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MATERNAL CHILD HEALTH - II PROJECT

1993 - 1995 IMPACT STUDY

Argelia Tejada Yangüela, Ph. D.

Santo Domingo
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EXECUTIVE SUMMARY

For some years, CARE in the Dominican Republic has run a food-assisted Mother and Child Health (MCH) project. In 1993, a newly focused project was initiated whose goals were three: to achieve improved health service delivery in 45 MOH clinics; to achieve community "ownership" and improved community health in at least 68 clinic-communities; and to improve the nutritional status of at least 2000 under-three year olds with moderate or severe malnutrition.

An ambitious Base line study was completed at the start of the project. A health/family planning survey was completed on 16,906 households, approximating 40% of the target population; a cross-indexed Knowledge, Beliefs, Attitude and Practices survey was conducted on 2,847 families. In September 1995, the KABP instrument was re-administered to 904 project families and 175 control families. The KABP instrument addresses indicators and analyzes findings in family planning practices, nutritional status, mother and child health care and breast feeding.

Results in family planning prove with extremely high levels of statistical validity four key findings. In project communities, non-Family Planning users fell by nearly a third; and the predominant mix of family planning choices previously available to project participants, sporadic pill use followed by early sterilization, has changed dramatically. A nearly fifty percent reduction in the percentage of mothers at risk of unwanted pregnancies was verified. A 36% increase in birth spacing to more than 24 months has also been documented. Non-project explanation of causation has been ruled out.

Program outreach has increased to over three-quarters of the rural target population. Women's participation in community organizations and assumption of leadership are up significantly.

Statistically significant changes in nutrition were found in three areas. While overall low birth weight did not improve, children whose mothers had participated in project activities demonstrated a decrease of 2.5% in low birthweight, nearly a fifth. Growth card use is up substantially but mothers' ability to read the card is down. Severe and moderate malnutrition has declined in project communities, 3% in 1-11 month old children, 4.2% in 12-23 month old children and 3.7% in 24-35 month old children.

Impact in maternal and child health care was found in six areas. 1) Prenatal care during the first trimester increased in project villages. Post partum control was much lower but held steady in project villages, against a declining trend in control communities. 2) The project had high impact in increasing project mothers' visits to MOH rural clinic. 3) Children's vaccinations are dramatically higher in all villages, in part due to the project's logistical assistance to national MOH vaccination campaigns. Three of four children had all boosters against DPT and Polio; nine of ten for BCG; eight of ten for measles. Six of ten have received all childhood vaccinations. 4) There has been no reduction in the incidence of diarrhea or acute respiratory

infection (ARI); there has been a statistically significant improvement in project mothers increasing the length of oral rehydration solution and the frequency of its administration to four or more times per day. A significant number of children had diarrhea for three days or less. 5) A statistically significant number of project mothers take their children to the rural clinics with ARI than heretofore. 6) A significant and substantive increase was verified in the proportion of mothers who can recognize three to six signs of dehydration.

Impact in breastfeeding and infant nutrition was found in three areas. Exclusive breast feeding for children under 6 months of age at time of survey has more than doubled, to 26%; results for under-four month olds are even better. Formula and bottle use in project villages have decreased by 17%. The administration of laxative to new borns and infants in project villages has gone down by 7.4% to under forty percent. Length of breast feeding has increased by nearly 12% in project and control villages. One graph from each chapter is presented below. Arrows indicate statistically significant change.

FIGURE 1.1

CHANGES IN NONE USERS OF CONTRACEPTION METHODS, TRADITIONAL AND NONTRADITIONAL CONTRACEPTION USERS, FOR BIOLOGICAL MOTHERS OF CHILDREN UNDER THREE YEARS OF AGE, FOR PROMI AND CONTROL COMMUNITIES, FOR THE 1993-1995 PERIOD

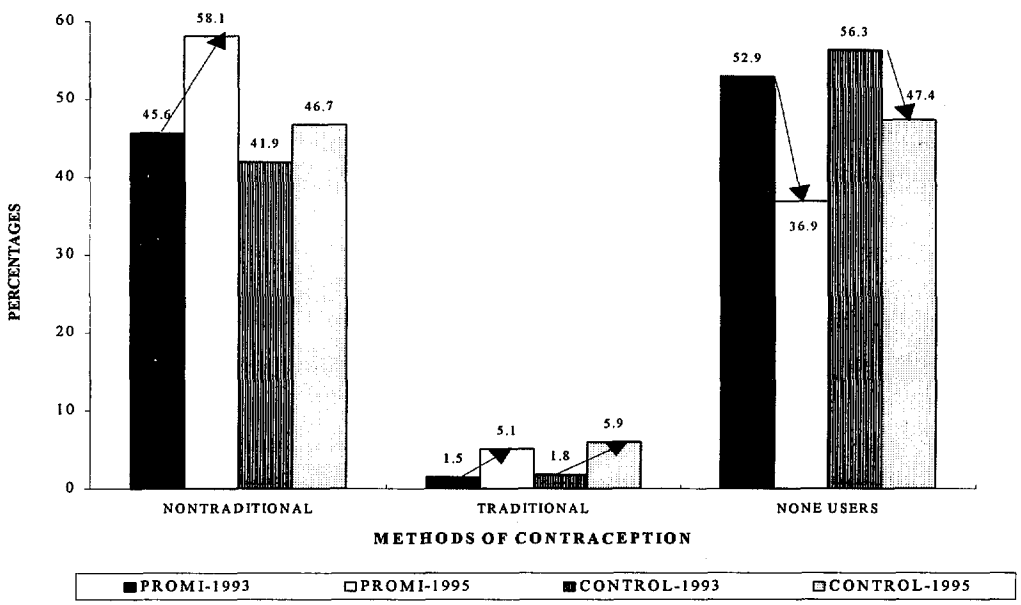


FIGURE 2.3

CHANGES IN WEIGHT FOR AGE MODERATE AND SEVERE, AND LOW LEVELS OF MALNUTRITION IN PROMI COMMUNITIES FOR THE POPULATION OF CHILDREN AGES 0-11, 12-23 AND 24-35 MONTHS OF AGE FOR THE 1993-1995 PERIOD

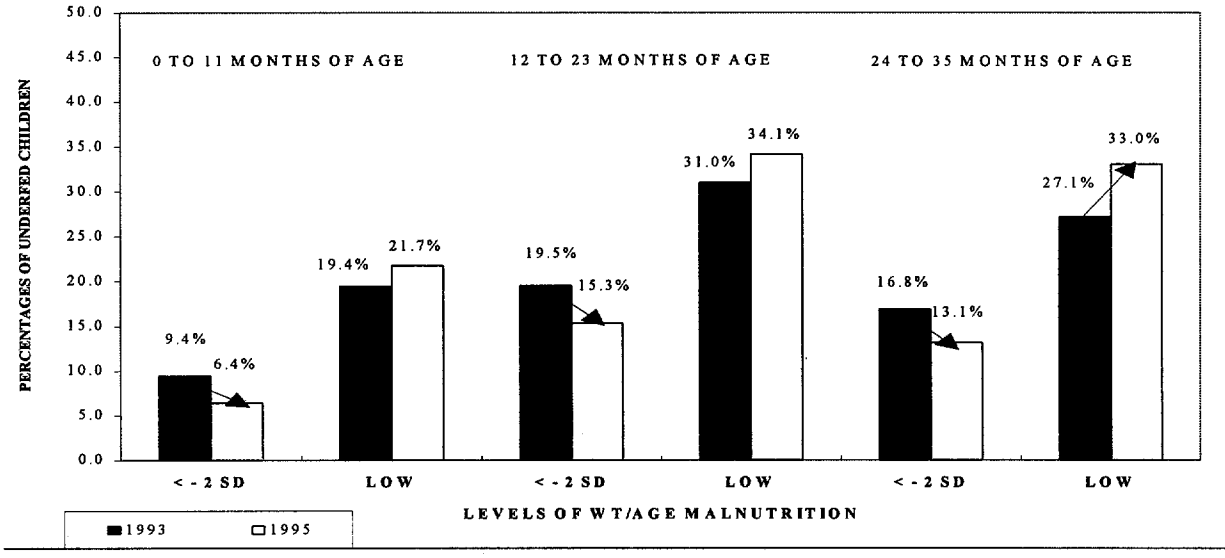


FIGURE 3.2

HEALTH CENTERS VISITED BY MOTHERS WITH CHILDREN UNDER ONE YEAR OF AGE DURING THE COMPLETE PREGNANCY OF THEIR MOST RECENT CHILD BY PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD

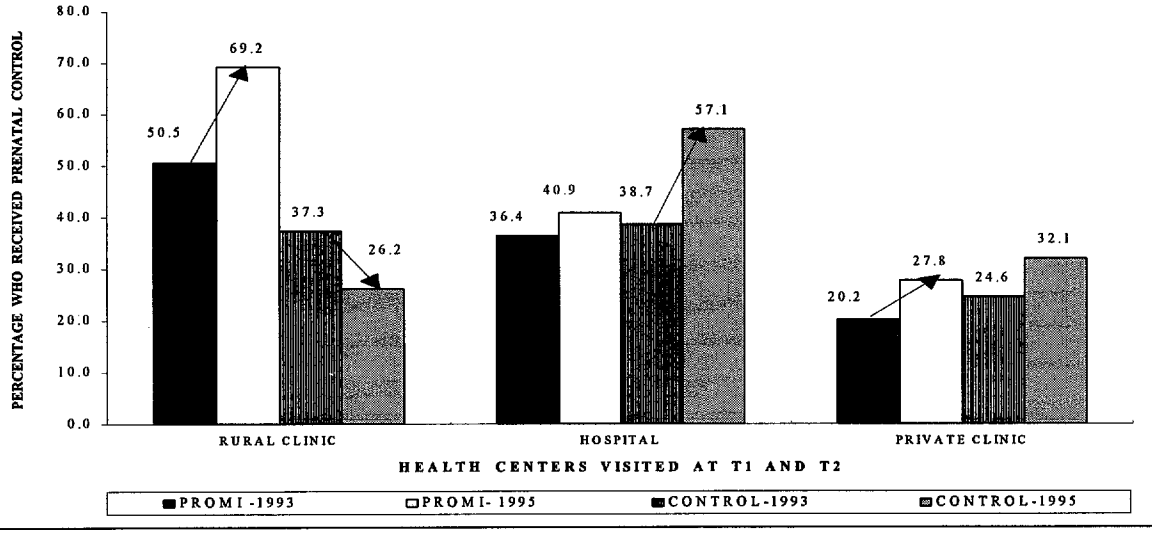
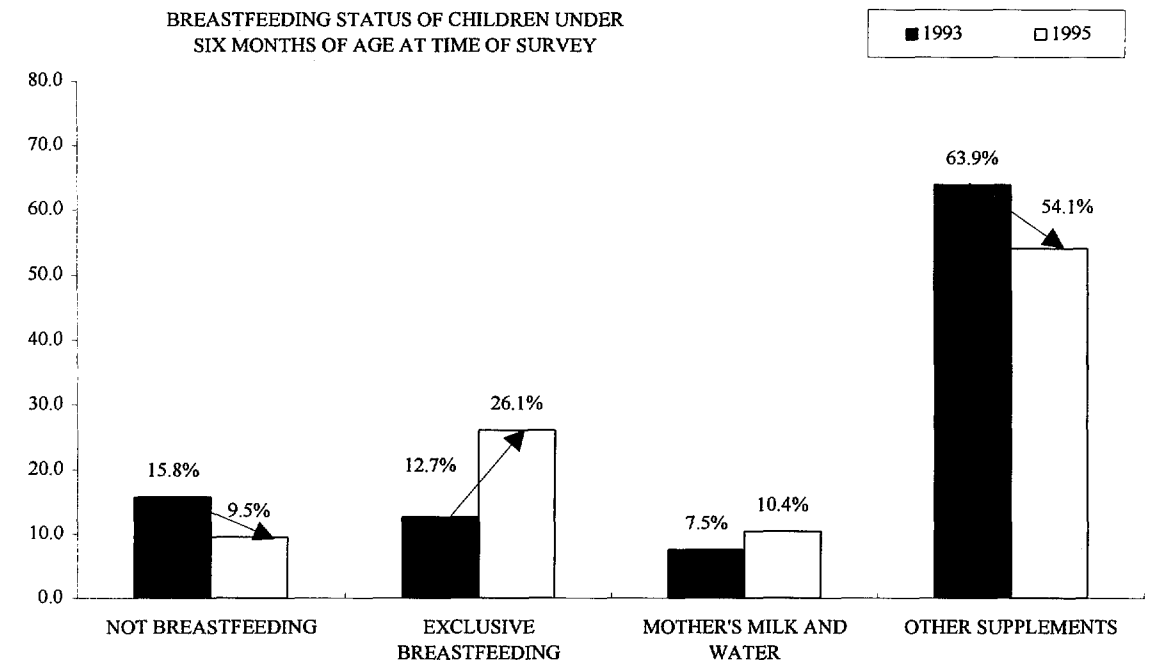
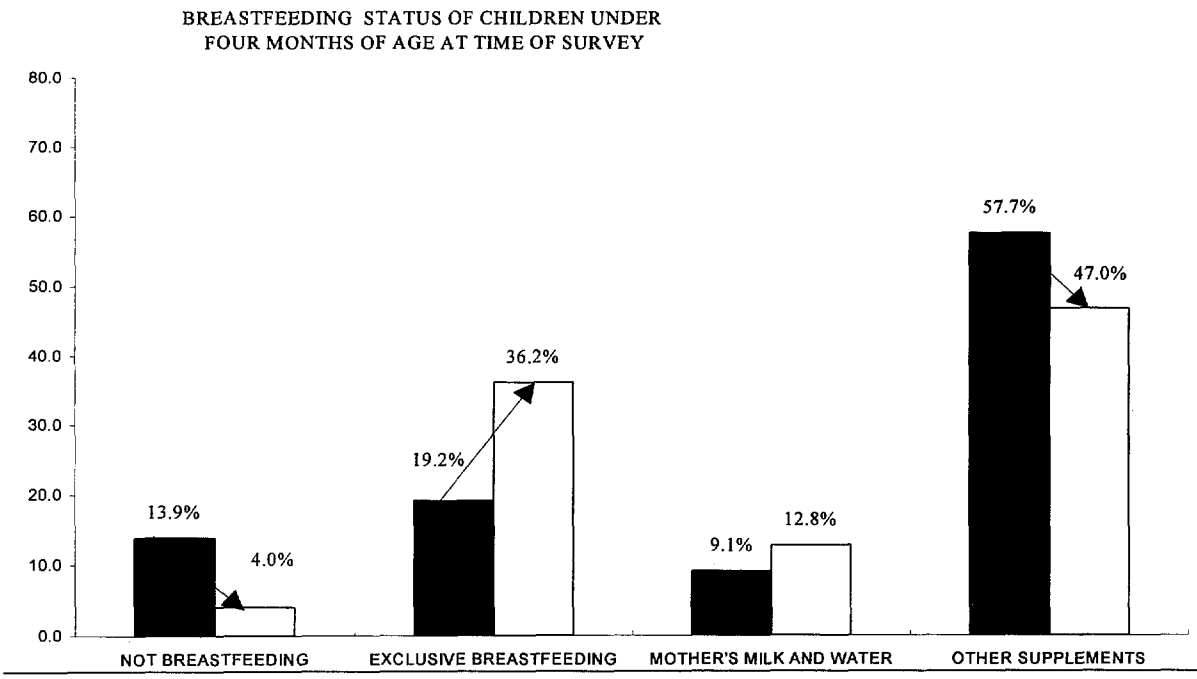


FIGURE 4.3

BREASTFEEDING STATUS OF CHILDREN FROM PROMI AND CONTROL COMMUNITIES UNDER FOUR AND UNDER SIX MONTHS OF AGE AT TIME OF SURVEY





Project designers hoped to demonstrate that food assisted programming could be shown to be as successful as the best of development programming anywhere in the world. Family planning results are dramatic at nearly unprecedented levels of statistical confidence. Nutrition results indicate that carefully targeted interventions can reduce malnutrition through education and better health services, even without a major reduction in poverty. The project has been highly successful in maternal and child health interventions, with a likely influence on decreased mortality. Finally, the project has had significant impact on improving feeding practices at birth.

PARTICIPANTS IN THE 1995 SURVEY

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English Editor	Frank Sullivan
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MATERNAL CHILD HEALTH CARE

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ACRONYMS

MCH	: Maternal Child Health Program
KBAP	: Knowledge, Beliefs, Attitudes and Practices
PROMI	: Program Materno Infantil (MCH in Spanish) -Name of the program
LOP	: Life of project
PROSANA	: Urban Environmental Sanitation Project
Z-SCORES	: A transformation of the scores of a continuous frequency distribution by substracting the mean from each outcome and dividing by the standard deviation.
SD	: Standard deviations
SESPAS	: Secretaría de Estado de Salud Pública y Asistencia Social (Name of the Ministry of Health).
NCHS	: National Center on Health Statistics
WHO	: World Health Organization

PREFACE

For many years, CARE in the Dominican Republic ran a food-assisted Mother and Child Health (MCH) project in conjunction with the Secretary of Public Health (SESPAS). In the early Nineties, the activity was scaled back from national scope and concentrated in the most impoverished regions of the country, the Haitian frontier, Health Regions IV, VI and VII. After a period of program consolidation, a newly focused project was initiated, Proyecto Materno Infantil, PROMI-II. The thrust of PROMI-II was three-fold: to achieve improved health delivery services in at least 45 SESPAS rural clinics; to achieve community "ownership" and improved community health in at least 68 clinic-communities; and to improve the nutritional status of at least 2000 under-three year olds with moderate or severe malnutrition: thus, resulting in institutional, community and individual benefits.

An ambitious Base line study was completed at the start of the new project. This study was unprecedented in the annals of CARE in at least four areas. First, it would control for and report on non-project influences by tracking change/non-change in control villages in a longitudinal study, that the literature calls a "quasi-experimental model," a rigorous analysis in the Social Sciences. Relatedly, the study would collect a sufficiently large data base in project and control villages, to permit reliable estimators and statistically significant conclusions. Next, improved nutritional status and behavioral change in mothers, "impact," would be expressed in public health terms compared to base line conditions in project villages, not against potentially different national health statistics. Finally, project designers hoped to demonstrate that food assisted programming could be shown to be as successful as the best of CARE programming anywhere in the world.

The Base line study represented a Herculean effort. In September, 1993, a household and health survey was completed on 16,906 households, approximating 40% of the total target population, an unheard of sample size. Secondly, an interrelated and cross-indexed Knowledge, Beliefs Attitudes and Practices (KBAP) survey was conducted on 2,847 families. This latter instrument addressed health indicators in depth and analyzed pre-project conditions in family planning practice, nutritional status, child health care, breast feeding and HIV/AIDS knowledge and practice. The researcher in charge of this study was Argelia Tejada Yangüela, Ph.D., a consultant to CARE/DR who has a doctorate from Bowling Green State University in Sociology with a specialization in quantitative methods. A two hundred page report detailing these findings was published by CARE Dominican Republic in August, 1994.

The original project proposal called for a five-year project, 1993-1998, with a Mid-Term evaluation to be conducted in the Summer of 1996. Because of cutbacks in US Government funds, the major source of project funding, and a number of related reasons, the project will expire after only three years, in September, 1996. An impact evaluation was carried out in September, 1995, only two years into project operations.

Frank Sullivan
Country Director

ACKNOWLEDGMENTS

In the completion of this mid-term evaluation, I am indebted to many persons. Mothers were gracious in providing information, with no rejections in 1995 and very few rejections in 1993. In 1993, PROMI field staff and coordinators participated for over a month in collecting data. Leah Steimel, project manager of PROMI II at the time, gave her support to the many activities which required staff participation.

Data collection is key to the quality of the data. In both 1993 and 1995, Josefina Espinal, Amparo Rosario and Guillermina Rodriguez provided expert supervision and aided in interviewer training. I also want to express my gratitude to Gisela Quiterio and Esther Martinez. Gisela constructed the data bases and assisted in the process of checking data processing mistakes in 1993 and 1995. Esther was an expert secretary in providing assistance with the report and handling administrative matters.

I want especially to recognize the collaboration of James Becht, CARE Regional Technical Advisor for Health. In 1993, Jim visited rural clinics and studied materials and the research proposal for the impact study. His input helped determine key health indicators, also expanding the original design to include a household survey. His participation enriched the original proposal design.

Most of all, I want to express my gratitude to Country Director, Frank Sullivan. As a new Director in the Dominican Republic, Frank changed PROMI I from a food distribution project to a community based educational MCH project. He saw the need to measure impact from its start. Frank also took upon himself to edit my English, both in 1993 and 1995. I take full responsibility for all findings and conclusions presented in this study, but appreciate the opportunity to have Frank read and edit the original versions.

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CHAPTER 1

INTRODUCTION AND FAMILY PLANNING

1.1. INTRODUCTION

The research design of this evaluation is based on testing null hypotheses in project and control communities between proportions of different health variables at Time 1 before project interventions, and Time 2, after 22 months of project implementation.[1] A full description of the research methodology (assumptions and design, objectives, sampling design for the 1995 survey, method of analysis, etc.) is attached in the Appendix. This Appendix also includes a description of the study's statistical methods for data analysis: difference of proportions tests, chi-square tests, contingency coefficients of association and p-values. The reader interested in this technical material is referred to that appendix.

Additionally, the Appendix presents a comparison of independent factors which act as confounding variables to project interventions. That analysis provides sufficient evidence that 1995 control communities show a higher standard of living than in 1993, while PROMI communities remained mostly unchanged. Proportions in socioeconomic and demographic variables between mothers from PROMI and control communities in 1995 are not statistically different, with the only exception being family size, with a lower average number of children in control communities. Thus, alternative explanation of results may be ruled out due to similar demographic and socioeconomic conditions in PROMI and non-PROMI communities.[2]

In September, 1995, the KABP instrument of 1993 was re-administered to 1,079 families. The sampling frame for the PROMI communities was constructed from a list of the ten "best" project clinic and non-clinic communities in each of the three regions, according to suggestions from CARE regional field staff. The selection of "best" communities is appropriate given the original project proposal: "at least". Control communities were selected at random, using the criterion of no other CARE or NGO involvement in the intervening two years.

In the analysis of the data, two comparisons are made, cross-sectionally and longitudinally. Cross-sectionally, current conditions in project villages are compared to current conditions in control villages, before PROMI interventions and 22 months after project implementation. Longitudinally, current conditions are compared with past conditions in project villages; also

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[1] Statistical tests are used to determined whether the observed difference between sample proportions could take place by chance in the populations from which the samples were selected. Reported p-values are the probability of observing the test statistic under the assumption that the null hypothesis is true.

[2] In 1995, the choice of fewer and larger control communities makes socioeconomic and demographic differences between mothers from PROMI and control community similar; a desirable situation accomplished by randomization in experimental designs.

current conditions in control villages are compared with past conditions in control villages. These differences are then compared to measure historical changes and make valid conclusions.

This report does not pretend to be more than a monograph. It would require a substantially longer document to further analyze the data. For this midterm evaluation, some Base line analyses have been omitted, such as multivariate regression, principal component factor analysis and calculation of confidence intervals. Further analysis would produce multivariate logistic regression to determine causal links between dependent variables of interest--nutritional status, exclusive breastfeeding, choice of family planning method, etc.--and determinant factors. Instead, the study will report the more salient findings in each of the research areas of the 1993 study.

1.2 REFERENCE POPULATION

In 1993, the Household Survey collected family planning data from all women 15-49 years of age and the KBAP Survey, data from mothers of children under 3 years of age. In 1995, the household survey was not replicated; data were collected from the population of mothers with children under 3 years of age using the 1993 KBAP Survey questionnaire. As a result, this chapter presents impact data for mothers of children under 3 years of age, not for all the FP target population of women in their reproductive years[3].

1.3 CONTRACEPTION PRACTICES

1.3.1 METHODS OF CONTRACEPTION

Table 1.1 presents the distribution of contraception practices of biological mothers of children under 3 years of age for the years 1993 and 1995. Chi-square based contingency coefficients of association and p-values are provided below the results of each cross-sectional survey.[4] Time 1 is represented by the pre-PROMI II column and Time 2 by the mid-PROMI II column. The longitudinal test of difference of proportions labeled "Impact differences," represents changes during the 22 month period, between PROMI communities at T2 and T1 and between control communities at T2 and T1. Differences are tested to rule out the possibility that the observed differences may be generated from two populations in which the true difference in proportions is zero. The last column represents the test statistics that were calculated for each difference. The corresponding probability level of significance is expressed by the number of asterisks next to each difference of proportions.

Results from Table 1.1 show statistically significant differences and substantive program impact. In family planning, fewer women are non-users; more women are users of traditional methods including breastfeeding; and more women are users of nontraditional methods of contraception.[5]

[3] The sample only included one mother under 15 years of age and none older than 49 years.

[4] See section 1.5 from the Appendix for a description of contingency coefficients and the interpretation of probability levels of significance.

A longitudinal analysis for the 1993-1995 period shows a statistically significant decrease in the proportion of non-users in PROMI and control communities. The decrease in PROMI communities is from 52.9% to 36.9%, that is, a 16.0% difference; while the decrease in control communities is a lower 8.9%. Thus, while other-than-PROMI factors are increasing the proportion of contraception users, in PROMI communities the effect is almost double that of control communities. Alternative explanation of results other than PROMI has been ruled out.[6]

TABLE 1.1

CHANGES IN NON USERS OF CONTRACEPTION AND IN USERS OF TRADITIONAL AND NONTRADITIONAL METHODS, FOR BIOLOGICAL MOTHERS OF CHILDREN UNDER THREE YEARS OF AGE, FOR PROMI AND CONTROL COMMUNITIES, FOR THE 1993-1995 PERIOD

VARIABLES	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
NONTRADITIONAL	780	45.6	330	41.9	460	58.1	71	46.7	12.4 ****	4.8 n.s.	5.85	1.08
TRADITIONAL/b	25	1.5	14	1.8	40	5.1	9	5.9	3.6 ****	4.1 *	4.32	2.1
NON USERS	904	52.9	443	56.3	292	36.9	72	47.4	-16 ****	-8.9 *	-7.64	-2.02
TOTAL	1,709	100	787	100	792	100	152	100				
LEVEL OF SIGNIFIC.	**NOT SIGNIFICANT**				**SIGNIFICANT**							
BETWEEN PROMI AND CONTROL COMMUNITIES	Contingency coefficient = .06615 p-value: .0893				Contingency coefficient = .08434*							

NOTE: a. When the critical value (C.V.) falls in the half lower tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less

than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is greater than > 1.645.

b. Traditional methods includes the following: rhythm, abstinence, withdrawal and breastfeeding.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

In 1995, an additional 12.4% of mothers from PROMI communities are using nontraditional contraception methods, while users of nontraditional methods remained stable in control communities. Traditional methods increased in both types of communities, an additional 3.6% in PROMI and 4.1% in control communities. Thus, increasing nontraditional contraceptive use can be attributable to PROMI, traditional use increase, not completely. Each of these changes

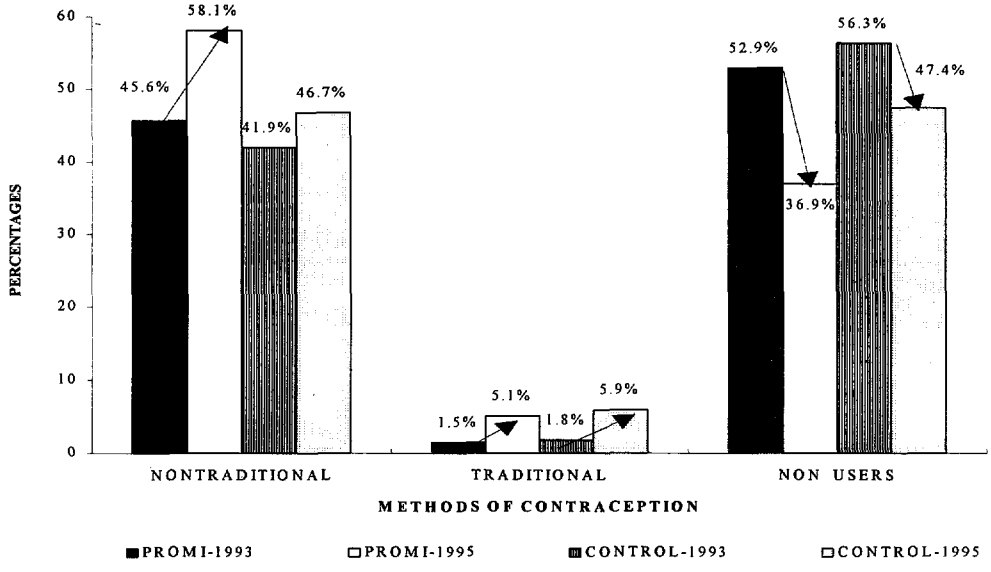
5 Traditional methods include mothers using rhythm, abstinence, withdrawal and exclusive breastfeeding.

6 The Appendix provides evidence of similar demographic and socioeconomic conditions in PROMI and control communities, a condition comparable to randomization in experimental designs.

takes place at the probability value of < .0001, a hard to achieve level of statistical significance. Data from Table 1.1 are graphically presented by Figure 1.1. Increments and declines during the 22 months period are portrayed by arrows headed in the direction of the change, individually for PROMI and control communities. The length of the arrows illustrate the intensity of the change, stronger for PROMI communities in increasing nontraditional methods of contraception and decreasing the proportion of mothers not using any method. Point estimators of proportions at T1 and T2 are represented by the height of the bars.

FIGURE 1.1

CHANGES IN NON USERS OF CONTRACEPTION METHODS, TRADITIONAL AND NONTRADITIONAL CONTRACEPTION USERS, FOR BIOLOGICAL MOTHERS OF CHILDREN UNDER THREE YEARS OF AGE, FOR PROMI AND CONTROL COMMUNITIES, FOR THE 1993-1995 PERIOD*



NOTE: *Arrows represent statistically significant changes

Table 1.2 provides the same data as Table 1.1, segregated by individual methods. Longitudinal increments reflect different trends among the various contraceptive options available to mothers. In PROMI communities, statistically significant increments in nontraditional methods are shown in an additional 2.3% of implant users, and 5.2% of NORPLANT users. In control communities, increments in IUD and NORPLANT users are based on a very small number of cases, the results of which are not statistically significant when aggregated. The higher prevalence in traditional methods is due to a dramatic increase in exclusive breastfeeding, (to be reported in Chapter 4), with an additional 3.5% in PROMI and 4.6% in control communities.

Therefore, the traditional anticonception trend cannot be attributed to PROMI alone. All of these results take place with p-value <.0001. Condom use is up also, but at less impressive levels of significance.

Female sterilization and pills continue to be the preferred methods of contraception. In 1993, female sterilization reached 22.7% and pill users 19.5% in PROMI communities, with a statistically non-significant increase of 2.6% and 1.6% respectively in 1995. In control communities female sterilization was 20.6% and pill users 17.8%, with a statistically non-significant decline in 1995 of 2.2% and 1.8% respectively. The direction of the changes may well be indicating a tendency of these two methods to increase in PROMI communities and to decline in control ones.

Other methods of contraception had very low proportion of users in 1993. All had under 1.0% of use (with the exception of IUD, with 2.3% of users in PROMI communities). By 1995, a statistically significant proportion of mothers increased usage of methods other than pills and sterilization: in PROMI communities an additional 2.3% are using implants; 5.2% are using NORPLANT; 3.5% exclusive breastfeeding; and 0.8% condoms. Other changes are not statistically significant, yet they show a positive direction with the exception of IUD. In control communities, IUD users increased an additional 3.0%; NORPLANT users an additional 3.3% and exclusive breastfeeding 4.6%. Thus, changes taking place in PROMI communities either do not take place in control communities or to a lesser extent, with the only exception of breastfeeding.

During the 1993-1995 period, the fact that users of contraception have increased due to methods other-than-pills and female sterilization is an important achievement. The growth in diversification reflects PROMI goals to give women choices according to individual needs, and to increase the use of non-terminal methods.

1.3.2 MOTHERS AT-RISK OF AN UNWANTED PREGNANCY

PROMI has had impact in reducing the proportion of mothers at-risk of an unwanted pregnancy at the <.0001 probability level of significance. Mothers are at-risk of an unwanted pregnancy if at time of survey they were not pregnant or insecure, were not menopausal, were not using any type of traditional or nontraditional contraception method, did not want any more children and did not offer as a reason for not using contraception methods the lack of a sexual partner. In 1993, data from Table 1.3 show there was no significant difference between at-risk mothers in PROMI and control communities; in 1995 the proportion is lower both substantively and in statistically significant terms in PROMI communities. In the latter, the proportion at-risk of an unwanted pregnancy decreased almost by half during the 1993-1995 period, from 40.1% to 22.9%. In control communities, the reduction is also statistically significant but smaller, decreasing from 41.9% to 30.3%.

TABLE 1.2

CHANGES IN CONTRACEPTION PRACTICES OF BIOLOGICAL MOTHERS
OF CHILDREN UNDER 3 YEARS OF AGE DURING THE 1993-1995 PERIOD,
FOR PROMI AND CONTROL COMMUNITIES

CONTRACEPTION METHOD	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
0. NOT USING	904	52.9	443	56.3	292	36.9	72	47.4	-16.0 ****	-8.9 *	-7.63	-2.01
1. PILLS	333	19.5	154	19.6	167	21.1	27	17.8	1.6 n.s..	-1.8 n.s.	0.93	-0.52
2. IUD	40	2.3	7	0.9	17	2.1	6	3.9	-0.2 n.s.	3.0 *	-0.38	1.88
3. IMPLANT	3	0.2	3	0.4	20	2.5	0	0.0	2.3 ****	-0.4 *	4.12	-1.74
4. DIAPHRAGM/FOAM	2	0.1	2	0.3	2	0.3	2	1.3	0.2 n.s.	1.0 n.s.	0.87	1.12
5. CONDOMS	10	0.6	2	0.3	11	1.4	2	1.3	0.8 *	1.0 n.s.	1.79	1.12
6. FEM. STERILIZATION	388	22.7	162	20.6	200	25.3	28	18.4	2.6 n.s.	-2.2 n.s.	1.41	-0.63
7. MALE STERILIZATION	4	0.2	0	0.0	2	0.3	1	0.7	0.1 n.s.	0.7 n.s.	0.29	1.04
8. INJECTION/NORPLANT	0	0.0	0	0.0	41	5.2	5	3.3	5.2 ****	3.3 *	6.59	2.28
9. WITHDRAWALS	7	0.4	1	0.1	5	0.6	0	0.0	0.2 n.s.	-0.1 n.s.	0.60	-1.00
10. RHYTHM/ABSTINENCE	7	0.4	6	0.8	7	0.9	2	1.3	0.5 n.s.	0.5 n.s.	1.33	0.55
11. BREASTFEEDING/b	0	0.0	0	0.0	28	3.5	7	4.6	3.5 ****	4.6 **	5.36	2.71
12. OTHER/TRADITIONAL	11	0.6	7	0.9	0	0.0	0	0.0	-0.6 ***	-0.9 **	-3.33	-2.66
TOTAL COLUMN	1,709	100.0	787	100.0	792	100.1	152	100.0				
LEVEL OF SIGNIFICANCE BETWEEN PROMI AND CONTROL COMMUNITIES	**SIGNIFICANT** Contingency Coefficient = .15165****				**SIGNIFICANT AT 94% LEVEL OF CONFIDENCE** Contingency Coefficient = .14022 p-value = .06231							

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is greater than > 1.645.

b. Breastfeeding was included in the "other" category for the baseline and separated for the second measurement. Only mothers who were exclusively breastfeeding and who reported this practice as a contraception method were included in this category.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 1.3

CHANGES IN THE PERCENTAGE DISTRIBUTION OF BIOLOGICAL MOTHERS OF CHILDREN UNDER 3 YEARS OF AGE AT RISK OF AN UNWANTED PREGNANCY DURING THE 1993-1995 PERIOD, FOR PROMI AND CONTROL COMMUNITIES

RISK FACTOR	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ	%	%	%	TEST ST	TEST ST
AT RISK/b	685	40.1	330	41.9	207	22.9	53	30.3	-17.2 ****	-11.6 **	-9.37	-2.99
NOT AT RISK	1,025	59.9	457	58.1	697	77.1	122	69.7				
TOTAL COLUMN	1,710	100.0	787	100.0	904	100.0	175	100.0				
LEVEL OF SIGNIFICANCE BETWEEN PROMI AND CONTROL COMMUNITIES	**NOT SIGNIFICANT**				**SIGNIFICANT** CC = .08855*							

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is greater than > 1.645.

b. At risk of an unwanted pregnancy is defined for the subpopulation of biological mothers under 50 years with children under three years of age. Mothers are at risk if at time of survey they were not pregnant or insecure, were not menopausal, were not using any contraceptive method, did not offer as a reason for not contracepting the lack of a sexual partner and did not want children.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

These results reflect an improving trend in women's control of their reproductive lives, accelerated by PROMI's interventions. This trend is necessarily associated with the use of contraception methods. But, it is not necessarily linked to birth-spacing practices, given that female sterilization is still the prevalent anticonception method in both PROMI and control communities. Sterilization is likely the result of short periods between births until the desired number of children is reached, given the final character of this method.

1.4 STILL BIRTHS AND TERMINATIONS

Abortion is illegal in the Dominican Republic. For this reason, the KBAP Survey questioned women on the number of still births and terminations, without inquiring the spontaneous or induced character of the terminations. Table 1.4 presents data on mothers who had at least one still birth and mothers with at least one termination. Data show that still births are uncommon whereas terminations are frequent events. While still births are caused by health factors, ultimately linked to socioeconomic determinants, terminations are both spontaneous and induced abortions. Our data on terminations are extremely high, as compared to still births, suggesting that most terminations are indeed induced abortions.

During the 1993-1995 period, still births and terminations rose in PROMI but not in control communities. In 1993, the proportion of mothers with at least one termination was significantly higher in control communities; the difference became non-significant in 1995. In both types of communities, at least one in four mothers with children under 3 years of age have had a termination. Under an assumption that two out of three of the mothers with termination could have been spontaneous events, results still indicate that induced abortion is the third most frequently used method of contraception, following female sterilization and pills.

1.5 LENGTH OF BIRTH INTERVAL

Prevalence of female sterilization over other family planning methods indicates action to avoid pregnancies after the desired number of children is born. Table 1.5 provides data on length of birth interval between the last two births or expected birth of the last pregnancy or termination.[7]

Statistically significant program impact has been achieved with a p-value <.0001. In 1995, an additional 15.3% of mothers had 24 months or more between births in PROMI communities, as opposed to no change in control communities. Initially in 1993, a higher proportion of mothers from control communities (52.5%) were adequately birth-spacing their last two children. By 1995, the proportion of mothers with adequate length of birth intervals increased to 57.1% in PROMI communities. This finding is consistent with the increased proportion of mothers using other-than sterilization methods for birth control. The variety of non-terminal methods opens choices based on health considerations, in addition to family size.

---

[7] The sample population is reduced in 1995 due to 22.8% of mothers with only one pregnancy event and 12.3% of mothers with one of the two events previous to 1992.

TABLE 1.4

CHANGES IN STILL BIRTHS AND TERMINATIONS DURING THE 1993-1995 PERIOD, FOR PROMI AND CONTROL COMMUNITIES/a

VARIABLE	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
AT LEAST ONE STILL BIRTH	67	3.5	30	3.3	56	6.2	5	2.9	2.7 **	-0.4 n.s.	2.98	-0.32
TOTAL MOTHERS	1,926	100.0	921	100.0	904	100.0	175	100.0	--	--		
AT LEAST ONE TERMINATION	384	20.0	228	24.8	199	28.0	32	27.4	8.0 ****	2.6 n.s	4.57	0.71
TOTAL MOTHERS	1,926	100.0	921	100.0	904	100.0	175	100.0	--	--		

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II
STILL BIRTHS	NOT SIGNIFICANT	NOT SIGNIFICANT
TERMINATIONS	SIGNIFICANT CC: .21265*	NOT SIGNIFICANT

NOTES: a. Both events are measured as total number of stillbirths and terminations ever had.

b. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, reject the null hypothesis if test statistic > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 1.5

CHANGES IN LENGTH OF BIRTH INTERVALS FOR BIOLOGICAL MOTHERS OF CHILDREN UNDER 3 YEARS OF AGE WITH AT LEAST TWO PREGNANCIES DURING THE 1993-1995 PERIOD, BY PROMI AND CONTROL COMMUNITIES

LENGTH OF BIRTH INTERVAL/a	PRE-PROMI II November 1993				MID-PROMI II/a September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
24 OR MORE MONTHS	356	41.8	197	52.5	342	57.1	53	52.5	15.3 ****	0.0 n.s.	5.79	0.00
UNDER 24 MONTHS	495	58.2	178	47.5	257	42.9	48	47.5				
TOTAL COLUMN	851	100.0	375	100.0	599	100.0	101	100.0				
LEVEL OF SIGNIFICANCE BETWEEN PROMI AND CONTROL COMMUNITIES	**SIGNIFICANT** CC = .10115**				**SIGNIFICANT** CC = .08885*							

NOTES: a. Intervals were calculated for the last three years previous to the survey. For the 1995 survey, the following mothers were excluded: 22.8% with only one event (one birth and no other stillbirth, termination or pregnancy) and 12.3% of the mothers with one event previous to 1992.

b. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is greater than > 1.645.

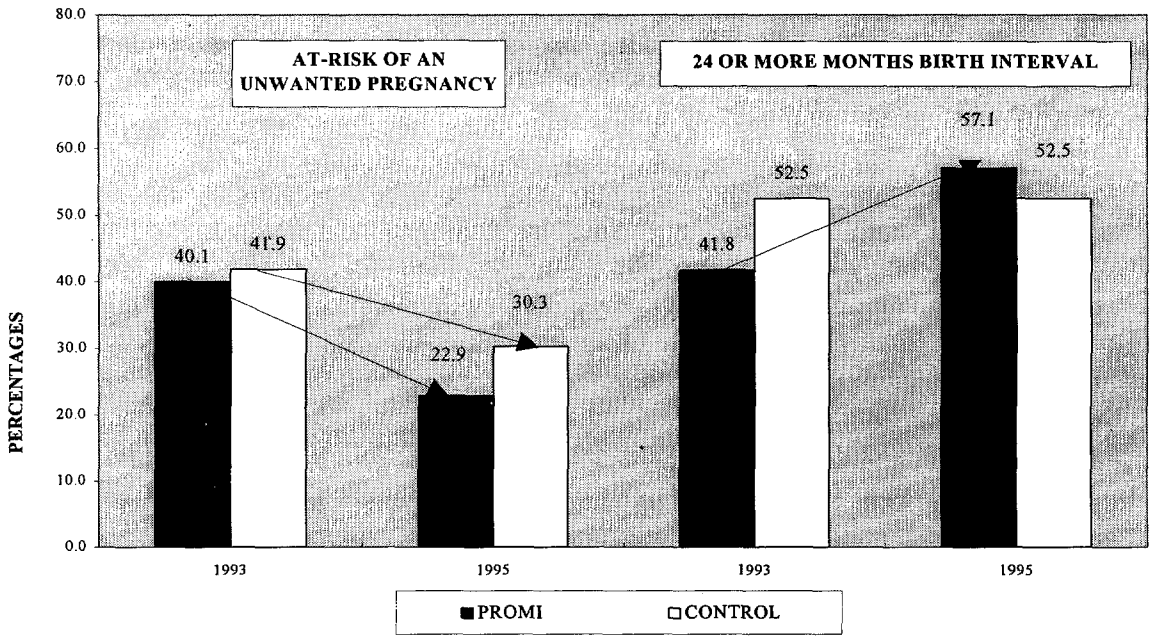
P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

Figure 1.2 graphically portrays this finding along with changes in lowering the proportion of mothers at risk of an unwanted pregnancy. Arrowheads point in the direction of the change. A horizontal line indicates no statistically significant change. All other slanted lines indicate statistically significant changes. If slanted lines were parallel for PROMI and control communities, changes would still be statistically significant, but causation of effects could not be attributed to the program, which is not the case in either of the two events illustrated by Figure 1.2. Single point estimators at T1 and T2 are portrayed by the height of the bars.

FIGURE 1.2

CHANGES IN THE PROPORTIONS OF MOTHERS AT RISK OF UNWANTED PREGNANCIES AND WITH 24 MONTHS OR MORE BIRTH INTERVALS, FOR PROMI AND CONTROL COMMUNITIES DURING THE 1993-1995 PERIOD



SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

1.6 CONCLUSIONS

The longitudinal study provides sufficient evidence to conclude that the family planning component of the MCH program has had statistical and substantive impact on the young subpopulation of biological mothers of children under 3 years of age. Impact of the FP component on older mothers or on sexually active single women was not measured in 1995.

Causation may be assigned to PROMI interventions. The research design provided for control groups to be able to measure changes due to historical factors during the 1993-1995 period. The adoption of new methods of contraception reduced the proportion of non-users in both types of communities, but PROMI communities almost doubled the reduction experienced in control groups. New users did not adopt the prevailing sterilization and pills methods; instead in PROMI communities, new users adopted implant, condoms, injections and breastfeeding as contraception methods. In control communities, mothers adopted IUD, injections and breastfeeding.

Unfortunately, in spite of increasing contraception use, the proportion of mothers with at least one pregnancy termination has increased from 20% to 28% in PROMI communities. This statistic aggregates spontaneous and induced abortions.

The increase in users of non-terminal anticonception methods and the lack of evidence of an increase in female sterilization indicate greater concern for planning pregnancies and not merely for reducing family size. Further evidence of project impact is provided by a large reduction in the percentage of mothers at risk of unwanted pregnancies experienced in PROMI communities, and a lower decrease in control communities. An interpretation of these accomplishments is PROMI's focus on an unmet need of this young population of mothers. If a similar trend and program strategy were to continue for two more years, the proportion of young mothers at risk of an unwanted pregnancy would decrease to 6% in "best" PROMI communities from an original 40% in all PROMI communities in 1993.

In addition to reducing the risk of unwanted pregnancies, in two years, the program has been highly successful in increasing the proportion of mothers with interval between births of 24 months or more for the last two pregnancies. This high increase in birth-spacing reduces the risk of mothers' and infants' morbidity and mortality. This achievement reflects PROMI's concern for the health of mothers and children. If this trend were to continue, in two more years, 72% of young mothers in "best" PROMI communities would have adequate length of birth intervals.

CHAPTER 2

PROGRAM'S PARTICIPATION AND NUTRITIONAL STATUS OF CHILDREN

2.1 INTRODUCTION

This chapter focuses on mothers' participation in program activities and coverage of children under three years of age. It will compare low birthweight for all children from PROMI and control communities, and for the population of children with PROMI mothers versus non-participants; it will also discuss nutritional status and growth monitoring for children under three years. Mother's participation is measured as individual recipients of PROMI interventions, and as participants in community organizations promoted by program staff. Community participation is measured by integration to a community association, by self-definition and by attitudinal items measuring different aspects of self-reliance.

2.2 PROGRAM'S COVERAGE

Data from the 1995 survey provide evidence of a sharp increase in the participation of mothers and children. The inclusion of past participation is important because the program targets all rural pregnant women and lactating mothers during the first year of life of the child. If after one year of participation the child is underweight, he or she remains in the program for an additional year. This procedure implies that mothers with children 13 to 35 months of age with normal weight could demonstrate past participation. Educational messages should have been learned during the 9 months of pregnancy and 12 months of lactation of the child.

Table 2.1 presents the data. At program start, 60.5% of eligible mothers--rural mothers with children under three years of age, regardless of the nutritional status of the child--were participating or had participated in PROMI I. By 1995, the proportion of mothers with present or past participation in PROMI II increased to 77.2%. That is, only 22.8% of eligible mothers had never participated in PROMI since 1993.

Increased coverage for children under one is higher than for mothers, given that some mothers have more than one child of eligible age. In 1993, 45.8% of children from PROMI and 13.2% from control communities had participated during their first year of life. During the 1993-95 period, participation of children during their first year of life increased an additional 22.2% in best PROMI communities, reaching 68.0% of all children.[1] Figure 2.1 illustrates increased coverage of the target population in best PROMI communities.

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[1] In control communities, only 0.5% of the children demonstrated past participation. Interviewers were instructed to drop cases where mothers had participated since 1993. Some mothers from control communities travel to PROMI communities to have their children's weight monitored and to receive food supplements. For this reason, additional control communities were added during the data collection process.

TABLE 2.1

MOTHERS' AND CHILDREN'S PARTICIPATION IN PROMI FOR THE 1993-1995 PERIOD

VARIABLES FOR MOTHERS' AND CHILDREN'S PARTICIPATION IN PROMI	PRE-PROMI II November 1993				MID-PROMI II September 1995				SAMPLE Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST STATISTIC
MOTHERS											
PAST/PRESENT*	1,442	60.5	182	17.8	698	77.2	0	0.0	16.7 ****	--	9.72
NEVER	943	39.5	838	82.2	206	22.8	175	100.0	--	--	
TOTAL	2,385	100.0	1,020	100.0	904	100.0	175	100.0			
CHILDREN'S PARTICIPATION					**PROMI**		**CONTROL**				
					FREQ.	%	FREQ.	%			
PAST SINCE 1993					404	35.3	0	0.0			
PRESENT					396	34.6	0	0.0			
NEVER					343	30.0	217	100.0			
TOTAL					1,143	100.0	217	100.0			
FIRST YEAR **	1,114	45.8	137	13.2	775	68.0	1	0.5	22.2 ****	--	12.96
NOT IN FIRST YEAR	1,316	54.2	903	86.8	364	32.0	216	99.5	--	--	
TOTAL	2,430	100.0	1,040	100.0	1,139	100.0	217	100			

NOTES: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

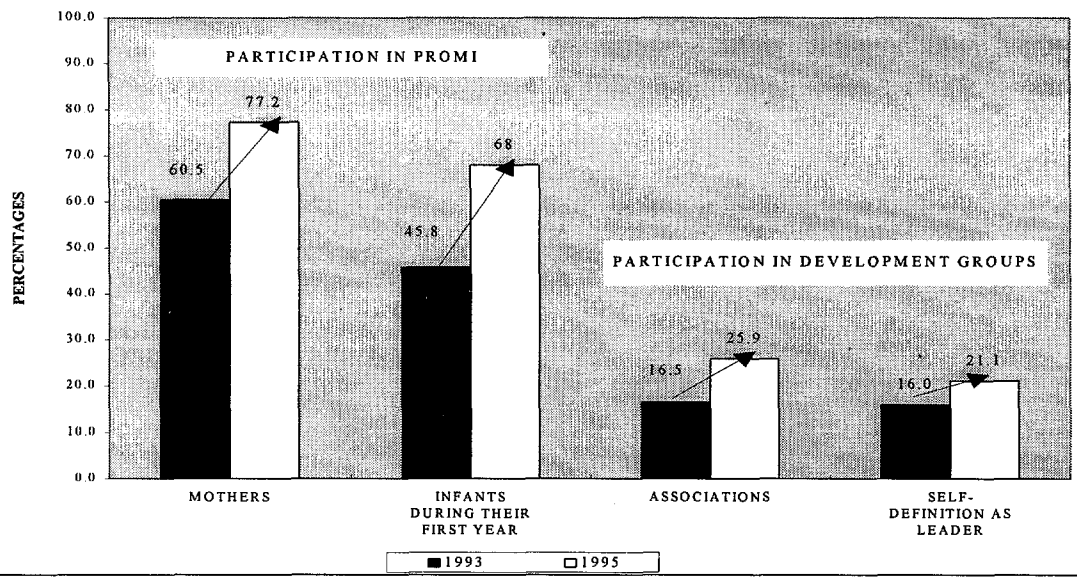
b. For the 1995 measurement, past participation was measured since 1993, that is, since the initiation of PROMI II. For the 1993 measurement, mothers from control communities that had received food supplements in PROMI I but were no longer participating in PROMI II, were included in the sample.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

FIGURE 2.1

INCREASED COVERAGE OF ELIGIBLE MOTHERS AND INFANTS AND INCREASED PARTICIPATION OF MOTHERS IN COMMUNITY GROUPS AND ACTIVITIES IN PROMI COMMUNITIES, FOR THE 1993-1995 PERIOD



2.3 LOW BIRTHWEIGHT

2.3.1 DEFINITION, INDICATOR AND FINDINGS

Birthweight is multicausal, related, among other factors, to length of pregnancy, intra-uterine growth, the nutritional status of the mother, the socioeconomic status of the household, etc. PROMI does not affect the socioeconomic status of the household, but it teaches pregnant mothers better prenatal control. With adequate prenatal care, birthweight should go up; however, poverty-stricken mothers might not be able to improve their own nutrition, even in the presence of food rations and greater awareness of the consequences of their health on birthweight.

Low birthweight is measured by the proportion of children weighing under 2,500 grams at birth. Data were collected in the 1993 Household Survey and in the 1995 KBAP Survey for all children under three years of age. Although most parents lack records, mothers consistently remember their children's birthweight because of the importance attributed to this factor in the society.

Table 2.2 provides data on birthweight for the 1993-1995 period. An analysis of the estimated proportions of children with low birthweight from each of the sample domains provides evidence to conclude that there is no statistically significant difference in the proportion of children with low birthweights from PROMI and control communities at T1 and T2. In 1993, the proportion of children with low birthweights was 11.7% in project villages and did not change in 1995 in a

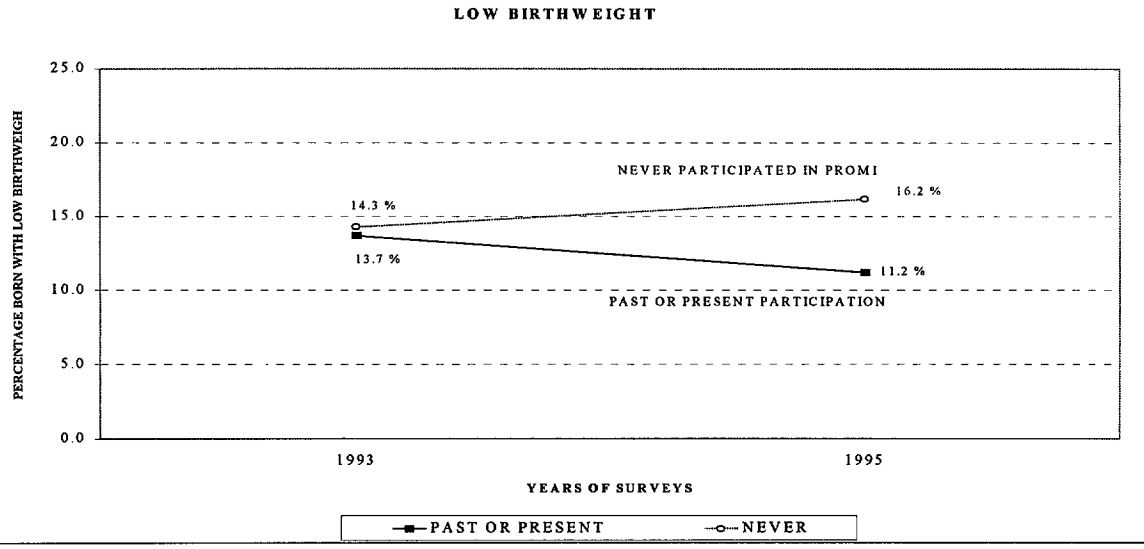
statistically significant way; in control communities, the proportion of children with low birthweight was 14.2% and did not change in 1995 in a significant way.[2]

2.3.2 LOW BIRTHWEIGHT AND PROMI PARTICIPATION

The fact that no statistically significant difference was found in low birthweight between children from PROMI and control communities does not rule out the possibility of significant difference in low birthweight between project participants and non-participants. Data from Table 2.3 and Figure 2.2 presents low birthweight by mothers' participation in the project, from PROMI and control communities. While at T1 and T2 the null hypotheses (no difference between the proportion of children with low birthweight whose mothers had never participated in PROMI and mother who had past or present participation) could not be rejected, the longitudinal analysis for the 1993-1995 period provides evidence of a statistically significant reduction in the proportion of children with low birthweight from mothers with past or present participation. From the original 13.7% of children with low birthweight from participating mothers, an additional 2.5% of children were born with normal weight during the period. This finding was achieved at the p-value of <.05.

FIGURE 2.2

CHANGES IN CHILDREN BORN WITH WEIGHT UNDER 2,500 GRAMS IN PROMI COMMUNITIES BY MOTHERS WITH PAST OR PRESENT PROJECT PARTICIPATION AND WITH NO PARTICIPATION, FOR THE 1993-1995 PERIOD



[2] Since birthweight data from 1993 was determined from a large sample size of 16,906 households representative of all PROMI and control communities and there were no changes in 1995, it is better to use 1993 values rather than using values from the smaller sample of 1995.

TABLE 2.2

CHANGES IN THE PROPORTION OF CHILDREN WITH WEIGHT AT BIRTH UNDER 2,500 GRAMS FOR PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD

	PRE-PROMI II November 1993		**MID-PROMI II September 1995**		**IMPACT Differences**	**LONGITUDINAL TEST C.V.= Z (.05) = 1.645/***
WEIGHT AT BIRTH	FREQ.	%	FREQ.	%	%	TEST ST
PROMI					**PROMI**	
< 2,500 gr.	568	11.7	140	12.3	0.6 n.s.	0.56
>= 2,500 gr.	4,291	88.3	998	87.7		
TOTAL	4,859	100.0	1,138	100.0		
CONTROL					**CONTROL**	
< 2,500 gr.	164	14.2	23	10.6	-3.6 n.s.	-1.54
>= 2,500 gr.	988	85.8	193	89.4		
TOTAL	1,152	100.0	216	100.0		

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	**MID-PROMI II**	
LOW BIRTHWEIGHT	NOT SIGNIFICANT	NOT SIGNIFICANT	

NOTE: *When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: Household Survey, August 22 to September 30, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 2.3

CHANGES IN BIRTHWEIGHT BY MOTHERS PARTICIPATION
IN PROMI AND SAMPLE DOMAINS FOR THE 1993-1995 PERIOD/a

BIRTHWEIGTH	PRE-PROMI II November 1993				MID-PROMI II Semptember 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b	
	MOTHERS' PARTICIPATION				MOTHERS' PARTICIPATION				MOTHERS' PART.		MOTHERS' PART.	
	NEVER		PAST OR PRESENT		NEVER		PAST OR PRESENT		NEVER	PAST OR PRESENT	NEVER	PAST OR PRESENT
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
PROMI												
NORMAL=>2500 gr.	808	85.7	1,245	86.3	207	83.8	791	88.3	--	--		
LOW WEIGHT < 2500 gr.	135	14.3	197	13.7	40	16.2	100	11.2	1.9 n.s.	-2.5 *	0.73	-1.80
NO ANSWER	--	--	--	--	--	--	5	0.5	--	--		
TOTAL	943	100.0	1,442	100.0	247	100.0	896	100.0				
CONTROL												
NORMAL=>2500 gr.	723	86.3	154	84.6	193	88.9	--	--	--	--		
LOW WEIGHT < 2500 gr.	115	13.7	28	15.4	23	10.6	--	--	-3.1 n.s.	--	-1.29	
NO ANSWER	--	--	--	--	1	0.5	--	--	--	--		
TOTAL	838	100.0	182	100.0	217	100.0	--	--				

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II
PROMI	NOT SIGNIFICANT	NOT SIGNIFICANT
CONTROL	NOT SIGNIFICANT	

NOTES: a. For the 1995 measurement, past participation was measured since 1993, that is, since the initiation of PROMI II. For the 1993 measuremts, mothers from control communities that had received food supplements in PROMI I but were no longer participanting in PROMI II, were included in the sample.

b. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: Household Survey, August 22 to September 30, 1993 and KBAP Survey, August 31 to September 18, 1995.

2.4 NUTRITIONAL STATUS

2.4.1 PROJECT ACTIVITIES

Improvement of the nutritional status of children under 3 years of age is one of the main objectives of PROMI. Pregnant and lactating mothers are included in the program, not only to prepare them to better care for their children but also to avoid low birthweight and weight loss during the first 3 years of life. Once the child is born, his or her nutritional status is monitored on a monthly basis for a year. Children underweight after their first year of age are continued in the program and given supplementary feeding. The project operates under the premise that morbidity and malnutrition may be reduced through educational messages aimed at changing traditional attitudes, beliefs and behaviors. Because of intra-household sharing, food supplements do not play an important role in raising the nutritional status of children per se.

2.4.2 INDICATORS, UNITS OF MEASUREMENT AND REFERENCE POPULATION

Malnutrition is measured in this study by a weight for age indicator. The World Health Organization has asserted that the "most usual and widely recognized indicator of protein energy malnutrition is weight for age" (1979, 17). However, by choosing only weight for age as an indicator of the nutritional status, some precision is lost. This lack of precision, reported in the baseline study, is worth recalling.

Weight for age indicates global past and present malnutrition but cannot discriminate between *chronic* and *acute* malnutrition. If wt/ht is low and ht/age is high, a normal wt/age indicator will fail to detect presently underfed children, who are relatively tall. When weight for age is low, weight for age indicators correctly discriminate underfed children, except for children with normal wt/ht and low ht/age, who are *short,* but with past history of malnutrition (WHO 1979: 16-17).

Z-scores or standard deviations (SD) are the units of measurement used in the baseline and mid-term survey to determine the nutritional status of children.[3] V*ery* low weight for age children are more than 2 standard deviations below the median weight for age of the reference population, also referred to as *moderate* malnutrition (under -2 SD to -3 SD), while *severe* malnutrition is under -3 SD. *Low* weight for age children are between 1 to 2 standard deviations below the median weight for age and normal children are from 1 standard deviation below the median to 1 standard deviation above the median weight for age.

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[3] Z-scores are preferred because they have the statistical property of being normally distributed, providing meaningful averages and standard deviations from the mean. The proportion of the population that falls below a Z-score of -2 is compared with the reference population in which 2.3 % fall below this cut-off point. Percentiles are rarely normally distributed and as a result, interpretation of the percentage of median is not consistent across the different levels of age and anthropometric measurements (Krick 1986). Gómez classification uses percentiles in reference to the median of the reference population. Categories are described as normal, Degree I (slight malnutrition), II (moderate malnutrition) and III (acute malnutrition). This terminology was used in the PROMI project proposal but modified during the period. However, at the beginning of writing the 1993 study, it was not possible to determine contradictory information from SESPAS regarding the reference population used by PROMI/SESPAS in the growth curve charts. SESPAS wt/age curve did not match the NCHS curve.

The reference population used in this study is the one defined by the National Center on Health Statistics (NCHS) and recommended by the World Health Organization (WHO). Measurements of the reference population have been standardized to make the median and the mean converge.[4] The reference population has a normal distribution with a mean of zero and a SD of 1. The electronic software used for building the data base and for calculating Z-scores in reference to the NCHS population has been EPI-INFO in 1995 and ANTHRO in 1993.[5]

For the analysis of malnutrition data WHO recommendations have been followed. Three age groups are described: newborns to 11.9 months of age, children 12.0 to 23.9 months, and 24.0 to 35.9 months of age. Nevertheless, such a subdivision of children into three age categories requires large samples. In 1993, each age-category was large enough so that differences of proportions could be measured and the effects of the sampling design (not a simple random sample) would not bias results. Size reduction in the Midterm 1995 evaluation, particularly in control communities, together with a larger proportion of children under one year of age in the control group, make it difficult to verify impact if all age groups are aggregated. This is so because data from 1993 show lower proportions of malnutrition for the younger 0 - 11 months age group.

2.4.3 FINDINGS AND ANALYSIS OF MALNUTRITION PREVALENCE

Table 2.4 presents the nutritional status of children for the three age categories within PROMI and control communities. Children with moderate and severe malnutrition (under -2 SD) are grouped in one category, children with low malnutrition (-2 SD to less than -1 SD) are reported separately, and children with normal and high level of nutrition (-1 and more SD) are collapsed.

In 1993 and in 1995, there is a moderate statistical association between age of children and their nutritional status. The group under one year of age presents the lowest proportion of severe and moderate malnutrition, while children 12 to 23 months present the highest proportion. This pattern repeats itself for children from PROMI and control communities, although in 1995 the small sample size in control communities does not allow for a reliable analysis of nine different categories as shown in Table 2.4.

The longitudinal analysis of the data provides sufficient evidence to conclude that malnutrition has declined in PROMI communities. Moderate and severe malnutrition for children 0 - 11.9 months of age declined by one-third, from an initial 9.4% in 1993 to 6.4% in 1995. For children 12.0 - 23.9 months, there is a reduction of 4.2% from the initial 19.5% of moderate and severe malnutrition to 15.3% in 1995. For PROMI communities, moderate and severe malnutrition also declined for the 24.0 - 35.9 months age group by 3.7%, from an initial 16.8% in 1993 to 13.1% in 1995. All findings are statistically significant at the p-value <.05.

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[4] The choice of a reference population against which the nutritional status of children of different cultures and races can be measured is based on the assumption that for any population of preadolescent children, the pattern of growth is similar.

[5] Design effects and confidence intervals in 1993 were calculated in PC-CARD.

TABLE 2.4

CHANGES IN MODERATE AND SEVERE, LOW AND NORMAL NUTRITIONAL STATUS BY CHILD AGES 0-11, 12-23 AND 24-35 MONTHS, BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

	PRE-PROMI II November 1993									IMPACT DIFFERENCES 1995-1993		
AGE GROUPS IN MONTHS	TOTAL		Nutritional Status %						LEVEL OF SIGNIFICANCE 1993			
			< - 2 SD		- 2 SD to < - 1 SD		- 1 SD and more			< -2 SD	-2 SD to < -1 SD	- 1 SD and and more
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%				
PROMI												
0 - 11	3,168	100.0	298	9.4	616	19.4	2,254	71.2	CC: .2225****	-3.0 *	2.3 n.s.	0.7 n.s.
12 - 23	2,914	100.0	568	19.5	904	31.0	1,442	49.5		-4.2 *	3.1 n.s.	1.1 n.s.
24 - 35	2,770	100.0	465	16.8	751	27.1	1,554	56.1		-3.7 *	5.9 **	-2.2 n.s.
TOTAL	8,852	100.0	1,331	15.0	2,271	25.7	5,250	59.3				
CONTROL										**CONTROL***		
0 - 11	593	100.1	66	11.1	127	21.4	400	67.6	CC: .19086****	NON-CONCLUSIVE		
12 -23	678	100.0	127	18.8	201	29.6	350	51.6				
24 - 35	612	100.0	105	17.2	173	28.2	334	54.6				
TOTAL	1,883	100.0	298	15.8	501	26.6	1,084	57.6				

	MID-PROMI II-September 1995								
PROMI	TOTAL		Nutritional Status %						LEVEL OF SIGNIFICANCE 1995
			< - 2 SD		- 2 SD to < - 1 SD		- 1 SD and more		
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	
0 - 11	392	100.0	25	6.4	85	21.7	282	71.9	CC: .24626****
12 - 23	328	100.0	50	15.3	112	34.1	166	50.6	
24 - 35	397	100.0	52	13.1	131	33.0	214	53.9	
TOTAL	1,117	100.0	127	11.4	328	29.4	662	59.3	
CONTROL									
0 - 11	84	100.0	4	4.8	15	17.9	65	77.4	NOT SIGNIFICANT
12 -23	61	100.0	7	11.4	16	26.2	38	62.2	
24 - 35	63	100.0	6	9.5	20	31.7	37	58.8	
TOTAL	208	100.0	17	8.2	51	24.5	140	67.3	

NOTE: * NC = Non-conclusive because of small cell cases for 1995 data.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

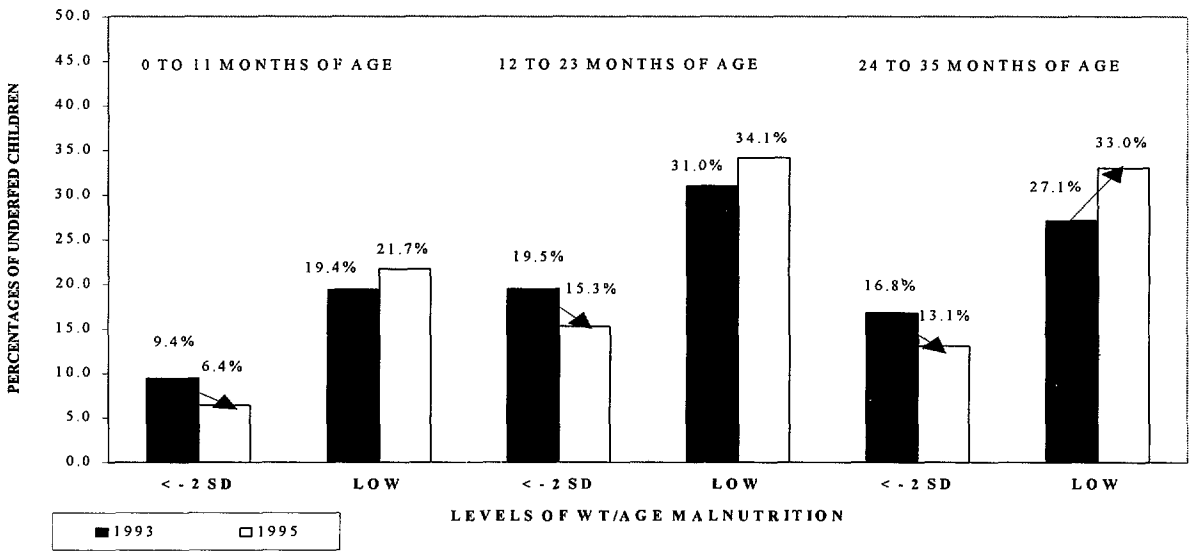
SOURCES: Household Survey, August 22 to September 30, 1993 and KBAP Survey, August 31 to September 18, 1995.

In control communities, (where only one of the nine cells from the 1995 contingency table reaches 50 cases), the null hypotheses of no difference among the three levels of malnutrition for the three age groups are not conclusive. The consequence is that historical effects cannot be ruled out as alternative explanation of results.

An analysis of children with *low* malnutrition (-2 SD to less than -1 SD) shows no impact in PROMI communities during the 1993-1995 period for children ages 0 - 11.9 and 12.0 - 23.9 months. However, the proportion of children 24.0 - 35.9 months of age with low malnutrition has improved an additional 5.9% from the 27.1% base line statistic. Figure 2.3 illustrates program impact in PROMI communities.

FIGURE 2.3

CHANGES IN WEIGHT FOR AGE MODERATE AND SEVERE, AND LOW LEVELS OF MALNUTRITION IN PROMI COMMUNITIES FOR THE POPULATION OF CHILDREN AGES 0-11, 12-23 AND 24-35 MONTHS OF AGE FOR THE 1993-1995 PERIOD *



NOTE: * Arrows represent statistically significant changes

Global prevalence of malnutrition is presented by Table 2.5 in PROMI and control communities. A longitudinal analysis provides evidence to conclude that prevalence of moderate and severe malnutrition diminished from 15.2% of children 0 - 35.9 months to 10.9% in best PROMI and comparable control communities. The longitudinal analysis shows a statistically significant reduction of 4.3% of the children with moderate and severe malnutrition in 1993, significant at the p-value of $< .0001$.

Table 2.5 also provides malnutrition prevalence for the different age groups. These data are reported because of the association between age of children and nutritional status. Prevalence of moderate and severe levels of malnutrition decreased for each age group. For the 0 - 11.9 months, prevalence of 9.7% was reduced to 6.1%; for the 12.0 - 23.9 months group prevalence was reduced from 19.3% to 14.7%; and for the 24.0 - 35.9 months age group, from 16.9% to 12.6%. Figure 2.2 illustrates reduction of moderate and severe malnutrition in PROMI communities and prevalence statistics with control and PROMI data collapsed.

2.4.4 MALNUTRITION AND PROMI PARTICIPATION

Table 2.6 presents data on moderate and severe malnutrition by two levels of mothers' participation in PROMI, analyzed separately for PROMI and control communities. For the 1993-95 period, the reduction in moderate and severe levels of malnutrition is not statistically significant in PROMI communities if data are partitioned between mothers with past or present participation and mothers who have never joined the program. This lack of significance may be explained because mothers who do not join the program tend to be less poor and their children better fed, than those mothers willing to participate in project activities and receive food supplements.

2.5 FURTHER ANALYSIS OF THE DATA

The DHS-DR 1991 Survey indicates the highest level of moderate and severe malnutrition prevalence in the country are found in the three Health Regions where PROMI operates. In 1991, urban and rural children under 5 years of age showed a prevalence of 20.9% moderate and severe malnutrition. However, comparisons of our findings with those of the DHS Survey must take into consideration the rural background and different age groups involved in PROMI's reference population. In 1993, the aggregated indicator of malnutrition of 2 standard deviations below the median for the three PROMI Health Regions in the 1993 Household Survey was 15.2%. In 1995, this indicator was lowered to 10.9% in best PROMI and control communities.

2.6 GROWTH MONITORING

2.6.1 PROJECT ACTIVITY

Growth monitoring is a project activity which PROMI staff supervise; in the last two years, staff have delegated the activity to trained mothers and SESPAS staff. Through this activity, children's weight for age is monitored and recorded on a monthly basis until they reach 3 years of age. PROMI gives each participant mother a growth monitoring card where weight measurements of her child are recorded. The main purpose of the card is as a learning tool. Learning how to read this card is important if mothers are to become knowledgeable about and responsible for their children's development.

TABLE 2.5

CHANGES IN GLOBAL PREVALENCE OF DIFFERENT LEVELS OF MALNUTRITION AND AGE GROUPS, FOR PROMI AND CONTROL COMMUNITIES IN 1993 AND 1995

LEVEL OF MALNUTRITION	PRE-PROMI 1993 THREE HEALTH REGIONS		MID-PROMI 1995 BEST PROMI AND CONTROL COMMUNITIES		IMPACT DIFFERENCES	
	FREQ	PREVALENCE	FREQ	PREVALENCE	DIFF	TEST ST/a
GLOBAL PREVALENCE/b						
MODERATE AND SEVERE	1,629	15.2	144	10.9	-4.3 ****	-4.67
ALL THREE LEVELS	4,401	41.0	523	39.5	-1.5 n.s.	-1.07

MODERATE AND SEVERE	PRE-PROMI 1993		MID-PROMI 1995		IMPACT DIFFERENCES	
	FREQ	PREVALENCE	FREQ	PREVALENCE	DIFF	TEST ST
0-11 MONTHS	364	9.7	29	6.1	-3.6 **	-2.72
12-23 MONTHS	695	19.3	57	14.7	-4.7 *	-2.25
24-35 MONTHS	570	16.9	58	12.6	-4.2 **	-2.34
ALL THREE LEVELS						
0-11 MONTHS	1,107	29.4	129	27.1	-2.3 n.s.	-0.98
12-23 MONTHS	1,800	50.1	185	47.6	-2.6 n.s.	-0.88
24-35 MONTHS	1,494	44.2	209	45.4	1.3 n.s.	0.47

NOTES: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. Prevalence for 1995 does not represent prevalence in the three Health Regions as it does in 1993. It represents prevalence in best PROMI communities and comparable control cmmunities.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: Household Survey, August 22 to September 30, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 2.6

CHANGES IN THE RELATIONSHIP BETWEEN PROMI PARTICIPATION AND CHILDREN WITH MODERATE AND SEVERE MALNUTRITION FOR THE 1993-1995 PERIOD

DESCRIPTION	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	MOTHER'S PARTICIPATION				MOTHER'S PARTICIPATION				MOTHER'S PARTICIPATION			
	NEVER		PAST OR PRESENT		NEVER		PAST OR PRESENT		NEVER	PAST OR PRESENT	NEVER	PAST OR PRESENT
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
PROMI												
2 SD OR MORE	827	86.3	1,204	83.6	219	90.5	771	88.1	--	--		
< - 2 SD	107	11.2	203	14.1	23	9.5	104	11.9	-1.7 n.s.	-2.2 n.s.	-0.79	-1.54
NO ANSWER	24	2.5	34	2.3	--	--	--	--				
TOTAL	958	100.0	1,441	99.9	242		875	100.0				
CONTROL/b												
2 SD OR MORE	738	86.9	155	83.3	191	91.8	--	--	--	--		
< - 2 SD	101	11.9	14	7.5	17	8.2	--	--	-3.7 *	--	-1.68	
NO ANSWER	10	1.2	17	9.1	--	--	--	--	--	--		
TOTAL	849	100.0	186	100.0	208	100.0						

LEVEL OF CONFIDENCE

	PRE-PROMI II	MID-PROMI II
PROMI	NOT SIGNIFICANT	NOT SIGNIFICANT
CONTROL	SIGNIFICANT CC: .13207*	--

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. Control communities for the 1993 Survey included children whose mothers had past participated in PROMI I.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

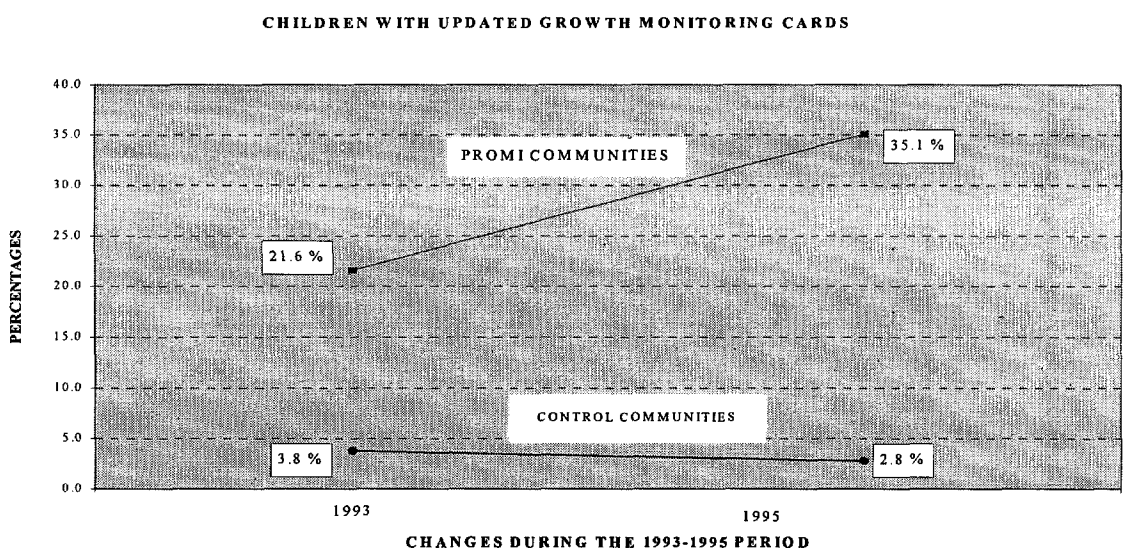
SOURCES: Household Survey, August 22 to September 30, 1993 and KBAP Survey, August 31 to September 18, 1995.

2.6.2 UPDATE OF GROWTH MONITORING CARDS

Table 2.7 provides data on children with updated growth monitoring cards at time of survey. At T1 and T2, there are statistically significant differences between the proportions of children with updated growth cards and those without cards or not updated. In 1995 the gap between children from PROMI and control communities is wider. A longitudinal test of the period 1993-1995 provides evidence to conclude that an additional 13.5% of the children from PROMI communities have updated cards. 21.6% of children had updated cards in 1993; in 1995 the proportion reaches 35.1% in best PROMI communities. In control communities, no statistical change could be verified from a low proportion of 3.8% in 1993. Figure 2.4 illustrates changes for the 1993-1995 period.

FIGURE 2.4

CHANGES IN THE PROPORTION OF CHILDREN WITH UPDATED GROWTH MONITORING CARDS BY PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD



2.6.3 ABILITY TO READ THE GROWTH MONITORING CARD

Mothers' abilities to read the curve is taken as an indicator of understanding and awareness of children's developmental growth. Without this awareness, it is less likely that mothers will change beliefs and practices to improve children's nutritional status. To measure mothers' ability to read the weight for age curve, two different indicators were tested at T1 and T2. Mothers were asked to explain the meaning of an ascending direction in a standard growth monitoring card. Second, they were asked to explain the meaning of the curve of a child who was located under the acute malnutrition curve.

TABLE 2.7

CHANGES IN THE PROPORTION OF CHILDREN WITH UPDATED GROWTH MONITORING CARDS BYSAMPLE DOMAINS FOR THE 1993-1995 PERIOD

GROWTH MONITORING CARD	PRE-PROMI II November 1993				MID-TERM September 1995				SAMPLE Differences			LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL		PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%		TEST ST	TEST ST
WITH UPDATED CARDS/b	501	21.6	39	3.8	399	35.1	6	2.8	13.5 ****	-1.0	n.s.	8.15	-0.77
WITHOUT CARD OR NOT UPDATED	1,815	78.4	987	96.2	737	64.9	207	97.2	-	-			
TOTAL	2,316	100.0	1,026	100.0	1,136	100.0	213	100.0					

LEVEL OF SIGNIFICANT

	PRE-PROMI II	MID-PROMI II	
UPDATED CARD	SIGNIFICANT P-VALUE: .0001	SIGNIFICANT CC: .38853****	

NOTES: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. In 1995, the 35.1% of total children from PROMI communities with updated cards is a collapsed category of 18.6% children with updated cards in their homes and 16.5% children with updated cards at the rural clinics.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

Table 2.8 provides the findings. At T1 and T2, there are statistically significant differences between the proportion of mothers who never participated in PROMI and those with past or present participation. In both years, a higher proportion of mothers with PROMI participation can read the growth card; however the gap is greater in 1995. Nevertheless, the longitudinal analysis for the period 1993-1995 provides evidence to conclude that mothers' ability has largely decreased for participants and non-participants alike. An additional 16.1% of non-participant and 14.5% of participant mothers cannot read the growth curve.

An explanation of the reduction of mothers' ability may be found in two different trends. In the last year, PROMI staff have trained a few mothers from each community in the time-consuming task of weighing the children and recording their weights in the growth cards. This practice gives staff time for other educational activities and encourages mothers' self-reliance and sustainability in the long term. However, it seems that mothers are not trained to teach other mothers to understand the growth curve, or that they are not being effective at this task.

A second trend which may be lowering mothers' ability to read the growth curve is the practice, heavily discouraged by PROMI staff, of SESPAS staff at some rural clinics keeping the cards. In 1995, from the 35.1% of children from PROMI communities with updated cards, only 18.6% had the cards in their homes. The remaining 16.5% were kept at rural clinics (Table 2.8). Respondents affirm that SESPAS staff keep the cards so that mothers will not loose them. As a result, in 1995 a smaller proportion is capable of understanding the cards than in 1993.

2.7 MOTHERS' PARTICIPATION IN SUPPORT AND DEVELOPMENT GROUPS

PROMI II began with a concern for sustainability by asking the question: what type of interventions directed to achieve attitudinal and behavioral changes at a community level would continue after LOP? Focus on sustainability is rooted in lack of institutionalization of governmental public services and prevalence of a political clientelistic and paternalistic culture, among other factors.[6] The project has promoted the formation of support groups for lactating mothers and development community organizations with focus on primary health care. Through community organizations, women are expected to change their behavior and "own" rural clinics, using and demanding better public services. The emphasis on organization and self-reliance plays down the use of food as an incentive to program participation.

To measure attitudinal changes associated with self-determination, seven items were constructed to operationalize the variable *self-reliance* at T1 and T2.[7] Conceptually, self-reliance stands for the Spanish *autogestión*, or the process by which men and women address objective reality to transform it.

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[6] See PROSANA base line study for a description of Dominican political culture (Tejada 1995).

[7] Attitudinal variables related to self-reliance are operationalized in the questionnaire by items 301 through 307. Item 308 gathers data on current participation in development or service organizations.

TABLE 2.8

MOTHERS' ABILITY TO READ THE ANTHROPOMETRIC WEIGHT/AGE CURVE BY PARTICIPATION IN PROMI FOR THE 1993-1995 PERIOD

GROWTH MONITORING CARD/a	PRE-PROMI II November 1993				MID-PROMI II September 1995				SAMPLE Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b	
	Mothers' Participation				Mothers' Participation				Mothers' Participation		Mothers' Participation	
	Never		Past/Present		Never		Past/Present		Never	Past/Present	TEST ST	TEST ST
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%		
PROMI												
CAN'T READ CURVE	633	77.6	658	58.4	193	93.7	509	72.9				
READS ONE OR TWO LEVELS/a	183	22.4	468	41.6	13	6.3	189	27.1	-16.1 ****	-14.5 ****	-7.21	-6.49
TOTAL	816	100.0	1,126	100.0	206	100.0	698	100.0				
CONTROL												
CAN'T READ CURVE	555	75.8	84	55.3	161	92.0	--	--				
READS ONE OR TWO LEVELS	177	24.2	68	44.7	14	8.0	--	--				
TOTAL	732	100.0	152	100.0	175	100.0	--	--				

LEVEL OF CONFIDENCE

	PRE-PROMI II	MID-PROMI II
PROMI	SIGNIFICANT P-VALUE: <.0001	SIGNIFICANT CC: .20469****
CONTROL	SIGNIFICANT CC: .16949****	--

NOTES: b. Levels are defined by the ability to read changes in weight gained or lost and by the ability to properly locate moderate and severe weight/age malnutrition.

a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) =-1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: Household Survey, August 22 to September 30, 1993 and KBAP Survey, August 31 to September 18, 1995.

Table 2.9 presents data on attitudes of self-reliance and participation in community organizations. In 1993, the higher educational level and standard of living of mothers in clinic versus non-clinic and control communities, did not automatically translate into higher scores in the self-reliance items.[8] Data in 1993 concluded that items measuring self-reliance were not statistically different between mothers from PROMI (clinic and non-clinic) and control communities, (with one exception). In 1995, two items are statistically different: a higher proportion of mothers from PROMI communities belong to associations. Also, a higher proportion of mothers from control communities think that associations are important for community development. The latter finding may be a demonstration effect in control communities from the increased number of associations in nearby PROMI communities.

A longitudinal analysis for the 1993-1995 period indicates PROMI's impact in community building and self-reliance in three areas: increasing the proportion of women who feel that the poor can change their situation, from 72.1% to 79.6%; increasing the proportion of women who define themselves as leaders or active in community affairs, from 16.0% to 21.1%; and increasing the proportion of organized mothers, from 16.7% to 25.9%. All other items did not change, with the exception of a 5.9% reduction in the proportion of mothers from PROMI communities who believe that they can choose family size. In control communities, the only longitudinal change is the additional 6.8% of women who feel that associations are important to improve their communities.[9]

Changes in attitudes are difficult to influence because of the high proportion of women with positive self-reliance attitudes at project start. Thus, increasing the participation of mothers in associations and community affairs is no small achievement. Changing behaviors is a harder task than changing attitudes. The program increased the proportion of mothers in associations to more than one in four, and the proportion of mothers defining themselves as active or community leaders to more than one in five. In control communities, women associated or self-defined as leaders did not increase, even though half of the mothers reported that associations are important to improve their communities.

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[8] In 1993, a scale was constructed with these items using factor analysis and a principal component method of extraction. However, a low coefficient of .70 reliability resulted, (Crombach 1951) mainly because items mixed attitudes and behavior, which do not necessarily correlate.

[9] This last attitudinal change is not consistent with the behavioral data on family planning presented in Chapter 2.

TABLE 2.9

CHANGES IN SELF RELIANCE ITEMS BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD*

ITEM No.	SELF-RELIANCE ATTITUDES	PRE-PROMI II November 1993		MID-PROMI II* September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645	
		PROMI	CONTROL	PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
		%	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
1	THE UNITED POOR CAN CHANGE THEIR SITUATION	72.1	73.2	720	79.6	132	75.4	7.5 ****	2.2 n.s.	4.45	0.62
2	ASSOCIATIONS ARE IMPORTANT TO IMPROVE OUR COMMUNITY	39.0	43.5	348	38.5	88	50.3	-0.5 n.s.	6.8 *	-0.25	1.65
3	WOMEN MUST BELONG TO ASSOCIATIONS JUST LIKE MEN	75.5	74.0	669	74.0	124	70.9	-1.5 n.s.	-3.1 n.s.	-0.85	-0.83
4	SELF-DEFINITION AS LEADER OR ACTIVE IN COMMUNITY AFFAIRS	16.0	17.0	191	21.1	36	20.6	5.1 ***	3.6 n.s.	3.20	1.09
5	WE CAN CHOOSE THE NUMBER OF CHILDREN WE WANT TO HAVE	76.7	70.8	640	70.8	120	68.6	-5.9 ***	-2.2 n.s.	-3.29	-0.58
6	A PERSON'S SOCIOECONOMIC STATUS DEPENDS ON INDIVIDUAL EFFORT	74.4	74.7	653	72.2	123	70.3	-2.2 n.s.	-4.4 n.s.	-1.23	-1.18
7	PLANNING IS BETTER THAN TAKING THINGS AS THEY COME	80.6	77.6	727	80.4	135	77.1	-0.2 n.s.	-0.5 n.s.	-0.13	-0.14
	SELF RELIANCE BEHAVIOR										
8	PRESENTLY ASSOCIATED TO A DEVELOPMENT OR SERVICE GROUP	16.7	16.5	234	25.9	25	14.3	9.2 ****	-2.2 n.s.	5.45	-0.75

LEVELS OF SIGNIFICANCE

ITEMS	PRE-PROMI II	MID-PROMI II
ITEM 2	NOT SIGNIFICANT	SIGNIFICANT AT P< .01
ITEM 5	SIGNIFICANT AT P< .001	NOT SIGNIFICANT
ITEM 8	NOT SIGNIFICANT	SIGNIFICANT AT P< .01
ITEMS 1,3,4,6 AND 7	NOT SIGNIFICANT	NOT SIGNIFICANT

NOTE: *Sample size for mothers clinic and non-clinic communities in the 1993 KBAP Survey is 1926 and for control communities 921. For the 1995 Survey, sample size for mothers is 904 from PROMI communities and 175 from control communities.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

2.8 CONCLUSIONS

PROMI's efforts to expand the project outreach in the last 22 months are evident in the increased coverage of eligible mothers and children. Individual participation in PROMI activities and participation in grass roots associations are both up. Community participation is an important aspect of the program, given that individual beliefs and values are difficult to change if dominant negative values remain unchanged. During the 1993-1995 period, the proportion of mothers with children under 3 years of age participating in PROMI increased from 60.5% to 77.2% in best PROMI communities, and children's participation during their first year of life increased an additional 22.2%. In 1993, only 16.7% of the mothers belonged to an organized group. This proportion statistically increased to 25.9% in best PROMI communities and did not increase in control ones.

Participation in PROMI did not change the 13% prevalence of low birth weight for all communities and 12% in PROMI communities. However, when data are partitioned by mothers who have never participated in PROMI and those with past or present participation, a statistically significant reduction of 2.5% in the proportion of children with low birthweight from mothers with past or present participation in PROMI was verified. This is a hard-to-achieve program goal, given the multicausality of birthweight and the fact that the socioeconomic situation of the mothers has not been altered by PROMI. A reduction of 2.5% in the proportion of low birthweight of past or present participants is important. It is a decline in an initial 13.7%. Data from Chapter 3 on prenatal control further support the thesis that low birthweight has been reduced due to better health care for pregnant women.

The increased proportion of children with growth monitoring cards is related to increased coverage. To be an active participant, each child must have a record of his or her growth card. Nevertheless, the program strives not only to keeps updated records, but also to make mothers responsible for monitoring their children's growth. Results reflect a 13.5% increase in the proportion of children with updated growth cards in PROMI communities. However, this finding is accompanied by a reduction in the proportion of mothers capable of understanding at least one level of the growth curve. This decline is due to several reasons: (1) the practice of delegating growth monitoring and food distribution to trained mothers with the supervision of SESPAS staff; and (2) the practice of using color ribbons to identify the nutritional status of the child. Colors are easier to understand for mothers with low educational background.

A cross-sectional analysis of the data at T1 and T2 provides evidence of a statistically significant association between age of children and their nutritional status. The younger group, age 0 -11 months, has the lowest proportion of weight for age malnutrition and the middle group, age 12 - 23 months, the highest proportion.

The longitudinal analysis during the 22 months of program implementation provides evidence that severe and moderate weight for age malnutrition has declined in PROMI communities by 3.0%, 4.2% and 3.7% for the 0-11, 12-23 and 24-35 months age groups, respectively. However, low weight for age malnutrition did not decline for the three age groups combined or separated, and increased for the oldest group. In the stratum of children 24-35 months, a statistically

significant increase of 5.9% is likely to reflect the proportion of children with moderate and severe malnutrition, previously malnourished, who grew older in the 22 months; but it may also reflect a proportion of normally fed children losing weight during the 22 month period. An assignation of causation to PROMI's intervention can not be verified or rejected because the partitioning of data results in very small cell frequencies for the control group.

Reduction of low birthweight in children born to PROMI participants and reduction of severe and moderate malnutrition are the likely effects of radical changes: promotion of health services to the rural poor; shifting responsibilities from health staff to the people themselves; and PROMI focus and follow up of children with moderate and severe malnutrition. Nevertheless, the major cause of malnutrition was not attacked by the program: poverty itself. These results indicate that it is possible to reduce malnutrition through education and better provision of health services alone. In fact, given that the period of review is only 22 months, this study is presently measuring effects in children 22-35 moths of age who are counted as participants but who were beneficiaries of PROMI I and not of PROMI II. Since PROMI I was only a food distribution program, better results could occur when a longer 35 month period is measured in PROMI II.

CHAPTER 3

MATERNAL CHILD HEALTH CARE

3.1 INTRODUCTION

This chapter discusses the program's impact on prenatal care, child vaccinations, control of diarrheal disease including homemade and packaged ORT's, and control of pneumonia.

3.2. PRENATAL AND POST PARTUM CONTROL

3.2.1 PRENATAL CARE

Early prenatal care has improved. Table 3.1 provides data for mothers with children under 1 year of age who received at least one prenatal check-up during the first trimester of pregnancy of their most recent child. While in 1993 and 1995 there was no significant difference between mothers from PROMI and control communities receiving at least one prenatal check-up during the first trimester, in 1995, 71% of the mothers from PROMI and 62% of the mothers from control communities did so. This is a statistically significant addition of 6.5% of project mothers receiving prenatal control. Prenatal care for the complete nine month pregnancy reached 97.3% and 94.3% for PROMI and control communities in 1993, which increased to practically total coverage in both types of communities in 1995.

The project has been similarly successful in encouraging mothers to make use of facilities and services for prenatal control at rural clinics. Table 3.2 provides responses to a multiple choice question about the type of persons and/or institutions mothers visited for prenatal control. In 1993, there were no statistically significant differences in the percentages of mothers who visited physicians in hospitals and private clinics in PROMI and control communities. In 1995, an additional 18.4% of mothers from control communities visited physicians in hospitals. There are statistically significant differences in the proportion of mothers from both PROMI and control communities who visited rural clinic physicians in 1993 and 1995. In 1995, a statistically significant increment of 18.7% of mothers from PROMI communities and an additional decline of 11.1% of mothers from control communities make the gap wide indeed: in PROMI communities, 69.2% of the mothers visited rural clinics; in control communities, only 26.2% did.

Mothers from PROMI communities visited rural clinics more often than any other institution, in both 1993 and 1995, while mothers from control groups, farther away from rural clinics, visited hospitals more frequently than any other institution. Globally, rural clinics received a larger proportion of visits for prenatal care than any other institution at T1 and T2. On the other hand, the small percentage of mothers who visit nurses and other persons for their prenatal control remains under 2.4% for PROMI and 1.2% for control communities.

TABLE 3.1

WOMEN WITH CHILDREN UNDER ONE YEAR OF AGE WHO RECEIVED AT LEAST ONE PRENATAL CHECK-UP DURING THE FIRST THREE MONTHS OF PREGNANCY OF THEIR MOST RECENT CHILD BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

PRENATAL CARE DURING 0 - 3 MONTHS OF PREGNANCY	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645*	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
PRENATAL CONTROL	474	64.4	142	54.2	276	71.0	52	61.9	6.5 *	7.7 n.s.	2.26	1.26
NO PRENATAL CONTROL	262	35.6	120	45.8	113	29.0	32	38.1	--	--		
TOTAL	736	100.0	262	100.0	389	100.0	84	100.0				

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II	
PRENATAL CONTROL	NOT SIGNIFICANT	NOT SIGNIFICANT	

NOTE: *When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 3.2

MOTHERS WITH CHILDREN UNDER ONE YEAR OF AGE WHO RECEIVED PRENATAL CARE DURING THEIR COMPLETE PREGNANCY BY INSTITUTION VISITED, BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

CARE DURING COMPLETE PREGNANCY	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
RECEIVED CARE	716	97.3	248	94.3	384	98.7	83	98.8	1.4 n.s.	4.5 **	1.73	2.43
NO CARE	20	2.7	15	5.7	5	1.3	1	1.2	--	--		
TOTAL	736	100.0	263	100.0	389	100.0	84	100.0				
TYPE OF CARE/b												
PHYSICIAN FROM RURAL CLINIC	372	50.5	98	37.3	269	69.2	22	26.2	18.7 ****	-11.1 *	6.28	-1.96
PHYSICIAN FROM HOSPITAL	268	36.4	102	38.7	159	40.9	48	57.1	4.5 n.s.	18.4 **	1.47	2.98
PHYSICIAN FROM PRIVATE CLINIC	149	20.2	65	24.6	108	27.8	27	32.1	7.6 **	7.5 n.s.	2.80	1.31
NURSE	8	1.1	5	1.8	8	2.1	1	1.2	1.0 n.s.	-0.6 n.s.	1.22	-0.44
OTHER	2	0.3	2	0.8	1	0.3	0	0.0	0.0 n.s.	-0.8 n.s.	0.15	-1.46

LEVEL OF CONFIDENCE

	PRE-PROMI II	MID-PROMI II
RECEIVED CARE	CC: .09139*	NOT SIGNIFICANT
RURAL CLINIC	CC: .16079****	CC: .31974****
HOSPITAL	NOT SIGNIFICANT	CC: .12435**
PRIVATE CLINIC	NOT SIGNIFICANT	NOT SIGNIFICANT
NURSE	NOT SIGNIFICANT	NOT SIGNIFICANT
OTHER	NOT SIGNIFICANT	NOT SIGNIFICANT

NOTES: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. Multiple answer question.

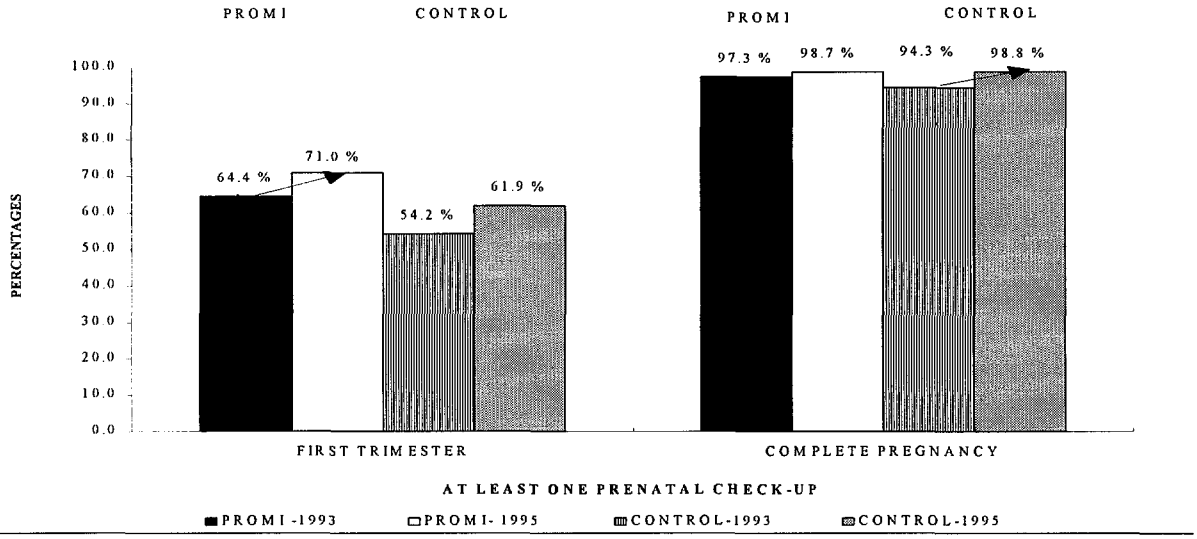
P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

Figure 3.1 illustrates findings on prenatal care for the most recent child of women with children under one year of age, for PROMI and control communities. Figure 3.2 illustrates types of health centers visited for prenatal care for the same subpopulation of women; multiple centers may be visited by the mother during her complete pregnancy.

FIGURE 3.1

MOTHERS WITH CHILDREN UNDER ONE YEAR OF AGE WHO RECEIVED AT LEAST ONE PRENATAL CHECK-UP DURING THE FIRST TRIMESTER AND DURING THE COMPLETE PREGNANCY OF THEIR MOST RECENT CHILD BY PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD*



* Arrows represent statistically significant changes.

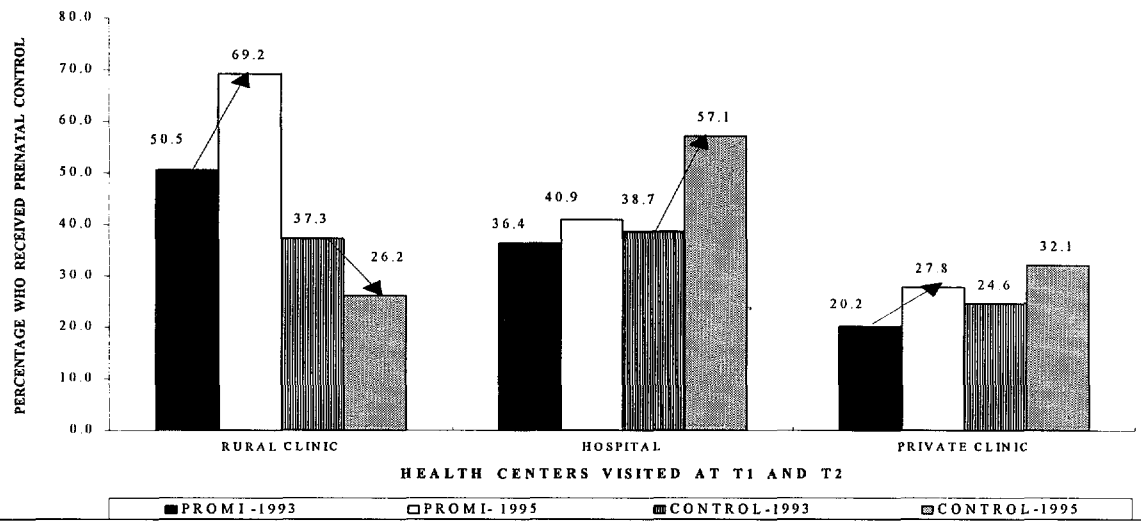
3.2.2 TETANUS TOXOID VACCINE

There is a general trend toward total immunization of pregnant women. Table 3.3 presents data on biological mothers under 50 years of age who received at least two doses of tetanus toxoid vaccine during their last pregnancy. There is a statistically significant difference between the percentages of mothers who received at least two doses of the vaccine from PROMI and control communities in 1993, but not in 1995. In 1993, 85.4 % of the mothers from PROMI communities were covered, against 80.1 % from control communities; in 1995, these figures experienced a statistically significant increase, reaching 91.9% and 91.4% respectively.

The DHS-DR 1991 Survey reports a global 76.2 % coverage for the five year period previous to the survey in PROMI Health Regions for rural and urban populations. The KBAP Survey percentage for the three years previous to the survey is a global 83.7 % in 1993 and 91.8% in 1995 for best PROMI and control communities. Thus, findings indicate a trend toward total coverage in recent years.

FIGURE 3.2

HEALTH CENTERS VISITED BY MOTHERS WITH CHILDREN UNDER ONE YEAR OF AGE DURING THE COMPLETE PREGNANCY OF THEIR MOST RECENT CHILD BY PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD*



* Arrows represent statistically significant changes.

3.2.3 KNOWLEDGE AND BELIEFS OF HIGH RISK PREGNANCY

Women were asked to describe at least three signs of high risk pregnancy. Table 3.4 provides knowledge and beliefs for the 12 most frequently reported answers, given spontaneously; those not precoded are not presented in the table.

In 1995, the proportion of mothers who could correctly identify 3 signs of risk diminished in both PROMI and control communities. Globally, only 16.1 % of the mothers could correctly identify at least three signs of high risk pregnancy in 1993 and 4.0% in 1995. However, all mothers could identify one or two signs. Table 3.4 also presents individual responses of mothers who identified each of the high risk symptoms. In 1993, statistically significant differences between PROMI and control communities are only found for four symptoms; in 1995 no differences are found.

The most generally recognized symptoms of high risk, both in 1993 and 1995 are *hemorrhaging,* followed by *lower back pain.* Other symptoms are recognized by less than 7% of the respondents in 1995. Recognition of hemorrhaging increased an impressive additional 25.6% for women in PROMI and 14.9% in control communities, but a lower proportion of mothers were capable of recognizing other symptoms, in both PROMI and control communities.

TABLE 3.3

BIOLOGICAL MOTHERS WITH CHILDREN UNDER 3 YEARS OF AGE WHO HAD RECEIVED AT LEAST TWO DOSIS OF TETANUS TOXOID VACCINE DURING THEIR LAST PREGNANCY, BY SAMPLE DOMAINS, FOR THE 1993-1995 PERIOD

TETANUS VACCINE	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645*	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
TWO OR MORE	1,444	85.4	624	80.1	831	91.9	160	91.4	6.5 ****	11.3 ****	5.23	4.43
ONE OR NONE	247	14.6	155	19.9	73	8.1	15	8.6	--	--		
TOTAL	1,691	100.0	779	100.0	904	100.0	175	100.0				

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II	
TWO OR MORE DOSIS	SIGNIFICANT CC: 0.06696*	NOT SIGNIFICANT	

NOTE: *When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 3.4

CHANGE IN KNOWLEDGE OF HIGH RISK PREGNANCY OF BIOLOGICAL MOTHERS OF CHILDREN UNDER THREE YEARS OF AGE, BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

SIGN OF RISK IDENTIFIED BY BIOLOGICAL MOTHERS	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
CORRECTLY IDENTIFIES 3 SIGNS	251	14.7	152	19.2	41	4.6	2	1.1	-10.1 ****	-18.0 ****	-9.17	-11.19
IDENTIFIES 2 SIGNS OR LESS	1,461	85.3	640	80.8	859	95.4	173	98.9	--	--		
TOTAL	1,712	100.0	792	100.0	900	100.0	175	100.0				
PERCENTAGE THAT IDENTIDIFIED THE FOLLOWING SIGNS:												
1.- NONE OR LITTLE WEIGHT GAIN	9	0.5	4	0.5	20	2.2	0	0.0	1.7 ***	-0.5 *	3.22	-1.92
2.- INSUFFICIENT ABDOMEN GROWTH	10	0.6	3	0.3	12	1.3	0	0.0	0.7 *	-0.3 *	1.70	-1.66
3.- PERMANENT FATIGUE/b	82	4.8	27	3.1	61	6.8	7	4.0	2.0 *	0.9 n.s.	2.02	0.54
4.- VAGINAL SECRETIONS WITH BAD ODOR/b	35	2.1	33	3.8	20	2.2	1	0.6	0.1 n.s.	-3.2 ****	0.25	-3.60
5.- FEVER	55	3.2	13	1.5	8	0.9	1	0.6	-2.3 ****	-0.9 n.s.	-4.38	-1.25
6.- URINE WITH BLOOD, TURBID OR WITH BAD ODOR/b	196	11.5	59	6.8	21	2.3	3	1.7	-9.2 ****	-5.1 ****	-10.01	-3.88
7.- LOWER BACK PAIN	508	29.8	252	29.2	264	29.3	49	28.0	-0.5 n.s.	-1.2 n.s.	-0.26	-0.33
8.- CONVULSIONS	31	1.8	11	1.3	2	0.2	1	0.6	-1.6 ****	-0.7 n.s.	-4.55	-0.96
9.- SWELLING OF FACE AND FEET	46	2.7	15	1.7	42	4.7	6	3.4	2.0 **	1.7 n.s.	2.48	1.15
10.-EXAGGERATED WEIGHT GAIN	2	0.1	3	0.3	1	0.1	0	0.0	0.0 n.s.	-0.3 *	-0.13	-1.66
11.-HEADACHES WITH HAZY VISION	138	8.1	78	9.0	49	5.4	6	3.4	-2.7 **	-5.6 ***	-2.69	-3.31
12.-HEMORRHAGING/b	593	34.8	364	42.2	544	60.4	100	57.1	25.6 ****	14.9 ****	12.84	3.60

NOTES: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. Statistically significant differences between mothers responses from PROMI and control communities for the 1993 survey. There were no differences for the 1995 survey.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

3.2.4 POST PARTUM CONTROL

Table 3.5 provides data on postpartum control during the first 2 months following childbirth. In 1993, there was no statistically significant difference in postpartum visits to mothers from PROMI and control communities with children 2-11 months of age; but there is in 1995, due to a reduction of 13.0% of mothers from control communities. Thus, there is a trend towards disappearance of postpartum control in non-PROMI communities.

In PROMI communities, 30.2 % of the mothers received postpartum control in 1993 (a proportion substantially smaller than the proportion of mothers with prenatal control). The null hypothesis of no difference between the proportion of mothers from PROMI communities receiving postpartum control in 1993 and 1995 could not be rejected; however there is sufficient evidence to conclude that the program has been effective in maintaining 1993 levels against a declining trend in non-PROMI communities.

3.3 CHILDREN'S VACCINATIONS

The target population for measuring children's vaccinations is children 12 to 23 months of age. Mothers were asked to show the immunization card for each child under two years of age. Responses from mothers without cards or not available at time of survey were also recorded. It is acknowledged that recall of this type of data tends to inflate coverage.

Table 3.6 provides the percentage distribution of children with immunization cards. There is a statistically significant difference between children with cards from PROMI and non-PROMI communities. In 1993, a higher proportion of 50.0% of children from PROMI communities had cards. During the 22 month period, an additional 20.2% of children from control communities had immunization cards. For both types of communities, the proportion of children ages 12-23 months with immunization cards increased from 46.5% in 1993 to 52.4% in 1995. Causation of results can not be directly assigned to PROMI, but to SESPAS immunization campaigns to which PROMI contributed logistic and managerial support.

Table 3.7 presents the global percentage of children ages 12 to 23 months from PROMI and control communities who have received each of the required vaccination for complete immunization. Data are collapsed for both types of communities because no statistically significant difference was found at T1 and T2. In 1995, there is a statistically significant increase in best PROMI and control communities for all individual vaccinations. Measles vaccination coverage reached 78.9% and BCG coverage reached 89.6% of the children. Polio and DPT require booster doses. Data from 1993 show high coverage for the first doses; subsequent doses sharply decline, so that only 53.6% of the children received 4 doses of polio and 50.5% received the three doses of DPT. In 1995 there is an impressive increase in the proportion of children receiving all required doses in control and PROMI communities; an additional 24.2% of children received Polio-3 booster and an additional 25.2% received the three doses of DPT. As a result, coverage of all individual vaccinations is at least 75% with all booster doses.

TABLE 3.5

CHANGES IN MOTHERS WITH CHILDREN 2 - 11 MONTHS OF AGE WHO RECEIVED AT LEAST ONE POSTPARTUM CHECK-UP DURING THE FIRST TWO MONTHS FOLLOWING CHILD BIRTH BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645*	
POST PARTUM	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
FIRST TWO MONTHS	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
POST-PARTUM CONTROL	202	30.2	63	27.3	103	26.5	12	14.3	-3.7 n.s.	-13.0 ****	-1.30	-4.21
WITHOUT CONTROL	467	69.8	168	72.7	281	72.2	72	85.7				
NO ANSWER	0	0.0	0	0.0	5	1.3	0	0.0				
TOTAL	669	100.0	231	100.0	389	100.0	84	100.0				

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II
POST-PARTUM CONTROL	NOT SIGNIFICANT	SIGNIFICANT CC: .12063*

NOTE: *When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 3.6

CHILDREN WITH IMMUNIZATION CARDS AT TIME OF SURVEY FOR AGE
CLASS 12 - 23 MONTHS OF AGE BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
WITH CARDS/b	398	50.0	144	39.0	164	51.1	35	59.3	1.1 n.s.	20.2 **	0.33	2.94
WITHOUT CARDS	398	50.0	225	61.0	157	48.9	24	40.7	--	--		
TOTAL	796	100.0	369	100.0	321	100.0	59	100.0				

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II	
WITH CARDS	SIGNIFICANT CC: .1061**	NOT SIGNIFICANT	

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. Excludes children whose cards were not available at time of survey.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 3.7

CHILDREN 12 TO 23 MONTHS OF AGE WHO HAD RECEIVED BCG, POLIO-3, DPT-3 AND MEASLES VACCINATIONS INDIVIDUALLY AT TIME OF SURVEY FOR PROMI AND CONTROL COMMUNITIES DURING THE 1993-1995 PERIOD/a

VACCINATIONS	T1		T2		T2 - T1	
	PRE-PROMI II November 1993		MID-PROMI II September 1995		IMPACT Differences	LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b
	PROMI AND CONTROL/c		PROMI AND CONTROL		PROMI AND CONTROL	PROMI AND CONTROL
	FREQ.	%	FREQ.	%	%	TEST STATISTIC
MEASLES	857	72.9	302	78.9	6.0 **	2.42
BCG	878	74.7	343	89.6	14.9 ****	7.38
POLIO-BIRTH	962	81.9	353	92.2	10.3 ****	5.79
POLIO-1	998	84.9	347	90.6	5.7 ****	3.13
POLIO-2	795	67.7	335	87.5	19.8 ****	9.10
POLIO-3	630	53.6	298	77.8	24.2 ****	9.40
DPT-1	940	80.0	349	91.1	11.1 ****	5.97
DPT-2	763	64.9	335	87.5	22.6 ****	10.30
DPT-3	593	50.5	290	75.7	25.2 ****	9.58

NOTES: a. For the 1995 Survey, sample size is n=324 for PROMI communities and n=59 for control communities. For the 1993 Survey, sample size is 786 for PROMI communities and 389 for control communities.

b. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

c. No significant differences were found between PROMI and control communities at T1 and T2

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

Table 3.8 presents data on children 12 to 23 months of age who had received the complete series of BCG, POLIO, DPT and measles vaccinations at the time of the survey. There is no significant difference between children's immunization schemes in PROMI and control communities at T1 and T2. A global 36.6 % of the children had completed all required vaccinations before two years of age in 1993 and a statistically significant higher proportion of 61.9% in 1995. Nevertheless, data are presented by sample domains.

There is a statistically significant and substantive additional increase in the proportion of children receiving the complete series, up 24.4% for PROMI and 23.7% for control communities. Results indicate that SESPAS/PROMI-supported immunization campaigns in the last 22 months have been largely successful. This achievement is more dramatic if baseline coverage is considered since 1991. Using a similar age group and data collection method, the DHS-DR 1991 found a national coverage of 37 %.

Figure 3.3 illustrates findings in increased immunization for children from PROMI and control communities. Vaccinations are presented individually as well as the complete immunization scheme for children from 12 to 23 months of age.

FIGURE 3.3

CHANGES IN VACCINATIONS, INDIVIDUALLY AND COMPLETE SERIES, FOR CHILDREN 12 TO 23 MONTHS OF AGE FROM PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD

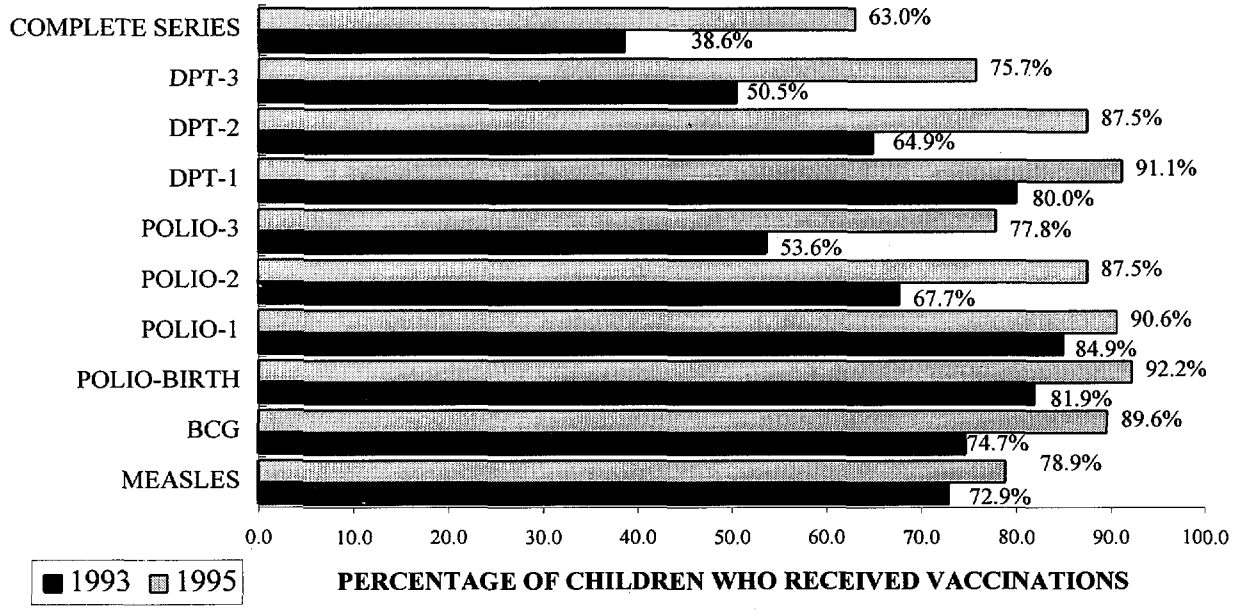


TABLE 3.8

CHANGES IN CHILDREN 12 TO 23 MONTHS OF AGE WHO HAD RECEIVED BCG, POLIO-3, DPT-3, AND MEASLES VACCINATIONS (COMPLETE SERIES) AT TIME OF SURVEY BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD/a

IMMUNIZATION CARD	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
COMPLETE SERIES	307	38.6	119	32.2	204	63.0	33	55.9	24.4 ****	23.7 ****	7.65	3.43
INCOMPLETE SERIES	489	61.4	250	67.8	120	37.0	26	44.1				
TOTAL	796	100.0	369	100.0	324	100.0	59	100.0				

LEVEL OF SIGNIFICANCE

	PRE-PROMI	MID-PROMI
COMPLETE SERIES	NOT SIGNIFICANT	NOT SIGNIFICANT

NOTES: a. Data collected through immunization cards and mothers' oral reports.

b. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then $-Z(.05) = -1.645$. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

3.4 CONTROL OF DIARRHEAL DISEASES (CDD)

3.4.1 PROJECT MESSAGES AND INDICATORS

Control of diarrhea is one of PROMI's goals, given that diarrhea may cause malnutrition, dehydration and death. PROMI encourages children's continued regular intake of nutrients, particularly breastfeeding for those lactating. PROMI teaches mothers to recognize signs of *slight*, *moderate* and *acute* dehydration, to prepare both industrial ORT solutions and to feed them to diarrhetic children. For acute dehydration, PROMI advises hospitalization and intravenous solutions.

The presence of diarrhea has been measured for a period of two weeks before the survey. Indicators of different variables measuring control of diarrhea were applied to the population of diarrhetic children only.

3.4.2 DIARRHEA INCIDENCE

The indicator for diarrhea has been collected at T1 and T2 for all children under 3 years of age in the two weeks previous to the survey and data are provided in Table 3.9. In 1993, diarrhea incidence in PROMI and control communities was 24.2 %. No statistically significant difference in the proportion of diarrhetic children from clinic, non-clinic and control communities was verified in baseline data. In 1995, there is still no significant difference between children with diarrhea from PROMI and control communities; for all communities it is 23.6%. Longitudinally, the trend is decreased; however, incidence of diarrhea did not decline in the last 22 months substantively or in a statistically significant way.[1]

3.4.3 PREVENTION OF DEHYDRATION BY ORT

Table 3.10 provides data on the proportion of children who had diarrhea and received ORT two weeks prior to the survey. In 1993 there was a statistically significant difference between the proportions of children treated with ORT from PROMI and control communities: in control communities, 11.3 % of diarrhetic children received the solution as opposed to 28.5% in PROMI communities. In 1995 there is no statistically significant difference between PROMI and control communities due to an additional 12.8% of diarrhetic children from control communities treated with oral solutions. Globally, during the 22 month period the proportion of mothers feeding ORT to their diarrhetic children increased from 22.9% to 29.1%.

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[1] In theory, other factors such as time of the year in which the data were collected or coincidence with epidemic episodes may affect the data. However, in this study, this type of confounding is less likely, given that seasonal changes in the area from September to November are not significant and children are selected by the application of systematic intervals to account for all sectors inside each community. Additionally, the sampling frame comprises a very large selection of communities. Thus, sample size and sample selection is not likely to affect results. Only in control communities in 1995 sample size was reduced to 19 communities. However, this is still a good sampling frame size, and findings for diarrhea incidence were exactly replicated in the larger PROMI sample.

TABLE 3.9

CHANGES IN THE PROPORTION OF ILL CHILDREN TWO WEEKS PRIOR TO THE SURVEY BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

DESCRIPTION	PRE-PROMI II Nov-93				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
FEVER OR COUGH	1,142	47.0	525	50.5	622	55.2	118	55.7	8.2 ****	5.2 n.s	4.57	1.39
TOTAL CHILDREN	2,430	100.0	1,040	100.0	1,127	100.0	212	100.0				
PNEUMONIA	659	27.1	361	34.7	397	35.2	65	30.7	8.1 ****	-4.0 n.s.	4.81	-1.14
TOTAL CHILDREN	2,430	100.0	1,040	100.0	1,127	100.0	212	100.0				
DIARRHEA	562	23.1	263	25.3	266	23.6	50	23.6	0.5 n.s.	-1.7 n.s.	0.33	-0.53
TOTAL CHILDREN	2,430	100.0	1,040	100.0	1,127	100.0	212	100.0				
DIARRHEA, PNEUMONIA OR FEVER	1,074	44.2	488	46.9	643	57.1	121	57.1	12.9 ****	10.2 **	7.20	2.72
TOTAL CHILDREN/b	2,430	100.0	1,040	100.0	1,127	100.0	212	100.0				
PNEUMONIA INCIDENCE	29.4				32.9				3.5 n.s.		1.34	
CASES	1,020				462							
DIARRHEA INCIDENCE	24.2				23.6				-0.6 n.s.		-0.21	
CASES	825				316							

LEVEL OF SIGNIFICANCE

DESCRIPTION	PRE-PROMI II	MID-PROMI II
WITH FEVER/COUGH	NOT SIGNIFICANT	NOT SIGNIFICANT
PNEUMONIA	SIGNIFICANT CC: .15184****	NOT SIGNIFICANT
DIARRHEA	NOT SIGNIFICANT	NOT SIGNIFICANT
DIARRHEA/PNEUMONIA OR FEVER	SIGNIFICANT	NOT SIGNIFICANT

NOTES: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. In 1993 control data was slightly higher due to the elimination of nonresponse cases when using PC-CARD to calculate design effects.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 3.10

CHANGES IN TREATMENT OF DIARREHIC CHILDREN BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

ORT TREATMENT	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
ORT TREATMENT	154	28.5	29	11.3	80	30.1	12	24.0	1.6 n.s.	12.8 *	0.47	2.01
NO ORT TREATMENT	387	71.5	227	88.7	186	69.9	38	76.0	--	--		
TOTAL	541	100.0	256	100.0	266	100.0	50	100.0				
DAYS WITH DIARRHEA												
TWO OR LESS	145	25.8	61	22.6	87	32.7	17	34.0	6.9 *	11.4 n.s.	2.02	1.59
THREE DAYS	162	28.8	85	31.5	62	23.3	12	24.0	-5.5 *	-7.5 n.s.	-1.71	-1.12
FOUR OR MORE	255	45.4	124	45.9	117	44.0	21	42.0	-1.4 n.s.	-3.9 n.s.	-0.38	-0.51
TOTAL	562	100.0	270	100.0	266	100.0	50	100.0				
NUMBER OF DAYS ORT WAS GIVEN												
TWO DAYS OR LESS	89	57.4	16	51.6	43	53.8	4	33.3	-3.7 n.s.	-18.3 n.s.	-0.54	-1.12
THREE DAYS	26	16.8	4	12.9	24	30.0	4	33.3	13.2 *	20.4 n.s.	2.23	1.37
FOUR DAYS OR MORE	33	21.3	6	19.4	13	16.3	3	25.0	-5.0 n.s.	5.6 n.s.	-0.96	0.39
NO RESPONSE	7	4.5	5	16.1	0	0.0	1	8.3	--	--		
TOTAL	155	100.0	31	100.0	80	100.0	12	100.0				
TIMES IN ONE DAY ORT WAS GIVEN												
ONCE	1	0.6	1	1.7	2	2.5	0	0.0	1.9 n.s.	-1.7 n.s.	1.02	-0.72
TWICE	18	11.6	6	20.4	6	7.5	3	25.0	-4.1 n.s.	4.6 n.s.	-1.05	0.32
THREE TIMES	40	25.8	3	9.8	21	26.3	1	8.3	0.5 n.s.	-1.5 n.s.	0.08	-0.16
FOUR OR MORE	66	42.6	15	51.2	46	57.5	7	58.3	14.9 *	7.1 n.s.	2.19	0.42
AFTER EACH DEFECATION	23	14.8	2	7.9	5	6.3	0	0.0	-8.5 *	-7.9 n.s.	-2.16	-1.60
NO RESPONSE	7	4.5	3	8.9	0	0.0	1	8.3	--	--		
TOTAL	155	100.0	30	99.9	80	100.0	12	100.0				
BREAST FEEDING PRACTICE OF DIARREHIC CHILDREN												
CONTINUED OR INCREASED BREASTFEEDING	174	89.7	61	79.2	98	93.3	26	92.9	3.6 n.s.	13.6 *	1.11	2.03
DECREASED OR STOP BREASTFEEDING	20	10.3	16	20.8	7	6.7	2	7.1	-3.6 n.s.	-13.6 *	-1.11	-2.03
TOTAL	194	100.0	77	100.0	105	100.0	28	100.0				

LEVEL O SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II
ORT TREATMENT	SIGNIFICANT CC: .19547****	NOT SIGNIFICANT
DAYS WITH DIARRHEA	SIGNIFICANT CC: .28082**	NOT SIGNIFICANT
NUMBER OF DAY ORT GIVEN	NOT SIGNIFICANT	SIGNIFICANT CC: .41515*
TIMES IN ONE DAY ORT GIVEN	SIGNIFICANT CC: .30274*	SIGNIFICANT CC: .34446*

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected.
For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

The effectiveness of ORT is largely dependent on length and frequency of administration during the diarrhetic episodes. Table 3.10 also provides data on duration of diarrhea and length and frequency of ORT administration. Diarrhetic episodes shortened in PROMI communities, decreasing the proportion of children with three days of diarrhea by a statistically significant 5.5% to two or less days. In control communities declines are not statistically significant, but the trend in both types of communities is to shortened episodes.

The length of ORT administration between PROMI and control communities was not statistically significant in 1993 but is in 1995. In PROMI communities, the proportion of children fed ORT for three days increased an additional 13.2%. Changes in other categories could not be verified due to low cell frequencies. Frequency of administration is provided in Table 3.10 by four categories with statistically significant differences at T1 and T2. There is an additional 14.9% of diarrhetic children in PROMI communities receiving ORT four or more times per day in 1995. Data from control communities are not reliable due to small frequencies for this subpopulation.

Findings support the conclusion that in 1995 the proportion of children receiving ORT in PROMI communities is close to 1/3 of the children who need it in PROMI communities and 1/4 in control communities. There is a significant improvement in PROMI communities in increasing the proportion of children fed ORT four or more times per day.

3.4.4 PREVENTION OF MALNUTRITION BY PROPER BREASTFEEDING

Data on diarrhetic children's feeding pattern were collected for infants still breastfeeding. Table 3.10 presents the proportion of children whose mothers continued or increased breastfeeding during diarrhea episodes against those children with decreased or discontinued breastfeeding. In 1995, an additional 13.6% of mothers in control communities maintained or increased breastfeeding during diarrhea episodes. Less than 7% of mothers in both types of communities decreased or stopped breastfeeding when their children had diarrhea.

3.4.5 ABILITY TO PREVENT DIARRHEA IN CHILDREN

Table 3.11 provides multiple spontaneous answers to the question on how diarrhea can be prevented in children.[2] In 1993, the most frequently mentioned means to avoid diarrhea in PROMI communities were boiling water, avoiding flies in food, hand washing and bathing the child frequently. By omission, only 1.1% of the mothers considered breastfeeding as a method of avoiding diarrhea and 0.3% were aware of environmental problems caused by lack of toilets or latrines. The most dramatic changes are the additional 30.5% of mothers from PROMI and 25.4% from control communities who mentioned boiling infants bottles; the additional 18.3% from PROMI and 13.3% from control communities who mentioned "keeping proper household hygiene"; and the additional 16.5% from PROMI and 16.8% from control communities who mentioned "proper nutrition" as means to avoid diarrhea.

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[2] All mothers are included in the calculation of these percentages. In the baseline study of 1993, percentages excludes 31% of mothers who said that diarrhea could not be prevented. Thus, proportions from the baseline report and for the impact study for 1993 do not match.

TABLE 3.11

KNOWLEDGE AND BELIEFS OF MEANS TO AVOID DIARRHEA IN CHILDREN INDICATED BY MOTHERS' MULTIPLE ANSWERS BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD/a

CORRECT PRECODED ANSWERS/a	PRE-PROMI II November 1993		MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b	
	PROMI AND CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
BREASTFEEDING	31	1.1	15	1.7	1	0.6	0.6 n.s.	-0.5 n.s.	1.22	-0.86
HAND WASHING	465	16.3	67	7.4	12	6.9	-8.9 ****	-9.5 ****	-8.01	-4.66
USING LATRINES RATHER THAN THE OPEN GROUND	8	0.3	1	0.1	0	0.0	-0.2 *	-0.3 ***	-1.15	-2.83
AVOIDING FLIES IN FOOD	722	25.4	193	21.3	28	16.0	-4.0 ****	-9.4 ****	-2.53	-3.24
BOILING WATER	887	31.2	249	27.5	55	31.4	-3.6 ****	0.3 n.s.	-2.10	0.08
BATHING THE CHILD FREQUENTLY	314	11.0	64	7.1	7	4.0	-3.9 ****	-7.0 ****	-3.81	-4.41
USING A GOOD-LUCK CHARM	7	0.2	0	0.0	0	0.0	-0.2 ***	-0.2 ***	-2.65	-2.65
BOILING BOTTLES	107	3.8	310	34.3	51	29.1	30.5 ****	25.4 ****	18.87	7.35
PROPER NUTRITION	41	1.4	162	17.9	32	18.3	16.5 ****	16.8 ****	12.73	5.75
KEEPING PROPER HOUSEHOLD HYGIENE	13	0.5	170	18.8	24	13.7	18.3 ****	13.3 ****	14.05	5.09
AVOIDING OILY FOOD	19	0.7	63	7.0	14	8.0	6.3 ****	7.3 ****	7.32	3.57
GIVING LAXATIVES	10	0.4	12	1.3	1	0.6	1.0 n.s.	0.2 n.s.	2.46	0.38
OTHER	721	25.3	56	6.2	14	8.0	-19.1 ****	-17.3 ****	-16.73	-7.85

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II
ALL VARIABLES	NOT SIGNIFICANT	NOT SIGNIFICANT

NOTES: a. Percentages are taken from the total number of respondents for both years.

b. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

3.4.6 RECOGNITION OF DEHYDRATION IN DIARRHETIC CHILDREN

Table 3.12 provides the proportion of mothers capable of recognizing none, 1 or 2, and 3 or more signs of dehydration in diarrhetic children. There is a statistically significant increase in the proportion of mothers who can recognize three to six signs of dehydration. An additional 14.1% of mothers from PROMI and 11.5% from control communities are capable of recognizing 3 to 6 signs of dehydration and almost all mothers can recognize at least one sign. Individually, in 1995, 54.4% of mothers from PROMI communities can recognize sunken eyes; 12.2% fallen fontanel; 65.2% weight loss, 23.1% dried mouth and 2.0% urination as signs of dehydration. In control communities percentages are lower, except for weight loss. Some mothers were able to identify other signs of dehydration, mainly loss of appetite, feebleness, sadness, vomiting, or skin dryness and crying without tears. A large proportion of mothers from both types of communities can now identify dehydration as a result of the project.

3.4.7 ABILITY TO PREPARE ORT SOLUTIONS

Table 3.13 presents the proportion of mothers who reported correct step-by-step preparation of the packaged ORT solution.[3] There is a statistically significant increase of 5.5% of mothers from PROMI communities who can correctly report preparation of the package ORT solution. This finding implies that half the mothers from PROMI know the correct preparation of the ORT packaged solution, although only 1/3 of the mothers with diarrhetic children fed the solution to their children. In control communities, knowledge is significantly lower than in PROMI communities. Knowledge of step-by-step preparation of ORT homemade solution increased to 13% in both types of communities.

To find beliefs that could explain obstacles to ORT, mothers were asked: "In case you believe that diarrhea is caused by *evil eyes* or by *witches* would you continue feeding the ORT solution?" Also presented in Table 3.13, the proportion of mothers who would continue ORT regardless of beliefs increased by 12.0% of mothers in PROMI and 6.8% in control communities. Thus in 1995, there is a statistically significant difference between 61.6% of mothers from PROMI and 47.4% from control communities who would continue ORT regardless of beliefs. These findings support the conclusion that beliefs which are likely to affect mothers' behavior with undesirable side effects for their children's health have decreased. Project activities have been a contributing factor in neutralizing the strength of beliefs.

Main findings on CDD are graphically provided by Figure 3.4. Data are presented for PROMI and control communities during the 1993-1995 period.. Statistically significant changes are represented by arrows in the direction of the change.

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[3] Proportions are presented for all mothers, including those who said they did not know and were not questioned about individual steps. For this reason, 1993 data reported in the baseline study differ from percentages presented in table 3.13.

TABLE 3.12

CHANGES IN ABILITY TO RECOGNIZE SIGNS OF
DEHYDRATION BY SAMPLE DOMAINS FOT THE 1993-1995 PERIOD

RECOGNIZE SIGNS OF DEHYDRATION	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/*	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
NONE	211	11.0	106	11.4	38	4.2	6	3.4	-6.8 ****	-8.0 ****	-6.92	-4.62
RECOGNIZE 1 TO 2 SIGNS	1,381	71.7	694	74.7	582	64.4	126	72.0	-7.3 ****	-2.7 n.s.	-3.86	-0.73
RECOGNIZE 3 TO 6 SIGNS	334	17.3	121	13.0	284	31.4	43	24.6	14.1 ****	11.5 ***	7.96	3.36
NO RESPONSE	0	0.0	8	0.9	0	0.0	0	0.0	--	--		
TOTAL	1,926	100.0	929	100.0	904	100.0	175	100.0				

LEVEL OF CONFIDENCE

	PRE-PROMI	MID-PROMI
RECOGNIZES DIFFERENT SIGNS OF DEHYDRATION	NOT SIGNIFICANT	SIGNIFICANT CC: .12311**

NOTE: *When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE 3.13

CHANGES IN ABILITY TO PREPARE PACKAGED AND HOME MADE ORT SOLUTIONS AND BELIEF THAT AFFECT ORT BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

VARIABLE	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
PACKAGED ORT												
STEP-BY-STEP PREAPARATION/b	886	46.0	332	36.0	466	51.5	70	40.0	5.5 **	4.0 n.s.	2.76	0.98
DOESN'T KNOW HOW	1,040	54.0	589	64.0	438	48.5	105	60.0	--	--		
TOTAL	1,926	100.0	921	100.0	904	100.0	175	100.0				
HOME MADE ORT												
STEP-BY-STEP PREPARATION/b	4	0.2	7	0.8	119	13.2	24	13.7	13.0 ****	13.0 ****	11.47	4.95
DOESN'T KNOW HOW	1,922	99.8	917	99.2	785	86.8	151	86.3	--	--		
TOTAL	1,926	100.0	924	100.0	904	100.0	175	100.0				
IMPACT OF BELIEFS IN ORT												
CONTINUE ORT	956	49.6	374	40.6	557	61.6	83	47.4	12.0 ****	6.8 *	6.05	1.66
DISCONTINUE ORT	753	39.1	462	50.2	266	29.4	67	38.3	-9.7 ****	-11.9 **	-5.15	-2.95
DID NOT SHARE BELIEFS	201	10.4	71	7.7	76	8.4	25	14.3	-2.0 *	6.6 **	-1.75	2.36
DOESN'T KNOW HOW	16	0.8	14	1.5	5	0.6	0	0.0	--	--		
TOTAL	1,926	100.0	921	100.0	904	100.0	175	100.0				

LEVEL OF CONFIDENCE

	PRE-PROMI II	MID-PROMI II
PACKAGED ORT	NOT SIGNIFICANT	SIGNIFICANT CC: .08484**
HOME MADE ORT	NOT SIGNIFICANT	NOT SIGNIFICANT
BELIEFS	SIGNIFICANT	SIGNIFICANT

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

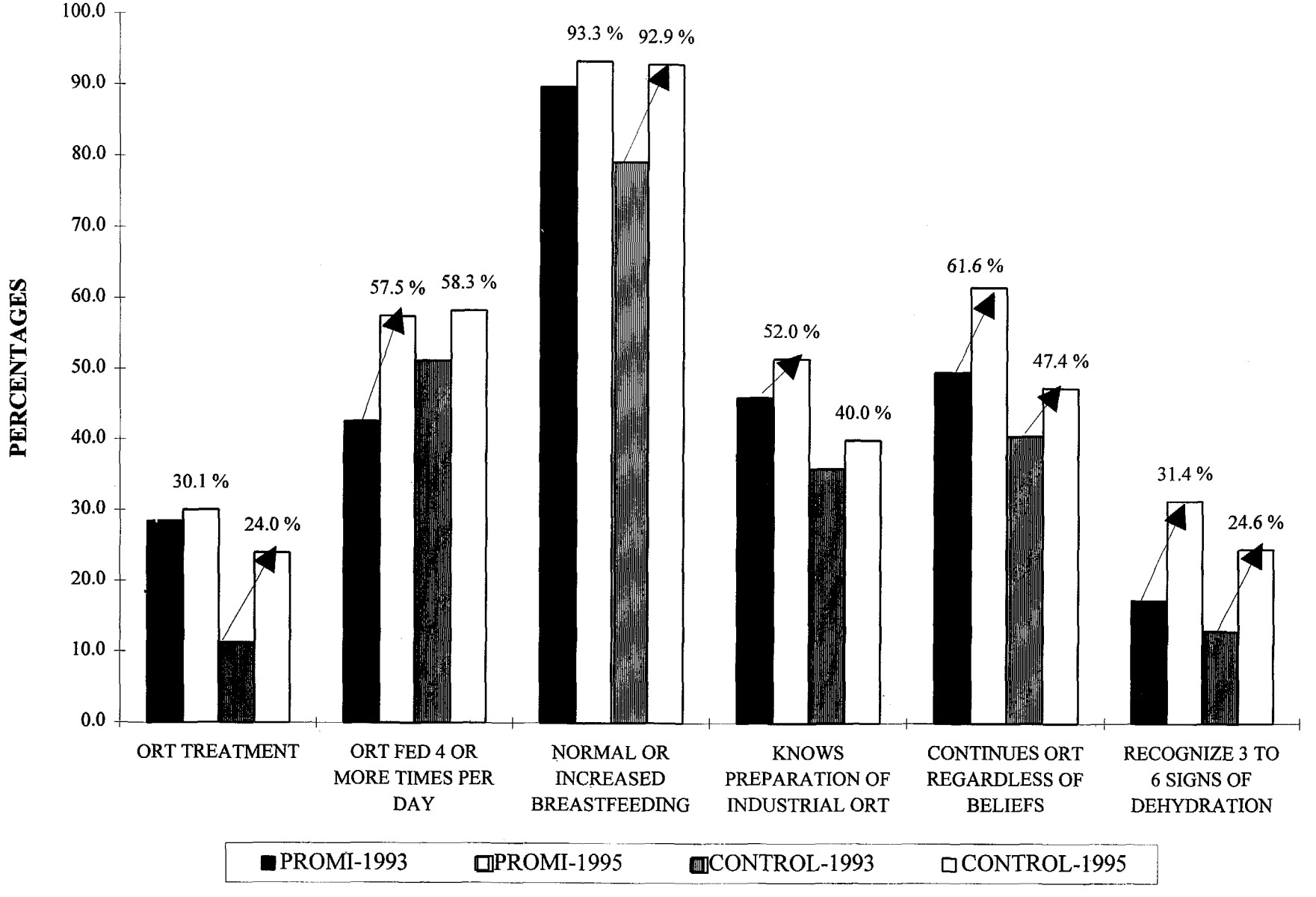
b. In the baseline study of 1993 percentages differ because they were calculated from the subpopulation of mothers who previously stated knowledge of package ORT preparation.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

FIGURE 3.4

CHANGES IN CDD BY PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD



3.5 CONTROL OF PNEUMONIA

3.5.1 INDICATORS

Pneumonia is measured in the study by symptoms of cough and short and rapid breathing two weeks previous to the survey. Indicators of control of pneumonia are measured by visits to health centers, intake of similar or greater amount of nutrients during pneumonia episodes, environment humidification and recognition of pneumonia symptoms.

3.5.2 INCIDENCE

Table 3.9 presents data on pneumonia. During the 1993-1995 period, there is no statistically significant change for the global indicator for pneumonia from the 1993 level of 29.4%; however, the non-significant change has a positive direction. When sample domains are analyzed separately, an additional 8.1% of the children had pneumonia in PROMI communities. The program had no impact in decreasing the incidence level. Given the multicausality of pneumonia, the program expects to teach mothers control of the infection and thus reduce the probability of death.

3.5.3 PNEUMONIA CONTROL TWO WEEKS PRIOR TO THE SURVEY

Table 3.14 provides data on pneumonia control. There is a statistically significant difference between mothers with children with pneumonia who sought help at health centers or sought expert advice in PROMI and control communities, at T1 and T2. During the 1993-1995 period, an additional 7.6% of mothers from PROMI communities sought treatment, reaching a high 72.3%. In control communities, the increase is not statistically significant, but is in a positive direction.

Table 3.14 also presents information on the pattern of feeding during such episodes. There is no statistically significant difference in the proportion of mothers from the different sample domains at T1 and T2 who increased, continued or decreased food intake. However, the longitudinal analysis reveals a trend in both types of communities of a falling proportion of mothers feeding less food to their children. In PROMI communities there is a statistically significant addition of children with pneumonia fed normal or larger amounts of food, while in control communities the addition is of normal feeding. In 1993, the majority of children with pneumonia were fed less; in 1995, 59.7% of children from PROMI and 61.5% from control communities were fed equal amounts or more food during the last pneumonia episode. Figure 3.5 presents findings on treatment of children with pneumonia for both PROMI and control communities. Arrows represent statistically significant changes.

TABLE 3.14

CHANGING PRACTICES IN TREATMENT, FEEDING AND ENVIRONMENTAL HUMIDIFICATION FOR CHILDREN WITH PNEUMONIA BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

DESCRIPTION	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
PERSON CONSULTED OR VISITED HEALTH CENTTER												
TREATMENT	427	64.7	179	49.6	287	72.3	36	55.4	7.6 **	5.8 n.s.	2.60	0.87
NO TREATMENT	233	35.3	182	50.4	110	27.7	29	44.6	--	--		
TOTAL	660	100.0	361	100.0	397	100.0	65	100.0				
FEEDING PRACTICE												
MORE FOOD	26	3.9	15	4.1	27	6.8	1	1.5	2.9 *	-2.6 n.s.	1.94	-1.41
SAME AMOUNT	267	40.5	136	37.6	210	52.9	39	60.0	12.4 ****	22.4 ***	3.95	3.40
LESS FOOD	366	55.5	210	58.0	155	39.0	24	36.9	-16.4 ****	-21.1 ***	-5.26	-3.23
NO RESPONSE	1	0.1	1	0.3	5	1.3	1	1.5	--	--		
TOTAL	660	99.9	362	100.0	397	100.0	65	100.0				
ENVIRONMENTAL HUMIDIFICATION												
HUMIDIFIER	83	12.6	37	10.2	15	3.8	0	0.0	-8.8 ****	-10.2 ****	-5.48	-6.42
NONE	577	87.4	324	89.8	375	94.5	65	100.0	--	--		
NO RESPONSE	0	0.0	0	0.0	7	1.8	0	0.0	--	--		
TOTAL	660	100.0	361	100.0	397	100.0	65	100.0				

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II	
VISITED HEALTH CENTER OR CONSULTED PERSON	SIGNIFICANT CC: .1328**	SIGNIFICANT CC: .12714**	
FEEDING PRACTICE	NOT SIGNIFICANT	NOT SIGNIFICANT	
ENVIRONMENT HUMIDIFICATION	NOT SIGNIFICANT	NOT SIGNIFICANT	

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

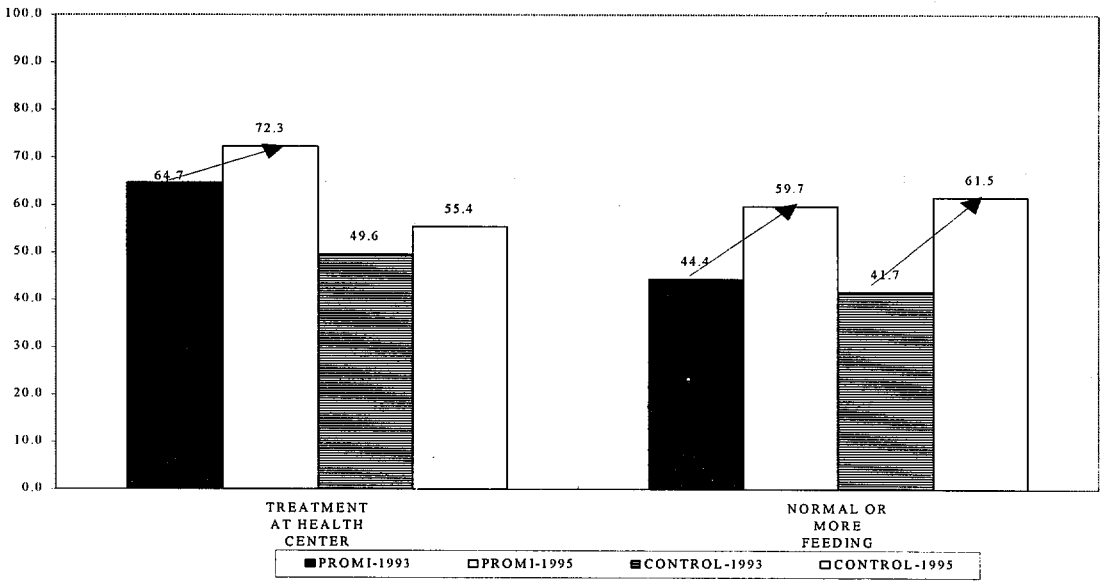
P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

CC: Chi-square based contingency coefficient

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

FIGURE 3.5

CHANGES IN TREATMENT OF CHILDREN WITH PNEUMONIA BY PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD



Another important aspect of pneumonia control is the humidity of the environment. For unknown reasons, there is a statistically significant decline in the humidification of the environment for both types of communities, reaching a low 3.8% in PROMI and 0% in control communities.

3.5.4 KNOWLEDGE OF PNEUMONIA SYMPTOMS

In 1995, during the two weeks previous to the survey, 55% of all children had cough, fever or both. It is important for mothers to be able to differentiate symptoms between acute and slight respiratory infection so they can seek expert help when needed. Table 3.15 provides data on mothers' recognition of pneumonia symptoms. In 1993, mothers from control communities could identify cough and rapid breathing in a statistically significant higher proportion than mothers from PROMI communities. In 1995 there is a statistically significant decline of 20.5% of mothers in control communities unable to recognize pneumonia symptoms, but not in PROMI communities. Data also indicate that at least 59.7% of mothers from PROMI and 50.9% from control communities recognize rapid breathing as one sign of pneumonia. These figures represent a statistically significant decline of 10.6 % of mothers from control communities, but not from PROMI communities. In both cases, the decline in control and not in PROMI communities points to some project impact in maintaining previous knowledge of recognition of pneumonia.

TABLE 3.15

CHANGES IN RECOGNITION OF PNEUMONIA SYMPTOMS

SYMPTOMS	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
CORRECT ANSWERS/b												
RECOGNIZES COUGH AND RAPID BREATHING	647	33.2	365	41.1	273	30.2	36	20.6	-3.0 n.s.	-20.6 ****	-1.59	-5.92
RECOGNIZES AT LEAST RAPID BREATHING	1,064	54.5	545	61.4	540	59.7	89	50.9	5.2 n.s.	-10.6 ****	2.62	-2.57
OTHER	599	30.7	248	28.0	338	37.4	83	47.4	6.7 ****	19.5 ****	3.49	4.79
NO ANSWER/DOES NOT KNOW	288	14.8	94	10.6	26	2.9	3	1.7	-11.9 **	-8.9 n.s.	-12.17	-6.23

LEVEL OF SIGNIFICANCE

	PRE-PROMI II	MID-PROMI II	
RECOGNITION OF SYMTOMS	SIGNIFICANT CC: 0.11220**	SIGNIFICANT CC: .13200**	

NOTE: a. When the critical valùe (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. Categories are not exclusive.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

3.6 CONCLUSIONS

Indicators for prenatal control provide sufficient evidence to conclude that the program had an impact, increasing the number of women who received at least one prenatal check-up during the first three months of pregnancy for their most recent child: 71.0% of mothers from PROMI and 61.9% from control communities receive this early control. During the entire pregnancy, medical controls include tetanus toxoid vaccinations for almost all pregnant women. Postpartum controls during the first two months following childbirth declined to very low proportions in control communities and PROMI's messages may explain the statistically non-significant decline in PROMI communities.

Mothers' awareness of risks during pregnancies was measured by their recognition of symptoms of high risk. All mothers can identify one or two signs, mainly hemorrhaging and lower back pain; very few mothers could identify three signs. The program had no impact in teaching mothers to recognize symptoms of high risk pregnancy such as low weight gain, insufficient abdomen growth, swelling, etc. On the other hand, the program had high impact in increasing mothers' visits to rural clinics for prenatal control, against a declining trend in mothers residing in non-PROMI communities.

Children's immunization has been analyzed for the population of children 12 to 23 months of age. Positive changes have been impressive. Individually, at least 3 out of 4 children of this age group had the last booster of DPT and Polio; 9 out of 10 had received BCG; and 8 out of 10, received measles vaccinations. Furthermore, 6 out of 10 children had received the complete immunization scheme. These data represent a remarkable improvement from the baseline data in 1993, increasing an additional 24% in both PROMI and control children with complete vaccination scheme. Causation on vaccination results can not be assigned to PROMI, yet the program has given logistical support to the rural clinics and, indirectly, has contributed to the vaccination campaigns.

Data on children's morbidity have been analyzed for pneumonia and diarrhea. There is no significant evidence to conclude that the program had impact in decreasing global incidence of pneumonia or diarrhea from 1993 morbidity indicators. However it is difficult to show impact on contagious infections with only two measurements, given that an epidemic may be affecting children in communities selected in 1995 and not in 1993. For this reason, improved care of ill children is a better indicator for program evaluation, as proper care is likely to reduce mortality risk for children with diarrhea and pneumonia.

There has been a statistically significant improvement in PROMI communities in increasing the proportion of mothers feeding ORT solutions to their diarrheic children four or more times per day, and in decreasing the proportion of children with three days of diarrhetic episodes to two or less days. Breastfeeding frequency of diarrhetic children increased or kept normal levels in control communities, making this breastfeeding pattern a generalized practice.

PROMI also had impact on pneumonia control. A statistically significant larger proportion of mothers with children with pneumonia from PROMI communities consult at Health Centers,

reaching 72.3% of the children affected in PROMI and 55.4% in control communities. Nutrition also improved in both types of communities, decreasing the proportion of mothers who fed less amounts of food during respiratory infection episodes. Causation for this improvement can not be assigned to the program, however. Humidification of the environment, a non-frequent practice in 1993, could hardly be measured with the smaller sample size in 1995.

Mothers' care of children with diarrhea and pneumonia is related to their ability to recognize symptoms of the illness and, in the case of diarrhea, on their knowledge of preparation of home made or industrial ORT solutions. During the 1993-1995 period, a statistically significant higher proportion of mothers reported household hygiene, proper nutrition and boiling infant bottles as means to protect children against diarrhea. Additionally, in 1995 almost all mothers recognize at least one sign of dehydration; and there is a statistically significant and substantive increase in the proportion of mothers who can recognize three to six signs of dehydration, with a higher increment in PROMI than in control communities.

PROMI had impact in training mothers to prepare industrial ORT solutions. Over one half of the mothers from PROMI communities are capable of preparing the packaged solution. The proportion of mothers capable of preparing the home-made solution is very low. Even though a larger statistically significant proportion of mothers from PROMI and control communities learned to prepare homemade solutions, only 13.0% of the mothers know how to prepare it. The effect of belief in witches and evil eye on ORT treatment declined in both types of communities, thus increasing the proportion of mothers who would not stop treatment or would not share these beliefs. Jointly, 70% of mothers from PROMI and 62% from control communities are not affected by these beliefs in 1995.

There is a statistically significant decline in the recognition of pneumonia symptoms of mothers from control communities when both coughing and rapid breathing are reported. Nevertheless the recognition of short and rapid breathing alone (without reporting cough) increased in both types of communities.

In conclusion, PROMI has been highly successful in maternal and child health interventions. Statistically significant differences between subjects from PROMI and control communities in many of the studied variables show impact, often in a substantive way. There has been an impressive immunization coverage achieved in children of 12-23 months of age. Although causation can not be directly assigned to PROMI, it is nevertheless related to the logistical support given by PROMI to rural clinics. Impact in reducing morbidity could not be verified. However, the program considerably improved proper control of diarrhea and acute respiratory diseases, known to reduce mortality risks.

SECTION 4

BREASTFEEDING AND NUTRITION

4.1 PROJECT MESSAGES

Proper nutrition during the first year of life is a major project goal and PROMI promotes exclusive breastfeeding during the first six months of life as the best practice.[1] PROMI emphasizes several advantages: provision of all nutrients required by the infant for healthy growth during the first six months; immunization of the child against certain infections; saving of time, work, and money etc. PROMI also teaches mothers to value colostrum and promotes the eradication of feeding laxatives to new born babies discovered in the 1993 baseline survey.

4.2 FEEDING PRACTICES AT BIRTH

Table 4.1 provides findings on feeding practices at birth. Between PROMI and control communities, there is no statistically significant difference in the proportion of mothers who feed colostrum to their newborn infants at T1 and T2. Colostrum feeding as a generalized practice shows a statistically significant increase of 4% in PROMI communities, reaching a global 97% of the children in 1995.

PROMI has also had impact in reducing the proportion of children fed artificial laxatives at birth. The longitudinal analysis for the 1993-1995 period provides evidence of a statistically significant decline of 7.4% in the proportion of children from PROMI communities who were fed laxatives in 1993, while in control communities no decline is observed.

Baseline data provided evidence that 95.8% of all children born 35 months before November of 1993 were breastfed at least once. These data are an indicator of mothers' generalized intention to breastfeed. The 1995 measurement replicates baseline findings in both PROMI and control communities, with an additional statistically significant 1.7% of newborns breastfed in PROMI communities. Yet, this proportion may include children who were fed only once or for a very short time, thus data on length of breastfeeding are needed to evaluate this finding.

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[1] The PROMI project proposal aimed at exclusive breastfeeding for the first four months. After the baseline study was initiated, under new Secretariat of Health guidelines, the project expanded the period to the first six months.

TABLE 4.1

CHANGES IN THE PROPORTION OF NEWBORNS FED COLOSTRUM AND LAXATIVES AT BIRTH, FROM THE POPULATION OF YOUNGEST CHILD, BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD

	PRE-PROMI II November 1993				MID-PROMI II				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645	
FEEDING	**PROMI**		**CONTROL**		**PROMI**		**CONTROL**		**PROMI**	**CONTROL**	**PROMI**	**CONTROL**
PRACTICE	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST	STATISTIC
COLOSTRUM	1,828	93.7	825	93.1	882	97.8	170	97.1	4.1 ****	4.0 **	5.57	2.63
NO COLOSTRUM	28	1.4	21	2.4	20	2.2	4	2.3				
NO ANSWER	94	4.8	40	4.5	--	--	1	0.6				
TOTAL	1,950	100.0	886	100.0	902	100.0		100.0				
LAXATIVES/a	907	46.4	345	38.9	352	39	69	39.4	-7.4 ****	0.5 0 n.s.	-3.74	0.12
NO LAXATIVE	999	51.2	516	58.1	548	60.8	105	60.0				
NO ANSWER	47	2.4	27	3.0	2	0.2	1	0.6				
TOTAL	1,953	100.0	888	100.0	902	100.0	175	100.0				

CHILDREN BREASTFED AT LEAST ONCE, FROM THE TOTAL POPULATION OF ALL CHILDREN UNDER 3 YEARS OF AGE

BREASTFEEDING AT BIRTH	**PRE-PROMI II**		**MID-PROMI II**				**IMPACT**		**LONGITUDINAL TEST**	
	PROMI AND CONTROL		**PROMI**		**CONTROL**		**PROMI**	**CONTROL**	**PROMI**	**CONTROL**
	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST	STATISTIC
AT LEAST ONCE	3,324	95.8	1,113	97.5	209	96.8	1.7 **	1.0 n.s	2.96	0.8
NEVER BREASTFED	139	4.0	27	2.4	7	3.2	-1.6	-0.8		
DK/NR	7	0.2	1	0.1	0	0.0	-0.1	-0.2		
TOTAL	3,470	100.0	1,141	10 0.0	216	100.0				

LEVEL OF SIGNIFICANCE

	PRE-PROMI	**MID-PROMI II**
COLOSTRUM	NOT SIGNIFICANT	NOT SIGNIFICANT
LAXATIVE	NOT SIGNIFICANT	NOT SIGNIFICANT
BREASTFED	NOT SIGNIFICANT	NOT SIGNIFICANT

NOTES: a. Homemade solutions thought to have laxative properties.

b. Three children are excluded from the 1995 sample because of immediate death after birth.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

Table 4.2 provides reasons for not breastfeeding given by mothers who did not breastfeed their infants at birth. Even with few observations, finding are replicated at T1 and T2: child's rejection and not having sufficient milk are the two most frequently reported reasons for not breastfeeding. Other responses are rare.

TABLE 4.2

CHANGES IN REASONS FOR NOT BREASTFEEDING FROM THE TOTAL POPULATION OF CHILDREN UNDER 3 YEARS OF AGE FOR THE 1993-1995 PERIOD*

	PRE-PROMI II - November 1993		**MID-PROMI II - September 1995**			
	PROMI AND CONTROL		**PROMI**		**CONTROL**	
	FREQ.	%	FREQ.	%	FREQ.	%
CHILD'S REJECTION	54	38.9	11	37.9	5	62.5
NO SUFFICIENT MILK	39	28.4	9	31	0	0.0
MOTHER'S ILLNESS	14	9.8	2	6.9	0	0.0
CHILD'S DEATH	6	4.2	2	6.9	2	253
CHILD'S ILLNESS	5	3.6	3	10.3	1	12.5
PROBLEM WITH BREAST	3	2.3	2	6.9	0	0.0
OTHER	10	7.3	0	0.0	0	0.0
ADOPTIVE MOTHERS DO NOT KNOW	8	5.6	0	0.0	0	0.0
TOTAL	85	38.2	18	62.0	3	37.5

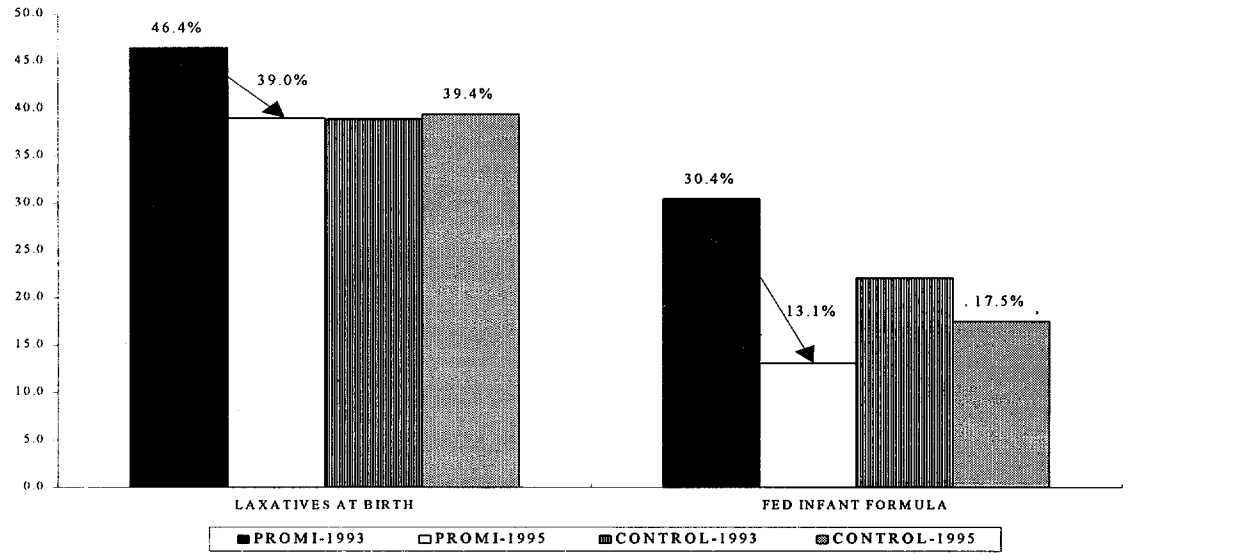
NOTE: *No tests of hypotheses have been calculated due to the small number of cases in all categories.

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

Results provide sufficient evidence to conclude that PROMI had an impact on improving feeding practices at birth. The proportion of newborn infants fed colostrum and breastfed significantly increased in PROMI communities, as to make breastfeeding a generalized practice. In addition, the proportion of children fed laxatives at birth had a statistically significant decline in PROMI communities, while in control communities the trend is to increase. Further evidence that feeding practices at birth have improved is provided by the reduction of breastfeeding children at the time of the survey who were supplemented with infant formula (age of introduction of infant formula is presented in section 4.5.3). Figure 4.1 illustrates project impact in reducing the practice of feeding laxatives at birth for the population of all children under three years of age, and the proportion of breastfeeding children at time of survey who were supplemented with infant formula. Arrows in the figure represent statistically significant changes.

FIGURE 4.1

CHANGES IN FEEDING LAXATIVES AT BIRTH FOR ALL CHILDREN UNDER 3 YEARS OF AGE AND IN SUPPLEMENTING BREASTFEEDING WITH INFANT FORMULA FOR ALL BREASTFEEDING CHILDREN AT TIME OF SURVEY, BY PROMI AND CONTROL COMMUNITIES FOR THE 1993-1995 PERIOD



4.3 LENGTH OF BREASTFEEDING

Breastfeeding cannot be established as a general practice if a significant proportion of mothers only breastfeed for a few days or weeks. Table 4.3 provides data on the mother's most recent child under one year of age still breastfeeding at time of survey. Data indicate that PROMI has had substantive impact in increasing breastfeeding in infants under one year of age. In 1993, 65.4% of project children and 69.3% of control children under one year were breastfeeding. In 1995, the proportion increased by a statistically significant 11.9% in PROMI communities and a non-significant 8.1% in control communities. As a result, a high 77% of children under one year of age in both types of communities were breastfeeding at time of survey.

Table 4.4 provides data on length of breastfeeding for the 1995 subpopulation of children under 3 years of age who were breastfed at least once (97% in PROMI and control) and who were not breastfeeding at time of survey. In 1995, data indicate that 92.0% of the children who had terminated breastfeeding from PROMI and 88.2% from control communities were breastfed for more than one month. Other data show 68.1% from PROMI and 60.6% from control communities were breastfed for more than 4 months; 56.5% from PROMI and 49.6% from control communities more than 6 months and one in four children breastfed for over 12 months. Since in 1995 there is no statistically significant difference in mean age and mean years of

education of mothers from PROMI and control communities, longer breastfeeding regimes in 1995 can be attributed to PROMI's efforts.

TABLE 4.3

CHANGES IN BREASTFEEDING STATUS OF LAST SURVIVING CHILD AT TIME OF SURVEY FOR CHILDREN 0-11 MONTHS OF AGE BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD/a

CHILDREN UNDER 1 YEAR OF AGE BREASTFEEDING STATUS	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
BREAST FEEDING	559	65.4	201	69.3	302	77.2	65	77.4	11.9 ****	8.1 n.s.	4.44	1.52
NOT BREAST FEEDING	256	29.9	73	25.2	89	22.8	19	22.6	-7.2	-2.6		
NOT BREAST FEEDING (ADOPTED)	39	4.6	16	5.5	0	0.0	0	0.0	-4.6	-5.5		
NO ANSWER	1	0.1	0	0.0	0	0.0	0	0.0	-0.1	100.0		
TOTAL	855	100.0	290	100.0	391	100.0	84	100.0				

LEVEL OF SIGNIFICANCE

	PRE-PROMI	MID-PROMI II
CHILDREN UNDER 1 YEAR	SIGNIFICANT CC: .15265***	NOT SIGNIFICANT

NOTES: a. Table 4.3 provides data on breastfeeding status of children at time of survey. It is not an exact indicator of length of breastfeeding, given that breastfeeding is not over for this subpopulation and its termination date is unknown.

b. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is greater than > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

Figure 4.2 illustrates findings from Table 4.4 aggregated by four different categories: infants breastfed for one month or less, between one and up to four months, between 4 months and up to one year and between one and up to two years. It is readily shown that infants from control communities have higher proportions in the categories breastfed four months or less; in PROMI communities, infants with longer intervals between 6 months and a year and between one and up to two years are higher.

TABLE 4.4

LENGTH OF BREASTFEEDING FOR THE POPULATION OF CHILDREN THAT WERE BREASTFED AT LEAST ONCE AND WHO WERE NOT BREASTFEEDING AT TIME OF SURVEY BY SAMPLE DOMAINS FOR 1995

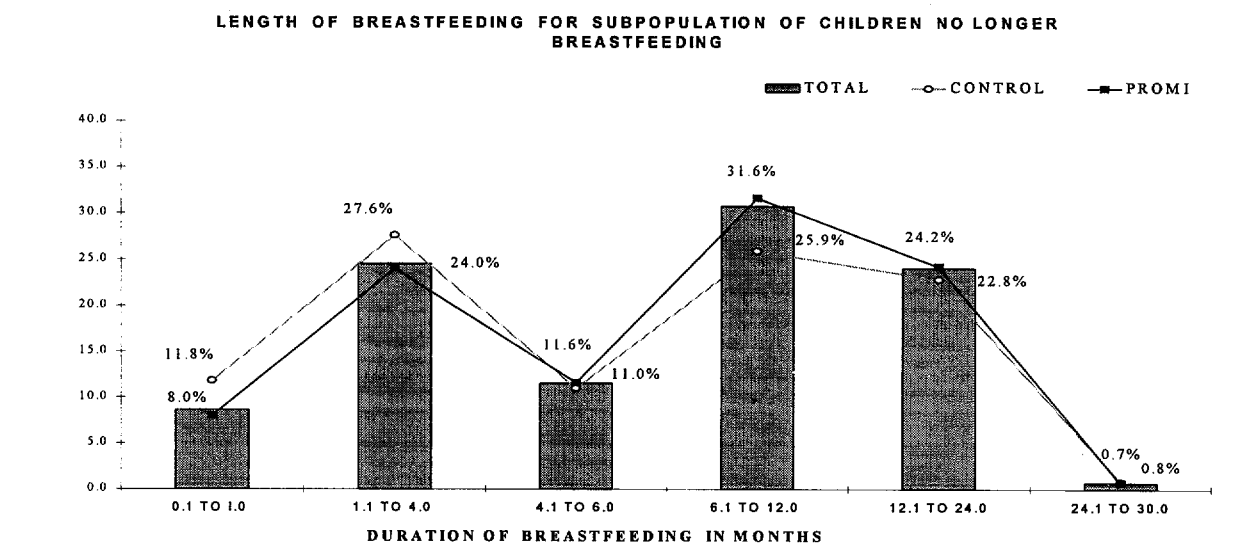
LENGTH OF BREASTFEEDING IN MONTHS	MID-PROMI 1995						TOTAL		
	PROMI			CONTROL					
	FREQ.	%	CUM %	FREQ.	%	CUM %	FREQ.	%	CUM %
24.1 TO 30 MONTHS	5	0.7	0.7	1	0.8	0.8	6	0.7	0.7
21.1 TO 24 MONTHS	20	2.9	3.6	1	0.8	1.6	21	2.6	3.3
18.1 TO 21 MONTHS	26	3.8	7.4	5	3.9	5.5	31	3.8	7.1
15.1 TO 18 MONTHS	50	7.3	14.7	10	7.9	13.4	60	7.4	14.5
12.1 TO 15 MONTHS	70	10.2	24.8	13	10.2	23.6	83	10.2	24.6
OVER 1 YEAR	171		24.8	30		23.6	201		24.6
9.1 TO 12 MONTHS	113	16.4	41.2	12	9.4	33.1	125	15.3	40.0
6.1 TO 9 MONTHS	105	15.2	56.5	21	16.5	49.6	126	15.4	55.4
4.1 TO 6 MONTHS	80	11.6	68.1	14	11.0	60.6	94	11.5	66.9
OVER 4 MONTHS	469		68.1	77		60.6	546		66.9
2.1 TO 4 MONTHS	117	17.0	85.1	18	14.2	74.8	135	16.5	83.5
1.1 TO 2 MONTHS	48	7.0	92.0	17	13.4	88.2	65	8.0	91.4
OVER 1 MONTH	634		92.0	112		88.2	746		91.4
3 TO 4 WEEKS	32	4.6	96.7	6	4.7	92.9	38	4.7	96.1
1 TO 2 WEEKS	19	2.8	99.4	7	5.5	98.4	26	3.2	99.3
UNDER 1 WEEK	4	0.6	100.0	2	1.6	100.0	6	0.7	100.0
TOTAL	689	100.0		127	100.0		816	100.0	

NOTE: * Data for all children is based on mothers' recall.

SOURCES: KBAP Survey, August 31 to September 18, 1995

FIGURE 4.2

DURATION OF BREASTFEEDING FOR THE SUBPOPULATION OF CHILDREN NO LONGER BREASTFEEDING FROM PROMI AND CONTROL COMMUNITIES FOR 1995



4.4 EXCLUSIVE AND SUPPLEMENTED BREASTFEEDING

Table 4.5 provides data on exclusive and supplementary breastfeeding based on feeding practices 24 hours before survey. This method is more reliable than gathering data on weaning practices through recall over a period of time which may extend to 35 months.[2] Data from Table 4.5 for PROMI and control communities have been collapsed because there is no statistically significant difference between proportions from PROMI and control communities at T1 and T2 and because collapsing increases cell frequencies for the different age classes.

Data indicate a statistically significant increase in the proportion of breastfeeding children for most age groups up to the 13th month. The proportion of children who were breastfeeding at time of survey increased from 92.9% to 100.0% for children under two months of age; from 86.1% to 95.9% for children under four months of age; from 84.2% to 90.5% for children under 6 months of age and from 68.7% to 76.6% for children under one year of age. For all these age groups, there is a statistically significant reduction in non-breastfeeding.

[2] The 1993 study provided two different methodologies for measuring exclusive and complete (mothers' milk plus water) breastfeeding: (1) data based on recall over a three year period; and (2) data based on 24 hours recall at time of survey. Using the first methodology, exclusive breastfeeding could not be measured because most mothers could not recall the age at which water was first given to their infants. Thus, for this specific method of data collection, *complete breastfeeding* was provided rather than *exclusive* breastfeeding. For the second methodology, exclusive and complete breastfeeding were separately calculated.

TABLE 4.5

CHANGES IN TYPES OF BREASTFEEDING BY AGE CLASSES FOR ALL SURVIVING CHILDREN BASED ON A 24 HOURS BEFORE THE SURVEY TIME INTERVAL BY AGE GROUPS FOR THE 1993-1995 PERIOD/a

PRE-PROMI II - November 1993

AGE MONTHS	NOT BREASTFEEDING		EXCLUSIVE BREASTFEEDING		BREASTFEEDING AND ONLY WATER		SUPPLEMENTS		TOTAL	
	%	No.	%	No.	%	No.	%	No.	%	No.
0-1	7.1	5	34.3	24	8.6	6	50.0	35	100.0	70
2-3	17.4	24	11.6	16	9.4	13	61.6	85	100.0	138
4-5	18.1	32	5.1	9	5.6	10	71.2	126	100.0	177
SUBTOTAL <6 months	**15.8**	**61**	**12.7**	**49**	**7.5**	**29**	**63.9**	**246**	**100.0**	**385**
6-7	34.5	67	0.5	1	2.1	4	62.9	122	100.0	194
8-9	35.3	73	0.5	1	5.8	12	58.5	121	100.0	207
10-11	50.2	120	0.4	1	1.3	3	48.1	115	100.0	239
SUBTOTAL <12 months	**31.3**	**321**	**5.1**	**52**	**4.7**	**48**	**58.9**	**604**	**100.0**	**1,025**
12-13	62.1	141	0.4	1	0.4	1	37.0	84	100.0	227
14-15	67.3	132	0.0	0	1.0	2	31.6	62	100.0	196
16-17	78.6	143	0.0	0	0.0	0	21.4	39	100.0	182
18-23	90.9	509	0.0	0	0.0	0	9.1	51	100.0	560
24-29	97.2	594	0.0	0	0.0	0	2.8	17	100.0	611
30-35	98.0	624	0.0	0	0.0	0	2.0	13	100.0	637
TOTAL 0-35 months	**71.7**	**2,464**	**1.5**	**53**	**1.5**	**51**	**25.3**	**870**	**100.0**	**3,438**

MID-PROMI II - September 1995

AGE MONTHS	NOT BREASTFEEDING		EXCLUSIVE BREASTFEEDING		BREASTFEEDING AND ONLY WATER		SUPPLEMENTS		TOTAL	
	%	No.	%	No.	%	No.	%	No.	%	No.
0-1	0.0	0	46.3	37	11.3	9	42.5	34	100.0	80
2-3	8.7	6	24.6	17	14.5	10	52.2	36	100.0	69
4-5	20.5	15	5.5	4	5.5	4	68.5	50	100.0	73
SUBTOTAL <6 months	**9.5**	**21**	**26.1**	**58**	**10.4**	**23**	**54.1**	**120**	**100.0**	**222**
6-7	22.2	14	1.6	1	3.2	2	73.0	46	100.0	63
8-9	40.0	40	2.0	2	2.0	2	56.0	56	100.0	100
10-11	39.4	37	0.0	0	1.1	1	59.6	56	100.0	94
SUBTOTAL <12 *months*	**23.4**	**112**	**12.7**	**61**	**5.8**	**28**	**58**	**278**	**100.0**	**479**
12-13	45.3	34	0.0	0	1.3	1	53.3	40	100.0	75
14-15	56.7	38	0.0	0	0.0	0	43.3	29	100.0	67
16-17	74.3	52	0.0	0	0.0	0	25.7	18	100.0	70
18-23	88.2	157	0.0	0	0.0	0	11.8	21	100.0	178
24-29	95.0	207	0.0	0	0.0	0	5.0	11	100.0	218
30-35	98.4	248	0.0	0	0.0	0	1.6	4	100.0	252
TOTAL 0-35 months	**63.3**	**848**	**4.6**	**61**	**2.2**	**29**	**29.9**	**401**	**100.0**	**1,339**

TABLE 4.5 (CONTINUATION)

CHANGES IN TYPES OF BREASTFEEDING BY AGE CLASSES FOR ALL SURVIVING CHILDREN BASED ON A 24 HOURS BEFORE THE SURVEY TIME INTERVAL BY AGE GROUPS FOR THE 1993-1995 PERIOD/b

AGE MONTHS	NOT BREASTFEEDING		EXCLUSIVE BREASTFEEDING		BREASTFEEDING AND ONLY WATER		BREASTFEEDING AND SUPPLEMENTS	
	DIFF	TEST ST	DIFF	TEST ST	DIFF	TEST ST	DIFF	TEST ST
0-1	-7.1 *	-2.32	12.0 n.s.	1.50	2.7 n.s.	0.55	-7.5 n.s.	-0.92
2-3	-8.7 *	-1.86	13.0 *	2.23	5.1 n.s.	1.03	-9.4 n.s.	-1.29
4-5	2.5 n.s.	0.45	0.4 n.s.	0.13	-0.2 n.s.	-0.05	-2.7 n.s.	-0.42
SUBTOTAL <6 months	**-6.4 ****	-2.36	**13.4 ******	3.94	**2.8 n.s.**	1.16	**-9.8 ****	-2.37
6-7	-12.3 *	-1.97	1.1 n.s.	0.65	1.1 n.s.	0.46	10.1 n.s.	1.54
8-9	4.7 n.s.	0.80	1.5 n.s.	1.02	-3.8 *	-1.77	-2.5 n.s.	-0.41
10-11	-10.8 *	-1.81	-0.4 n.s.	-1.00	-0.2 n.s.	-0.15	11.5 *	1.91
SUBTOTAL <12 months	**-7.9 *****	-3.28	**7.7 ******	4.59	**1.2** n.s.	0.92	**-0.9** n.s.	-0.33
12-13	-16.8 **	-2.55	-0.4 n.s.	-1	0.9 n.s.	0.64	16.3 **	2.48
14-15	-10.6 n.s.	-1.54	0.0	-	-1.0 n.s.	-1.42	11.7 *	1.69
16-17	-4.3 n.s.	-0.71	0.0	-		-	4.3 n.s.	0.71
18-23	-2.7 n.s.	-0.99	0.0	-		-	2.7 n.s.	0.99
24-29	-2.3 n.s.	-1.39	0.0	-	0.0	-	2.3 n.s.	1.39
30-35	0.5 n.s.	0.47	0.0	-	0.0	-	-0.5 n.s.	-0.47
TOTAL 0-35 months	**-8.3 ******	-5.47	**3 ******	4.96	**0.7** n.s.	1.52	**4.6 *****	3.19

NOTES: a.- Categories of breastfeeding among age-classes of children from PROMI and Control communities are not significant at T1 and T2.

b.- When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then $-Z(.05) = -1.645$. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is greater than > 1.645.

P-VALUES: *P<.05 **P<.01 ***P<.001 ****P<.0001

SOURCES: KBAP Survey, November 1 to December 15, 1993 and KBAP Survey, August 31 to September 18, 1995.

Table 4.5 also provides data on exclusive breastfeeding. From 1993 to 1995, exclusive breastfeeding increased from 34.3% to 46.3% for children under two months of age. This additional 12.0% is not statistically significant at the 95% level of confidence, but is at the 93% level. Exclusive breastfeeding diminishes rapidly after two months of age. Nevertheless, between 1993 and 1995, an additional 13.0% of children in the 2.0-3.9 months group were exclusively breastfed; and exclusive breastfeeding for children 0-3.9 months at time of survey

increased from 19.2% to 36.2%. For the age group 0-5.9 months of age, exclusive breastfeeding increased 13.4%, from 12.7% in 1993 to 26.1%. Increments for children ages 0 to 5.9 months have been verified at the 99.9% level of confidence.

The proportion of breastfeeding children who were introduced to early water (complemented breastfeeding) for any of the groups under 6 months of age did not increase in a statistically significant way during the 1993-1995 period. However, the proportion of children fed supplements other than water decreased for the 0-5.9 month age group from a statistically significant 63.9% to 54.1%. Figure 4.3 illustrates findings on breastfeeding status for children under four and under six months of age at time of survey.

Table 4.6 provides data on breastfeeding practices by Health Regions. In 1995, small cell frequencies constrain reliable estimators by regions, particularly for children under 4 and under 6 months of age. Nevertheless, when children under one year of age are considered, the pattern of change remains similar to that of younger children. The largest change is experienced in Region VI, with a statistically significant reduction of children who were not breastfeeding in 1993 of 12.7%, followed by Region VII with a 9.9% decline of non-breastfeeding children. This decline is due to an increase of children exclusively breastfeeding in Region VI. In Region VII, the increment in breastfeeding is shared by children who are fed supplements, without statistical significance in any category.

As a result of 1993-1995 changes, communities from Region VI have the largest proportion of breastfeeding children and exclusively breastfeeding ages 0-11.9 months. Region IV has the second largest proportion.

The baseline study provided an analysis of the major obstacles to exclusive breastfeeding. Since rural clinics are not equipped for child birth, mothers are forced to deliver at hospitals and private clinics. Although these health centers should have better informed staff, they are not always prepared to promote exclusive breastfeeding. As a result, newborn infants are introduced to bottles and infant formula. Lack of suction at this early stage prevents the release of hormones needed to activate production of milk, which causes mothers to deduce that they lack sufficient milk because of personal genetic deficiencies. They introduce their infants to formulas based on the belief that otherwise the children will starve to death.[3]

Other challenges to exclusive breastfeeding come from poverty. Pain produced by excess milk, by infants continuing to suckle or by mastitis, may discourage many mothers from breastfeeding. Mothers argue that when they are weak from hunger "having a child sucking on you is unbearable, you get dizzy and even faint." Still an other obstacle to exclusive breastfeeding derives from local customs. An unknown number of mothers make the judgment that the quality of their milk is not good for their infants. It becomes "sour" or "bad." Mothers argue that "if you eat straw, your milk is also straw" (Tejada 1992). The decision to introduce supplements to breastfeeding early is taken without expert consultation and knowledge of their own nutritional status.

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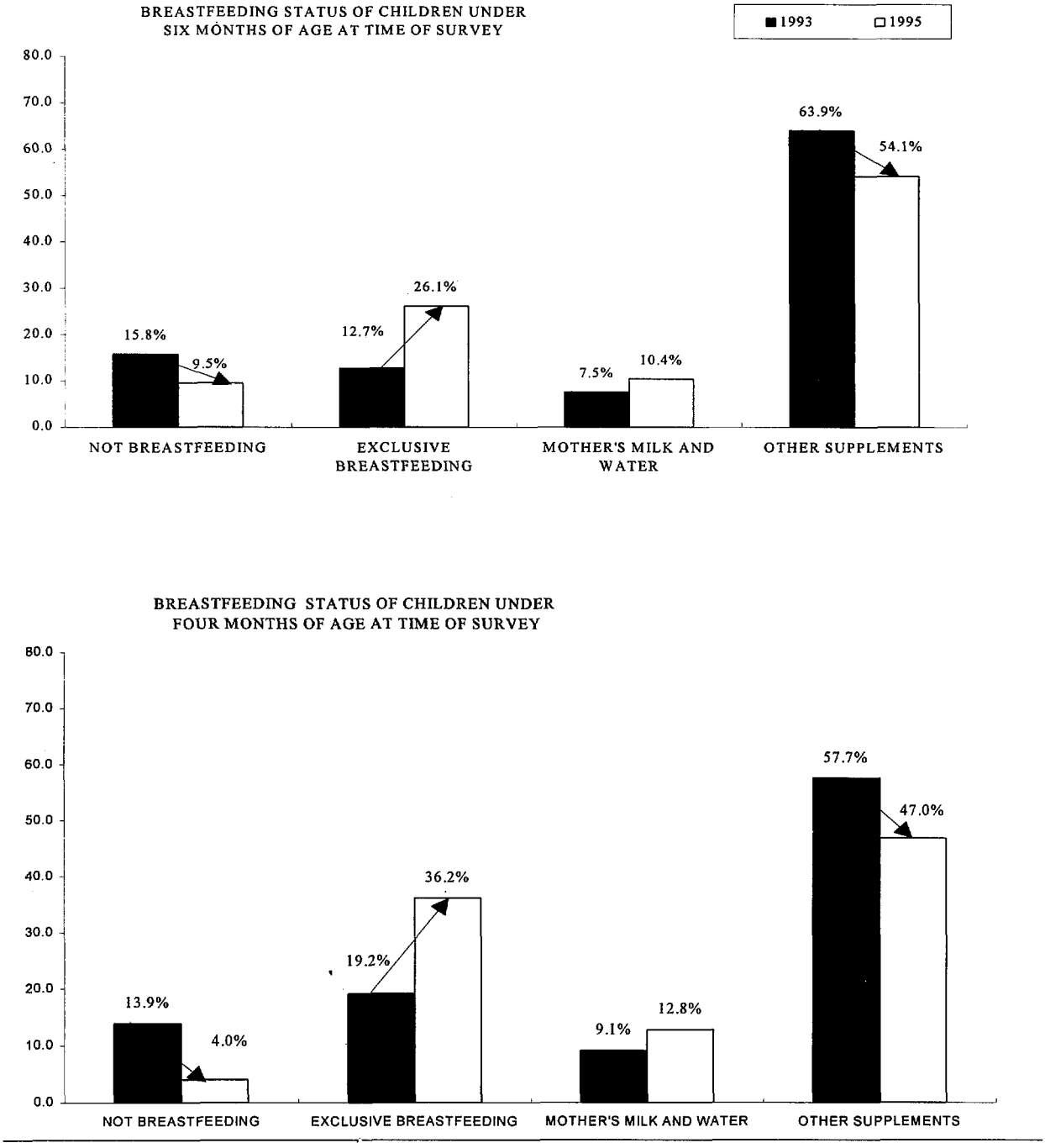
[3] Interviews with PROMI staff and mothers just returning from childbirth deliverance at clinics and hospitals.

FIGURE 4.3

BREASTFEEDING STATUS OF CHILDREN FROM PROMI AND CONTROL COMMUNITIES UNDER FOUR AND UNDER SIX MONTHS OF AGE AT TIME OF SURVEY*



NOTE: * Arrows represent statistically significant changes

TABLE 4.6

CHANGES IN BREASTFEEDING PRACTICES BY REGIONS AND AGE CLASSES
BASED ON A 24 HOURS BEFORE THE SURVEY TIME INTERVAL

PRE-PROMI II - November 1993

AGE IN MONTHS	NOT BREASTFEEDING		EXCLUSIVE BREASTFEEDING		BREASTFEEDING AND ONLY WATER		BREASTFEEDING AND SUPPLEMENTS		TOTAL	
	%	No.	%	No.	%	No.	%	No.	%	No.
0 TO < 4										
REGION IV	60.0	3	28.0	14	8.0	4	58.0	29	100.0	50
REGION VI	15.5	17	9.1	10	10.0	11	65.5	72	100.0	110
REGION VII	18.8	9	33.3	16	8.3	4	39.6	19	100.0	48
SUBTOTAL	13.9	29	19.2	40	9.1	19	57.7	120	100.0	208
0 TO < 6										
REGION IV	4.9	5	14.7	15	6.9	7	73.5	75	100.0	102
REGION VI	18.6	35	6.4	12	6.9	13	68.1	128	100.0	188
REGION VII	22.1	21	23.2	22	9.5	9	45.3	43	100.0	95
SUBTOTAL	15.8	61	12.7	49	7.5	29	63.9	246	100.0	385
0 TO < 12										
REGION IV	25.0	71	5.6	16	4.6	13	64.8	184	100.0	284
REGION VI	30.5	148	2.9	14	4.9	24	61.7	300	100.0	486
REGION VII	40.0	102	8.6	22	4.3	11	47.1	120	100.0	255
SUBTOTAL	31.3	321	5.1	52	4.7	48	58.9	604	100.0	1,025

MID-PROMI II - September 1995

AGE IN MONTHS	NOT BREASTFEEDING		EXCLUSIVE BREASTFEEDING		BREASTFEEDING AND ONLY WATER		BREASTFEEDING AND SUPPLEMENTS		TOTAL	
	%	No.	%	No.	%	No.	%	No.	%	No.
0 TO < 4										
REGION IV	4.3	2	28.3	13	17.4	8	50.0	23	100.0	46
REGION VI	8.2	4	40.8	20	8.2	4	42.9	21	100.0	49
REGION VII	0.0	0	38.9	21	13	7	48.1	26	100.0	54
SUBTOTAL	4.0	6	36.2	54	12.8	19	47.0	70	100.0	149
0 TO < 6										
REGION IV	6.8	5	19.2	14	12.3	9	61.6	45	100.0	73
REGION VI	8.5	6	31.0	22	8.5	6	52.1	37	100.0	71
REGION VII	12.8	10	28.2	22	10.3	8	48.7	38	100.0	78
SUBTOTAL	9.5	21	26.1	58	10.4	23	54.1	120	100.0	222
0 TO < 12										
REGION IV	22.2	35	8.9	14	6.3	10	62.7	99	100.0	158
REGION VI	17.7	28	15.8	25	5.1	8	61.4	97	100.0	158
REGION VII	30.1	49	13.5	22	6.1	10	50.3	82	100.0	163
SUBTOTAL	23.4	112	12.7	61	5.8	28	58.0	278	100.0	479

TABLE 4.6 (CONTINUATION)

IMPACT DIFFERENCES AND TEST STATISTICS
FOR BREASTFEEDING PRACTICES BY REGIONS AND AGE CLASSES
BASED ON A 24 HOURS BEFORE THE SURVEY TIME INTERVAL

AGE IN MONTHS	NOT BREASTFEEDING		EXCLUSIVE BREASTFEEDING		BREASTFEEDING AND ONLY WATER		BREASTFEEDING AND SUPPLEMENTS	
	DIFF	TEST ST*	DIFF	TEST ST*	DIFF	TEST ST*	DIFF	TEST ST*
0 TO < 4								
REGION IV	-1.7 n.s.	-0.37	0.3 n.s.	0.03	9.4 n.s.	1.39	-8.0 n.s.	-0.79
REGION VI	-7.3 n.s.	-1.40	31.7 ****	4.21	-1.8 n.s.	-0.38	-22.6 **	-2.69
REGION VII	-18.8 ***	-3.33	5.6 n.s.	0.58	4.6 n.s.	0.76	8.6 n.s.	0.87
SUBTOTAL	-9.9 ***	-3.43	17.0 ****	3.55	3.6 n.s.	1.07	-10.7 *	-2.01
0 TO < 6								
REGION IV	1.9 n.s.	0.53	4.5 n.s.	0.77	5.5 n.s.	1.19	-11.9 *	-1.66
REGION VI	-10.2 **	-2.34	24.6 ****	4.26	1.5 n.s.	0.41	-16.0 **	-2.34
REGION VII	-9.3 n.s.	-1.63	5.0 n.s.	0.75	0.8 n.s.	0.17	3.5 n.s.	0.45
SUBTOTAL	-6.4 **	-2.36	13.4 ****	3.94	2.8 n.s.	1.16	-9.8 **	-2.37
0 TO < 12								
REGION IV	-2.8 n.s.	-0.68	3.2 n.s.	1.22	1.8 n.s.	0.76	-2.1 n.s.	-0.45
REGION VI	-12.7 ****	-3.45	12.9 ****	4.31	0.1 n.s.	0.06	-0.3 n.s.	-0.08
REGION VII	-9.9 *	-2.10	4.9 n.s.	1.52	1.8 n.s.	0.80	3.2 n.s.	0.65
SUBTOTAL	-7.9 ***	-3.28	7.7 ****	4.59	1.2 n.s.	0.92	-0.9 n.s.	-0.33

NOTE: * When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then $-Z(.05) = -1.645$. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is greater than > 1.645.

P-VALUES: *P<.05 **P<.01 ***P<.001 ****P<.0001

SOURCES: KBAP Survey, November 1 to December 15, 1993 and KBAP Survey, August 31 to September 18, 1995.

4.5 WEANING

4.5.1 MESSAGES

The age at which breastfeeding infants are introduced to water, liquid drinks and semisolid foods is the weaning period. Early introduction of semisolid foods in impoverished populations increases infants at risk of diarrhea. PROMI teaches mothers the likelihood of food and bottle contamination, resulting in chronic diarrhea, and that a diminished intake of iron, calcium, and other minerals leads to decreased immunization effect provided by maternal milk. The MCH program teaches that only after six months of life is the organism prepared to receive other types of food. Weaning foods are identified from local staples from the four major categories capable of providing the child with carbohydrates, proteins, energy, minerals and vitamins.

4.5.2 WEANING FOODS

4.5.2 WEANING FOODS

Table 4.7 presents mothers' responses when questioned if they had fed each item to their breastfeeding child the day or night before the survey. A reading across communities provides evidence that in 1993 and 1995, a statistically significant higher proportion of children from PROMI communities were fed fruit juice and special infant formula. However, in 1995, an additional 17.3% of mothers from PROMI communities stopped feeding infant formula; and as a result, control communities show a statistically higher percentage of breastfeeding children supplemented with infant formula.

Reduction of infant formula as a supplement to breastfeeding is an important program impact. It is well known that in Third World countries, low-income mothers do not follow correct directions in formula preparation. Another important change between 1993 and 1995 is the statistically significant decline in the percentage of breastfeeding children who were supplemented with water and rice water, in both PROMI and control communities. On the other hand, supplementing breastfeeding with cow or goat milk decreased in PROMI communities, and supplementing powdered milk increased an additional 6.8% in PROMI and 10.8% in control communities.

The two most frequently reported foods at T1 and T2 are fruit juice and cream of beans, with a slight decline in cream of beans in 1995. Although fresh fruits are readily available in local markets, only 2.6 % of all children were fed mashed fruits. The proportion of children fed fruit juice remained high for both types of communities. In this respect, PROMI had no impact in changing local customs of supplementing breastfeeding with juices, and in the preference for juices to fresh fruits when foods are introduced after six months of age.

In 1993, carbohydrates were mainly provided by mashed potatoes and plantains to 28.5 % of the children; by yam to 6.2 %; and by cereals, included in the *other* category, (cream of rice, wheat, and oats) to 24.8 % of the children. In 1993 there was no statistically significant difference in carbohydrate intakes between the children from PROMI and control communities. In 1995 there is a statistically significant higher proportion of 24.8% of mothers from PROMI feeding mashed potatoes and/or plantains to their infants than in control communities. Energy food seems to be the most deficient in complementary feeding, although it is possible that close to half of the children in 1995 are receiving sugar in fruit juices, a proportion similar to the one found in 1993.

TABLE 4.7

CHANGES IN CHILDREN PRESENTLY BREASTFEEDING AND SUPPLEMENTARY FEEDING GIVEN THE DAY AND NIGHT BEFORE THE SURVEY BY SAMPLE DOMAINS FOR THE 1993-1995 PERIOD*

TYPE OF FOOD	PRE-PROMI II - 1993				MID-PROMI II -1995				IMPACT-Differences		LONGITUDINAL TEST	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
ONLY WATER	601	85.9	233	85.3	314	76.4	61	76.3	-9.5 ****	-9.0 *	-3.82	-1.73
WATER WITH SUGAR	128	18.3	54	19.9	70	17	14	17.5	-1.3 n.s	-2.4 n.s	-0.54	-0.49
RICE WATER	87	12.4	43	15.7	24	5.8	7	8.8	-6.6 ****	-6.9 *	-3.90	-1.79
CREAM OF BEANS	299	42.7	104	38.0	151	36.7	23	28.8	-6 *	-9.2 n.s	-1.99	-1.57
FRUIT JUICE	313	44.7	101	36.8	181	44	30	37.5	-0.7 n.s	0.7 n.s	-0.23	0.11
HERB TEA	134	19.1	50	18.1	66	16.1	13	16.3	-3 n.s	-1.8 n.s	-1.30	-0.38
INFANT FORMULA	213	30.4	60	22.1	54	13.1	14	17.5	-17.3 ****	-4.6 n.s	-7.20	-0.93
COW OR GOAT MILK	132	18.9	45	16.6	61	14.8	16	20.0	-4.1 *	3.4 n.s	-1.77	0.68
POWDERED MILK	83	11.9	18	6.7	77	18.7	14	17.5	6.8 **	10.8 **	3.00	2.39
SOUP	201	28.7	79	29.0	110	26.8	23	28.8	-1.9 n.s	-0.2 n.s	-0.69	-0.03
VEGETABLE OIL	48	6.9	13	4.9	6	1.5	1	1.3	-5.4 ****	-3.6 *	-4.75	-1.98
MASHED POTATO/PLANTAIN	207	29.6	70	25.6	102	24.8	15	18.8	-4.8 *	-6.8 n.s	-1.74	-1.33
MASHED FRUITS	22	3.1	4	1.3	16	3.9	2	2.5	0.8 n.s	1.2 n.s	0.65	0.64
PAPAYA OR SWEET POTATO	45	6.4	16	6.0	13	3.2	4	5.0	-3.2 **	-1.0 n.s	-2.54	-0.35
OTHER	171	24.4	71	25.9	73	17.8	22	27.5	-6.6 **	1.6 n.s	-2.66	0.28

LEVEL OF SIGNIFICANCE

	PRE-PROMI	MID-PROMI II
FRUIT JUICE	SIGNIFICANT-CC: 0.0844*	SIGNIFICANT-CC: .11107
INFANT FORMULA	SIGNIFICANT-CC:0.1206***	SIGNIFICANT-CC: .11258*
POWDERED MILK	SIGNIFICANT- CC: 0.0917*	NOT SIGNIFICANT
COW OR GOAT MILK	NOT SIGNIFICANT	SIGNIFICANT-CC: .11517*
MASHED PLANTAIN	NOT SIGNIFICANT	SIGNIFICANT-CC: .11323*
OTHER	NOT SIGNIFICANT	SIGNIFICANT-CC: .13724*
OTHER CATEGORIES	NOT SIGNIFICANT	SIGNIFICANT

P-VALUES: *P<.05 **P<.01 ***P<.001 ****P<.0001

*Percentages are calculated from the total number of breastfeeding children. in 1995, this subclass had 411 children in PROMI and 80 children in control communities. In 1993 there were 273 breastfeeding infants from control and 700 from PROMI at time of survey.

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

PROMI had an impact in reducing the use of infant bottles. In 1993, water was given the day or night before to 85.7 % of all breastfeeding children, and 61.4 % of the mothers reported feeding children with bottles the night before, with no significant difference between PROMI and control communities. Thus, the majority of breastfeeding children were exposed to bottle contamination through water or drinks. In 1995, a statistically significant higher proportion of mothers from control communities used infant bottles the day or night before the survey. In control communities the use of bottles increased to 67.5% while in PROMI communities it actually decreased to 53.3%.

4.5.3 WEANING TIME AND INFANT FORMULA SUBSTITUTION

The reference population chosen to measure the age at which infants are first introduced to weaning foods and milk formula was all children who were not exclusively breastfeeding at time of survey, or who died after they had been introduced to food other than mother's milk. Data are provided for food introduced during the first year of life. Nonresponses due to foster parents' inability to provide information in 1993 were excluded from this population. Table 4.8 provides statistics for infant formula, drinks other than water, and solid and semisolid foods for the subpopulation of those children in the sample who were introduced to each category.

In 1993, there was a statistically significant difference in the proportion of children who received the three categories of food at specific ages among children from PROMI and control communities. The strongest association between age of child at which food was introduced and type of community was for formula for infants. The subpopulation of children fed infant formula during the first year of life represented 63.8% from all children in PROMI communities in 1993. In 1995, it was 56.3%. Infant formula is fed to approximately 1/4 of the children from PROMI and 1/3 of the children from control communities, at T1 and T2, during the first days of their lives. When children reach one month of age, over one half from both types of communities in 1993 were introduced to infant formula; in 1995, the percentage lowered in PROMI communities to 46.8% and in control communities in a statistically non-significant decline.

Data from Table 4.7 refer to the breastfeeding population at time of survey, which implies that infant formula was fed as a supplement to breastmilk and not as a substitute. On the other hand, data from Table 4.8 are in reference to the non-exclusive breastfeeding population. Although over half of the children under 3 years of age were introduced to infant formula during their first year of life, the data say nothing about frequency and length of feeding.[4]

The percentage of children introduced to liquids-other-than-water at an early age declined in both PROMI and control communities. A statistically significant proportion of 13.0% and 14.7% of children from PROMI and control communities respectively were not fed liquids-other-than-water during the first day of their lives. Before the first week of age, in 1993 19.2% of the children from PROMI communities had received liquids other-than-water, which diminished to

[4] It is possible that the high proportion of children who received formula during the first week were lately breastfed and the formula discontinued. PROMI staff individually visit mothers on their return from the hospitals and teach them to overcome this first obstacle to breastfeeding.

6.2% in 1995. In control communities, liquids declined from 21.0% to 6.3%. Subsequent declines are experienced in PROMI communities up to 1 month of age. In control communities further declines could not be verified by the test of differences of proportions.

Given that liquids-other-than-water aggregate a variety of drinks like fruit juices, soups, herb teas and other types of milk, the significance of infant formula as a substitute or a supplement for mothers' milk becomes salient at both T1 and T2 for PROMI and control communities. Nevertheless, as shown in Table 4.7, infant formula as a complement to breastfeeding has declined by 17.3% of mothers from PROMI communities, with no statistically significant decline in control communities.

In general, introduction of semisolid foods shows mixed results. There is a positive trend in both PROMI and control communities in decreasing semisolids fed to children up to the second month of age. However, in both types of communities, it is not clear why the proportion of children who were fed semisolids between 2 and 4 months of age increased with statistical significance.[5]

Table 4.9 presents aggregated data on weaning foods with percentages calculated from the total population of children, including those exclusively breastfeeding and those fed semisolids, solids and liquids after one year of age. For this reason, statistics are different from Table 4.8, given that the reference populations are different. Aggregated data from Table 4.9 make the analysis easier to grasp.

The program had an impact by reducing the percentage of children who early on were introduced to infant formula and to other-than-water liquids before four months of age. No statistically significant decline was found in the introduction of infant formula and a smaller decline took place in the introduction of liquids in control communities; thus causation of results may be attributed to PROMI. Reduction in the proportion of children introduced to semisolids could only be verified for children two month and younger; assignation of results to PROMI is not possible given a similar reduction in control communities.

4.6 CONCLUSIONS

PROMI has shown impact in improving feeding practices at birth by increasing breastfeeding in the population of children under one year of age and by decreasing the practice of feeding laxatives to newborn infants. Additionally, a statistically significant increase in the proportion of newborns fed colostrum was also verified, although this was a general trend experienced in control communities as well.

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[5] Since data is based over a 35 months period, children ages 22-35 months do not reflect PROMI II interventions.

TABLE 4.8

AGE AT WHICH FOODS WERE FIRST INTRODUCED DURING THE FIRST YEAR OF LIFE FOR THE POPULATION OF CHILDREN UNDER 3 YEARS OF AGE, FED INFANT FORMULA, LIQUIDS OR SOLIDS*

AGE AT WHICH FOODS WERE INTRODUCED	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
INFANT FORMULA												
BEFORE FIRST WEEK	405	26.1	190	32.3	155	24.1	41	32.3	-2.0 n.s	0.0 n.s	-0.99	0.01
WEEKS 1-2	153	9.9	57	9.7	59	9.2	12	9.3	-0.7 n.s	-0.4 n.s	-0.50	-0.13
WEEKS 3-4	258	16.6	85	14.4	87	13.5	14	10.9	-3.1 *	-3.6 n.s	-1.88	-1.16
>1 TO 2 MONTHS	256	16.5	52	8.8	95	14.8	16	12.4	-1.7 n.s	3.6 n.s	-1.03	1.14
>2 TO 4 MONTHS	269	17.3	114	19.4	153	23.8	31	24.0	6.5 ***	4.7 n.s	3.33	1.14
>4 TO 6 MONTHS	118	7.6	47	8.0	68	10.6	8	6.2	3.0 *	-1.8 n.s	2.14	-0.74
>6 TO 12 MONTHS	92	5.9	44	7.5	26	4.0	7	5.4	-1.9 *	-2.0 n.s	-1.92	-0.90
TOTAL	1,551	100.0	589	100.0	643	100.0	129	100.5				
% FROM TOTAL		63.8		56.6		56.3		59.4	-7.5 ***	2.8 n.s.	-3.25	0.59
LIQUIDS OTHER THAN WATER												
BEFORE FIRST WEEK	426	19.2	200	21.0	63	6.2	12	6.3	-13.0 ****	-14.7 ****	-11.48	-6.70
WEEKS 1-2	105	4.7	47	4.9	47	4.6	7	3.7	-0.1 n.s	-1.3 n.s	-0.11	-0.83
WEEKS 3-4	325	14.6	161	16.9	102	10.1	28	14.7	-4.6 ****	-2.3 n.s	-3.78	-0.79
>1 TO 2 MONTHS	409	18.4	164	17.2	165	16.3	38	19.9	-2.1 n.s	2.7 n.s	-1.49	0.85
>2 TO 4 MONTHS	674	30.4	275	28.9	375	37.1	72	37.7	6.7 ****	8.8 *	3.70	2.32
>4 TO 6 MONTHS	190	8.6	68	7.1	192	19.0	23	12.0	10.4 ****	4.9 *	7.61	1.96
>6 TO 12 MONTHS	90	4.1	37	3.9	68	6.7	11	5.8	2.7 **	1.9 n.s	2.99	1.04
TOTAL	2,219	100.0	952	100.0	1,012	100.0	191	100.0				
% FROM TOTAL		91.3		91.5		88.5		88.0	-2.8 **	-3.5 n.s.	-2.40	-1.39
SEMI-SOLIDS AND SOLIDS												
BEFORE FIRST WEEK	75	3.5	41	4.4	0	0.0	0	0.0	-3.5 ****	-4.4 ****	-8.82	-6.55
WEEKS 1-2	1	0.0	1	0.1	0	0.0	0	0.0	0.0 n.s	-0.1 n.s	-1.00	-1.00
WEEKS 3-4	39	1.8	21	2.3	11	1.1	0	0.0	-0.7 n.s	-2.3 ****	-1.49	-4.64
>1 TO 2 MONTHS	143	6.6	75	8.1	38	4.0	10	5.6	-2.7 ***	-2.6 n.s	-3.25	-1.33
>2 TO 4 MONTHS	516	24.0	247	26.7	359	37.4	73	40.6	13.4 ****	13.8 ****	7.40	3.51
>4 TO 6 MONTHS	1,078	50.1	428	46.3	366	38.1	60	33.3	-12.0 ****	-13.0 ***	-6.29	-3.35
>6 TO 12 MONTHS	300	13.9	111	12.0	186	19.4	37	20.6	5.4 ****	8.5 **	3.68	2.67
TOTAL	2,152	100.0	924	100.0	960	100.0	180	100.0				
% FROM TOTAL		88.6		88.8		84.0		82.9	-4.6 ***	-5.9 *	-3.36	-1.97

LEVEL OF SIGNIFICANCE

	PRE-PROMI	MID-PROMI II
INFANT FORMULA	SIGNIFICANT CC: .20672***	SIGNIFICANT CC: .15920*
LIQUIDS OTHER THAN WATER	SIGNIFICANT CC: .13941**	NOT SIGNIFICANT
SOLIDS	SIGNIFICANT CC: .15411**	NOT SIGNIFICANT

NOTE: *Data based on mothers' recall, excludes children exclusively breastfeeding at time of survey, dead children and those who were fed after one year of age.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to september 18, 1995.

TABLE 4.9

FOODS FED TO INFANTS DURING THE FIRST FOUR AND SIX MONTHS FOR THE POPULATION OF ALL CHILDREN UNDER 3 YEARS OF AGE /a

4 MONTHS AND YOUNGER	PRE-PROMI II November 1993				MID-PROMI II September 1995				IMPACT Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/b	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
INFANT FORMULA												
0 TO 4.0 MONTHS	1,341	55.2	498	47.9	549	48.0	114	52.5	-7.2 ****	4.6 n.s	-4.00	1.25
4.1 TO 12.0 MONTHS	210	8.6	91	8.8	94	8.2	15	6.9	-0.4 n.s.	-1.8 n.s	-0.42	-0.95
NOT FED/OTHER/c	879	36.2	451	43.4	500	43.7	88	40.6				
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
OTHER-THAN WATER LIQUIDS												
0 TO 4.0 MONTHS	1,939	79.8	847	81.4	752	65.8	157	72.4	-14.0 ****	-9.1 **	-8.63	-2.78
4.1 TO 12.0 MONTHS	280	11.5	105	10.1	260	22.7	34	15.7	11.2 ****	5.6 *	8.02	2.11
NOT FED/OTHER/c	211	8.7	88	8.5	131	11.5	26	12.0				
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
SEMI-SOLIDS AND SOLIDS												
0 TO 4.0 MONTHS	774	31.9	385	37.0	408	35.7	83	38.2	3.8 *	1.2 n.s.	2.26	0.34
4.1 TO 12.0 MONTHS	1,378	56.7	539	51.8	552	48.3	97	44.7	-8.4 ****	-7.1 *	-4.71	-1.92
NOT FED/OTHER/c	278	11.4	116	11.2	183	16.0	37	17.1				
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
6 MONTHS INFANT FORMULA												
0 TO 6.0 MONTHS	1,459	60.0	545	52.4	617	54.0	122	56.2	-6.1 ***	3.8 n.s.	-3.41	1.03
6.1 TO 12.0 MONTHS	92	3.8	44	4.2	26	2.3	7	3.2	-1.5 **	-1.0 n.s	-2.58	-0.74
NOT FED/OTHER/c	879	36.2	451	43.4	500	43.7	88	40.6				
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
OTHER-THAN WATER LIQUIDS												
0 TO 6.0 MONTHS	2,129	87.6	915	88.0	944	82.6	180	82.9	-5.0 ****	-5.0 *	-3.85	-1.83
6.1 TO 12.0 MONTHS	90	3.7	37	3.6	68	5.9	11	5.1	2.2 **	1.5 n.s.	2.82	0.95
NOT FED/OTHER/c	211	8.7	88	8.5	131	11.5	26	12.0				
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
SEMI-SOLIDS AND SOLIDS												
0 TO 6.0 MONTHS	1,852	76.2	813	78.2	774	67.7	143	65.9	-8.5 ****	-12.3 ****	-5.21	-3.54
6.1 TO 12.0 MONTHS	300	12.3	111	10.7	186	16.3	37	17.1	3.9 **	6.4 **	3.07	2.34
NOT FED/OTHER/c	278	11.4	116	11.2	183	16.0	37	17.1				
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				

NOTES: a.- Data based on mothers recall. Water is excluded because for older children a significant number of mothers could not remember the date water was introduced in 1993.

b.-When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test less statistic is greater than > 1.645.

c.- Includes children who were fed this particular food after their first year, who were never fed this specific food because of early death or for other reasons and who were exclusively or completed breastfeeding at time of survey.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 15, 1993 and KBAP Survey, August 31 to September 18, 1995.

PROMI has had considerable impact in increasing length of breastfeeding. In PROMI communities, over 9 out of 10 children are breastfed over one month, close to 7 out of 10 are breastfed over four months and 1 in 4 over a year.

The most important and difficult-to-achieve objective during the 22 months period has been raising exclusive breastfeeding for children under 6 months of age at time of survey from 12.7% to 26.1%. For children under 4 months of age, exclusive breastfeeding increased from 19.2% to 36.2%.

An analysis of the breastfeeding status of children at time of survey by regions provides evidence that increments in the proportion of children exclusively breastfed are caused largely by increments in Health Region VI. From having the lowest proportion of exclusively breastfeeding children in 1993, Region VI has now the highest proportion, followed closely by Region VII.

Improvement in Region VI can not be attributed solely to a more efficient intervention of PROMI staff, but to low prevalence in 1993. The baseline study provided evidence that the proportion of children from Region VI six months of age who were exclusively breastfeeding at time of survey was only 6.4%. This proportion was less than half of those exclusively breastfeeding from Region VII. Thus, Region VI was likely to have a larger proportion of mothers non-exposed to nutritional education and willing to accept the challenge of exclusive breastfeeding, already in practice by a larger proportion of mothers from other regions.

In addition to increasing the proportion of children exclusively breastfeeding up to six months of age, PROMI had impact in increasing length of breastfeeding and reducing the use of artificial nipples. It was shown that the use of infant bottles declined from two thirds of breastfeeding children to slightly over one half, taking breastfeeding children at time of survey as the reference population.

REFERENCES
FOR THE BASELINE
AND THE
IMPACT STUDIES

CONSULTED REFERENCES
1993 AND 1995 REPORTS

AID. **Pl 480 Title II Evaluations, 1980-1985: the Lessons of Experience.** US Agency for International Development, June 1985 (Doc # 5335).

AMERICAN PUBLIC HEALTH ASSOCIATION. **Healthy Communities 2000: Model Standards. Guidelines for Community Attainment of the Year 2000 National Health Objectives.** 3rd. Ed. Washington D.C., 1991.

BLALOCK, Hubert. "Making Causal Inferences for Unmeasured Variables from Correlations Among Indicators." **American Journal of Sociology** 69 (1963): 53-62.

BECHT, James. **Consultant Report.** Analysis and Recommendations on Indicators of Attainment, Data Collection Methods and Research Design for an Impact Evaluation of the Project. California: CARE-Dominicana, 1993, mimeographed.

BOHRNSTEDT, George W. and David Knoke. **Statistics for Social Data Analysis.** Itasca, Illinois, 1982.

BULATAO, Ronald and Ronald LEE. "An Overview of Fertility Determinants in Developing Countries." **Determinants of Fertility in Developing Countries: An Overview and a Research Agenda,** ed. by the Committee on Population and Demography. Washington: National Academy Press, 1982.

BLUMENFELD, S. **Impact of PL 480 Title II in the Philippines.** US AID: Philippines,1981. (Doc # 4634)

CAIN, Mead. "Perspectives on Family and Fertility Planning in Developing Countries." **Population Studies** 36 (July 1982): 159-175.

_____ **Women's Status and Fertility in Developing Countries: Son Preference and Economic Security.** World Bank Staff Working Papers no. 682. Population and Development Series, No. 7. Washington: The World Bank, 1984.

CALDWELL, John. "Toward a Restatement of Demographic Transition Theory." **Perspectives on Population,** ed. by Scott Menard and Elizabeth Moen, 42-69. New York: Oxford University Press, 1987.

CAMPBELL D. and J. STANLEY. **Experimental and Quasi-Experimental Designs for Research.** Chicago: Rand Mcnally College Publishing Company, 1966.

CARE-DOMINICANA. **Material de Orientación sobre PROMI, Clínicas Rurales de la Región Fronteriza**. Santo Domingo: CARE-Dominicana and SESPAS, n.d.

CARMINES, E. and R. ZELLER. **Reliability and Validity Assessment.** Beverly Hills: Sage, 1979.

CHILD, Dennis. **The Essentials of Factor Analysis**. 2d. Ed. New York: Holt, Rinehart and Winston, 1973.

COCHRAN, William. **Sampling Techniques**. 3rd. Ed. New York: John Wiley and Sons, 1977.

CONAPOFA/IRD. **Encuesta Demográfica y de Salud, DHS-1986**. Santo Domingo: Alpha y Omega, 1987.

COOK, Thomas and Donald CAMPBELL. **Quasi-Experimentation**. Chicago: Rand McNally, 1979.

CROMBACH, L.J. "Coefficient Alpha and the Internal Structure of Tests." **Psychometrika** 16 (1951): 297-334.

CRS/CARITAS. **Impact Evaluation of the Applied Nutrition Education Program (ANEP) of CRS/CARITAS in the Dominican Republic, 1983-1987**. Santo Domingo: CRS/CARITAS, n.d. mimeographed.

COTTAM, H. **PROMI Baseline Study**. Santo Domingo: CARE-Dominicana, 1991, mimeographed.

DEAN, Dwight. "Alienation: Its Meaning and Measurement, " **American Sociological Review**, 26 (October, 1961): 753-58.

_____ "Alienation and Political Apathy," **Social Forces**, 38 (1960): 185-89.

FAIGENBLUM, Jacques. **The Level of Living in two Rural Guatemalan Communities and its Relationship to Health.** Dissertation. University of North Carolina at Chapel Hill, Department of Environmental Sciences and Engineering, 1978.

FLEISS, Joseph. **Statistical Methods for Rates and Proportions.** New York: Wiley Series in Probability and Mathematical Statistics, 1981.

FREIRE, Paulo. **Education for Critical Consciousness**. New York: The Seabury Press, 1973.

_____ **The Politics of Education**. Introduction by Henry Giroux, trans. by Donaldo Macedo. Massachusetts: Bergin and Garvey publishers, 1985.

GEYER, Felix and SCHWEITZER. **Theories of Alienation**. Leiden: Martinus Nijhoff, 1976.

GRANT, James. **The State of the World's Children 1993**. Oxford: UNICEF, 1993.

GROVES, Robert. **Survey Errors and Survey Costs**. New York: John Wiley and Sons, 1989.

GURAK, Douglas and Mary KRITZ. "Female Employment and Fertility in the Dominican Republic: A Dynamic Perspective." **American Sociological Review** 47 (December 1982): 810-818.

HAYDUCK, Leslie. **Structural Equation Modeling with Lisrel**. 3rd. Ed. Baltimore: The Johns Hoptkins University Press, 1988.

INCAP. **Indices e Indicadores Antropométricos.** Unidad 1. Guatemala: INCAP, 1986.

_____ **Monografia sobre Crecimiento y Desarrollo del Niño**. INCAP: Guatemala, 1988.

IEPD. **Encuesta Demográfica y de Salud 1991: Informe Preliminar**. Santo Domingo : PROFAMILIA, 1991.

ISRAEL, Joachim. "Alienation and Reification." **Theories of Alienation**. Ed. by Felix Geyer and D.R. Schweitzer. Leiden: Martinus Nijhoff, 1976, pp. 59-77.

KALTON, Graham. **Introduction to Survey Sampling**. 2nd Ed. Beverly Hills: Sage Publications, 1984.

KERLINGER, F. **Foundations of Behavioral Reserach**. 3rd. Ed. New York: Holt, Rinehart and Winston,

KISH, Leslie. **Survey Sampling**. New York: John Wiley and sons, Inc. 1965.

_____ **Statistical Design for Research**. New York: John Wiley and Sons, 1987.

KRICK, Jackie. "Using the Z Score as a Descriptor of Discrete Changes in Growth." **In Nutritional Support Services**, Volume 6, No. 8, (August, 1986): 14-21.

KLEINGBAUM, David; Lawrence Kupper and Hal Morgenstern. **Epidemiologic Research. Principles and Quantitative Methods.** New York: Van Nostrand Reinhold Company, 1987.

LOEHLIN, John. **Latent Variable Models: An Introduction to Factor, Path, and Structural Analysis**. New Jersey: Lawrence Earlbaum Associates, Publishers, 1987.

MASON, Karen Oppenheim. **The Status of women: A Review of its Relationships to Fertility and Mortality**. The Rockefeller Foundation, 1984.

McCLUNG LEE, Alfred. "An Obituary for 'Alienation," **Social Problems**, 20 (1972): 121-129.

MCGUIRE, Judith. **Malnutrition: Opportunities and Challenges for AID**. Washington: National Center for Food and Agricultural Policy Resources for the Future, 1988.

MONTGOMERY, Douglas. **Design and Analysis of Experiments**. 2da. Ed. New York: John Wiley and Sons, 1984.

MORA, Jose; Joyce KING and Charles TELLER. **The Effectiveness of Maternal and Child Health (MCH) Supplementary Feeding Programs: An Analysis of Performance in the 1980s and Potential Role in the 1990s.** AID, Contract No PDC-0262-I-00-7151-00, 1990.

MORRIS, Leo. "Contraceptive Use and Reported Levels of Unplanned Pregnancies in Latin America." Proceedings from the XIV International Congress of the Latin American Studies Association in New Orleans, Louisiana, March 17-19, 1988.

NACHMIAS D. and C. NACHMIAS. **Research Methods in the Social Sciences.** 3rd. Ed. New York: Saint Martin Press, 1987.

NETER, J.; WASSERMAN And KUTNER. **Applied Linear Regression Models**. Homewood: Richard Irwin Co., 1983.

NEAL, A. and S. RETTIG. "On the Multidimensionality of Alienation," **American Sociological Review** 32, No. 1 (February, 1967):54-67.

NORUSIS, Marija J. **Data Analysis for SPSS**, 2nd Edition. 1991.

OFICINA NACIONAL DE ESTADISTICA (ONE). **República Dominicana en Cifras 1990**, Vol. XVI. Santo Domingo: ONE, 1991.

OPS. **Evaluación del Impacto de los Programas de Nutrición y de Salud**. Publicación Científica No. 432, 1982.

PUFFER R. and C. SERRANO. **Caracteristícas del Peso al Nacer**. OPS: Washington, 1988.

QUINN PATTON, Michael. **Utilization-Focus Evaluation**. Beverly Hills: Sage publication, 1986.

ROBERTS, John and Phillip SHAVER. **Measures of Social Psychological Attitudes**. Ann Arbor, Michigan: Institude for Social Research, 1973.

ROESEL, C. **Growth Monitoring and Promotion: Guidelines for Designing and Implementation.** PHC Report No. 1. CARE-New York, 1989.

SCHWARTZMAN, Simón. **Técnicas Avanzadas en Ciencias Sociales**. Buenos Aires: Ediciones Nueva Visión, 1977.

SEEMAN, Melvin. "On the meaning of Alienation," **American Sociological Review** 24, No. 5 (October, 1959):783-791.

_____. "Alienation Motifs in Contemporary Theorizing: The Hidden Continuity of the Classic Themes," **Social Psychology Quaterly** 46, No. 3 (September, 1983): 171-184.

_____"Alienation and Knowledge-seeking: a Note on Attitude and Action" **Social Problems** 20, No. 1 (Summer, 1972): 3-17.

SINGH, Susheela and Deirdre WULF. "Estimated Levels of Induced Abortion in six Latin American Countries." **International Family Planning Perspectives**, Vol. 20, No. 1 (March,1994): 4-13.

STEIHMEL, Leah and Liliam BOBEA. **Mother and Child Health Project, PROMI II, July 1993-June 1998**. Project Proposal. CARE-Dominicana: Santo Domingo, 1993, mimeographed.

STOCKWELL, Edward. **The Methods and Materials of Demography**. New York: Academic Press, 1976.

TEJADA YANGUELA, Argelia. **Comunidades Cañeras del Ingenio Barahona: Población Estacionaria y Mujer y Salud**. Santo Domingo: CARE-Dominicana, 1992, mimeographed.

TEJADA YANGUELA, Argelia. **Maternal Child Health Progran with Supplementary Feeding,** Baseline Study 1993. Santo Domingo, 1994.

_____**CARE-Dominicana PROMI II Impact Evaluation Proposal, 1993-1998**. Santo Domingo: CARE-Dominicana, 1993, mimeographed.

UNICEF. **Evaluation of Growth Monitoring and Promotion Programmes**. Nairobi, 7-9 May 1992.

WARWICK, Donald and C. LININGER. **The Sample Survey: Theory and Practice**. New York: McGraw-Hill, Inc., 1975.

WEINBERGER, Mary Beth, Cynthia LLOYD, and Ann Klimas Blanc. "Women's Education and Fertility: A Decade of Change in Four Latin American Countries." **Interntional Family Planning Perspectives 15**, No. 1 (March, 1989): 4-14.

WHO. **Measurement of Nutritional Impact**. Geneva: World Health Organization, 1979.

APPENDIX

RESEARCH DESIGN AND DIFFERENCES IN CONTROL COMMUNITIES AT T1 AND T2

1.1 RESEARCH ASSUMPTIONS

The present study measures the impact of the MCH program with supplemental feeding by comparing data at Time 1 and Time 2 for the period 1993-1995. Results from the 1995 KBAP Survey are compared to results from both the 1993 Household Survey and the 1993 KBAP Survey. The research design has been selected under several assumptions:

First, impact is expected to be sustainable. For this reason, changes are sought not only among project participants, but among the entire population from PROMI communities of all children under 3 years of age and their mothers. In other words, the program expects changes in non-participants and participants inside PROMI communities. It also expects that children who have graduated from the program will continue to remain healthy and to gain weight. Had the sample been taken only from program participants, at time of entrance and of graduation, much higher effects could be measured. The latter is a commonly use methodology to measure impact; however, it says nothing about coverage, real community changes and sustainability beyond life of the program.[1]

Second, education, and not the food supplement, is the key project component. Food supplements are known to be shared by the whole family. Family consumption of individual food rations cannot be considered deviation, but normal behavior. Therefore, supplemental feeding along can not be expected to change the nutritional status of underfed children. Other interventions targeting goals such as exclusive breastfeeding, proper introduction of solid foods up to six months of age, adoption of improved hygiene and household practices, vaccinations, etc. are expected to contribute to raising the nutritional status of malnourished children.

Third, community impact is measured in this study two years along in program implementation, not at full completion of PROMI, which was originally planned for five years. Therefore, dramatic changes would not normally be expected. The original evaluation proposal (Tejada 1993) expected impact five years after program initiation. Therefore, lack of statistically and substantively significant differences between PROMI measurements from the 1995 and 1993 surveys can not be automatically projected to end of LOP.[2] This early measurement will provide

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[1] The effect of the program on its participants is monitored by project management. Impact is a more ambitious goal and a harder one to achieve.

[2] It is not until the second year of program implementation that management and staff have succeeded at establishing different lactating mothers' support groups and different community development organizations. Through the activities and the processes generated by these groups, PROMI expects to improve inappropriate child care practices and to provide communal support to sustain those changes. Impact from this process can more realistically be expected after several years of operation.

management with indicators of change in those area where changes in individual practices do not require significant changes against the dominant culture or in raising the socioeconomic status of the families.

1.2 OBJECTIVES

The study has two main objectives:

-to provide management with early indicators of impact in the best PROMI communities,
-to determine interventions that can effect changes in the target population after two years of PROMI II implementation.

1.3 ORGANIZATION OF THE REPORT

This appendix addresses the methodology used to collect data at time 1 and time 2 and the methods used to analyze differences of these two measurements. The baseline study (Tejada 1994) provided an extended description of the sampling and weighting procedures used in the collection and analysis of the two 1993 MCH surveys. Therefore only some reference is made of the sampling methodology at Time 1. On the contrary, this appendix presents a description of the sampling frame from which households were selected for the 1995 survey.

Another issue addressed in this appendix is that of historical effects in selected demographic and socioeconomic variables. Even though the text answers the question of historical effects by providing results for control groups for each of the dependent variables, in this appendix PROMI and control groups are compared on the basis of independent factors. In other words, the comparison of independent variables provides evidence of causes, other than PROMI interventions, that may affect final results, in both PROMI and control communities.

The first chapter presented impact indicators of the family planning component. In 1993, the Baseline Household Survey gathered data on contraception for the total population of women in their reproductive years and the KBAP Survey for mothers of children under 3 years of age. In 1995, data have only been collected for the latter subpopulation. Therefore, impact is presented for the PROMI target group of mothers, not for the wider population of women in their reproductive years who receive family planning services from the FP project component.

The second chapter focused on mothers' participation in program activities, birthweight, the nutritional status of children under three years of age and growth monitoring. Mother's participation is measured at two levels: as individual recipients of PROMI interventions, and as participants in community organizations, mostly promoted by program staff.

The third chapter analyzed the components of maternal child health care. It presents impact indicators for prenatal and postpartum control, children's vaccinations, control of diarrhea diseases, control of acute respiratory infections and general morbidity. Mortality data were not

measured in 1995. In the baseline study, mortality data were calculated from the Household Survey, which had a very large sample of 16,906 completed interviews and addressed the issue of mortality in the household for the three years previous to the survey.

The fourth and last chapter analyzed indicators for nutrition and breastfeeding. Impact has been measured for important program goals, such as feeding practices at birth, length of breastfeeding, exclusive and supplemental breastfeeding and age at which infant formula, liquids other than water and semisolids and solids are first introduced. This report does not present indicators for KBAP variables related to the prevention of HIV/AIDS (chapter VIII in the baseline report). However, similar data were collected at Time 2 and may be presented at a later time.

1.4 RESEARCH DESIGN

The research design of the mid-term evaluation is based on testing null hypotheses between proportions of different KBAP health variables at Time 1 and Time 2 for PROMI and control communities. Rejections of null hypotheses indicate that differences--gains or reductions--are not the result of sampling error, but represent actual differences in the populations from which the samples have been selected. Type I errors (alpha probability values) associated with each test have been calculated.

Proportions from Time 1 are the result of grouping PROMI communities (clinic and non-clinic) from the 1993 baseline surveys (Tejada 1994). Two variables are taken from the 1993 Household Survey: the nutritional status of children under 3 years of age and birthweight. The remaining variables are proportions from the 1993 KBAP survey. The instrument used to collect data for the latter was used to gather data at Time 2, from August 31 to September 18 of 1995. For this reason the questionnaire is not included in this report.

Control communities were selected for the two T1 and T2 measurements. They were identified as rural communities from the same geographical area where PROMI operates and where other NGOs with similar MCH programs were not functioning at time of survey. Since PROMI and non-PROMI (control) communities are relatively near each other, some form of contamination takes place. This is particularly so in communities where some mothers travel to PROMI communities to have their children's weights monitored and to receive food rations. These participating mothers were excluded from the control sample.

Another form of confounding effect takes place through the different services provided by the rural clinics. PROMI provides logistical support to all rural clinics. By so doing, women from control communities seeking services at these clinics will indirectly benefit from the program as well. For this reason, impact is likely to be underestimated.

Sampling procedures at Time 2 are not identical to procedures used in the baseline study. In 1993, the sampling frame was formed by 253 PROMI communities and 172 control communities. PROMI communities were subdivided into 1,068 equal sized clusters of which 131 clusters from 124 different communities were selected. For the control group, the sampling

frame was formed by 172 communities aggregated into 156 equal size clusters. By using probability stratified cluster sampling, a total of 38 clusters were selected from 47 control communities. Proportions for both control and PROMI communities were weighted to account for the unequal probability sampling among strata and to adjust for nonresponse of eligible mothers.[3]

At Time 2, the sampling procedure is simpler, due to time and cost considerations as well as to the fact that Time 2 measurements represent a mid-term evaluation rather than study at end of life of project. The sampling frame for PROMI communities was constructed from a list of the "best" 10 PROMI clinic and non-clinic communities in each of the three Health Regions and from five control communities in Health Region IV and seven in Health Regions VI and VII. Project staff used value judgment criteria to select the communities where PROMI activities were more successful. Justification for this type of selection is based on PROMI's proposal.[4]

Tables A.1, A.2 and A.3 provide the T2 sampling frame in each Health Region. To achieve a near-equal representation from each community, a sample of approximately 30 households was selected from each PROMI community and of 12 households from each control community. Intervals of selection in each community were determined from previous knowledge of community size. Adjustments were made by over-sampling larger communities in communities with less than 30 eligible mothers, particularly in Health Region VII. For the control groups, adjustments were made for communities with less than 12 eligible mothers by expanding the number of communities in the original sampling frame of five control communities per Health Region.

1.5 METHOD OF ANALYSIS

To measure impact, tests of statistical significance of simple differences between two proportions (comparison of values of the same variable at T1 and T2) have been calculated. Difference of proportions is based on the fact that the mean of a dichotomous variable is the proportion of cases with the value of 1. Any variable with several categories may be transformed into a dichotomous variable by giving the value of 1 to the category of interest and the value of 0 to the other categories. In this study, proportions multiplied by 100 represent percentages.

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[3] Differences between weighted and non-weighted proportions were negligible in the 1993 surveys.

[4] PROMI # 2 goal states that "community organizations are systematically overseeing MCH health surveillance and service delivery" in half of the 36 clinic-communities where the project works; that is, in 68 communities. To measure progress, a sample of approximately half of these communities has been selected. In addition, goal #1 states that technical and managerial improved health services are expected to be effective in 45 rural clinics, not in all of them.

TABLE A 1

SAMPLING FRAME

HEALTH REGION IV, BARAHONA

PROVINCE	MUNICIPIO/a	SECTION	COMMUNITY	ESTIMATED HOUSEHOLDS	INTERVAL OF SELECTION	ASSIGNED INTERVIEWS	COMPLETED INTERVIEWS
			CLINIC				
Barahona	Peñón	Jaquimeyes	1.- Jaquimeyes	615	1-6	30	30
Bahoruco	Tamayo	Cabeza deToro	2.- Cabeza de Toro	178	1-2	30	30
Barahona	Barahona	Guazara	3.- La Guázara	836	1-9	30	23
Barahona	Vicente Noble	Canoa	4.- Canoa	564	1- 6	30	31
Independencia	Cristobal	Zona Urbana	5.- Cristobal (centro)	500	1-13	30	34
			NON-CLINIC				
Bahoruco	Uvilla	Uvilla	1.- El Jobo	163	1-2	30	30
Barahona	Palo	Los Arroyos	2.- Arroyo Arriba		1	30	30
Barahona	Peñón	Palo Alto	3.- Palo Alto	170	2-3	30	30
Barahona	Vicente Noble	Canoa	4.- Bombita	250	1-2	30	30
Independencia	Cristobal	Batey 7	5.- Batey No.7	485	2-3	30	32
SUBTOTAL PROMI						300	300
			CONTROL				
Bahoruco	Tamayo	Barranca	1.- La Barranca (de San Ramón)	70	1	12	11
Barabona	Baranona	La Cienaga	2.- El Arroyo	40	1	12	10
Barahona	Tamayo	Barranca	3.- Vuelta Grande	100	1-2	12	12
Barahona	Paraiso	El Platon	4.- San Rafael	75	1	12	12
Bahoruco	Galvan	Tamarindo	5.- Tamarindo	152	1-4	12	12
SUBTOTAL CONTROL						60	57
TOTAL						360	357

NOTE: a.- Dominican equivalent to county

TABLE A 2

SAMPLING FRAME

HEALTH REGION VI, SAN JUAN

PROVINCE	MUNICIPIO/a	SECTION	COMMUNITY	ESTIMATED HOUSEHOLDS	INTERVAL OF SELECTION	ASSIGNED INTERVIEWS	COMPLETED INTERVIEWS
			CLINIC				
Azua	Pueblo Viejo	El Rosario	1.- El Rosario	365	1-4	32	32
San Juan	San Juan	Pedro Corto	2.- Pedro Corto	320	1-4	32	40
Elias Piña	El Llano	El Llano	3.- El Llano	490	1-7	31	30
San Juan	Juan de Herrera	Jínova	4.- Jínova	31	1	19	19
San Juan	Bohechio	Zona Urbana	5.- Bohechio (centro)	355	1-4	31	30
Azua	Las Charcas	Las Charcas	6.- Las Charcas	1500	1-17	33	28
Azua	Pueblo viejo	Zona Urbana	7.- Pueblo viejo (centro)	581	1-7	31	32
Azua	Padre las Casas	Zona Urbana	8.- Las Yayas	274	2-3	31	31
			NON-CLINIC				
San Juan	San Juan	La Jagua	9.- El Hatico	91	1	30	29
San Juan	Juan de Herrera	Juan de Herrera	10.- El Catibo	41	1	30	29
SUBTOTAL PROMI						300	300
			CONTROL				
Elías Piña	Comendador	Los Rinconcitos	1.- Potroso de EP	29	1	12	7
San Juan	Juan de Herrera	Mogollón	2.- Mogollón de Jínova	300	1-9	12	14
San Juan	San Juan	Sabaneta	3. Los Arroyos	121	1-3	12	3
San Juan	San Juan	Las Charcas de M. Nova	4. Las Charcas de María Nova	270	1-8	12	25
San Juan	Pedro Corto	Pedro Corto	5. Media Cara/b	31	1	12	3
San Juan	Pedro Corto	Pedro Corto	6. Columna Arriba	35	1	-	3
San Juan	El Cercado	El Pinar	7. La Meseta	59	1	-	4
SUBTOTAL CONTROL						60	59
TOTAL						360	359

NOTES: a.- Dominican equivalent to county

b.- There were only three eligible mothers in Media Cara. The communities of Columna Arriba and La Meseta were added to the original sampling frame to be able to complete for lack of eligible mothers at Media Cara.

TABLE A 3

SAMPLING FRAME

HEALTH REGION VII, MAO

PROVINCE	MUNICIPIO / a	SECTION	COMMUNITY	ESTIMATED HOUSEHOLDS	INTERVIEW	ASSIGNED INTERVIEW	COMPLETED INTERVIEWS
			CLINIC				
Dajabón	Loma Cabrera	El Aguacate	1.- El Aguacate/b	62	1	18	11
Dajabón	Restauración	Cruz de Cabrera	2.- Rio Limpio	128	1	43	58
Dajabón	Dajabón	Sabana Larga	3.- Sabana Larga	135	1	39	30
Valverde Mao	Valverde Mao	Jaibon	4.- Pueblo Nuevo	624	1-4	48	53
Monte Cristi	Castañuela	El Vigiador	5.- El vigiador	492	1-2	48	57
Santiago Rodriguez	Sabaneta	Las Caobas	6.- Las Caobas/b	89	1	22	25
			NON-CLINIC				
Santiago Rodriguez	Sabaneta	San José	1.- Zamba	60	1	15	16
Dajabón	Loma Cabrera	Monte Grande	2.- Monte Grande	77	1	19	24
Dajabón	Loma Cabrera	Castellar	3.- La Jagua/b	102	1	28	14
Monte Cristi	Guayubin	Sabana Cruz	4.- Los Limones/b	79	1	20	16
SUBTOTAL PROMI						300	304
			CONTROL				
Santiago Rodriguez	Los Almacigos	La Lana	1.-La Lana/c	100	1	12	6
Monte Cristi	Monte Cristi	Las Peñas	2.-Batey Isabel	103	1	12	8
Monte Cristi	Monte Cristi	El Rincón	3.-Laguna Verde	80	1	12	14
Dajabón	Partido	Vaca Gorda	4.-Buen Gusto	72	1	12	2
Monte Cristi	Guayubin	Villa Elisa	5.-Hato del Medio	153	1	12	13
Dajabón	Dajabón	Cañango	6. Corral Grande	200	1-2	-	8
Monte Cristi	Guayubin	Hatillo del Palmar	7. Doña Antonia	292	1-3	-	8
SUBTOTAL CONTROL						60	59
TOTAL						360	363

NOTES: a.- Dominican equivalent to county

b.- Cuotas were not completed at these communities because household sizes were smaller than expected. To compensate, a larger size sample of mothers was drawn from the larger communities of Rio Limpio, Pueblo Nuevo and El Vigiador.

c.- Only seven mothers were interviewed at La Lana because the remaining were participating in a maternal child health program with FUDECO. In Batey Isabel a total of 25 mothers were contacted and only 8 mothers were not participating in PROMI or in a diocesan health program. In Buen Gusto only two interviews were completed because a religious congregation (Hermanas Dolorosas) and FUDECO have maternal child health programs in this community. The communities of Coral Grande and Doña Antonia were added to the original sampling frame to obtain the desired control cases.

Since the proportion of a variable with only two outcomes is the mean of that variable, we can do significance testing with proportions, applying the same formulas used to test differences between means.[5] The simple difference between the two proportions is $d = p_2 - p_1$. This is the measure most frequently used (Fleiss 1981) to describe the differential effectiveness of the second treatment over the first. In our case, this is program impact after two years of implementation.

To test whether the difference ($d = p_2 - p_1$) is statistically significant, the *test statistic* has been calculated using the formula for the difference between two proportions. Its mathematical expression is:

$$Z(p_2 - p_1) = \frac{p_2 - p_1}{\sqrt{\frac{p_2 q_2}{n_2} + \frac{p_1 q_1}{n_1}}}$$

The following procedure is followed in this study to verify if observed differences in sample proportions (d= p2 - p1) could be generated from two populations in which the true difference in proportions is exactly zero.

a. A minimal alpha level = .05 is chosen.

b. A test statistic is computed based on the null hypothesis.

c. The critical value is that Z_x which cuts off the upper or lower 5% of the normal distribution. For the normal distribution $Z_{.05} = 1.645$ and $-Z_{.05} = -1.645$.

d. The test statistic is compared to the critical value 1.645 or -1.645.

e. The null hypothesis can be rejected if the tests statistic is larger than the critical value above the zero mean of the normal distribution, or less than the critical value below the mean.

f. A precise p-value is calculated.[6]

In addition to the longitudinal test, two chi-square test were implemented at Time 1 and Time 2.[7] This is an appropriate test for assessing the statistical significance of crosstabulated variables. Most dependent variables in the study are measured at the nominal or ordinal level. Continuous variables, such as birthweight and Z-scores for the nutritional status of children, have been grouped or collapsed into a smaller number of categories. For this reason, chi-square tests are used throughout the study; gamma coefficients of association are sometime reported for

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5 See any basic statistic text for a discussion of the relationship between means and proportions.

6 A p-value is the probability of observing the test statistic under the assumption that the null hypothesis is true. P-values are more precise ways of stating not only that the null hypothesis can be rejected at the stringent alpha = .05 level, but that the probability of a type I error is smaller than the chosen alpha level.

7 A chi-square test is a test of statistical significance based on a comparison of the observed cell frequencies that would be expected under the null hypothesis of no relationship (Bohrnstedt and Knoke 1982: p106).

orderable variables; and t-tests are reported for independent continuous variables, such as parity, age and years of education. For all statistical tests, p-values have been reported.

In the analysis of crosstabulated data, contingency coefficients rather than chi-square (χ^2) statistics are reported. This choice is based on the fact that there is an implication that for a given sample size, a hypothesis which is rejected at the .001 level represents a stronger relationship than one that is rejected at the p-value of .05. However, the determination of coefficients of associations are more accurate ways to access strength of relationships (Bohrnstedt and Knoke, 1982). Although the chi-square (χ^2) test properly assesses if two categorical variables are independent, nothing can be concluded about the strength of their association on the basis of the chi-square value. This is so because chi-square increases in direct proportion to sample size even though the strength of the relationship remains the same. In other words, large chi-square values do not indicate strong associations or amount of departure from independence for the two variables, because its value depends on sample size.

For these reasons, at Time 1 and Time 2, rather than the chi-square test (χ^2), the *contingency coefficient* has been reported. This coefficient is a measure of association for non-orderable discrete variables based on the chi-square test. The contingency coefficient attempts to modify the chi-square (χ^2) statistic so that it is not influenced by sample size and so that it falls in the range of 0 to 1. Without these adjustments (Norusis 1991: p313), one cannot compare chi-square values from tables with different sample sizes and different dimensions. In the range of 0 to 1, a value of 0 corresponds to no association and a value of 1 to perfect association.

The Coefficient of Contingency is calculated from the chi-square statistic using the following formula to normalize the χ^2 statistic:

$$C = \sqrt{\frac{\chi^2}{\chi^2 + n}}$$

It takes the value of zero when no relationship exists between two variables since χ^2 is also zero; its upper limit depends on the number of rows and columns in the table.[8]

For orderable discrete variables, in some cases the gamma coefficient has been reported. This coefficient is not chi-square based, but built on the idea of the proportional reduction in error, or PRE. PRE measures tell how well one can predict the value of a dependent variable when the value of the independent variable is known. PRE measures are more easily interpreted than chi-square ones, yet, in our study, most variables are nominal, not ordinal.

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[8] In a 2 x 2 table, the largest value χ^2 can reach is N, hence the value for C is the square root of one half; similarly, the largest possible χ^2 in a 3 x 3 table is 2N and its upper limit for C is .816. It may be shown that as the dimensions of the crosstabulation increase, so does the upper limit of C, but it can never reach 1.00 (Bohrnstedt and Knoke 1982: p.288).

1.6 COMPARISON OF INDEPENDENT FACTORS

The quasi-experimental nature of the research design makes comparisons of independent variables between PROMI and control groups necessary. In other words, since project interventions are not assigned at random, but in selected communities, there may be original inequalities between PROMI and control groups that also affect final results (dependent variables). Thus, independent factors are confounding variables. At Time 1, the baseline study (Tejada 1994: Section III) established original differences and inequalities among clinic, non-clinic and control communities. At Time 2, differences and inequalities between PROMI and control communities will be first presented, followed by the longitudinal analysis to establish 1993-1995 differences.

1.6.1 HOUSEHOLD STANDARD OF LIVING

Table A.4 presents the percentage distribution and the result of testing statistical differences between PROMI and control communities at Time 1 and Time 2 for eight variables of household standard of living. Chi-square based contingency coefficients and p-values are provided below the results of each cross-sectional survey. Time 1 is represented by the pre-PROMI II column and Time 2 by the mid-PROMI II column. In addition, Table A.4 presents the difference between variables measured at Time 2 and Time 1 for PROMI and control communities. As explained in section 1.5, these differences have been tested in order to rule out the possibility that the observed differences may be generated from two populations in which the true difference in proportions is zero. The fifth column presents the test statistics that were calculated for each difference. The corresponding level of significance is expressed by the number of asterisks next to each difference of proportions in the fourth column.[9]

Socioeconomic variables in Table A.4 may be analyzed into 3 different groups: (1) houses with electricity, which is a condition for owning refrigerators and television sets and increases the possibility of having a radio; (2) houses with running water, inside or in the backyard; and (3) houses with private, collective or no latrine or toilet.

The percentage of houses with electricity from PROMI communities did not change from 1993 to 1995, but in control groups, which at T2 represent a smaller number of larger communities than at T1, it increased from 31.7%, to 63.4%. However, changes in control communities may not necessarily represent historical changes in all non-PROMI communities, but may be due to a selection of better-off control communities at T2.

The proportion of households with running water (inside or patio faucet) is significantly different between PROMI and control communities in both 1993 and 1995, but the difference is narrower in 1995. On the other hand, the proportion of households with private latrine or toilets remained unchanged during the period and a proportion of households using collective latrines diminished in both types of communities.

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[9] Almost all subsequent tables in this report follow a similar structure; further explanation is not required.

TABLE A 4

POPULATION DIFFERENCES IN SOCIOECONOMIC HOUSEHOLD VARIABLES
AT T1 AND T2 SURVEYS, FROM PROMI AND CONTROL COMMUNITIES

HOUSEHOLD CHARACTERISTICS	PRE-PROMI II November 1993				MID-PROMI II September 1995				SAMPLE Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ	%	FREQ.	%	%	%	TEST ST	TEST ST
WITH ELECTRICITY	1,386	72.0	292	31.7	634	70.1	111	63.4	-1.9 n.s.	31.7 ****	-1.04	8.02
RUNNING WATER/PATIO OR INSIDE	1,038	53.9	176	19.2	398	44.0	47	26.9	-9.9 ****	7.7 *	-4.94	2.14
WITHOUT LATRINES/ON GROUND	489	25.4	271	29.4	291	32.2	65	37.1	6.8 ****	7.7 n.s.	3.69	1.95
WITH COLLECTIVE TOILETS/LATRINES	435	22.6	193	21.0	143	15.8	24	13.7	-6.8 ****	-7.3 **	-4.41	-2.50
WITH PRIVATE TOILETS/LATRINES	1,002	52.0	457	49.6	470	52.0	86	49.1	0.0 n.s.	-0.5 n.s.	0.00	-0.12
OWNS REFRIGERATOR	275	14.3	70	7.6	129	14.3	37	21.1	0.0 n.s.	13.5 ****	0.00	4.21
OWNS RADIO	824	42.8	327	35.5	393	43.5	84	48.0	0.7 n.s.	12.5 **	0.35	3.05
OWNS TELEVISION	560	29.1	188	20.4	348	38.5	77	44.0	9.4 ****	23.6 ****	4.89	5.93

LEVEL OF CONFIDENCE

	PRE-PROMI II	MID-PROMI II
ELECTRICITY	SIGNIFICANT CC: .40088****	SIGNIFICANT
RUNNING WATER	SIGNIFICANT CC: .41112****	SIGNIFICANT CC: .30995****
WITHOUT LATRINES/TOILETS WITH COLLECTIVE LAT/TOILETS WITH PRIVATE LATRINES/TOILETS	SIGNIFICANT CC: .20547****	SIGNIFICANT
WITH REFRIGERATORS	SIGNIFICANT CC: 12704****	SIGNIFICANT CC: .07005*
WITH RADIOS	SIGNIFICANT CC: .12028****	NOT SIGNIFICANT
WITH TELEVISION	SIGNIFICANT CC: .15857****	NOT SIGNIFICANT

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. Sample size for PROMI communities in 1993 is 1926 for PROMI communities and 921 for control communities. In 1995, sample size is 904 for PROMI communities and 175 for control communities.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

This higher proportion of households with electricity from control communities shows a higher standard of living, using electric equipment as a proxy variable. While in 1993 there were statistically higher proportions of households from PROMI communities with refrigerators, radios and television, in 1995, the population from "best" PROMI communities shows no statistically significant difference with households from control communities, with the exception of refrigerators, with a higher proportion in control communities. The proportion of households owning refrigerators rose from 7.6% to 21.1% in control communities.

Changes in ownership of television sets and radios between households from PROMI and control communities from 1993 to 1995 provide evidence of equal conditions for both types of communities in 1995. In control communities, it more than doubled from 20.4% to 44.0%, and rose to 38.5% in PROMI communities. On the other hand, the proportion of households with radios did not change in PROMI communities and rose an additional 12.5% in control communities. These results give evidence of a narrowing difference between PROMI and control communities from 1993 to 1995. In general, control communities show a higher standard of living than in 1993, while PROMI communities remained unchanged with the exception of 9.4% additional households with television.

1.6.2 SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF MOTHERS

The last section portrayed higher levels of homogenization in living conditions between PROMI and control communities in 1995 than in 1993. Nevertheless, PROMI communities remained in 1995 with statistically significant higher proportion of households with electricity and running water than control ones. This is not the case for socioeconomic and demographic variables which describe characteristics of mothers. In 1995, mothers from PROMI and control communities are similar, with the only exception being family size.

Table A.5 presents the results of 10 different chi-square tests for different socioeconomic and demographic variables of mothers of children under 3 years of age from PROMI and control communities in 1995. All tests failed to reject the null hypotheses, providing evidence of the equality of mothers from both groups in the following variables: *age,* by five years groupings; mothers' *formal years of education* and completed *primary, secondary* and *university* levels; participation in the *labor market; paid labor* and assistance with *day care* for their children; *marital status* and *occupation* of their partners or ex-partners. Contingency coefficients are presented with their non-significant probability values. In addition, t-values for the PRE gamma association coefficients also provide evidence of no significant difference.

Further evidence of the greater homogeneous character of mothers from PROMI and control groups at T2 is provided by the result of two t-tests taking the variables *mother's age* and *years of education* as two continuous variables. In 1993, there was a statistically significant difference in mean age between mothers from PROMI and control communities--Table A.6. In 1995 the average age of mothers drops in both types of communities and shows no significant difference. It decreased in control communities from 30 years to 25.3 years, and in PROMI communities from 27.7 years to 25.5 years.

TABLE A 5

MOTHERS' SOCIO-ECONOMIC CHARACTERISTICS AT TIME 2
RESULTS OF CHI-SQUARE TESTS THAT FAILED TO REJECT THE NULL HYPOTHESES
BETWEEN MOTHERS FROM PROMI AND CONTROL GROUPS, 1995

VARIABLE	QUESTIONNAIRE ITEM	CONTINGENCY COEFFICIENT	P.VALUE	T-VALUE OF GAMMA TEST
Mothers age by year	102	.1561	.7618	0.21435
School assistance	103	.0274	.3687	0.97879
Level of mothers' education	104N	.0217	.9263	0.15598
Test of functional literacy for mothers in first level of primary education	105	.0368	.8196	-0.60866
Participation in the labor market	106	.0168	.5818	-0.56144
Paid labor	107	.0303	.8884	-0.17533
Child care for working mothers	108	.0724	.7148	0.41549
Marital status	109	.0495	.7539	1.1153
Husband residing with family	110	.0297	.3691	-0.82654
Husband occupation	111	.1399	.1204	-1.51321

SOURCE: KBAP Survey, August 31 to September 18, 1995.

TABLE A 6

T-TEST BETWEEN MEAN YEARS OF MOTHERS' EDUCATION AND MEAN MOTHER' AGE
FOR PROMI AND CONTROL COMMUNITIES

	PRE-PROMI II November 1993			MID-PROMI II Semptember 1995			MEAN DIFFERENCE		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	MEAN	VAR.	FREQ.	MEAN	VAR	FREQ.	PROMI	CONTROL	PROMI	CONTROL
MOTHERS' AGE									TEST ST	TEST ST
CLINIC	28.1	108.16	958							
NON-CLINIC	27.3	79.21	968							
PROMI	27.7		1,926	25.5	38.68	904	-2.2 ****	-4.7 ****	-6.99	-8.01
CONTROL	30.0	132.25	921	25.3	35.15	175				
MEAN DIFFERENCE	-2.3		--	0.2		--				
YEARS OF EDUCATION										
CLINIC COM.	5.0	18.49	958							
NON-CLINIC	3.9	15.21	968							
PROMI	4.5		1,926	5.0	17.04	896	0.6 ***	1.4 ****	3.25	4.14
CONTROL	3.7	16.81	921	5.1	16.86	175				
MEAN DIFFERENCE	0.8			-0.1						

LEVEL OF SIGNIFICANCE OF MEAN DIFFERENCES

VARIABLE	PRE-PROMI II		MID-PROMI	
COMMUNITIES	T-VALUE	P-VALUE	T-VALUE	P-VALUE
MOTHERS' AGE	SIGNIFICANT		NOT SIGNIFICANT	
CLINIC AND NON-CLINIC	2.02	.043	-0.40	.687
CLINIC AND CONTROL	-3.64	.000	PROMI AND CONTROL	
NON-CLINIC AND CONTROL	-5.80	.000		
YEARS OF EDUCATION			NOT SIGNIFICANT	
CLINIC AND NON-CLINIC	5.81	.000	0.42	.687
CLINIC AND CONTROL	6.98	.000	PROMI AND CONTROL	
NON-CLINIC AND CONTROL	1.44	n.s.		

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, reject the null hypothesis if test statistic > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

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While mothers mean age dropped in both types of communities, their mean years of education increased. It rose from 4.5 years in PROMI communities to 5.0 during the 1993-1995 period and from 3.7 years to 5.1 years in control communities. This is an expected finding since women's schooling in the DR has increased in the last decades. Mean years of mothers' education from clinic and control communities were statistically different in 1993 but not statistically significant different in 1995.

The only demographic characteristic that shows a statistically significant difference between mothers from PROMI and control groups in 1995 is family size, measured by the average number of children ever born. Mothers from control group had on average 2.92 children, a statistically lower mean than the 3.44 average in PROMI communities. The inverse was true in 1993. Longitudinally, the mean number of children ever born increased by 0.18 in PROMI communities and decreased by 0.82 in control communities--Table A.7. While the change is not substantial in PROMI communities, in control communities it is close to an average of one less child per mother. This change in control communities may reflect the higher standard of living and the lower mean age of mothers of control communities selected in 1995, rather than actual changes in non-PROMI communities.

1.6.3 DEMOGRAPHIC CHARACTERISTICS OF CHILDREN

Table A.8 presents data on basic demographic variables for children under 3 years of age. In 1995, only biological children were included in the sample, thus no statement is made regarding differences in the proportion of children who are not raised by their biological mothers. Demographic characteristics of children are not statistically different at T1 and T2, with the exception of the proportion of children 0-11 and 12-23 months of age in control communities. In the latter, children 0-11 months increased from 25.8% to 40.1% and children 12-23 months diminished from 37.6% to 29.6%. The 24-35 month group remained unchanged. On the other hand, proportions remained basically unchanged in PROMI communities.

A reading of Table A 8 for minor differences between children's demographic characteristics from PROMI and control communities shows the following: gender and multiple birth proportions have not changed, and the proportion of children who have died in the last three years previous to the survey increased by an additional 1.8% in control communities.

1.7 CONCLUSION

In this appendix, the research assumptions and design have been presented as well as the method of analysis of both the cross sectional and the longitudinal data. Additionally, the chapter provides a justification for selecting chi-square based contingency coefficients as measures of associations for crosstabulation of non-orderable nominal variables rather than the chi-square statistic for analyzing cross-sectional data at T1 and T2.

TABLE A 7

AVERAGE NUMBER OF CHILDREN EVER BORN TO KBAP POPULATION
OF MOTHERS BY SAMPLE DOMAINS

	PRE-PROMI II November 1993								SAMPLE MEAN DIFFERENCES		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
TYPE OF COMMUNITY	**MAIN STATISTICS 1990-1993**				**MAIN STATISTICS 1992-1995**				**PROMI**	**CONTROL**	**PROMI**	**CONTROL**
	MEAN	**SD**	**VAR**	**FREQ.**	**MEAN**	**SD**	**VAR**	**FREQ.**	%	%	TEST ST	TEST ST
PROMI												
CLINIC	3.10	2.2488	5.0571	830	3.44	2.385	5.688	904				
NON-CLINIC	3.43	2.2952	5.2679	879	-	-		-				
SUBTOTAL (MEAN)	3.27			1,709	3.44	2.385	5.688	904	0.18 *	--	1.86	
CONTROL	3.74	2.6532	7.0395	787	2.92	1.990	3.960	175	--	-0.82 ****		-4.61
TOTAL	3.42			4,205	3.18			1,079				
	0.52											
LEVEL OF SIGNIFICANCE BETWEEN PROMI AND CONTROL COMMUNITIES	**SIGNIFICANT** Difference between Clinic and Control but not between Non Clinic and Control.				**SIGNIFICANT** T-Test for equality of means is -3.06***, with a mean difference of -0.52 . The unequal variance 95 % CI for the mean difference is (-.855, - .185).							

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is greater than > 1.645.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP Survey, August 31 to September 18, 1995.

TABLE A 8

DEMOGRAPHIC CHARACTERISTICS OF CHILDREN IN SAMPLE DOMAINS

CHARACTERISTICS	PRE-PROMI II November 1993				MID-PROMI II September 1995				SAMPLE Differences		LONGITUDINAL TEST C.V.= Z (.05) = 1.645/a	
	PROMI		CONTROL		PROMI		CONTROL		PROMI	CONTROL	PROMI	CONTROL
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	%	%	TEST ST	TEST ST
MALE	1,207	49.7	551	53.0	580	50.7	114	52.5	1.1 n.s.	-0.4 n.s.	0.60	-0.12
FEMALE	1,223	50.3	489	47.0	563	49.3	103	47.5	--	--		
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
BIOLOGICAL/b	2,193	90.2	904	86.9	1,143	100.0	217	100.0	--	--		
ADOPTED	237	9.8	136	13.1	0	0.0	0	0.0	--	--		
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
SIMPLE	2,376	97.8	1,029	98.9	1,120	98.0	213	98.2	--	--		
MULTIPLE	54	2.2	11	1.1	23	2.0	4	1.8	-0.2 *	0.7 n.s.	-0.39	0.72
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
ALIVE	2,400	98.8	1,035	99.5	1,127	98.6	212	97.7	--	--		
DEAD	30	1.2	5	0.5	16	1.4	5	2.3	0.2 n.s	1.8 *	0.40	1.73
TOTAL	2,430	100.0	1,040	100.0	1,143	100.0	217	100.0				
AGE GROUPS:												
0 - 11 months	798	33.2	267	25.8	390	34.6	85	40.1	1.4 n.s.	14.3 ****	0.81	3.94
12 - 23 months	786	32.7	389	37.6	334	29.6	59	27.8	-3.1 *	-9.8 **	-1.86	-2.85
24 - 35 months	818	34.1	379	36.6	403	35.8	68	32.1	1.7 n.s.	-4.5 n.s.	0.99	-1.28
TOTAL	2,402	100.0	1,035	100.0	1,127	100.0	212	100.0				

NOTE: a. When the critical value (C.V.) falls in the lower half tail of the sampling distribution, then -Z(.05) = -1.645. If the test statistic is less than -1.645, the null hypothesis is rejected. For the upper tail, the null hypothesis is rejected if the test statistic is > 1.645.

b. For the 1995 survey, only biological children were selected, thus, proportions do not reflect population estimates for this year.

P-VALUES: *p<.05 **p<.01 ***p<.001 ****p<.0001

SOURCES: KBAP Survey, November 1 to December 10, 1993 and KBAP survey, August 31 to September 18, 1995.

A comparison of determinant factors which may act as confounding variables when assigning causation to PROMI interventions has also been presented. The analysis of these data provides sufficient evidence to conclude that the standard of living of households from control communities, as measured by access to electricity, running water and possession of refrigerators, radios and televisions is statistically and substantively higher in 1995 than in 1993. As a result, the 1993 gap between the standard of living of households from PROMI and control communities is narrower in 1995.

In addition to standard of living, other variables measuring demographic and socioeconomic characteristic of mothers with children under 3 years of age from PROMI and control communities have been compared, both longitudinally and cross-sectionally. Test results of noncontinuous variables based on chi-squares and PRE coefficients of associations provide sufficient evidence to conclude that in 1995, the demographic and socioeconomic characteristics of mothers are similar. In addition, t-tests comparing mothers' ages and years of education provide evidence of no significant difference between PROMI and control communities in 1995 while in 1993 mothers from control communities were on average older and had fewer years of formal education.

The improved situation of mothers from control communities has also been verified by testing family size, measured by the number of children ever born. While in 1993 mothers from control communities had a statistically significant higher mean number of children, in 1995 mothers from PROMI communities have a statistically higher mean number of children.

It should be highlighted that differences from control communities at T1 and T2 can not be interpreted as historical changes in non-PROMI communities but rather as a result of sample selection. While in 1993 the control group was selected from a large sampling frame of 172 small communities (representative of non-PROMI and non-NGO's activities), in 1995 the control group was selected from a small sampling frame of 19 somewhat larger-sized communities. These control communities are better off than the 1993 control sample. As a result, in 1995, the study compares the "best" PROMI communities from the stand point of mothers' participation in the program, with the "best" control communities, from the stand point of household standard of living and socioeconomic characteristics of mothers. This selection resulted in near-equal socioeconomic and living conditions for mothers from PROMI and control communities in 1995. Therefore, the equal socioeconomic situation of mothers at T2 rules out the possibility of extraneous socioeconomic factors affecting changes in PROMI communities and not in control ones.

As a consequence of the sampling design, longitudinal changes in dependent variables for mothers and children from "best" PROMI communities not found in control communities, can readily be assigned to PROMI's interventions. Longitudinal changes in dependent variables from control communities may be caused by PROMI's indirect intervention through rural clinics or by other historical factors affecting all communities, such as mass media.