea and dehydration, leading to the death of the child. When healers looked at this figure, they looked first at the drawing of the dead child and ignored the sequence leading up to it. They did not understand the significance of the arrows drawn between the figures, and therefore read the illustration in reverse order, starting with death, and progressing backwards to the figures representing evil eye, fright, heat, teething, etc. After viewing the figures, they were unable make the expected connections between cause and effect. We returned to our office with the materials and redesigned them using

the suggestions of the TH. The same message was communicated, this time using Figure 2. Here the sequence with arrows is eliminated and popularly-believed causes of diarrhea are represented as a circle which can be viewed from any point. We represented the causes with more elaborate figures and simplified the message, removing the image of the dead child which had totally absorbed the attention of the healers, its negative impact overshadowing the other message. This is how we designed almost all our figures, designing and testing them until we had arrived at the best possible designs.

Another example of using appropriate messages to teach the public is our sign about preparation of our homemade ORS (Figure 3). Healers identified the Coca-Cola bottle cap as a readily available standardized measure during our meetings. Subsequently, we tested the bottle cap measure in our UFC laboratories and found that the correct concentration of glucose/per liter could be made with 7 or 8 full caps. Healers opted for 7 rather than 8 because 7 is a magical number in folk culture and is thought to be lucky; 7 is used in many cures, prayers, and remedies. The acceptance and memory of the ORT recipe was easier than we had hoped because of its close fit with popular cognitive categories.

That mothers' popular beliefs about diarrhea were respected and held by researchers as valid, important, and interesting was another important factor in the development of our material. Our method was to build on folk medical concepts new health messages. We started with what mothers knew and believed about a subject, gave value to her interpretations, then added new biomedical knowledge. Even so, new information given was minimal, as healers generally had a keen understanding of diarrhea/dehydration, although they often obscure their basic clinical observations/experience with folk medical/mystical terminology. Refer for example to Figures 4 and 5. Initially in Figure 4, we see the signs by which mothers popularly know and recognize dehydration (by whatever name they call it). These lay terms are often not known to doctors, but they are excellent descriptions of seriously dehydrated children: angel eyes, broken vision, dry skin, fallen fontanelle, etc. Next, in Figure 5, we see the same picture of a dehydrated child, but this time a few key additional signs/terms recognized by biomedicine are added. Healers found it simple to add a few new thoughts to their baseline knowledge.

We used these basic concepts -- respect for mothers'/TH's indigenous beliefs, simple graphic presentations that incorporated people's cognitive forms of organizing and "seeing" reality, and building on people's base knowledge

new messages to develop all our educational materials. Figures 6 and 7 show this same process with popular and biomedical ideas about preventative strategies for diarrheal diseases. Figure 8 shows our health messages about the biomedical management of diarrhea.

5.3) Cost Analysis

"So much for so little". No phrase better describes the cost analysis of this PRICOR project (Appendix 34). The cash outlay is pitiful in comparison with the services provided, the "hidden" health resources mobilized and the community spirit sparked.

We mobilized, trained, supervised, in the end 46 lay healers, and 4 village health agents to deliver ORT, constructed from scratch 5 fully equipped "curing rooms", or popular rehydration clinics, upgraded an additional 13 existing curing rooms and equipped them for ORT delivery. Traditional healers ...vered over 7,400 liters of ORT in 12 months.

The total program cost of $US 4,027.23 is a small price to pay. Initial costs totaled only $US 2,959.53 and this amount includes the training of traditional healers by senior and junior level physicians+ and a nurse, supplies, materials to construct and equip the curing rooms and transportation expenses. Operating expenses for a 15 month period were equally minimal: $US 1,067.70. And this figure included ongoing supervision of TH's by 2 physicians and a nurse, and 4 health agents, and an "incentive" for TH's. It includes the salt, sugar, and other necessary ORT materials and travel costs.

When we break our cost analysis down by activity the financial feasibility of such a project even in economically strapped communities makes plain sense. All initial training performed mostly by health professionals is only $US 870.00. Ongoing supervision, training, and maintenance totals only $US 1,157.09 for the 15 months. The average cost of constructing a curing room is $US 26.22; and fully equipping it for ORT delivery is $US 43.15. The estimated cost of sugar needed per month per healer is an embarrassingly low $US 0.48; for that she can provide over 30 liters of ORT.

The costs are low because the technology is simple, no expensive mass media campaigns are utilized (depending instead on word of mouth), healers are paid by their communities in love and respect and gifts, as has always been their custom. And the mothers and fathers of village children themselves donate their labor, their resources and their energies to an effort for which they can see their direct pay back: the lives of their own children.

+ This cost could be cut further using non-professional health trainers/supervisors.

5.4) Mortality Impact

For the purpose of calculating mortality impact, we will consider only deaths in 1985 as project impact, since healers did not fully function in 1984. Our survey data (Appendix 35 revealed that the pre-PRICOR infant (0 to 5 years) mortality rates in Pacatuba were historically as follows:

In the 5 years immediately preceeding the PRICOR ORT project, the infant deaths per thousand were 106.2 in 1980, 61.2 in 1981, 71.8 in 1982, 38.5 in 1983, and 53.4 in 1984. The PRICOR program began in February of 1985. Post program infant mortality rate in Pacatuba was 51/1000 in 1985.

The mean infant mortality death rate for the five years preceeding PRICOR (1980 - 1984) was 66.2/1000. Because (fortunately) only 5 deaths occurred in 1985 in children < 1 year, we are unable to statistically compute a chi-square value to test the significance of their difference because one cell is less than 10.

Mean IMR

	pre 1980-1984	post 1985
live births	175	98
deaths	12	5
total	187	103

Hence we cannot conclude whether the difference is statistically significant.

While we did not have a large enough sample size to document a reduction in mortality, we did discover that the method of death surveilance leads to significantly different mortality rates. It is difficult to get accurate death statistics: PRICOR tested 3 methods and found them quite different in terms of accuracy. The methods included using the official death registry, using an intensive door-to-door survey, and questioning local gravediggers. The official registry recorded 4 deaths of children under 5 years in 1985 in Pacatuba. PRICOR in-depth and labor intensive questionnaires detected an additional 4 deaths in children <5 years for a total of 6 deaths, but failed to record 2 deaths found in the official registry and 3 deaths reported

by grave diggers. The most accurate method by far was a culturally-derived death surveillence network composed of local traditional healers and the grave diggers. They noted 8 deaths that occured in the same period and in the same setting.

A comparison of the information from all sources revealed that 9 deaths had occurred in 1985 (see Appendix 36). If we were to calculate the infant mortality rate (<1 year) for 1985 using each method, we would discover significantly different IMRs. The official registry would yield an IMR of 30.6/1000 (3 deaths/98 live births). PRICOR's door to door survey yields an IMR of 40.8/1000 (4 deaths/99 live births). And the gravedigger's simplest method yields an IMR of 51.02/1000 (5 deaths/98 live births). The last is the most accurate and suggests that more culturally appropriate death recording methods are needed. If we fail to address this problem, deaths could be underestimated by at least 20%.

6) Conclusions/Recommendations

6.1) QR Method

The positive aspect of QR methods is that they are PROCESS oriented; they are FLEXABLE and allow for, we believe, the greatest degree of creativity. There is no need to wait two years for some final outcome. Rather, one can change, modify, alter what isn't working based on your current data and group process.

There is a serious shortcoming which we wrestled with throughout the project: the inherent problem of class conflict in group decision process. Initially we had planned to bring together traditional healers, administrators, researchers etc. and rate/rank our solutions. This was a naive approach. Traditional healers, illiterate, economically inferior and socially signmatized, sat with their hands neatly folded in their school desk, eyes cast downwards. There was no reasonable chance they were going to contribute equally with the hospital administrator in a setting where social class inequality is hundreds of years old. We had to modify our approach: traditional healers alone with researchers, meetings held in their houses, no written materials, reaching consenses through dialogue and exchange. QR methods need some serious rethinking with such real situations in mind.

Summarizing the large volume of data we have presented is a difficult task; there are however two essential take home messages:

1) Traditional healers in Northeastern Brazil can be effectively mobilized to deliver homemade ORT without destroying existing popular traditions. They are capable of preparing safe and effective ORS and conveying this message to mothers; they can significantly influence mothers' feeding and drug use behaviors during the diarrheal episode.

2) The PRICOR traditional healer model is an accesible, low cost, ORT delivery model that is understandable to illiterate people, maximizes community participation and is replicable in other Northeastern Brazilian communities; it involves no costly mass media advertisements or health campaigns.

6.2) Recommendations Acted Upon

Through the UFC's PROAIS/VIVA Projects (AID's Child Survival Project) traditional healers are now being

systematically mobilized to delivery ORT in 33 counties, with a total coverage of approximately 500,000 people. With the exception of the "curing rooms" all other aspects of the PRICOR project have been adapted including our graphics, teaching aids, ORT preparation methods and measures.

6.4) Additional Research

These questions still remain:

1. What are doctor's knowledge and attitudes towards working with traditional healers? We did not find resistence on the part of traditional healers. Perhaps the general resistence to such an alternative health program can best be explained by physicians' lack of knowledge or negative attitudes towards popular medicine.

2. What is the essential healer-patient interaction like? How does it differ from a doctor-patient clinical encounter? Why do mothers seem to prefer this encounter? Perhaps this qualitative aspect, the HUMANISTIC CARING of patients, more than any quantiative measure is the most fundamental aspect to capture and evaluate.

7) ADMINISTRATION

7.1) Staff/Role:

The project was directed by Dr. Marilyn K. Nations, PH.D. and Dr. Maria Auxiliadora de Sousa, M.D., Ph.D. The two principal investigators oversaw all technical aspects of the research project as well as the much of the day to day functioning. They were directly responsible for the supervision of the Coordinator of Research, Dr. Luciano Correia and Coordinator of Field Activities, Diana Nunes, a nurse. Five community health researchers collected our large volume of questionnaire data. One, a trained nurse, conducted in-depth qualitative interviews as well. Transcriptions of taped interviews was performed in part by a contracted employee as was the data coding. Expert assistance was given by three PRICOR central staff. Secretarial and bookkeeping assistance, while highly deficient, was paid in part by PRICOR and donated by UFC's Department of Community Health. English translations of all reports were done by Dr. Nations, the Principal Investigator. Statistical assistance was contracted as was laboratory evalutions. Technical medical assistance was provided by Dr. Richard Guerrant. Volunteer medical students (5), Fellows etc. were involved through the University of Virginia or UCSF.

7.2) Amount of PRICOR support

This 25 month study cost $135,146; this includes direct and indirect costs for American and Brazilian portions.

7.3) Estimated Total Support/Source

Support for this project came from numerous sources in addition to PRICOR. Portions funded by outside sources included:

Dr. Nations' salary (approx. $45,000) Dr. Auxiliadora's salary $10,000 additional from UFC

computer use (HOPE) $1,000

Office space, air conditioning, lights etc. $5,000 from UFC

student volunteer time ($20,000)

UVA support secretarial staff ($10,000)
Misc. contributions ($2,000)

Total cost of project: approximately $228,146.

8) SHARING FINDINGS

8.1) VIVA/PROAIS

During the past six months of the project, PRICOR staff participated directly in PROAIS (the Federal University of Ceara's PHC program) and VIVA, Project HOPE/AID's Child Survival Project. Formal presentations of data were presented and aspects of the PRICOR project, as well as the entire staff, have been incorporated into these University programs.

8.2) NOVA Television Program

The film "The Silent Emergency" produced by Boston Public Broadcast Service's series NOVA featured our PRICOR project and has been broadcast nationwide; filming was arranged and conducted during our project.

8.3) International Academic Community

Evaluative findings have been presented at five international academic meetings:

1) Western Meeting of Clinical Research, Carmel California, February 1986

2) Vatican Conference on the Interaction of Parasitic Diseases and Nutrition, Vatican City Rome, Italy, November 1986

3) XXIV Brazilian Pediatric Conference, Fortaleza Ceara Brazil, October 1985

4) ICORT Conference, Washington DC, December 1985

5) NICH Conference, Washington DC, June 1986.

Findings are being prepared for publication in a special edition of Social Science and Medicine on ORT and in an Oxford University Press Book Child Health in a Transitional Society.

8.4) Brazilian National Health Institutions

PRICOR staff has planned upon the termination of our final report to present findings/lectures to the W.K. Kellog Foundation, UNICEF, AID in Brasilia, and possibly PAHO regional headquarters.

APPENDIX 1

Total Causes Attributed to Childhood Deaths by Mothers in Pacatuba

535 deaths of children < 5 years occuring in Pacatuba between 1951 and 1984.

Cause	#	%
Doenca de Crianca	110	21.0
Diarrhea	93	17.0
Dehydration	58	11.0
Measles	34	6.0
Teething	20	4.0
Pneumonia	18	3.0
Fright Disease	15	2.8
Evil Eye	8	1.5
Other	188	35.1

Percentage of Deaths Attributed to Popular Diagnoses

Neighborhoods listed in ascending order of wealthiness

Neighborhood	No. Deaths attributed to popular causes/ total deaths	
Sao Joao	88/252	35
Forquilho	12/58	21
Sao Jose	12/47	26
Matadouro	21/86	24
Sao Bento	11/35	31
Centro	10/57	18
TOTAL	154/535	29

APPENDIX 2

Socioeconomic Levels for Pre- and Post Project Community ORT Survey Facatuba, Brazil, 1984-1985

Level	Income per capita	Type of house walls/ floor	Type of toilet	Source of water
I	a.* 0- 9.900 b. 0-59.900	thatch/ dirt	don't have	river or dam
	$US 0-5.85			
II	a.10.000- 19.900 b.60.00- 119.900	brick/ dirt	running water/ septic tank	community faucet with openair sources
	$US 5.89 - 11.73			
III	a. 20.000- 49.900 b.120.000- 299.900	thatch/ cement	running water septic tank	pro- tected well
	$US 11.74- 29.38			
IV	a. 50.000+ b.300.000+	brick/ cement	flush toilet	piped in
	$US 29.39+			

* a= July 1984 to October 1984, $US 1.00 = $cr 1,700

b= December 1985. $US 1.00 = $cr 10,200.

APPENDIX 3

Question: Have you ever heard about ORT?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=66		I=71	
yes	63	95.40	71	100.00
no	3	4.60	0	0.00
Level 2	II=70		II=64	
yes	67	95.70	61	95.30
no	3	4.30	3	4.70
Level 3	III=31		III=51	
yes	29	93.50	51	100.00
no	2	6.50	0	0.00
Level 4	IV=37		IV=40	
yes	37	100.00	40	100.00
no	0	0.00	0	0.00
TOTAL	total=204		total=226	
yes	196	96.10	223	98.68
no	8	3.90	3	1.32

Note:Level 1 increased by 4.6%, Level 2 decreased by 0.4%, Level 3 increased by 6.5%, and Level 4 remained the same. Overall community increased by 2.58%.

Chi Square=not appropriate statistic.

Conclusions: Only a 2.58% increase was detected in the numbers of mothers who are aware of ORT before and after the PRICOR project. The percentages of mothers who had heard about ORT was amazingly high (96.1%) before PRICOR and increased 2.6% to 98.7% after. Interestingly, 100% of the poorest women report knowing about ORT, up 4.6% after the PRICOR project.

APPENDIX 4

Question: Are you familiar with any type of homemade ORT?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=66		I=71	
1. Don't know any	63	95.50	18	25.35
2. Rice water	03	4.50	0	0.00
3. Coconut water	00	0.00	0	0.00
4. TH ORT	00	0.00	53	74.65
Level 2	II=70		II=64	
1. Don't know any	68	97.10	17	26.56
2. Rice water	01	1.40	0	0.00.
3. Coconut water	01	1.40	0	0.00
4. TH ORT	00	0.00	47	73.44
Level 3	III=31		III=51	
1. Don t know any	31	100.00	18	35.00
2. Rice water	00	0.00	0	0.00
3. Coconut water	00	0.00	0	0.00
4. TH ORT	00	0.00	33	65.00
Level 4	IV=37		IV=40	
1. Don't know any	36	97.30	12	30.00
2. Rice water	01	0.02	0	0.00
3. Coconut water	00	0.00	0	0.00
4. TH ORT	00	0.00	28	70.00
TOTAL	total=204		total=226	
1. Don t know any	198	97.10	65	28.00
2. Rice water	5	2.50	0	0.00
3. Coconut water	1	0.50	0	0.00
4. TH ORT	0	0.00	161	72.00

Note: Percentage increase and decrease as follows: Level 1: don't know any (down 70.1%), rice water (up 74.6%), coconut water (no change), TH ORT (up 74.6%). Level 2: don't know any (down 70.1%), rice water (down 1.4%), coconut water (down 1.4%), TH ORT (up 73%). Level 3: don't know any (down 65%), rice water, coconut water (no change), TH ORT (up 65%). Level 4: don't know any (down 67.3%), rice water (down 0.03%), coconut water (no change), TH ORT (up 70%). Overall: don't know any (down 69.1%), rice water (down 2.5%), coconut water (down 0.5%), TH ORT (up 72%).

Chi Square=207.6809

	before	after
yes	6	161
no	198	65
Total	204	226

p<0.001, Highly significant

Conclusions: Significantly more mothers know about homemade ORT after the PRICOR program. Whereas 97.1% of all mothers did not know about homemade ORT at the program's onset, only 28% did not know at the conclusion, a significant drop of 69.1% (p<0.001). Mothers who do not know declined amongst all socio-economic strata almost equally, with only a slightly higher drop (70.1%) among poorest mothers. Although mothers frequently use rice water and coconut water to treat dehydration few specifically named these as ORT before or after the project. Clearly, the introduction of the traditional healers' ORT is directly accountable for the highly significant drop in mothers' lack of familiarity with ORT. While no (0%) mother mentioned the TH ORT at the onset, 72% did afterwards; a striking increase. TH ORT is best known and accounts for the largest increase in knowledge about ORT amongst the poorest mothers. Here, knowledge of TH ORT increased from 0 to 74.6%.

APPENDIX 5

Question: Do you know about the free government packages of ORT that are given out by CEME?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=66		I=71	
Yes	39	59.00	62	87.00
No	27	41.00	9	13.00
Level 2	II=70		II=64	
Yes	42	60.00	48	75.00
No	28	40.00	16	25.00
Level 3	III=31		III=51	
Yes	17	54.90	35	69.00
No	14	45.10	16	31.00
Level 4	IV=37		IV=40	
Yes	17	45.90	25	62.00
No	20	54.00	15	38.00
TOTAL	total=204		total=226	
Yes	115	56.30	170	75.00
No	89	43.60	56	25.00

Note: Level 1 increased by 28%, Level 2 by 15%, Level 3 by 14.1%, and Level 4 by 16.1%, overall community increase: 18.6%.

Chi Square=25.54

	Before	After
Yes	115	170
No	89	56
Total	204	226

$p<0.001$, highly significant

Conclusions: PRICOR project increased significantly ($p<0.001$) the numbers of mothers who know about free government (CEME) ORT packages. 56.3% knew before whereas 75% knew afterwards. The overall community increase was 18.6%. The greatest increase (28%) occurred amongst Level 1 (poorest) mothers. The percentage of wealthiest mothers who learned about CEME ORT increased only by 16%.

APPENDIX 6

Question: Have you ever used ORT?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=66		I=66	
Always	29	43.90	47	66.30
Sometimes	29	43.90	23	32.30
Never	8	12.10	1	1.40
Level 2	II=70		II=64	
Always	30	42.85	45	70.30
Sometimes	34	48.57	13	20.30
Never	6	8.58	6	9.40
Level 3	III=31		III=51	
Always	11	35.40	39	76.50
Sometimes	14	45.20	12	23.50
Never	6	19.30	0	0.00
Level 4	IV=37		IV=40	
Always	10	27.00	24	60.00
Sometimes	24	64.80	13	32.50
Never	3	8.20	3	7.50
TOTAL	total=204		total=226	
Always	80	39.20	155	68.59
Sometimes	101	49.50	61	26.99
Never	23	11.30	10	4.42

Note: Level 1 increased by 10.65, Level 2 decreased by 0.82%, Level 3 increased by 19.4%, Level 4 increased by 0.70%, and the overall community increased by 6.88%.

Chi Square=6.166

	Before	After
Ever	181	216
Never	23	10
total	204	226

$p<.05$, significant

Chi Square=36.378

	Before	After
Always	80	155
Other	124	71
Total	204	226

$p<.001$, highly significant

Conclusions: PRICOR project significantly increased ($p<.05$) the numbers of mothers who have ever used ORT; the percentage increase was 6.8% overall. There was also detected a highly significant ($p<.01$) increase in the frequency of use: whereas only 34.2% always used ORT when their child had diarrhea prior to the program, 68.6% report doing so afterwards, an increase of 29.4%.

APPENDIX 7

Question: In cases of diarrhea, do you think you must give ORT?

	Before		After	
	#	%	%	%
Level 1 (poor)	I=65		I=71	
Yes	54	83.07	69	97.00
No	11	16.93	2	3.00
Level 2	II=70		II=64	
Yes	58	82.85	56	88.00
No	12	17.15	8	12.00
Level 3	III=31		III=51	
Yes	25	80.65	50	98.00
No	6	19.35	1	2.00
Level 4	IV=37		IV=40	
Yes	34	91.90	36	90.00
No	3	8.10	4	10.00
TOTAL	total=203		total=226	
Yes	171	84.20	211	93.00
No	32	15.80	15	7.00

Note: Level 1 increased by 13.93%, Level 2 increased by 5.15%, Level 3 increased by 17.35%, Level 4 decreased by 1.9%, and overall community increased by 8.8%.

Chi Square=8.167

	Before	After
Yes	171	211
No	32	15
Total	203	226

$p < .01$, highly significant

Conclusions: PRICOR project significantly increased ($p < .01$) the numbers of mothers (by 8.8%) who believe ORT must be given if a child has diarrhea. The percentage of mothers who believed one must give ORT in cases of diarrhea prior to PRICOR was already high (84.2%); but the project drove the percentage higher to 93% overall.

APPENDIX 8

Question: Have you ever used homemade ORT from the traditional healer?

ALL "BEFORE" = 0

	After #	%
Level 1 (poor)	I=71	
yes	44	66.00
no	27	38.00
Level 2	II=64	
yes	40	63.00
no	24	37.00
Level 3	III=51	
yes	22	43.00
no	29	57.00
Level 4	IV=39	
yes	16	41.00
no	23	59.00
TOTAL	total=225	
yes	122	54.30
no	103	45.30

Note: Level 1 increased by 62%, Level 2 by 63%, Level 3 by 43%, Level 4 by 41%, and overall community by 54.3%.

Conclusions: PRICOR project resulted in a striking increase in the numbers of mothers who have used homemade ORT from traditional healers. The greatest increase (>60%) was observed in the poorest homes, while even (>40%) of the "wealthier" homes in the town center have used the traditional healers' ORT.

APPENDIX 9

Question: Do you know how to prepare the homemade ORT that the traditional healers are teaching?

ALL "BEFORE" = 0

		After #	After %
Level 1 (poor)	I=71		
yes		22	31.00
no		45	69.00
Level 2	II=62		
yes		22	35.00
no		40	65.00
Level 3	III=50		
yes		10	20.00
no		40	80.00
Level 4	IV=40		
yes		09	23.00
no		31	77.00
TOTAL	total=223		
yes		63	28.20
no		160	71.80

Note: Level 1 increased by 31%, Level 2 increased by 35%, Level 3 increased by 20%, and Level 4 increased by 23%. The overall community increase was 28.2%.

Conclusions: PRICOR project resulted in a striking 28.2% increase in the numbers of mothers who know how to prepared homemade ORT. The greatest increase (>30%) was recorded in the poorest neighborhoods. When taken together with data of those who have ever used the traditional healer's ORT, a trend occurs: of approximately 1/2 of mothers who have used ORT, only about 1/4 know how to make it, a trend which remains constant in all classes.

APPENDIX 10

Question: Who taught you how to prepare homemade ORT?

ALL "BEFORE" = 0

	After #	After %
Level 1 (poor)	I=	
1. Didn't learn	45	64.30
2. Rezadeira	25	35.70
3. Doctor	0	0.00
4. Health Agent	0	0.00
Level 2	II=63	
1. Didn't learn	42	66.67
2. Rezadeira	20	31.74
3. Doctor	1	1.59
4. Health Agent	0	0.00
Level 3	III=51	
1. Didn't learn	39	76.60
2. Rezadeira	11	21.50
3. Doctor	01	1.59
4. Health Agent	0	0.00
Level 4	IV=39	
1. Didn't learn	25	64.10
2. Rezadeira	13	33.30
3. Doctor	0	0.00
4. Health Agent	1	2.50
TOTAL	total=223	
1. Didn't learn	151	67.72
2. Rezadeira	69	30.95
3. Doctor	2	0.89
4. Health Agent	1	0.44

Note: Total of those who did learn = 72 or 32.28%

Conclusions: Approximately 65 to 70% of mothers still do not know how to mix up homemade ORT solutions themselves. Of those who do, 95.8% learned it from the traditional healer; only 2.8% learned it from a local doctor and 1.45 from village health workers.

APPENDIX 11

Question: Do you know how to prepare the free government packages of ORT?

	Before		After	
	#	%	%	%
Level 1 (poor)	I=66		I=71	
Yes	36	54.54	61	86.00
No	30	45.45	10	14.00
Level 2	II=68		II=64	
Yes	44	64.70	41	64.00
No	24	35.29	23	36.00
Level 3	III=31		III=51	
Yes	17	54.83	30	59.00
No	14	45.16	21	41.00
Level 4	IV=37		IV=40	
Yes	15	40.54	20	50.00
No	22	59.45	20	50.00
TOTAL	total=202		total=226	
Yes	112	55.40	152	67.00
No	90	44.60	74	33.00

Note: Level 1 increased by 31.46%, Level 2 decreased by 0.705, Level 3 increased by 4.17%, Level 4 increased by 9.46%, and the overall community increased by 11.6%.

Chi Square=5.8057

	Before	After
Yes	112	152
No	90	74
Total	202	226

p<.01, highly significant

Conclusions: PRICOR project significantly (p<.01) increased the numbers of mothers who know how to prepare the free government packages of ORT by 11.6%, from 55.45 prior to the project to 67% after. The greatest increase (31.46%) was recorded among the poorest women. This increase is a byproduct of the PRICOR project, which concentrated on homemade solutions but also instructed healers in packet preparation and provided them "backup" CEME packets for markedly dehydrated children.

APPENDIX 12

Question: Do you have sugar in your house today?

	Before		After	
	#	%	%	%
Level 1 (poor)	I=66		I=71	
Yes	58	87.87	55	77.00
No	8	12.12	16	23.00
Level 2	II=70		II=64	
Yes	61	87.15	56	87.00
No	9	12.85	8	13.00
Level 3	III=31		III=51	
Yes	25	80.65	49	96.00
No	6	12.85	8	4.00
Level 4	IV=37		IV=41	
Yes	37	100.00	40	100.00
No	0	0.00	0	0.00
TOTAL	total=204		total=226	
Yes	181	88.70	200	88.00
No	23	11.30	26	12.00

Note: Level 1 decreased by 10.87%, Level 2 decreased by 0.15%, Level 3 increased by 15.355, Level 4 remained the same, and the overall community decreased by 0.70%.

Chi Square=1.3046

	Before	After
Yes	181	200
No	23	26
Total	204	226

p<.05, not significant

Conclusions: Sugar is available in approximately 88-89% of Pacatuba households overall; there was no significant difference in sugar availability before and after the PRICOR project.

APPENDIX 13

Question: In cases of diarrhea, do you continue breastfeeding?

	Before #	Before %	After %	After %
Level 1 (poor)	I=65		I=71	
Yes	50	76.90	69	97.20
No	15	23.10	2	2.80
Level 2	II=69		II=64	
Yes	50	72.40	60	93.80
No	19	27.60	4	6.30
Level 3	III=31		III=50	
Yes	24	77.40	42	84.00
No	7	22.60	8	16.00
Level 4	IV=37		IV=40	
Yes	20	54.00	36	90.00
No	17	45.90	4	10.00
TOTAL	total=202		total=225	
Yes	144	71.20	207	92.00
No	58	28.70	18	8.00

Note: Increase in Level 1, 20.30%; Level 2, 21.4%; Level 3, 6.6%; Level 4, 36%; overall community increase, 20.8%.

Chi Square=29.812?

	Before	After
Yes	144	207
No	58	18
Total	202	225

p<.001, highly significant

Conclusions: PRICOR project significantly increased by 20.8% the numbers of mothers who believe they should continue breastfeeding when a child has diarrhea. Overall there was a 20% increase; with the greatest increase (36%) occurring among wealthiest women while the percentages of women who believe breastfeeding should continue during the diarrheal episode was already high (71.2%) before the program and increased even more afterwards to 92%. The problem, however, is that infants are weaned very early and mothers, especially wealthier ones, may not have breastmilk to give during diarrheal attacks even when if they support the idea.

APPENDIX 14

Question: When your child has diarrhea, how long do you withhold milk?

	Before		After	
	#	%	%	%
Level 1 (poor)	I=66		I=71	
1. 0 days	22	33.3	35	49.2
2. 1-2 days	9	13.6	16	22.5
3. 3-4 days	19	28.7	14	19.7
4. 5 or more	16	24.2	6	8.4
Level 2	II=70		II=64	
1. 0 days	19	27.1	26	40.6
2. 1-2 days	12	17.1	12	18.7
3. 3-4 days	24	34.2	20	31.2
4. 5 or more	15	21.4	6	9.3
Level 3	III=31		III=51	
1. 0 days	11	35.4	28	54.9
2. 1-2 days	7	22.5	8	15.6
3. 3-4 days	9	29.0	11	21.5
4. 5 or more	4	12.9	4	7.8
Level 4	IV=37		IV=40	
1. 0 days	7	18.9	17	42.5
2. 1-2 days	17	45.9	11	27.5
3. 3-4 days	10	27.0	8	20.0
4. 5 or more	3	8.1	4	10.0
TOTAL	total=204		total=226	
1. 0 days	59	28.9	106	46.9
2. 1-2 days	45	22.0	47	20.7
3. 3-4 days	62	30.3	53	23.4
4. 5 or more	38	18.6	20	8.8

Note: In Level 1, the practice of not withholding milk increased 15.9%, Level 2, 13.5%, Level 3, 19.5%, Level 4 23.6%, for an overall increase of 18%. Those who believe in withholding milk 1-2 days increased 8.9% in Level 1, 1.65 in Level 2, decreased 6.9% in Level 3, and decreased 18.4% in Level 4 for an overall decrease of 1.3%. Withholding milk 3-4 days decreased 9% in Level 1, 3% in Level 2, 7.5% in Level 3, 7% in Level 4, for an overall decrease of 6.9%. The practice of withholding milk 5 or more days decreased 15.8% in Level 1, 12.15 in Level 2, 5.1% in Level 3, increased 1.95 in Level 4 for an overall decrease of 9.8%.

Chi Square=13.9086

	Before	After
Not Withhold	59	106
Withhold	145	120
Total	204	226

$p<.01$, highly significant

Chi Square=7.9667, highly significant

	Before	After
5 or more days	38	20
Other	166	206
Total	204	226

$p<.01$, highly significant

Conclusions: Pricor signifiantly ($p<.01$) increased the numbers of mothers by 18% who feed milk to their children during the diarrhea episode. Only 28.9% of mothers did so before PRICOR; 46.9% did afterwards. At the same time, PRICOR significantly ($p<.01$) decreased the numbers of mothers who withhold milk for dangerously long periods of time (5+ days) by 9.8%. 18.6% of mothers did so before PRICOR and only 8.8% did afterwards; the biggest decrease in this harmful practice occurred amongst the poorest mothers; 24.2% withheld 57 days before; only 8.4% did after the project.

APPENDIX 15

Question: Do you think it possible that a child can be managed for diarrhea using only ORT and dietary interventions?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=56		I=71	
Yes	27	40.90	48	68.00
No	39	59.10	23	32.00
Level 2	II=70		II=64	
Yes	29	41.40	42	66.00
No	41	58.60	22	34.00
Level 3	III=31		III=51	
Yes	15	48.38	36	70.00
No	16	51.62	15	30.00
Level 4	IV=37		IV=40	
Yes	16	43.20	28	68.00
No	21	56.70	12	30.00
TOTAL	total=204		total=226	
Yes	87	42.60	154	68.00
No	117	54.40	72	32.00

Note: Level 1 increased 27.155, Level 2 increased 24.65, Level 3 increased 21.7%, Level 4 increased 26.8%, and overall community increased 25.4%.

Chi Square=27.26

	before	after
Yes	87	154
no	117	72
Total	204	226

p .001, highly significant

Conclusions: PRICOR project significantly increased the numbers of mothers (by 25.4%) who believe that it is possible to manage their child's diarrhea using only ORT and dietary interventions. The change was slightly higher (27.1%) in the poorest neighborhoods.

APPENDIX 16

Question: What type of ORT do you use most?

	Before #	Before %	After #	After %
Level 1 (poor)	I=61		I=105	
1. Pedialyte	4	6.55	10	9.52
2. CEME	19	31.14	42	40.00
3. Comm Packet	32	52.45	8	7.61
4. Homemade/TH	0	0.00	44	41.90
5. Don't Use	6	9.83	1	0.95
Level 2	II=66		II=89	
1. Pedialyte	25	37.87	16	17.87
2. CEME	10	15.15	21	23.59
3. Comm Packet	27	40.90	13	14.60
4. Homemade/TH	0	0.00	39	43.82
5. Don't Use	4	6.06	0	0.00
Level 3	III=28		III=67	
1. Pedialyte	11	39.28	17	25.37
2. CEME	5	17.85	15	22.38
3. Comm. Packet	8	28.57	13	19.40
4. Homemade/TH	0	0.00	22	32.83
5. Don't Use	4	14.28	0	0.00
Level 4	IV=34		IV=52	
1. Pedialyte	23	67.64	25	48.07
2. CEME	5	14.70	6	11.53
3. Comm. Packet	3	8.82	2	3.84
4. Homemade/TH	0	0.00	16	30.76
5. Don't Use	3	8.82	3	5.76
TOTAL	total=189		total=313	
1. Pedialyte	63	33.33	68	21.72
2. CEME	39	20.63	84	26.83
3. Comm. Packet	70	37.03	36	11.50
4. Homemade/TH	0	0.00	121	38.65
5. Don't Use	17	8.99	4	1.27

Note: Use of Pedialyte increased 2.97% in Level 1, decreased 19.9% in Level 2, decreased 13.91% in Level 3, and decreased 19.57% in Level 4, for an overall decrease of 16.61%. Use of CEME increased 8.86% in Level 1, increased 8.44% in Level 2, increased 4.53% in Level 3, decreased 3.17% in Level 4 for an overall increase of 6.29%. Use of commercially-prepared dried salt packets fell 44.84% in Level 1, 26.3% in Level 2, 9.17% in Level 3, and 4.98% in Level 4 for an overall decrease of 25.53%. Homemade traditional healer ORT increased 41.9% in Level 1, 43.82% in Level 2, 32.83% in Level 3, and 30.76% in Level 4: for an overall community increase of 38.65%

Pedialyte Chi Square=7.5722

	Before	After
Yes	63	245
No	126	245
Total	189	313

$p<.01$, highly significant

CEME Chi Square=2.108

	Before	After
Yes	39	84
No	150	229
Total	189	313

$p<.05$, not significant

Commercial Chi Square=44.1815

	Before	After
Yes	70	36
No	119	277
Total	189	313

$p<.001$, highly significant

Conclusions: PRICOR significantly decreased ($p<.01$) by 11.6% the use of expensive Pedialyte; which is used primarily amongst wealthier mothers (67.6%); even this, however, decreased by 19.6% after the program. A 3% increase was found in the Pedialyte use in poorest homes which we attribute to a general increase in Pedialyte use for ORT in these neighborhoods. No significant change ($p>.05$) was detected in the numbers of mothers who use the free government CEME packets. A slight increase of 6.2% was recorded overall. It appears that the staggering 38.65% use of the TH's homemade ORT (and the 6.2% use of free government CEME packet) did significantly reduce ($p<.001$) by 25.53% overall use of commercially prepared dried salts packets which are similar to the homemade and CEME salts. The use of commercial ORT packets fell from 37.03% to only 11.55 as the preferred ORT. The most significant drop (44.8%) in the commercial packets was recorded in the poorest neighborhood, the same locale where the TH's homemade solutions enjoyed the greatest (41.9%) increase in popularity.

APPENDIX 17

Question: Do you think that in cases of diarrhea, you should give pharmaceuticals?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=65		I=71	
Yes	60	92.30	45	63.30
No	5	7.60	26	36.60
Level 2	II=70		II=64	
Yes	63	90.00	43	67.18
No	7	10.00	21	32.80
Level 3	III=31		III=51	
Yes	29	93.50	41	80.40
No	2	6.50	10	19.60
Level 4	IV=37		IV=40	
Yes	37	100.00	35	87.50
No	0	0.00	5	12.50
TOTAL	total=203		total=226	
Yes	189	93.10	164	72.56
No	14	6.90	62	27.43

Note: Level 1 decreased by 29%, Level 2 decreased by 22.8%, Level 3 decreased by 13.1%, Level 4 decreased by 12.5%, and overall community decreased by 20.54%.

Chi Square=29.5493

	Before	After
Yes	189	164
No	14	62
Total	203	226

$p<0.001$, highly significant

Conclusions: We found a highly significant reduction ($p<0.001$) in the numbers of mothers who believed they must give modern pharmaceuticals to their children with diarrhea after the implementation of the PRICOR project, whereas a shocking 93.1% of mothers believed they should give drugs prior to the project, 72.6% surveyed believed they should afterwards. While this is still an unacceptably high number, the PRICOR project does make significant inroads in reducing indiscriminate drug use. The greatest decrease (29%) ws recorded in the poorest households, those least able to afford expensive and unindicated drugs. Before PRICOR 92.3% of poorest mothers believed in giving drugs for diarrhea, 63.3% did after PRICOR. The smallest reduction was recorded amongst the wealthiest, 100% believed in giving drugs before and this declined only 12.5%, to a still alarmingly high 87.5% post program.

APPENDIX 18

Question: When a child has diarrhea, do .ce you think you must take him or her to a <u>rezadeira</u>?

	Before #	Before %	After %	After %
Level 1 (poor)	I=66		I=71	
Yes	58	87.80	60	84.50
No	8	12.20	11	15.50
Level 2	II=70		II=64	
Yes	56	80.00	59	92.20
No	14	20.00	5	7.80
Level 3	III=31		III=51	
Yes	26	83.80	39	76.50
No	5	16.20	12	23.50
Level 4	IV=27		IV=40	
Yes	22	81.40	30	75.00
No	5	18.60	10	25.00
TOTAL	total=204		total=226	
Yes	162	79.40	188	83.20
No	42	20.60	38	16.80

Note: Level 1 increased by 3.3%, Level 2 increased by 12.20%, Level 3 decreased by 7.35, Level 4 decreased by 5.45, and overall community increased by 3.8%.

Chi Square=0.7733

	Before	After
Yes	162	188
No	42	38
Total	204	226

p>.05, not significant

Conclusions: Seeing of traditional healers for diarrhea did not change significantly; already high (79.4%) before, it increased slightly to 83.25 afterwards; a 3.8% increase overall.

APPENDIX 19

Question: In cases of diarrhea, do you take your child first to the rezadeira?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=61		I=71	
Yes	54	88.50	51	72.00
No	7	11.50	20	28.00
Level 2	II=70		II=64	
Yes	56	80.00	56	88.00
No	14	20.00	8	12.00
Level 3	III=31		III=51	
Yes	26	83.80	38	75.00
No	5	16.20	13	25.00
Level 4	IV=36		IV=40	
Yes	20	55.50	27	68.00
No	16	44.50	13	32.00
TOTAL	total=198		total=226	
Yes	156	78.70	172	76.00
No	42	21.30	54	24.00

Note: Level 1 decreased by 16.5%, Level 2 increased by 8.0%, Level 3 decreased by 8.8%, Level 4 increased by 12.5%, and overall community decreased by 2.7%.

Chi Square=0.2937

	before	after
yes	156	172
no	42	54
Total	198	226

p>0.05, not significant

Conclusions: PRICOR project did not significantly change (p>.05) family's first seeking of rezadeiras in cases of diarrhea. 78.7% of mothers did before PRICOR, and 76% did afterwards.

APPENDIX 20

Question: In cases of diarrhea, do you take your child first to the .ce
Mother of Gods?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=65		I=71	
Yes	0	0.00	4	6.00
No	65	100.00	67	94.00
Level 2	II=70		II=64	
Yes	0	0.00	1	2.00
No	70	100.00	63	98.00
Level 3	III=31		III=51	
Yes	0	0.00	0	0.00
No	31	100.00	51	100.00
Level 4	IV=37		IV=40	
Yes	0	0.00	0	0.00
No	37	100.00	40	100.00
TOTAL	total=203		total=226	
Yes	0	0.00	5	2.00
No	203	100.00	221	98.00

Note: Level 1 increased by 6%, Level 2 increased by 25%, Levels 3 and 4 did not change. The overall increase was 2%.

Chi Square= not appropriate

Conclusions: Only a 2% increase was detected the numbers of mothers who first take their children sick with diarrhea to the Mother of the Gods as a consequence of the PRICOR project. No family admitted going first before; 2% reported they did afterwards.

APPENDIX 21

Question: When your child has diarrhea, do you (mother) believe that you should give a medicinal tea?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=65		I=71	
Yes	51	78.50	64	90.10
No	14	21.50	7	9.90
Level 2	II=69		II=64	
Yes	55	79.70	54	84.40
No	14	20.30	10	15.60
Level 3	III=31		III=51	
Yes	25	80.60	39	76.50
No	6	19.40	12	23.50
Level 4	IV=37		IV=40	
Yes	23	62.10	30	75.00
No	14	37.90	10	25.00
TOTAL	total=206		total=226	
Yes	154	76.20	185	82.70
No	48	23.80	39	17.30

Note: Level 1 increased 11.6%, Level 2 increased 4.7%, Level 3 decreased 4.1%, Level 4 increased 12.9%. overall community increased 6.5%.

Chi Square=2.4003

	Before	After
Yes	154	187
No	48	39
Total	202	226

p>.05, no significant difference

Conclusions: Mothers did not change their practice of giving medicinal teas to children with diarrhea. A 6.5% increase was recorded in the belief that when a child has diarrhea it should be given ORT.

APPENDIX 22

Question: In cases of diarrhea, do you take your child first to the doctor?

	Before		After	
	#	%	#	%
Level 1 (poor)	I=65		I=71	
Yes	7	10.70	14	20.00
No	58	89.30	57	80.00
Level 2	II=70		II=64	
Yes	12	17.10	5	8.00
No	58	82.90	59	92.00
Level 3	III=31		III=51	
Yes	4	12.90	11	22.00
No	27	87.10	40	78.00
Level 4	IV=37		IV=40	
Yes	14	37.80	10	25.00
No	23	62.10	30	75.00
TOTAL	total=203		total=226	
Yes	37	18.20	40	17.70
No	166	81.80	186	82.30

Note: Level 1 increased 9.3%, Level 2 decreased 9.15, Level 3 increased 9.1%, Level 4 decreased 12.8%, overall community use of doctors decreased 0.5%.

Chi Square=2.609

	before	after
yes	37	40
no	166	187
Total	203	227

p>.05. not significant

Conclusions: PRICOR project had no significant impact on the utilization of doctors as the first source of care for diarrhea in children. Percentages of mothers using doctors first was low (18.2%) before the project and remained constant (17.7%), a minimal decrease of 0.5% overall.

APPENDIX 23

Question: In cases of diarrhea, do you take your child first to the pharmacist?

	Before #	Before %	After #	After %
Level 1 (poor)	I=58		I=71	
yes	2	3.50	0	100.00
no	56	96.50	71	100.00
Level 2	II=57		II=64	
yes	0	0.00	0	0.00
no	57	100.00	0	0.00
Level 3	III=24		III=51	
yes	1	4.10	0	0.00
no	23	95.90	51	100.00
Level 4	IV=30		IV=40	
yes	2	6.60	0	0.00
no	28	93.30	40	100.00
TOTAL	total=169		total=226	
yes	5	3.00	0	0.00
no	164	97.00	226	100.00

Note: Level 1 decreased 3.55, Level 2 stayed the same, Level 3 decreased 4.1%, Level 4 decreased 6.6%, and overall community decreased 3%.

Chi Square=not appropriate statistic

Conclusions: Only a 3% decrease was detected in the numbers of mothers who first take their child with diarrhea to the pharmacist. Only 3% reported first consulting the pharmacist before PRICOR. 0% report doing so afterwards.

APPENDIX 24

Question: Why does a child have diarrhea?

	Before		After	
	No.	%	No.	%
1. Don't know	4	1.18	5	1.26
2. Worms	43	12.72	40	10.10
Worm Attack				
3. Hygienic	38	11.24	56	14.14
Flies				
Flies dirty the food				
Dirty water				
Lack of Asseio				
Walking barefoot				
Poorly washed baby bottles				
Lack of hygiene				
Playing with sand				
Unwashed fruit				
Mother doesn't take care				
Water				
4. Heat	10	2.95	7	1.76
Walking on hot sand				
Hot ground				
When the child feels hot				
5. Food	87	25.73	99	25.00
Poorly made food				
Food which attacks the liver				
Food without base (too strong or too weal)				
Cereal				
Mother doesn't pay attention to food of child				
Heavy food				
When they eat a lot of beans				
Mandioca and beans				
Fatty foods				
Food with too much smoke				
Eat a lot of sugar				
Eat dirt				
6. Falling	90	2.66	8	2.02

Question: Why does a child have diarrhea? continued

	Before		After	
	No.	%	No.	%
7. Teething When the teeth are about to appear Appearance of incisors Appearance of teeth	49	14.49	57	14.39
8. Dehydration Because they lack water in their body Because they weren't given water	4	1.18	2	0.50
9. Milk They don't tolerate milk Poorly prepared milk Milk does bad Because of milk	16	4.73	22	5.55
10. Evil Eye Quebranto Mal Olhado	16	4.73	26	6.56
11. Fright Susto Vento Caido	60	17.75	71	17.92
12. Other Weak intestines Infections	2	0.59	3	1.75
TOTAL RESPONSES	338		396	

Note: Percentage increase and decrease in beliefs as follows: don't know increased 0.08%, Worms decreased 2.62%, Hygienic increased 2.95, Heat decreased 1.19%, Food decreased 0.73%, Falling decreased 0.64%, Teething decreased 0.10%, Dehydration decreased 0.68%, Milk increased 0.82%, Evil Eye increased 1.83%, Fright increased 0.17%, and Other increased 1.16%.

Worms Chi Square=1.0012

	Before	After
yes	43	40
no	295	356
total	338	396

p>.05, not significant

Hygiene Chi Square=1.1249

	Before	After
yes	38	56
no	300	340
total	338	396

p>.05, not significant

Food Chi Square=0.0208

	Before	After
yes	87	99
no	251	297
total	338	396

p>.05, not significant

Teething Chi Square=4.3200

	Before	After
yes	49	57
no	289	339
total	338	396

p<.05, significant

Milk Chi Square=0.1114

	Before	After
yes	16	22
no	322	374
total	338	396

p>.05, not significant

Evil Eye Chi Square=0.8202

	Before	After
yes	16	26
no	322	370
total	338	396

p>.05, not significant

Fright Chi Square=1.1552

	Before	After
yes	60	71
no	278	325
total	338	396

p>.05, not significant

Conclusion: PRICOR did not significantly change villager's beliefs about the causes of diarrhea in children. Food, preparation and quality (42.64%), fright disease (29.4%), worms (21.0%), and hygienic practices (18.6%) were cited as causes before PRICOR; after PRICOR, responses were nearly identical. Belief in teething, hygienic practices, milk, evil eye, and fright as a cause of diarrhea increased slightly. The only significant change ($p<0.05$) occurred in the belief in teething as a cause of diarrhea.

APPENDIX 25

TRADITIONAL HEALERS' ATTITUDES TOWARD BIOMEDICINE

Total Number of Traditional Healers Interviewed=19

Traditional Healers by Name

Name	age	years curing
Jose Martins	40	12
Corina	55	29
Beatriz	50	9
Alfredo	82	30
Nelsa	56	14
Geraldo	47	42
Jesuina	63	20
Antonio	37	12
Chiquinha	76	30
Galdencia	62	15
Jose Maria	54	25
Vicencia	42	15
Ana	56	30
Raimundo	65	20
Idalina	61	30
Loura	60	20
Luciene	35	6
Binha	65	40
Raimundo	72	55

Traditional Healer Median Ages=56.73

Traditional Healer Range of Ages=35-82

Median Years of Healing=23.89

Range of Years of Healing=6-55

Question: Who do your patients believe more, you or the doctor?

responses	#	%
Equal	8	42.10
Traditional healer	6	31.57
Doctor	2	10.52
Don't know	2	10.52
No response	1	5.26
TOTAL	19	

Question: Do you think your clients understand what doctors say about their illnesses?

responses	#	%
Yes	7	36.84
Sometimes	3	15.78
A few things	1	5.26
No	4	21.05
Don t know	3	15.78
Missing data	1	5.26
TOTAL	19	

Question: Are there any illnesses that only you can cure?

responses	#	%
Yes	17	89.47
No	2	10.52
TOTAL	19	

Which ones?

Ramo, queda, bruxaria (witchcraft), feiticaria (enchantment), macumba (religious curse), luxucao, carne triada, hematoma, engasgo, vermelha, ezipa, quebrante (evil eye), dor de cabeca (headache), negocio espirito (spirit business), constipacao (constipation), dor de mulher (woman's pain), the diarrhea of quebrante, the diarrhea of susto (fright disease), espinilha caida (fallen spine), vento caida (fallen fontanelle), doenca de crianca (the illness of the child)

Question: Are there any illnesses that only doctors can cure?

responses	#	%
Yes	18	94.73
No response	1	5.26
TOTAL	19	

Which ones?

Doences grandes (big sicknesses), doences por dentro (sicknesses inside), dedo cortada (cut fingers), fever, cancer, mais perigoso (most dangerous), anemia, pain, dehydration, hepititis, (carocos) skin infections, utero, polio, pneumonia, garganta (throat), coracao (heart), operation.

Question: Would you like to use some equipment exams, or drugs that doctors have?

responses	#	%
Yes	8	42.10
No	6	31.57
Don't know these things	2	10.52
No response	3	15.78
TOTAL	19	

Question: Do you know what hospital equipment is used for?

responses	#	%
No	6	31.67
Yes, for specific equipments*	9	47.36
No response	3	15.78
Missing data	1	5.26
TOTAL	19	

Question Do you know any prejudice that doctors have against you or your work?

responses	#	%
They don't have any	9	47.36
Maybe they have, don't know	4	21.05
Yes	2	10.52
Don't think so	1	5.26
No response	3	15.78
TOTAL	19	

Question: Do you try to find out if your patient has already seen the doctor before seeing you?

responses	#	%
Yes	11	57.89
Sometimes	2	10.52
No	6	31.57
TOTAL	19	

Question: Do you want to accompany your patients inside the hospital when they are very sick?

responses	#	%
Yes	9	47.36
Yes, conditional*	5	26.31
Don't know	1	5.26
I'm too old	3	15.78
No response	1	5.26
TOTAL	19	

*but I have other responsibilities

Question How do you think you will be received at a hospital?

responses	#	%
Well	8	42.10
Indifferent	3	15.78
Don't know	5	26.78
No response	3	15.78
TOTAL	19	

Question What do you think you could do at a hospital to help?

responses	#	%
Pray	10	52.63
Give medical history to doctor	2	10.52
Take care of child	1	5.26
Give homemade remedies	1	5.26
Depends on what patient needs	1	5.26
Take care of mother	1	5.26
Everything that I can	1	5.26
No response	2	10.52
TOTAL	19	

Question: Do you have an idea how many people in your community self-treat and die without seeking traditional healers?

responses	#	%
Yes, it happens, but I don't know how often	3	15.78
No, it doesn't happen	5	26.31
Don't know	8	42.10
No response	3	15.78
TOTAL	19	

Question: What do you think about non-medical people (not doctors, nurses, or traditional healers) working in community health?

responses	#	%
Good	19	100
TOTAL	19	

Question: How do you think the government views the work of these non-medical people to improve the health conditions of people?

responses	#	%
Approve	8	42.10
They don't want to know	5	26.31
Don't know	2	10.52
No response	4	21.05
TOTAL	19	

Question: Are politicians in favor of or against community heath work?

responses	#	%
In favor	6	31.57
Against	4	21.05
Indifferent	2	10.52
Don't know	3	15.78
No response	4	21.05
TOTAL	19	

Question: Does it help you to speak in medical terms to your patients?

responses	#	%
Yes	4	21.05
Yes, conditional	5	26.31
Sometimes	2	10.52
No	6	31.57
Don't know	1	5.26
No response	1	5.26
TOTAL	19	

Question: Do you try to find out what the doctor does (follow up) when you send send a patient to him?

responses	#	%
Yes	15	78.94
No	3	15.78
No response	1	5.26
TOTAL	19	

Question: Are you familiar with homemade ORT?

responses	#	%
Yes	17	89.47
No	2	10.52
TOTAL	19	

Question: How do you prepare homemade ORT?

responses	#	%
Prepare correctly	16	84.21
Prepare incorrectly	1	5.26
Don t know	2	10.52
TOTAL	19	

Question: Does it help your work as a traditional healer if you speak in medical terms to your patients?

responses	#	%
Yes	19	100
TOTAL	19	

Question: Do you think it is worthwhile for doctors discuss the causes of illness with mothers when his beliefs about them are very different from the mothers'?

responses	#	%
Yes	12	63.15
Yes, conditional*	2	10.52
Indifferent	1	5.26
No	4	21.05
TOTAL	19	

*But mothers won't do what he says

Question: Do you think people should know how to prevent and treat diseases at home without having to wait for doctors or healers to help them?

responses	#	%
Yes	18	94.73
No response	1	5.26
TOTAL	19	

Question: Do you attend all the sick people in your community?

responses	#	%
Yes	4	21.05
Yes, conditional*	14	73.68
No response	1	5.26
TOTAL	19	

*I treat all who seek me.

Question: Do you believe it is very important for mothers to use homemade ORT?

responses	#	%
Yes	19	100.00
TOTAL	19	

Question: Do you believe mothers must always have at home some type of ORT that can be used at any time?

responses	#	%
Yes	18	94.73
No	1	5.26
TOTAL	19	

Question: Which is best, intravenous or oral ORT?

responses	#	%
Oral	10	52.63
Intravenous	7	36.84
Either	1	5.26
Depends on situation	1	5.26
TOTAL	19	

Question: Have you already referred someone to the doctor/hospital?

responses	#	%
Yes	18	94.73
No	1	5.26
TOTAL	19	

Question: Do you always refer patients to the doctor/hospital?

responses	#	%
Yes	6	31.57
Sometimes	10	52.63
Only once	1	5.26
No	1	5.26
No response	1	5.26
TOTAL	19	

Question: Do you prescribe pharmaceuticals for your patients?

responses	#	%
Sometimes	8	42.10
Yes	5	26.31
No	6	31.57
TOTAL	19	

Which ones?

Infectrin for diarrhea	1
Micostantin for "little balls in mouth"	1
Caulim for teething	1
ORT for diarrhea	5
Colestase	3
Enterovioforme	2
Teas (various)	5
Manah	1
Fitalomicina	1
Sweet oil de riano	1
Xarope de aeromicina for fever	1
Meracilina, terramicina, garamicina	1
Comel for throat	1
AAS	1
Ribalcim	1
Cibalene	1
Anador	1
Erovite for lack of appetite	1
Redoxon for colds	1
Ascaridil for worms	1

Question: Does the doctor need to forget what he has learned and learn what you know about illnesses in order to work together with you?

responses	#	%
No	18	94.73
Don't know	1	5.26
TOTAL	19	

Question: If you work together with a doctor on a case, and you don't agree with his opinion who should have the final word on treatment?

responses	#	%
Healer	7	36.84
Depends on the type of illness	6	31.57
Reach an agreement together	2	10.52
Doctor	2	10.52
No response	2	10.52
TOTAL	19	

Question: Do you, yourself, believe in the causes of illnesses doctors talk about?

responses	#	%
Yes	14	73.68
Yes, if they also make exams	1	5.26
Sometimes	3	15.78
No	1	5.26
TOTAL	19	

Question: Can a person who really believes in biomedical causes of illness, become ill or get well because of their beliefs?

responses	#	%
Yes	17	89.47
No	1	5.26
No response	1	5.26
TOTAL	19	

Question: Do you think that for a treatment to be successful people must believe in it?

responses	#	%
Yes	19	100.00
TOTAL	19	

Question: Do you believe that homemade ORT is effective?

responses	#	%
Yes	17	89.47
Yes, conditional*	2	10.52
TOTAL	19	

*for those who don't have money

Question: If the doctor learned how to cure evil eye would it be good or bad for you?

responses	#	%
Good	9	47.36
Indifferent	3	15.78
No response	4	21.05
Missing data	3	15.78
TOTAL	19	

Question: Do you believe in working together with doctors?

responses	#	%
Yes	8	42.10
Yes, conditional*	5	26.31
Indifferent	1	5.26
No	4	21.05
No response	1	5.26
TOTAL	19	

*if I were younger 4

Question: Until what point would you permit the doctor to work with you?

responses	#	%
No limits	9	47.36
Limits*	6	31.57
Would not work together	1	5.26
Don't know	1	5.26
No response	2	10.52
TOTAL	19	

*would not permit the doctor to

receive a spirit	1
achieve a point of equality	1
Diagnose yes, treat, no	1

Question: Would you accept the doctor entering your house and observing your prayers?

responses	#	%
Yes	15	78.94
It wouldn't hinder me	1	5.26
It wouldn't hinder me, but I don't like the idea	1	5.26
No response	2	10.52
TOTAL	19	

Question: Do you think that doctors would gain more confidence from patients if they worked together with you?

responses	#	%
Yes	16	84.21
Yes, if they knew how to cure	1	5.26
Indifferent	1	5.26
They wouldn't lose	1	5.26
TOTAL	19	

Question: Would the rezadeira lose the confidence of her patients by working together with the doctor?

responses	#	%
No	17	89.47
Don't know	1	5.26
No response	1	5.26
TOTAL	19	

Type of Traditional Healer

responses	#	%
Prayer	12	63.1
Prayer/Afro-Brazilian Priest	1	5.2
Prayer/Spiritist	1	5.2
Spiritist	0	0.0
Herbalist	1	5.2
Afro-Brazilian Priest	3	15.7
Birth Attendant	1	5.2

Question: What do you think the doctor should know about the popular illnesses to help your work?

responses	#	%
How to pray/cure	9	47.36
Know and believe in popular illnesses	4	21.05
Take more time/ care in examining	1	5.26
Understand/learn Umbanda/spiritism	3	15.78
Homemade remedies	1	5.26
No response	1	5.26
TOTAL	19	

Question: Do you think that a doctor whose orientation is to use modern medicine is capable of curing evil eye without your help?

responses	#	%
Yes	1	5.26
Yes, if he learns how to pray	2	10.52
No*	15	78.94
No response	1	5.26
TOTAL	19	

*Why?

He has to take the child to a prayer	1
He doesn't know about evil eye	1
He has to learn how to pray and cure	1
Medicine can help but not cure evil eye	1

Question: if the doctor knew how to cure evil eye would this diminish the number o people who seek your help?

responses	#	%
Yes	12	63.15
No	1	5.26
No response	6	31.57
TOTAL	19	

Question: Can a mother cure her child by taking it to you and to the doctor at the same time?

responses	#	%
Yes	14	73.68
Yes, conditional	2	10.52
No	3	15.78
TOTAL	19	

Question: Is there something you would like to learn from doctors about illness or treatment?

responses	#	%
Yes*	11	57.89
Don't know	1	5.26
No	5	26.31
No response	2	10.52
TOTAL	19	

*infections, garganta (throat), dehydration, treatments of children.

Question: Should health services give spiritual support to patients?

responses	#	%
Yes	18	94.73
No response	1	5.26
TOTAL	19	

Question: Do you think it is important for you to go with your sick patients?

responses	#	%
Yes	16	84.21
I am too old	2	10.52
No response	1	5.26
TOTAL	19	

Question: Should you receive money for your work?

responses	#	%
Yes	3	15.78
Yes, conditional*	1	5.26
No	7	36.84
No response	8	42.10
TOTAL	19	

*Only if I need to buy something.

APPENDIX 26

HEALTH TEST FOR TRADITIONAL HEALERS

Administered to 18 healers

Correct answers provided in parentheses following questions.

1. Who are the following health professionals?

A. An educated person who consults people and gives remedies. (doctor)

responses	#	%
correct	13	72.22
not correct	4	22.22
no response	1	5.56
TOTAL	18	100%

B. An educated person who cares for sick people in the hospital and orients people about health. (nurse)

responses	#	%
correct	13	72.22
not correct	4	22.22
no response	1	5.56
TOTAL	18	100%

C. A non-educated person from the community who is trained to orient people about health. (health agent)

responses	#	%
correct	0	0
not correct	17	94.44
no response	1	5.56
TOTAL	18	100%

D. A person who is not educated, works in a hospital or health post and helps educated people to care for sick people. (health auxiliary, nursing auxiliary)

responses	#	%
correct	3	16.66
not correct	14	77.78
no response	1	5.56
TOTAL	18	100%

2. What do you call ...?

A. A doctor who only cares for children? (Pediatrician)

responses	#	%
correct	5	27.78
not correct	12	66.66
no response	1	5.56
TOTAL	18	100%

B. A doctor who cares for any sickness? (general clinician)

responses	#	%
correct	4	22.22
not correct	13	72.22
no response	1	5.56
TOTAL	18	100%

C. A doctor who cares for intestinal or stomach sickness? (gastroenterologist)

responses	#	%
correct	0	0
not correct	17	94.44
no response	1	5.56
TOTAL	18	100%

D. A hospital which only cares for children? (pediatric hospital)

responses	#	%
correct	4	22.22
not correct	12	66.67
no response	2	11.11
TOTAL	18	100%

E. A hospital which only cares for problems that need immediate attention? (emergency hospital)

responses	#	%
correct	5	27.78
not correct	13	72.22
no response	0	0
TOTAL	18	100%

F. A hospital which cares for all sicknesses? (general hospital)

responses	#	%
correct	6	33.33
not correct	11	61.11
no response	1	5.56
TOTAL	18	100%

3. What sicknesses are these?

A. A child defecating only water, with yellow color, without bad smell, without fever; who goes to the doctor and he gives ORT and rice water and recommends continuing giving milk? (diarrhea)

responses	#	%
correct	4	22.22
not correct	14	77.78
no response	0	0
TOTAL	18	100%

B. A child with diarrhea, with a bad smell, streaks of blood and muccus, high fever who goes to the doctor and he gives ORT, a diet, and an antibiotic. (intestinal infection, dysentery)

responses	#	%
correct	7	38.89
not correct	11	61.11
no response	0	0
TOTAL	18	100%

C. A child with diarrhea and vomiting for several days, weak, with "broken vision" and a fallen fontanelle who goes to the doctor and he orders the mother to give ORT to the child. (dehydration)

responses	#	%
correct	6	33.33
not correct	12	66.67
no response	0	0
TOTAL	18	100%

4. Which of these diseases present diarrhea?

A. Gastroenteritis. (yes)

responses	#	%
correct	12	66.67
not correct	6	33.33
no response	0	0
TOTAL	18	100%

B. Amigdalitis (no)

responses	#	%
correct	10	55.56
not correct	8	44.44
no response	0	0
TOTAL	18	100%

C. Dehydration (yes)

responses	#	%
correct	13	72.22
not correct	2	11.11
no response	3	16.67
TOTAL	18	100%

D. Impetigo (yes)

responses	#	%
correct	10	55.56
not correct	5	27.78
no response	3	16.67
TOTAL	18	100%

E. Dysentery (yes)

responses	#	%
correct	10	55.56
not correct	4	22.22
no response	4	22.22
TOTAL	18	100%

F. Giardiosis (yes)

responses	#	%
correct	14	77.78
not correct	1	22.22
no response	0	0
TOTAL	18	100%

5. Which of these remedies are used for diarrhea?

A. Caulim, kaomagma (yes)

responses	#	%
correct	12	66.67
not correct	6	33.33
no response	0	0
TOTAL	18	100%

B. Melhoral, AAS (no)

responses	#	%
correct	14	77.78
not correct	3	16.66
no response	1	5.56
TOTAL	18	100%

C. Plasil (no)

responses	#	%
correct	8	44.44
not correct	9	
no response	1	5.56
TOTAL	18	100%

D. Imosec (yes)

responses	#	%
correct	7	38.89
not correct	11	61.11
no response	0	0
TOTAL	18	100%

E. Elixir Paregorico (yes)

responses	#	%
correct	12	66.67
not correct	6	33.33
no response	0	0
TOTAL	18	100%

G. Bronchitis (no)

responses	#	%
correct	14	77.78
not correct	4	22.22
no response	0	0
TOTAL	18	100%

H. Malnutrition (yes)

responses	#	%
correct	15	83.34
not correct	3	16.66
no response	0	0
TOTAL	18	100%

I. Measles (yes)

responses	#	%
correct	17	94.44
not correct	1	5.56
no response	0	0
TOTAL	18	100%

F. Buzatona (no)

responses	#	%
correct	11	61.11
not correct	7	38.89
no response	0	0
TOTAL	18	100%

G. Colestase (yes)

responses	#	%
correct	15	83.34
not correct	3	16.66
no response	0	0
TOTAL	18	100%

H. Ftalomicina (yes)

responses	#	%
correct	11	61.11
not correct	7	38.89
no response	0	0
TOTAL	18	100%

I. Infectrim, dientrim, bactrim (yes)

responses	#	%
correct	10	55.56
not correct	8	44.44
no response	0	0
TOTAL	18	100%

J. Franol (no)

responses	#	%
correct	9	50.0
not correct	7	38.89
no response	2	11.11
TOTAL	18	100%

K. Leite de Magnasia (milk of magnesia) (no)

responses	#	%
correct	9	50.00
not correct	7	38.89
no response	2	11.11
TOTAL	18	100%

L. Flagyl (yes)

responses	#	%
correct	3	16.66
not correct	15	83.34
no response	0	0
TOTAL	18	100%

M. Novalgina, Magnopyrol (no)

responses	#	%
correct	11	61.11
not correct	7	38.89
no response	0	0
TOTAL	18	100%

N. Cloranfenicol, Quemicetina (yes)

responses	#	%
correct	7	38.89
not correct	11	61.11
no response	0	0
TOTAL	18	100%

O. Colistin (yes)

responses	#	%
correct	5	27.78
not correct	12	66.66
no response	1	5.56
TOTAL	18	100%

P. Buscopan, Bentyl (yes)

responses	#	%
correct	13	72.22
not correct	5	27.78
no response	0	0
TOTAL	18	100%

6. Which of these are recommended by doctors to avoid diarrhea?

A. Don't step or sit on hot ground. (no)

responses	#	%
correct	3	16.66
not correct	14	77.78
no response	1	5.56
TOTAL	18	100%

B. Don t eat very cold foods. (no)

responses	#	%
correct	5	27.78
not correct	11	61.11
no response	2	11.11
TOTAL	18	100%

C. Vaccinate children. (no)

responses	#	%
correct	7	38.89
not correct	9	50.00
no response	2	11.11
TOTAL	18	100%

D. Avoid dust. (no)

responses	#	%
correct	8	44.44
not correct	8	44.44
no response	2	11.11
TOTAL	18	99.99%

E. Treat water. (yes)

responses	#	%
correct	15	83.34
not correct	0	0
no response	3	16.66
TOTAL	18	100%

F. Take a bath every day. (no)

responses	#	%
correct	6	33.33
not correct	10	55.56
no response	2	11.11
TOTAL	18	100%

G. Construct bathrooms and running water in the houses. (yes)

responses	#	%
correct	12	66.67
not correct	5	27.78
no response	1	5.56
TOTAL	18	100%

H. Breastfeed children. (yes)

responses	#	%
correct	15	83.34
not correct	2	11.11
no response	1	5.56
TOTAL	18	100%

I. Walk with shoes. (no)

responses	#	%
correct	0	0
not correct	16	88.89
no response	2	11.11
TOTAL	18	100%

J. Boil or filter drinking water. (yes)

responses	#	%
correct	12	66.66
not correct	1	5.56
no response	5	27.78
TOTAL	18	100%

K. Don't eat very sweet foods. (no)

responses	#	%
correct	2	11.11
not correct	15	83.34
no response	1	5.56
TOTAL	18	100%

L. Don't get wet with dew or rain. (no)

responses	#	%
correct	10	55.56
not correct	7	38.89
no response	1	5.56
TOTAL	18	100%

APPENDIX 27

Question: Does the official system of health help or hinder?

responses	#	%
Helps	8	42.10
Doesn't hurt	4	21.05
Indifferent	2	10.52
Have different roles	3	15.78
No Response	2	10.52
TOTAL	19	

Question: Is the official health system good or bad for people's health?

responses	#	%
Good	14	73.68
Bad	0	0.00
Indifferent	3	15.78
No Response	2	10.52
TOTAL	19	

Question: Which people go more to the doctor?

responses	#	%
Sick middle class	1	5.26
All sick people	8	42.10
Whoever has money	1	5.26
Pregnant women with problems	2	10.52
Very sick people	1	5.26
Poor people, because they have more sickness	2	10.52
Children	3	15.78
Adults	1	5.26
TOTAL	19	

Question: What methods do you think doctors use to diagnose and treat illness?*

responses	#	%
diagnose		
Examinations	5	21.73
Stethoscope	4	17.39
Studying books	7	30.43
Experience	3	13.04
Don't know	1	4.34
No response	3	13.04
TOTAL	23	
treatment		
Operations	4	21.05
Medicines	8	42.10
Food	2	10.52
Don t know	1	5.26
no response	4	21.05
TOTAL	19	

*possible to have more than one response

Question: Do you think that people believe in the doctor?

responses	#	%
yes	9	47.36
some believe, some don't	10	52.63
TOTAL	19	

Question: What does the doctor gain from his work?*

responses	#	%
Money	15	57.69
Praise	4	15.38
Intelligence	2	7.69
Friendship	1	3.84
Ticket to heaven, God's blessing	3	11.53
no response	1	3.84
TOTAL	26	

*Possible to have more than one response.

Question: Have people sought your help more or less recently?

response	#	%
More	11	57.89
Less	0	0.00
The same	5	26.31
no response	3	15.78
TOTAL	19	

Question: Do you think the doctor can in his practice utilize traditional remedies?

responses	#	%
Yes	7	36.84
No	8	42.10
Some	2	10.52
Don't know	2	10.52
TOTAL	19	

Question: Can doctors recognize evil eye in children?

response	#	%
Yes	1*	5.26
No	11	57.89
Some	7	36.84
TOTAL	19	

*but they can't cure it

Question: Do you think the doctor could help you in your work? How?

response	#	%
Yes	12	63.15
No	2	10.52
Don't know	3	15.78
Yes, conditional*	1	5.26
No response	1	5.26
TOTAL	19	

How?

*Responses included: by helping at births, reading, studying, helping with people who don't respond well to prayer, with medicines (2), money, attendance, support, and by curing traditional healers so they can practice.

*if they learn how to pray

Question: If you had the opportunity to teach something to a doctor, what would you teach?

response	#	%
Home remedies:	7	36.84
bottled remedies	1	
plants that cure infections	1	
tea for diarrhea	1	
others	4	
Prayer:	6	31.57
to stop blood	1	
for children	1	
other prayers	3	
Curing:	3	15.78
curing children	1	
curing in general	1	
Drug remedies	1	5.26
Nothing, the doctor knows more already	1	5.26
Don't know	1	5.26
TOTAL	19	

Question: Do you think that the doctor can do harmful things to people?

response	#	%
Yes	4	21.05
No	15	78.94
TOTAL	19	

Question: What are the good things that doctors do in their work?*

responses	#	%
Help save lives	6	28.57
Treat dangerous illness	2	9.52
Attend people	4	19.04
Give good remedies	6	28.57
Be careful	1	4.76
no response	2	9.52
TOTAL	21	

*possible to have more than one response

APPENDIX 28
Healer Formulas for Administration of ORS

Formula	Number
1. Under a year, a half cup, older, a cup	37
2. One liter to all	4
3. Under one year, half liter, older, 1 liter.	3
4. Under one vear, a spoonful an hour, older, a half cup.	2
5. A spoonful an hour.	2
6. Under 2 years, 1 liter, older, 2 liters.	1
7. Under a year, one and a half liters, older, 2 liters.	1
8. Under a vear, one liter a day, older, 2 liters	1
9. Under a year, a cup an hour, older, 2 liters a day.	1

APPENDIX 29
ORS Use With Ethnomedical Complaints

Month	Susto		Vento Caido		Mal Olhado, Quebranto	
ORS:	yes	no	yes	no	yes	no
May	0	9	11	35	13	25
June	1	6	1	21	2	14
July	2	12	4	19	2	21
Aug.	5	6	3	18	3	27
Sept.	0	0	0	20	0	9
Oct.	--	--	--	--	--	--
Nov.	0	1	1	9	1	8
Dec.	0	5	0	15	0	9
Jan.86	0	28	0	50	0	31
TOTALS	8	52	20	187	52	144

Liters Prepared Per Healer Per 3 Days

Month	Maximum	Minimum	Average
Feb	8	0	2.5
March	16	0	3.5
April	3	0	1.1
May	6	0	2.18
June	11	0	2.5
July	11	0	3.6
Aug.	11	0	5.8
Sept.	15	0	5.4
Oct.	--	--	---
Nov.	15	0	4.8
Dec.	8	0	3.1
Jan. 86	14	0	7.4

APPENDIX 30
Concentrations in Homemade ORS

Healer	Glucose (mg/dl)	Chemical Sodium (mEg/L)	Potassium (mEg/L)
Jose	1.722	98	0.7
Ma. Paula	1.327	76	0.4
Beatriz	2.218	58	0.5
Geralda	1.274	52	0.3
Raimunda	1.239	48	0.7
Idalina	1.670	45	0.6
no name	1.066	42	0.3

Concentrations in CEME ORS

Healer	Glucose (mg/dl)	Chemical Sodium (mEg/L)	Potassium (mEg/L)
Jose	1.468	90	15.4
Ma. Paula	1.179	82	13.2
Beatriz	1.646	104	17.3
Geralda	1.057	84	13.6
Raimunda	1.389	98	16.3
Idalina	1.747	104	17.5
no name	1.511	110	19.0

Analysis of CEME ORS for 7 Healers

	Beatrice:	Binha:
Ph	8.1	7.9
Glucose	1.646 mg/dl	1.511mg/dl
Sodium	104.0 mEq/l	110.0 mEq/l
Potassium	17.3 mEq/l	19.0 mEq/l
Chloride	88.8 mEq/l	77.7 mEq/l

	Idalina:	Ze:
Ph	7.9	8.1
Glucose	1.747 mg/dl	1.468 mg/dl
Sodium	104.0 mEq/l	90.0 mEq/l
Potassium	17.5 mEq/l	15.4 mEq/l
Chloride	85.1 mEq/l	70.3 mEq/l

	Geralda:	Ma Paula:
Ph	8.2	8.0
Glucose	1.057 mg/dl	1.179 mg/dl
Sodium	84.0 mEq/l	82.0 mEq/l
Potassium	13.6 mEq/l	13.2 mEq/l
Chloride	66.6 mEq/l	62.9 mEq/l

Raimunda Chando:

Ph	8.1
Glucose	1.389 mg/dl
Sodium	98.0 mEq/l
Potassium	16.3 mEq/l
Chloride	81.4 mEq/l

Observations

Substance	Method	Apparatus
Sodium and Potassium	Espectrofotometria de chama	Micronal B 262
Glucose	Enzimatico GOD/POD	Espectra I
Chloride	Schales & Schales	Titulacao
Ph	Eletrodo	Potenciometro Metrohm

Investigator: Dr Domingos Barreto de Oliveira

Fortaleza, January 25, 1985

Analysis of Homemade TH ORT for 7 Healers

	Beatriz:	Binha:
Ph	7.3	7.2
Glucose	2.218 mg/dl	1.066 mg/dl
Sodium	58.0 mEq/l	42.0 mEq/l
Potassium	0.5 mEq/l	0.5 mEq/l
Chloride	48.0 mEq/l	33.0 mEq/l

	Idalina:	Ze:
Ph	6.9	7.1
Glucose	1.670 mg/dl	1.722 mg/dl
Sodium	45.0 mEq/l	98.0 mEq/l
Potassium	0.6 mEq/l	0.7 mEq/l
Chloride	66.6 mEq/l	89.0 mEq/l

	Geralda:	Maria Paula:
Ph	7.1	7.1
Glucose	1.274 mg/dl	1.327 mg/dl
Sodium	52.0 mEq/l	76.0 mEq/l
Potassium	0.3 mEq/l	0.4 mEq/l
Chloride	44.0 mEq/l	67.0 mEq/l

Raimunda Chando:

Ph	7.2
Glucose	1.284 mg/dl
Sodium	48.0 mEq/l
Potassium	0.7 mEq/l
Chloride	48.0 mEq/l

Observations:

Substance	Method	Apparatus
Sodium and Potassium	Espectrofotometria de chama	Micronal B262
Glucose	Enzimatico GOD/POD	Espectra I
Ph	Eletrodo	Potenciometro Metrohm
Chloride	Schales & Schales	Titulacao

Investigator: Dr Domingos Barreto de Oliveira

Fortaleza, January 18, 1985

Analysis of Glucose in TH Homemade ORS

Solution	Glucose	Healer
01	1.644 mg/dl	Ana
02	1.926 mg/dl	Beatriz
03	1.662 mg/dl	Binha
04	1.836 mg/dl	Idalina
05	1.362 mg/dl	Jesuina
06	1.848 mg/dl	Ze da Eliete
07	1.836 mg/dl	Maria Paula
08	1.968 mg/dl	Raimunda Chandu
09	2.064 mg/dl	Vicencia

Observations

Substance	Method	Apparatus
Glucose	Enzimatico GOD/POD	Gemini

Investigator: Dr Domingos Barreto de Oliveira

Fortaleza November 7, 1984

Analysis of Homemade ORS of Beatriz

Solution 01

Ph	6.7
Sodium	60.0 mEq/l
Potassium	1.6 mEq/l
Glucose	1,200.0 mg/dl

Observations:

Substance	Method	Apparatus
Ph	-----	Potenciometro Metrohm
Sodium and Potassium	Espectrofotometria de chama	Micronal B 262
Glucose	Enzimatico GOD/POD	Gemeni

Investigator: Dr Domingos Barreto de Oliveira

Fortaleza, October 30, 1984

APPENDIX 31

Analysis of ORS of Differing Types

Analysis of Medicinal Teas

Solution	Glucose	Type (healer)
01	1872 mg/dl	Capim Santo (Vicencia)
02	1672 mg/dl	Folha de laranja (Geralda)
03	1976 mg/dl	Cidreira (Jose)
04	1632 mg/dl	Marmeleiro (Beatriz)
05	1568 mg/dl	Aortela (Raimundo Chando)
06	1464 mg/dl	Folha de laranja (Idalina)
07	2096 mg/dl	Agua (Binha)
08	1496 mg/dl	Anador (Maria Isala)

Observations:

Substance	Method	Apparatus
Glucose	Ensimatico GOD/POD	Gemeni

Investigator: Dr Domingo Barreto de Oliveira
Fortaleza, 22 October 1984

APPENDIX 32

Analysis of Rice Water of Vicencia

Solution 01:

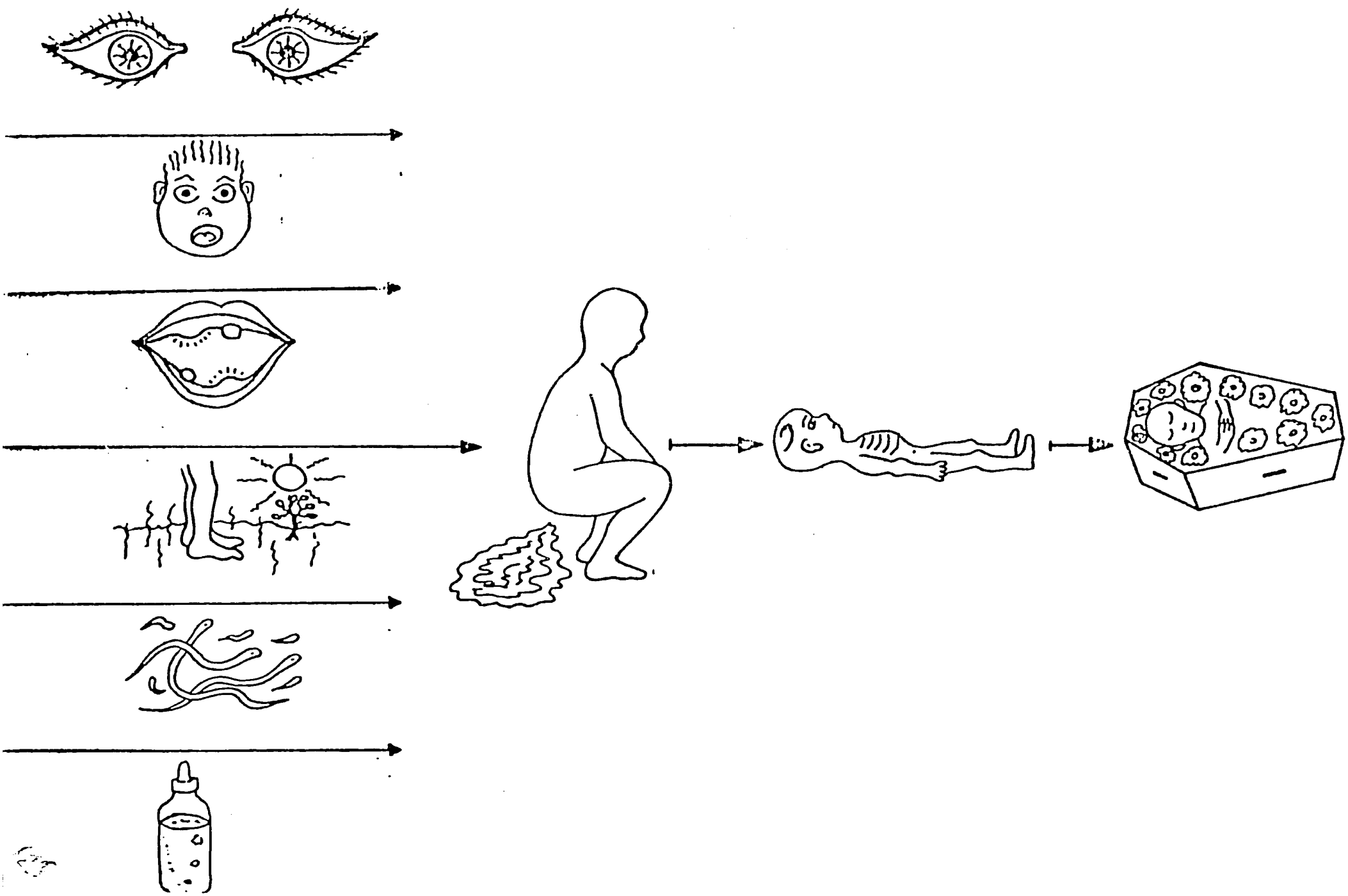
Glucose	9.6 mg/dl
Protein	14.6 mg/dl
Sodium	6.0 Eq/l
Potassium	4.7 Eq/l
Calcium	2.8 mg/dl
Chloride	0.0 mg/dl

Observations:

Substance	Method	Apparatus
Sodium and Potassium	Espectrofotometria de chama	Micronal B 262
Glucose	Orto-toluidina	Espectra I
Protein	Acido Tricholoro-acetico 10%	Espectra I
Calcium	Coley mod.	Titulacao
Chloride	Schales & Schales	Titulacao

Investigator: Dr Domingos Barreto de Oliveira

Fortaleza, July 4 1984



Appendix 55, figure 5

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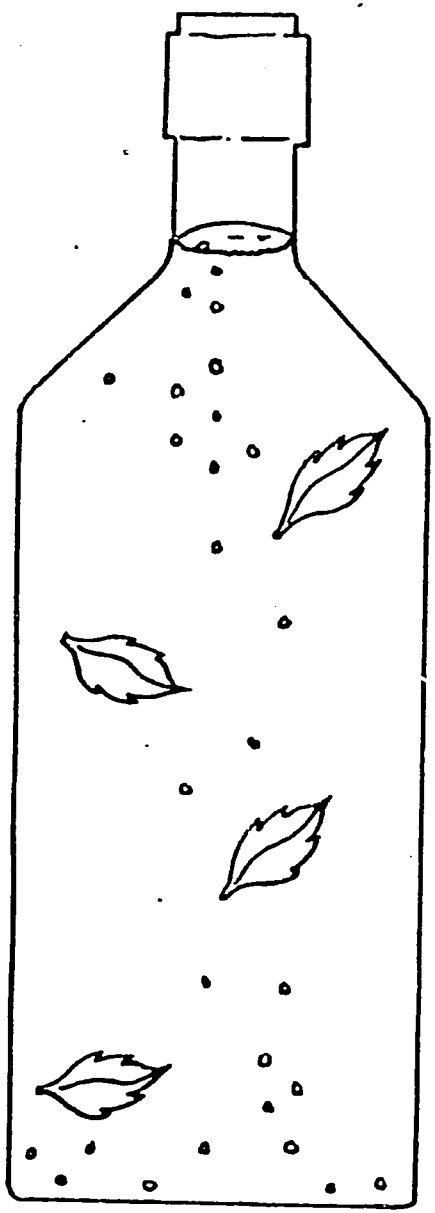
PREPARAÇÃO DE SORO CASEIRO



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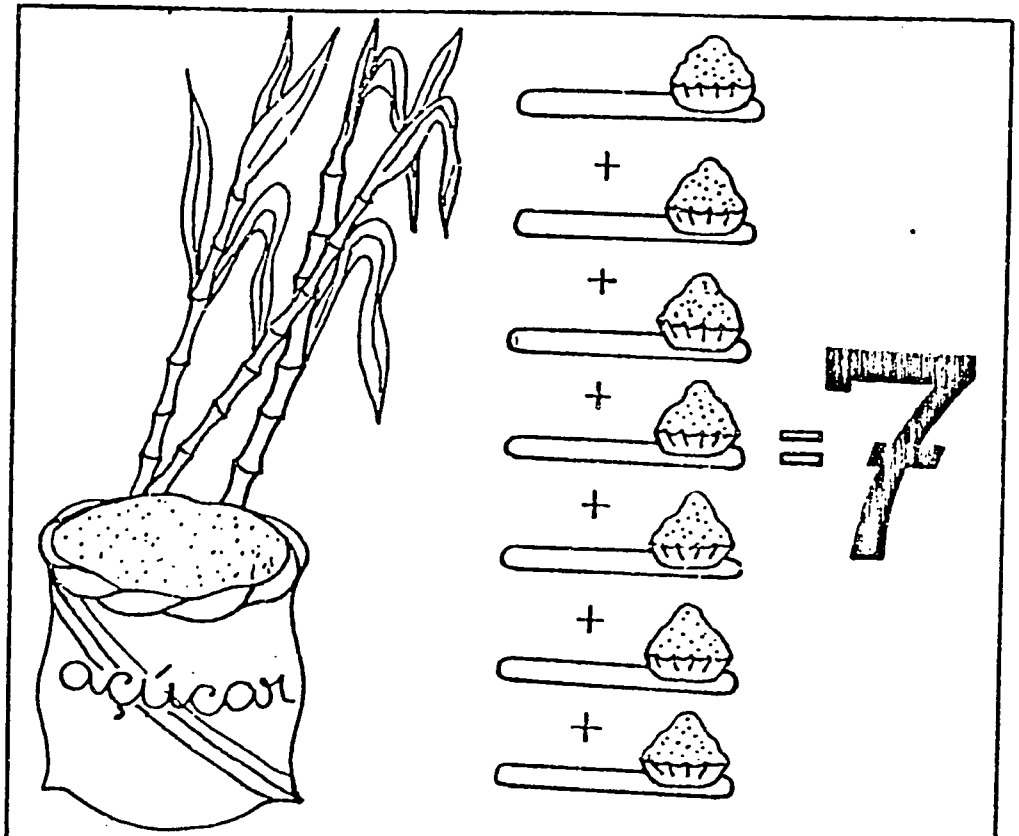
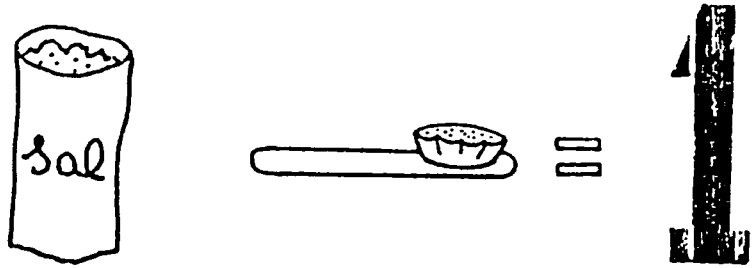
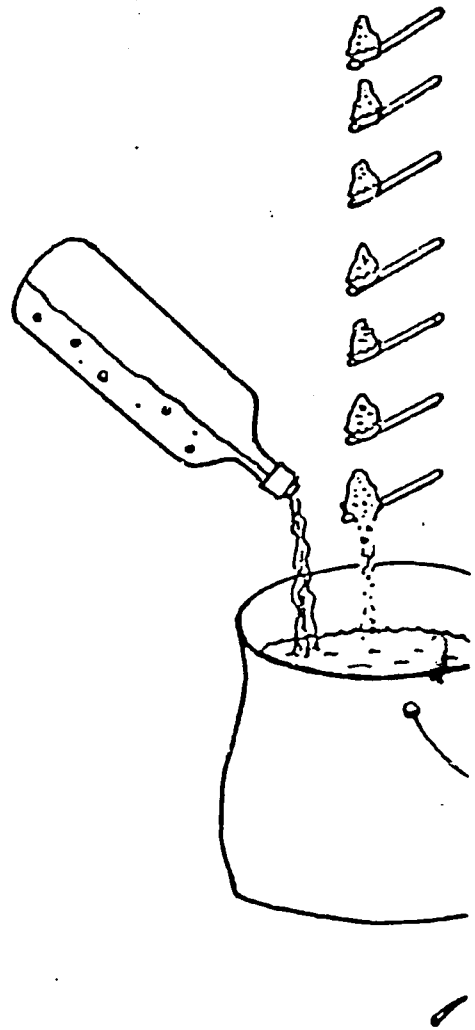


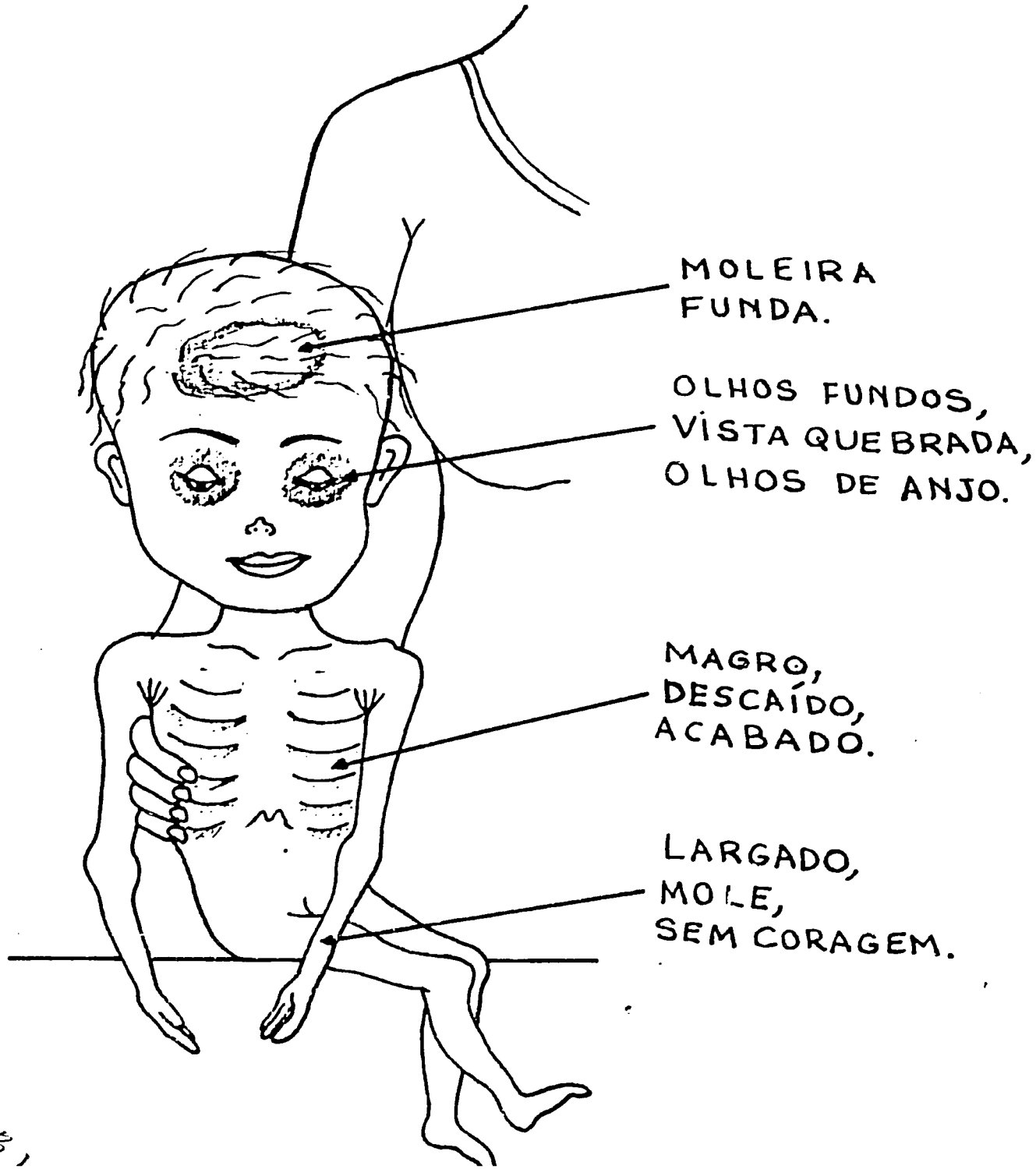
- 7 TAMPINHAS CHEIAS DE AÇUCAR



- 1 TAMPINHA RASA DE SAL



- MISTURAR TUDO EM UMA VASILHA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FUNDA.
OLHOS FUNDOS,
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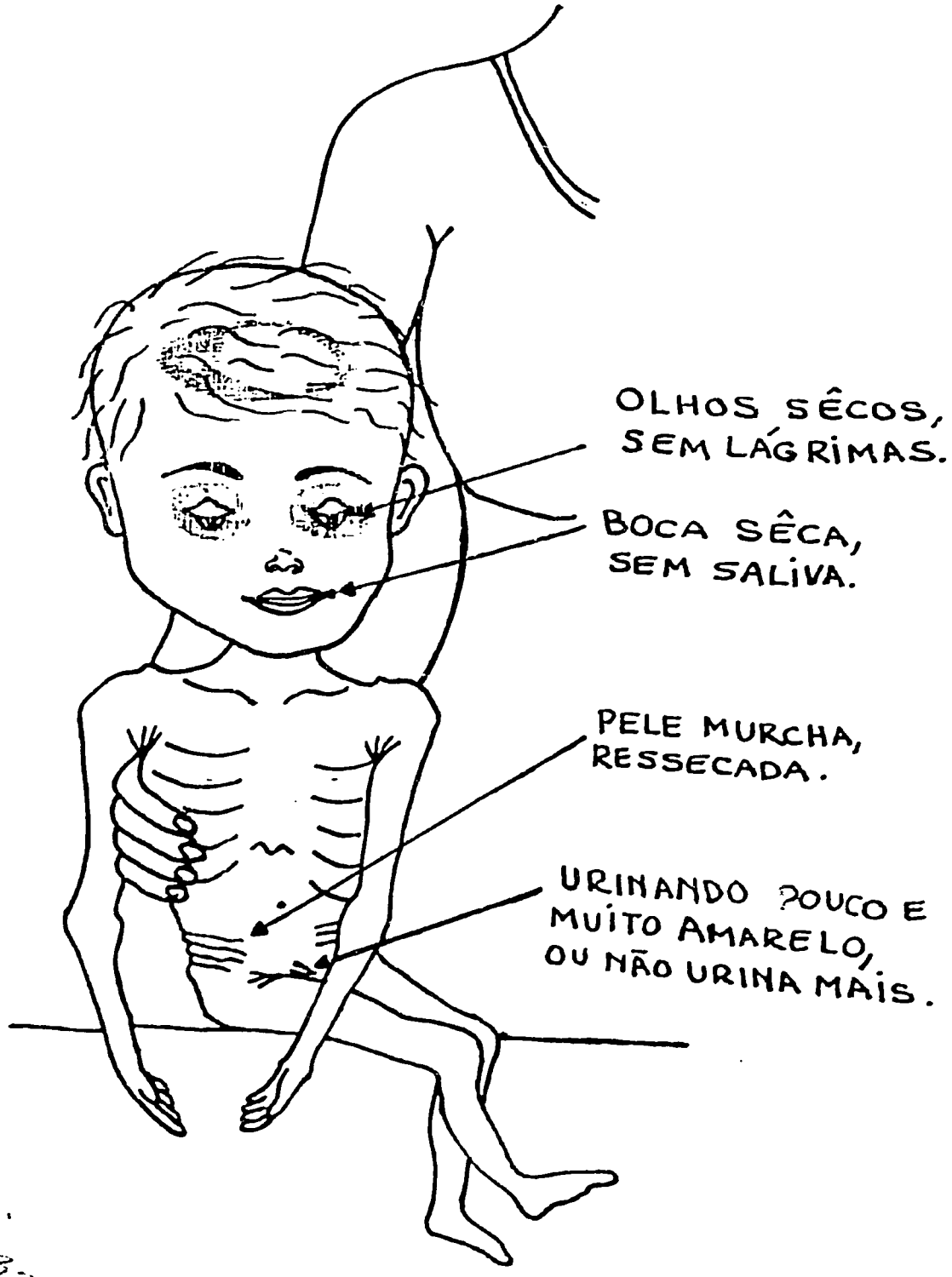
OLHOS DE ANJO.
MAGRO,
DESCAÍDO,
ACABADO.
LARGADO,
MOLE,
SEM CORAGEM.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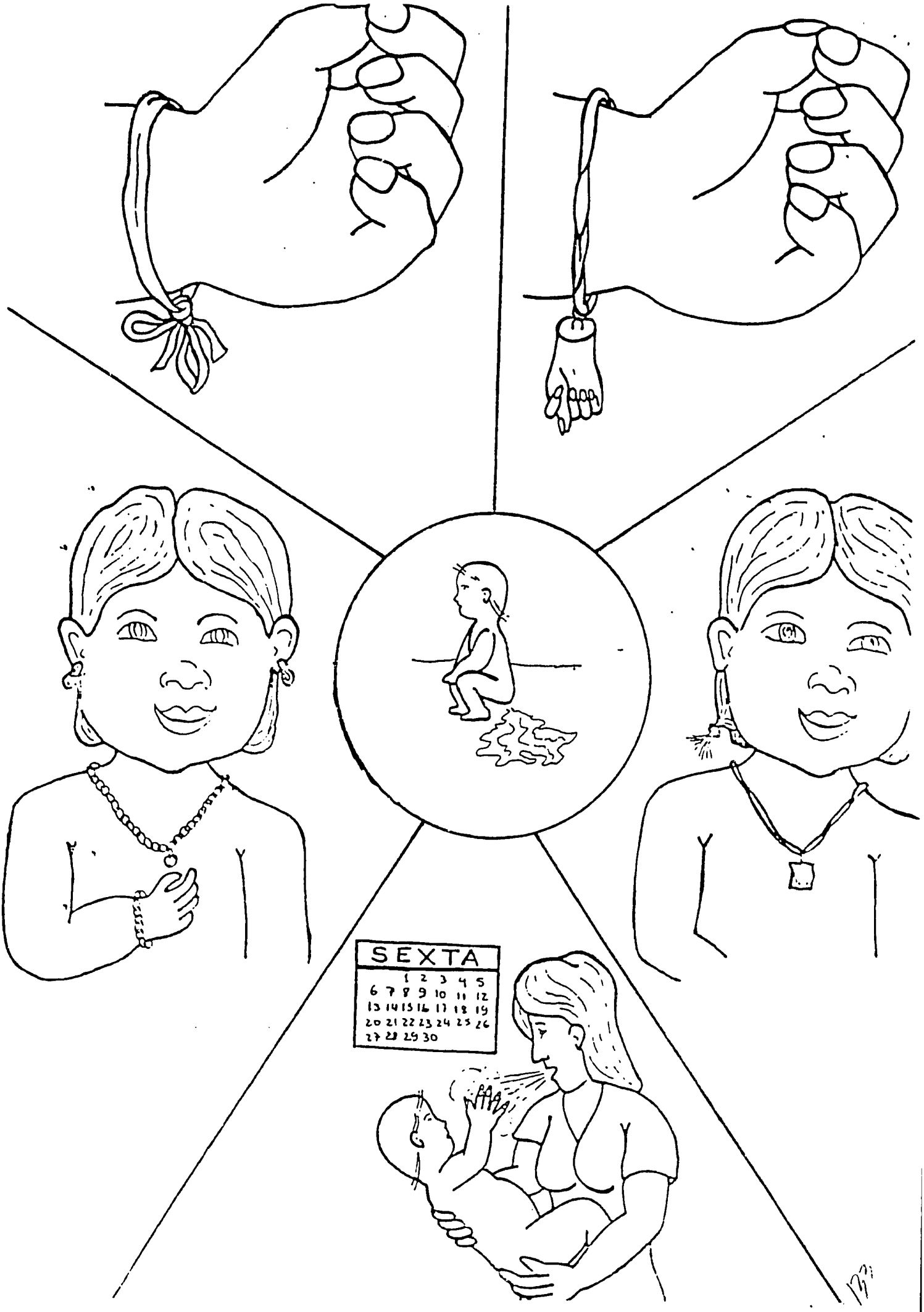
SEM LÁGRIMAS.
BOCA SÊCA,
SEM SALIVA.
PELE MURCHA,
RESSECADA.
URINANDO POUCO E
MUITO AMARELO,
OU NÃO URINA MAIS.


SEXTA
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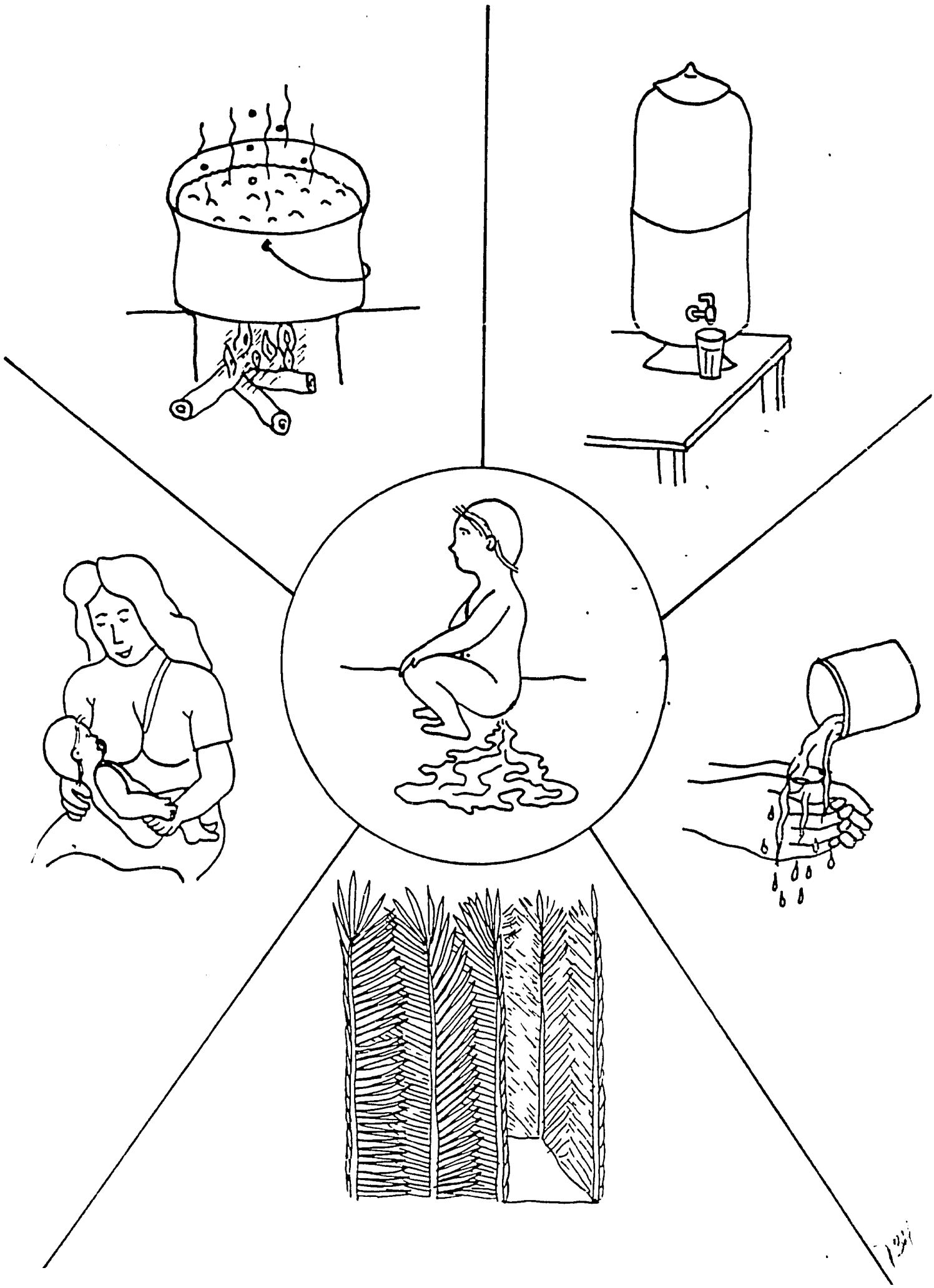
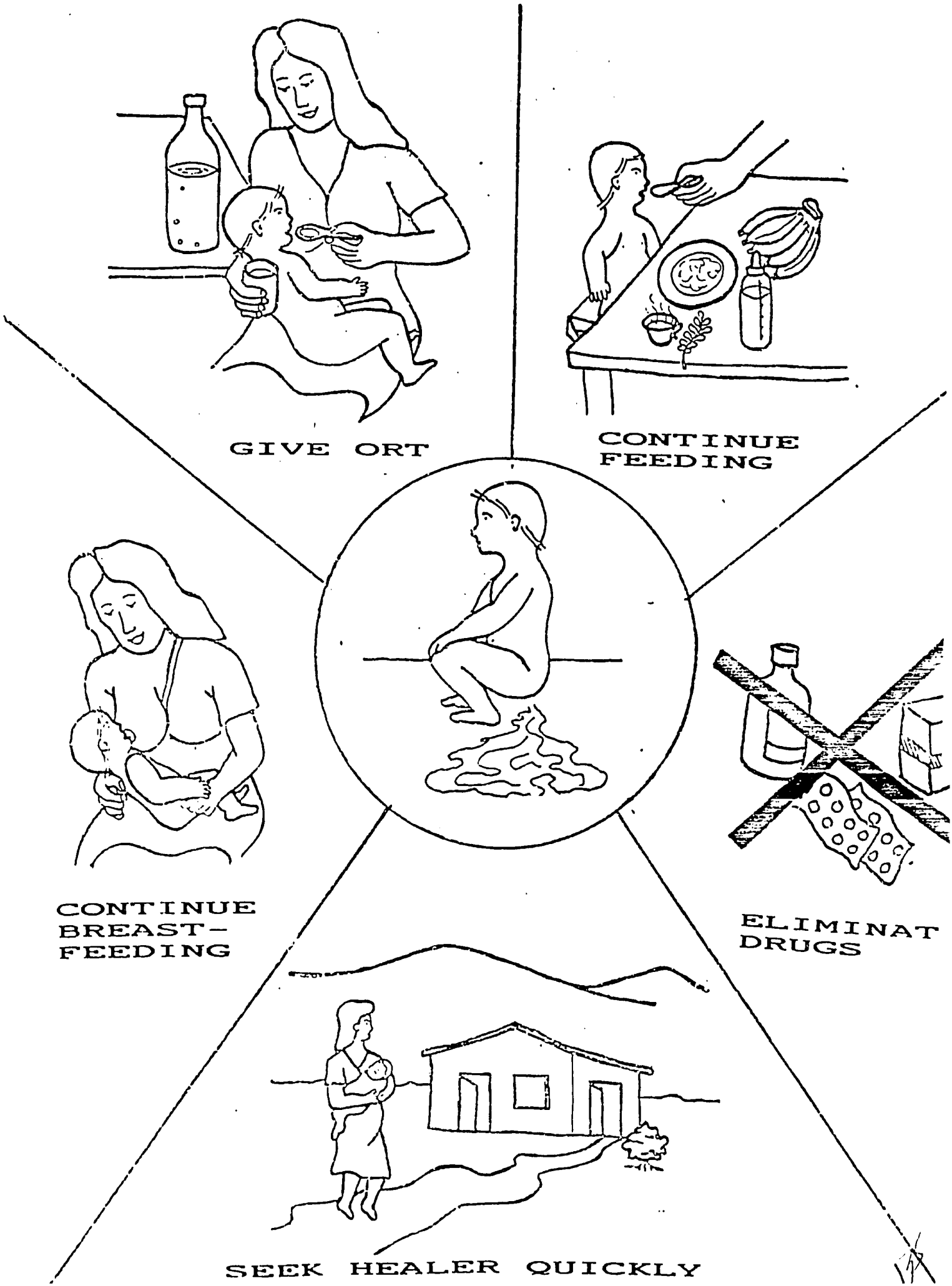
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30

Appendix 33 fig 7




GIVE ORT
CONTINUE FEEDING
CONTINUE BREAST-FEEDING
ELIMINAT DRUGS
SEEK HEALER QUICKLY

APPENDIX 34

PROJECT COSTS FOR PRICOR TRADITIONAL HEALER ORT PROGRAM PACATUBA, BRAZIL

July 1984 to October 1985 (15 months) in cruzeiros of January 1985 (exchange rate = $cr3,585 to $US 1.00)

Personnel

1. Physician-Director, Senior Level:

a. Direction of assistance project
1/2 day/week x 6 months (July-Dec) = 12 days.

b. Training of traditional healers
1/2 day/week x 6 meetings + 1 day preparation = 9 days.

c. Training of health agents
1/2 day preparation + 1 day teaching = 1.5 days.

TOTAL DAYS: 22.5 x
$cr161.000/day = $cr3.622.500 =

$US 1,010.00

2. Physician-Research Coordinator, Junior Level

a. Training of traditional healers
(1 day preparation + 1/2 day)/meeting x 6 meetings = 9 days.

b. Training of health agents
1/2 day preparation + 1 day teaching = 1.5 days

c. Construction and outfitting of curing rooms
5 days to buy materials + 5 days per curing room x 6 curing rooms = 35 days.

TOTAL DAYS: 45.5 days x
$cr42,923 = $cr 1,952.99 =

$US 545.00

3. Nurse-Field Activities Coordinator, Junior Level

a. Training of traditional healers
(1 day preparation + 1/2 day)/meeting x 6 meetings = 9 days.

b. Training of health agents
1/2 day preparation + 1 day teaching = 1 1/2 days.

c. Construction and outfitting of curing rooms
5 days to buy materials + 5 days of work per curing room x 6 curing rooms = 35 days

TOTAL DAYS = 45.5 x
$cr33.692 =
$cr1.532.986 =

$US 427.60

4. Health Agents

a. Training

2 days x 4 agents x $cr7,000/day = $cr56,000 =

$US 15.60

TOTAL PERSONNEL: $cr7.164.470

$US 1,998.20

INITIAL COSTS (continued)

Other Direct Costs

1. Office Supplies (estimated materials used in the preparation of the training of health agents)

Paper	$cr13.600
Pens, erasers	$cr 5.000
Art supplies	$cr 7.500
Total	$cr26.100

$US 7.28

2. Construction of curing rooms (6)+

a. Nails	$cr	9.004
b. Wood		28.909
c. Tile		99.788
d. Labor		181.019
e. Doors		59.168
f. Hardware		4.583
g. Door latches		10.630
h. Delivery of Materials		18.408
i. Whitewash		19.260
j. Hinges		27.446
k. Trowels		6.000
l. Windows		6.000
m. Purchase of entire house for Raimundo		107.219
n. Cement		42.515
TOTAL		619.949

$US 172.90

+This does not include materials and labor donated by the community.

Outfitting of curing rooms+
A. Materials

a. Fans	¢cr	82.705
b. Plastic and metal spoons		46.822
c. Funnels		7.653
d. Metal cups		44.203
e. Glass containers and liter bottles		124.362
f. Pictures and statues of saints		311.190
g. Child-size hammocks and diapers		590.820
h. Rope, storage bins, dish towels		104.512
i. Filters		290.030
j. Tables		108.000
k. Benches		81.072
l. Table cloths		70.465
m. Replaceable filter parts		58.822
n. Jars for medicinal herbs		1.748
TOTAL		1.922.404
		¢US 536.20

TOTAL OTHER DIRECT COSTS		2.568.453
		¢US 716.38

+This figure includes materials purchased and distributed until present; final costs will be slightly higher as some healers are still missing items.

INITIAL COSTS (continued)

Trips and Per Diems

1. Training

a. Travel Pacatuba-Fortaleza x 6 meetings x $cr20.000/trip = $cr120.000

US$ 33.50

b. Travel of health agents (4) to Fortaleza for their training = $cr12.000

$US 3.30

c. Food for health agents (4) during training =$cr125.000

$US 34.90

2. Construction and outfitting of curing rooms

a. Gasoline for shopping trips (estimated) = $cr20.000

$US 5.60

b. Travel Pacatuba-Fortaleza x 5 days x 6 curing rooms x $cr20.000/trip = $cr600.000

$US 167.40

TOTAL TRIPS AND PER DIEMS $cr877.000

$US 244.70

OPERATING COSTS

Personnel

1. Physician-Director, Senior Level

   a. Direction/supervision of project: 1/2 day/month x 10 months = 5 days.

   b. On-the-job training: 1 meeting/month x 10 months = 5 days

   TOTAL DAYS: 10 days x $cr161.000 = 1.610.000

   $US 449.10

2. Physician-Research Coordinator, Junior Level

   a. Supervision of health agents and traditional healers: 1/2 day/month x 10 months = 5 days.

   b. On-the-job training: 1 meeting/month x 10 months = 5 days.

   TOTAL DAYS: 10 days x $cr42.923 = 492.230
   $US 119.70

3. Nurse-Field Activities Coordinator, Junior Level

   a. Supervision of agents and traditional healers: 1/2 day/month x 10 months = 5 days.

   b. On-the-job training: 1 meeting/month x 10 months = 5 days

   TOTAL DAYS: 10 days x $cr33.692 = $cr336.920

   $US 94.00

4. Health Agents

Supervision of traditional healers: 80 hours/month x $cr875/hour = $cr70.000/month x 10 months = $cr 700.000.

$US 195.30

5. Traditional healers

Incentives (parties, Dec through Oct): $cr83.299

$US 23.20

TOTAL PERSONNEL OPERATING COSTS: $cr3.159.449

$US 881.30

OPERATING COSTS (continued)

Other Direct Costs

Materials

1. Health agent uniforms and umbrellas

$cr83.468
$US 23.30

2. Materials Maintenance+

a. Salt	$cr3.950	$US 1.10
b. Glue	8.217	2.29
c. Sugar (244 kgs)	253.823	70.80
d. Plastic bags	25.471	7.10
e. Other	83.468	23.28
TOTAL MATERIALS	374.929	
		$US 104.6(

+Does not include additional liter bottles purchased to substitute for lost bottles.

TOTAL OTHER
DIRECT COSTS: $cr458.397

$US 127.90

Continuing Travels and Per Diems

1. Supervision and Training: 1 trip/month
Pacatuba-Fortaleza x 10 months x $cr20.000=$cr200.000
$US 55.80

2. Food in Pacatuba (estimated): $cr1.000/month x 10 months = $cr10.000

$US 2.80

TOTAL TRIPS AND
PER DIEMS $cr210.000

$US 58.60

TOTAL INITIAL COSTS: $US 2,959.53
TOTAL OPERATING COSTS: $US 1,067.70

COSTS OF THE PROJECT OF ASSISTANCE OF TRADITIONAL HEALERS BY ACTIVITY

July 1984 to October 1985 (15 months)
Dollar amounts calculated in cruzeiros of January 1985.
Values also given as corrected by the inflation index factor. (Exchange rate = $cr 3.585 to $US 1.00)

Initial Training

Traditional healers

$cr2.258-2.484.388
$US 630.00, corrected to
$US 693.00

Health agents

$cr 575.522-633.074
$US 160.00 corrected to
$US 177.00

TOTAL INITIAL TRAINING
$cr2.843.057-3.117.462
$US 790.00 corrected to
$US 870.00

Operating (Supervision, Training, Maintenance)

Total cost

$cr3.744.378-4.118.816

$US 1,045.00 corrected to
$US 1,149.00

Cost per month of work per healer: (total cost divided by 142 months)

$cr26.369 - 29.006

$US 7.36 corrected to
$US 8.09

Construction/equipping of curing rooms

Average cost of curing room construction (not all healers required construction of healing rooms)

$cr 85.455 - 94.000

$US 23.84 corrrected to
$US 26.22

Cost of completely outfitting the curing room

$cr140.640 - 154.704

$US $US 39.23 corrected to $US 43.15

COST EFFECT OF TRADITIONAL HEALER ORT PROGRAM

Estimated Number of Liters of ORT Distributed per Healer per Month

38

Estimated Number of Liters of ORT Distributed by 17 Healers per Month

646

Estimated Number of Liters of ORT Distributed by 17 Healers per 12 Months

7,752

Estimated Number of Kilos of Sugar Used per Healer per Month

1.65

Estimated Cost of Sugar per Kilo

$US 0.29

Estimated Cost of Sugar per Month for 17 Healers
$US 8.18

Estimated Cost of Sugar per Healer per Month
$US 0.48

Estimated Liters of ORT Prepared from One Kilo of Sugar
10

Estimated Liters of ORT Administered Per Healer Per Month
36.30+

Estimated Liters of ORT Administered By 17 Healers Per Year
7,405++

+Independent data from our monthly supervision of traditional healers sets the number of liters of ORT administered per healer slightly higher at 38 liters.

++Based on 36 liters rather than 36.30. The total ORT delivered in Facatube by 17 healers during one year is estimated to be 7752.

APPENDIX 35

Year	Number of Live Births	Number of Deaths < 1 year	Death Rate < 1 year/ 1000
1985	98	5	51.0
1984	131	7	53.4
1983	156	6	38.5
1982	195	14	71.8
1981	196	12	61.2
1980	198	21	106.1
1979	182	20	109.1
1978	166	18	108.4
1977	198	17	85.9
1976	139	14	100.7
1975	121	15	124.0
1974	147	15	102.0
1973	154	13	84.4
1972	137	14	102.2
1971	98	10	100.5
1970	100	10	100.0
1969	112	17	151.8
1968	85	11	129.4
1967	100	11	110.0
1966	95	10	105.3
1965	65	13	200.0
1964	72	13	180.6
1963	59	10	169.5
1962	60	9	150.0
1961	47	12	255.3
1960	41	10	243.9
1959	27	6	222.2
1958	24	6	250.0
1957	23	3	130.4
1956	23	3	130.4
1955	17	4	235.3
1954	23	4	173.9
1953	15	3	200.0
1952	13	4	307.7
1951	13	3	230.8

Year	Number of Live Births	Number of Deaths 1-4 years	Death Rate 1-4 years
1985	98	3	6.8
1984	131	1	7.6
1983	156	5	32.1
1982	195	2	10.3
1981	196	1	5.1
1980	198	2	10.1
1979	182	5	27.5
1978	166	5	30.1
1977	198	3	15.2
1976	138	6	43.2
1975	121	9	74.4
1974	147	11	74.8
1973	154	6	39.0
1972	137	6	43.8
1971	98	9	91.8
1970	100	5	50.0
1969	112	9	80.4
1968	85	4	47.1
1967	100	5	50.0
1966	95	3	31.5
1965	65	2	30.8
1964	72	10	138.8
1963	59	2	33.9
1962	60	1	16.7
1961	47	5	106.4
1960	41	3	73.2
1959	27	3	111.1
1958	24	1	41.7
1957	23	2	87.0
1956	23	0	0
1955	17	0	0
1954	23	1	43.5
1953	15	0	0
1952	13	0	0
1951	13	0	0

Year	Number of Live Births	Number of Deaths 0-5	Death Rate 0-5
1984	131	8	61.1
1983	156	11	70.5
1982	195	17	87.2
1981	196	14	71.4
1980	198	23	116.2
1979	182	25	137.4
1978	166	23	138.6
1977	198	20	101.0
1976	138	20	143.9
1975	121	24	198.3
1974	147	26	176.9
1973	154	19	123.4
1972	137	20	146.0
1971	98	19	193.9
1970	100	15	150.0
1969	112	26	232.1
1968	85	15	176.5
1967	100	16	160.0
1966	95	14	147.4
1965	65	15	230.8
1964	72	23	319.4
1963	59	12	203.4
1962	60	10	166.7
1961	47	17	361.7
1960	41	13	317.1
1959	27	10	370.4
1958	24	7	291.7
1957	23	5	217.4
1956	23	4	173.9
1955	17	4	235.3
1954	23	5	217.4
1953	15	3	200.0
1952	13	4	307.7
1951	13	3	230.8

APPENDIX 36

Deaths in Pacatuba As Reported By Different Sources

All deaths listed by name, followed by address, age, date of death, and diagnosis.

PRICOR House to House Survey	Official Death Records	Grave-Digger Reports
1. ---- San Jose 2 months 15/02/85 D. de Crianca	----	Diana San Jose 2 months 15/02/85 Diarrhea/ dehydration
2. ------	Carlos Henrique Martins -- 8 months 14/02/85 intestinal insufficiency	Carlos Martins Matadouro 8 months 14/02/85 intestines
3. -- Centro 1 year 27/02/85 coqueluche	-----	------
4. -- Sao Joao Sa 1 year 03/85 measles	Luis Antonio Braga -- 11 months 04/03/85 measles	Luis Antonio Braga Sao Joao 11 months 03/85 measles
5. -----	Dirliane de Sousa Pacatuba 8 months 24/07/85 typhoid	Dirliane Sousa -- 8 months 25/07/85 typhoid

PRICOR House to House Survey	Official Death Records	Grave-Digger Reports
6. --	Manoel Machado Chagas	Emanuel Machado Chagas
Matadouro 79.1 3 years 12/08/85 diptheria	-- 3 years 12/08/85 diptheria	Matadouro 3 years 12/08/85 chicken pox and heart
7. -----	-----	--
		Sao Joao 2 years 30/08/85 Pneumonia
8. --	-----	Antonio Freitas Filho
Sao Joao 81 3 years 10/10/85 convulsions		Sao Joao 3 years 10/10/85 convulsions
9. --		--
Sao Joao 88.2 20 days 30/10/85 D. de crianca		Sao Joao 20 days 30/10/85 d. de crianca