

ENVIRONMENTAL HEALTH PROJECT

# ACTIVITY REPORT

No. 61

Diarrheal Disease Prevention Through  
Community-Based Participation Interventions

Santa Cruz, Bolivia  
1997-1998

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by

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## ACRONYMS AND TERMS

ARI	acute respiratory infection
CARE	Cooperative for Assistance and Relief Everywhere
CCH	Community and Child Health Project
CIMEP	Community Involvement in the Management of Environmental Pollution
CPI	Community-Based Participation Intervention
CT	community team
CS	child survival
DD	diarrheal disease
DDP	DD Prevention (activity)
EHP	Environmental Health Project
EpiInfo 6.0	statistical software for epidemiology developed by the U.S. Centers for Disease Control and Prevention (CDC)
ID	infectious disease
IR	intermediate result
KAP	knowledge, attitudes, and practices
KAPB	knowledge, attitudes, practices, and behavior
NGO	nongovernmental organization
NHS	National Health Secretariat
OTB	Organización Territorial Basico
PAHO	Pan American Health Organization
PROCOSI	Bolivian organization of NGOs
PROSIN	Proyecto de Salud Integral
PRODESCO	Proyecto de Desarrollo Comunitario
RSH	reproductive and sexual health

RT	regional team
SO	strategic objective
TT	technical team: the TT used in the CPI model
USAID	U.S. Agency for International Development
UNICEF	United Nations Children's Fund
WHO	World Health Organization

# MAP OF BOLIVIA





## EXECUTIVE SUMMARY

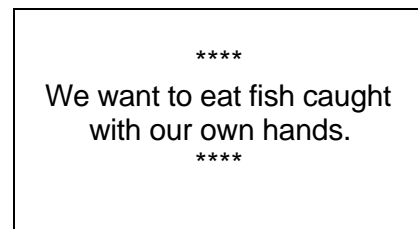
The Bolivia Diarrheal Disease Prevention (DDP) activity targeted three communities in or near the town of Samaipata in the state of Santa Cruz. Using a community-based approach, the project focused on reducing DD in children five and under by reducing high-risk behaviors and improving environmental conditions in the target communities. The DDP also sought to enhance community capacity through skill-building workshops and microprojects that enabled community members to facilitate scale-up of the project. Such an approach is particularly appropriate for controlling DD in areas where, although water supply and sanitation services have been provided in previous years, diarrheal rates are still high and communities have not yet addressed household-, or community-level disease control. An emphasis on primary prevention complements other prevention activities that focus on vaccinations, breastfeeding, nutrition, and treatment of disease.

**Activity Title:** DD Prevention Through Community-Based Participation Interventions (CPI). (CPI is a community process developed by EHP. See Section 1.3.)

**Country/Region:** Bolivia/Santa Cruz

**USAID Bolivia Strategic Objective 3.0:** Improved Health of the Bolivian Population and Intermediate Results 1.1, 1.2, 3.1, and 3.2

**Schedule:** January 1997 through December 1998



### Overall Goals

The overall goals of the DDP activity were twofold: to reduce DD rates, using a community-based approach to change behaviors associated with known risks of diarrhea, and to scale up the approach to other areas in Bolivia. Toward that end, community members engaged in a series of activities to identify risk behaviors, understand disease-transmission routes, develop local leadership, and collaboratively create interventions designed to reduce DD rates. A series of community-based educational activities were undertaken to

- reduce diarrhea rates for children five and under in the target communities;
- reduce community-identified high-risk behaviors in the target population;
- mitigate community-identified high-risk environmental conditions;
- provide community, municipal, and regional participants with the skills to design and implement DD-reduction interventions through microprojects; and
- establish and train five regional teams, three located in the Valles Cruceños area of Samaipata in the state of Santa Cruz, and the remaining two drawn from the states of Potosí and La Paz to facilitate future scale-up activities.

### Project Activities

The DDP activity involved several components:

- Site selection

- Baseline environmental-health assessment survey
- Four skill-building workshops
- Community identification and design, implementation, and evaluation of microprojects
- Follow-up (outcome) survey
- Activity monitoring and evaluation

## Primary Results

- 49% reduction in rates of diarrheal episodes in children five and under
- 58% increase in mother's knowledge of cases, causes, and prevention of diarrhea
- 66% increase in food safety among mothers
- 193% increase in mothers' handwashing after changing diapers
- Some contribution of municipal funds for microprojects/activities

These results are from the two neighborhoods in the primary intervention site of Samaipata. They exclude the smaller intervention community of Cuevas because of sample size limitations.

In both neighborhoods of the intervention site there was about a 50% decrease in diarrheal episodes for the children five and under; more than a 50% increase in knowledge about environmental (household and yard) causes of diarrhea; more than a 50% increase in awareness of the food safety of washing kitchen utensils; and all sites were promised municipal contributions to the proposed microprojects.

The primary results of the activity are given in the table below. Note that, in the 16 months between the baseline and final surveys, the barrios of Samaipata (the primary intervention site) had a reduction of 49% in severe diarrhea—a net change of 17%.

Mothers (and primary caretakers) in the primary intervention site of Samaipata showed a marked increase in knowledge of causes and prevention of diarrhea (58% on average). There was also an increase in food safety—66% on average. Finally, mothers' handwashing after changing diapers increased twofold.

Upon completion of the DDP activity, four of six microprojects had been implemented with the contribution of private and municipal funds.

### Summary Analysis of Key Indicators (Samaipata Only)

Indicator	Baseline Prevalence	Final Survey Prevalence	Projected Change	Actual Change
1. Reduction in rates of diarrheal episodes, children five and under	35%	18%	15%↓	49%↓
2. Increase of mothers' knowledge of causes and prevention of diarrhea	39%	62%	20%↑	58%↑
3. Increase in food safety among mothers	33%	55%	20%↑	66%↑
4. Increase in mothers' handwashing after changing diapers	14%	41%	20%↑	193%↑
5. Contribution of private or municipal funds to microprojects/activities	Initially promised but only small sums realized			

### Prospects for Scale-Up and Sustainability

The community-based model applied in the DDP activity can be scaled up in two distinct ways: either by extending the methodology into other health districts in Bolivia, targeting diarrhea as was done in the pilot project, or by adapting the methodology for other diseases—developing disease-specific “packets” to suit the particular target. The first option has already been implemented by the Community and Child Health (CCH) Project in a number of districts outside the Valles Cruceños pilot zone. (CCH, a bilateral program of the Bolivian Ministry of Health and USAID, has been the major USAID-funded Child Survival program in Bolivia over the last decade.) The development of an Infectious Disease (ID) program in Bolivia has been discussed to allow for expansion of the CPI model to other diseases. Once a community has enhanced its capacity for community participation and appropriate behavior changes at both individual and household levels, the CPI process will enable the community to alleviate numerous local problems without repeating the training for each disease or environmental health problem.



# 1 BACKGROUND

## 1.1 Bolivia Health Profile

The second poorest country in the Western Hemisphere, Bolivia has a fairly young population, whose life expectancy at birth is 61 years (USAID 1998; UNICEF 1998). There is extensive malnutrition within the country, especially among children: of every three rural children, for example, one suffers from chronic malnutrition (low height-for-age). For urban children the ratio lowers to one in five. Acute malnutrition (low weight-for-height) has been reported among 4.4% of children three and under (PAHO 1998).

Bolivia's infant mortality rate is one of the highest in Latin America, distributed nearly equally between neonatal mortality (37 per thousand live births) and postneonatal (39 per thousand) (USAID 1998). For children five and under, the mortality rate is very high—116 per thousand live births, most of those deaths resulting from DD (Bolivia 1994). According to Bolivia's National Secretariat for Health, 13,000 children in that age group die every year from diarrheal disease (DD) alone.

According to World Health Organization (WHO) figures for 1994, 55% of Bolivia's population has access to potable water and 41% to sanitation.

Bolivia has an average per capita gross national product of US\$800, about one quarter of the average on the continent. Overall, income in Bolivia is disproportionately distributed. In the rural areas, 88% of the population has an income below the poverty line, and 90% of those are below the "extreme" poverty line (USAID 1998).

Poverty is symptomatic of major systemic constraints that continue to impede economic growth in Bolivia. These include inadequate governmental, financial, and educational institutions; poor technological capability; limited financial services; poor infrastructure; and a shortage of human capital and experience (USAID 1998).

## 1.2 The DDP Activity at a Glance

The DD Prevention (DDP) activity originated in response to a request from the U.S. Agency for International Development (USAID) to strengthen household and community prevention of the major childhood illnesses—DD, malaria, and acute respiratory infections (ARI)—dealt with in Child Survival projects. The resultant project specifically targeted DD in the state of Santa Cruz, Bolivia, focusing on the hill town of Samaipata in Valles Cruceños. Samaipata was selected because, although other projects had provided water supply and sanitation services to the community, diarrheal rates remained unacceptably high; therefore the site was ideal for a behavior change project.

DDP aimed to achieve its objectives by applying results from a baseline disease and environmental-health assessment survey in a community-based participation and training process that involved community members, local authorities, nongovernmental organizations (NGOs), health districts, and educators. Through a series of “learning by doing” workshops, participants learned to identify the major DD risk factors and select the most sustainable interventions. The workshops helped inform the technical specialists about local knowledge and customs, constraints, and limitations, while training community members about the pathogens and behaviors associated with DD. Following each workshop, community-participation activities encouraged community members to continue applying lessons learned from workshops. Community identification, design, and implementation of microprojects resulted from the workshops and community-participation activities. In addition to addressing technical issues (e.g., the interruption of DD transmission rates for children), the microprojects considered financial sustainability and institutional barriers and needs. At the end of the activity, a final (outcome) survey assessed results.

This activity was undertaken in conjunction with the USAID-funded Community and Child Health Project (CCH), a bilateral program of the Bolivian Ministry of Health and USAID and the major USAID-funded Child Survival program in Bolivia over the past decade. Other important partners included a USAID-funded association of 24 Bolivian NGOs known as PROCOSI, CARE (a PROCOSI member), staff from the national and department health secretariats, and local municipalities. CCH provided office space for the consultants, allocated staff to work with the project team and the communities, and helped review the survey data. PROCOSI’s involvement in the project brought more people into the training, which then offered additional opportunities for scale-up and replication. CARE representatives also attended the workshops, and CARE supported microprojects in some areas.

### **1.3 The CPI Model**

The DDP activity in Bolivia relied upon previous successful Environmental Health Project (EHP) community-based projects in Ecuador and Tunisia. For instance, the Community Involvement in the Management of Environmental Pollution (CIMEP) model, used in Tunisia, focused on environmental health issues and developed community-participation strategies to encourage municipal involvement to alleviate those problems (Yacoob and Kelly 1996). Bolivia’s DDP activity, on the other hand, focused on household behavior-change strategies to lower the risk of DD and relied upon the Community-Based Participation (CPI) behavioral-change model. That model, first developed for and tested in a project in Ecuador, focused upon behavior change in indigenous communities to control the spread of cholera (Whiteford *et al.* 1996a, 1996b).

The Bolivia DDP activity expanded the CPI methodology to include several elements: clinic-, survey-, and interview-generated data concerning diarrhea; comparison of baseline and follow-up survey results; community self-reporting and monitoring of behavior changes; observational site visits in the target communities; and focus group interviews in communities and among community members trained in local and regional workshops.

Incorporating nonformal health-education techniques with epidemiological and ethnographic methodologies, the CPI model facilitates culturally appropriate behavioral changes. An underlying assumption of the CPI model is that local knowledge is not only valuable but also essential to behavioral change; of equal importance is technical knowledge about disease transmission and community-education techniques. These two critical assumptions form the conceptual base of the CPI model and

are incorporated through a process of education/practice/education in which the knowledge is shared multidirectionally. Community members share their neighborhood-based knowledge with the specialists, while the specialists communicate skills, techniques, and disease-related information. These educational opportunities occur through a variety of processes: workshops, interviews, observations, community projects, neighborhood gatherings, and microprojects.

#### **1.4 DDP Activity Teams**

Community and technical knowledge are the critical bases of the CPI model. Three teams translate them into action by integrating them into behavior-change activities. Each team is responsible for particular activities: the community team (CT) helps develop local leadership and participation; the regional team (RT) bridges local and specialized knowledge, facilitates community meetings and neighborhood projects, and collects and transmits local knowledge to the last team—a technical team (TT) of specialists that provides information about health education, disease transmission, design and financing of microprojects, research methodologies, and techniques to evaluate and sustain community projects. The three teams work in tandem to achieve the desired changes in knowledge and behavior.

For the DDP activity, the TT consisted of two technical consultants (an applied medical anthropologist and a nonformal educator and facilitator), an EHP Activity Manager (a biologist), and two Bolivian specialists (a physician and a community educator). In turn, local knowledge and community and outreach activities were generated by the 22 RT members, who were trained in the workshops, and by over 100 community members, who were trained by the RTs and eventually comprised the CTs.

#### **1.5 Site Selection: Valles Cruceños District**

The project site was the Valles Cruceños District in the state of Santa Cruz. Located on the Andean foothills and in the lowland plains of southeastern Bolivia, Santa Cruz state has a population of 1.5 million, nearly three-quarters of whom reside in urban areas (DHS 1994). The Valles Cruceños District itself has a population of 64,900 (with 9,400 under five years of age). In 1992, the literacy rate was 78%. Access to piped water and sanitation facilities varies considerably—being higher in the urban areas than in the rural. Even in the Santa Cruz rural areas there is considerable difference among communities. For example, in some communities in the Chiquitania areas, coverage is as low as 25%, while in the Valles Cruceños area where the project was conducted, from two-thirds to three-fourths coverage has been documented by CCH.

Infant mortality is 50 per thousand births, and mortality for children five and under is 80 per thousand live births. Although the state of Santa Cruz has the highest prevalence of reported diarrheal episodes in the country [1996 and 1997], only 37.3% of primary caretakers report using oral rehydration therapy.

Several factors contributed to the target-community selection process. First, the major Child Survival programs sponsored by USAID/Bolivia through CCH and PROCOSI focused on rural populations in three departments: La Paz, Cochabamba, and Santa Cruz. Second, preexisting data on critical health indicators were available. Third, a basic level of water supply and sanitation was necessary in order to evaluate the addition of hygiene behavior change interventions. Other factors considered included the availability of infrastructure to meet logistical needs and CCH experience in the community.

The three intervention communities selected were the neighborhoods of Barrio Nuevo and Barrio Surtidor, in the town of Samaipata, and the town of Cuevas. The town of Mairana was chosen as the control based upon its similarity to Samaipata; the barrios Villa El Carmen and Final Barrio Pan served as the two sites within Mairana. (Table 1 presents the characteristics of the target and control communities.)

Both intervention and control sites were located off the principal highway leading to Santa Cruz (120 and 150 kilometers, respectively), with Mairana being just down the road from Samaipata. As a result, there is significant interaction between the two communities. For instance, people from Mairana come to Samaipata daily to work and shop, and families often have members living in both towns with interaction on a weekly, if not daily, basis.

The two towns have comparable heterogeneous populations (a mixture of families who had lived in the community for generations and immigrants from other towns in Bolivia), easy access to a hospital, some access to water and sanitation, and exposure to both radio and television. Another town, Bermejo, was also considered as a control site. However, the TT concluded that it was too small and dispersed to be a good control. El Torno, another community on the same highway from Santa Cruz (40 kilometers away), was an option as well but was rejected because it was a transient bus-stop community.

RTs from La Paz, Potosí, and Yapacani also participated in all of the workshops and community activities to expand the project to other areas and to increase the chances of replicating the community development process. The other three teams designed behavior change interventions, as did the RT from Valles Cruceños, but since they were part of the scale-up activities and not of the original DDP work plan, neither baseline nor follow-up surveys took place in those other locations. As a result, the data in this report reflect the original focus on the Valles Cruceños area of the state of Santa Cruz.

## **1.6 Organization of the Report**

The main text of this report summarizes the entire EHP activity (1997-1998). The appendixes include the Bibliography (A); Survey Questionnaire (B); Overview of Workshop Objectives, Contents, and Products (C); Microprojects (D); Technical, Regional, and Community Team Members (E); and Results from the 1997 Baseline and the 1998 Final Surveys (F).

The quotations in boxes throughout the report are taken from the participant evaluation. See Section 4.7.

**Table 1**  
**Characteristics of Principal Target Communities and Control Site**

	<b>Size of Intervention Population</b>	<b>Characteristics</b>
<b>Samiapata</b>		
<b>Barrio Nuevo</b>	730 residents (162 families)	Barrio Nuevo is a neighborhood in Samaipata located off the main highway; houses are close together. There are many immigrants to the area, and both Spanish and local dialects (Aymara and Quechua) are spoken. The area is highly influenced by tourism, and there is some access to both radio and television
<b>Barrio Surtidor</b>	660 residents (150 families)	Barrio Surtidor is a neighborhood in Samaipata located off the main highway; houses are widely dispersed. Like Barrio Nuevo, it is affected by tourism, and Spanish and the local dialects are spoken there. There is some access to radio and television.  Barrio Nuevo contains more recently-arrived residents than Surtidor and its houses are more poorly constructed.  At the initiation of this project, in both barrios the access to piped (treated and untreated) water was over 75%. Over 70% had access to latrines or other sanitary methods to dispose of feces. However, over half of the latrines were constructed inappropriately for children five and under.
<b>Cuevas</b>	277 residents (60 families)	A community spread along the highway (and on hillsides and valleys) between Santa Cruz and Samaipata. There are fewer immigrants to the area and greater use of local dialects. It is the only community without electricity; thus, while there is access to radio, none of the residents have television. Approximately two-thirds of the population have access to potable water and latrines.
<b>Mairana (Control)</b> <b>Villa El Carmen</b>	675 residents (150 families)	A community located along the highway to Samaipata; designated as control site because it's closest and most similar of possible sites to Samaipata. Houses are located in "blocks" or "quadrants." There are many immigrants to the barrios, and much Spanish is spoken there. There is access to both radio and television. Water and sanitation coverage is in the same range as Samaipata.
<b>Final Barrio Pam</b>	450 residents (100 families)	



# 2 OBJECTIVES

DDP's overall objective was to develop sustainable approaches for preventing and reducing childhood diarrhea in the Valles Cruceños area of Santa Cruz and to facilitate scale-up to other areas in Bolivia. The project area is one of 11 health districts in which CCH works with the Secretariat of Health to improve local services. While water supply and sanitation coverage is relatively high in Valles Cruceños (see Table 1 in the previous chapter), data collected by the primary health system showed high childhood diarrhea rates (i.e., nearly 250 reported episodes/1,000 children per year).

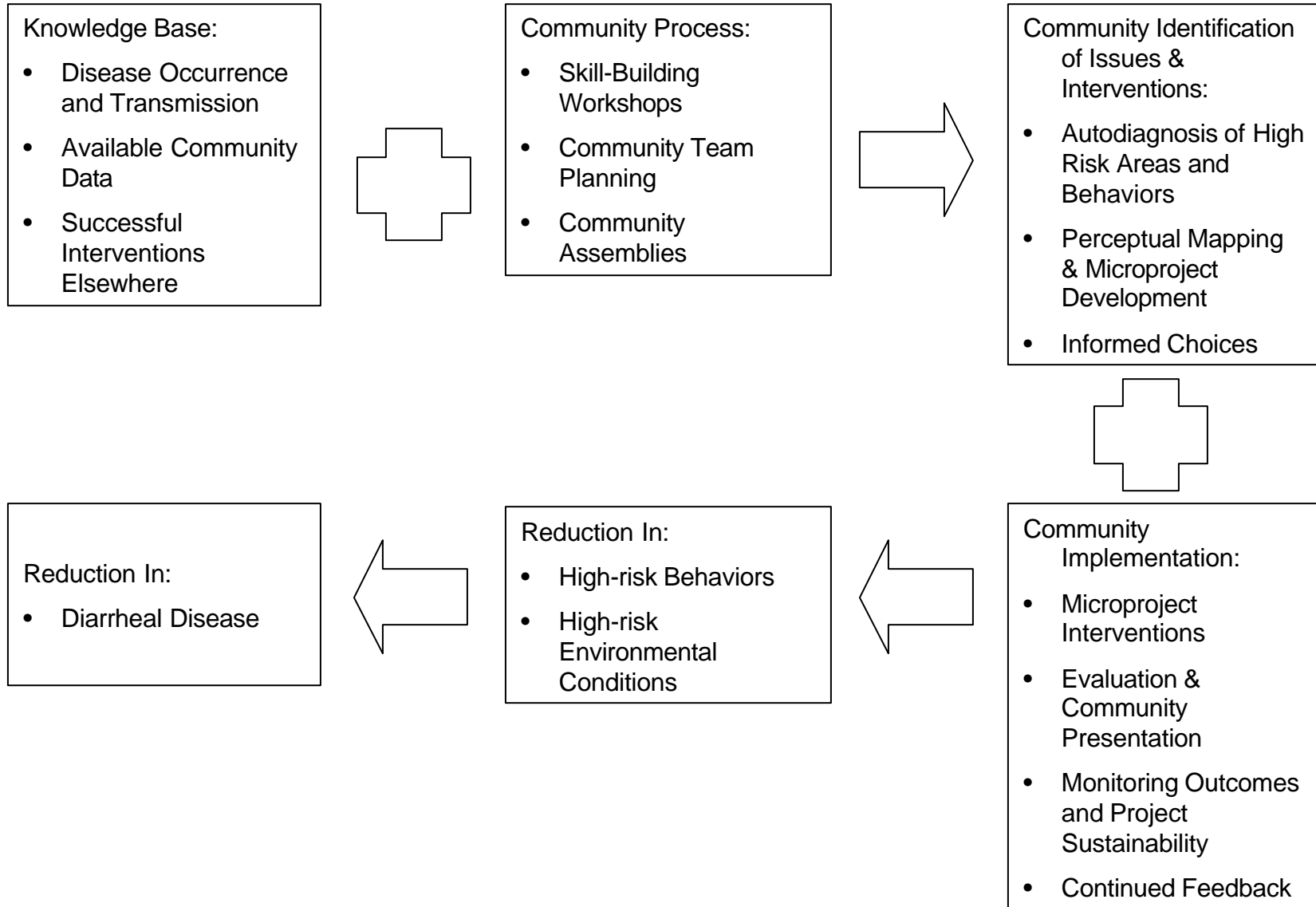
\*\*\*\*  
CPI taught us to make plans together, but only after we have learned the needs of the community. It taught us to study our communities.  
\*\*\*\*

In addition, an epidemiological and KAP (knowledge, attitudes, and practices) survey revealed that, while a high percentage of respondents washed their hands before eating and after using the toilet, only 43% said they washed them before cooking and only 13% said they washed their hands after changing a baby's diaper. These practices, when seen in conjunction with the high rates of DD, framed the objectives of the activity:

- Reduce diarrhea rates for children five and under in the target communities.
- Reduce community-identified high-risk behaviors in the target communities.
- Mitigate community-identified high-risk environmental conditions in the target communities.
- Provide community, municipal, and regional participants with the skills to design and implement DD-reduction interventions through microprojects.
- Establish and train three state teams (Santa Cruz plus two other states) to facilitate scale-up of the approach.

The DDP activity reflects EHP's increased emphasis on prevention of environmentally related diseases, especially childhood DDs, and the need to integrate environmental health components into existing and future Child Survival programs and projects. Environmental health interventions address water and sanitation use and behavior change, as well as community hygiene, vector control, and other interventions. They are implemented according to the Environmental Health Intervention Model developed by EHP and used in Bolivia and elsewhere (see Figure 1).

**Figure 1**  
**Environmental Health Intervention Model**





## 2.1 USAID Strategic Objectives

USAID/Bolivia's Strategic Objective 3.0 (Improved Health of the Bolivian Population) and Intermediate Results 1.1, 1.2, 3.1, and 3.2 support directly the DDP activity objectives. (See Figure 2.) Specifically, components of Strategic Objective 3.0 emphasize reduced mortality of children five and under and also support the Bolivian Popular Participation and Decentralization Laws of 1995; this legislation has provided funds to municipalities for local development activities, including those in the health sector. Table 2 indicates how both of the secondary IRs for IR-1 (1.1 and 1.2) and two of the secondary IRs for IR-3 (3.1 and 3.2) are supported by DDP.

\*\*\*\*  
Now we have learned to  
make plans based on  
community and not just  
individual needs.  
\*\*\*\*

## 2.2 Development of Indicators

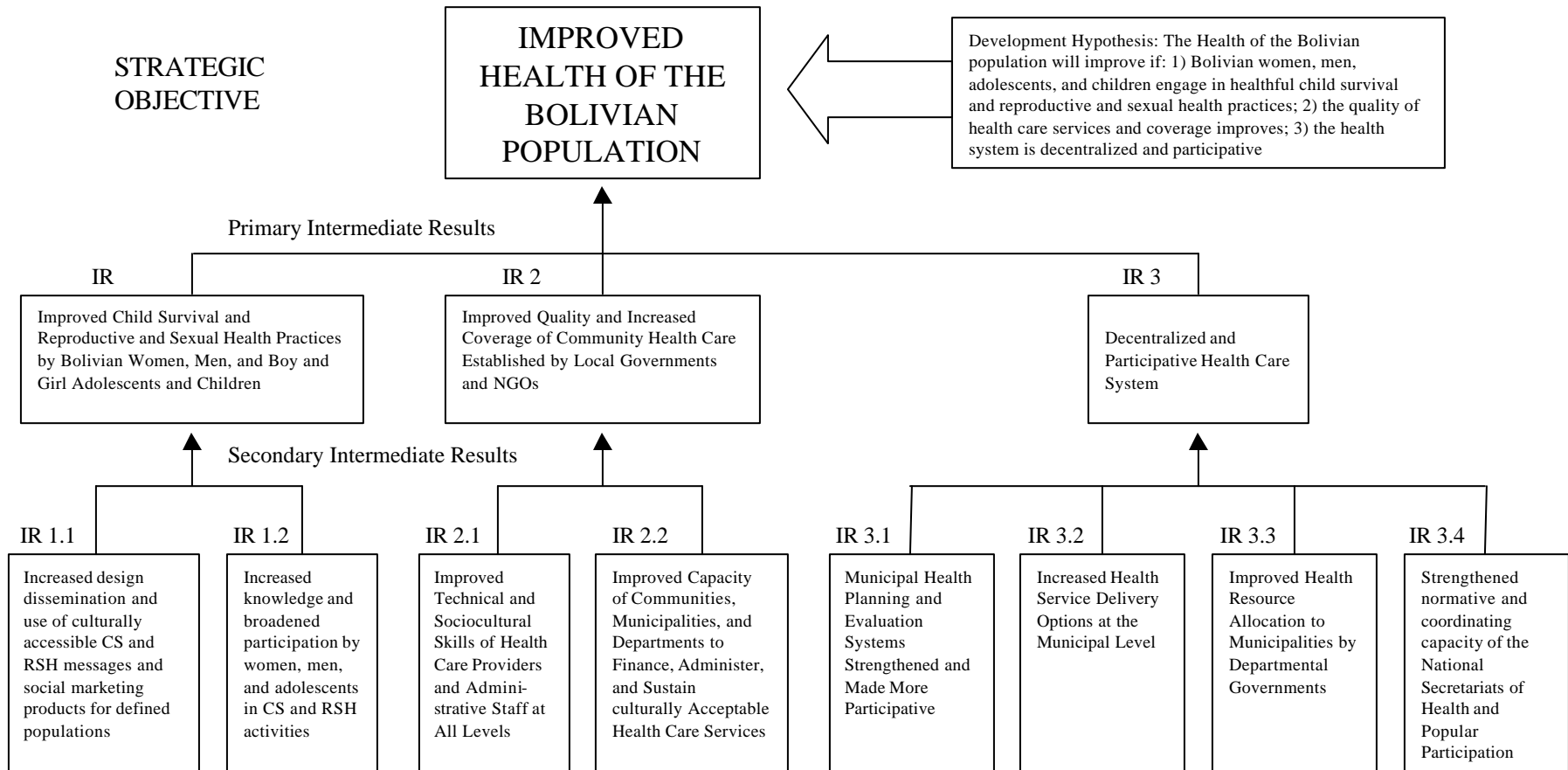
Initially, key indicators for the DDP activity were identified in the DDP activity work plan. Subsequently, the USAID Mission requested that EHP adjust the indicators to mission style, including the addition of expected results in a quantitative manner (e.g., percentiles of expected change). Thus, two sets of indicators were developed: (1) results indicators, with percentile targets, focused upon specific changes in diarrhea rates among children five and under, in caretaker behaviors to prevent diarrhea, and in community efforts to use municipal funds to develop and sustain microprojects to mitigate diarrhea; and (2) process indicators, without percentiles, tracked workshop implementation, formation of the various teams, and planning and implementation of the microprojects.

For purposes of this report, which focuses on activity outcomes, only the results indicators will be examined. They are

- Episodes of diarrhea reported in the first year after implementation of the microprojects (target: reduction of 15%).
- Proportion of mothers in the first year that can identify the causes of DD and know measures to prevent it (target: increase of 20%).
- Proportion of mothers who practice safe food-handling practices (target: increase of 20%).
- Proportion of mothers who demonstrate handwashing after changing their children's diapers (target: increase of 20%).
- Contribution of private or municipal funds to microprojects or similar activities to reduce DD in children.

The targets were based on prior studies (Esrey *et al.*, 1991 and Huttly *et al.*, 1997) of the impacts of water, sanitation, and hygiene education, which found median reductions in diarrheal morbidity of 22% for sanitation alone, 17% for improvements in water quality alone, 27% for improvements in water quantity alone, and 33% for hygiene alone. Other

**Figure 2**  
**Results Framework for USAID Bolivia's Health Strategic Objective**



studies (Feachem, 1984 and Boot and Cairncross 1993) have shown reductions in DD ranging from 32-43% and 30-48%, respectively, due to improvements in handwashing (e.g., the use of soap).

Results of these indicators are provided in detail in Chapter 4.

**Table 2**  
**Relationship between USAID Bolivia’s Health IRs and DDP Activities**

<b>Secondary Intermediate Result</b>	<b>Related DD-Prevention Activity</b>
1.1: Increased design, dissemination, and use of culturally acceptable child survival (CS) and reproductive and sexual health (RSH) messages and social marketing products for defined populations.	<ul style="list-style-type: none"> <li>• Community identifies child DD risk factors.</li> <li>• Community identifies, designs, and disseminates messages and actions to prevent child DD.</li> </ul>
1.2: Increased knowledge and broadened participation by women, men, and adolescents in CS and RSH activities.	<ul style="list-style-type: none"> <li>• Activity transfers knowledge of child DD risk factors combined with community skill-building workshops to maximize understanding of target population and people’s ability to implement DD-prevention interventions via microprojects.</li> </ul>
3.1: Municipal health planning and evaluation systems strengthened and made more participative.	<ul style="list-style-type: none"> <li>• Municipal, local NGO, and district health staff work as a department team, facilitated by EHP/CCH, to implement environmental health interventions in a more participative manner.</li> </ul>
3.2: Increased health service-delivery options at the municipal level.	<ul style="list-style-type: none"> <li>• Entire activity offers a new model or option for achieving a desired health outcome at the municipal level, e.g., prevention of DD in children five and under, rather than relying upon treatment alone.</li> </ul>



# 3

## ACTIVITIES

Initiated in early 1997, the DDP activity included the following components:

- Site-selection process
- Baseline disease and environmental health survey
- Four skill-building workshops
- Community identification and design, implementation, and evaluation of microprojects
- Follow-up survey
- Activity monitoring and evaluation

Site-selection activities, described in Section 1.5, began in January 1997. That April, after the sites had been chosen, designated participants took a study tour to Ecuador to observe sites where the CPI project had been successfully implemented and sustained earlier. After the study tour, a start-up workshop took place in Santa Cruz, Bolivia—also during April. Data collection and analysis for the baseline disease and environmental health survey took place from May to August. Four multi-day workshops with intervening community-based self-diagnosis, intervention, and design of local activities were held beginning in June 1997 and ending in February 1998. (The first two workshops overlapped with the collection and analysis of the baseline survey data.) In December 1997, Plan International, an international NGO with experience in microprojects that coordinated the microproject component of the DDP activity, presented a course on the administration of microprojects. This was not considered one of the four skill-building workshops. After completion of the Plan International course, work on microprojects began and continued up until the end of the activity. The final (outcome) survey and analysis took place from October until December 1998. The entire DDP was completed by December 1998. (See Figure 3.) A number of photographs illustrating the project may be found starting on page 47.

\*\*\*\*  
We learned to recognize what we needed to do, how to organize ourselves and communicate among groups, and how to develop and present a project. If CPI had not taught us these things, it would be like giving someone a beautiful sewing machine, but not teaching them how to use it.  
\*\*\*\*

### 3.1 Study Tour to Ecuador

Before the actual initiation of the DDP activity, Bolivian decision makers and potential stakeholders visited four Ecuadorian communities to acquaint themselves with the CPI model and methodology used during 1994-1995 as part of cholera-control activities.

**Figure 3  
Time Line for DDP Activities**

	1997												1998											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
<b>Site selection</b>	■	■	■																					
<b>Study tour</b>				■																				
<b>Start-up workshop</b>				■																				
<b>Baseline survey and analysis</b>					■	■	■	■																
<b>Skill-building workshops and community work</b>						■	■	■	■	■	■	■	■	■										
<b>Plan International microproject workshop</b>											■													
<b>Microprojects</b>													■	■	■	■	■	■	■	■	■	■	■	■
<b>Final survey and analysis</b>																						■	■	■

Participants, who included 10 Bolivian senior officials from the National Health Secretariat, the Department of Health Services, PROCOSI, CARE, CCH, and selected local leaders from Valles Cruceños, took part in a number of activities:

- Visited with USAID, the Ministry of Public Health, and the Provincial Directorate of Cotopaxi and Chimborazo in Ecuador
- Held work meetings with Ecuadorian RTs in the communities of Latacunga and Riobamba
- Met with Ecuadorian CTs in the communities of Alpamala, Zonas de la Canal, Pompeya, and Gatazo Grande
- Working as a group prepared work plans with the USAID/Ecuador staff and the Ecuadorian Ministry of Health

### **3.2 Start-Up Workshop**

After the study tour, a start-up workshop was held for the Bolivia DDP activity to provide a general understanding of health status indicators and their associated behaviors in Bolivia on a national and regional level; introduce the CPI model; review insights from the Ecuador study tour that related to DDP; and profile project communities.

Participants included 30 to 35 representatives from CCH national and regional offices, PROCOSI, CARE, Santa Cruz health authorities, the Health Prefecture of Samaipata and the towns of Bermejo, Cuevas, and Samaipata, and also from municipal and civil groups in Samaipata. Among the workshop activities were:

- Meetings of the TT and local/international consultants
- A visit to Samaipata to select project communities
- Interviews with members of the health prefecture and municipality of Samaipata
- Analysis and design of a flowchart regarding project communication and coordination
- Review of an action plan for executing the first skill-building workshop

### **3.3 Baseline Assessment Survey**

Developing a knowledge base was the first step in the health intervention model used in Bolivia (see Figure 1). “Available community data” collected by means of the baseline survey were reviewed and used during the community process. Specifically, the baseline survey and subsequent impact evaluation reflect the three basic purposes in the Bolivia DDP activity, as given below.

- ***Identifying local risk factors to inform microproject design***

Many of the major environmental risk factors for childhood diseases are known. During the baseline-assessment process, however, the most important local risk factors for disease were identified and used to inform the design of the environmental health interventions or microprojects.

- ***Reinforcing the importance of behavior changes and enhancing sustainability, especially by conducting the overall evaluation process in a community-based, participatory manner***

“Managing for results” means not only emphasizing the outcomes of environmental health interventions in terms of the health impacts achieved, but also ensuring that participants recognize how these outcomes were achieved and whether further improvements are possible. A good understanding of baseline conditions combined with graphic displays of the baseline results was important in informing community intervention efforts and providing a basis for follow-up in reinforcing behavior change and enhancing the sustainability of community-based interventions.

- ***Increasing the database documenting the effectiveness of community-based environmental health interventions in achieving health outcomes***

Microprojects are based on the premise that certain activities that have been shown to contribute to better child health—activities such as improving key hygienic behaviors, environmental conditions, and infrastructure, and enhancing community participation—can reduce environmentally related morbidity in children. Demonstrating the results of interventions has become increasingly important as resources decline and the need for accountability increases.

### **3.3.1 Developing the questionnaire**

EHP staff, technical consultants, and Bolivian counterparts jointly designed the survey questionnaire, which was pre-tested in Bolivia, revised with both local and EHP input, and finally conducted in May 1997. Development of the original survey questionnaire was guided by previous EHP experience, including development of child DD prevention indicators (Bendahmane 1997) and *Actions Speak: The Study of Hygiene Behavior in Water and Sanitation Projects* (Boot and Cairncross 1993). Based on suggestions in the published literature, the survey included discrete sections on the following topics:

- Prevalence of diarrhea in children five and under, based upon primary caretakers’ two-week recall
- Knowledge and practices of primary caretakers in the household regarding the causes of diarrhea and the means to prevent it
- Observations of sanitary conditions and behaviors in the households related to known risks for diarrhea in children five and under

The survey included questions, observations within and outside the home, and observations and demonstrations of personal hygiene behavior (see Appendix B). The survey respondents were mothers or other adult primary caretakers (fathers, grandmothers, aunts, etc.). In each survey, the interviewer asked the respondent about the number of children five and under in the household. A separate survey was done for each child in the household. Up to three children were selected for each household. For purposes of analysis, households (rather than number of children) comprised the denominator.

The survey was pre-tested with 10 mothers of different socioeconomic and cultural backgrounds at Florida County Hospital in Samaipata. The main medical center for all of the towns in the Florida District of the Valles Cruceños (serving 7,000 people), the hospital functions on Sundays as a maternal and child health center where mothers with small babies from Samaipata and neighboring towns can get their children vaccinated. While this was an unorthodox means of field-testing the questionnaire, the TT chose this site because the hospital provided a good “captive” sample of mothers and children five and under from the project area. Health personnel from the hospital, previously selected by CCH as interviewers, administered the pretest. The interviewers, who were already trained and familiar with



home surveys regarding health topics, used all parts of the survey except questions 26 through 51, which related to household hygiene, handling of human waste, and external surroundings.

### **3.3.2 Sampling design**

The baseline, as well as the follow-up and point surveys (see Sections 3.3.4 and 3.6 below), all shared the same sampling frame. They were household surveys, focusing on homes where at least one child five or under was living. All children of that age in survey households were considered separately and their health histories taken. A systematic random sample of every third house in each of the three project communities was used to identify households to be approached by an interviewer. If no one was home, the interviewers took the next house either to the right or to the left of the originally designated house. This modification of simple random sampling does not require that all households be enumerated. A random starting point in the community (e.g., a household) is chosen and then every “n<sup>th</sup>” unit or household is selected thereafter from the series at regular intervals. The limitations of this methodology reflect the usual difficulties of working in areas without streets, house numbers, or streetlights. In the two Samaipata neighborhoods, Barrio El Surtidor and Barrio Nuevo, the sampling frame was much easier to adhere to than in the rural farming community of Cuevas, which presented particular difficulties, discussed in Section 5.2.

### **3.3.3 Administering the baseline survey**

To administer the baseline survey, the DDP TT decided to use interviewers from the communities, as they would be familiar with their region and customs. The public health nurse in charge of the District Health Office in Samaipata selected 11 interviewers, eight of whom ultimately completed the interviews. Interviewers were health personnel with prior experience in using questionnaires. All of them received training (or retraining) from members of the DDP TT (the Bolivian public health pediatrician and the Bolivian health educator), who also supervised the interviews and checked the survey forms for accuracy. All the interviewers were paid.

Due to administrative and logistics problems, the baseline survey was conducted in June 1997. Optimally, the baseline assessment survey would have taken place in March when there is reportedly a higher incidence of DD. After March, the DD curve begins to decline as the incidence of pneumonia rises during the winter months (May through October).

In Samaipata (total population of 3,000 inhabitants in 2,000 households), 220 households encompassing 270 children of five and under from the two communities of Barrio Nuevo and Barrio Surtidor were sampled; this sample represents about 11% of the total Samaipata households. In the smaller community of Cuevas, with a total population of 277 in 60 households, interviewers surveyed 21 households that among them included 32 children of five and under. Thus, about one-third of all households in Cuevas were sampled. In the control site, Mairana, 78 households (including 100 children of five and under) out of 250 households in the two communities of Villa El Carmen and Final Barrio Pam were sampled.

A CCH computer consultant in Santa Cruz, Bolivia, entered the data, and two epidemiologists (a Bolivian national from the DDP TT and a Washington, D.C.-based EHP staff person) performed the analysis on EpiInfo 6.0 statistical software. Households (rather than number of children) comprised the denominator. Univariate analysis was conducted and risk factors and summary findings determined.

### 3.3.4 Point surveys

In addition to the baseline and final surveys, point surveys of diarrheal frequency in children five and under were conducted at four points in time to capture seasonal variations in diarrheal frequencies. The four point surveys complemented the DD registry and enabled the DDP TT to determine if similar seasonal variation in DD prevalence existed. These surveys were conducted by applying Part B of the household survey (questions 9A through 14C regarding history of DD). For each survey, 100 households in both Barrio Nuevo and Barrio Surtidor were sampled.

### 3.3.5 Results of the baseline assessment

The survey provided baseline data and informed project design. The data were used to confirm features of the epidemiological data (e.g., rates of reported and nonreported diarrheal episodes in children five and under) to create a baseline for monitoring indicators and to serve as a monitoring and evaluation tool. The local and international knowledge base regarding DD risk factors, transmission routes, and intervention successes elsewhere was then integrated into a specific community-participation and training process.

For instance, results of the baseline assessment survey were used in the third skill-building workshop (October 10-17, 1997) so participants could see data from their own communities, rather than from national surveys. These data included calculation of odds ratios indicating clearly that the degree of knowledge about prevention practices and the extent of appropriate handwashing behavior by mothers and other caregivers were the most critical determinants of the occurrence of childhood DD.

The odds ratio measures the odds of having the risk factor if the condition is present, divided by the odds of having the risk factor if the condition is not present. It is a useful and valid measure of the strength of the association—in this case between risk of diarrhea episodes and behaviors and beliefs. An odds ratio of 1 implies that the odds of having the risk factor if the condition is present, compared with the odds of having the risk factor if the condition is not present, are equal. The p-value (probability) is the “bottom line” in statistical significance tests. It is the probability that differences between the study and comparison groups would occur if no true difference exists in the larger population from which both the study and comparison group individuals in the samples have been selected.

The DDP TT chose to analyze data from all of the communities together for the purpose of evaluating overall risk factors in the project area. This also provided a larger sample. For example, in the intervention communities—

- ***Children were about three times more likely (at greater risk) to experience episodes of diarrhea if their mothers did not think it possible to prevent the illness than children of mothers who thought it was preventable. (Question 22)***

<b>22. Do you think that diarrhea can be prevented?</b>		
<b>Number</b>	<b>%</b>	<b>Odds Ratio</b>
Yes 273	86	2.74 (p=.001)*
No 44	14	

\* denotes statistically significant association between diarrhea and variable under study if p-value is  $\leq 0.05$  level.

- *Children were twice as likely to get diarrhea if their mothers did not think that washing hands, fruits, and vegetables could prevent diarrhea than if their mothers thought it could. (Question 23)*

23. How do you think diarrhea can be prevented?				
	Number		%	Odds Ratio
Keep house clean	Yes	116	42	1.15
	No	159	58	
Mother washes hands	Yes	81	30	2.64 (p=0.04)*
	No	194	70	
Child washes hands	Yes	185	67	0.85
	No	90	33	
Wash utensils	Yes	52	19	1.10
	No	223	81	
Wash fruits and vegs	Yes	116	42	2.20 (p=0.06)*
	No	159	58	
Watch what you eat	Yes	88	32	1.79
	No	187	68	

\* denotes statistically significant association between diarrhea and variable under study if p-value is  $\leq 0.05$  level.

- *Children had 2.6 times greater risk of diarrheal episodes if their mothers did not wash their hands before cooking than if their mothers did. (Question 25)*

25. When do you wash your hands?				
	Number		%	Odds Ratio
Before eating	Yes	312	99	1.16
	No	3	1	
Before cooking	Yes	150	48	2.60* (p<.0001)
	No	165	52	
After going to bathroom	Yes	299	95	.76
	No	16	5	
Before breastfeeding	Yes	28	67	1.33
	No	287	9	
After changing diapers	Yes	42	13	1.69
	No	273	87	

\* denotes statistically significant association between diarrhea and variable under study if p-value is  $\leq 0.05$  level.

Given results such as these, the DDP activity focused on trying to improve caretaker knowledge regarding prevention of DD, emphasizing the importance of changing specific adult behaviors implicated in diarrheal transmission: handwashing, food preparation, and disposal of feces. According to the baseline assessment survey, women did not wash their hands at such critical times as before breastfeeding or after changing dirty diapers—despite their awareness of good hygiene and sanitation practices. Therefore, reaching those primary caretakers and helping them change their behaviors became a major thrust of the DDP activity.

The baseline survey also suggested that many families understood little of the importance of household sanitation and community hygiene. They were unaware that animals could be implicated in disease transmission and that feces in proximity to children were unsanitary. Therefore, health education about prevention of DD (and often about other common infectious or childhood diseases) formed a significant part of all workshops for the RTs and CTs, and of all of the community activities as well. A major thrust of health education was on changing people's understanding and thereby their behaviors related to diarrhea. The desired result was improved household and community environmental sanitation.

### **3.4 Workshops**

To help change behaviors linked to DD, the DDP activity developed a series of four skill-building workshops and community practice exercises based upon local KAP surveys, household observations, key informant interviews, and information gained through community gatherings. These workshops used both epidemiological and ethnographic methods to facilitate community recognition of local health problems and to design culturally appropriate and biomedically sound interventions. In addition, the course on the administration of microprojects augmented the information on microprojects conveyed in the third skill-building workshop. As mentioned earlier, this course was developed and conducted by Plan International.

Each of the four workshops had a specific focus designed to increase participants' knowledge of behaviors and beliefs associated with the spread of diarrhea and of ways to avoid high-risk behaviors. The workshops and community practice exercises were oriented toward developing community leadership and communication skills, community and individual awareness of the relationship between hygiene/sanitation and the spread of disease, and community involvement in and commitment to resolving community health problems.

The first two workshops focused attention on creating awareness of disease, particularly DD, in the community and on developing community leadership. At these workshops RT members gained the ethnographic and epidemiological skills to conduct a community self-diagnosis of risk sites and behaviors. In addition, they worked on communication skills such as active listening and paraphrasing in order to become more effective community leaders.

The third and fourth workshops focused on developing behavior-change microprojects appropriate to the local communities. RT members learned about community-assessment techniques, microproject design and financing, process and outcome evaluation methods, and increasing project sustainability.

Four members of the TT conducted the four workshops—two consultants and two Bolivian nationals. The consultant facilitators brought extensive experience in community participation in health and in nonformal education techniques. One facilitator was a medical anthropologist specializing in infectious disease, the other a psychologist with expertise in nonformal education. The two Bolivians provided medical and rural education experience in the workshops.

Each skill-building workshop lasted four to five days and included about 20 participants who included RT members (health personnel, educators, and other professionals) from the respective communities and also other community members. Immediately preceding each workshop, the full TT gathered to work out the details of each activity. In four days of in-country pre-workshop planning, the technical

assistance consultants in the TT were able to adapt their methods to local realities in Bolivia and to train the two Bolivian members of the TT in facilitation techniques.

At the end of each workshop, the TT met to review the workshop, establish an action plan for the next workshop, and discuss potential problems and modifications to the proposed plan of action. Between workshops, the four TT members remained in contact and the two Bolivian members of the TT visited the RTs and CTs to help them prepare materials, assist them in the baseline survey, and in general provide both logistical and material support.

The Bolivian TT members also assisted the RT members with community activities, which included community self-risk diagnosis, creation of the community perceptual maps, involvement of residents in the CTs, attendance at CPI-sponsored health fairs and other health-education activities. Together, they also drafted and produced training materials for upcoming workshops; RT members held over 100 mini-workshops for CT members, sharing techniques and information with them, learning from them, and working with them to develop locally appropriate behavior-change microproject interventions.

\*\*\*\*  
The community is organized, and that motivates residents to take responsibility for locally desired interventions.  
\*\*\*\*

See Appendix C for further information regarding the four skill-building workshops.

### 3.5 Microprojects

The microprojects were low-cost interventions selected by the communities to make improvements in overall health and sanitation. They were designed to encourage ownership of the problem-solving process. Microprojects met several criteria:

- Responding to community initiatives or priorities that met the need of both women and men
- Addressing a child DD risk factor
- Passing a technical review by government sanitarians
- Requiring little funding

The foci of the microprojects were based on joint decisions between the teams and the communities. Because all activities shared the same goal—that of changing behaviors related to risk of diarrhea—communities and teams needed to learn about such behaviors and the pathways of risk. All of the communities decided to focus on two types of activities: health education and material improvements. Although latrines and water containers were built and purchased, of equal importance were the health education activities developed to ensure effective use of the latrines and containers and thus improve overall hygiene behavior. The data generated in the baseline survey suggested that a greater emphasis needed to be placed on health education activities surrounding handwashing—for example, handwashing with soap before breastfeeding and after changing a child’s diaper. Also stressed was the importance of disposing of feces in latrines, removing used diapers and toilet paper from living areas, and moving animals outside of family dwellings. While all of the health education activities focused on ways to reduce DD, many of them also carried other health messages unrelated to DD. Each neighborhood or community hosted health fairs and community environmental sanitation clean-up campaigns in conjunction with their community assemblies.

A contract was drawn up for each microproject to formalize the agreement among community representatives, the local government, and NGO officials. Each microproject received US\$5,000 from USAID/EHP, with materials and oversight provided by the local government and Plan International. The community provided labor, expertise, knowledge, and support.

More specific information regarding the six microprojects (three in Valles Cruceños and the three scale-up projects in Potosí, La Paz, and Yapacani), including purpose, objectives, and costs, appears in Appendix D. While the three microprojects in Valles Cruceños were all implemented during the project period, the scale-up projects were undocumented in this project. Despite strong initial support for the projects from the sponsoring entities (CARE and PROCOSI), the three scale-up projects ultimately received little or no funding due to financial and other difficulties experienced by those same organizations.

### **3.6 Final Survey**

The final (impact) survey took place in October 1998, 16 months after the baseline survey, and used the same questionnaire to better allow for comparisons. In Samaipata, 182 households (including 197 children five and under) were sampled; in the smaller community of Cuevas, 22 households were interviewed (31 children); and in Mairana (the control site, with no direct interventions), 81 households were included (103 children).

In assessing results from 1997 to 1998, it is important to note that sample sizes for the two years were about the same. As with the baseline survey, a CCH computer consultant in Santa Cruz entered the data, and EHP completed an initial analysis using EpiInfo 6.0. EpiInfo data tables were converted to Microsoft Excel and further analysis was undertaken. (See 1997 and 1998 data tables in Appendix F.)

Continued monitoring of these target communities over the next three to five years would be necessary to see if the short-term improvement in health-related behavior is sustained.



# 4 RESULTS

This chapter presents results from the DDP activity, including those relative to the seasonality of childhood DD and its influence on prevalence over a 16-month period. The chapter also summarizes overall results from the intervention and control communities (Samaipata, Cuevas, and Mairana) based upon the indicators agreed to with USAID. In addition, it reviews the quantitative and qualitative results of the questionnaire's three major components: (1) DD history of children five and under based upon two-week recall; (2) knowledge and behavior of primary caretakers regarding DD; and (3) observations of sanitary conditions and observations and demonstrations of hygiene behavior. This analysis helps document the interrelationship between diarrheal prevalence, specific risk factors, and the means to mitigate these factors (i.e., changing various behaviors among primary caretakers in the intervention sites) and outlines changes in prevalence over the project period. Finally, it provides an assessment/evaluation of the project from the perspective of members of the intervention communities. (Appendix F contains all data for the three communities for the convenience of those who wish to conduct further analysis.)

## 4.1 Seasonality of Child DD

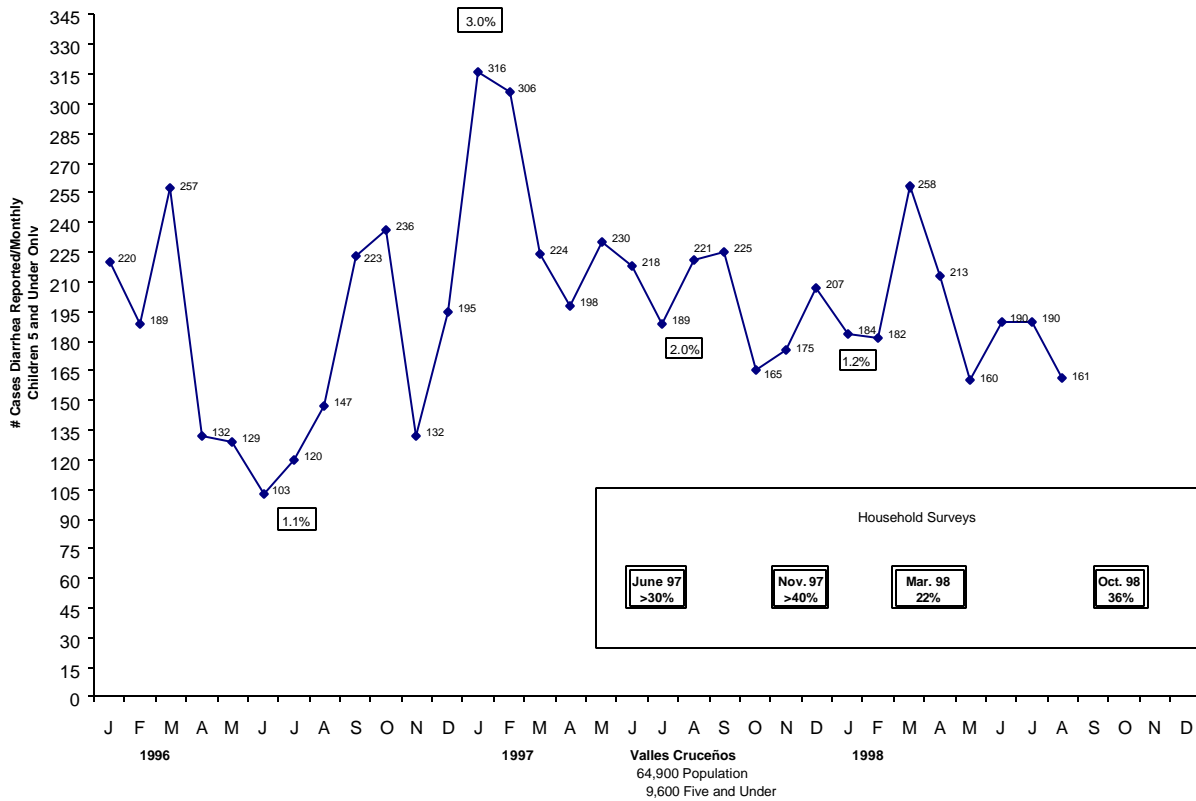
Initial discussions with local health officials and team members and community indicators suggested that diarrheal incidence was highly seasonal, peaking in October-December (rainy season) and falling in the dry winter months of May through August. However, actual reporting of diarrhea cases to health authorities indicated considerable variation but no strong seasonal pattern (see Figure 4). The lack of such a pattern could reflect incomplete reporting. The public health nurse at the District Health Office in Samaipata maintains a registry of diarrheal cases from hospitals and health clinics that were reported to CCH monthly and tracked over a 32-month period during the course of the DDP activity. Because diarrhea is not a reportable disease, the figures are commonly (and in this case) far below those gathered at the household level.

Clinic reports of child diarrhea indicated that, per month, 1 to 3% of children five and under had diarrhea (bloody stools and/or watery feces lasting for over 24 hours) (see percentages given in boxes at several points along the graph in Figure 4). On the other hand, household surveys using the questionnaire revealed that in 20 to 40% of the households with children five and under, the children had experienced diarrhea during the previous two weeks—roughly 22 to 26% of the five and under population (see household survey results in the box in the lower right quadrant of the graph). These data



**Figure 4**  
**Diarrhea Prevalence in Valles Cruceños**  
**Clinic Records and EHP/CCH Survey Data**

suggest that the actual burden of child diarrheal disease is an order of magnitude greater than official



data indicate.

Responses to the questions regarding treatment (questions 15-17) indicated that about 50% of children with diarrhea were taken to clinics, hospitals, and/or a doctor. Official statistics, however, did not reflect this high percentage. Probably some children are taken to private doctors (and pharmacies) who do not inform the official health information system. When measured at the household level, DD rates appear considerably higher; they also show little seasonal variation.

## 4.2 Analysis of Key Indicators

Table 3 provides an analysis of the results for each of the five indicators. The data are drawn from Samaipata, the principal intervention site, only because the size of the sample in Cuevas for both the baseline and final surveys was too small to yield valid results. It is important to note that the DDP activity exceeded all except one (#5) of the targets for observed change. Furthermore, while the fifth indicator (contribution of private or municipal funds to microprojects/activities) was not fully satisfied, four of six microprojects were successfully implemented by the end of the activity.

**Table 3**  
**Summary Analysis of Key Indicators (Samaipata Only)**

<b>Indicator</b>	<b>Baseline Prevalence</b>	<b>Final Survey Prevalence</b>	<b>Projected Change</b>	<b>Actual Change</b>
1. Reduction in rates of diarrheal episodes, children five and under	35%	18%	15%↓	49%↓
2. Increase of mothers' knowledge of causes and prevention of diarrhea	39%	62%	20%↑	58%↑
3. Increase in food safety among mothers	33%	55%	20%↑	66%↑
4. Increase in mothers' handwashing after changing diapers	14%	41%	20%↑	193%↑
5. Contribution of private or municipal funds to microprojects/activities	Initially promised but only small sums realized			

### 4.3 Summary of Overall Results

Overall, the barrios of Samaipata had a reduction of 49% in severe diarrhea during the 16 months between the baseline and final surveys. In the smaller community of Cuevas, the reduction in childhood diarrhea was 52%. (Because the sample size in Cuevas was quite small, 21 and 22, respectively, even slight changes in responses over the project period could be reflected as sizable percentage changes. No attempt was made to determine statistical significance given the small sample sizes.) The control community, Mairana, showed a 44% decrease—slightly less than Samaipata.

Primary caretakers in Samaipata and Cuevas demonstrated greater understanding of the causes of diarrhea and the means to prevent it than those in the control community; however, mothers in the two project communities cited different reasons. For example, in Samaipata, caretakers in 1998 were more likely to cite the importance of primary prevention behaviors such as handwashing, while mothers in Cuevas noted the importance of secondary prevention behaviors like keeping animals outside of the house. (More-rural households, such as those in Cuevas, are more likely to have domesticated animals than are urban barrios such as those in Samaipata.) There were also some improvements in prevention behaviors in Mairana, despite its use as a control site. Such changes may have come about through the influence of other DD prevention activities (and overall health education) occurring within Valles Cruceños at the same time as the DDP activity or may be the result of information spread between communities by family members and commuters.

Interestingly, in the 1997 baseline survey, many questions yielded statistically significant odds ratios, while in the 1998 surveys, few of the results were statistically significant. One would expect this to be true in a project that has successfully addressed the risk factors originally identified.

The following subsections examine results in detail from the three sites. For each a table summarizes results by indicator and additional findings are discussed drawing on the survey data presented in Appendix F.

### 4.3.1 Samaipata: Barrio Nuevo and Surtidor

From 1997 to 1998, primary caretakers showed a marked increase in understanding of the causes of diarrhea and the means to prevent it (see Table 4). For instance, there was a 123% increase in mothers who thought their children got sick with diarrhea due to such factors as unclean conditions in the home environment. In addition, there was an overall increase in knowledge regarding preventive behaviors such as cleaning house (118% increase) and mothers washing hands (162% increase, statistically significant). Interestingly, while most mothers believed that handwashing was important, fewer mothers in 1998 cited the importance of children washing their hands—a 31% decrease. (See Appendix F, p. 6: questions 23 and 24.) This may have been because the DDP activity focused primarily on mitigating behaviors of primary caretakers themselves as opposed to those of their family members.

With respect to food safety and prevention of DD, in 1998 more mothers cited the importance of washing utensils (132% increase) and fruits and vegetables (33% increase), and of watching what they ate (140% increase). In general, handwashing increased at critical targeted times: before cooking, 38% increase; before breastfeeding, a greater than threefold increase; and after changing diapers, an almost twofold increase. (See Appendix F, pp. 6-7: question 25.)

With respect to observations and questions regarding personal hygiene, the greatest changes were in the disposal of feces by children. In 1998, more children used latrines with water (a 15% increase) and fewer adults and children disposed of feces outside without burying it (a 81% and 59% decrease, respectively). (See Appendix F, p. 10: questions 45 and 46.)

Mothers also cited other preventive behaviors as important: keeping animals outside of the house (129% increase; statistically significant), constructing pens for animals (52% increase), and devising better kitchens (126% increase). All these attitudes were confirmed by behavioral observations (e.g., a 63% observed increase in domesticated animals outside the home). In addition, more mothers realized that it was important to keep drinking water covered (70% increase) and flies from utensils (125% increase), and to remove trash inside and outside of the house (10% increase). In addition, garbage was more likely to be recovered/recycled instead of being spread outside or put in a hole (5% increase), and the communities were much more inclined to recover and bury solid waste (a sevenfold increase). (See Appendix F, pp. 6-7, 10: questions 26, 48, 49, 50, 51.)

**Table 4**  
**Samaipata (Barrio Nuevo and Surtidor): Analysis of Key Indicators**

Indicator	1997 n = 220	1998 n = 182	Reduction/ Increase
1. Child had diarrhea in last two weeks, bloody or liquid stool > 24 hours	35%	18%	49%↓
2. Knowledge of causes of diarrhea and ways to prevent it	39%	62%	58%↑
Causes of diarrhea			
Dirty conditions	17%	38%	123%↑
Ways to prevent diarrhea			
Clean house	39%	85%	118%↑
Mother washes hands	26%	68%	162%↑
Child washes hands	75%	57%	31%↓
3. Food safety	33%	55%	66%↑
Wash utensils	22%	51%	132%↑
Wash fruits and vegetables	42%	56%	33%↑
Watch what you eat	20%	48%	140%↑
Wash hands before cooking	47%	65%	38%↑
4. Wash hands after changing diapers	14%	41%	193%↑
5. Municipal contributions	Promised but minimal		

#### 4.3.2 Cuevas

In Cuevas, mothers (and primary caretakers) gained in knowledge regarding the causes of diarrhea (see Table 5). For instance, many more understood that dirty conditions play a role in causing diarrhea (a fourfold increase), and there was a small increase in mothers' perception of the importance of cleaning house. Also, there was a 20% increase in the belief that handwashing is important, although little change (or a decrease in frequency) in the times at which hands were washed. Over 90% more caretakers believed it was important to wash utensils, and 15% more thought it was important as well to remove trash both inside and outside of the house. (See Appendix F, pp. 16-17, questions 24-26.)

Twice as many primary caretakers were observed using soap when washing their hands, and there was a marginal increase in those who dried their hands with a clean towel and a nearly 50% decrease in those who dried their hands with a dirty towel. In terms of children's handwashing behavior, there was a large decrease observed in those who used only water, a 150% increase in those who used soap with water, and a nearly 92% increase in those who dried their hands with a clean towel. (See Appendix F, p. 18, questions 33 and 34.)

Other hygiene behaviors improved as well. For example, primary caretakers reported a 30% increase in the use of water and soap for washing plates and a similar increase in the use of boiled water, and soup, tea, or powdered drinks prepared with boiled water. All the adults interviewed noted that they wash their hands after defecation (up from 86%), and mothers reported that 82% of children also wash their hands at that key time (up from 62%). (See Appendix F, pp. 19-20, questions 37, 38, 43, and 44.)

**Table 5**  
**Cuevas: Analysis of Key Indicators**

Indicator	1997 n = 21	1998 n = 22	Reduction/ Increase
1. Child had diarrhea in last two weeks, bloody or liquid stool > 24 hours	29%	14%	52%↓
2. Knowledge of causes of diarrhea and ways to prevent it	50%	45%	10% ↓
Causes of diarrhea			
Dirty conditions	5%	27%	440%↑
Ways to prevent diarrhea			
Clean house	39%	43%	10%↑
Mother washes hands	78%	67%	15%↓
Child washes hands	78%	43%	45%↓
3. Food safety	55%	49%	11%↑
Wash utensils	17%	33%	94%↑
Wash fruits and vegetables	33%	24%	28%↓
Watch what you eat	78%	57%	27%↓
Wash hands before cooking	90%	82%	19%↓
4. Wash hands after changing diapers	37%	23%	38%↓
5. Municipal contributions	Promised but minimal		

There was a fourfold increase in the observation that floors were clean and a 78% decrease in observed dirty diapers in the house. Adults showed an over 100% increase and children a fourfold increase in the use of latrines with water. Interviewers observed that domesticated animals were more likely to be outside of the house (over 100% increase) and that garbage was recovered/recycled (up 100%) rather than spread outside (down 80%). (See Appendix F, pp. 19-20, questions 40, 41, 48, and 50.)

### 4.3.3 Mairana

As Mairana was used as the control, theoretically no changes in response from the baseline and final surveys should have occurred. However, results demonstrated a general increase in primary caretakers' knowledge of causes of diarrhea and ways to prevent it. Furthermore, as Table 6 shows, diarrheal rates in Mairana decreased 44% over the project period. Given the degree of interaction between family members and others living in Samaipata and Mairana, as well as the interest Mairana residents expressed in the DDP activity, information sharing is not a surprise. In fact, community members asked the DDP team to develop a similar intervention for Mairana. When the team explained that it would not be immediately feasible to include Mairana in the intervention, community members began collecting DD information on their own. The lack of differential results between Samaipata and Mairana suggests that at some level the DDP activity had a greater overall effect on the region—including Mairana—than the team had previously imagined.

**Table 6**  
**Mairana: Analysis of Key Indicators**

Indicator	1997 n = 78	1998 n = 81	Reduction/ Increase
1. Child had diarrhea in last two weeks, bloody or liquid stool > 24 hours	54%	30%	44%↓
2. Knowledge of causes of diarrhea and ways to prevent it	31%	50%	61%↑
Causes of diarrhea			
Dirty conditions	8%	20%	150%↑
Ways to prevent diarrhea			
Clean house	53%	73%	38%↑
Mother washes hands	25%	63%	152%↑
Child washes hands	38%	47%	24%↑
3. Food safety	37%	44%	18%↑
Wash utensils	8%	34%	325%↑
Wash fruits and vegetables	45%	53%	18%↑
Watch what you eat	58%	44%	24%↓
Wash hands before cooking	40%	48%	20%↑
4. Wash hands after changing diapers	6%	33%	450%↑
5. Municipal contributions	None		

#### **4.4 Baseline Survey**

This section presents and discusses the major findings of the baseline surveys, examining the association between DD prevalence and knowledge of DD prevention, hygiene behavior, and environmental conditions.

##### ***Knowledge of DD Prevention Practices***

Mothers or caretakers were less likely to have a child in the household with DD if they believed the following:

- Diarrhea can be prevented.
- Several behaviors can prevent DD, such as:
  - boiling water and keeping it covered,
  - washing hands,
  - washing fruits and vegetables, and
  - watching what you eat.
- Hands should be washed before food preparation.

##### ***Behavior***

Several behaviors (noted in Table 7) were found to be inversely associated with DD:

- Mothers washing their hands with soap and water rather than water alone

- Mothers drying their hands with a clean towel
- Children washing their hands with soap and water rather than water alone
- Children drying their hands with a clean towel
- People who cook washing their hands with soap and water before doing so

Other behaviors, such as washing hands at other key times, covering food and utensils, and washing dishes with soap and water, were not associated with DD.

### *Environmental Conditions*

Two environmental factors were found to be associated with DD: household trash and dirty diapers (see Table 8).

- Households with surroundings free of trash, rubbish, or excrement were slightly less likely to have a case of DD.
- Undisposed-of dirty diapers were significantly associated with DD in households with a child of 12 to 24 months.

Several factors were found to be unassociated (at levels of statistical significance) with DD: disposal of excreta, solid waste, and water; and source of drinking water. Other investigated factors also unassociated with diarrhea disease were solid-waste handling at the community level, presence of domestic animals, type of water-storage container, method of obtaining water from container, and amount of water available (data not presented).

In summary, knowledge of DD prevention practices and “correct” handwashing behavior were associated with a lower prevalence of DD in the household. As noted earlier, with the exception of overall cleanliness of household surroundings, no other environmental factors appeared to be risk factors for DD. Although one would expect such factors as source of drinking water, use of latrines, disposal of solid waste, and others to be associated with DD, this was not the case here. There are two possible explanations for this:

- *The small sample size of the survey (about 300 households)* would make it difficult to identify factors that might result in small but important increases in the risk of DD.
- Although none of the environmental factors in and of themselves were statistically significant, it is possible that several factors together might represent a poor sanitary environment that could increase a child’s risk of contracting DD (Bessinger 1998).

**Table 7**  
**Association between DD Prevalence and**  
**Hygiene Behaviors, Baseline Survey**

	DD		p-value
	Yes %	No %	
<b>Person who cooks washes hands before preparing meal (question)</b>			
Yes	86	93	<.07
No	14	7	
<b>Adult washes hands (demonstration)</b>			
Water and soap	64	83	<.001
Water only	35	18	
<b>Child washes hands (demonstration)</b>			
Water and soap	62	75	<.10
Water only	38	25	
<b>Adult washes dishes with soap and water (question)</b>			
Yes	88	91	n.s.
No	12	9	
<b>Adult washes hands after defecation/urination (question)</b>			
Yes	90	95	n.s.
No	10	5	
<b>Child washes hands after defecation/urination (question/observation)</b>			
Yes	75	81	n.s.
No	25	19	
<b>Cooking utensils covered (observation)</b>			
Yes	44	54	n.s.
No	56	46	
<b>Food covered (observation)</b>			
Yes	77	79	n.s.
No	23	21	

n.s.: not statistically significant,  $p > .10$  (Bessinger 1998)

\* In the analysis, a chi-square test was done to determine the p-values that show the significant difference between the populations.



**Table 8**  
**Association between DD Prevalence and Household**  
**Environmental Conditions, Baseline Survey**

	DD		p-value
	Yes %	No %	
<b>Disposal of child excreta</b>			
Latrine, toilet, buried	62 (65)	165 (74)	n.s.
Open ground	33 (35)	59 (26)	
<b>Disposal of adult excreta</b>			
Latrine, toilet, buried	73 (77)	179 (80)	n.s.
Open ground	22 (28)	45 (20)	
<b>Cleanliness of household surroundings</b>			
Clean	34 (36)	106 (47)	<.06
Not clean	61 (64)	118 (53)	
<b>Solid waste disposal at household level</b>			
Collected/buried	71 (75)	185 (83)	n.s.
Scattered/open pits	24 (25)	39 (17)	
<b>Disposal of dirty water</b>			
Closed drain	21 (22)	58 (26)	n.s.
Other	74 (78)	166 (74)	
<b>Source of drinking water</b>			
Treated pipe water	27 (28)	50 (22)	n.s.
Untreated pipe water	62 (65)	169 (75)	
Well/spring/rainwater	6 (6)	5 (2)	

n.s.: not statistically significant,  $p > .10$  (Bessinger 1998).

\* In the analysis, a chi-square test was done to determine the p-values that show the significant difference between the populations.

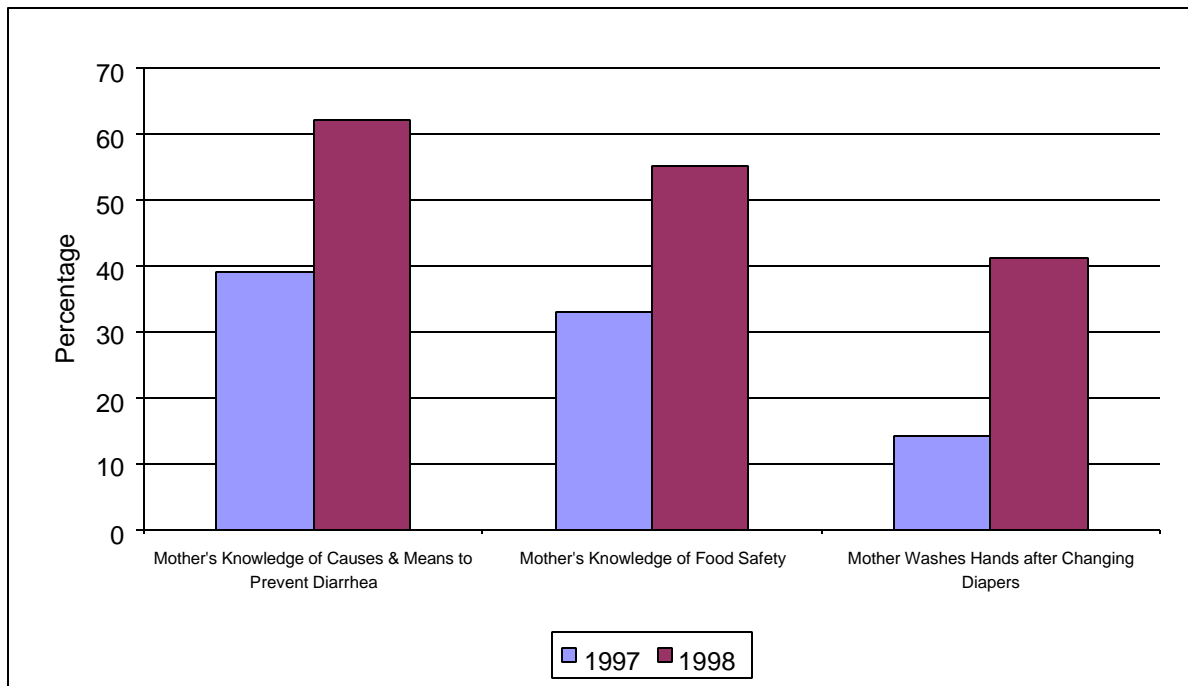
## 4.5 Final survey

This section presents the major results from the final survey conducted in 1998, including summary figures. Changes in knowledge, behavior, and environmental conditions in comparison with the baseline survey are quantified and discussed. Appendix F provides a comprehensive set of tables with results for 1997 and 1998 (questions 12A through 51) with explanatory notes.

### *Knowledge of DD Prevention Practices*

During the project period, there was an 11% increase in the number of mothers (or primary caretakers) who believed that diarrhea could be prevented. The largest cause attributed to diarrhea was dirty conditions (123% increase), although another important cause primary caretakers cited was mother's neglect (75% increase). Interestingly, other behaviors cited as important in 1997 (i.e., "eating something bad") declined markedly (an eightfold decrease). In addition, fewer primary caregivers said they did not know what caused their children to get sick with diarrhea (a 63% decline). Thus, health education regarding causes of DD appears to have been effective at increasing knowledge. (See Figure 5.)

**Figure 5**  
**Pre- and Post-Intervention Comparison: DD Knowledge and Behavior in Samaipata**



With respect to prevention of diarrhea, mothers cited several behaviors as important:

- Cleaning house
- Washing hands
- Washing cooking utensils
- Washing fruits and vegetables
- Watching what you eat

Knowledge of these DD prevention practices increased on average by 58%. The one answer that declined in frequency was “child washing hands” (31% decrease); this may have resulted from the DDP activity’s focusing its behavior-change activities largely on improving mothers’ knowledge regarding their own personal hygiene behavior—as opposed to the behavior of other family members. However, when asked what other things they thought could be done to prevent their children from getting sick, 40% more primary caretakers in 1998 noted the need to make sure that children washed hands after defecating and after eating. While these results were not statistically significant, they point to a greater overall knowledge regarding DD prevention practices.

In summary, people gained in overall knowledge regarding causes of diarrhea and ways to prevent it—particularly in Samaipata. In Cuevas, there was a large increase in *knowledge* about certain causes of diarrhea (i.e., a fourfold increase in understanding the link between DD and dirty conditions) but decreases in many preventive *behaviors* (with the exception of cleaning house and washing utensils).

It is possible that behaviors will improve in Cuevas upon completion of the microproject (bringing water and latrines into the community). Mairana residents showed gains in both knowledge and behavior. (See Appendix F, questions 20-26 for Samaipata, Cuevas, and Mairana.)

### ***Behavior***

With respect to behavior, there were overall increases in positive handwashing and other hygiene behavior *as reported by the mothers* (i.e., a 50% increase in handwashing before breastfeeding and a twofold increase after changing diapers) in Samaipata. As these were both identified as important risk factors for contracting diarrhea, it is particularly important to have improved upon these practices in the DDP activity. (See question 25 in Appendix F.) However, demonstrations of handwashing behavior among mothers did not confirm these positive findings; for example, there was a decrease in the use of soap with water and drying hands with a clean towel (down 38%). A similar decline was noted in the use of soap with water and other positive handwashing behavior in children. This discrepancy may have resulted from the introduction of a new observer during the final survey and respondents' reluctance to demonstrate their handwashing practices.

In Cuevas, it appeared that many positive behaviors actually decreased; for example, there was a 6% decrease in reported handwashing before breastfeeding and a 62% decrease in reported handwashing after changing diapers. However, demonstrations of behavior showed more positive results, such as a more than 100% increase in the use of soap with water. As noted earlier, some of the decline in handwashing may be due to the presence of a new observer. Furthermore, it is important to note that the sample size in Cuevas was very small (22 and 21, respectively). Thus, the responses of one or two people could have skewed the results either positively or negatively. Mairana caretakers reported significant increases in positive handwashing and other hygiene behavior (the same trend as in Samaipata): an eight-fold increase in handwashing before breastfeeding and a fourfold increase after changing diapers. However, behavioral observations showed little change in handwashing behavior with the exception of less frequent drying of hands on clothing and air drying hands. (See Appendix F, question 33 for Samaipata, Cuevas, and Mairana.)

### ***Environmental Conditions***

Primary caretakers believed that some external (environmental) conditions were important for preventing diarrhea. While these conditions were not primary risk factors for DD

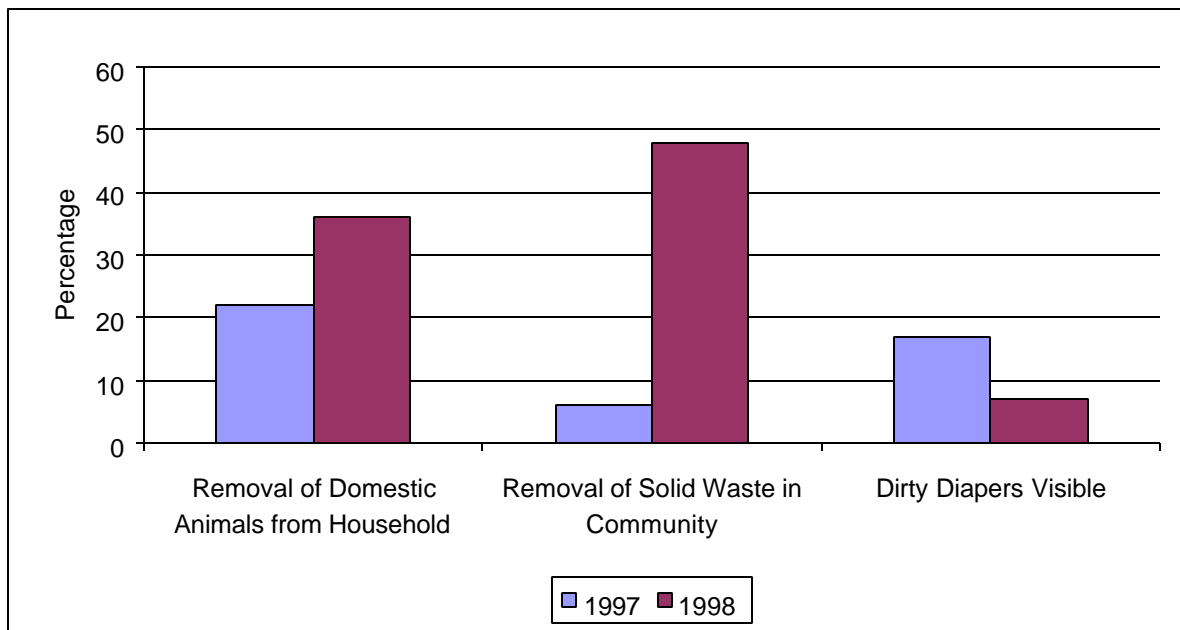
identified in the baseline assessment, several of them taken together might increase a child's risk of contracting diarrhea. For instance, there was some change in how adults and children reportedly disposed of their feces. In Samaipata, adults and children were much less likely to defecate outside of the house or, if they did so, to not bury their waste (30% and 45% decline, respectively). In Cuevas, there was a large increase in the use of latrines with water by both adults and children (over 100% for adults and a fourfold increase for children). As noted earlier, it is important to consider these results within the context of a small sample size. Mairana also showed improvements in defecation practices: 43% greater use of latrines with water by adults and 55% greater use by children. (See Appendix F, question 45, for Samaipata, Cuevas, and Mairana.)

Primary caretakers in the intervention sites also considered other external conditions important for preventing diarrhea. Project wide, the number of households that kept their domesticated animals outside the home increased by 63%. In Samaipata, where the most critical practice was keeping animals out of the house, there was a reported increase of over 100%, (statistically significant, odds ratio, 2.28,  $p=.009$ ). Observations confirmed this finding. In Cuevas, that practice was considered important as well. Respondents also noted the importance of keeping flies from utensils and removing trash inside and outside of the house. Among the communities, eight times more respondents indicated that the community was now more likely to handle its solid waste by recovering and burying it. As well, there was a 60% decline in visible dirty diapers in homes. (See Figure 6.) Finally, in Mairana managing animals in general (keeping them out of the house and constructing pens for them) was cited as well as other practices—making it easier for children to use the bathroom, keeping flies from food, keeping drinking water covered, and keeping flies from utensils. (See Appendix F, question 26, for Samaipata, Cuevas, and Mairana.)

## **4.6 Health Results**

In the 16 months between the baseline and final surveys, as shown in Table 9 and Figure 7, the barrios of Samaipata experienced a 49% reduction in severe diarrhea. In Cuevas, childhood diarrhea was reduced by 52%, while the control community (Mairana) showed a 44% decrease. These figures are based upon families reporting diarrhea among children five and under.

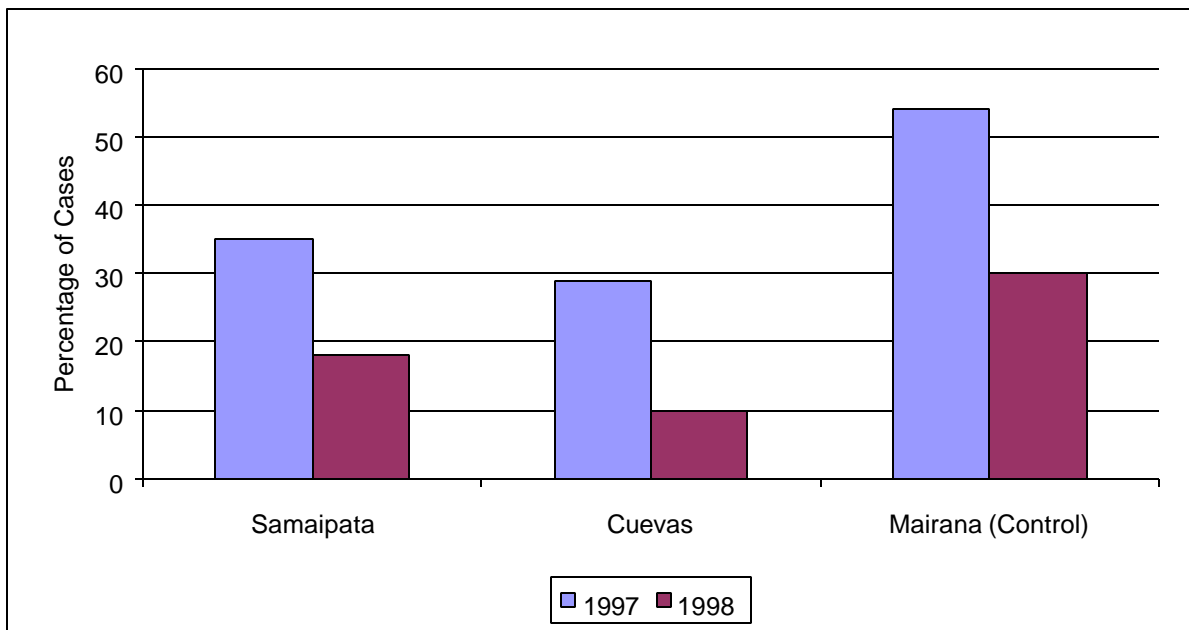
**Figure 6**  
**Pre- and Post-Intervention Comparison: Environmental Conditions in Samaipata**



**Table 9**  
**DD Rates in Samaipata, Cuevas, and Mairana**

Community	1997	1998	Change
Samaipata	n=220	n=182	
	35%	18%	49%↓
Cuevas	n=21	n=22	
	29%	14%	52%↓
Mairana	n=78	n=81	
	54%	30%	44%↓

**Figure 7**  
**Pre- and Post-Intervention Comparison: Occurrence of Childhood Diarrhea**



## 4.7 Participant Evaluation

This evaluation relies heavily upon the community voices recorded during interviews and upon observations made in the homes and neighborhoods in the target areas. Voices of the community, too often overlooked in projects based exclusively on quantitatively generated data, are critical to listen to and preserve. It is in those voices that the memory of a project resides and its sustainability is rooted, and it is upon those voices that the spread of a project's success depends. Extensive interviews with approximately 80% of the project participants assessed their perceptions of the DDP Activity. Interviews were also conducted with the community-based local OTBs and representatives of Bolivian and international health organizations (e.g., CCH and Plan International) that were actively involved in the DDP activity.

The most salient finding is that people perceive the activity to have changed the intervention sites by increasing awareness of disease transmission, creating a recognition of high-risk behaviors, promoting analysis of community-based needs, and helping to develop community leadership. Following the DDP activity, Barrio Nuevo, Barrio Surtidor, and Cuevas were observed to be cleaner, with less trash and less toilet paper or diapers in the yards or in the street. Working with community residents, the DDP teams began clean-up activities at the beginning of the activity. The neighborhood residents liked the effect so much that they have maintained clean-up activities and have helped families find containers in which to put their trash. By the end of the activity, community members commented upon the cleanliness of the neighborhoods. In addition, Saturday clean-up campaigns spread from the three intervention sites to other neighborhoods throughout the city. Neighborhoods without DDP teams requested that such teams be created in their areas and petitioned officials for more garbage cans and better waste removal.

Public awareness of household health risks increased as DDP team members continued house-to-house visits to discuss household sanitation. As a result of these community-awareness campaigns, animals were moved away from living quarters: "We never knew that living with our animals could make us sick."

Other residents said that, while they had heard they should wash their hands, they didn't understand why. "It just didn't seem important until we made those maps and could see how we get sick." As a result of the community mapmaking exercises, community assemblies, and health fairs and health-education campaigns, handwashing increased. Interviews suggested that more children were washing their hands with soap than before. While the final survey did not bear out this purported difference, the reported increase may be a reflection of the sampling of the interviews. However, in community interviews, people reported seeing children wash their hands in circumstances when they hadn't before and in houses that had no hand soap before the DDP activity.

\*\*\*\*

The CPI project helped us to develop community leadership based on collective decisions.

We now see the difference between sharing the responsibility of learning to fish to feed the community, and waiting for the fish to come from others' hands.

\*\*\*\*

\*\*\*\*

The improvement in the health of each family helps the community. When one person is sick, others become sick as well.

\*\*\*\*

In an interview, one of the grade school teachers observed that after the DDP activity, her school bought soap, and children were instructed how to use it. The teacher then began the practice of lining up the children before lunch in order to wash their hands with soap. In another interview, a woman told of seeing several dozen children who receive meals at the Red Cross lunchroom being lined up to wash their hands (with soap) before receiving their meals. By the end of the DDP activity, the children were lining up to wash without adult supervision. Behavior change was reported in many instances; for example, mothers who were interviewed said their children didn't want to eat if they hadn't washed their hands. One of the community leaders, also an OTB member, told interviewers that as a result of what he had learned in the DDP activity, he insisted that his children all wash their hands, even though it meant buying soap.

Community cleanliness, household sanitation, behavior change, and increased knowledge about the prevention of DD—all were foci of the DDP activity. Children were affected indirectly by the intervention, as the project tried to change their behaviors by informing their caretakers. When children in a Red Cross day-care center refused to drink their powdered fruit drinks after seeing the cook make them up with tap water, they were asked why. Claiming the tap water to be contaminated (which it was), the children said they would get sick if they drank water that wasn't boiled or bottled. When the cook began to use boiled water, the children stopped refusing the drinks.

Ethnographic interviews support the information derived from the surveys. As the survey showed, the majority of women interviewed said they washed their hands after changing diapers; this reflected a change in their behaviors, as it was something they said they had not done before. In addition, most women interviewed said that as a result of the DDP activity, they now wash their hands before preparing food; however, fewer than half reported washing their hands after using the bathroom. (Those who did report washing their hands used soap.)

Many of the activities, beliefs, and behaviors documented as part of the DDP activity are validated through the triangulation of observations, interviews, and the survey. Because the survey was designed to measure changes related to DD—knowledge, practices, and incidence—it included no questions about the development of community leadership. That information emerged through interviews with community members, team members, and community leaders. As was found in the cholera-control activity in Ecuador, where the CPI model was also employed (Whiteford *et al.* 1996), one of the consequences of the DDP activity was the development and nourishment of community leadership.

In Bolivia, the government's push for local control through the Public Participation Law and the emphasis on local initiative through the Decentralization Law resulted in a powerful opportunity to develop new leadership in target communities. The Education Reform Law also emphasized the same learning techniques that were used in the DDP workshops. "The CPI methodology encourages and strengthens community organization and community development, an indispensable base for the sustainability of any project." Another individual interviewed eloquently noted, "The CPI model has particular relevance for Bolivia because it is the methodology we have been looking for to solve our country's health problems, and it fits with the political-administrative changes occurring at the level of the state. CPI as a concept is like a pyramid with its base in the community, drawing the population through a process of development that uses self-direction to resolve community problems."

The community voices quoted throughout the report capture some of the hope and excitement as well as behavioral changes generated by the DDP activity.



# 5

## LESSONS LEARNED

### 5.1 CPI Model

Lessons on the following topics were learned in applying the CPI model to the DDP activity.

- Multilevel involvement and commitment
- Multisectoral representation
- Community diagnosis and collaboration
- Validation of formal and folk/scientific and popular views of disease causation and prevention (ethnography and epidemiology)
- Program flexibility and design appropriateness
- Learning by doing
- Broadening the base of support

#### 5.1.1 Multilevel involvement and commitment

The DDP activity and CPI model incorporate many levels of stakeholders, not only local but also regional and district representatives, NGOs, and national government players. The model rests upon at least three assumptions: that local people recognize their needs better than outsiders can; that others who are trying to resolve similar problems have access to resources, ideas, and information potentially useful for resolving local needs; and that the resolution of local problems in one place can be generalized to other similar areas. Therefore, the DDP activity and the CPI model involves technical, community, and regional teams, each representing different levels and capabilities.

#### 5.1.2 Multisectoral representation

Most remedies require support, resources (both human and fiscal), and ideas from a multiplicity of sources. In both Ecuador and Bolivia, the activities were enriched by shared ownership. The DDP activity received contributions from municipal governments as well as the national government; from local health districts, school administrators, and teachers; from OTB representatives and representatives of the Red Cross; and from local shop owners and workers of all kinds. Because of the multisectoral representation on the DDP activity, local politics—present in all community projects—was reduced.

### 5.1.3 Community diagnosis and collaboration

Validation of local knowledge is critical to successful community enhancement projects. The Bolivia DDP activity succeeded because it used the good ideas and information of the local communities in diagnosing health risks and designing interventions. Interviews of community members and perceptual maps of the communities helped identify health risks people encounter in their daily lives and, equally important, helped determine what kinds of interventions would be culturally and locally appropriate and sustainable.

\*\*\*\*  
Training without clear objectives that we understand and that are based in our community never goes anywhere.  
\*\*\*\*

### 5.1.4 Validation of formal and folk/scientific and popular views

Successful behavioral change depends upon understanding both the reasons people use certain behaviors in the first place and the risks those behaviors entail. To gain such understanding requires assessing and integrating biomedical and local knowledge about behaviors and beliefs indicated in disease causation and the context in which they occur. In the Bolivia DDP activity, both medical and local knowledge about what causes diarrhea and how to prevent it were taken into account.

### 5.1.5 Program flexibility and design suitability

The Bolivian government's laws of Public Participation, Decentralization, and Educational Reform presented the DDP activity with an unusual opportunity. The first two of these three laws were particularly important for this activity because through them the national government offered local government and communities the opportunity to assume control. Although at the time of the DDP activity the exact nature of this distribution of power was not yet well understood, it was mandated. For instance, OTBs were designed as apolitical neighborhood organizations with elected representatives. The DDP activity benefited from OTB representation on the regional and community teams, and OTB involvement also helped train community members to become OTB-style leaders. Because the design of the Bolivian DDP activity and the CPI model reflect local realities, the Bolivian laws became central to the DDP activity with OTB membership being important to the activity's success.

\*\*\*\*  
This project solves community problems from the bottom up, just as the Law of Popular Participation says it should.  
\*\*\*\*

### 5.1.6 Learning by doing

\*\*\*  
We have learned by doing. That we won't forget.  
\*\*\*

Central to the DDP activity and the Bolivian Educational Reform Law is the premise that information is learned by applying it in a real-world context (*learning by doing*). People must understand both theory and context for a proposed action, and then have the opportunity to change it, revise it, and change it again within the context of their own lives. The DDP workshops interspersed theory with community-based practice activities, thereby improving understanding of local conditions and community adaptations of DDP messages.

### **5.1.7 Broadening the base of support**

Bolivia was selected for this project partly because of the degree of decentralization occurring in the country. Local communities had latitude to invest in community improvement (including health) projects. However, strong political pressures still affect investment decisions. Although contact was made with municipal authorities at the initiation of this activity, the contact was not strong enough to withstand a change in government (administration) after elections. As a result, the originally estimated municipal investment in the microprojects was unrealized, and some of the strongest proponents of the local committees were no longer in positions of authority. In retrospect, a broader and more intensive effort to bring all political factions into project planning and coordination would have better contributed to a sustainable result.

## **5.2 Technical Considerations**

There were a variety of technical considerations in the DDP activity: selection of the control site, the way in which the questionnaire was pretested, constraints in the sampling methodology, and types of bias that may have existed in the collection of data for the baseline and final surveys.

### **5.2.1 Selection of Mairana as the control site**

Given the degree of interaction between family members and others living in Samaipata and Mairana, as well as Mairana residents' interest in the DDP activity, it is not surprising that information was shared. In fact, community members in Mairana requested assistance from the DDP activity team to develop a similar intervention. When the team explained that it would not be immediately feasible to include Mairana in the intervention, community members began collecting DD information on their own. The lack of differential results between Samaipata and Mairana suggest that at some level the DDP activity had a greater overall effect on the region—including Mairana—than previously supposed.

### **5.2.2 Pretest of questionnaire**

The questionnaire was pretested with 10 mothers of different socioeconomic and cultural backgrounds at the main hospital in Samaipata, with health workers from the hospital serving as interviewers. Questions 27 through 51, which relate to observations of the home, handling of human waste, and external surroundings, were not used.

A more orthodox means of pretesting the questionnaire would have been to field test it in the homes of mothers (and/or primary caretakers) in one of the intervention communities. It would have been preferable as well to use the same interviewers to pretest the questionnaire and conduct the baseline

and final surveys. Finally, all questions in the questionnaire should have been tested and revised if necessary. The “observation” section of the original questionnaire did not have the benefit of pretesting.

### 5.2.3 Sampling methodology

As it was not possible to enumerate the households, systematic sampling of houses was used in Bolivia. While the sampling methodology was sound, the field staff found it difficult to carry out the sampling as planned due to constraints in the field. In Cuevas, the adult members of many designated households could not be interviewed during the day because they worked in the agricultural or plant nursery businesses that surround the area. After dark, when the workers returned home, it was difficult to interview them, not only because the community had no electricity, but also because time was precious for family caretakers who were preparing meals and trying to accomplish other activities. In addition, the community of Cuevas is scattered along the roadside, with some houses tucked into areas away from the road and others strung along the roadside. This pattern of household distribution made it difficult to conduct interviews.

Because the survey questionnaire was pretested in Samaipata, the difficulties interviewers encountered in Cuevas were not fully anticipated or recognized until the actual survey was being conducted. During the initial site-selection activity, Cuevas was selected over other rural communities because it was less dispersed than similar communities, such as Bermejo.

The original design called for comparison of two peri-urban neighborhoods (such as those identified in Samaipata) with a rural counterpart, and then comparison of the three intervention sites with the control site of Mariana. However, sampling problems encountered in Cuevas made it impossible to use data collected there as a basis from which to generalize findings to other rural communities. Therefore, the comparisons have been restricted to those that can be made between the primary intervention site in Samaipata and the control site in Mariana.

### 5.2.4 Potential sources of bias

Bias may have been introduced in the collection of data in both baseline and final surveys. For example, there were differences between interviewers used for the baseline and final surveys. In the baseline survey, interviewers were trained by TT members to prepare them for the type of interviews needed for this activity. The baseline survey was designed using guidelines from other behavior change and sanitation projects, in particular, *Actions Speak* (Boot and Cairncross 1993) and *Transforming Community Environments for Health* (Faul-Doyle and Francis 1996). All interviewers were paid a small stipend. Some of the interviewers were health workers previously trained for other regional projects. In the final survey, some of these same interviewers and some RT members trained in the course of the DDP activity were selected as interviewers. The RT members’ training and knowledge about behavior change, observational methods, and interview and listening skills, while seen as a distinct advantage for the project, may have introduced a source of bias. These interviewers were not paid.

Interviewers in the final survey may have been less objective and may have felt more vested in the survey’s outcome. On the other hand, it could be argued that they may also have become better interviewers and more astute observers, able to elicit greater informational detail. In addition, using RT members helped to empower the local communities and to ensure the long-term sustainability of the effort.





# 6

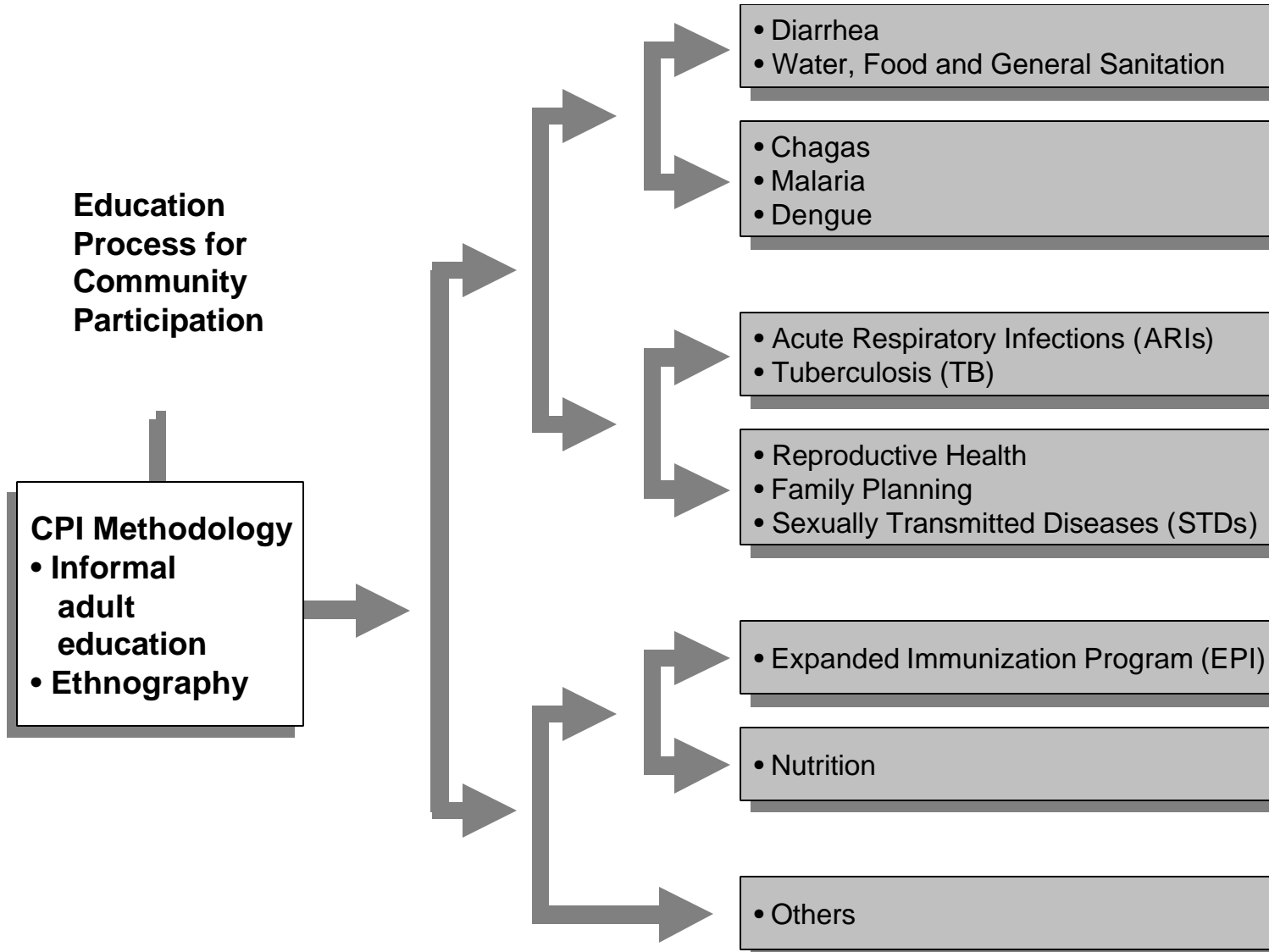
## SCALE-UP AND SUSTAINABILITY

The sites selected for the present activity were those in which other USAID-funded projects had been working and for which data on water and sanitation facilities and diarrheal rates (as reported to the general health services) were available. Many diseases (including malaria and other vector-borne diseases, tuberculosis, etc.) can also be prevented by reducing the levels of high-risk behaviors, lifestyles, and housing conditions. However, it was believed that diarrhea in children five and under would be the most likely to respond to changed behavioral patterns in the relatively short time available for this project; in addition, diarrhea in young children is a major cause of morbidity and mortality and a major target of USAID's Child Survival strategies.

The major components of the process used in this project (skill-building workshops, development of community committees for autodiagnosis, and microprojects to alleviate some of the risk factors at community and/or household level) clearly have application for health problems other than diarrhea; likewise, the materials developed for the capacity-building workshops are multipurpose. Only the "packet" of materials covering diarrhea is disease specific. The groundwork for future scale-up activities has already been laid; in Bolivia, for instance, teams from four states have been trained in the CPI methodology and the materials for those workshops already produced.

There are two distinct ways to plan a scale-up of the CPI process: extend the methodology into other health districts, targeting diarrhea as was done in the pilot project, or adapt the methodology for other diseases by developing other disease-specific "packets" (Figure 8). The first scale-up method has already been used by CCH in a number of districts outside the Valles Cruceños pilot zone. The development of an Infectious Disease (ID) program in Bolivia has been discussed to allow for expansion of the CPI model to other diseases—the second method. For example, packets similar to those produced for the DD prevention project can easily be developed for vector-borne diseases, tuberculosis, nutritional problems, and other illnesses. These need not be developed only by EHP, but could also be produced by other specialist groups using the EHP/CPI process. Once a community has expanded its capacity for community participation and enhancement of appropriate behavior changes at the individual and household levels, it can apply the same process to various other local problems without repeating the training for each disease or environmental health problem. All the CPI training materials (several hundred pages, all in Spanish) are available at the USAID Mission in LaPaz, at EHP (both on diskette and in hard copy), and with the former CCH project.

**Figure 8**  
**Education Process for Community Participation**





Critical to sustained effectiveness are sustained interest and activities. The Bolivian situation, for instance, is one ready for expansion to other diseases: the trained personnel are available (through CCH), and the materials providing the basic outline of the process are written for Bolivia and need only to be expanded to other disease domains. In addition, replication of the DDP/CPI model in a country where the basic adaptations have already been accomplished would provide an opportunity for Bolivians trained in the process to continue adapting the model to local realities. For instance, could the workshops be reduced from four to three if the personnel were already trained in the longer, more extensive sequence of four workshops? Or would it be possible to shift the emphasis of the CPI model from the RTs to the CTs? Replicating the process in-country might allow the incorporation of more health educators and de-emphasize the role of physicians. In short, the model and process are easily transferable to other community-based, behavior-change activities, but they need to be tried.

In addition to the focus of the current project (diarrhea) and the potential use for others (tuberculosis and vector-borne diseases such as malaria, Chagas disease, and dengue), there is great potential for expanding into areas such as pesticide poisoning in agricultural communities, maintenance and/or improvement of existing water and sanitary facilities, or other environmental improvements such as those carried out in the CIMEP activities.

Behaviors are notoriously difficult to change, and the behaviors of adults the most difficult because they are often deeply embedded in cultural norms and expectations. Yet, people do change their health behaviors with powerful consequences. A recent technical brief by Curtis and Cairncross (1999) identifies key principles to changing hygiene behaviors and notes that such changes are more likely to occur in a participatory and community-by-community manner. However, in a situation such as the DDP activity in Bolivia, where the intervention was first developed locally by participatory research, Curtis and Cairncross note that the intervention can usefully be applied and would be cost-effective on a large scale and across regions. They further describe a number of key principles that are very similar to those used in the DDP activity in Bolivia:

- Target a small number of risk practices (in Bolivia, those relative to handwashing, environmental sanitation, and food preparation).
- Target identifiable audiences (in Bolivia, caretakers of children five and under).
- Identify motivational strategies (in Bolivia, participation in community development).
- Disseminate positive hygiene messages (in Bolivia, health fairs, games, and hygiene-promotion activities).
- Establish links with other activities (in Bolivia, links with material hardware interventions such as latrines).

In short, the Bolivian DDP activity follows many of the principles identified in other work on behavior change, hygiene education, and participatory research and is ready for further scale-up activities to take it to the next level. As one CT member said, “This project helped us develop community leadership based on collective decisions. We now see the difference between sharing the responsibility of learning to fish to feed the community, and waiting for the fish to come from others’ hands.”

## PHOTOGRAPHS



Photo 1. Regional team members from Samaipata meet in an informal setting.



Photo 2. A typical street in Samaipata, the mountainous capital of the province of Florida in Santa Cruz Department.



Photo 3. Members of the Cuevas regional team meet outside the "Central" school in Cuevas.

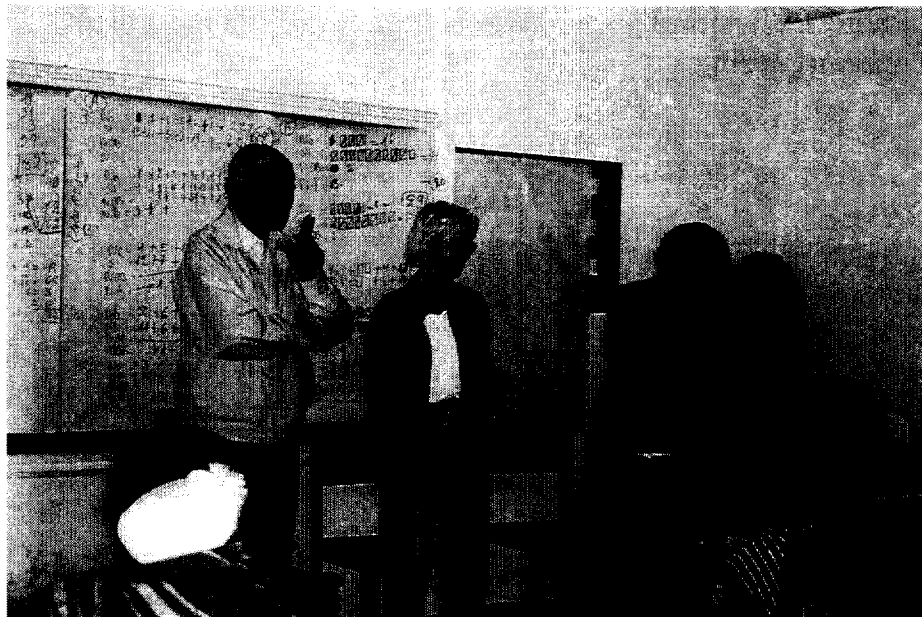


Photo 4. Community meeting in Samaipata facilitated by Dr. Linda Whiteford (second from left), Dr. Dolly Montaña (second from right), and others.

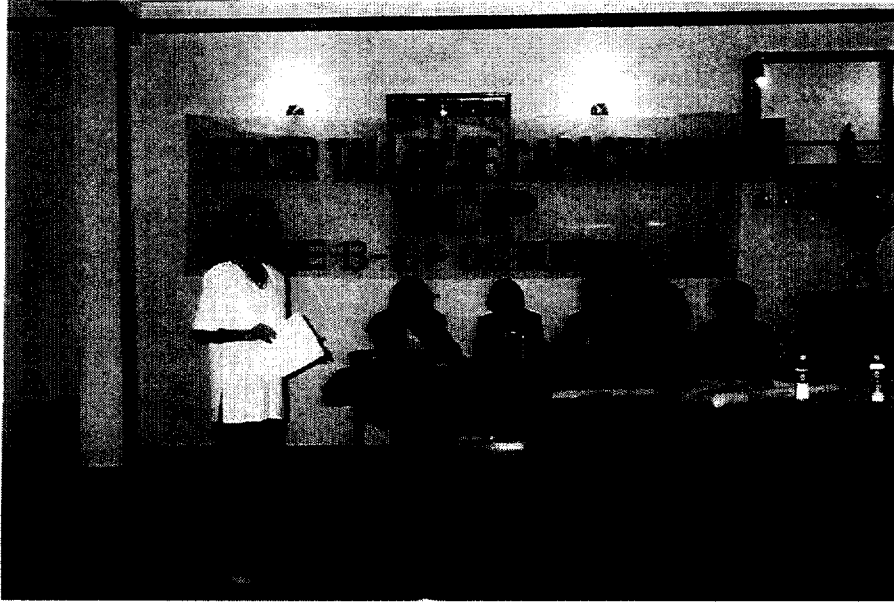


Photo 5. Dr. Linda Whiteford and members of the regional teams kick off the third skill-building workshop.



Photo 6. Community perceptual map of Cuevas completed by one of the small groups during the first skill-building workshop.

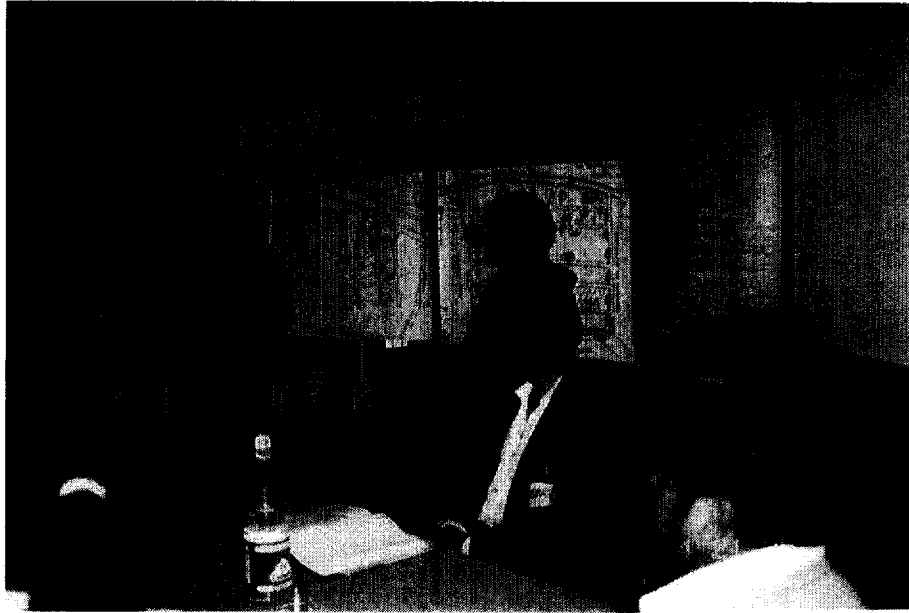


Photo 7. Community Participation Intervention (CPI) Workshop participants discuss the perceptual maps.



Photo 8. Stages in the CPI model are depicted on a poster: promotion, investigation, community empowerment, planning, skill-building, education, microprojects, and evaluation.



Photo 9. This latrine in Samiapata was constructed through a community microproject.

Photo 10. Improvements in health and health-related behaviors benefited families like this one in Barrio Nuevo.



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# APPENDIX B: Questionnaire

<b>ENCUESTA DE LINEA BASE</b> <b>Proyecto:</b> <b>“Prevención de las Diarreas con Participación Comunitaria” (I.C.P.)</b> <b>EHP / USAID / CCH Bolivia</b>
---

Familia: \_\_\_\_\_

Dirección: \_\_\_\_\_

Número de niños menores de 5 años: \_\_\_\_\_ (si no hay, finalizar la entrevista, si hay, proceder)

Persona Entrevistada: \_\_\_\_\_

Relación con los niños: \_\_\_\_\_

---

## PARTE A: INFORMACION GENERAL

1. Número de entrevista: \_\_\_\_\_

2. Localidad: \_\_\_\_\_

3. Provincia: \_\_\_\_\_

4. Municipio: \_\_\_\_\_

5. Departamento: \_\_\_\_\_

6. Fecha: \_\_\_\_\_

7. Nombre del entrevistador: \_\_\_\_\_

---

## CONTROL DE CALIDAD

	Fecha	Iniciales
Entrevistador		
Supervisor		
Coordinador		

8. Resultado de la entrevista (1 = Completa, 2 = Incompleta) \_\_\_\_\_

**PARTE B: HISTORIA DE LA ENFERMEDAD DE LA DIARREA**

Por cada niño, llene en una caja separada abajo:

Niño 1:

9A. Nombre: \_\_\_\_\_

10A. Fecha de Nacimiento: \_\_\_\_\_

11A. Sexo: (1 = masculino, 2 = femenino) \_\_\_\_\_

12A. Ha tenido este niño alguna de los siguientes síntomas durante las dos semanas últimas: \_\_\_\_ (1=Si, 2 = No)

- a. Sangre en sus heces fecales \_\_\_\_\_
- b. Heces fecales líquidas por más de 24 horas \_\_\_\_\_
- c. Mayor afluencia al baño \_\_\_\_\_
- d. Fiebre o lo sintió caliente \_\_\_\_\_
- e. Vómitos \_\_\_\_\_
- f. Dolor de estómago \_\_\_\_\_
- g. Otro \_\_\_\_\_

13A. ¿Cuáles, si hubieron, de los síntomas de arriba han ocurrido juntos? \_\_\_\_\_

14A. Para mi niño la enfermedad de la diarrea es: \_\_\_\_\_

- 1. Un problema que ocurre frecuentemente (siempre)
  - 2. Un problema que ocurre a menudo (casi siempre)
  - 3. Un problema que ocurre de vez en cuando
  - 4. Un problema que ocurre casi nunca
  - 5. Ningún problema
- 

Niño 2:

9B. Nombre: \_\_\_\_\_

10B. Fecha de Nacimiento: \_\_\_\_\_

11B. Sexo: (1 = masculino, 2 = femenino) \_\_\_\_\_

12B. Ha tenido este niño alguna de los siguientes síntomas durante las dos semanas últimas:  
(1=Si, 2=No)

- a. Sangre en sus heces fecales \_\_\_\_\_
- b. Heces fecales líquidas por más de 24 horas \_\_\_\_\_
- c. Mayor afluencia al baño \_\_\_\_\_
- d. Fiebre o lo sintió caliente \_\_\_\_\_
- e. Vómitos \_\_\_\_\_
- f. Dolor de estómago \_\_\_\_\_
- g. Otro \_\_\_\_\_

13B. ¿Cuáles, si hubieron, de los síntomas de arriba han ocurrido juntos? \_\_\_\_\_

14B. Para mi niño la enfermedad de la diarrea es: \_\_\_\_\_

- 1. Un problema que ocurre frecuentemente (siempre)
- 2. Un problema que ocurre a menudo (casi siempre)
- 3. Un problema que ocurre de vez en cuando
- 4. Un problema que ocurre casi nunca
- 5. Ningún problema

Niño 3:

9C. Nombre: \_\_\_\_\_

10C. Fecha de Nacimiento: \_\_\_\_\_

11C. Sexo: (1 = masculino, 2 = femenino) \_\_\_\_\_

12C. Ha tenido este niño alguna de los siguientes síntomas durante las dos semanas últimas: \_\_\_\_\_ (1=Si, 2=No)

- a. Sangre en sus heces fecales \_\_\_\_\_
- b. Heces fecales líquidas por más de 24 horas \_\_\_\_\_
- c. Mayor afluencia al baño \_\_\_\_\_
- d. Fiebre o lo sintió caliente \_\_\_\_\_
- e. Vómitos \_\_\_\_\_
- f. Dolor de estómago \_\_\_\_\_
- g. Otro \_\_\_\_\_

13C. ¿Cuáles, si hubieron, de los síntomas de arriba han ocurrido juntos? \_\_\_\_\_

14C. Para mi niño la enfermedad de la diarrea es: \_\_\_\_\_

- 1. Un problema que ocurre frecuentemente (siempre)
- 2. Un problema que ocurre a menudo (casi siempre)
- 3. Un problema que ocurre de vez en cuando
- 4. Un problema que ocurre casi nunca
- 5. Ningún problema

**PARTE C: TRATAMIENTO (Si la respuesta hasta el 12 es “Si”)**

Niño 1:

15A. Este niño fue tratado en (escriba los números): \_\_\_\_\_

- 1. Hogar
- 2. Curandero
- 3. Centro de Salud
- 4. Hospital
- 5. Médico
- 6. No tratado

16A. El tratamiento incluyó (escriba los números): \_\_\_\_\_

- 1. Beber una solución salada
- 2. Alimentación intravenosa
- 3. Tabletas, cápsulas o jarabes
- 4. Remedios caseros
- 5. Otros

Describe: \_\_\_\_\_

\_\_\_\_\_

17A. El niño tratado (escriba los números): \_\_\_\_\_

- 1. Se recuperó (hasta la normalidad)
- 2. Continúa enfermo (continúa la diarrea)
- 3. Murió

Niño 2:

15B. Este niño fue tratado en (escriba los números): \_\_\_\_\_

1. Hogar
2. Curandero
3. Centro de Salud
4. Hospital
5. Médico
6. No tratado

16B. El tratamiento incluyó (escriba los números): \_\_\_\_\_

1. Beber una solución salada
2. Alimentación intravenosa
3. Tabletas, cápsulas o jarabes
4. Remedios caseros
5. Otros

Describe: \_\_\_\_\_  
\_\_\_\_\_

17B. El niño tratado (escriba los números): \_\_\_\_\_

1. Se recuperó (hasta la normalidad)
2. Continúa enfermo (continúa la diarrea)
3. Murió

Niño 3:

15C. Este niño fue tratado en (escriba los números): \_\_\_\_\_

1. Hogar
2. Curandero
3. Centro de Salud
4. Hospital
5. Médico
6. No tratado

16C. El tratamiento incluyó (escriba los números): \_\_\_\_\_

1. Beber una solución salada
2. Alimentación intravenosa
3. Tabletas, cápsulas o jarabes
4. Remedios caseros
5. Otros

Describe: \_\_\_\_\_  
\_\_\_\_\_

17C. El niño tratado (escriba los números): \_\_\_\_\_

1. Se recuperó (hasta la normalidad)
2. Continúa enfermo (continúa la diarrea)
3. Murió

18. ¿Ha perdido uno o más días de trabajo para cuidar a su niño o niños enfermos con diarrea?  
(1=Si, 2=No) \_\_\_\_\_

19. Si la respuesta es "Si", ¿Cuántos días? \_\_\_\_\_

**PARTE D: CONOCIMIENTOS**

20. ¿Por qué piensa usted que sus hijos se enferman con diarrea?
- a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_
  - d. \_\_\_\_\_
  - e. \_\_\_\_\_
21. ¿Qué hace usted para evitar que a sus niños les dé diarrea?
- \_\_\_\_\_
- \_\_\_\_\_
22. ¿Piensa usted que se puede prevenir la diarrea? (1=Si, 2=No) \_\_\_\_\_
23. ¿Cómo?
- a. Hervir y mantener el agua tapada \_\_\_\_\_
  - b. Mantener la casa limpia \_\_\_\_\_
  - c. Lavarse las manos-madre \_\_\_\_\_
  - d. Lavarse las manos-niños \_\_\_\_\_
  - e. Lavar los utensilios \_\_\_\_\_
  - f. Lavar las frutas y los vegetales \_\_\_\_\_
  - g. Vigilar lo que comen \_\_\_\_\_
  - h. Otros \_\_\_\_\_
24. ¿Ud. cree que lavarse las manos es importante? (1 = Si, muy importante,  
2 = Si, más o menos importante,  
3 = No, no es importante)
25. ¿Cuándo se debería lavar las manos?
- a. Antes de comer \_\_\_\_\_
  - b. Antes de cocinar \_\_\_\_\_
  - c. Después de ir al baño \_\_\_\_\_
  - d. Antes de dar el pecho \_\_\_\_\_
  - e. Después de cambiar pañales \_\_\_\_\_
  - f. Otros \_\_\_\_\_

26. Si pudiera, ¿qué otras cosas haría en su casa para prevenir que sus hijos se enfermen? (haga una pregunta abierta y pondere 5 respuestas, 1 = Más importante)

- a. Mantener los animales fuera de la casa \_\_\_\_\_
- b. Construir un corral para animales \_\_\_\_\_
- c. Construir una mejor cocina \_\_\_\_\_
- d. Tener agua potable (grifo) \_\_\_\_\_
- e. Hacer un tanque de agua \_\_\_\_\_
- f. Construir un baño \_\_\_\_\_
- g. Hacer más fácil el uso de las letrinas para los niños \_\_\_\_\_
- h. Supervisar y animar a sus hijos a que usen las letrinas \_\_\_\_\_
- i. Evitar que las moscas toquen los alimentos \_\_\_\_\_
- j. Asegurarse que los niños se laven las manos después de defecar y antes de comer \_\_\_\_\_
- k. Cubrir el agua para tomar \_\_\_\_\_
- l. Evitar que las moscas toquen los utensilios \_\_\_\_\_
- m. Limpiar la basura dentro/fuera de la casa \_\_\_\_\_
- n. Cambiar lo que comen los niños \_\_\_\_\_
- o. Otros \_\_\_\_\_

## HOJA DE OBSERVACIONES

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### Observaciones sobre la casa

#### AREA DE LA COCINA

27. Observación: ¿De dónde viene el agua para tomar y cocinar? \_\_\_\_\_
1. Agua de lluvia
  2. Tratada, de cañería
  3. Pozo o fuente
  4. No tratada, de cañería
  5. Río o canal
28. Observación/pregunta: ¿Cómo describiría la cantidad de agua para asearse, lavar la ropa y cocinar? \_\_\_\_\_
1. Más que suficiente para todas las necesidades
  2. Adecuada
  3. Mínima, no siempre adecuada
  4. Inadecuada
29. Pregunta: ¿Qué clase de contenedores son usados para almacenar el agua? \_\_\_\_\_
1. Contenedor con una pequeña abertura y una tapa
  2. Contenedor con una pequeña abertura sin tapa
  3. Una jarra con tapa
  4. Tanques grandes con tapa
  5. Tanques grandes al descubierto
30. Observación: ¿Cómo una persona saca agua de un contenedor? \_\_\_\_\_
1. Del tope del contenedor
  2. Usando un cucharón sólo para este propósito
  3. Con otros utensilios (una tasa) usada sólo para este propósito
  4. Con cualquier utensilio
  5. Con la mano
31. Pregunta: ¿Las comidas crudas son lavadas antes de comerlas? (1 = Sí, 2 = No) \_\_\_\_\_
32. Pregunta: ¿La persona que cocina se lava las manos con agua y jabón antes de preparar la comida? (1 = Sí, 2 = No)

33. Observación: ¿Me mostraría como usted (un adulto) lava sus manos? (si está de acuerdo, observe como lo hace)

No está de acuerdo

- Usa sólo agua \_\_\_\_\_
- Usa jabón y agua (número de estrujes) \_\_\_\_\_
- Se seca las manos con una toalla limpia \_\_\_\_\_
- Se seca las manos con una toalla sucia \_\_\_\_\_
- Se seca las manos en su ropa \_\_\_\_\_
- El aire seca sus manos \_\_\_\_\_

34. Observación: ¿Nos mostraría cómo usted (un niño) lava sus manos? (Si está de acuerdo, observe como lo hace)

-----  
No está de acuerdo

- Usa sólo agua \_\_\_\_\_
- Usa jabón y agua (número de estrujes) \_\_\_\_\_
- Se seca las manos con una toalla limpia \_\_\_\_\_
- Se seca las manos con una toalla sucia \_\_\_\_\_
- Se seca las manos en su ropa \_\_\_\_\_
- El aire seca sus manos \_\_\_\_\_

35. Observación: ¿Está la comida tapada? (1 = Sí, 2 = No, ó sólo alguna)

36. Observación: ¿Están los utensilios de comida tapados? (1 = Sí, 2 = No)

37. ¿Qué tipo de bebidas están siendo consumidas?

1. Agua, sopa, té, o jugo hecho con agua no hervida
2. Agua, sopa, té, o jugo hecho con agua hervida

38. Observación: ¿Con qué lava sus platos?

1. Agua y jabón
2. Agua y ceniza
3. Con agua solamente
4. Con un trapito sin agua
5. No los lava

39. Observación y pregunta: ¿Cómo bota el agua sucia?

1. Por el alcantarillado
2. En la cuneta
3. Afuera en el patio



40. Los pisos de la casa están generalmente
1. Limpios
  2. Con excrementos de animales
  3. Con basura orgánica (comida)
  4. Con basura inorgánica (papel, etc)
41. Hay pañales sucios a la vista (1 = Sí, 2 = No)
42. La persona entrevistada tiene las manos limpias (1 = Si; 2 = No)

**Observaciones o preguntas concernientes a la higiene personal**

43. Pregunta: ¿Los adultos lavan sus manos después de hacer sus necesidades (defecar u orinar)? (1 = Sí, 2 = No)
44. Observación o pregunta: ¿Los niños se lavan sus manos después de hacer sus necesidades (defecar u orinar)? (1 = Si, 2 = No)
45. Pregunta: ¿Cómo los adultos disponen de sus heces fecales?
1. Inodoro
  2. En una letrina con agua
  3. En una letrina sin agua
  4. Enterrándolas
  5. En el campo abierto sin enterrarlas
46. Pregunta: ¿Cómo los niños disponen de sus heces fecales?
1. Inodoro
  2. En una letrina con agua
  3. En una letrina sin agua
  4. Enterrándolas
  5. En el campo abierto sin enterrarlas

**Observaciones o preguntas concernientes alrededor de la casa**

47. Pregunta: ¿De dónde viene el agua para regar el jardín y el huerto?
1. Agua de lluvia
  2. De cañería
  3. De un pozo
  4. De una corriente
  5. De canal o río
48. Los animales domésticos están:
1. Fuera de la casa
  2. Cerca de la casa
  3. Dentro de la casa
  4. No hay animales



49. Observación: ¿Cómo están los alrededores de la casa?
1. Limpios
  2. Con restos de comida o basura
  3. Con restos de papel plásticos, etc.
  4. Con excrementos de animales
  5. Con excrementos humanos
50. Observaciones o pregunta: ¿Cómo las basuras sólidas son manejadas en la casa?
1. Desparramadas
  2. En un pozo sin tapar
  3. Enterradas
  4. Recogidas
  5. Otras
51. Observación o pregunta: ¿Cómo las basuras sólidas son manejadas en la comunidad?
1. No son recogidas
  2. Son recogidas y enterradas
  3. Recogidas y depositadas en un pozo sin cubrir
  4. Recogidas y quemadas
  5. Otros

# APPENDIX C: Overview of Workshop Objectives, Contents, and Products

## **First Skill-Building Workshop, June 3-6, 1997**

**Purpose:** To provide participants with an overall understanding of the CPI model and the use of community-based strategies to identify and mitigate risk factors for diarrheal disease.

**Objectives:** To facilitate communication among participants; to understand effective group-communication techniques and stages in community participation; to analyze baseline survey data; to learn about causes of diarrhea and its social impact; to understand and analyze community mapping; to define responsibilities of three teams; and to develop a plan of action for the regional teams.

**Materials:** 1 handbook/manual (100 pages)

**Participants:** 22

### ***Community Practice Exercises***

- Contacting both formal and informal community leaders
- Presenting the CPI/DDP activity
- Selecting community groups and inviting volunteers to participate in the CPI/DDP activity
- Training community volunteers (community team)
- Participatory elaboration of the community risk maps with regional and community team members
- Community presentation and discussion of maps

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## **Second Skill-Building Workshop, July 21-24, 1997**

**Purpose:** To help participants become aware of causes of diarrheal disease and strategies for prevention, including use of community-based tools.

**Objectives:** To strengthen participants' skills through participation, communication, and mutual collaboration; to enhance knowledge about risk behaviors for diarrheal disease (i.e., oral-fecal transmission routes associated with diarrheal disease and human behaviors); to define the role of culture in maintaining beliefs and their impact on behaviors; to clearly establish correlations between sanitation behaviors and health; to identify appropriate interventions using microprojects; to review techniques of social investigation (observation checklist, interview guide, and brief survey); and to develop clear, concrete, and feasible plan of action for execution by regional team.

**Materials:** 1 handbook/manual (100 pages)

**Participants:** 20

**Community Practice Exercises**

- Training community team members in survey methods
- Administering the baseline survey
- Organizing survey results
- Presenting results to community assembly

\*\*\*\*  
Recognizing and understanding the realities of our lives and what we can do to make changes in our communities. That was the biggest step in what we have learned.  
\*\*\*\*

**Third Skill-Building Workshop, October 13-16, 1997**

**Purpose:** To train participants in how to use data from baseline survey in formulating and developing microprojects.

**Objectives:** To provide participants with analysis of appropriate data from baseline survey and community investigation; to convey formal mechanism for designing microprojects; to provide opportunities to reinforce community teams; to develop plan of action for next phase of activity and national norms for microprojects; and to establish contact with Plan International to develop and monitor community collaboration with project financing.

**Community Practice Exercises**

- Community assembly to discuss proposed microprojects
- Training community team members in techniques for microproject development
- Buy-in from community members and formal leaders

**Materials:** 1 handbook/manual (100 pages)

**Participants:** 20

**Course: Administration of Microprojects with Community Participation: December 11-13, 1997**

This course, developed and conducted by Plan International, was an additional component of the DDP activity and not one of major four open skill-building workshops.

**Purpose:** To strengthen the community's ability to administer microprojects effectively through active participation and improved communication.

**Objectives:** To convey the critical elements in the design and implementation of microprojects: construction and other physical elements, health education, and community organization; to disseminate information regarding all stages of microproject administration (including planning, execution, control, and

evaluation); and to complete group exercises in receipt of project funds (e.g., opening and managing bank accounts), negotiating contracts, purchasing and acquiring project materials, and supervising execution of microprojects (e.g., overseeing labor and providing technical supervision and financial oversight of project funds).

**Materials:** 1 handbook/manual (100 pages)

**Participants:** 100

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#### **Fourth Skill-Building Workshop: January 13-17, 1998**

**Purpose:** To train regional teams in participatory, community-based monitoring and self-evaluation as a way to facilitate both technical and regional teams' abilities to keep track of and direct microprojects to completion, and to encourage sustainability. This workshop aimed to give participants an understanding of project monitoring, data generation, and decision making, and—through appropriate selection of indicators and methodologies—the tools to carry out these activities.

**Objectives:** To present and evaluate proposed microprojects per team; to present participatory techniques for project monitoring and follow-up; to present participatory methods of process and outcome evaluations; and to develop health education materials.

**Materials:** 1 handbook/manual (100 pages)

**Participants:** 21

#### **Community Action Exercises**

- Presenting and discussing the proposed microproject in a community assembly
- Training volunteers
- Establishing criteria for project monitoring by the community.

\*\*\*\*  
We are now successfully  
trained and qualified to be better  
organized, and we can compete for  
funding for other projects to improve  
our communities.  
\*\*\*\*

## APPENDIX D: Microprojects

### Barrio Zona del Surtidor (Villa Mercedes), Samaipata

- Purpose:** To construct latrines, provide water-storage containers, and include health education regarding their use to community families, 50% of whom have no latrines. Many people suffer from lice, mange, or Chagas disease, and 60 children have diarrhea.
- Objectives:** To construct latrines for 26 families (166 families indirectly); to acquire and donate bidones CLARO for 80 families (166 families indirectly); and to provide health education to 166 families regarding use of latrines/bidones and the benefits of using uncontaminated water.
- Cost:** 47,737.86 Bs. (EHP contributed 40%, while the community added 30%, and the municipality an additional 20%).

### Barrio Nuevo, Samaipata

- Purpose:** To construct latrines, provide bidones, and include health education regarding their use to community families, 30% of whom have no latrines. The existing water supply is unpurified and contains high rates of fecal coliform and waterborne pathogens such as Giardia.
- Objectives:** To construct latrines for 34 families (137 families indirectly); to acquire and donate bidones CLARO for 100 families (162 families indirectly); and to provide health education to 162 families regarding use of latrines/bidones and the benefits of using uncontaminated water.
- Cost:** 61,379.50 Bs. (EHP contributed 50%, the community about 30%, and the municipality about 20%).

### Cuevas

- Purpose:** To expand the potable water system and improve sanitation and health education, with particular emphasis on those families involved with agriculture and livestock who have no access to other such basic services as electricity and radio.
- Objectives:** To improve toilets (with doors and lids) and provide health education for 59 families.
- Cost:** 28,000 Bs. (The entire sum came from EHP.)

### Potosi, Cucho Ingenio, la provincial J.M. Linares

- Purpose:** To provide health education and health support to reduce morbidity/mortality of mothers and children, thus directly improving the community health of 560 inhabitants (270 families and 83 children five and under directly and 210 inhabitants indirectly).
- Objectives:** To develop, apply, and revise a pretest to assess and determine knowledge of maternal-infant health and acute respiratory infections; to inventory available material and medicines; to select two partners in community to assist in developing maternal and child health program; and to schedule monthly meetings and home visits to enhance

community capacity regarding prenatal and post-natal care and care of young children (e.g., immunizations, etc.).

**Cost:** 14,460 Bs. (EHP contributed the bulk of the funds, with additional monies coming from the community and CARE).

### **Barrio San Juan del Calvario, north of La Paz, capital de la provincial Murillo**

**Purpose:** To contribute to and support activities to reduce morbidity and mortality from diarrhea in children five and under through community participation to promote health and prevent disease.

**Objectives:** To implement a permanent public hygiene service and education system to prevent disease; to construct public bathing facilities (hygiene services, showers, laundries) for those with no such services in their homes; to develop a system of education/training to increase people's knowledge about basic hygiene and sanitation; and to promote positive attitudes and practices about basic hygiene and sanitation in the population.

**Justification:** 48% of households in which one to two children live have no containers for solid waste, thus increasing the likelihood that children five and under will contract diarrhea; of those with solid waste "receptacles," 23% do not use them under optimal conditions or maintain them; in 52% of families observed, hygiene was inadequate for children; in 13% of families observed, water and soap were not used for handwashing after use of the toilet; of those surveyed, 48% indicated that some of the children five and under in their families recently contracted diarrhea.

**Cost:** 79,000 Bs.

### **Yapacani, la provincial Ichilo**

**Purpose:** To construct clean latrines and improve existing ones as a means to eliminate bad odors and reduce diarrheal disease in 67% of children five and under.

**Objectives:** To build latrines out of cement and brick that will not attract flies or emit odors for 32 families directly (eight families indirectly).

**Cost:** 29,861 Bs. (EHP contributed the bulk of the funds, with additional monies from the community and CEPAC.)



# APPENDIX E: Technical, Regional, and Community Team Members

## Technical Team

Linda Whiteford  
Andrew Arata  
Mercedes Torres  
Dolly Montano  
Nancy Suarez

## Regional Teams

### Barrio Nuevo

Elva Melgar de Fernandez  
Ruth Arnez  
Romualda Soliz

### Barrio Surtidor

Maria Isabel Quiroga  
Tania Cuca Gutierrez  
Fabiola Manrique  
Miquel Manrique

## Community Teams

### Barrio Nuevo

Fammy Vallyos  
Emilio Siles  
Juan Bruno  
Ovidio Alba  
Lucia Roda

### Barrio Surtidor

Marecela Banegas  
Candelaria Fernandez  
Gloria Maron  
Berta Saunero  
Simona Servano  
Ceferino Chabasrias  
Maribel de Vargas  
Irma Vargas  
Olejo Castellon  
Olberto Tapia

**Cuevas**

Silvia Lucas  
Menffy Ribera  
Nemecio Hinojosa  
Osvaldo Urrelo

**Cuevas**

Rosario Hurtado  
Doris Pena  
Elvira Mendoza  
Pastora Quancilia  
Simona Quancilia  
Gladys Ribera  
Ona Ligeron  
Luciano Quancilia  
Severo Ribera  
Victoria Quancilia  
Raimundo Rossel  
Dolly Martinez  
Martina Ligeron

# APPENDIX F: Results

Attached are tables that summarize the results of questions 12A through 51 of the questionnaire.

## 1. Sample Size

The sample sizes used in the three sets of tables (Samaipata, Cuevas, and Mairana) were the number of surveys distributed for each community in 1997 (baseline) and 1998 (final).

Samaipata: 1997 – n=220

1998 – n=182

Cuevas: 1997 – n=21

1998 – n=22

Mairana: 1997 – n=78

1998 – n=81

## 2. Headings for Tables

The following headings were used for the data tables:

# Number of responses

% Percentage resulting from number of responses/sample size

OR Odds ratio—measures the odds of having the risk factor if the condition is present, divided by the odds of having the risk factor if the condition is not present. It is a useful and valid measure of the strength of the association—in this case, between risk of diarrhea episodes and behaviors and beliefs. An odds ratio of 1 implies that the odds of having the risk factor if the condition is present, compared with the odds of having the risk factor if the condition is not present, are equal.

P-value Probability—the “bottom line” in statistical significance tests and typically set at .05. This means that a 5% chance or less of occurrence is considered unlikely enough to allow the investigators to reject the “null” hypothesis (see explanation under “Statistical Significance”). If the probability of the results occurring by chance is less than or equal to 0.05, investigators can reject the null hypothesis. Thus, the probability is small that chance alone could produce the differences in outcome if the null hypothesis is true. By elimination investigators accept the study hypothesis that a true difference exists in the outcome between study and control groups in the larger population.

### Statistical

Significance Statistical significance indicates the probability of getting a measure of association equal to or more extreme than that calculated. Investigators need to know if changes between the pre-and post-intervention are statistically significant (e.g., the prevalence of diarrhea before and after the project).

Statistical significance testing or hypothesis testing is based on the premise that populations have only two types of relationships: either there are or are not differences between groups in a population. The role of statistical significance testing is to determine whether the results obtained from the samples are so unusual that we are willing to conclude that a difference exists in the population.

Testing begins with a study hypothesis stating that a difference exists in the larger population. It is assumed initially that the study hypothesis is false, and a “null” hypothesis is formulated stating that no difference exists in the larger population. Statistical methods are then used to calculate the probability of obtaining the observed results in the study sample, or more extreme results, if no difference actually exists in the larger population.

In this case, the statistical significance cutoff level used was .05. The values applied were: 1.96 for the two-sided test (investigator accepts data that deviates in either direction from “null” hypothesis) and 1.65 for the one-sided test (investigator accepts only data that deviates in the direction of the study hypothesis).

See Note #3 for an explanation of the type of test and formulas used in statistical significance testing.

### 3. Formula

EpiInfo data tables were converted to Excel for further analysis by a biostatistician. For purposes of the final analysis, univariate analysis and the normal test for binomial proportions were chosen to assess the

statistical significance of the percentage changes from 1997 to 1998 in behaviors targeted for intervention. Two different significance numbers were used. First,  $H_A$  (hypothesis): there is simply a difference between the two percentages (no direction implied),  $p_1 \neq p_2$ , a two-sided test. Second,  $H_0$  (null hypothesis): there is a difference between the two percentages (1997 larger than 1998),  $p_1 > p_2$ , a one-sided test.

Where  $p_1$  is the proportion in 1997 and  $p_2$  is the proportion in 1998, both are calculated by the percentage divided by 100, and  $n_1$  is the sample size for 1997 and  $n_2$  is the sample size for 1998. The formula is as follows:

$$z = \frac{p_1 - p_2}{\sqrt{pq(1/n_1 + 1/n_2)}}$$

$$\text{Where } p = \frac{(n_1 p_1 + n_2 p_2)}{(n_1 + n_2)}, \quad q = 1 - p$$

*Caution:* This test was valid only when  $n_1 p_1 q_1 \geq 5$  and  $n_2 p_2 q_2 \geq 5$ . The cut-off values for significance at the .05 level were 1.96 for the two-sided test and 1.65 for the one-sided test.

#### 4. Diarrheal Disease Prevalence

For question 12, positive responses to 12A, 12B, and 12C for “blood in stool” and “watery diarrhea > 24 hours” were totaled and then percentages taken from the sample size. “Blood in stool” and/or “watery diarrhea > 24 hours” comprised the case definition for diarrhea used by the authors. Example: for Samaipata, in 1997 (from 220 surveys), for 12A, 4 responded “yes” to “blood in stool,” 56 responded “yes” to “watery diarrhea > 24 hours” (total=60). Add these to “yes” responses to “blood in stool” and “watery diarrhea >24 hours” for 12B (total=14 (1+13) and “yes” responses to “blood in stool” and “watery diarrhea >24 hours” for 12C (total=2(1+1). The total is 76. Then 76/220 yields .345 or 35%.

This method was used consistently for Samaipata, Cuevas, and Mairana and the results reflect the total responses to Question 12 not just 12A

#### 5. Gaps in the Data Table

P-values, odds ratios, and statistical significance are listed for all questions for which a meaningful value could be applied. In some instances, the number of responses or difference in responses was small enough to make calculations not relevant. Thus, p-values, odds ratios, and statistical significance values were not included for some questions in the tables.



Comparison Of Baseline and Final Data For Bolivia										
Diarrheal Disease Prevention Project: SAMAIPTA (1997) and (1998)										
Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>12A</b> Has your child had the following symptoms during the last two weeks?										
Yes	129	58.9	39.50			60	39.5			
No	90	41.1				92	60.5			
Blood in stool Yes	Y	4	3.1		0.3400	*	0	0.0		
	N	123	96.9				61	100.0		
Watery diarrhea > 24 hours	Y	56	44.1				23	37.7		
	N	71	55.9				38	62.3		
Greater times to bathroom	Y	8	6.3	0.63	0.5370		26	26.0		
	N	119	93.7				74	74.0		
Fever or feel warm	Y	75	59.1	0.34	0.0037	*	56	56.0		
	N	52	40.9				44	44.0		
Vomiting	Y	18	14.2	0.18	0.0040	*	23	23.0		
	N	109	85.8				77	77.0		
Stomach pain	Y	20	15.7	0.87	0.7670		33	33.0		
	N	107	84.3				67	67.0		
Other (Bronchitis, headache)	Y									
	N									
<b>13A</b> What, in your opinion, are the symptoms that occur together?										
2		3	12.5							
5		1	4.2							
ABF		1	4.2							
ADCF		14	4.2							
BD		1	58.3				1	25.0		
BDF		1	4.2							
BF		1	4.2							
CD		1	4.2							
DF		1	4.2							
CDE							1	25.0		
CE							1	25.0		
CF							1	25.0		
<b>14A</b> For my child, diarrheal disease is:										
A problem that occurs frequently		16.0	7.6				1	1.2		
A problem that occurs sometimes		14.0	6.7				13	16.0		
A problem that occurs once in a while		88.0	41.9				36	44.4		
A problem that occurs rarely		23.0	11.0				30	37.0		
No problem		68.0	32.4				1	1.2		

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>12B</b> Has your child had the following symptoms during the last two weeks?										
Yes	Y	21.0	44.7			23	54.8	25.0	0.0002	*
No	N	26.0	55.3			19	45.2			
Blood in stool Yes	Y	1.0	4.8			1	4.3			
	N	20.0	95.2			22	95.7			
Watery diarrhea > 24 hours	Y	13.0	61.9			8	34.8			
	N	8.0	38.1			15	65.2			
Greater times to bathroom	Y	1.0	4.8			11	47.8			
	N	20.0	52.4			12	52.2			
Fever or feel warm	Y	10.0	47.6	0.15		11	47.8			
	N	11.0	52.4			12	52.2			*
Vomiting	Y	2.0	9.5	0.58		7	30.4			
	N	19.0	90.5			16	69.6			
Stomach pain	Y	3.0	14.3	1.27		5	21.7			
	N	18.0	85.7			18	78.3			
Other	Y									
	N									
<b>13B</b> What, in your opinion, are the symptoms that occur together?										
ABDF		1.0	33.3							
BD		2.0	66.7							
BF						1	33.3			
CE						1	33.3			
CF						1	33.3			
<b>14B</b> For my child, diarrheal disease is:										
A problem that occurs frequently		4.0	8.7			1	3.7			
A problem that occurs sometimes		4.0	8.7			6	22.2			
A problem that occurs once in a while		18.0	39.1			13	48.1			
A problem that occurs rarely		5.0	10.9			7	25.9			
No problem		15.0	32.6			0	0.0			
<b>12C</b> Has your child had the following symptoms during the last two weeks?										
Yes	Y	3	75.0			2	66.7			
No	N	1	25.0			1	33.3			
Blood in stool Yes	Y	1	33.3			0	0.0			
	N	2	66.7			2	100.0			
Watery diarrhea > 24 hours	Y	1	33.3			0	0.0			
	N	2	66.7			2	100.0			



Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Greater times to bathroom	Y	1	33.3				0	0.0			
	N	2	66.7				2	100.0			
Fever or feel warm	Y	1	33.3				1	100.0			
	N	2	66.7				0	0.0			
Vomiting	Y	3	100.0				0	0.0			
	N	0	0.0				2	100.0			
Stomach pain	Y	1	33.3				1	50.0			
	N	2	66.7				1	50.0			
Other	Y										
	N										
<b>13C</b>	<b>What, in your opinion, are the symptoms that occur together?</b>										
	ABDF	1	100.0								
<b>14C</b>	<b>For my child, diarrheal disease is:</b>										
	A problem that occurs frequently	0					0				
	A problem that occurs sometimes	2	50.0				0				
	A problem that occurs once in a while	1	25.0				1	50.0			
	A problem that occurs rarely	1	25.0				1	50.0			
	No problem	0					0				
<b>15A</b>	<b>This child was treated at:</b>										
Home	Y	98	60.5	0.730	0.335		38	57.6			
	N	24	39.5				28	42.4			
Traditional healer	Y	12	7.4	1.200	0.765		2	3.0			
	N	150	92.6				64	97.0			
Health center	Y	7	4.3	0.650	0.612		1	1.5			
	N	155	95.7				65	98.5			
Hospital	Y	64	39.5	1.910	0.050		35	53.0			
	N	98	60.5				31	47.0			
Doctor	Y	35	39.5	1.530	0.266		4	6.1			
	N	127	60.5				62	93.9			
Not treated	Y	5	3.1		0.077		0	0.0			
	N	157	96.9				66	100.0			
<b>16A</b>	<b>The treatment included:</b>										
Drink salt solution	Y	13	8.3	1.39	0.572		5	7.6			
	N	144	91.7				61	92.4			
IV	Y	2	1.3	1.58	0.744		1	1.5			
	N	155	98.7				65	98.5			
Tablets, capsules, etc.	Y	102	65.0	1.70	0.133		40	60.6			
	N	55	35.0				26	39.4			
Home remedies	Y	95	60.5	0.65	0.190		33	50.0			
	N	62	39.5				33	50.0			
Other	Y										
	N										

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>17A My child was treated and:</b>										
Recovered	147	89.2	0.2	0.004	*	61	92.4			
Continued to be sick	17	10.8				5	7.6			
Died	0									
<b>15B This child was treated at:</b>										
Home	Y	16	48.5			10	40.0			
	N	17	51.5	0.40	0.207	15	60.0			
Traditional healer	Y	1	3.0		0.236	2	8.0			
	N	32	97.0			23	92.0			
Health center	Y	0	0.0			1	4.0			
	N	33	100.0			24	96.0			
Hospital	Y	15	45.5	3.90	0.060	17	68.0			
	N	18	54.5			8	32.0			
Doctor	Y	7	21.2	0.47	0.403	0	0.0			
	N	26	78.8			25	100.0			
Not treated	Y	1	3.0		0.236	0	0.0			
	N	32	97.0			25	100.0			
<b>16B The treatment included:</b>										
Drink salt solution	Y	0.0	0.0			4	16.0			
	N	33.0	100.0			21	84.0			
IV	Y	1.0	3.0			0	0.0			
	N	32.0	97.0			25	100.0			
Tablets, capsules, etc.	Y	22.0	66.7	0.83	0.803	16	64.0			
	N	11.0	33.3			9	36.0			
Home remedies	Y	16.0	48.5	0.68	0.578	13	52.0			
	N	17.0	51.5			12	48.0			
Other	Y									
	N									
<b>17B My child was treated and:</b>										
Recovered		29	87.9	0.2	0.159	23	92.0			
Continued to be sick		4	12.1			2	8.0			
Died										
<b>15C This child was treated at:</b>										
Home	Y	2	66.7			1	50.0			
	N	1	33.3			1	50.0			
Traditional healer	Y	0	0.0			0	0.0			
	N	3	100.0			2	100.0			
Health center	Y	0	0.0			0	0.0			
	N	3	100.0			2	100.0			
Hospital	Y	2	66.7			1	50.0			
	N	1	33.3			1	50.0			
Doctor	Y	0	0.0			0	0.0			
	N	3	100.0			2	100.0			
Not treated	Y	0	0.0			0	0.0			
	N	3	100.0			2	100.0			
<b>16C The treatment included:</b>										
Drink salt solution	Y	0	0.0			0	0.0			
	N	3	100.0			2	100.0			
IV	Y	0	0.0			0	0.0			
	N	3	100.0			2	100.0			

Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Tablets, capsules, etc.	Y	2	66.7				1	50.0			
	N	1	33.3				1	50.0			
Home remedies	Y	2	66.7				1	50.0			
	N	1	33.3				1	50.0			
Other	Y										
	N										
<b>17C My child was treated and:</b>											
Recovered		3	100.0				2	100.0			
Continued to be sick											
Died											
<b>18 Have you lost one or more days of work taking care of a child/children sick with diarrhea?</b>											
Yes		97.0	71.9	4.52	0.0006	*	36	49.3	1.61	0.418	
No		38.0	28.1				37	50.7			
<b>19 If "yes", how many days?</b>											
1		8	8.3				1	2.9			
2		16	16.7				7	20.0			
3		21	21.9				9	25.7			
4		13	13.5				6	17.1			
5		5	5.2				4	11.4			
6		4	4.2				1	2.9			
7		3	3.1				2	5.7			
8		15	15.6				4	11.4			
10		2	2.1				1	2.9			
14		2	2.1								
15		4	4.2								
20		1	1.0								
30		2	2.1								
<b>20 What do you think causes your children to get sick with diarrhea?</b>											
Eating something bad		41	18.6				3	1.6			
Because of cold temperatures		21	9.5				9	4.9			
Because of infections		35	15.9				9	4.9			
Because of dirty conditions		38	17.3				69	37.9			
Poor food		24	10.9				6	3.3			
Neglect of mother		18	8.2				26	14.3			
Eating paper		8	7.4				0	0.0			
Don't know		16	7.3				6	3.3			
<b>21 What can be done to keep your children from getting diarrhea?</b>											
Cuidarlos bien		72	32.7				93	51.1			
Don't know		56	25.5				3	1.6			
Clean		32	14.5				40	22.0			
Wash food		31	5.5				0	0.0			
Home remedies		12	5.9				1	0.0			
Get doctor		13	6.4				0	0.0			
Hygiene							22	12.1			

	Question	Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
22	<b>Do you think that diarrhea can be prevented?</b>										
	Yes	195	89.4	0.32	0.009	*	180	98.9			
	No	23	10.6				2	1.1			
23	<b>How? (How do you think DD can be prevented?)</b>										
	Boil and cover water	Y	147	74.6	1.33	0.460	147	81.7	1.16	0.713	
		N	50	25.4			33	18.3			
	Keep clean house	Y	77	39.1	0.80	0.520	153	85.0	0.66	0.328	
		N	120	60.9			27	15.0			
	Mother washes hands	Y	52	26.4	0.29	0.006	123	68.3	1.19	0.597	
		N	145	73.6			57	31.7			
	Child washes hands	Y	148	75.1	1.50	0.310	102	56.7	1.24	0.497	
		N	49	24.9			78	43.3			
	Wash utensils	Y	44	22.3	0.94	0.880	91	50.6	1.01	0.966	
		N	153	77.7			89	49.4			
	Wash fruits and vegetables	Y	83	42.1	0.33	0.002	100	55.6	0.99	0.972	
		N	114	57.9			80	44.4			
	Watch what you eat	Y	39	19.8	0.46	0.094	86	47.8	1.21	0.545	
	N	158	80.2			94	52.2				
24	<b>Do you think handwashing is important?</b>										
	Yes	216	98.6				173	95.1	0.14	0.007	*
	No	2	0.9				9	4.9			
	Don't know	1	0.5								
25	<b>When do you wash your hands?</b>										
	Before eating	Y	216	99.1	0.40	0.5080	179	98.4	0.27	0.259	
		N	2	0.9			3	1.6			
	Before cooking	Y	102	46.8	0.19	0.0008	119	65.4	1.05	0.87	
		N	116	53.2			63	34.6			
	After going to the bathroom	Y	213	97.7	0.60	0.5800	149	81.9	0.82	0.625	
		N	5	2.3			33	18.1			
	Before breastfeeding	Y	22	10.2	0.70	0.5010	80	44.0	1.54	0.167	
	N	196	89.9			102	56.0				
After changing diapers	Y	30	13.8	0.45	0.1120	74	40.7	1.06	0.857		
	N	188	86.2			108	59.3				
26	<b>What do you think are other things that can be done to prevent your children from getting sick?</b>										
	Keep animals outside house	Y	53	24.2	2.16	0.018	100	54.9	2.28	0.009	*
		N	116	75.8			82	45.1			
	Construct pen for animals	Y	51	23.3	1.33	0.411	64	35.2	1.02	0.963	
		N	168	76.7			118	64.8			
	Construct better kitchen	Y	148	67.6	1.16	0.65	55	30.2	0.74	0.373	
		N	71	32.4			127	39.8			
	Have potable water (grifo)	Y	48	21.9	0.64	0.17	38	20.9	0.34	0.012	
	N	171	78.1			144	79.1				
Construct bathroom	Y	144	65.8	0.59	0.088	46	25.3	0.41	0.022		
	N	75	34.2			136	74.7				

Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Make it easier for children to use bathroom	Y	21	9.6	0.75	0.6		38	20.9	0.41	0.033	
	N	198	90.4				144	79.1			
Supervise and encourage children in use of bathroom	Y	46	21.0	2.62	0.004	*	45	24.7	1.28	0.489	
	N	173	79.0				137	75.3			
Keep flies from food	Y	162	74.0	1.72	0.135		94	51.6	0.64	0.157	
	N	57	26.0				88	48.4			
Make sure children wash hands after defecating and after eating	Y	76	34.7	2.17	0.01	*	89	48.9	0.77	0.388	
	N	143	65.3				93	51.1			
Keep drinking water covered	Y	72	32.9	0.48	0.033	*	101	55.5	0.67	0.205	
	N	147	67.1				81	44.5			
Keep flies from utensils	Y	88	40.2				82	45.1	0.80	0.477	
	N	131	59.8				100	54.9			
Clean trash inside/outside house	Y	139	63.5				126	69.2	2.04	0.044	*
	N	80	36.5				56	30.8			
Change what children eat	Y	36	16.4				29	15.9	0.42	0.065	
	N	183	83.6				153	84.1			
<b>27</b>	<b>Where does the water come from that is used for drinking and cooking?</b>										
	From treated pipe water	22	10.0				79	43.4			
	From well	5	2.3								
	From untreated pipe water	191	86.8				103	56.6			
	From river/canal	2	10.9								
<b>28</b>	<b>How would you describe the quantity of water that you use?</b>										
	More than sufficient for all of needs	147	66.8				68	37.4			
	Adequate	33	15.0				93	51.1			
	Minimal, not always adequate	16	7.3				10	5.5			
	Inadequate	24	10.9				11	6.0			
<b>29</b>	<b>What type of containers do you use for your water?</b>										
	Container with a small opening and a lid	36	17.3				75	41.7			
	Container with a small opening and no lid	14	6.7				11	6.1			
	A "jar" with a lid	19	9.1				51	28.3			
	Large tank with lid	121	58.2				13	7.2			
	Large tanks outside (cisterns)	18	8.7				30	16.7			
<b>30</b>	<b>How does a person get water from container?</b>										
	With top of container	4	2.1				8	5.0			
	Uses only spoon	2	1.0				14	8.7			
	With other utensil (cup) used	104	54.5				83	51.6			
	Only with container	0	0.0				55	34.2			
	With whatever utensil	75	39.3				1	0.6			
	With hands	6	3.1				0	0.0			

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>31 Is raw food cooked before eating?</b>										
Yes	214	97.7				149	82.3			
No	5	2.3				30	16.6			
							1.1			
<b>32 Does the person who cooks wash their hands with soap and water before preparing food?</b>										
Yes	201	92.2				141	78.8	0.41	0.014	
No	17	7.8				38	21.2			
<b>33 Can you show me how you wash your hands?</b>										
Not in agreement with request	Y	25	11.4	1.82	0.17					
	N	194	88.6			48	26.4	2.88	0.0018	*
Use only water	Y	40	18.4	2.17	0.03	*	26	14.3	1.15	0.75
	N	177	81.6				156	85.7		
Use soap with water	Y	157	72.4	0.32	0.0003	*	88	48.4	0.26	0.0003
	N	60	27.6				94	51.6		
Dry hands with clean towel	Y	144	66.4	0.45	0.0096	*	69	37.9	0.31	0.006
	N	73	33.6				113	62.1		
Dry hands with dirty towel	Y	12	5.5	0.48	0.3477		2	1.1		
	N	205	94.5				180	98.9	0.211	
Dry hands on clothing	Y	11	5.1	0.54	0.4338		16	8.8	1.91	
	N	206	94.5				166	91.2	0.839	
Air dry hands	Y	15	5.1	4.22	0.005	*	5	2.7	1.21	
	N	202	94.9				177	97.3		
<b>34 Can you show me how your children wash their hands?</b>										
Not in agreement with request	Y	48	21.9	1.20	0.6090		46	25.3	1.98	0.0470
	N	173	78.1				136	74.4		
Use only water	Y	36	17.6	2.45	0.0150	*	28	15.4	1.20	0.6680
	N	168	78.1				154	84.6		
Use soap with water	Y	128	62.7	0.42	0.0050	*	82	45.1	0.22	0.0008
	N	76	37.3				100	54.9		
Dry hands with clean towel	Y	110	53.9	0.60	0.0970	*	58	31.9	0.52	0.0570
	N	94	46.1				124	68.1		
Dry hands with dirty towel	Y	15	7.4	0.15	0.0380	*	2	1.1	1.81	0.6710
	N	189	92.6				180	98.9		
Dry hands on clothing	Y	7	3.4	0.91	0.9150		6	3.3	1.84	0.0457
	N	197	96.6				176	96.7		
Air dry hands	Y	17	8.3	6.58	0.0017	*	12	6.6	6.11	0.0030
	N	187	91.7				170	93.4		
<b>35 Is the food covered?</b>										
Yes		196	93.8	1.47	0.566		126	69.6		
No		13	6.2				55	30.4		

	Question	Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>36</b>	<b>Are the utensils covered?</b>										
	Yes	137	62.8	0.65	0.155		108	60.0	0.27	0.00004	*
	No	81	37.2				72	40.0			
<b>37</b>	<b>What type of drinks are consumed?</b>										
	Water, soup, tea or juice prepared with unboiled water	93	44.7	1.29	0.403		101	56.7			
	Water, soup, tea or juice prepared with boiled water	115	55.3				77	43.3			
<b>38</b>	<b>What do you wash your plates with?</b>										
	Water and soap	212	97.2				167	91.8			
	Water and ash	0					5	2.7			
	Only with water	5	2.3				7	3.8			
	With cloth without water	4	0.5				3	1.6			
	Not washed	0					0	0.0			
<b>39</b>	<b>Where is dirty water thrown?</b>										
	In the sewer	76	34.9				30	16.5			
	In the ditch/gutter	64	29.4				78	42.9			
	Outside on patio	78	35.8				74	40.7			
<b>40</b>	<b>The floors of the house are generally?</b>										
	Clean	171	79.2				111	61.3			
	With animal excrement	5	2.3				22	12.2			
	With organic waste (food)	10	4.6				17	9.4			
	With inorganic waste (paper)	30	13.9				31	17.1			
<b>41</b>	<b>Did you see dirty diapers during your visit?</b>										
	Yes	38	17.6	1.54	0.251		12	7.2	6.06	0.004	*
	No	178	82.4				154	92.8			
<b>42</b>	<b>Does the person being interviewed have clean hands?</b>										
	Yes	196	90.3				168	92.8			
	No	21	9.7				13	7.2			
<b>43</b>	<b>Do adults wash their hands after completing their necessities?</b>										
	Yes	210	97.2	0.2	0.04	*	160	93.0	0.37	0.095	
	No	6	2.8				12	7.0			
<b>44</b>	<b>Do children wash their hands after completing their necessities?</b>										
	Yes	174	84.9	1.07	0.873		141	83.4	0.19	0.0008	*
	No	31	15.1				28	16.6			

	Question	Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>45</b>	<b>How do adults dispose of feces?</b>										
	Toilet	59	27.2				56	30.8			
	Latrine with water	46	21.2				38	20.9			
	Latrine without water	76	35.0				58	31.9			
	Bury in hole	2	0.9				6	3.3			
	Outside without burying	34	15.7				24	13.2			
<b>46</b>	<b>How do children dispose of their feces?</b>										
	Toilet	52	25.5				56	31.1			
	Latrine with water	41	20.1				42	23.3			
	Latrine without water	58	28.4				52	28.9			
	Bury in hole	9	4.4				6	3.3			
	Outside without burying	44	21.6				24	13.3			
<b>47</b>	<b>Where does water for the flower/vegetable garden come from?</b>										
	Rainwater	23	16.4				7	4.5			
	Pipe	111	79.3				146	94.2			
	Well	1	0.7				2	1.3			
	Current	4	2.9				0	0.0			
	Canal or river	1	0.7				0	0.0			
<b>48</b>	<b>Domesticated animals are:</b>										
	Outside of house	46	21.6				61	35.9			
	Near house	53	24.9				50	29.4			
	Inside house	3	1.4				6	3.5			
	No animals	111	52.1				53	31.2			
<b>49</b>	<b>How do the surroundings of the house look?</b>										
	Clean	130	59.6				103	56.6			
	With leftover food/trash	5	2.3				27	14.8			
	With leftover paper, plastic, etc.	61	28.0				47	25.8			
	With animal excrement	20	9.2				5	2.7			
	With human excrement	2	0.9				0	0.0			
<b>50</b>	<b>How is garbage from the house disposed of?</b>										
	"Spread" outside	13	5.9				8	4.4			
	In hole without cover	11	5.0				6	3.3			
	Buried	6	2.7				5	2.7			
	Recovered/recycled	189	86.3				163	89.6			
<b>51</b>	<b>How does the community handle its solid waste?</b>										
	Not recovered/recycled	11	5.0				11	6.0			
	Recovered and buried	12	5.5				87	47.8			
	Recovered and deposited without cover	21	9.6				30	16.5			
	Recovered and burned	174	79.8				54	29.7			



Comparison Of Baseline and Final Data For Bolivia										
Diarrheal Disease Prevention Project: CUEVAS (1997) and (1998)										
This table only includes frequencies as the sample sizes (21 and 22) were too small to obtain statistical significance. Thus, odds ratio (OR) and p-values are not included.										
Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>12A</b> Has your child had the following symptoms during the last two weeks?										
Yes	10	47.6				5	22.7			
No	11	52.4				17	77.3			
Blood in stool	Y	0	0.0			0	0.0			
	N	10	100.0			5	100.0			
Watery diarrhea > 24 hours	Y	3	30.0			0	0.0			
	N	7	70.0			5	100.0			
Greater times to bathroom	Y	7	70.0			3	60.0			
	N	3	30.0			2	40.0			
Fever or feel warm	Y	9	90.0			2	40.0			
	N	1	10.0			3	60.0			
Vomiting	Y	3	30.0			1	20.0			
	N	7	70.0			4	80.0			
Stomach pain	Y	6	60.0			2	40.0			
	N	4	40.0			3	60.0			
Other (TOS)	Y	1	100.0							
	N									
<b>13A</b> What, in your opinion, are the symptoms that occur together?										
BC		1	50.0							
DE		1	50.0							
CD						1.0	50.0			
CE						1.0	50.0			
<b>14A</b> For my child, diarrheal disease is:										
A problem that occurs frequently		1.0	5.0							
A problem that occurs sometimes		2.0	10.0							
A problem that occurs once in a while		8.0	40.0			8	53.3			
A problem that occurs rarely		2.0	10.0			7	46.7			
No problem		7.0	35.0							

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>12B Has your child had the following symptoms during the last two weeks?</b>										
Yes	Y	6	66.7			4	57.1			
No	N	3	33.3			3	42.9			
Blood in stool Yes	Y	1	16.7			0	0.0			
	N	5	83.3			4	100.0			
Watery diarrhea > 24 hours	Y	2	33.3			1	25.0			
	N	4	66.7			3	75.0			
Greater times to bathroom	Y	4	66.7			1	25.0			
	N	2	33.3			3	75.0			
Fever or feel warm	Y	5	83.3			4	100.0			
	N	1	16.7			0	0.0			
Vomiting	Y	2	33.3			2	50.0			
	N	4	67.7			2	50.0			
Stomach pain	Y	3	50.0			1	25.0			
	N	3	50.0			3	75.0			
Other	Y									
	N									
<b>13B What, in your opinion, are the symptoms that occur together?</b>										
BC		1	100.0							
BCDEF						1.0	50.0			
CD						1.0	50.0			
<b>14B For my child, diarrheal disease is:</b>										
A problem that occurs frequently		2	22.2			1	14.3			
A problem that occurs sometimes		2	22.2			0	28.6			
A problem that occurs once in a while		3	33.3			2	0.0			
A problem that occurs rarely		0	0.0			4	57.1			
No problem		2	22.2			0	0.0			
<b>12C Has your child had the following symptoms during the last two weeks?</b>										
Yes	Y	2	100.0			1	50.0			
No	N	0	0.0			1	50.0			
Blood in stool Yes	Y	0	0.0			1	100.0			
	N	2	100.0			0	0.0			
Watery diarrhea > 24 hours	Y	0	0.0			1	100.0			
	N	2	100.0			0	0.0			

Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Greater times to bathroom	Y	0	0.0				1	100.0			
	N	2	100.0				0	0.0			
Fever or feel warm	Y	2	100.0				0	0.0			
	N	0	0.0				1	100.0			
Vomiting	Y	0	0.0				0	0.0			
	N	2	100.0				1	100.0			
Stomach pain	Y	1	50.0				1	100.0			
	N	1	50.0				0	0.0			
Other	Y										
	N										
<b>13C</b>	<b>What, in your opinion, are the symptoms that occur together?</b>										
	NA										
<b>14C</b>	<b>For my child, diarrheal disease is:</b>										
	A problem that occurs frequently	0					0				
	A problem that occurs sometimes	1	50				0				
	A problem that occurs once in a while	1	50				1	50			
	A problem that occurs rarely	0					1	50			
	No problem	0					0				
<b>15A</b>	<b>This child was treated at:</b>										
Home	Y	12	80.0				2	66.7			
	N	3	20.0				1	33.3			
Traditional healer	Y	1	6.7				0	0.0			
	N	14	93.3				3	100.0			
Health center	Y	5	33.3				0	0.0			
	N	10	67.6				3	100.0			
Hospital	Y	2	13.3				1	33.3			
	N	13	86.7				2	66.7			
Doctor	Y	2	13.3				0	0.0			
	N	13	86.7				3	100.0			
Not treated	Y	1	6.7				0	0.0			
	N	14	93.3				3	100.0			
<b>16A</b>	<b>The treatment included:</b>										
Drink salt solution	Y	1	6.7				2	66.7			
	N	14	93.3				1	33.3			
IV	Y	1	6.7				0	0.0			
	N	14	93.3				3	100.0			
Tablets, capsules, etc.	Y	10	66.7				0	0.0			
	N	5	33.3				3	100.0			
Home remedies	Y	10	66.7				1	33.3			
	N	5	33.3				2	66.7			
Other (diarrhea, no answer, rice water, chamomile tea, small tablets)	Y	1	100.0								
	N										

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>17A My child was treated and:</b>										
Recovered	14	93.3				3.0	100.0			
Continued to be sick	1	6.7				0.0				
Died										
<b>15B This child was treated at:</b>										
Home	Y	4	50.0			1	100.0			
	N	4	50.0			0	0.0			
Traditional healer	Y	1	12.5			0	0.0			
	N	7	87.5			1	100.0			
Health center	Y	4	50.0			1	100.0			
	N	4	50.0			0	0.0			
Hospital	Y	2	25.0			0	0.0			
	N	6	75.0			1	100.0			
Doctor	Y	1	12.5			0	0.0			
	N	7	87.5			1	100.0			
Not treated	Y	1	12.5			0	0.0			
	N	7	87.5			1	100.0			
<b>16B The treatment included:</b>										
Drink salt solution	Y	2.0	25.0			1	100.0			
	N	6.0	75.0			0	0.0			
IV	Y	2.0	25.0			1	100.0			
	N	6.0	75.0			0	0.0			
Tablets, capsules, etc.	Y	8.0	100.0			1	100.0			
	N	0.0	0.0			0	0.0			
Home remedies	Y	5.0	62.5			0	0.0			
	N	3.0	37.5			1	100.0			
Other	Y	1.0	100.0							
	N									
<b>17B My child was treated and:</b>										
Recovered		6	75.0			0	0.0			
Continued to be sick		2	25.0			1	100.0			
Died										
<b>15C This child was treated at:</b>										
Home	Y	0	0.0			1	100.0			
	N	2	100.0			0	0.0			
Traditional healer	Y	0	0.0			0	0.0			
	N	2	100.0			1	100.0			
Health center	Y	0	0.0			0	0.0			
	N	2	100.0			1	100.0			
Hospital	Y	0	0.0			0	0.0			
	N	2	100.0			1	100.0			
Doctor	Y	0	0.0			0	0.0			
	N	2	100.0			1	100.0			
Not treated	Y	0	0.0			0	0.0			
	N	2	100.0			1	100.0			
<b>16C The treatment included:</b>										
Drink salt solution	Y	1	50.0			0	0.0			
	N	1	50.0			1	100.0			
IV	Y	0	0.0			0	0.0			
	N	2	100.0			1	100.0			

Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Tablets, capsules, etc.	Y	2	100.0				0	0.0			
	N	0	0.0				1	100.0			
Home remedies	Y	1	50.0				1	100.0			
	N	1	50.0				0	0.0			
Other	Y										
	N										
<b>17C My child was treated and:</b>											
Recovered		2	100.0				1	100.0			
Continued to be sick		0	0.0				0	0.0			
Died											
<b>18 Have you lost one or more days of work taking care of a child/children sick with</b>											
Yes		8	72.7				3	37.5			
No		3	27.3				5	62.5			
<b>19 If "yes", how many days?</b>											
1		1	12.5				1	33.3			
2		2	25.0				1	33.3			
3		3	37.5				0	0.0			
6		1	12.5				0	0.0			
8		1	12.5				0	0.0			
<b>20 What do you think causes your children to get sick with diarrhea?</b>											
Eating something bad		6	28.6				1	9.1			
Because of cold temperatures		0	0				2	9.1			
Because of infections		1	4.8				0	0.0			
Because of dirty conditions		1	4.8				6	27.3			
Poor food		3	14.3				2	9.1			
Neglect of mother		1	4.8				4	18.2			
Eating paper		1	4.8				0	0.0			
Don't know		3	14.3				0	0.0			
<b>21 What can be done to keep your children from getting diarrhea?</b>											
Cuidarlos bien		7	33.3				7	31.8			
Don't know		3	14.3				1	4.5			
Clean		1	4.8				9	40.9			
Wash food		5	23.8				3	13.6			
Home remedies		1	4.8				0	0.0			
Get doctor		1	4.8				0	0.0			
Hygiene		0	0.0				1	4.5			

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>22 Do you think that diarrhea can be prevented?</b>										
Yes	18	85.7				21	95.5			
No	3	14.3				1	4.5			
<b>23 How? (How do you think DD can be prevented?)</b>										
Boil and cover water	Y 10	55.6				8	38.1			
	N 8	44.4				13	61.9			
Keep clean house	Y 7	38.9				9	42.9			
	N 11	61.1				12	57.0			
Mother washes hands	Y 14	77.8				14	66.7			
	N 4	22.2				7	33.3			
Child washes hands	Y 14	77.8				9	42.9			
	N 4	22.2				12	57.1			
Wash utensils	Y 3	16.7				7	33.3			
	N 15	83.3				14	67.7			
Wash fruits and vegetables	Y 6	33.3				5	23.8			
	N 12	66.7				16	76.2			
Watch what you eat	Y 14	77.8				12	57.1			
	N 4	22.2				9	42.9			
<b>24 Do you think handwashing is important?</b>										
Yes	17	85.0				22	100.0			
No	1	5.0				0	0.0			
Don't know	2	10.0								
<b>25 When do you wash your hands?</b>										
Before eating	Y 19	100.0				20	90.9			
	N 0	0.0				2	9.1			
Before cooking	Y 17	89.5				18	81.8			
	N 2	10.5				4	18.2			
After going to the bathroom	Y 19	100.0				21	95.5			
	N 0	0.0				1	4.5			
Before breastfeeding	Y 3	15.8				2	9.1			
	N 16	84.2				20	90.9			
After changing diapers	Y 7	36.8				5	22.7			
	N 12	63.2				17	77.3			
Other	Y 0	0.0				0	0.0			
	N 19	100.0				22	100.0			
<b>26 What do you think are other things that can be done to prevent your children from</b>										
Keep animals outside house	Y 8	44.4				12.0	54.5			
	N 10	55.6				10.0	45.4			
Construct pen for animals	Y 3	16.7				1.0	4.5			
	N 15	83.3				21.0	95.5			
Construct better kitchen	Y 4	22.2				1.0	4.5			
	N 14	77.8				21.0	95.5			
Have potable water (grifo)	Y 10	55.6				0.0	0.0			
	N 8	44.4				22.0	100.0			
Construct bathroom	Y 5	27.8				1.0	4.5			
	N 13	72.2				21.0	95.5			

Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Make it easier for children to use bathroom	Y	2	11.1				0.0	0.0			
	N	16	88.9				22.0	100.0			
Supervise and encourage children in use of bathroom	Y	3	16.7				3.0	13.6			
	N	15	83.3				19.0	86.4			
Keep flies from food	Y	11	61.1				11.0	50.0			
	N	7	38.9				11.0	50.0			
Make sure children wash hands after defecating and after eating	Y	3	16.7				5.0	22.7			
	N	15	83.3				17.0	77.3			
Keep drinking water covered	Y	4	22.2				1.0	4.5			
	N	14	77.8				21.0	95.5			
Keep flies from utensils	Y	8	44.4				5	22.7			
	N	10	55.6				17	77.3			
Clean trash inside/outside house	Y	12	66.7				17	77.3			
	N	6	33.3				5	22.7			
Change what children eat	Y	2	11.1				1	4.5			
	N	16	88.9				21	95.5			
Other	Y	0	0.0				0	0.0			
	N	18	100.0				22	100.0			
<b>27</b>	<b>Where does the water come from that is used for drinking and cooking?</b>										
	From treated pipe water	18	85.7				16	72.7			
	From well	2	9.5				0	0.0			
	from untreated pipe water	0	0.0				6	27.3			
	From river/canal	1	4.8				0	0.0			
<b>28</b>	<b>How would you describe the quantity of water that you use?</b>										
	More than sufficient for all of needs	12	57.1				13	59.1			
	Adequate	3	14.3				3	13.6			
	Minimal, not always adequate	4	19.0				5	22.7			
	Inadequate	2	9.5				1	4.5			
<b>29</b>	<b>What type of containers do you use for your water?</b>										
	Container with a small opening and a lid	3	15.0				10	45.5			
	Container with a small opening and no lid	5	25.0				7	31.8			
	A "jar" with a lid	5	25.0				3	13.6			
	Large tank with lid	4	20.0				2	9.1			
	Large tanks outside (cisterns)	3	15.0				0	0.0			
<b>30</b>	<b>How does a person get water from container?</b>										
	With top of container	2	9.5				9	40.9			
	Uses only spoon	0	0.0				0	0.0			
	With other utensil (cup) used	14	66.7				12	54.5			
	Only with container										
	With whatever utensil	4	19.0				1	4.5			
	With hands	1	4.8				0	0.0			
<b>31</b>	<b>Is raw food cooked before eating?</b>										
	Yes	20	95.2				22	100.0			

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
No	1	4.8				0	0.0			
<b>32 Does the person who cooks wash their hands with soap and water before preparing food?</b>										
Yes	20	95.2				21	95.5			
No	1	4.8				1	4.5			
<b>33 Can you show me how you wash your hands?</b>										
Not in agreement with request	Y	9	42.9			1	4.5			
	N	12	57.1			21	95.5			
Use only water	Y	5	25.0			13	59.1			
	N	15	75.0			9	40.9			
Use soap with water	Y	6	30.0			13	59.1			
	N	14	70.0			9	40.9			
Dry hands with clean towel	Y	4	20.0			5	22.7			
	N	16	80.0			17	77.3			
Dry hands with dirty towel	Y	4	20.0			2	9.1			
	N	16	80.0			20	90.9			
Dry hands on clothing	Y	4	10.0			2	9.1			
	N	16	90.0			20	90.9			
Air dry hands	Y	2	10.0			5	22.7			
	N	18	90.0			17	77.3			
<b>34 Can you show me how your children wash their hands?</b>										
Not in agreement with request	Y	13	61.9			17	77.3			
	N	8	38.1			5	22.7			
Use only water	Y	6	30.0			0	0.0			
	N	14	70.0			22	100.0			
Use soap with water	Y	2	10.0			5	22.7			
	N	18	90.0			17	77.3			
Dry hands with clean towel	Y	1	5.0			3	13.6			
	N	19	95.0			19	86.4			
Dry hands with dirty towel	Y	1	5.0			0	0.0			
	N	19	95.0			22	100.0			
Dry hands on clothing	Y	3	15.0			2	9.1			
	N	17	85.0			20	90.9			
Air dry hands	Y	1	5.0			0	0.0			
	N	19	95.0			22	100.0			
<b>35 Is the food covered?</b>										
Yes		15	71.4			11	50.0			
No		6	28.6			11	50.0			



	Question	Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>36</b>	<b>Are the utensils covered?</b>										
	Yes	3	71.4				8	36.4			
	No	17	28.6				14	63.6			
<b>37</b>	<b>What type of drinks are consumed?</b>										
	Water, soup, tea or juice prepared with unboiled water	15	71.4				12	54.5			
	Water, soup, tea or juice prepared with boiled water	6	28.6				10	45.5			
<b>38</b>	<b>What do you wash your plates with?</b>										
	Water and soap	16	76.2				21	95.5			
	Water and ash	3	14.3				0	0.0			
	Only with water	1	4.8				1	4.5			
	With cloth without water	1	4.8				0	0.0			
	Not washed	1	4.8				0	0.0			
<b>39</b>	<b>Where is dirty water thrown?</b>										
	In the sewer	0	0.0				0	0.0			
	In the ditch/gutter	1	4.8				4	18.2			
	Outside on patio	20	95.2				18	81.8			
<b>40</b>	<b>The floors of the house are generally?</b>										
	Clean	2	9.5				11	50.0			
	With animal excrement	2	9.5				1	4.5			
	With organic waste (food)	6	28.6				0	0.0			
	With inorganic waste (paper)	11	52.4				10	45.5			
<b>41</b>	<b>Did you see dirty diapers during your visit?</b>										
	Yes	8	40.0				2	9.1			
	No	12	60.0				20	90.9			
<b>42</b>	<b>Does the person being interviewed have clean hands?</b>										
	Yes	18	85.7				20	90.9			
	No	3	14.3				2	9.1			
<b>43</b>	<b>Do adults wash their hands after completing their necessities?</b>										
	Yes	18	85.7				22	100.0			
	No	3	14.3				0	0.0			

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>44 Do children wash their hands after completing their necessities?</b>										
Yes	13	61.9				18	81.8			
No	8	38.1				4	18.2			
<b>45 How do adults dispose of feces?</b>										
Toilet	0	0.0				0	0.0			
Latrine with water	8	38.1				18	81.8			
Latrine without water	5	23.8				1	4.5			
Bury in hole	0	0.0				0	0.0			
Outside without burying	8	38.1				3	13.6			
<b>46 How do children dispose of their feces?</b>										
Toilet	0	0.0				0	0.0			
Latrine with water	3	14.3				16	72.7			
Latrine without water	2	9.5				1	4.5			
Bury in hole	0	0.0				0	0.0			
Outside without burying	16	76.2				5	22.7			
<b>47 Where does water for the flower/vegetable garden come from?</b>										
Rainwater	3	15.8				6	27.3			
Pipe	10	52.6				12	54.5			
Well	0	0.0				1	4.5			
Current	1	5.3				1	4.5			
Canal or river	5	26.3				2	9.1			
<b>48 Domesticated animals are:</b>										
Outside of house	4	20.0				9	40.9			
Near house	12	60.0				7	31.8			
Inside house	2	10.0				3	13.6			
No animals	2	10.0				3	13.6			
<b>49 How do the surroundings of the house look?</b>										
Clean	0	0.0				10	45.5			
With leftover food/trash	2	9.5				1	4.5			
With leftover paper, plastic, etc.	13	65.0				9	40.9			
With animal excrement	6	30.0				2	9.1			
With human excrement	0	0.0				0	0.0			
<b>50 How is garbage from the house disposed of?</b>										
"Spread" outside	13	61.9				3	13.6			
In hole without cover	0	0.0				3	13.6			
Buried	1	4.7				2	9.1			
Recovered/recycled	7	33.3				14	63.6			
Other	0	0.0				0	0.0			
<b>51 How does the community handle its solid waste?</b>										
Not recovered/recycled	16	80.0				17	77.3			
Recovered and buried	0	0.0				0	0.0			
Recovered and deposited without cover	0	0.0				0	0.0			
Recovered and burned	4	20.0				5	22.7			

Comparison Of Baseline and Final Data For Bolivia											
Diarrheal Disease Prevention Project: MAIRANA (1997) and (1998)											
Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>12A</b>	<b>Has your child had the following symptoms during the last two weeks?</b>										
	Yes	32	41.0	26.80	0.0001	*	26	32.1			
	No	46	59.0				55	67.9			
	Blood in stool Yes	Y 8	25.0		0.0410	*	4	15.4		0.00001	
		N 24	75.0				22	84.6			
	Watery diarrhea > 24 hours	Y 22	68.8		0.0002	*	15	57.7		0.03100	*
		N 10	31.3				11	42.3			
	Greater times to bathroom	Y 13	40.6	3.21	0.1840		5	57.7	0.42	0.50900	
		N 19	59.4				21	42.3			
	Fever or feel warm	Y 25	78.1	1.03	0.9760		13	50.0	2.18	0.53900	
		N 7	21.9				13	50.0			
	Vomiting	Y 11	34.4	6.15	0.0830		4	15.4		0.43200	
		N 21	65.6				22	84.6			
	Stomach pain	Y 20	62.5	1.50	0.6110		11	42.3	1.54	0.73700	
		N 12	37.5				15	57.7			
	Other (Bronchitis, headache)	Y 2	6.3								
		N									
<b>13A</b>	<b>What, in your opinion, are the symptoms that occur together?</b>										
	ABC	1	4.8								
	ABCD	4	4.8								
	ABCDEF	1	19.0								
	ABDCEF	1	4.8								
	ABF	0	4.8								
	ADCF	0	4.8								
	BD	1	4.8				1	12.5			
	BDF	1	4.8								
	BF	3	14.3				1	12.5			
	CD	1	4.8				1	12.5			
	DF	0	4.8				1	12.5			
	CDE	1	4.8								
	CE	2	9.5								
	CF	0	4.8								
	AF						1	12.5			
	BC						1	12.5			
	CB						1	12.5			
	DF						1	12.5			
<b>14A</b>	<b>For my child, diarrheal disease is:</b>										
	A problem that occurs frequently	12	15.4				2	4.7			
	A problem that occurs sometimes	7	9.0				1	2.3			
	A problem that occurs once in a while	49	62.8				29	67.4			
	A problem that occurs rarely	8	10.3				10	23.3			
	No problem	2	2.6				1	2.3			

Question		Baseline (1997)					Final (1998)					
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.	
<b>12B</b>	<b>Has your child had the following symptoms during the last two weeks?</b>											
	Yes	Y	12	54.5	11.67	0.011	*	8	42.1	8.0	0.0390	*
	No	N	10	45.5				11	57.9			
	Blood in stool Yes	Y	4	33.3		0.027		3	37.5		0.2050	
		N	8	66.7				5	62.5			
	Watery diarrhea > 24 hours	Y	8	66.7		0.028		2	25.0		0.3450	
		N	4	33.3				6	75.0			
	Greater times to bathroom	Y	6	50.0		0.121		3	37.5		0.2050	
		N	6	50.0				5	62.5			
	Fever or feel warm	Y	11	91.7		0.019		4	50.0	1.0	1.0000	
		N	1	8.3				4	50.0			
	Vomiting	Y	6	50.0	1.00	1.000		0	0.0			
		N	6	50.0				8	100.0			
	Stomach pain	Y	7	58.3		0.066		2	25.0	0.2	0.3	
		N	5	41.7				6	75.0			
	Other	Y	2	100.0								
		N										
<b>13B</b>	<b>What, in your opinion, are the symptoms that occur together?</b>											
	ABDCEF		2	28.6								
	ACDF		1	14.3								
	BCD		1	14.3								
	BCDEF		1	14.3								
	BCDF		1	14.3								
	DF		1	14.3								
	AB							1	50.0			
	CF							1	50.0			
<b>14B</b>	<b>For my child, diarrheal disease is:</b>											
	A problem that occurs frequently		4	18.2				2	16.7			
	A problem that occurs sometimes		3	13.6				0	0.0			
	A problem that occurs once in a while		12	54.5				9	75.0			
	A problem that occurs rarely		3	13.6				0	0.0			
	No problem		0	0.0				1	8.3			
<b>12C</b>	<b>Has your child had the following symptoms during the last two weeks?</b>											
	Yes	Y	0	0.0				0	0.0			
	No	N	2	100.0				2	100.0			
	Blood in stool Yes	Y										
		N										
	Watery diarrhea > 24 hours	Y										
		N										

Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Greater times to bathroom	Y										
	N										
Fever or feel warm	Y										
	N										
Vomiting	Y										
	N										
Stomach pain	Y										
	N										
Other	Y										
	N										
<b>13C</b>	<b>What, in your opinion, are the symptoms that occur together?</b>										
	NA										
<b>14C</b>	<b>For my child, diarrheal disease is:</b>										
	A problem that occurs frequently	0	0.0				0	0.0			
	A problem that occurs sometimes	0	0.0				0	0.0			
	A problem that occurs once in a while	0	0.0				0	0.0			
	A problem that occurs rarely	1	50.0				1	100.0			
	No problem	1	50.0				0	0.0			
<b>15A</b>	<b>This child was treated at:</b>										
	Home	Y	14	42.4	0.480	0.349	4	17.4	0.56	0.658	
		N	19	57.6			19	82.6			
	Traditional healer	Y	3	9.1	0.150	0.108	0	0.0			
		N	30	90.9			23	100.0			
	Health center	Y	18	54.5	3.330	0.133	2	8.7	0.17	0.209	
		N	15	45.5			21	91.3			
	Hospital	Y	1	3.0		0.534	16	69.6	11.25	0.033	*
		N	32	97.0				30.4			
	Doctor	Y	1	3.0		0.534	2	8.7	0.17	0.203	
		N	32	97.0			21	91.3			
	Not treated	Y	0	0.0			0	0.0			
		N	33	100.0			23	100.0			
<b>16A</b>	<b>The treatment included:</b>										
	Drink salt solution	Y	10	30.3		0.0200	9	39.1		0.1	
		N	23	69.7			14	60.9			
	IV	Y	0	0.0			0	0.0			
		N	33	100.0			23	100.0			
	Tablets, capsules, etc.	Y	24	72.7	14.00	*	20	87.0	0.0	0.4	
		N	9	27.3			3	13.0			
	Home remedies	Y	10	30.3	0.10	0.0053	2	8.7		0.5	
		N	23	69.7			21	91.3			
	Other (diarrhea, no answer, rice water, chamomile tea, small tablets)	Y	6	85.7	0.0	0.0081	1	33.3			
		N	1	14.3			1	33.3			
							1	33.3			

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>17A My child was treated and:</b>										
Recovered	25	73.5	1.58	0.586		21	91.3	0.00	0.497	
Continued to be sick	9	26.5				2	8.7			
Died										
<b>15B This child was treated at:</b>										
Home	Y	3	30.0		0.107	1	14.3		0.659	
	N	7	70.0			6	85.7			
Traditional healer	Y	1	10.0		0.725	0	0.0			
	N	9	90.0			7	100.0			
Health center	Y	9	90.0		0.002	0	0.0			
	N	1	10.0			7	100.0			
Hospital	Y	0	0.0			6	85.7		0.659	
	N	2	100.0			1	14.3			
Doctor	Y	0	0.0			0	0.0			
	N	2	100.0			7	100.0			
Not treated	Y	0	0.0			0	0.0			
	N	2	100.0			7	100.0			
<b>16B The treatment included:</b>										
Drink salt solution	Y	2	20.0		0.5980	3	42.9		0.349	
	N	8	80.0			4	57.1			
IV	Y	1	10.0		0.7250	0	0.0			
	N	9	90.0			7	100.0			
Tablets, capsules, etc.	Y	9	90.0		0.0015	6	85.7	0.0	0.349	
	N	1	10.0			1	14.3			
Home remedies	Y	3	30.0		0.1070	0	0.0			
	N	7	70.0			1	100.0			
Other	Y	1	100.0							
	N									
<b>17B My child was treated and:</b>										
Recovered		8	80.0	0.0	0.598	7	100.0			
Continued to be sick		2	20.0			0	0.0			
Died										
<b>15C This child was treated at:</b>										
Home	Y	0	0.0							
	N	1	100.0							
Traditional healer	Y	0	0.0							
	N	1	100.0							
Health center	Y	0	0.0							
	N	1	100.0							
Hospital	Y	1	100.0							
	N	0	0.0							
Doctor	Y	0	0.0							
	N	1	100.0							
Not treated	Y	0	0.0							
	N	1	100.0							
<b>16C The treatment included:</b>										
Drink salt solution	Y	0	0.0							
	N	1	100.0							
IV	Y	0	0.0							
	N	1	100.0							

Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Tablets, capsules, etc.	Y	1	100.0								
	N	0	0.0								
Home remedies	Y	1	100.0								
	N	0	0.0								
Other	Y										
	N										
<b>17C</b>	<b>My child was treated and:</b>										
	Recovered	1	100.0								
	Continued to be sick	0	0.0								
	Died										
<b>18</b>	<b>Have you lost one or more days of work taking care of a child/children sick with diarrhea?</b>										
	Yes	27	77.1	5.75	0.0370	*	13	27.7	3.35	0.068	
	No	8	22.9				34	72.3			
<b>19</b>	<b>If "yes", how many days?</b>										
	1	0	0.0				2	15.4			
	2	3	11.1				5	38.5			
	3	6	22.2				1	7.7			
	4	2	7.4				2	15.4			
	5	1	3.7				0	0.0			
	6	1	3.7				0	0.0			
	7	6	22.2				2	15.4			
	8	0	0.0				0	0.0			
	10	0	0.0				0	0.0			
	14	6	22.2				0	0.0			
	15	1	3.7				1	7.7			
	20	0	0.0								
	30	1	3.7								
<b>20</b>	<b>What do you think causes your children to get sick with diarrhea?</b>										
	Eating something bad	21	26.9				5	6.3			
	Because of cold temperatures	1	1.3				1	1.3			
	Because of infections	17	21.8				5	6.3			
	Because of dirty conditions	6	7.7				16	20.0			
	Poor food	6	7.7				3	3.8			
	Neglect of mother	3	3.8				21	26.3			
	Eating paper	2	8.7				0	0.0			
	Don't know	15	19.2				7	8.8			
<b>21</b>	<b>What can be done to keep your children from getting diarrhea?</b>										
	Cuidarlos bien	31	39.7				23	29.1			
	Don't know	11	14.1				10	12.7			
	Clean	26	33.3				17	21.5			
	Wash food	7	9.0				0	0.0			
	Home remedies	1	1.3				4	5.1			
	Get doctor	1	1.3				3	3.8			
	Hygiene						9	11.4			

	Question	Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>22</b>	<b>Do you think that diarrhea can be prevented?</b>										
	Yes	60	76.9	0.32	0.033	*	70	86.4	1.22	0.781	
	No	18	23.1				11	13.6			
<b>23</b>	<b>How? (How do you think DD can be prevented?)</b>										
	Boil and cover water	Y	35	58.3	3.10	0.073		49	70.0	1.21	0.736
		N	25	46.7				21	30.0		
	Keep clean house	Y	32	53.3	0.98	0.969		51	72.9	0.71	0.551
		N	28	46.7				19	27.1		
	Mother washes hands	Y	15	25.0	0.13	0.031	*	44	62.9	0.60	0.329
		N	45	75.0				26	37.1		
	Child washes hands	Y	23	38.3	1.18	0.775		33	47.1	0.91	0.848
		N	37	61.7				37	52.9		
	Wash utensils	Y	5	8.3	1.78	0.545		24	34.3	3.60	0.015
		N	55	91.7				46	65.7		
	Wash fruits and vegetables	Y	27	45.0	0.91	0.708		37	52.9	1.10	0.848
		N	33	55.0				33	47.1		
	Watch what you eat	Y	33	58.3	0.74	0.594		31	44.3	1.07	0.893
		N	24	41.7				39	55.7		
<b>24</b>	<b>Do you think handwashing is important?</b>										
	Yes	75	96.2	1.06	0.962		79	97.5		0.338	
	No	3	3.8				2	2.5			
	Don't know										
<b>25</b>	<b>When do you wash your hands?</b>										
	Before eating	Y	77	98.7		0.4630		75	92.6	2.35	0.433
		N	1	1.3				6	7.4		
	Before cooking	Y	31	39.7	1.35	0.5370		39	48.1	1.58	0.344
		N	47	60.3				42	51.9		
	After going to the bathroom	Y	67	85.9	2.68	0.2160		64	79.0	2.44	0.184
		N	11	14.1				17	21.0		
	Before breastfeeding	Y	3	3.8	0.94	0.9620		31	38.3	1.41	0.478
		N	75	96.2				50	61.7		
	After changing diapers	Y	5	6.4	1.28	0.7930		27	33.3	1.53	0.395
		N	73	93.6				54	66.7		
	Other	Y	2	2.6	1.92	0.643		2	2.5	0.00	0.338
		N	76	97.4				79	97.5		
<b>26</b>	<b>What do you think are other things that can be done to prevent your children from getting sick?</b>										
	Keep animals outside house	Y	8	10.5	0.25	0.17		32	39.5	2.69	0.040
		N	68	89.5				49	60.5		
	Construct pen for animals	Y	8	10.5	1.17	0.83		27	33.3	0.92	0.864
		N	68	89.5				54	67.7		
	Construct better kitchen	Y	29	38.2	1.66	0.3		15	18.5	1.65	0.396
		N	47	61.8				66	81.5		
	Have potable water (grifo)	Y	4	5.3	6.39	0.077		15	18.5	3.29	0.036
		N	72	94.7				66	81.5		
	Construct bathroom	Y	45	59.2	1.16	0.765		26	32.1	0.76	0.597
		N	31	40.8				55	67.9		



Question		Baseline (1997)					Final (1998)				
		#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
Make it easier for children to use bathroom	Y	4	5.3	6.39	0.077		20	24.7	1.29	0.644	
	N	72	94.7				61	75.3			
Supervise and encourage children in use of bathroom	Y	2	2.6	1.96	0.633		21	25.9	1.56	0.404	
	N	74	97.4				60	74.1			
Keep flies from food	Y	12	15.8	0.33	0.162		33	40.7	0.96	0.923	
	N	64	84.2				48	59.3			
Make sure children wash hands after defecating and after eating	Y	43	56.6	1.07	0.887		20	24.7	0.95	0.923	
	N	33	43.4				61	75.3			
Keep drinking water covered	Y	3	3.9	4.08	0.226		29	35.8	0.60	0.327	
	N	73	96.1				52	64.2			
Keep flies from utensils	Y	13	17.1	1.25	0.722		36	44.4	0.77	0.590	
	N	63	82.9				45	55.6			
Clean trash inside/outside house	Y	48	63.2	0.43	0.086		49	60.5	0.76	0.580	
	N	28	36.8				32	39.5			
Change what children eat	Y	29	38.2	1.02	0.968		7	8.6	3.37	0.115	
	N	47	61.8				74	91.4			
Other	Y	76	100.0				81	100.0			
	N										
<b>27</b>	<b>Where does the water come from that is used for drinking and cooking?</b>										
	From treated pipe water	37	47.4				26	32.1			
	From well	0	0.0				0	0.0			
	From untreated pipe water	40	51.3				55	67.9			
	From river/canal	0	0.0				0	0.0			
<b>28</b>	<b>How would you describe the quantity of water that you use?</b>										
	More than sufficient for all of needs	27	34.6				16	19.8			
	Adequate	41	52.6				59	72.8			
	Minimal, not always adequate	5	6.4				5	6.2			
	Inadequate	5	6.4				1	1.2			
<b>29</b>	<b>What type of containers do you use for your water?</b>										
	Container with a small opening and a lid	10	13.0				13	16.0			
	Container with a small opening and no lid	4	5.2				4	4.9			
	A "jar" with a lid	31	40.3				45	55.6			
	Large tank with lid	6	7.8				5	6.2			
	Large tanks outside (cisterns)	26	33.8				14	17.3			
<b>30</b>	<b>How does a person get water from container?</b>										
	With top of container	1	1.5				8	10.7			
	Uses only spoon	5	7.5				8	10.7			
	With other utensil (cup) used	31	46.3				18	24.0			
	Only with container										
	With whatever utensil	30	44.8				29	38.7			
	With hands	0	0.0				12	16.0			

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>31</b>	<b>Is raw food cooked before eating?</b>									
Yes	75	96.2	1.06	0.962		74	91.4	0.3	0.115	
No	3	3.8				7	8.6			
<b>32</b>	<b>Does the person who cooks wash their hands with soap and water before preparing food?</b>									
Yes	67	85.9	0.59	0.414		61	75.3	0.3	0.115	
No	11	14.1				20	24.7			
<b>33</b>	<b>Can you show me how you wash your hands?</b>									
Not in agreement with request	Y	35	44.9	0.97	0.955	8	9.9		0.046	
	N	43	55.1			73	90.1			
Use only water	Y	16	20.5	1.17	0.785	41	50.6	1.3	0.598	
	N	62	79.5			40	49.4			
Use soap with water	Y	31	39.7	0.84	0.722	29	35.8	1.3	0.598	
	N	47	60.3			52	64.2			
Dry hands with clean towel	Y	16	20.5	0.57	0.364	15	18.5	1.65	0.396	
	N	62	79.5			66	81.5			
Dry hands with dirty towel	Y	1	1.3	0.00	0.463	2	2.5	2.29	0.553	
	N	77	98.7			79	97.5			
Dry hands on clothing	Y	6	7.7	4.26	0.085	1	1.2		0.132	
	N	72	92.3			80	98.8			
Air dry hands	Y	17	21.8	1.44	0.520	3	3.7	1.13	0.924	
	N	61	78.2			78	96.3			
<b>34</b>	<b>Can you show me how your children wash their hands?</b>									
Not in agreement with request	Y	41	52.6	1.51	0.3880	15	18.5	0.78	0.6960	
	N	37	47.4			66	81.5			
Use only water	Y	20	25.6	0.38	0.1110	46	56.8	1.21	0.6960	
	N	58	74.4			35	43.2			
Use soap with water	Y	19	24.4	1.14	0.8140	15	18.5	1.15	0.8180	
	N	59	75.6			66	81.5			
Dry hands with clean towel	Y	10	12.8	0.79	0.7420	15	18.5	1.15	0.8180	
	N	68	87.2			66	81.5			
Dry hands with dirty towel	Y	0	0.0			5	6.2	0.54	0.5870	
	N	78	100.0			76	93.8			
Dry hands on clothing	Y	10	12.8	0.79	0.7420	5	6.2	1.54	0.6470	
	N	68	87.2			76	93.8			
Air dry hands	Y	16	20.5	1.17	0.7850	0	0.0			
	N	62	79.5			81	100.0			
<b>35</b>	<b>Is the food covered?</b>									
Yes		30	38.5	0.71	0.498	40	54.1			
No		48	61.5			33	44.6			
Don't know						1	1.4			

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>36</b>	<b>Are the utensils covered?</b>									
Yes	20	25.6	0.38	0.111		30	40.5			
No	58	74.4				43	58.1			
Don't know						1	1.4			
<b>37</b>	<b>What type of drinks are consumed?</b>									
Water, soup, tea or juice prepared with unboiled water	53	67.9	1.56	0.398		51	63.0	3.23	0.033 *	
Water, soup, tea or juice prepared with boiled water	25	32.1				30	37.0			
<b>38</b>	<b>What do you wash your plates with?</b>									
Water and soap	59	75.6				65	79.0			
Water and ash	0	0.0				2	2.5			
Only with water	17	21.8				13	16.0			
With cloth without water	0	0.0				1	1.2			
Not washed	2	2.6				1	1.2			
<b>39</b>	<b>Where is dirty water thrown?</b>									
In the sewer	3	3.8				3	3.7			
In the ditch/gutter	2	2.6				19	23.5			
Outside on patio	73	93.6				59	72.8			
<b>40</b>	<b>The floors of the house are generally?</b>									
Clean	19	24.4				48	59.3			
With animal excrement	2	2.6				15	19.8			
With organic waste (food)	13	16.7				11	13.6			
With inorganic waste (paper)	44	56.4				6	7.4			
<b>41</b>	<b>Did you see dirty diapers during your visit?</b>									
Yes	14	17.9	4.6	0.009 *		6	7.4	1.13	0.891	
No	64	82.1				75	92.6			
<b>42</b>	<b>Does the person being interviewed have clean hands?</b>									
Yes	58	74.4	0.17	0.0009 *		63	77.8	0.63	0.403	
No	20	25.6				18	22.2			
<b>43</b>	<b>Do adults wash their hands after completing their necessities?</b>									
Yes	67	85.9	0.91	0.895		73	91.3	2.94	0.31	
No	11	14.1				7	8.8			
<b>44</b>	<b>Do children wash their hands after completing their necessities?</b>									
Yes	49	67.1	0.47	0.144		59	76.6	0.81	0.713	
No	24	32.9				18	23.4			

Question	Baseline (1997)					Final (1998)				
	#	%	OR	p value	Sign.	#	%	OR	p value	Sign.
<b>45 How do adults dispose of feces?</b>										
Toilet	4	5.2				7	8.8			
Latrine with water	18	23.4				26	32.5			
Latrine without water	29	37.7				34	42.5			
Bury in hole	1	1.3				0	0.0			
Outside without burying	25	32.5				13	16.3			
<b>46 How do children dispose of their feces?</b>										
Toilet	3	4.2				7	8.8			
Latrine with water	16	22.2				27	33.8			
Latrine without water	21	29.2				29	36.3			
Bury in hole	0	0.0				0	0.0			
Outside without burying	32	44.4				17	21.3			
<b>47 Where does water for the flower/vegetable garden come from?</b>										
Rainwater	15	36.6	0.82	0.78		12	16.9			
Pipe	26	63.4				58	81.7			
Well	0	0.0				1	1.4			
Current	0	0.0				0	0.0			
Canal or river	0	0.0				0	0.0			
<b>48 Domesticated animals are:</b>										
Outside of house	7	9.0				9	11.3			
Near house	35	44.9				27	33.8			
Inside house	14	17.9				13	15.3			
No animals	22	28.2				31	38.8			
<b>49 How do the surroundings of the house look?</b>										
Clean	10	12.8				30	37.5			
With leftover food/trash	6	7.7				10	12.5			
With leftover paper, plastic, etc.	29	37.2				26	32.5			
With animal excrement	19	24.4				11	13.8			
With human excrement	14	17.9				3	3.8			
<b>50 How is garbage from the house disposed of?</b>										
"Spread" outside	22	28.2				16	17.5			
In hole without cover	2	2.6				4	27.5			
Buried	2	2.6				2	35.0			
Recovered/recycled	51	65.4				58	18.8			
Other	1	1.3				0	1.3			
<b>51 How does the community handle its solid waste?</b>										
Not recovered/recycled	15	19.2				14	17.5			
Recovered and buried						22	27.5			
Recovered and deposited without cover	60	76.9				28	35.0			
Recovered and burned	3	3.8				15	18.8			
						1	1.3			