PN-AAZ-547

PROJECT ON ANALYSIS OF COMMUNITY LEVEL NUTRITION PROGRAMS

ISN-55501

Volume IV:

The Promotora Program in Candelaria

Part I:

A Colombian Attempt to Control Malnutrition and Disease, 1968-1974

Part II:

A Revisitation Two Years After Program End

William D. Drake, Ph.D.
Luis J. Fajardo, M.D.
Roy L. Miller, Ph.D.

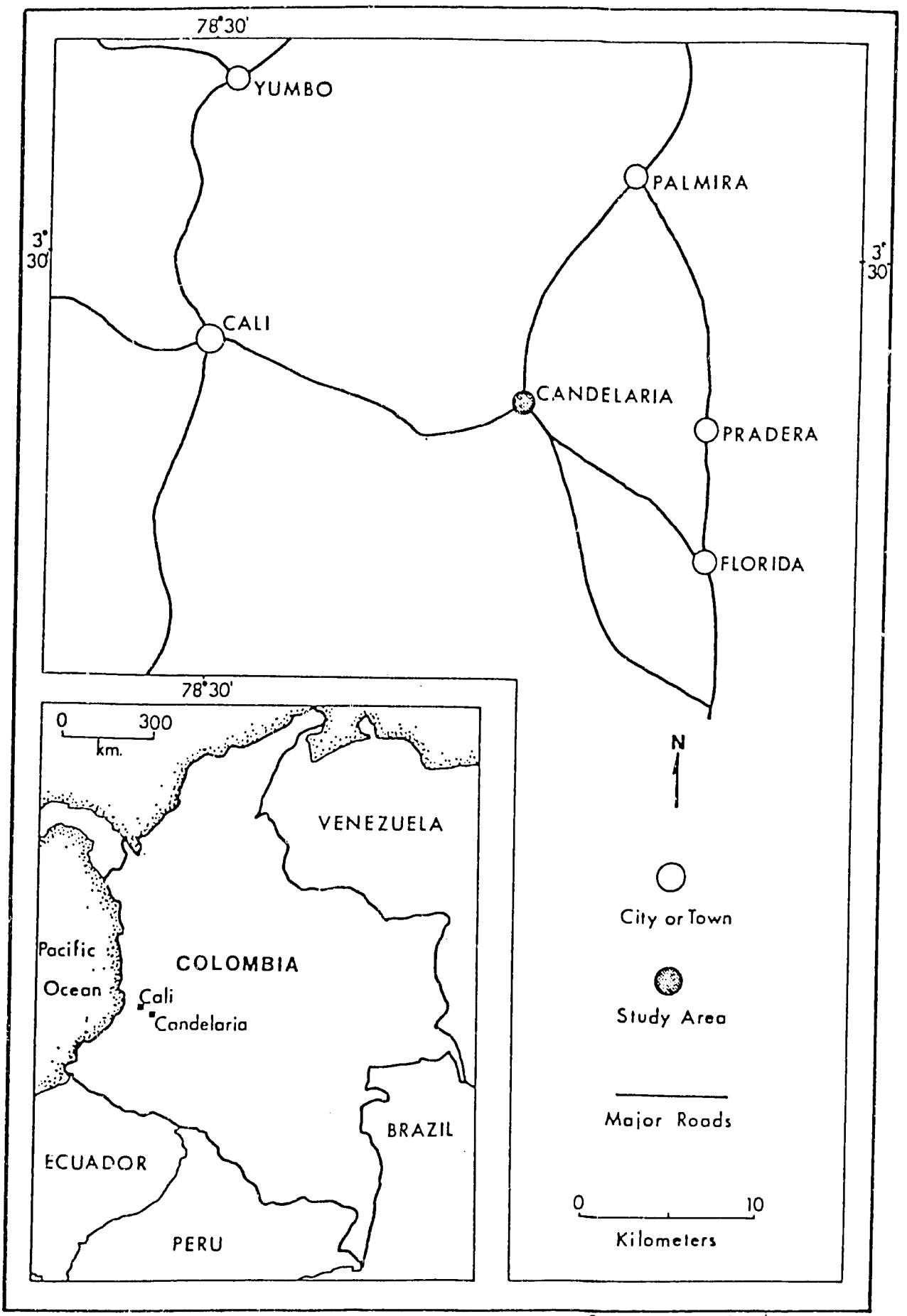
November 1980

Office of Nutrition

U.S. Agency for International Development
Washington, D.C.

Community Systems Foundation
1130 Hill Street
Ann Arbor, Michigan 48104

PROMOTORA PROGRAM - CANDELARIA, COLOMBIA



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PREFACE

This volume contains two separate studies both of which are concerned with a nutrition intervention carried out in a rural community, Candelaria, Colombia. The first study conducted in 1975 reports the results of the Promotora Program--a Colombian attempt to control malnutrition and disease.

The second study, in many ways unique, focuses upon the question: What are the long-term effects of community-level nutrition interventions **following their termination** using Candelaria as the case example? This second study, which was part of the overall research program "Analysis of Community-Level Nutrition Programs," utilizes a data set on five hundred families, both participants and nonparticipants, gathered two years after the Promotora program was terminated.

These studies have both influenced and been influenced by our four year investigation. The first report acted as an **initial** model for the other case study in this research project. As our data handling and methodological procedures became more fully developed, they were then applied to the second study.

ACKNOWLEDGMENTS

Drs. Alfredo Aguirre, M.D. and Alberto Pradilla, M.D. who were deeply involved in the implementation of the Promotora Program were extremely helpful in setting the stage for the evaluation, and contributed their insights during the analysis in the first study. Useful discussions also were held with Joe D. Wray, M.D., Alex Cobo, M.D., David Denman, Dean Wilson, James Eckroad, John D. Nystuen, Peter S. Heller and Bart Burkhalter.

Assistance in carrying out this research was provided by Charles Eisendrath, Robert Tessier, Beth Drake, David Sahn, Diane MacEachern, Kathy Jones, Royer Held, Deborah Howe, Eileen Trzcinski, Margaret Humphrey, and Steve Hynson. Dr. Luis Fajardo, a co-author in the first study provided key contextual information for the second paper.

Financial assistance for the initial study was provided by Fundacion Para La Educacion Superior, Cali, Colombia and the U.S.A.I.D. Mission in Bogota, Colombia under Order Number 514-247-75. The second study and republication of the first was funded by the Project on Analysis of Community-Level Nutrition Programs (AID/TA-G-1419).

CONTENTS

PREFACE i

ACKNOWLEDGMENTS ii

CONTENTS iii

PART 1 The Promotora Program in Candalaria: A Colombian Attempt to Control Malnourishment and Disease (1968-74) 1

- Summary and Conclusions 1
- Statement of Purpose 3
- The Setting - Candelaria, Colombia 4
- Description of the Promotora Program 4
- The Evaluation of the Promotora Program 8
  - Changes in Child Malnourishment, 1968-1974 10
  - Child Malnourishment and Infection 11
  - Malnourishment and Sex of Child 14
  - Malnourishment and Family Planning 15
- Analysis of Factors External to the Program 15
  - Malnourishment and Inflation 15
  - Malnourishment and Food Consumption 17
  - Malnourishment and Parental Education 17
- Further Analysis of Program Effects 18
- Conclusions 19

Figures 21

Tables 48

Appendix A 56

PART 2 The Promotora Program in Candelaria: A Revisitation Two Years After Program Ending (1976) 69

- Summary and Conclusions 70
- Statement of Purpose 72

Background: Program and Data 73
Program 73
Origins of the Data 74
Preparation of the Data 75
Introduction to the Data Set: Participants and Nonparticipants 76
Definition of Participants 76
Comparisons of Participants with Nonparticipants 78
Methodological Issues 84
Selection of a Growth Standard 84
Selection of a Functional Form 86
Resolution 87
Analysis of Program Impact 89
Nutritional Status 90
Disease 93
Pregnancy History 95
Conclusions 97
Figures 99
Tables 104
Appendix A 132
BIBLIOGRAPHY 148

The Promotora Program in Candelaria
Part I:
A Colombian Attempt to Control Malnutrition and Disease, 1968-1974

William D. Drake, Ph.D.
Luis J. Fajardo, M.D.

THE PROMOTORA PROGRAM IN CANDELARIA: A COLOMBIAN ATTEMPT TO CONTROL MALNUTRITION AND DISEASE, 1968-1974

SUMMARY AND CONCLUSIONS

In 1968 a new health program was initiated in Candelaria, Colombia. This program centered around health volunteer workers (Promotoras), girls between 16 and 21 years of age with at least five years of primary school. Following a six-month training period, they assumed the task of visiting all families with children less than six years of age every two months. The ten volunteers provided education on nutrition, hygiene, and utilization of health services; gathered data including child height and weight; and referred sick children to a Health Service Unit. The latter was staffed by four Public Health Nurse Aides and provided initial treatment of the most common illnesses. Pregnant and lactating mothers were also instructed in prenatal and postnatal care.

The overall management of the Health Center was directed by a general practitioner (sixth year medical student) and a Public Health nurse. The major purpose of the program was to prevent disease as well as to reach children before any illnesses had progressed to a point requiring extensive and costly medical treatment.

By utilizing the volunteers to identify those children requiring further treatment, the time of the highly skilled health care personnel could be reserved for tasks appropriate to their skills. The direct participation of community members in the program increased its acceptability.

Detailed records were obtained on 80 percent of the entire child population and associated families, including health and nutritional status and a rich collection of family socioeconomic information (see Bibliography and Appendix A). This data set, representing over one-half million variable observations in 9,800 child and 1,800 family records, was converted to

machine-readable form and analyzed during 1975 and 1976.

The conclusions stemming from this analysis are that the Promotora Program as carried out in Candelaria was successful in reducing child malnourishment for a variety of reasons as summarized below.

-- Although the child population was well off relative to other semi-rural Colombian villages at the start of the program, the malnourishment rate dropped in the entire child population, from roughly 29 percent in 1968 to 21 percent in 1974--a 25 percent reduction. This occurred in spite of an erosion of purchasing power and a large turnover in families participating in the program (Figure 3).

-- When children who entered the program during their first year are compared with those entering in their second or later year, the reduction in malnourishment is even greater: a 30 to 40 percent improvement (Figure 11).

-- A strong relationship between the presence of diarrhea and malnourishment is shown both graphically (Figure 4) and statistically (Pages 19, 20). More important is the finding that the Promotora Program reduced incidence of diarrhea significantly: by 20 to 50 percent, depending upon the age of the child and the duration of time the family was in the program (Figure 8).

-- A particularly surprising result was that the nutritional status of girls improved far more than boys during the seven-year period. Based on the Gomez standard, which was used during the period of the program, malnourishment in girls decreased from 36.1% to 24.8%, while the rate for boys went from 19.7% to 17.3%. That is, girl malnourishment dropped 31% and boy malnourishment dropped only 12%. Although the utilization of a sex-differentiated standard would change the relative position of boys to girls, there would be no change in the finding that girls improved far more than boys (Figure 12).

-- The education level of the parent, expenditures on food, and monthly income all affected the level of child malnourishment.

-- During the seven-year period, 1968-1974, there was a significant erosion in family purchasing power for the entire community. Although the average family income increased from 683 pesos to 1251 pesos, real income, when adjusted for inflation, dropped to 566 pesos in constant

terms. This resulted in a decrease in real expenditures on food of 8.7% over the seven-year period (Figure 20).

A function describing the relationship between infectious disease and food consumption was formulated (Figure 21). This relationship is important because it could lead to helping define what the best mixture of community-level interventions should be.

-- Consumption of food also dropped, which increased the gap between need and consumption from 22.7% to 33% for proteins and 19.7% to 29.7% for calories. In addition, shifts occurred from animal proteins to lower priced vegetable proteins. Whereas the mixture was 47% animal and 53% vegetable in 1968, it was 37% animal and 63% vegetable by 1974 (Table 7).

-- The use of birth control more than doubled during the Promotora Program. Families using some form increased from 18.7% in 1968 to 43.6% in 1974, with the largest change in use being the IUD (Figure 14). Birth order was shown to affect sibling malnourishment rate in Candelaria. It is therefore reasonable to presume that as family planning increases there will be further positive effects upon the child malnourishment rate.

STATEMENT OF PURPOSE

This report analyzes the nutritional and health characteristics of a semi-rural Colombian community. It utilizes a set of data almost unique in the developing world. The data consist of systematic observations of over 80 percent of all children under six years old and their families during the "Promotora" program in Candelaria, a town of 8,000. Promotora's intervention during 1968 to 1974 appears to have successfully reduced child malnourishment. Equally important, it promises to achieve similar results if applied elsewhere.

Additionally, this report discusses important methodological issues related to evaluating community health systems and charting a course of inquiry into the better understanding of extremely complex interrelationships underlying malnutrition at the family and community levels.

THE SETTING - CANDELARIA, COLOMBIA

Candelaria (population approximately 8,000) is located in the Cauca River Valley 30 kilometers from Cali. The major crop produced by the surrounding rich agricultural lands is sugar cane. Most of the men work in sugar cane fields or mills. Average monthly income is $30.00 U.S. Although there is some home production of vegetables and other foodstuffs, the people depend on cash incomes for survival.

Recently the population has been growing at an annual rate of approximately 10 percent, due to the high natural birthrate and the immigration of families from subsistence farms in search of employment. The family migration rate is approximately 18 percent per year, since many of the immigrants remain in Candelaria for only a year or two before moving on to Cali or other cities Thus, Candelaria is in constant transition--typical of communities in the area.

DESCRIPTION OF THE PROMOTORA PROGRAM

The Promotora Program centers around health volunteer workers (Promotoras), between 16 and 21 years of age with at least five years of primary school. Following a six-month training period they assumed the task of visiting all families with children less than six years of age every two months. The ten volunteers provided education on nutrition, hygiene and utilization of health services; gathered data including child height and weight; and referred sick children to a Health Service Unit. The latter was staffed by four Public Health Nurse Aides and provided initial treatment of the most common illnesses. Pregnant and lactating mothers were also instructed in prenatal and postnatal care.

The overall management of the Health Center was directed by a general practitioner (sixth-year medical student) and a Public Health nurse. The major purpose of the program was to prevent disease as well as to reach children before any illnesses had progressed to a point requiring extensive and costly medical treatment.

By utilizing the volunteers to identify those children requiring further

treatment, the time of the highly skilled health care personnel could be reserved for tasks appropriate to their skills. The direct participation of community members in the program increased its acceptability.

As shown in Table 1, the Promotora Program serviced an average of 921 families per year (except the first year, when 737 families were involved), including 1,392 children (first year - 694) less than six years old. Based upon a census conducted in 1963, 506 families inhabited the town, including 1,094 children less than six years old, with 2.16 children less than six years old per family.

However, 1973 census indicated 1,260 dwellings with 1,952 families, for a total of 8,773 inhabitants. No data now exist concerning the total number of children less than six years old in Candelaria, but it is reasonable to believe that between 20 and 25 percent of the population belong in this age group. Based on these criteria, we can conclude that over 80 percent of the children in the population participated in the Promotora Program.

During the seven years of the program's operation, 1,840 different families participated, including 9,051 children less than six years old. The operation of the program was fairly stable. The first year, 40 percent of the attending families registered, of which 240 families (13 percent) permanently enrolled in the program for the six years of its duration. Abandonment by the enrolled families primarily due to outmigration during their first year in the program was on the average 17 percent (Table 2). Thus, except for the initial year, each of the 10 health volunteers served approximately 139 children in 92 families, with roughly 17 percent of the participants changing each year as migration to and from Candelaria occurred.

A health card, Figure 1, was kept by the mother for every child under six years of age. Data were recorded on this card during each visit so that the mother could observe the progress of her child in relation to a standard. The Gomez standard was used for this purpose, and no distinction was made between male and female children.

Two types of data were generated by the Promotora Program: (1) family demographic and general health information; and (2) individual child

health data. Family-level information includes number of years in the Promotora Program, family size and composition, age of family members, educational level of parents, occupation, income of principal wage earner, weekly expenditures of food, and the number of children in the family classified by degree of malnourishment. Individual child health data consist of age and weight of child, order of birth in the family, nutritional status, extent of diarrhea sickness, hospitalization and clinic visitation, and whether or not DPT and polio immunization was given during the preceding period. A detailed description of these data is shown as Appendix A.

Candelaria has had health-related interventions since 1958, when the Board of the Faculty of Medicine at the Universidad del Valle in Cali decided to establish a rural health center there for teaching purposes. Consequently, the analysis of the Promotora Program (1968-1974) must be placed in the context of these previous interventions. Before delving into the effects of the Promotora Program it is therefore necessary to describe these previous interventions, a more complete description of which is contained in "Comparative Effects of Three Types of Nutritional Assistance Programs," by Alfredo Aguirre, Universidad del Valle, Cali, Colombia, 1971.

-- In 1958 the Department of Preventive Medicine and Public Health of the Universidad del Valle established a rural health center. Services in preventive and curative medicine were rendered by residents and medical students exposed by their work to community problems. The point was utilization of available resources rather than development of a "University Hospital" in rural surroundings. Students and residents learned to resolve problems they might face in other communities with no university assistance.

-- The Nutritional Recuperation Center, started in August, 1962, provided care for children with second- and third-degree malnourishment after release from the hospital. Children remained at the center during the week and were sent home on weekends. Besides furnishing children with adequate food, the center was to educate the mother about the importance of balanced diets. It became evident, however, that the educational efforts were not reaching the rest of the community; often the siblings of

the children under treatment were malnourished. Even some of the "recuperated" children became malnourished upon return home. The costs of the program per recuperated child were high and the scarce facilities limited the number who could be treated. The emphasis was on curative rather than preventive medicine.

-- In January, 1964, the Nutritional Recuperation Center was disbanded and all children showing any sign of malnourishment were treated as outpatients. Weekly food supplements were distributed for each person of vulnerable age (preschool children, pregnant or nursing mothers). Mothers in groups of 25-30 took part in seven educational presentations. The educational efforts of this project appeared to have reached the rest of the community. The weight-for-age malnourishment rate decreased from 40.8% to 31.8% in the first six months of the program and was proportionately greater in the severely malnourished groups. While the project was considered successful, the costs were high in relation to the economic resources of the health center.

-- As a result of municipal water and sewage programs, 67.7% of the homes had sanitary waste facilities and 90.9% had piped water by 1964. The impact of this on the malnourishment rate cannot be accurately determined, but a 1963 survey conducted prior to the supplementation program indicated a rate of 40.8%, compared to the 55.6% shown in the 1965 national survey.

Consequently, by the time the Promotora Program was initiated, the children of Candelaria were already comparatively healthy. The most recent nationwide survey of Colombia (1966) found that 55.7% of the children less than six years of age were malnourished in communities comparable to Candelaria. In 1968, however, when the Promotora Program was initiated, malnourishment in Candelaria was roughly 30%, the collective result of the interventions conducted during the previous decade. Figure 2 summarizes the prevalence of malnourishment and diarrhea in Candelaria children between 1963 and 1974, and Table 3 indicates the nutritional status of Colombian children between 1960 and 1974 in various regions.

It is clear that Candelaria is not typical of rural communities in Colombia. Although many of its families reside there only temporarily, the community as a whole is accustomed to projects being conducted by

outsiders. This was a strong influence on the acceptance of the Promotora Program. Beyond that, water and sewage treatment systems made the task of reducing the infection rate through education somewhat easier. It is therefore difficult to predict precisely what the impact of a Promotora Program would be in a community with minimal sanitation facilities and a malnourishment rate of 50 to 60 percent. Despite these problems, the Promotora Program in Candelaria is the only program that can be evaluated and, when the limitations of some of the data are recognized, significant conclusions may still be drawn regarding both the Promotora Program and some characteristics of the community/family infrastructure.

Time limited the analysis. In many cases underlying relationships have been only touched upon. Questions raised have vastly exceeded answers. The information in this report is offered to enable others to tackle problems of malnutrition more effectively. We reluctantly call this a final report, for much more information can and will be derived from this data source. The results of the Promotora Program are described in the following section.

THE EVALUATION OF THE PROMOTORA PROGRAM

It would be methodologically convenient if we could merely report changes in the health and nutritional status of children exposed to the Promotora Program over the seven-year period 1968-1974 and then assess whether these changes warranted the expenditures necessary for their attainment. But such is not the case. Time and again, as we have examined the relationships between the intervention and the resultant improvement in child health, we have found it necessary to delve into many aspects of the environment that are not directly related to the Promotora Program. While this has made the task more difficult, it has also produced a rich collection of exogenous factors which at times have overwhelmed the effects of the program under direct analysis. We shall treat each major finding both in terms of the Promotora Program and where possible, in the larger Colombian setting.

As we evaluate the Promotora Program, it is also important to clarify

the nature of what we call malnourishment and the methodology employed to measure changes produced by the program. If we review the natural history of child malnourishment--whether it is caused by infection or a nutrient deficiency, or both--we see that children born in a healthy nutritional state often suffer a period of sharp but short-term malnutrition during weaning. When malnourishment occurs over a short period, it is characterized by a weight loss in relation to height, and is called **acute** malnutrition. If the diseased condition continues, growth in height is retarded. Prolonged illness produces a permanent deficit in height for a given age. This deficit we call **chronic** or stunting malnutrition. Recovery from malnutrition results in a weight gain proportional to the child's height and some gain in the child's height proportionate to his age. Consequently, recordings of weight for a given age represent the sum of damages produced by long-term chronic malnutrition and short-term acute malnutrition.

The data set used in this analysis contained weight-for-age information for all observations, but only a sample of height-for-age information. As a result, most of the analysis utilizes the weight-for-age measurements. Under these conditions, then, any short-term changes in the weight-for-age measurements represent a rather dramatic change in the actual nutritional status of the child population.

A child was considered undernourished if it was 15 percent below the expected weight for its age. The Gomez standard was used, which measures slightly below the 25th percentile of the Boston standard for children. Note that the standard for the population of Colombia runs slightly above the 25th percentile of the Boston standard for children, and undernourishment is defined as a weight loss of 10 percent with regard to that standard. Thus some children considered normal in Candelaria would be considered undernourished if defined by the standard of undernourishment accepted in Colombia. Given that during the entire period of the program the same standards and definitions were used, it is possible to draw conclusions from the variations in the malnutrition rate.

It is necessary to note the different interpretations of the variations in

the malnutrition rate and their implications. The most current is to express the measurement of undernourishment as a function of its variations by calendar years (malnutrition vs. calendar year). One of the factors that can most affect this type of analysis is internal and external migration. In Candelaria, the phenomenon of migration is notable; it has been calculated that each year a migration of 15 to 25 percent occurs. Variations in the income of the population serviced are also important.

Another means of expressing the variations in the malnutrition rate consists of examining its relationship to the amount of time spent in the program by the participants (% malnutrition vs. years in the program); the greatest inconvenience with an analysis of this type lies in the possibility of deducing the effect of the program with the accompanying effect of an increase in the age of the population served.

Finally, it is possible to examine the percentage of children who are malnourished for different cohorts of children defined in terms of their length of particiption in the program. This obviates the problems described previously but, recognizing the fact that the number of children in the older ages is generally low, makes the data seem less conclusive.

Changes in Child Malnourishment 1968-1974

At the program's inception in 1968, the malnutrition rate of all grades was 28.6%. By 1971 it had dropped to 19%. Between 1972 and 1974 this rate remained stable at around 21% (Figure 3 and Table 4).

It is important to consider if, for the population of Candelaria, we should expect a major reduction in the malnutrition rate independently of whether such a reduction is due to the intervention; or if the stabilization of the malnutrition rate is due to the point at which the normal distribution of weight/age does not easily permit a further reduction. Comparing what is considered the normal weight distribution for the populaton of Bogota with the population of Candelaria, we see that the lower weight limit for each group considered normal in Candelaria coincides with the 20th percentile of the weight distribution for Bogota children. Thus if the normal populations are comparable, the definition of

undernourishment would classify 20 percent of the normal children of both populations as undernourished. In other words, the maximum sensitivity of the instruments used to measure undernourishment is roughly 20 percent.

We can conclude then that for a combination of reasons, malnutrition dropped in Candelaria during the Promotora Program to a level below which it would be difficult to attain under most conditions.

Child Malnourishment and Infection

One of the most useful methods of assessing the impact of a community health services program is to examine changes in the rate of infection. However, isolating malnutrition and infection is virtually impossible. Their synergistic relationship precludes separation. A change in the infection rate will affect the amount of nutrients available to the child, which in turn influences malnourishment. By the same token, a change in nutrient intake will affect by some degree the incidence and severity of infections.

Trends in the rate of malnourishment and infection over program and calendar year will be discussed separately and then compared in order to identify some of their interrelationships within Candelaria, Colombia. The analysis uses diarrhea as the expression of infection because of its high prevalence in early childhood and its statistical correlation with malnourishment. Our measure of malnutrition is the weight-for-age classification using the Gomez standard.

The diarrhea rate is the average frequency of diarrhea as recalled by the mother for the month preceding the Promotora visit. The quantification of the incidence of this infection is thus subject to a lack of recall, mothers not seeing the child's stool, and acceptance of what would clinically be diagnosed as diarrhea as the norm. Despite these methodological limitations, the diarrhea rate by age may be observed accurately. There is a low incidence in infancy, when many children are nursing, and then a sharp rise from six months to 30 months, the postweaning period. At this time, children are being introduced to new foods, usually low in protein, and are also mobile, enabling them to crawl

around and pick up infections. In Candelaria, this period is followed by a steady decline (Figure 4).

It is important to recognize the "natural change" in rate of malnourishment and infection as the child ages. This is independent from any health program. Similarly, differing environmental conditions will influence what is "natural." For instance, the national Colombian survey of 1966 showed that the malnourishment rate for children less than one year was 32.9%. It peaked in the third year at 66.8%, and then dropped to 55.9% by the fifth year. Therefore, it is misleading to base an analysis of the effects of the program strictly by charting children over time because, as they age, a change in their malnourishment rate will occur regardless of intervention.

The evaluation of any observable trends in diarrhea over time is complicated by this "aging effect." The average age of the children in Candelaria increases the longer they are in the program (Figure 5). There also appears to be an increase in the average age of the population of children through the calendar years as well (Figure 6). Thus a change in the diarrhea rate is not necessarily indicative of success or failure--the observable trend may be related to the aging process. Therefore, it is difficult to assess the impact of the progrm based strictly on the graph of the rate of diarrhea as the time enrolled in the program increases (Figure 7).

Figure 8 indicates that the Promotora program is successful with respect to reducing diarrhea rates. In essentially all age groups the rate decreases through the third year of the program. In other words, a two-year-old in the program the second year will have a lower diarrhea rate than a two-year-old during its first year in the program.

We had planned to examine both the incidence and severity of diarrhea. The longer the duration of a particular case, the greater the impact on a child's nutritional status. If a child suffers five consecutive days of diarrhea, it will be more damaging than five bouts of one day's duration separated by a few days of relative health. The data from the Promotora Program on the duration of diarrhea, however, showed little promise for

further analysis. It is probably easier for a mother to remember the number of times the child had diarrhea rather than the duration of each illness. Thus our attempts to correlate severity of diarrhea with malnourishment have not yet been successful.

For the reasons described earlier in this section, malnourishment is clearly tied to infection rates. The graph of malnourishment rate versus time spent in the program reveals a modest decline after the second year (Figure 9). During this semester the average age of children enrolled in the program is 32.4 months, which corresponds with the age in which children suffer the highest incidence of malnourishment. The rate of malnourishment does not fall as low as the rate for diarrhea, because beyond early childhood it is no longer a dominating factor in the etiology of malnutrition. When children can walk, they are less liable to become infected with germs from human feces and other contaminants that abound on the floors and ground of poverty-ridden communities. Furthermore, by the time they pass early childhood, they have developed some resistance to diarrhea. At this point, the controlling factors in determining nutritional status are probably a lack of food and metabolic stresses caused by low-grade infections from a variety of sources.

The plot of malnourishment against age and number of years in the program shows decreasing malnourishment among children three and under (Figure 10).

Malnourishment does not decrease as consistently for the older age groups. This could be the result of different factors. The malnourished four- and five-year-old who is enrolled in the first year of the program may be chronically undernourished and hence more difficult to treat. An analysis of the two youngest groups as they move through the program indicates a continual decrease in the malnourishment rate (Figure 11). The graph of malnourishment by age for the first program year is a reflection of the expected rate of malnourishment for each age group without any intervention, and in that sense can act as a control. Figure 11 also graphically illustrates the importance of reaching the children when they are very young. If a child is enrolled as an infant, the probability of its

being malnourished at age three, four, or five will be lower than if the child is two years of age at entry.

Malnourishment and Sex of Child

One of the most interesting results to come from the analysis of the Candelaria Promotora data concerns the effect of sex on both the absolute amount and the relative change in malnourishment rate. Nationally, the Colombian rates differ: 47.5% for boys; 64.6% for girls. The same differential existed for children in Candelaria in 1968: 19.7% for boys and 36.1% for girls. However, by 1974 the values had changed to 17.3% for boys and 24.8% for girls (Figure 13).

In other words, most of the drop in malnourishment for all children between 1968 and 1974 was attributable to a dramatic decrease in female malnourishment (31 percent) and a modest (12 percent) reduction in male malnourishment.

Several theories can be offered to explain this observation. Applying one standard to both males and females could cause a higher female malnourishment rate than if separate standards were used. However, this would not explain the narrowing of the differential over the period of the program.

We suspect that increased awareness of dietary practices and an explicit observable record of the status of each child regardless of sex no longer allowed the mother to "favor" male children due to her cultural upbringing. The entire family had visible assessment, showing their daughters seeming to need more attention relative to their sons. This permitted other natural paternal instincts towards the well-being of their family to come into play.

Further analysis will be undertaken on this variable by applying a sex differential, height-for-weight standard to confirm this sex effect. However, regardless of which standard is used, the change in malnourishment rate will continue to be greater for girls than for boys.

Malnourishment and Family Planning

Another aspect of the Promotora Program included instruction in family planning. It is well known that the number of children and their spacing affect the malnourishment of all siblings in the family. Therefore, one measure of effectiveness of the program may be usage of birth control as related to the number of years each family participates in the program. Figure 13 and Table 8 indicate that birth control usage increased from 19.9% in the first year a family was enrolled to 51.8% in the seventh year. While all methods except rhythm increased substantially, the IUD increased most (6.8% to 19.8%). (When usage is measured over calendar years there is an increase from 18.7% in 1968 to 43.6% in 1974, as shown in Figure 14 and Table 8.)

The relationship between malnourishment rate and child birth order is shown in Figure 15. The malnourishment rate for children was 15.5% for first children, rising unevenly to 32.6% for ninth children. Although there is no direct evidence of the relationship between family planning usage and number of children in the family, it is reasonable to assume that the Promotora Program is helping to decrease average family size and consequently is having a positive effect upon child malnourishment.

ANALYSIS OF FACTORS EXTERNAL TO THE PROGRAM

Figure 16 describes the major factors which determine the nutritional status of a child. The quantity and quality of food, together with the degree of biological utilization, determines nutritional status. In turn, these two major variables are driven by numerous other factors. Some of these are not related to the Promotora Program but must be considered when evaluating the results of the experiment.

Malnourishment and Inflation

For the most part, the families in Candelaria depend on cash income for survival. These families are very susceptible to inflation, because their incomes are so low that 85 percent of their earnings are spent on food. The graph of the consumer price index reflects the increase in cost of

living in Colombia over the seven-year period of the Promotora Program (Figure 17). The graph of percent change in the consumer price index is more readily understandable, for it shows the inflation rate by year (Figure 18). If wages and per capita food expenditures do not increase annually by a corresponding rate, less or lower quality food will be purchased and malnourishment will increase. Applying the consumer price index to the monthly income, it can be seen that the real income of families in the Promotora program decreased from 1968 to 1974 by 7.1 percent (Figure 19).

There is a comparable decrease in per capita weekly food expenditures. The decrease is 8.7%, which is more than that of monthly income (Figure 20). Since requirements are rather inelastic at low levels of income, we expected that the percentage decrease in per capita food expenditures would be less than the decrease in income, because the people would increase the proportion of their income spent on food. It appears, however, that the percent of the income not spent on food is as inelastic if not more so than food expenditures. The explanation for this relative lack of elasticity is probably the very high percentage of total monthly income devoted already to food. The remaining disposable income is so small that only essentials are being purchased even in good times.

Effects of inflation upon malnourishment are futher dramatized by observing the manner in which overall child malnourishment rates for the entire community track expenditures on food in price-adjusted pesos (Figure 20). At almost the same time that real family expenditures in food start to decrease (1971), the child malnourishment rate ceases to decrease and begins to climb slowly. On the other hand, if families are divided into groups of relatively constant expenditures in food (adjusted to 1968 pesos), the malnourishment rate drops over the life of the program, both in terms of year in the program and calendar year. Thus, not only is the Promotora Program effective in improving the nutritional status of the children, but it is helpful in alleviating and overcoming the potentially detrimental effects of inflation.

Malnourishment and Food Consumption

Tables 5, 6, and 7 illustrate how, during the years of the Promotora Program, the gap between requirement and consumption increased from 22.7% in 1968 to 33% in 1974 for proteins, and from 19.7% to 29.7% for calories, reflecting our previous conclusions on food expenditures.

In terms of the quality of food consumed, the prediction that inflation would lead people to buy food of lower quality is also fulfilled, as evidenced by the fact that the percentage of animal proteins therein diminishes from 47 percent in 1968 to 37 percent in 1974 (Table 7). Here again we can expect the effect of the Promotora Program to reduce the malnutrition rate in spite of not having provoked an increase in the consumption and quality of food.

A function describing the relationship between infectious diseases and food consumption was formulated. The measure for decrease was incidence of diarrhea and the variable measuring food consumption was weekly food expenditures per capita in constant pesos. It can be seen from Figure 21 that to attain the same level of nourishment, a diarrhetic child must consume considerably more nutrients. Conversely, for a given consumption, a child's level of nourishment will change by as much as 15 percent. A 15 percent drop in weight is sufficient to advance the child by at least one degree of malnourishment. Although the measures available from the data in the Promotora Program are not ideal for defining this function, we believe these initial findings merit further investigation. A more precisely defined function could lead to helping predict what the best mixture of community-level interventions should be.

Malnourishment and Parental Education

Our analysis indicates that parental education affects child malnutrition to a significant degree. Figures 22 and 23 show literate parents (either mothers or fathers) having a lower average child malnourishment throughout the entire seven years of the Promotora Program. It was hypothesized that the malnourishment rates for literate and illiterate mothers would converge as the length of time in the program increased,

but we found no such convergence.

Figures 24 and 25 illustrate the tendency for children of a literate father or mother who remain in the program longer than other children to have a lower malnutrition rate. For the baby sons of an illiterate father or mother, this tendency is not as evident, although for all ages the malnutrition rate is less following a year of participation in the program than the malnutrition rate for children unexposed to the program.

Finally, Figure 26 shows that food expenditures are greater in families whose fathers are literate than they are in families whose fathers are illiterate, both by program year and calendar year. Thus, the Promotora Program is as effective in the reduction of the malnutrition rate among literate families as it is among illiterate families.

FURTHER ANALYSIS OF PROGRAM EFFECTS

The analysis described in previous sections used weight-for-age as the measure of child malnutrition. As mentioned previously, this measure confounds both chronic and acute malnourishment. Consequently, further analysis was performed on the subset of observations having both height and weight recordings. This allowed us to observe acute malnourishment for year 1969 through 1974 on approximately 40 percent of the individual child observations.

A regression equation was formed using the National Academy of Sciences weight-for-height standard as the dependent variable. Many different independent variables were tried, with the following variables being statistically significant.

Variable Definition	Statistically Significant Relationships
1. Number of days sick with diarrhea	Negative correlation with nutritional percentile
2. Whether or not the mother nursed	Positive correlation with nutritional percentile for the first 24 months

3. Educational level of mother	Positive correlation with nutritional percentile
4. Sex of child	Positive correlation
5. Number of children in family	Negative correlation
6. Age of mother	Negative correlation
7. Per capita food expenditures	Positive correlation with nutritional percentile for 2-12 months and 24-48 month intervals but no significance for the 12-24 month interval
8. Amount of time in Promotora program	Positive correlation with nutritional percentile

These results appear to be consistent with the weight-for-age findings and show promise of shedding additional light upon the program effects if pursued further.

CONCLUSIONS

The Promotora Program as carried out in Candelaria was quite successful in reducing child malnourishment, for a variety of reasons.

-- Although the child population was well off relative to other semi-rural Colombian villages at the start of the program, the malnourishment rate dropped in the entire child population from roughly 29 percent in 1968 to 21 percent in 1974--a 25 percent reduction. This occurred in spite of an erosion of purchasing power and a large turnover in families participating in the program (Figure 3).

-- When children that entered the program during their first year are compared with those entering in their second or later year, the reduction in malnourishment is even greater: a 30 to 40 percent improvement (Figure 11).

-- A strong relationship between the presence of diarrhea and malnourishment is shown both graphically (Figure 4) and statistically (Pages 19,20). More important is the finding that the Promotora Program reduced incidence of diarrhea

significantly by 20 to 50 percent, depending upon the age of the child and the duration of time the family was in the program (Figure 8).

-- A particularly surprising result was that the nutritional status of girls improved far more than boys during the seven-year period. Based on the Gomez standard, which was used during the period of the program, malnourishment in girls decreased from 36.1% to 24.8%, while the rate for boys went from 19.7% to 17.3%. That is, girl malnourishment dropped 31% and boy malnourishment dropped only 12%. Although the utilization of a sex-differentiated standard would change the relative position of boys to girls, there would be no change in the finding that girls improved far more than boys (Figure 12).

-- The educational level of the parent, expenditures on food, and monthly income all affected the level of child malnourishment.

-- During the seven-year period 1968-1974, there was a significant erosion in family purchasing power for the entire community. Although the average family income increased from 683 pesos to 1,251 pesos, real income, when adjusted for inflation, dropped to 566 pesos in constant terms. This resulted in a decrease in real expenditures on food of 8.7% over the same seven-year period (Figure 20).

A function describing the relationship between infectious disease and food consumption was formulated (Figure 21). This relationship is important because it could lead to helping define the best mixture of community-level interventions.

-- Consumption of food also dropped, which increased the gap between need and consumption from 22.7% to 33% for proteins and 19.7% to 29.7% for calories. In addition, shifts occurred from animal proteins to lower priced vegetable proteins. Whereas the mixture was 47% animal and 53% vegetable in 1968, it was 37% animal and 63% vegetable by 1974 (Table 7).

-- The use of birth control more than doubled during the Promotora Program. Families using some form increased from 18.7% in 1968 to 43.6% in 1974, with the largest change in use being the IUD (Figure 14). Birth order was shown to affect sibling malnourishment rate in Candelaria. It is therefore reasonable to presume that as family planning increases there will be further positive effects upon the child malnourishment rate.

FIGURE 1

HEALTH CARD USED BY MOTHERS IN CANDELARIA, COLOMBIA

IMPORTANTE:

HAGA ANOTAR TODAS LAS VACUNAS QUE RECIBA SU NIÑO.

Tipo	No.	Fecha	INSTITUCION
B C G	1		
D P T	1		
	2		
	3		
	1er. Ref.		
	2do Ref.		
Polio	1		
	2		
	3		
	Ref.		
Sarampion	1		
VIRUELA	P		

LOS SUPLEMENTOS VEGETALES SON DE GRAN VALOR NUTRICIONAL.

V E G E T A L E S.

PARA PREPARARLOS PROCEDA ASI:

MEZCLA

1º 4 CUCHARADAS Grandes rasas de leche en polvo incaparina — Mas — 8 onzas ACUA — Mas — 2 CUCHARADAS Grandes rasas de azucar o panela

2º Hierva 15 min. enfrieta, sirvala.

3º Cada dia dele 3 o 4 tetaros o vasos de leche o incaparina a cada niño.

Para una buena nutricion en el primer año, agregue cada mes los siguientes alimentos:

MES

1º Jugo de frutas
2º Papillas de cereales
3º Yema de huevo, pure de frutas
4º Papilla de carne
5º Pan, arepas o galletas
6º Purees: frijoles, arvejas, frutas
7º Trocitos: papa, yuca, platano
8º Trocitos de frutas y vegetales
9º Carnes picadas o molidas
10º Debe comer todos los alimentos.

PARA UNA BUENA ALIMENTACION EN TODO EL AÑO DELE L E C H E M A T E R N A.

BUENA NUTRICION SIGNIFICA NIÑOS SANOS

El alimento esencial en los primeros años es la L E C H E.

La leche materna: ES LA MEJOR LECHE que puede darle a su hijo. Deseala el mayor tiempo que pueda.

Cuando no puede darle al seno, dele leche de vaca o leche en polvo.

Carné de Salud

DISTRITO DE SALUD DE CALI
Secretaría Municipal

UNIVERSIDAD DEL VALLE
División de Salud

PROGRAMA DE PRESTACION DE SERVICIOS DE SALUD

NOMBRE DEL NIÑO:

NOMBRE DE LA MADRE O RESPONSABLE:

CENTRO DE SALUD:

NUMERO DE IDENTIFICACION:

DATOS DEL NIÑO:

PESO AL NACER	TALLA	Varon
		Mujer

LUGAR DE NACIMIENTO:

☐ Casa ☐ H. Universitario
☐ Centro de Salud ☐ Servicio Especiales
☐ H. Carlema ☐ Otro

DIRECCION	CIUDAD O BARRIO

DATOS DE IMPORTANCIA:

SU NIÑO SERA CONTROLADO POR LA PROMOTORA DE SALUD.

COLABORE CON ELLA, SIGA SUS INSTRUCCIONES

DOCTOR: Anote sus diagnosticos - Gracias

Fecha	Diagnostico	Institucion

HOSPITALIZACIONES:

Fecha Entrada	Diagnostico	Dias Hospital	Instit.

Fecha de nacimiento:

EDAD EN MESES

Año / Mes	Ene	Feb	Mar	Abr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic

CLASIFICACION ESTADO NUTRICIONAL DEL NIÑO

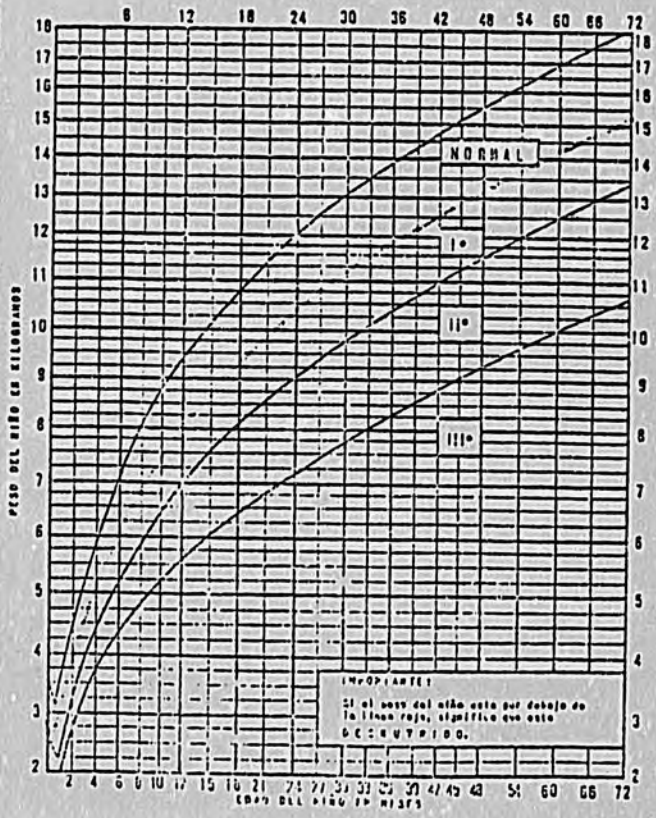


FIGURE 2

CHILD MALNOURISHMENT AND DIARRHEA RATE

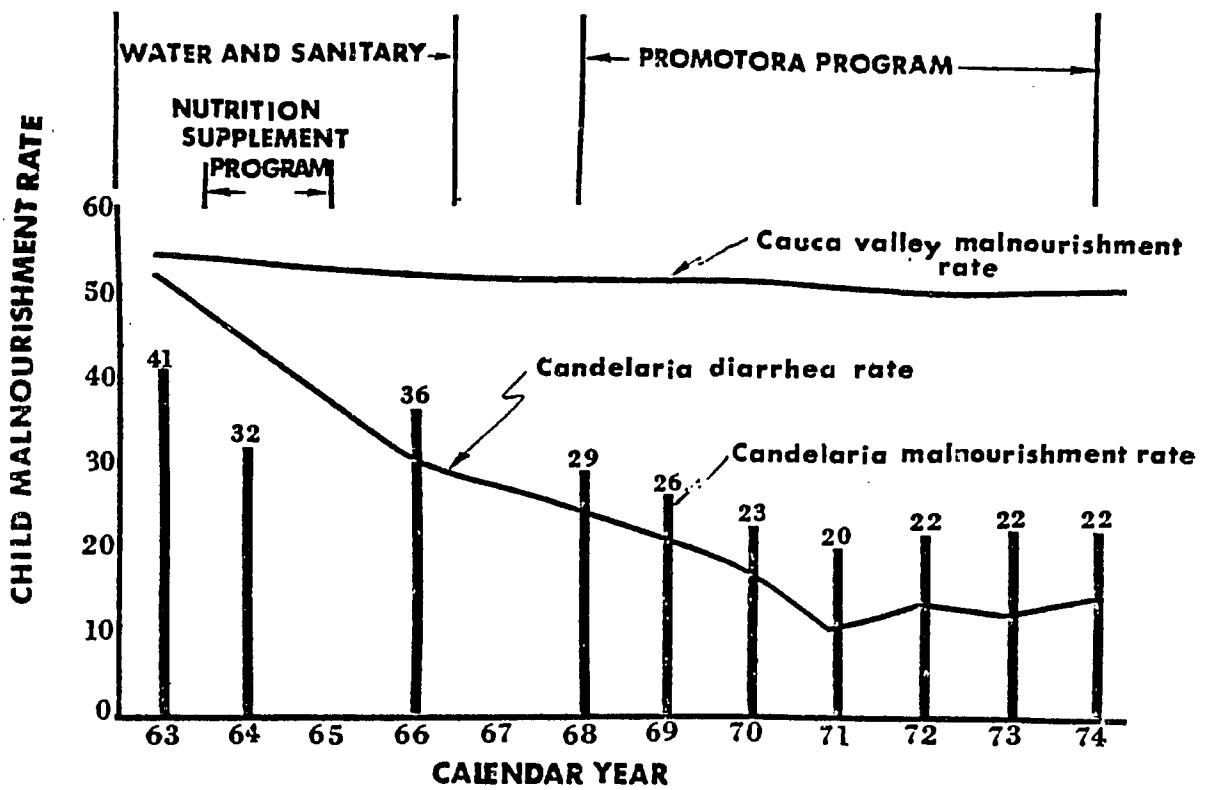


FIGURE 3

PERCENT MALNOURISHMENT FOR CHILDREN OF ALL AGES

IN CANDELARIA, COLOMBIA 1968 TO 1974

(BASED ON 9800 INDIVIDUAL CHILD RECORDS)

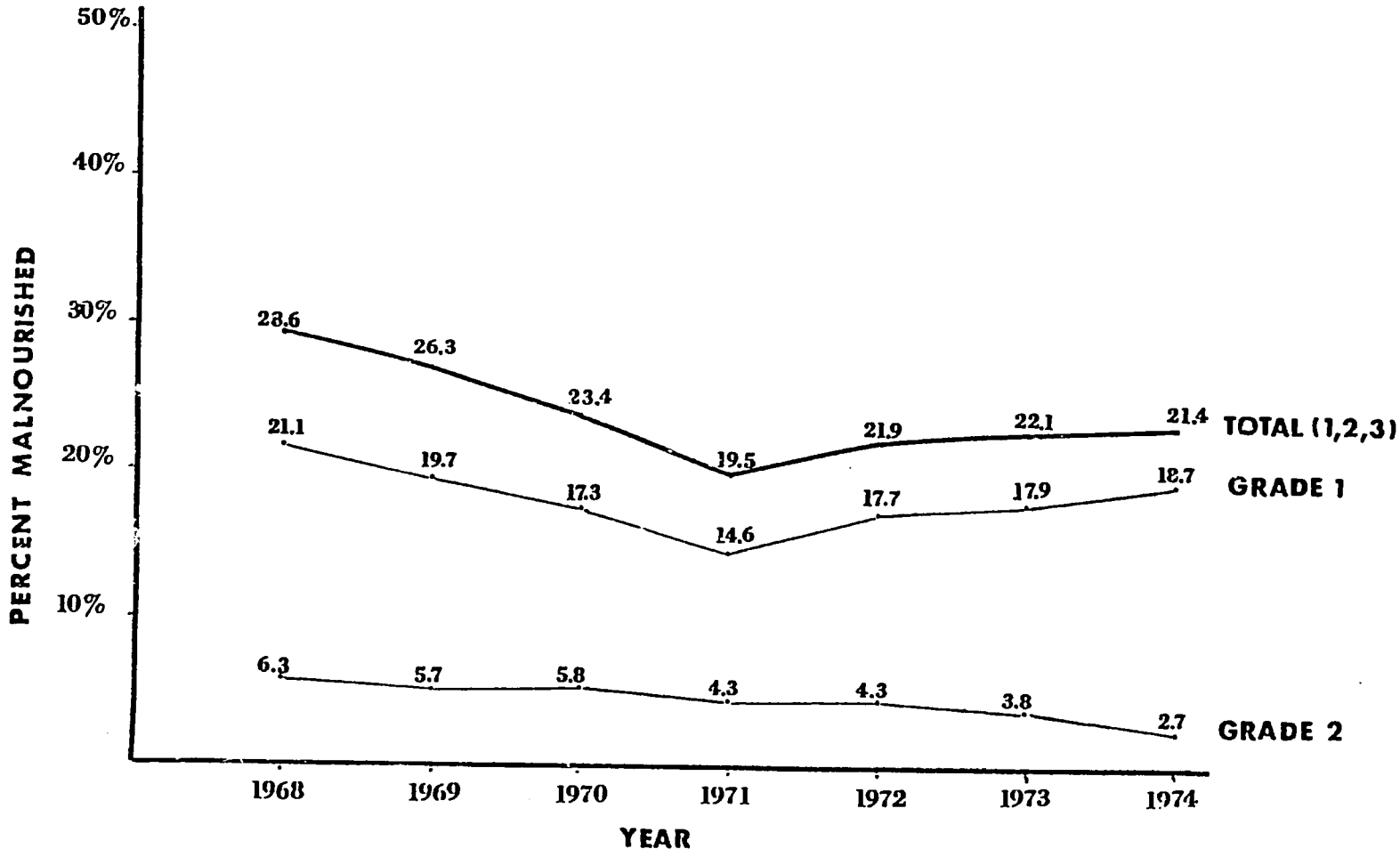


FIGURE 4

PERCENT MALNOURISHMENT AND DIARRHEA VS. AGE OF CHILD
(CANDELARIA, COLOMBIA)

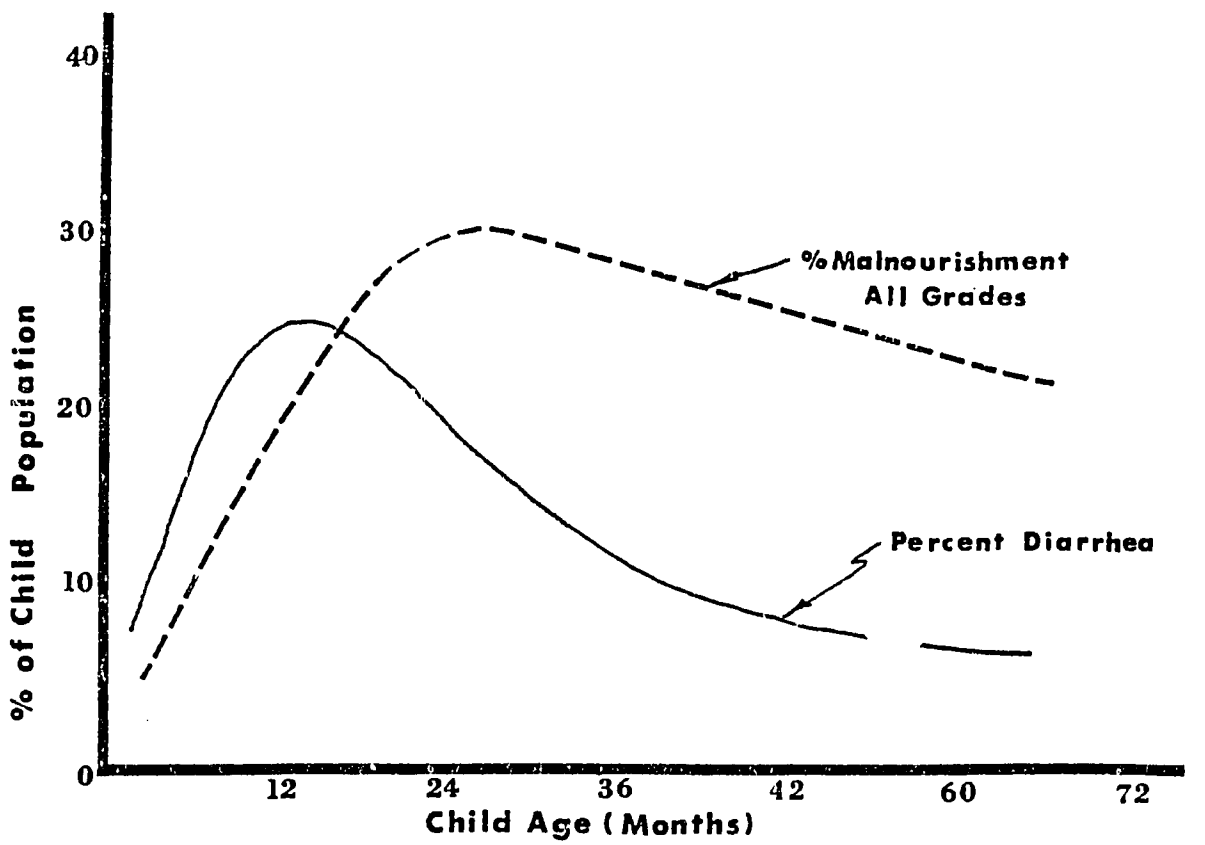


FIGURE 5

AVERAGE AGE OF CHILD IN MONTHS BY YEAR IN PROGRAM

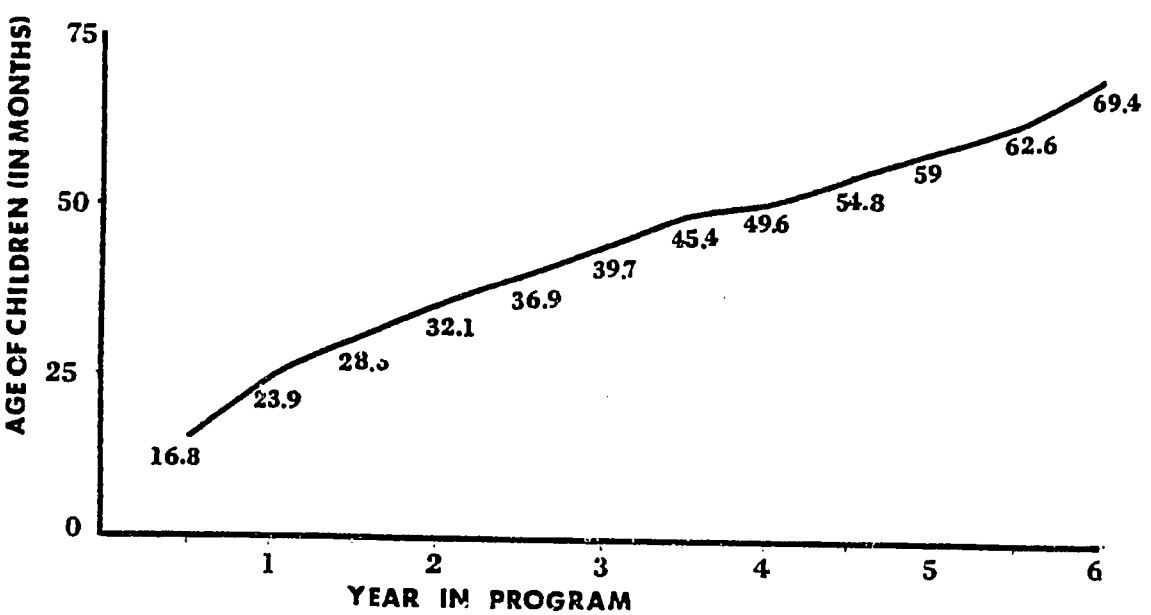


FIGURE 6

AVERAGE CHILD AGE BY CALENDAR YEAR

(CANDELARIA, COLOMBIA)

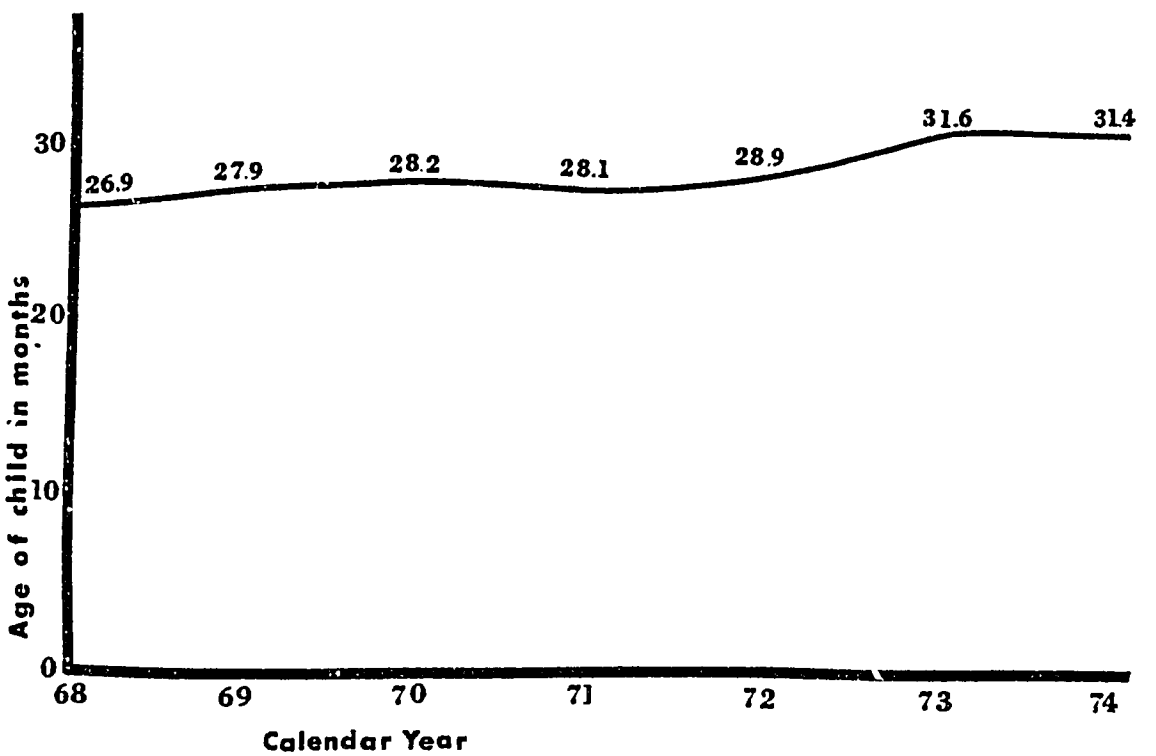


FIGURE 7

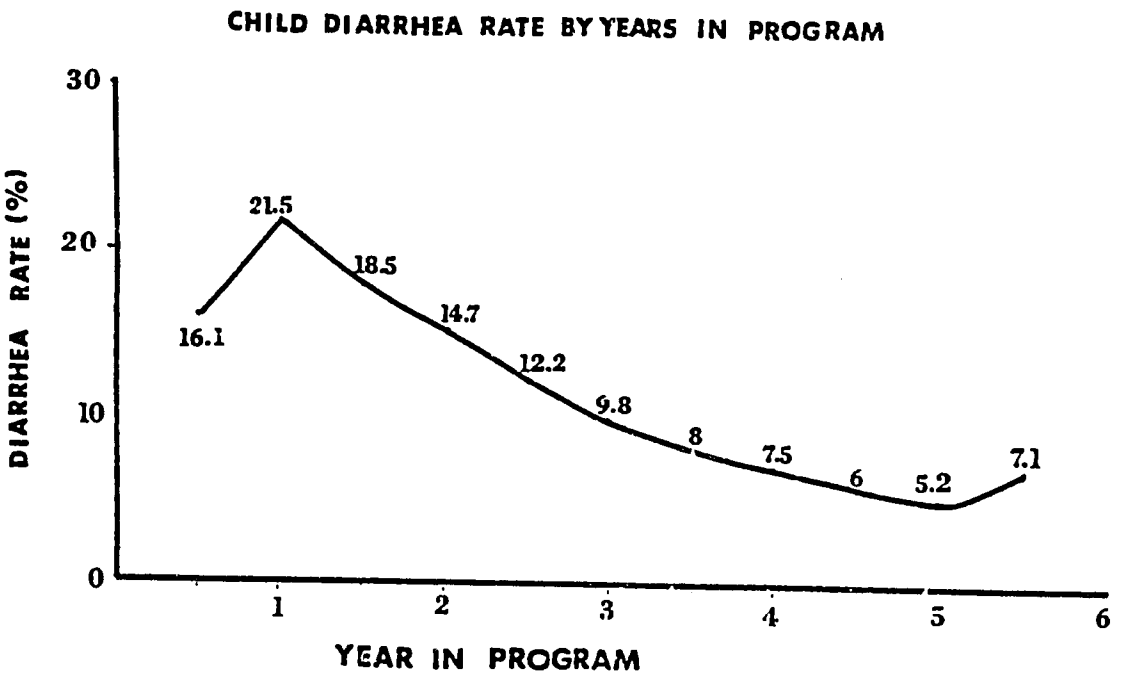

CHILD DIARRHEA RATE BY YEARS IN PROGRAM
DIARRHEA RATE (%)
30
20
10
0
16.1
21.5
18.5
14.7
12.2
9.8
8
7.5
6
5.2
7.1
1
2
3
4
5
6
YEAR IN PROGRAM

FIGURE 8

DIARRHEA RATE BY YEAR IN PROGRAM AND CHILD AGE
(CANDELARIA, COLOMBIA)

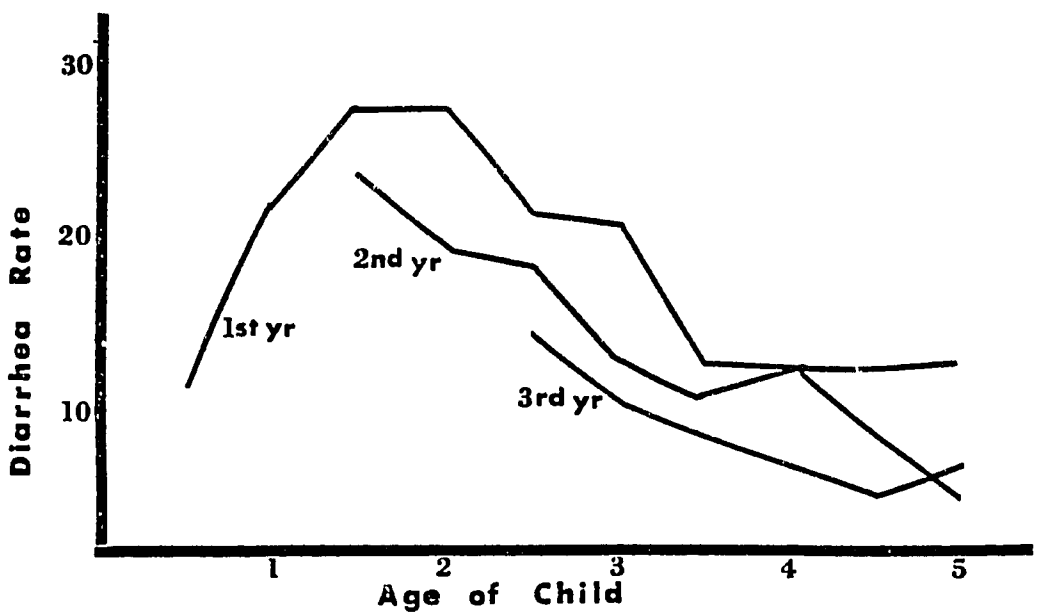


FIGURE 9

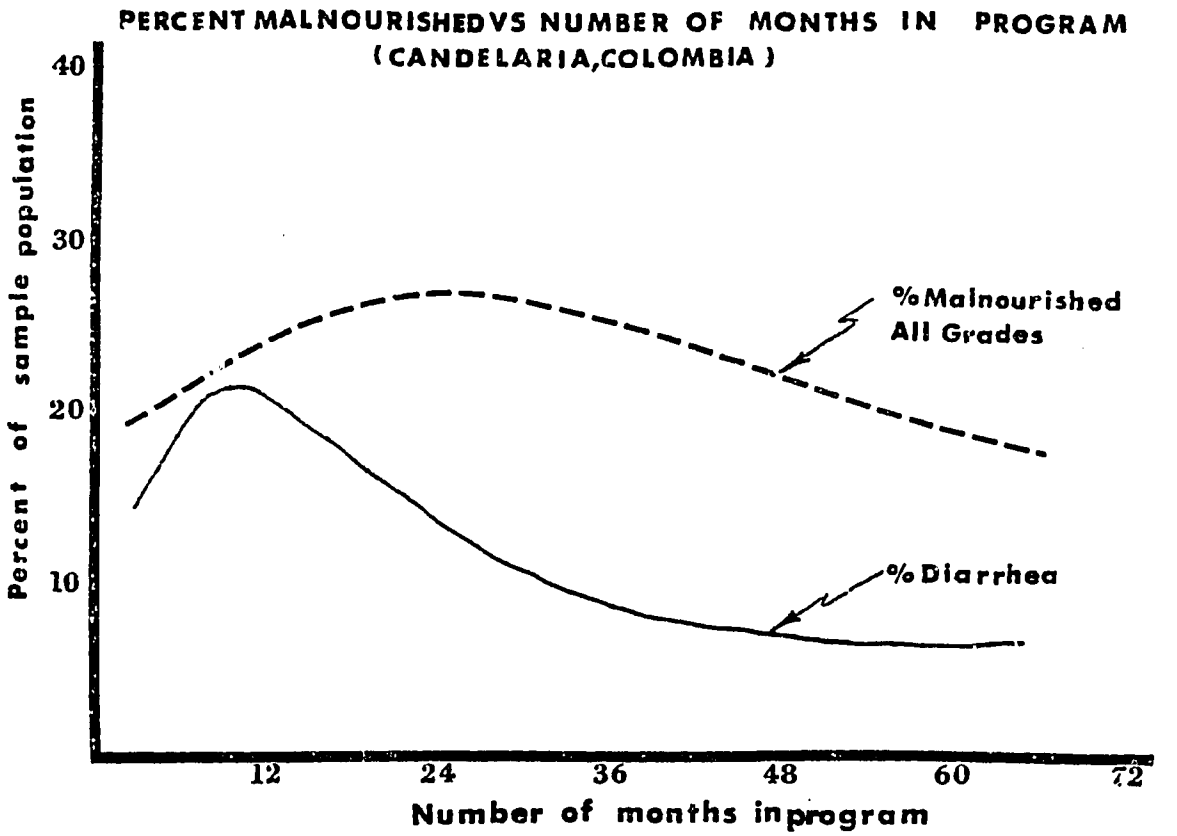

PERCENT MALNOURISHED VS NUMBER OF MONTHS IN PROGRAM
(CANDELARIA, COLOMBIA)
Percent of sample population
40
30
20
10
% Malnourished
All Grades
% Diarrhea
12
24
36
48
60
72
Number of months in program

FIGURE 10

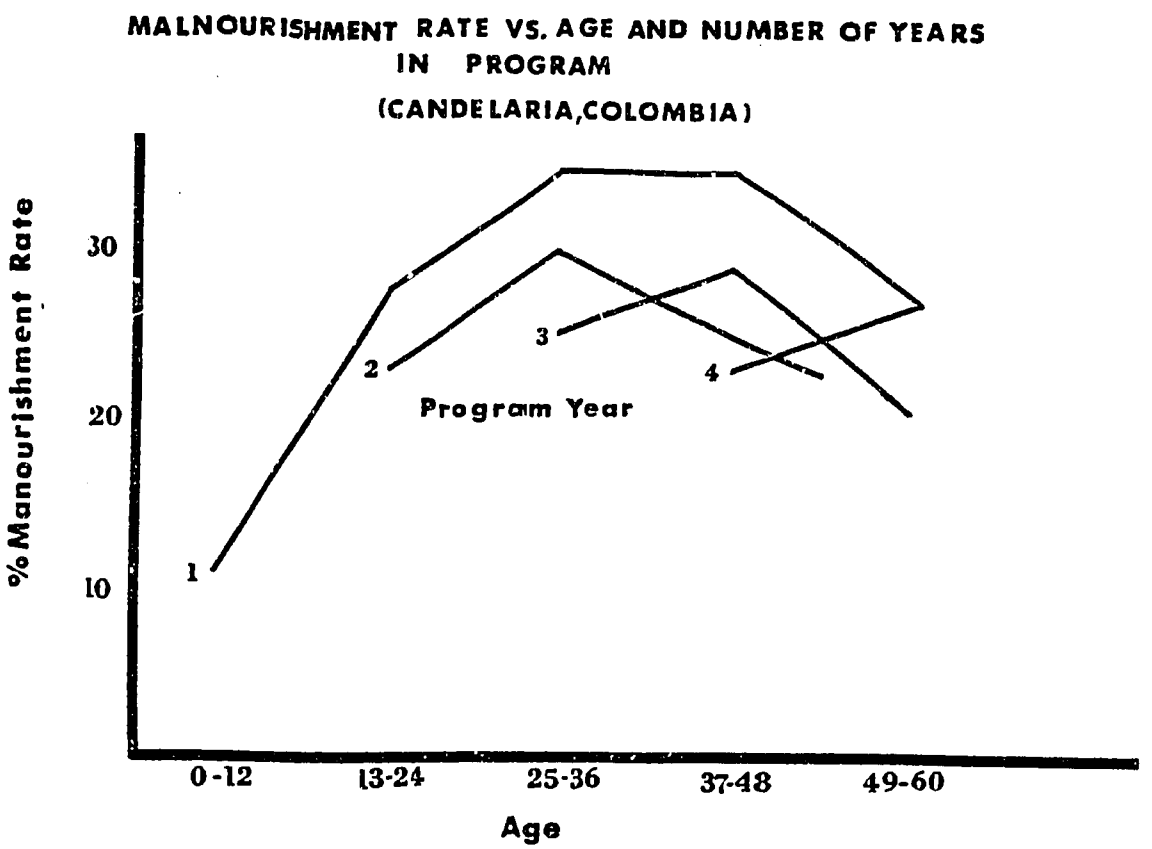

MALNOURISHMENT RATE VS. AGE AND NUMBER OF YEARS IN PROGRAM
(CANDELARIA, COLOMBIA)
% Manourishment Rate
30
20
10
1
2
3
4
Program Year
0-12
13-24
25-36
37-48
49-60
Age

FIGURE 11

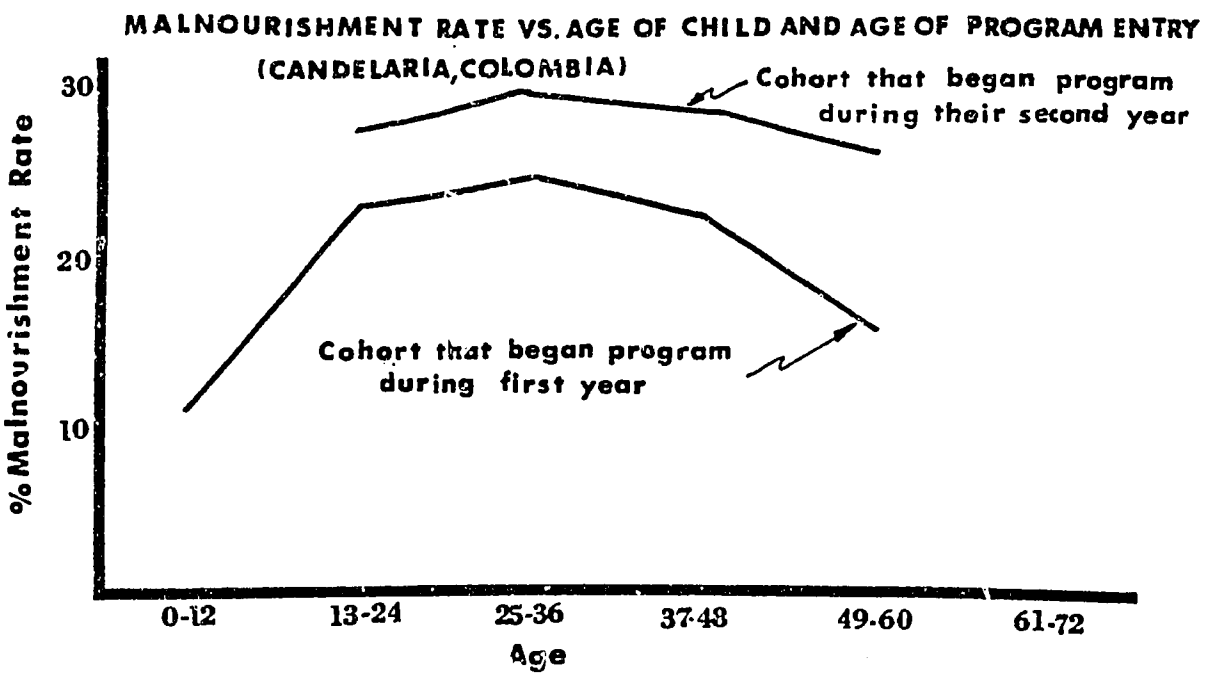
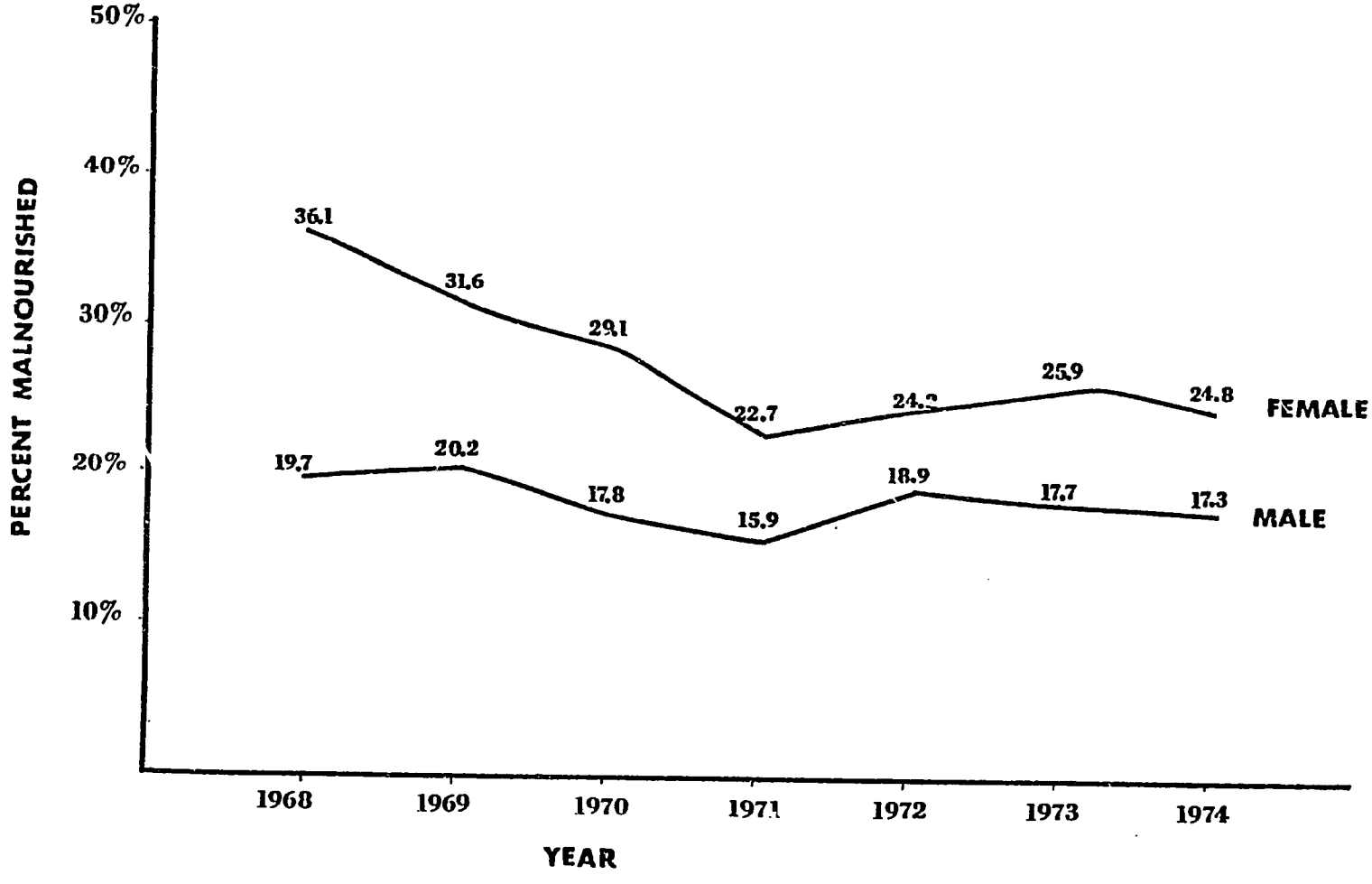

MALNOURISHMENT RATE VS. AGE OF CHILD AND AGE OF PROGRAM ENTRY
(CANDELARIA, COLOMBIA)
Cohort that began program during their second year
Cohort that began program during first year
% Malnourishment Rate
30
20
10
0-12
13-24
25-36
37-48
49-60
61-72
Age

FIGURE 12

PERCENT MALNOURISHMENT BY SEX
IN CANDELARIA COLOMBIA 1968 TO 1974
(BASED ON 9800 INDIVIDUAL CHILD RECORDS



PERCENTAGE OF WOMEN USING BIRTH CONTROL
BY PROGRAM YEAR, AND METHOD
CANDELARIA, COLOMBIA (1840 FAMILIES)

FIGURE 13

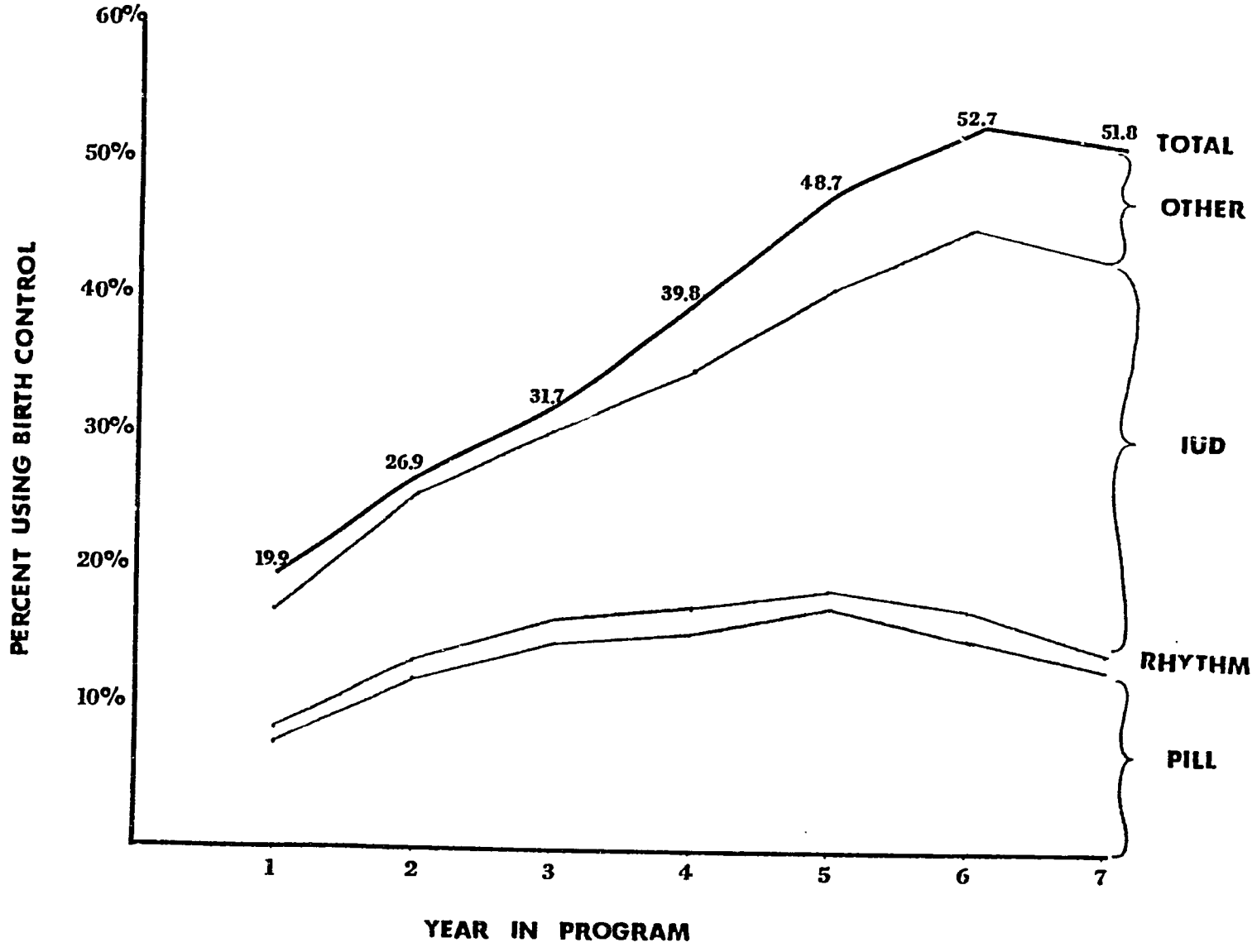


FIGURE 14

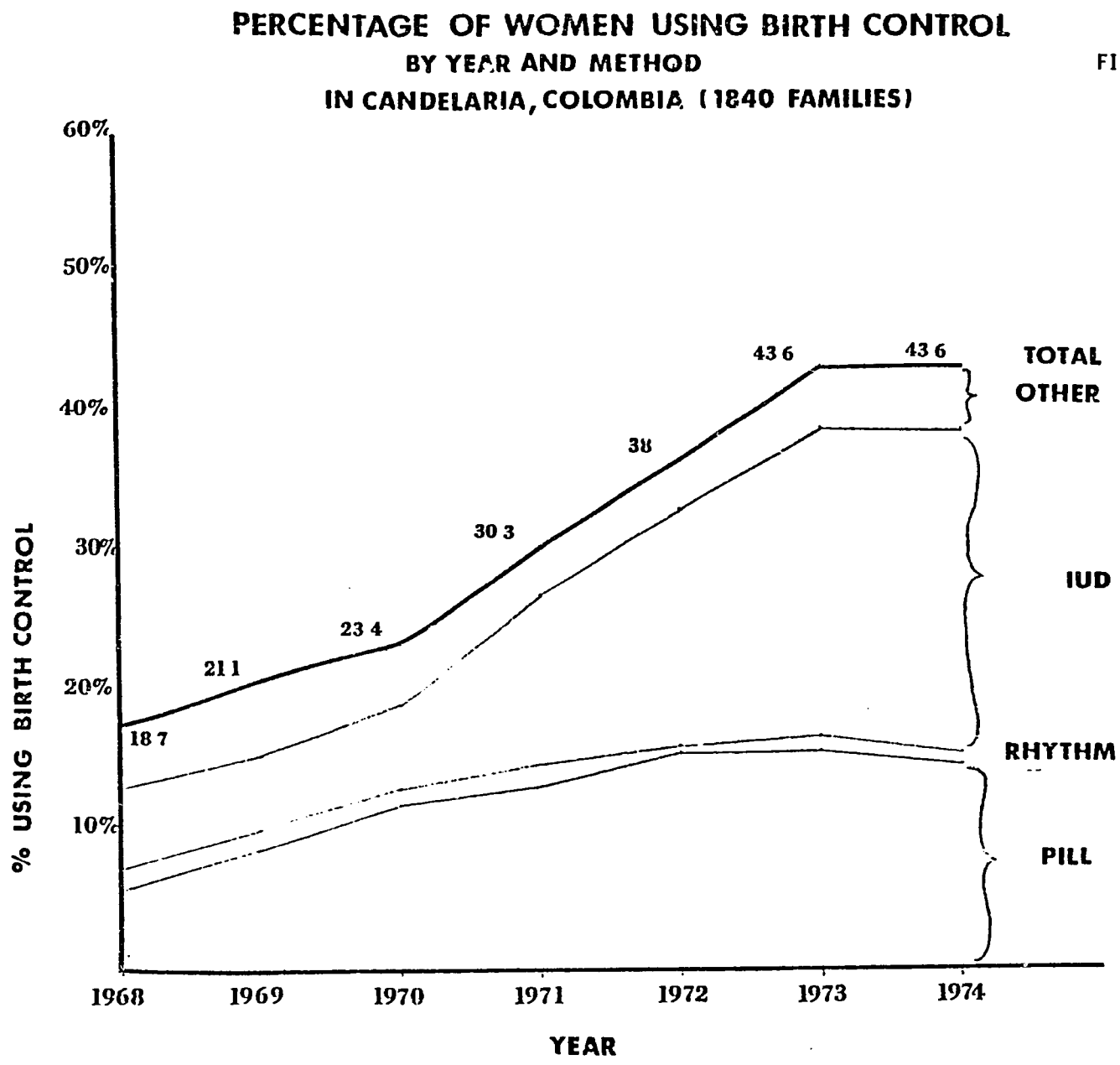

PERCENTAGE OF WOMEN USING BIRTH CONTROL
BY YEAR AND METHOD
IN CANDELARIA, COLOMBIA (1840 FAMILIES)
% USING BIRTH CONTROL
60%
50%
40%
30%
20%
10%
18 7
21 1
23 4
30 3
38
43 6
43 6
TOTAL
OTHER
IUD
RHYTHM
PILL
1968
1969
1970
1971
1972
1973
1974
YEAR

FIGURE 15

MALNOURISHMENT RATE VS. BIRTH ORDER
(CANDELARIA, COLOMBIA)

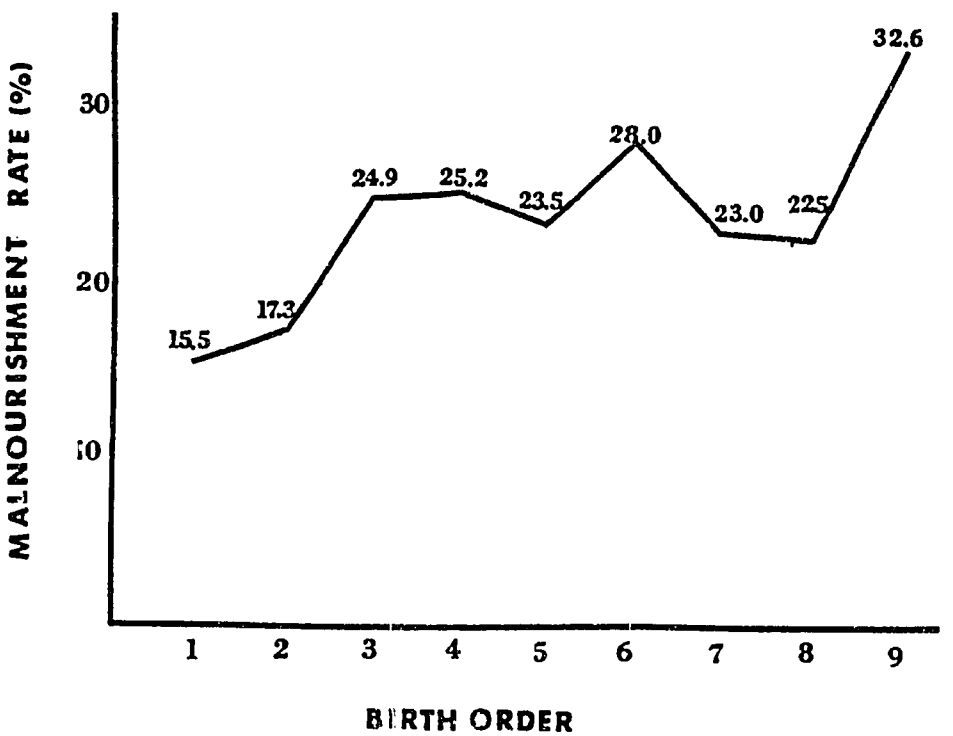
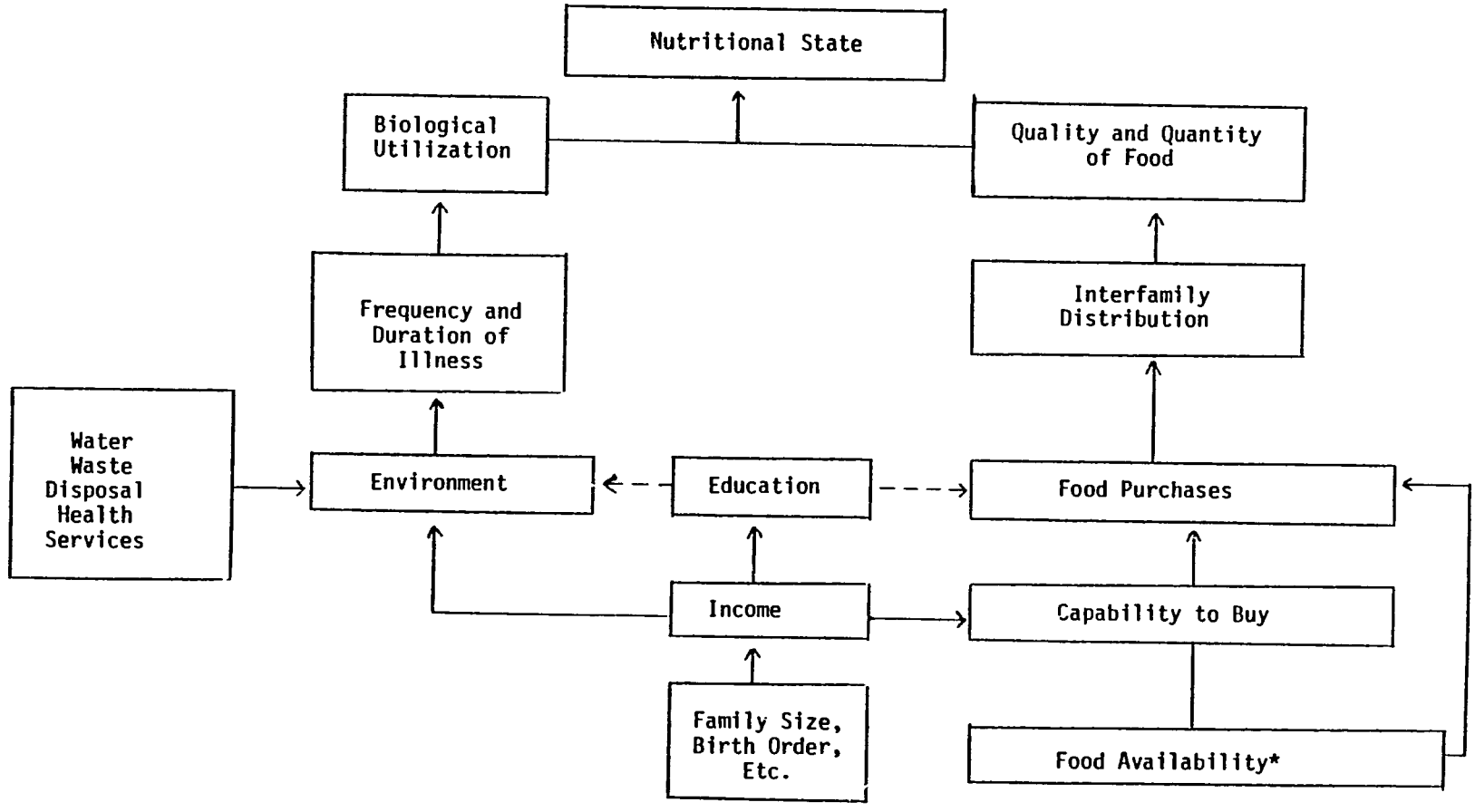


FIGURE 16

INTERRELATIONSHIP BETWEEN NUTRITIONAL STATUS & SOCIOECONOMIC FACTORS



*Risk Factors

FIGURE 17

CONSUMER PRICE INDEX IN COLOMBIA 1968 TO 1974

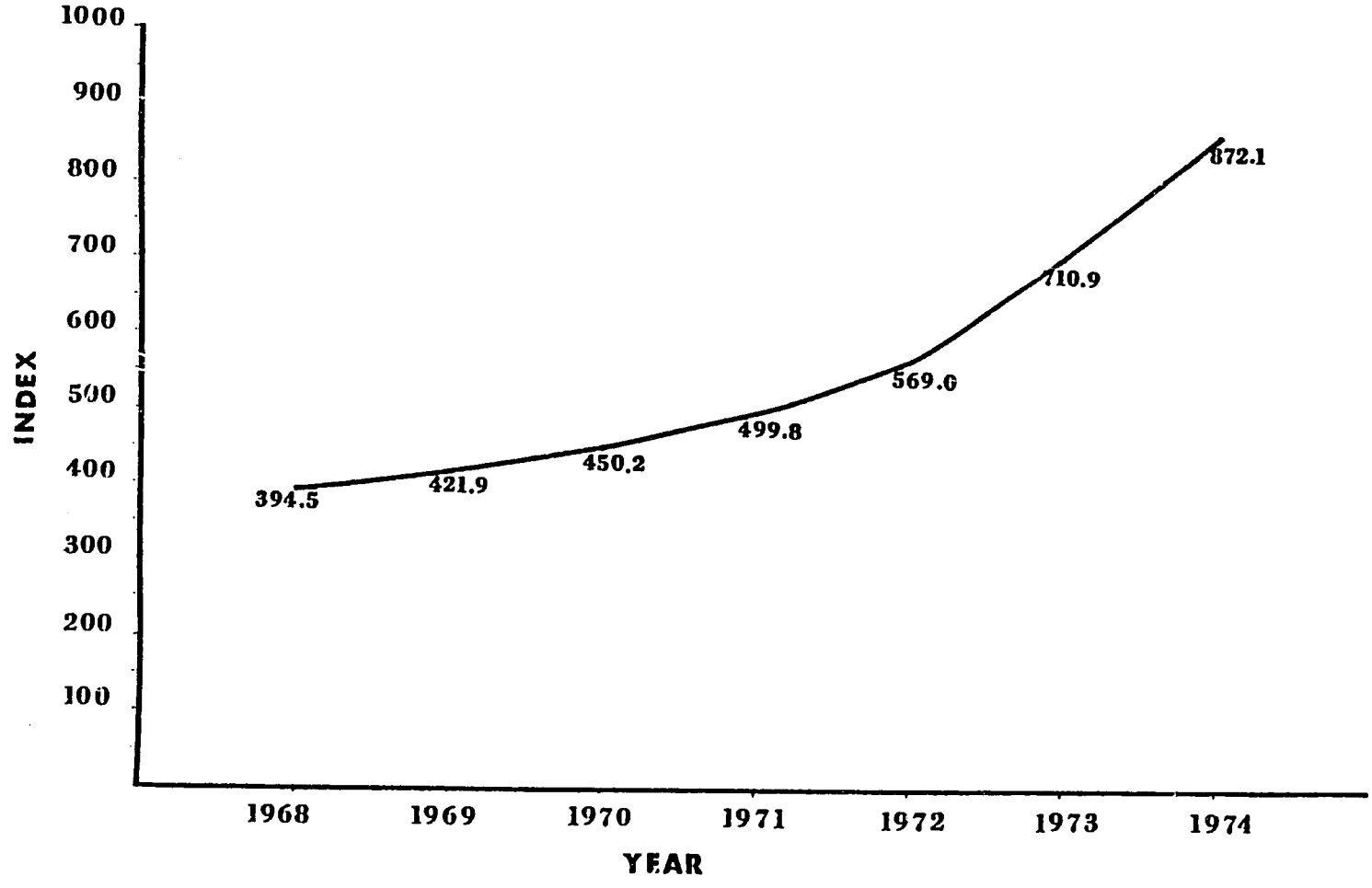


FIGURE 18

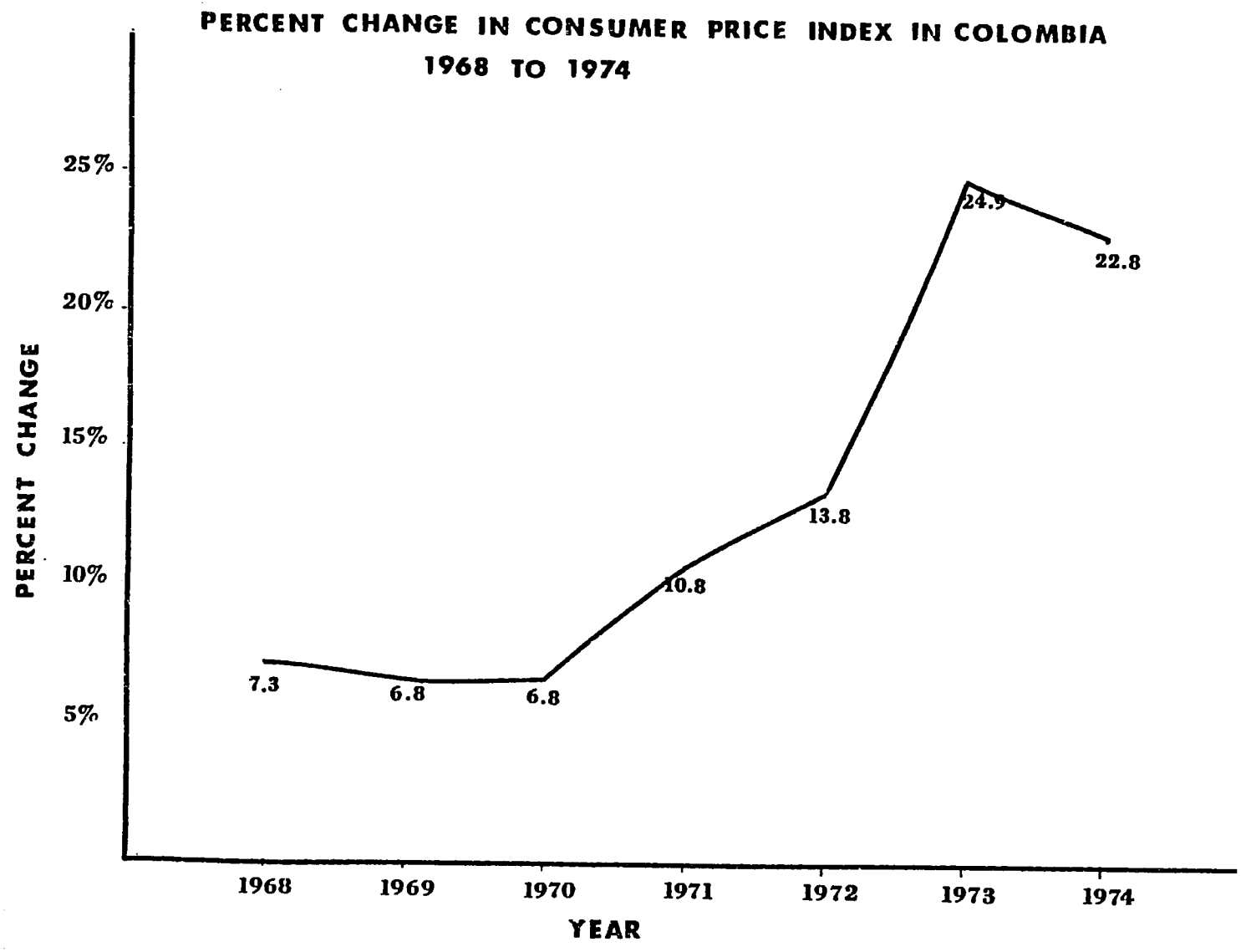

PERCENT CHANGE IN CONSUMER PRICE INDEX IN COLOMBIA
1968 TO 1974
PERCENT CHANGE
25%
20%
15%
10%
5%
7.3
6.8
6.8
10.8
13.8
24.9
22.8
1968
1969
1970
1971
1972
1973
1974
YEAR

FIGURE 19

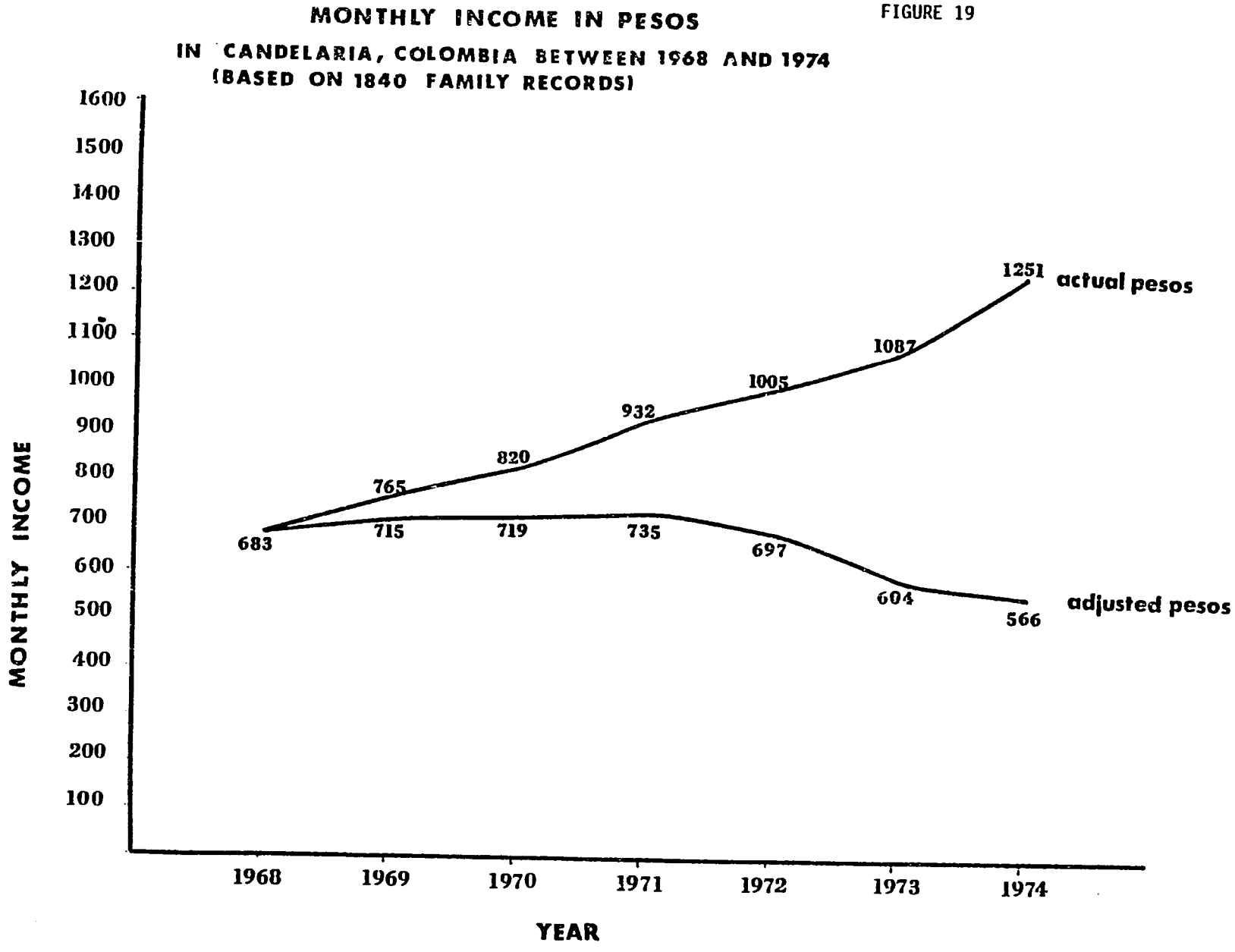

MONTHLY INCOME IN PESOS
IN CANDELARIA, COLOMBIA BETWEEN 1968 AND 1974
(BASED ON 1840 FAMILY RECORDS)
MONTHLY INCOME
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
683
765
820
932
1005
1087
1251
actual pesos
715
719
735
697
604
566
adjusted pesos
1968
1969
1970
1971
1972
1973
1974
YEAR

FIGURE 20

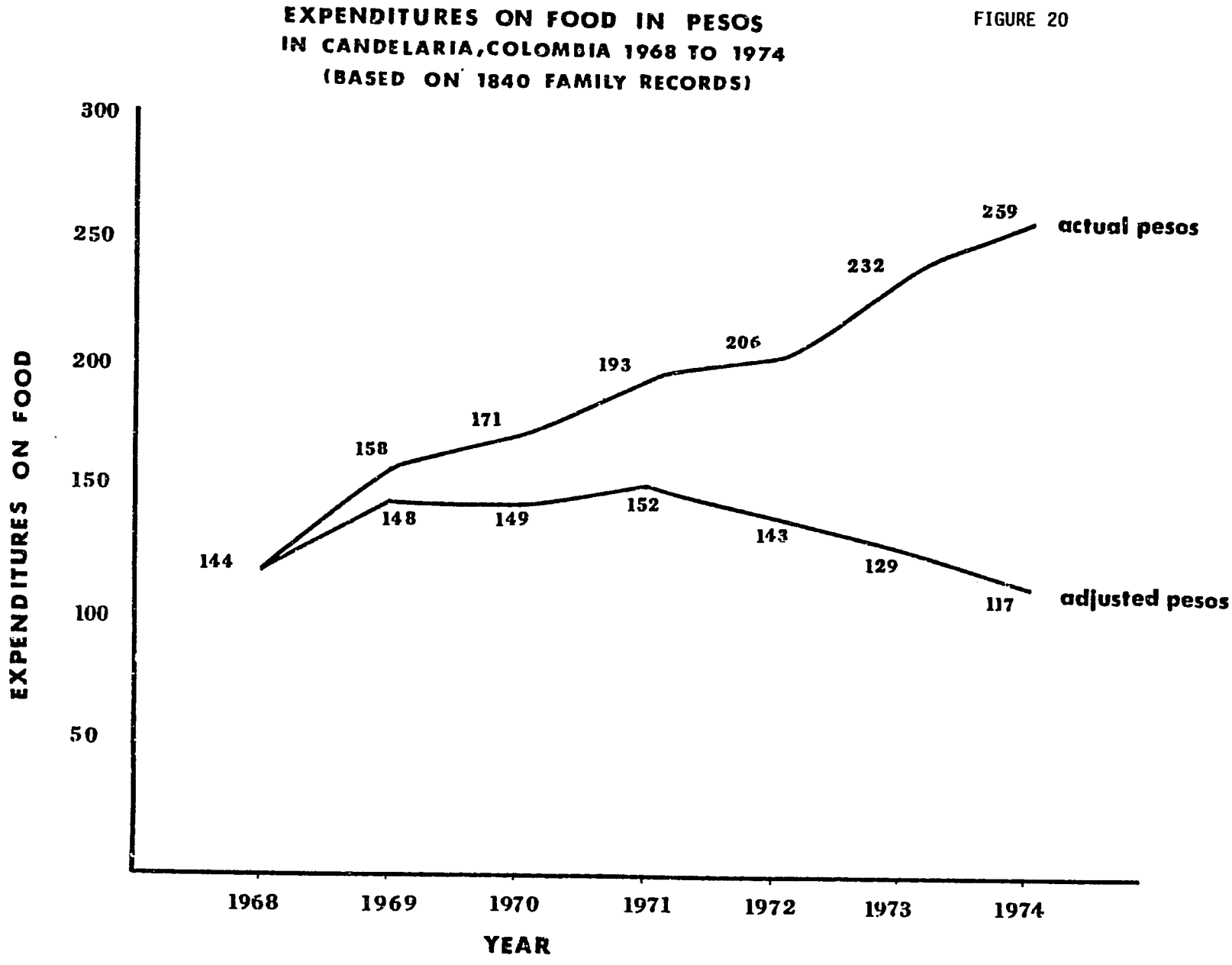

EXPENDITURES ON FOOD IN PESOS
IN CANDELARIA, COLOMBIA 1968 TO 1974
(BASED ON 1840 FAMILY RECORDS)
EXPENDITURES ON FOOD
300
250
200
150
100
50
144
158
171
193
206
232
259
actual pesos
148
149
152
143
129
117
adjusted pesos
1968
1969
1970
1971
1972
1973
1974
YEAR

FIGURE 21

WEEKLY EXPENDITURES ON FOOD PER CHILD VS. NOURISHMENT LEVEL
(CANDELARIA, COLOMBIA)

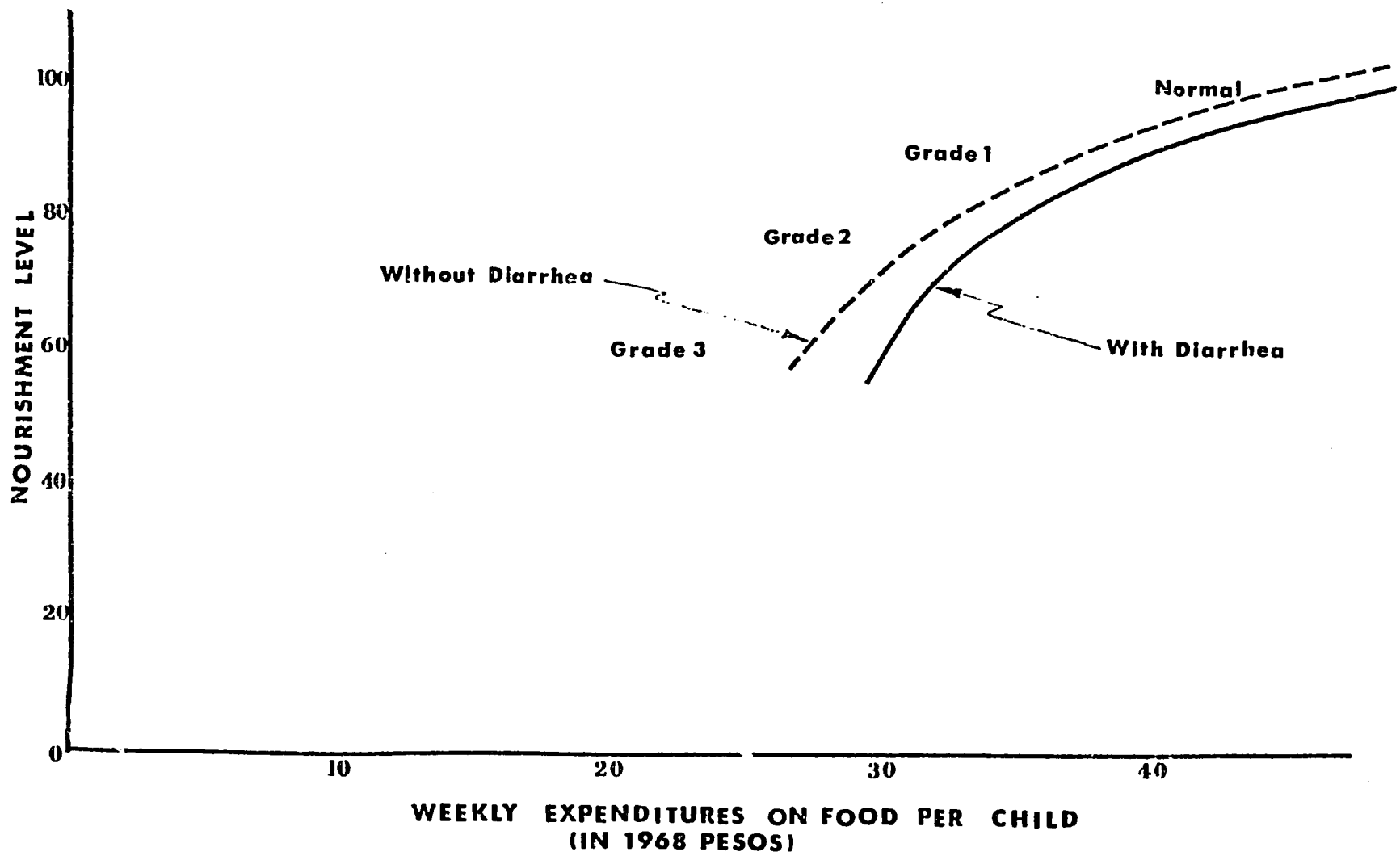


FIGURE 22

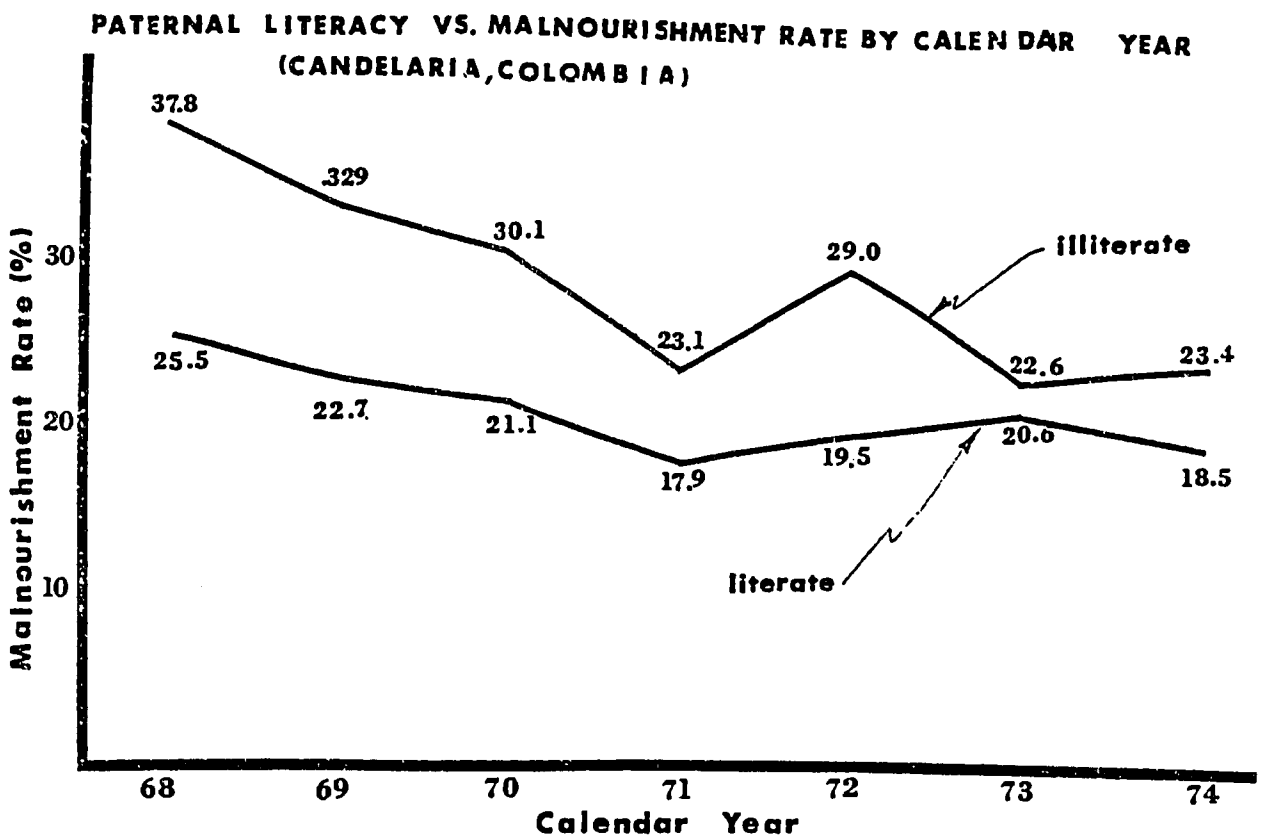

PATERNAL LITERACY VS. MALNOURISHMENT RATE BY CALENDAR YEAR
(CANDELARIA, COLOMBIA)
Malnourishment Rate (%)
30
20
10
37.8
.329
30.1
23.1
29.0
22.6
23.4
illiterate
25.5
22.7
21.1
17.9
19.5
20.6
18.5
literate
68
69
70
71
72
73
74
Calendar Year

FIGURE 23

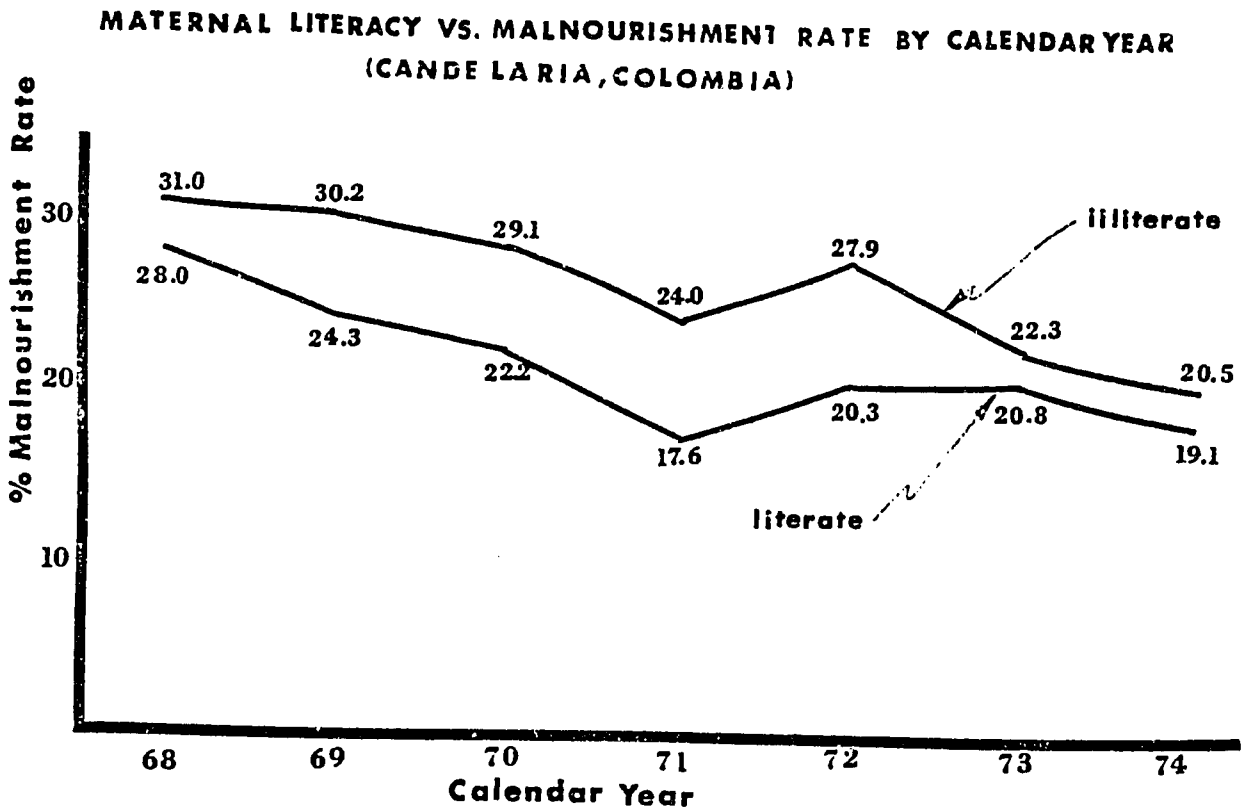
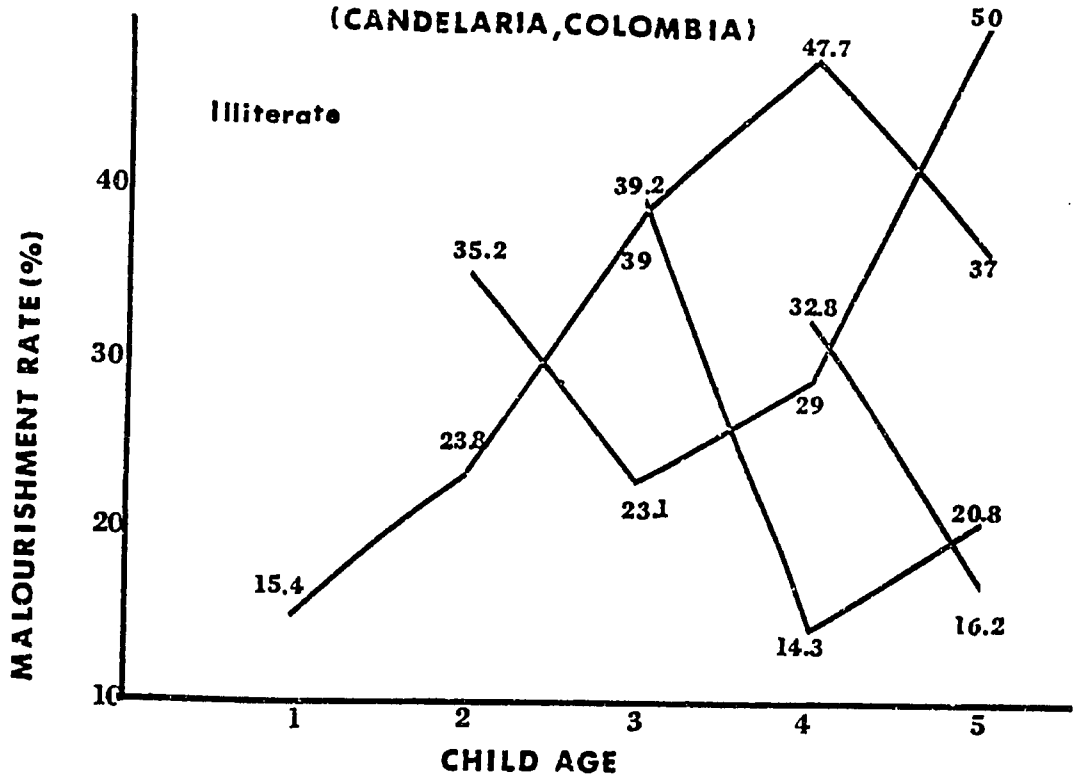

MATERNAL LITERACY VS. MALNOURISHMENT RATE BY CALENDAR YEAR
(CANDELARIA, COLOMBIA)
% Malnourishment Rate
30
20
10
31.0
30.2
29.1
24.0
27.9
22.3
20.5
28.0
24.3
22.2
17.6
20.3
20.8
19.1
Illiterate
literate
68
69
70
71
72
73
74
Calendar Year

FIGURE 24

PATERNAL LITERACY VS PERCENT MALNOURISHMENT BY CHILD AGE AND TIME IN PROGRAM (CANDELARIA, COLOMBIA)



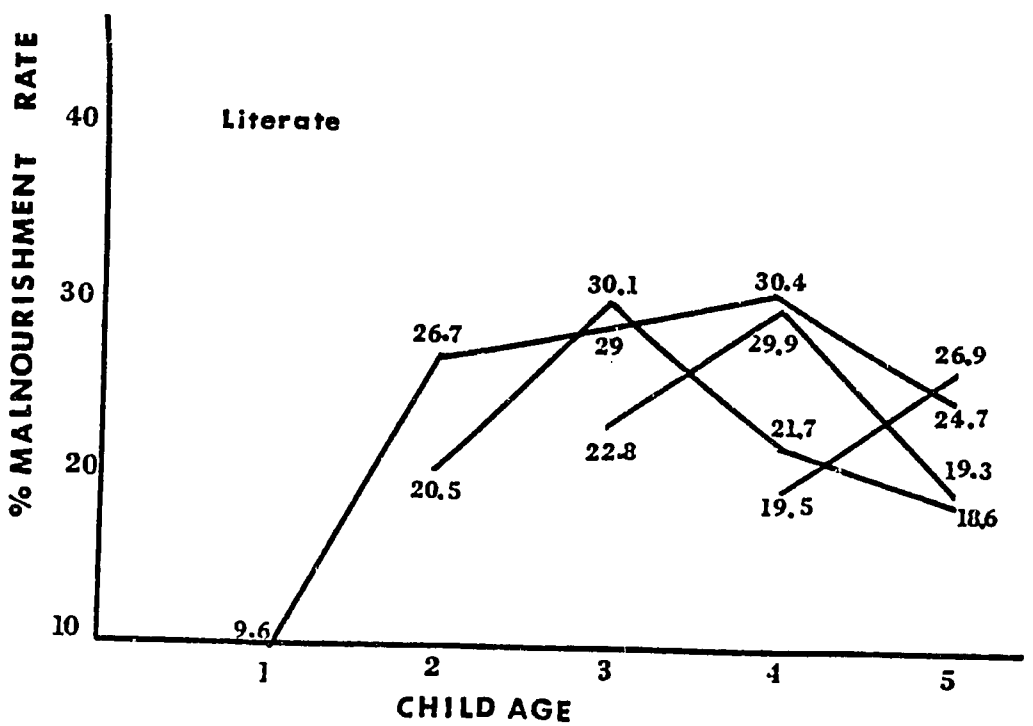
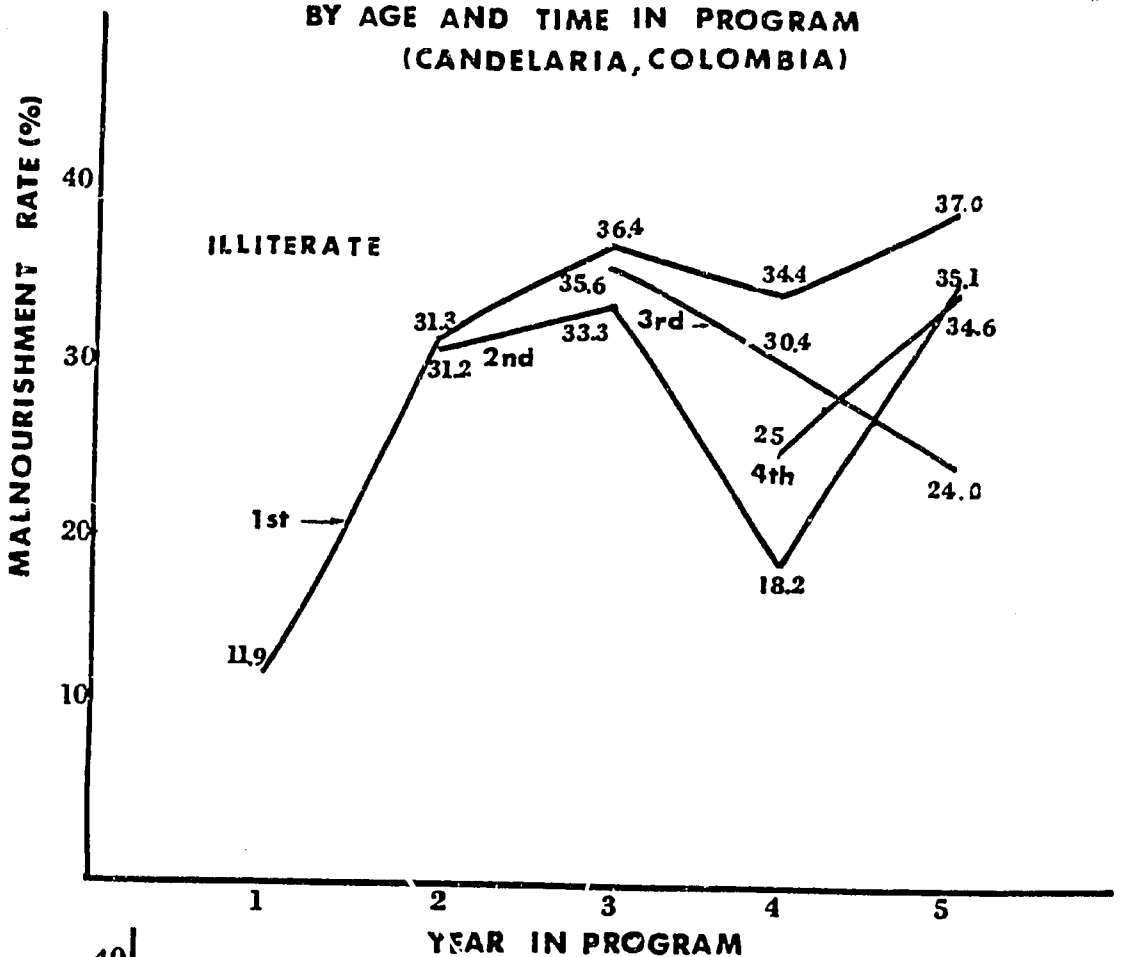


FIGURE 25

MATERNAL LITERACY VS PERCENT MALNOURISHMENT BY AGE AND TIME IN PROGRAM (CANDELARIA, COLOMBIA)



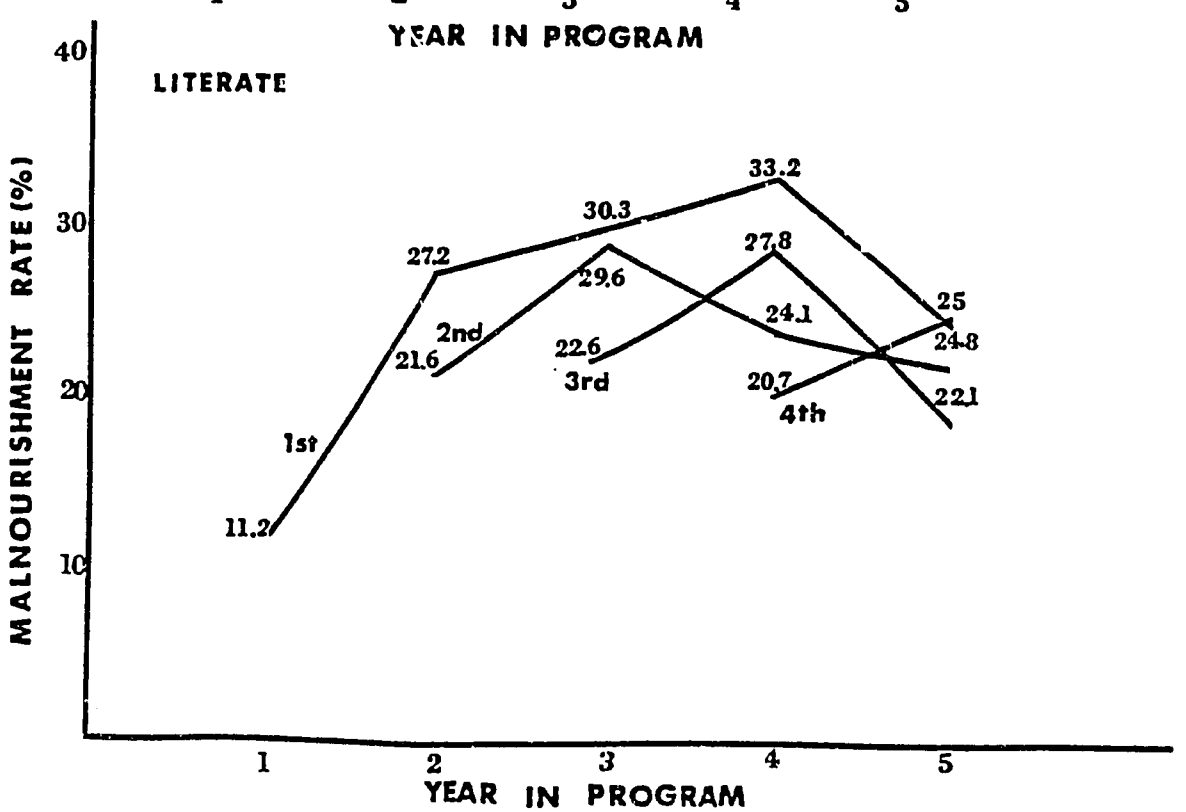
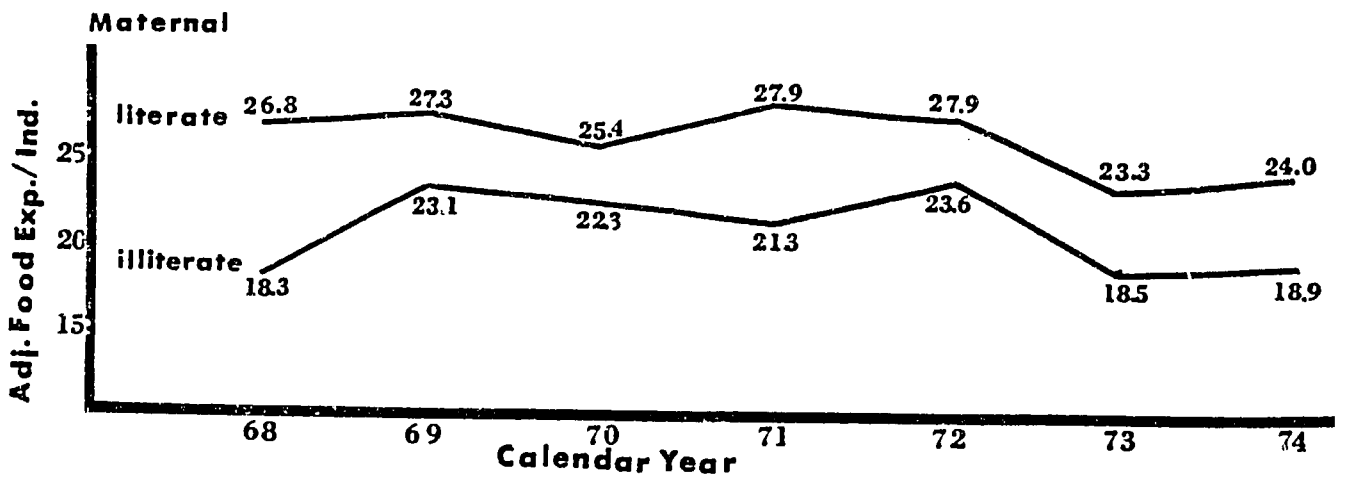
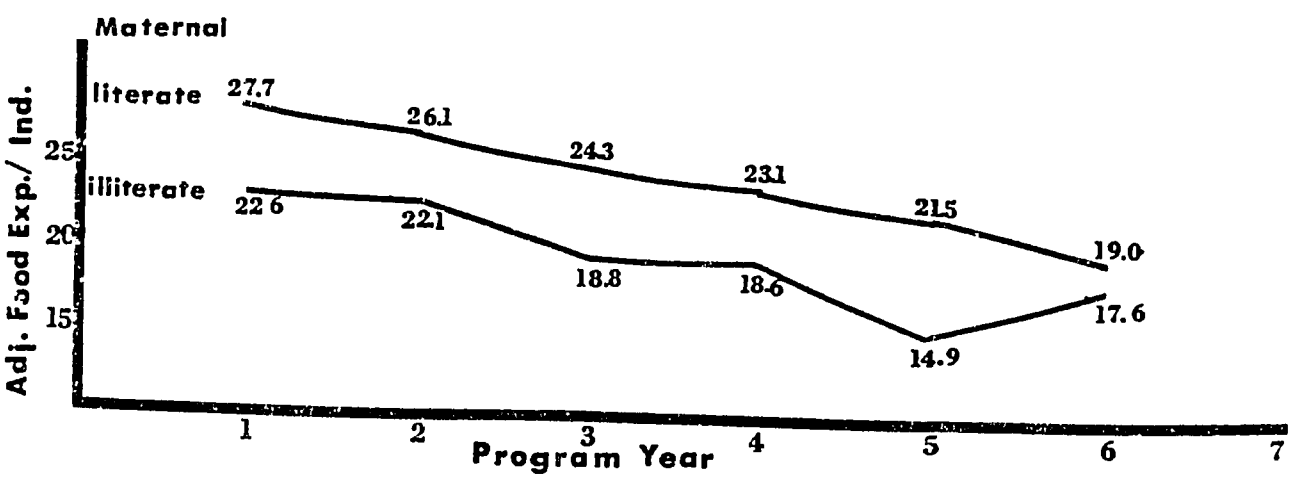


FIGURE 26

ADJUSTED FOOD EXPENDITURE PER INDIVIDUAL VS. LITERACY

(CANDELARIA, COLOMBIA)





TABLES

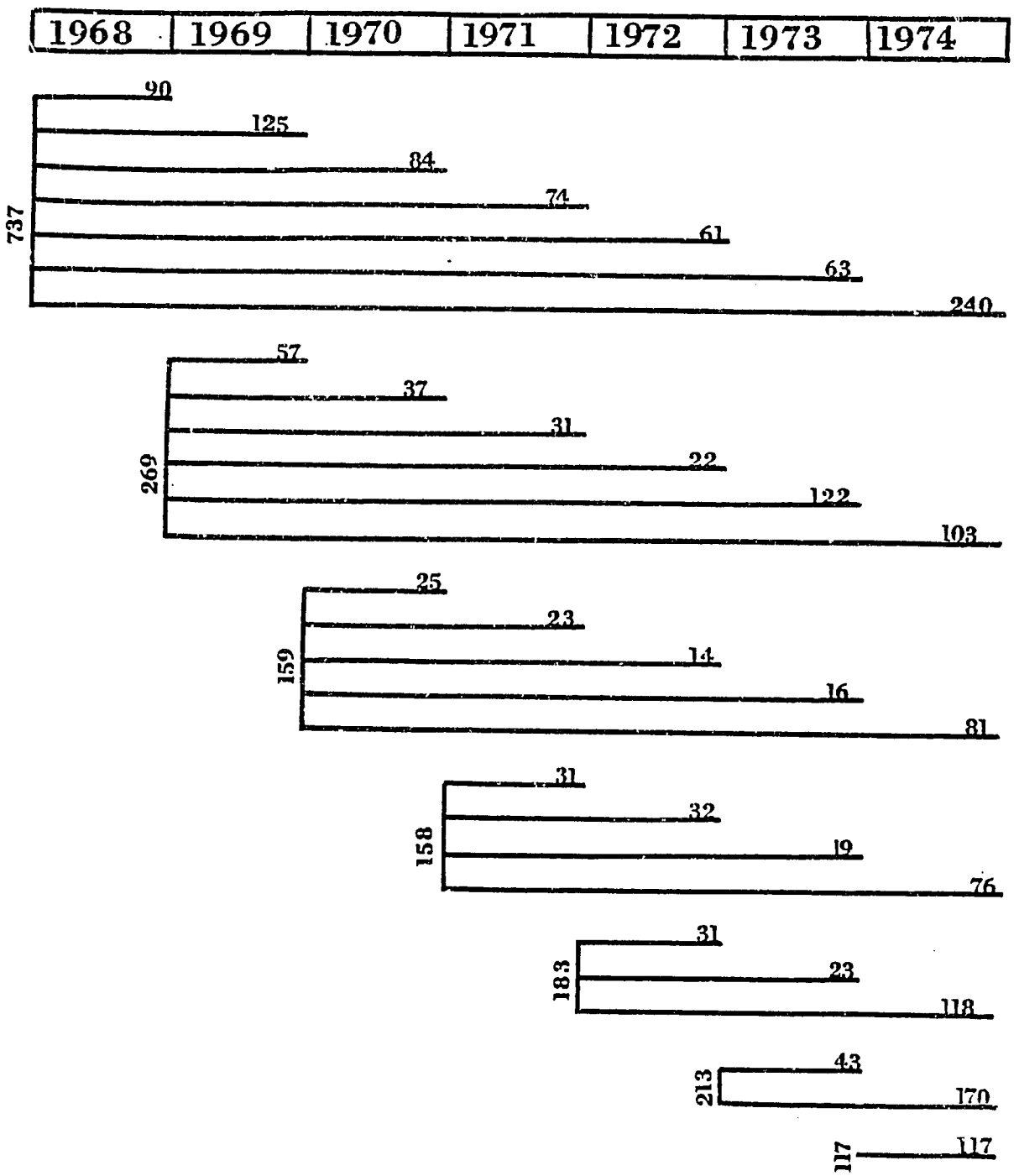
TABLE 1

CHARACTERISTICS OF THE PROMOTORA PROGRAM IN CANDELARIA 1968 - 1974

Year:	1968	1969	1970	1971	1972	1973	1974
Participating Families	737	916	893	905	929	982	905
Participating Children	694	1,309	1,350	1,438	1,430	1,638	1,192
Children per family (< 6 years)	0.94	1.43	1.53	1.53	1.54	1.62	1.32
Average Age of Attenting Children (months)	26.9	27.9	28.2	28.1	28.9	31.6	31.4

NUMBER OF FAMILIES PARTICIPATING IN PROMOTORA PROGRAM BY YEAR (BASED ON 1840 FAMILY RECORDS)

TABLE 2



TOTAL COUNT BY YEAR

1968	1969	1970	1971	1972	1973	1974
737	916	893	905	929	982	905

TABLE 3

NUTRITIONAL STATUS OF COLOMBIAN CHILDREN 1960 - 1974

CHILDREN	AREA	AGE (Months)	YEAR OF SURVEY	% N	I	II	III
477	Huila (Tolima) Templado (U)	0-15 (a)	1960	47.8	27	28	6
314	Nariño. Alti-Plano (U)	0-12	1960	52.5	23	11	9
1094	Valle (S.R.)	0-6	1963	59.2	26	13	1.3
640	Colombia (S.R.)	0-3	1963	58.4	25.8	13.8	2
970	Rural. Haliconia (Ant.)	0-13	1968	+	+	+	+
964	S.R. San Jacinto (Bolivar)	3-72	1968	33	49.2	15.8	1.1
452	San Andrés	0-6 (a)	1974	62	27.6	9.5	0.7
3378	Colombia (9 localidades)	0-6 (a)	1953--68	33.4	45.6	19.3	1.7
2000	Colombia	0-18	1964	44	40	14	2
400	Bogatá. Medio hospitalario	0-6	1962--63	29	47	20	4
9725	AVERAGES			48%	33%	14%	2.9%

TABLE 4

PERCENT MALNOURISHMENT FOR ALL CHILDREN 0-72 MONTHS
CANDELARIA COLOMBIA 1968-74
(Based on Individual Child Data)

NUTRITIONAL STATUS	PERCENT MALNOURISHMENT						
	1968	1969	1970	1971	1972	1973	1974
Grade I	21.1	19.7	17.3	14.6	17.0	17.9	18.7
Grade II	6.3	5.7	5.8	4.3	4.3	3.8	2.2
Grade III	1.2	.8	.4	.6	.5	.4	.5
Total	28.6	26.3	25.4	19.5	21.9	22.1	21.4
Normal	71.4	73.7	76.6	80.5	78.1	77.9	78.6
Count	694	1309	1350	1438	1430	1638	1192
Nursing	18.5	21.6	19.6	20.0	17.6	13.1	13.4
Count	694	1309	1350	1438	1430	1638	1192

TABLE 5

CONSUMPTION OF NUTRIENTS IN CANDELARIA

1968 - 1974

	1968	1969	1972	1973	1974
Calorie Deficit	19.17	33.50	39.6	31.7	29.7
Protein Deficit	22.7	29.33	42.6	34.5	33
Calcium Deficit	61.83	58.83	79.6	75.6	74.8
Iron Deficit	25.0	27.4	54.2	30.2	30.2
Animal Protein Consumed (%)	47.0		43.0	36.0	37.0
Vegetable Protein Consumed (%)	53.0		57.0	64.0	63.0

TABLE 6

PERCENTAGE OF REQUIRED CALORIES CONSUMED IN CANDELARIA 1964 - 1968

Calendar Year \ Age Groups	Breast Fed Children	Preschool	School Age	Adolescent Boys	Adolescent Girls	Male Adults	Female Adults
1964	64	77	51	72	92	89	132
1969	53	62	42	60	76	73	109
1972	48	57	38	54	66	66	99
1973	54	65	43	61	78	75	112
1974	56	67	44	63	80	77	115

TABLE 7

PERCENTAGE OF REQUIRED PROTEINS CONSUMED IN CANDELARIA 1964 - 1974

Calendar Year \ Age Groups	Breast Fed Children	Preschool	School Age	Adolescent Boys	Adolescent Girls	Male Adults	Female Adults
1964	58	89	65	90	90	81	81
1969	51	79	58	84	84	76	76
1972	41	64	47	68	68	62	62
1973	47	73	53	78	78	71	71
1974	48	74	54	80	80	72	72

TABLE 8

BIRTH CONTROL USAGE BY PROGRAM AND CALENDAR YEAR
(Candelaria Colombia 1968-74)

PRESENT BIRTH CONTROL BY CALENDAR YEAR

	1968	1969	1970	1971	1972	1973	1974
Pill	5.9	9.2	11.8	13.3	15.7	15.8	14.9
Rhythm	1.7	1.5	1.3	1.5	.6	1.0	.7
IUD	5.1	5.5	6.3	12.0	16.0	21.7	22.5
Other	6.0	4.9	4.1	3.5	5.7	4.9	5.5
None	81.3	78.9	76.6	69.7	62.0	56.6	56.4
Count	712.0	889.0	862.0	880.0	892.0	941.0	854.0

PRESENT BIRTH CONTROL BY PROGRAM YEAR

	1	2	3	4	5	6	7
Pill	8.4	12.1	14.4	15.7	18.2	15.4	13.2
Rhythm	.8	1.0	1.3	1.9	.7	1.8	.9
IUD	6.8	9.5	11.4	17.2	22.3	28.2	29.8
Other	3.8	4.4	4.6	5.0	7.4	7.3	7.9
None	80.1	73.1	68.3	60.2	51.3	47.3	48.2
Count	1800.0	1399.0	982.0	722.0	538.0	383.0	228.0

APPENDIX A

CANDELARIA INDIVIDUAL CHILD DATA SET: 1968-1974

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description
ID	1	1-4		Family identification code number. Unique to each family and identical to records in family data set.
FAMORD	2	5-6		Order of person in family (adults first, children next with oldest first and non-nuclear members last).
AGE	3	7-8		Age of child in months at time of visit.
BIRTHORD	5	10		Order of birth in family (1 = first born).
INTERVAL	6	11-12		Interval between this child and last born in months. 0 = no following children.
WEIGHT	7	13-17		Actual weight in gms. of child at time of visit.
BOSWT	8	18-22		Weight of Boston child at same age in months + by 10. 50th percentile value of Boston standard. Cal.18 should always be zero.
COLWT	9	23-27		Weight of Colombian child at same age in months + 10. 50th percentile value of Bogota standard.
NU STAT	10	28		Nutritional status of child based upon Candelaria standard. 1 = grade I; 2 = grade II; 3 = grade III; 4 = normal.
BOSTAND	11	29-30		Percentile of Boston Standard (based upon a chart look-up for the child's height and age).
CANSTAND	12	31-32		Percentile of Candelaria Standard (based upon a chart look-up for the child's height and age).

CANDELARIA INDIVIDUAL CHILD DATA SET: 1968-1974

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description
		33-35		Alpha punch of CAI identifying that this is an individual child record.
HEIGHT	13	36-38		Height of child at time of visit in centimeters (blank = no data).
BOSHGHT	14	39-41		Ideal height for child at given age based upon the 50th percentile of the Boston Standard. This table look-up was: (if value is greater than 99.9 cm. decimal point is moved one place to the left).
COLHGHT	15	42-44		Ideal height for child at given age based upon the 50th percentile of the Colombian Standard. (if value is greater than 99.9 cm. decimal point is moved one place to the left).
NURSING	16(c)	45	1	Breast feeding at time of visit.
			2	No breast feeding at time of visit.
DIARREA	17(c)	46	1	Child has had diarrea during month preceeding visit. definition of diarrea is more than three loose stools per day. Since the mother is the observer this may also indicate a significant deviation from the norm in her option, the himodal frequency distribution indicated in the data may be the result of differences in definition.
			2	No diarrea during last month.
DIA #	18	47-48		Number of episodes of diarrea during month preceeding visit (an episode is defined as a continued period of diarrea followed by a period of normalcy).

CANDELARIA INDIVIDUAL CHILD DATA SET: 1968-1974

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description
DIADAYS	19	49-50		Number of days sick with diarrea during the proceeding month.
DPT	20(c)	51	1	DPT given during preceeding month.
			2	No
POLIO	21(c)	52	1	Oral polio vaccine given during preceeding visit.
			2	No
OUTPAT	22(c)	53	1	Child visited outpatient clinic during preceeding month. Children only go to outpatient when sick and usually upon recommendations of Promotora.
			2	No visit
HOSP	23(c)	54	1	Child hospitalized during preceeding month.
			2	No hospitalization
SICK	24(c)	55	1	Child sick at any time since last visit of Promotora.
			2	No sickness
DAYSICK	25	56-57		Number of days sick since last visit - with or without diarrea.
MONTHS	26	58-59		The number of months the child has been in the Promotora program and consequently receiving its benefits;

CANDELARIA INDIVIDUAL CHILD DATA SET: 1968-1974

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description	
JUNE 30	27	60	1	Visit of Promotora before June 30th of year; e.g., in first semester.	
			2	Visit of Promotora after June 30th of year; e.g., in second semester.	
YEAR	28	61-62		Calendar year of Promotora visit.	
WEIGHT*	29	63-67		Weight of child in grams on the first visit child was in the program.	
BOSWT*	30	68-72		Ideal weight for the age of the child at the time of the first visit in the program. (Based upon the 50th percentile of the Boston Standard - in grams ÷ 10.	
COLWT*	31	73-77		Ideal weight for the age of the child at the time of the first visit in the program based upon the 50th percentile value of the Colombian Standard. (grams ÷ 10)	
CHANGE*	32(c)	78	1	Improved	Change in grade of nutritional status since the child first entered into the program. Standard is the Candelaria classification of nutrition.
			2	Worsened	
			3	No change	
CHANGE	33	79	1	Improvement	Change in grade of nutritional status since the last Promotora visit. Standard is the Candelaria classification of nutrition.
			2	Worsening	
			3	No change	

CANDELARIA FAMILY DATA SET: 1968-1974

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description	
ID	1	1-4		Family identification code number. Unique to each family and identical to individual child records in individual data set.	
TIME	2	5		The number of years the family has been in the program since the beginning of 1968.	
IN.PROG	3(c)	6	1	Actually in the program as of October 1974	
			2	Left the program due to outmigration from Candelaria prior to October, 1974	
			3	Left the program due to all children in family becoming more than 72 months before October, 1974.	
			4	Left program because of dislike prior to October, 1974	
			5	Left program for other reasons or don't know (probably migration).	
HOUSING	4(c)	7	1	Owned own home when entered program.	
			2	Rented when entered program.	
			3	Living with some other family and not paying rent when entered program.	
FAMS/HS	5	8		Number of families living in the same structure.	
RENT*	6	9-12		Rent per month in pesos when entered the program (blank if owned or if living with someone else).	
TYPE HEAD	7(c)	13	1	Man-husband	type of head of household upon entering the program
			2	Woman-wife or unmarried	

CANDELARIA FAMILY DATA SET: 1968-1974

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description	
TYPE HEAD	7(c)	13	3	Other	
AGE.HEAD	8	14-15		Age of head of household upon entering the program.	
FAM.SIZE	9	16-17		Number of persons in family upon entering program.	
CH*0-6	10	18		Number of children in family who are less than 72 months old upon entering the program.	
MALES	11	19-20		Number of males in family upon entering the program.	
FEMALES	12	21-22		Number of females in family upon entering the program.	
AGE.DAD	13	23-24		Age of father upon entering the program. (Blank if there is no father).	
AGE.MOM	14	25-26		Age of mother upon entering the program. (Blank if there is no mother).	
SCHOOL.D	15	27-28		Number of years of schooling for father.	
SCHOOL.M	16	29-30		Number of years of schooling for mother.	
ED.LVL.D	17(c)	31	1	Illiterate	Level of educational attainment of the father at the time of entry into program.
			2	Read and write only	
			3	Primary(Grades 1-5)	
			4	Secondary (Grades 6-11)	
			5	Technical(Comparable to Secondary)	

CANDELARIA FAMILY DATA SET: 1969-1974

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description	
ED.LVL.D	17(c)	31	6	University attendance	
			7	Other or don't know	
ED.LVL.M	18(c)	32	1	Illiterate	Level of educational attainment of the mother at the time of entry into program.
			2	Read and write only	
			3	Primary (Grades 1-5)	
			4	Secondary (Grades 6-11)	
			5	Technical (Comparable to Secondary)	
			6	University attendance	
			7	Other or don't know	
MRTL.D	19(c)	33	1	Married	Marital status of the father upon entry into the program/
			2	Living in free union	
			3	Married but separated	
			4	Free union but separated	
			5	Spouse deceased	
			6	Single	
MRTL.M	20(c)	34	1	Married	(see next page)
			2	Living in free union	
			3	Married but separated	

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description	
MRTL.M	20(c)	34	4	Free union but separated	Marital status of the mother upon entry into the program.
			5	Spouse deceased	
			6	Single	
OCCUP.HH	21(c)	35	1	Worker - manual labor	Occupational classification of the head of household.
			2	Employee - clerical, office, etc.	
			3	Small merchant	
			4	Other	
INC*	22	36-39		Family income per month in pesos at time of entry into program.	
LST.BORN	23	40-41		Number of months since the last child was born regardless of whether the child lived.	
BIRTH. AID	24(c)	42	1	Physician or intern	Type of person who attended last birth.
			2	Midwife	
			3	Neighbor	
			4	Other	
BIRTH.CK	25(c)	43	1	Some pre-natal attention by a physician.	
			2	None	
PREG?*	26(c)	44	1	Pregnant at time of entry into program - yes.	

CANDELARIA FAMILY DATA SET: 1968-1974

Variable Name	Variable Number (C=categorical)	Card Column	Numeric Value	Description
PREG?*	26(c)	44	2	No
		45		Bad data
FAM.PL	27(c)	46	1	Enrolled in family planning program
			2	Was enrolled but not now
			3	Not enrolled?
KNOW?FP	28(c)	47	1	Mother has heard of family planning program
			2	Not heard
UNIONS	29	48		Number of different unions mother has had which led to pregnancy. (unions can be marriages, free or casual)
PREGS*	30	49-50		Number of pregnancies mother has had by time of entry into program.
BIRTHS*	31	51-52		Number of live births by time of entry into program.
ABORTS*	32	53		Number of abortions by time of entry into program.
STILL*	33	54		Number of stillbirths by time of entry into program.
ALIVE*	34	55-56		Number of children living at the time of entry into program.
RENT 74	35	57-59		Rent per month in pesos in October, 1974

CANDELARIA FAMILY DATA SET: 1968-1974

The following variables are the time series data arranged by the number of years in the program. Since the variables differ only by the time during which they were measured, they are described in general and the variable number that corresponds to program year is then listed. Note that the label for each variable for a particular program year differs from those of other years only in its last character. In the list of variables below a # appears where this character occurs in the label. Thus the label for a particular program year would have the program year replace the #.

Variable Name	Variable Number for Program Year (Card columns are in brackets followed by card number.)							Description
	1	2	3	4	5	6	7	
BIRTH#	36 (60,1)	51 (7,2)	66 (27,2)	81 (47,2)	96 (67,2)	111 (16,3)	126 (36,3)	Number of children born live during program year.
ABORT#	37 (61,1)	52 (8,2)	67 (28,2)	82 (48,2)	97 (68,2)	112 (17,3)	127 (37,3)	Number of abortions during program year.
STILL#	38 (62,1)	53 (9,2)	68 (29,2)	83 (49,2)	98 (69,2)	113 (18,3)	128 (38,3)	Number of stillbirths during program year.
DEATHS#	39 (63,1)	54 (10,2)	69 (30,2)	84 (50,2)	99 (70,2)	114 (19,3)	129 (39,3)	Number of child deaths during program year (only children in program).
BC#	40 (64,1)	55 (11,2)	70 (31,2)	85 (51,2)	100 (71,2)	115 (20,3)	130 (40,3)	Method of birth control: 1 = Pill 2 = Rhythm 3 = IUD 4 = Other 5 = None

CANDELARIA FAMILY DATA SET: 1968-1974

Variable Name	Variable Number for Program Year (Card columns are in brackets followed by card number.)							Description
	1	2	3	4	5	6	7	
INC#	41 (65-68,1)	56 (12-15-2)	71 (32-35,2)	86 (52-55,2)	101 (72-75,2)	116 (21-24,3)	131 (41-44,3)	Monthly family income in pesos. Recorded at the end of each year, but representing a rough weighted average.
FOOD#	42 (69-71,1)	57 (16-18,2)	72 (36-38,2)	87 (55-58,2)	102 (5-7,3)	117 (25-27,3)	132 (45-47,3)	Weekly family expenditures on food in pesos. Rough average for year.
PROGYR#	43 (72,1)	58 (19,2)	73 (39,2)	88 (59,2)	103 (8,3)	118 (28,3)	133 (48,3)	Calendar year the data pertains to. Coded as follows: 1=68, 2=69, 3=70, 4=71, 5-72, 6-73, 7=74
CH.TOT#	44 (73,1)	59 (20,2)	74 (40,2)	89 (60,2)	104 (9,3)	119 (29,3)	134 (49,3)	Number of children in family during year (includes children over 72 months)
CH.#.0-6	45 (74,1)	60 (21,1)	75 (41,2)	90 (61,2)	105 (10,3)	120 (30,3)	135 (50,3)	Number of children less than 72 months alive at end of program year.
GI.#	46 (75,1)	61 (22,1)	76 (42,2)	91 (62,2)	106 (11,3)	121 (31,3)	136 (51,3)	Number of children in family less than 72 months, with grade I malnourishment at end of program year.
GII.#	47 (76,1)	62 (23,1)	77 (43,2)	92 (63,2)	107 (12,3)	122 (32,3)	137 (52,3)	Number of children in family less than 72 months, with grade II malnourishment at end of program year.

CANDELARIA FAMILY DATA SET: 1968-1974

Variable Name	Variable Number for Program Year (Card columns are in brackets followed by card number.)							Description
	1	2	3	4	5	6	7	
GIII.#	48 (77,1)	63 (24,1)	78 (44,2)	93 (64,2)	108 (13,3)	123 (33,3)	138 (53,3)	Number of children in family less than 72 months with grade III malnourishment at end of program year.
CH#-	49 (78,1)	64 (25,1)	79 (45,2)	94 (65,2)	109 (14,3)	124 (34,3)	139 (54,3)	Number of children in family less than 72 months who dropped at least one grade during the year.
CH#+	50 (79,1)	65 (26,1)	80 (46,2)	95 (66,2)	110 (15,3)	125 (35,3)	140 (55,3)	Number of children in family less than 72 months who improved at least one grade of malnourishment during year of program.

The Promotora Program in Candelaria

Part II:
A Revisitation Two Years After Program End

Roy L Miller, Ph.D.

William D. Drake, Ph.D.

November 1980

THE PROMOTORA PROGRAM IN CANDELARIA: A REVISITATION TWO YEARS AFTER PROGRAM ENDING, 1976

SUMMARY AND CONCLUSIONS

This report deals with the question: What are the long-term effects of community-level nutrition interventions carried out in developing countries? It focuses on a single community, Candelaria, Colombia, for which there is substantial longitudinal information for the period during which the projects were in effect, and for a period of two years following completion of the major program elements. The policy issues are: (1) Are there benefits accruing to the target population that remain beyond the intervention itself? and (2) What are those benefits?

Candelaria is a community in which numerous programs for reducing child malnutrition have been undertaken over nearly twenty years. These programs have included food supplementation, provision of potable water, sanitary sewers, family planning, health and dental care clinics, and, most recently, a health and nutrition outreach program. This outreach, or Promotora Program, utilized young women to seek out high-risk families with young children and provide both preventive and curative services. It was initiated in 1968 and continued without interruption through 1974, when it was terminated.

In 1976 a survey was conducted of a sample of residents of Candelaria, roughly half of whom had participated in the Promotora Program and half who had not. To our knowledge, this is the first time such an opportunity has existed for the analytic study of the long-term residual effects of a nutrition intervention. As a consequence, several interesting and difficult research issues arose in the process of this inquiry: for example, defining the participation status of children who were not yet born when the Program was terminated but who (presumably) benefited from the mother's prior participation. This and other experimental design and data handling

problems are dealt with in sections II and III.

Methodological issues, such as the impact of the growth standard selected, and the functional form and specific statistical model utilized, are described in Section IV. Several different methodologies were utilized in parallel, and the similarities and differences are presented. The differences in findings, depending upon the methodological approach utilized, lead to a certain degree of analytic indeterminacy for some of the outcome indicators. The basis for the substantive findings are articulated, in each instance being careful to distinguish between the numerical analytics and judgmental assessments.

Section V presents the differences between participants and nonparticipants two years after termination of the Promotora Program. These can be summarized as follows:

1. The nutritional status of children born into participating families following termination of the program **appears to be no better** than children in nonparticipating families.

2. The nutritional status of children who actually participated in the program two years earlier is less clear. Some of our analytic indicators show an improved condition and others do not.

3. Children from families that particpated two years previously appear to **suffer less from diarrhea** than children in nonparticipating families. Different methods of analysis generated inconsistant conclusions in this instance. However, since the mother's recall of diarrhea is a notoriously weak method of measuring prevalance and severity, underreporting is common. On balance, we are confident that this conclusion is valid.

4. Two years following termination of the Promotora Program, other diseases do not appear to be significantly affected by past participation, although this lack of relationship may be due to field-level difficulties in accurate measurement.

5. Fewer participating mothers in all age categories were pregnant than were their nonparticipating counterparts. Depending on the measure used, **the pregnancy rate was roughly thirty percent lower in participants** two years following termination of the Program. This finding holds

true regardless of the analytics used and is probably the strongest relationship in the study. Since there was a government-operated family planning program in existence during the entire period, there is strong evidence that reinforcement arising from exposure to the outreach aspects of the Promotora Program resulted in considerable synergism. The question of the level of intensity of effort necessary to have a meaningful impact on the target population is undoubtedly one of the most significant policy issues facing sponsors of interventions, and may be worthy of further investigation.

STATEMENT OF PURPOSE

This report looks at the **lasting impact** of the Candelaria Promotora Program. As such, it is written with two objectives. First, it considers the long-term effects of participation in the Candelaria Promotora Program. Second, it considers the methodological issues that confront the analyst who attempts to determine such long-term effects. In practice, the second objective had to be met first. We had to make some explicit decisions with regard to methodology before we could attempt any solid substantive analysis.

In only a relatively few cases have health/nutrition interventions generated enough usable data during their terms of operation to allow for objective (data-oriented) evaluation of their impact. In Candelaria, we have a situation that may be unique: not only does such data exist from child measurements and family surveys taken during the program, but also a revisitation was made to gather parallel data two years **after** the program was completed. An analysis of the data gathered **during** the program is presented in the first report in this volume. Additional analysis was done by William Drake with Peter Heller (Heller and Drake, 1978). This report—Candelaria Revisited—concentrates on the data collected two years **after** the program was terminated. Specifically, we consider methodological issues and answers to the following questions:

1. Were the children who participated in the Candelaria Program healthier than nonparticipants two years after termination of the program?

2. Did the families who participated in the program learn enough to change their behavior in such a way that all children in the family (participants and those born later) were better off than those in nonparticipating families?

In the next section we will consider both the nature of the intervention and the nature of the data set. Following that, we will develop an empirical "feel" for the data by examining the responses to individual questions asked in the revisitation survey. This will take us directly to the methodological issues. Our resolution of these issues is as important in determining our final results as are the collected data. Finally, we will answer the questions posed above as best we can within the limitations set by the methodological problems.

BACKGROUND: PROGRAM AND DATA

Program

A relatively complete description of the Candelaria Promotora Program is given on page of this volume for readers unfamiliar with the nature of the intervention. Several key points, however, bear repeating at this time:

1. The Candelaria Promotora Program was only one component of a major computing effort by the faculty of the Universidad del Valle in Cali, Colombia, to bring the concept of community medicine into the curriculum for its students (with the ultimate objective, of course, of increasing the implementation of the concept throughout rural Columbia). Thus, the population of Candelaria had already derived substantial benefits from the faculty involvement at the start of the Promotora Program—particularly with regard to sewer and water systems.

2. The Program centered around the use of volunteer health workers (Promotoras) to provide education on nutrition, hygiene, and the utilization of health services; gather data on child progress with respect to height and weight; and refer sick children to the appropriate health service unit. The volunteers tried to visit all families in Candelaria every two months throughout the years 1968-1974.

3. Candelaria is a "temporary" stopping place for families

migrating from highly rural settings to the urban areas; therefore, the family migration rate is approximately eighteen percent per year.

For a variety of reasons, the Promotora Program was terminated by the Government of Colombia in 1976. A planned phase-out of the Promotoras was implemented, which included final visits to all the participants by the volunteers to describe the revised health care delivery system. Following the transition, many of the services provided by the Promotora Program were still available, but usually at a much-reduced level. Consequently, when we refer to a resurvey of the population in 1976, it would be inappropriate to assume that all services had ceased abruptly in 1974.

Origins of the Data

As noted, the revisitation of Candelaria in 1976 represents an unusual, if not unique, attempt to search for enduring impacts of a health/nutrition intervention. One would hope that the effect of the educational and immunization components of a Promotora-type program would lead to behavior changes on the part of mothers—changes that would show up in improved nutritional status for their children when compared to children of mothers who had not seen Promotoras on a regular basis for some time period during the preceding years.

To test this hypothesis, a survey was administered in Candelaria in 1976, 2 years after the Promotora Program had been phased out. The survey was a "one-visit" interview administered to approximately half of the families in Candelaria. We do **not** know the precise nature of the sampling scheme. We understand that Candelaria is composed of approximately 70 distinct groupings of houses called blocks. About 25 families live in each block. Thirty-five of the blocks were selected at random, and every family with a child under 6 years of age in those blocks was interviewed. In all, 498 mothers were interviewed; 265 had participated in the original Promotora Program. Nonparticipant mothers existed in such large numbers (233, or 46.8%) because of the relatively high rates of in-migration and out-migration in Candelaria (approximately

18% per year); thus, in just 2 years, the new migrants, when added to new families formed, may well be expected to account for half of the families in Candelaria with children under 6 years old. (No doubt, some former participants in the city were not interviewed because they no longer had children under 6.)

Mothers were asked questions concerning participation in those programs continuing in Candelaria under government auspices after 1974; questions defining the size and composition of their families; questions concerning fertility and birth control; and questions revealing the socioeconomic status of their families. For each child under 6, mothers provided information on age, sex, breastfeeding history, immunization history, current illnesses and anthropometrics. The basic variables created from both the mother and child interviews are described in Appendix A.

Preparation of the Data

One experience shared by most social scientists called upon to analyze data generated and processed by others is the frustration of finding idiosyncracies in the data during analysis—idiosyncracies which could have been eliminated or corrected by more careful processing at each of the stages involved in developing a data set. In the case of the Candelaria revisitation, the surveys were designed, administered, and placed into machine-readable form before CSF received the data for inclusion in the project, "Analysis of Community-Level Nutrition Programs." To minimize the potential distortion in analysis due to coding and/or keypunching errors, the data were subjected to a cleaning procedure prior to analysis.

The first and most straightforward step in cleaning the data is the confirmation that individual variables take on values within permissible ranges. FORTRAN programs were written for both the children's data and the mothers' data. When run, the programs made a notation for each error found in a given record. Erroneous values were set to "missing." Relatively few such errors were found.

The more complex and more troublesome errors pertained to the identification numbers of the children and mothers. The original data

contained a significant number of duplicate identification numbers as well as some unmatched children and mothers. For example, the data file for children contained two distinct observations for child "1" in family "2003." In this instance, one of the two records contained an identification number from the original Candelaria study that matched the original number for a mother with family number "2303." The family number for that child was changed. There are eleven children in all who could not be matched to a mother by using logic of the type illustrated above. In the analysis that follows, these eleven children were omitted from the data set. Volume VII of this series lists the computer programs used to detect errors and records the judgments made involving identification numbers of unmothered children.

The data were entered into the data base management system described in Volume VII in order to facilitate merger with other data sets and permit application of diverse standards of growth in the analysis. The MIDAS statistical package was used for statistical operations.

INTRODUCTION TO THE DATA SET: PARTICIPANTS AND NONPARTICIPANTS

Although the term "data analysis" suggests an objective appraisal of the content of a data set, the analyst must make some subjective decisions with regard to his methodology and, later, with respect to interpretation. A familiarity with the data set is a necessary foundation upon which to make those decisions. In this section we describe many of the variables in the data set and examine the relationship between the participants and nonparticipants with respect to those variables.

Definition of Participants

For each mother in the study, we can determine participation status by examining one of two variables. First, if a mother has an identification number from the Promotora Program, it can be assumed that she was a participant. Similarly, the response to the request for duration of

participation is an indication of whether the mother participated. In both cases, missing responses corresponding to "don't know" were allowed. Fortunately, for each mother, one of the two questions was answered definitively, or, at worst, both were answered "don't know." Thus, we could determine with confidence the figures given earlier: 265 mothers had participated.

Similarly, several questions existed to determine the participation status of each child: the identification number in the original study and the historical record of the Promotora's first and last visit to the child. Using these questions as a guide, we determined that 310 children had participated (36.1%) and 549 had not. The first immediate problem was classification of children under two years of age. They could **not** have participated directly in the program, since it terminated before their birth. Yet, one might argue that if their mothers had participated with an older brother or sister, they should be differentiated from children born to mothers who never participated. This consideration led to a four-fold classification of children, based on age and participation, where a child under two years of age is a participant only if his/her mother participated.

In practice, there is one problem with this classification. Some children over two years old were, in fact, nonparticipants while their mothers participated; these are children who were old enough to have participated and, in the resurvey, belong to families who participated, but who did **not** participate. There are several possible explanations for this phenomenon. First, as the Program was phased out, the Promotoras stopped visiting all new children born to the community. Also, relatives (cousins, etc.) who were not part of the family at the time of the original Program had since joined the family. Thirdly, the Promotoras may have missed some children outright during the Program. Finally, and most distressing, the children and/or the mothers may have been misidentified during the revisitation survey. Table 1 indicates the potential magnitude of this misclassification.

As shown in Table 1, sixty-six children who were strictly older than twenty-four months, at the time of the survey, were matched to a

participating mother and yet did not participate in the Program. Twenty-six of these children were less then eight months old at the time that the Promotoras were phased out in Candelaria. In all likelihood, these children were not added to the Program because of its planned termination. The others are more of a problem. Attempts to apply judgment to the classification of these children yielded no adequate and consistent rule for reclassifying some children as participants. At least, no empirical basis for reclassification was found to replace the belief that the interviewers were sufficiently careful in identifying past participants at the time of the survey.

In the analysis that follows, we will classify mothers as participants according to the data in the mother's file. We will classify children as participants according to the data in the children's file. The exception is that children under two will be assigned to a "family participated" category based on the mother's participation status.

Comparison of Participants with Nonparticipants

We are now ready to explore the simplest relationships in the data: comparisons between participating and nonparticipating mothers, and between particpating and nonparticipating children. Let us begin with the mothers.

1. MOTHERS

Our first variable for comparison is the age of the mother. A priori, we would expect the mothers who were visited by the Promotoras to have been older than those who were not, because at least some nonparticipating mothers are young women in newly formed families. Table 2A verifies this contention.

Because we will present many tables in a similar format, we will describe 2A in some detail. The contingency table presents the number of cases falling in each cell where the cell is defined as the intersection of the indicated categories

(thus, 52 mothers between the ages of 15 and 24 participated). The numbers in parentheses in each cell are the row percentages (thus, 20.3%--52% of 256—participating mothers were between ages 15 and 24). The test for the existence of a relationship between the named variables is the Chi-square test. The Chi-square value, the degrees of freedom, and the lowest significance level for which the null hypothesis of no relationship can be rejected are given under the table. The "direction" of the relationship cannot be summarized in a single statistic using this format. However, by examining the row percentages, that relationship can usually be determined. In this case, we see that 46.1% of the nonparticipating mothers were between ages 15 and 24, while only 20.3% of the mothers who participated were so young.

With respect to the number of years in Candelaria, we would expect many more nonparticipating mothers to have lived in the city for a short time, only because a primary reason for nonparticipation is recent in-migration. Table 2B illustrates this quite clearly, as sixty percent of nonparticipating mothers lived in Candelaria for less than five years, while only ten percent of participating mothers in-migrated so recently.

The origins of the mothers in both groups were the same. Table 2C shows the lack of a statistically significant relationship between participation and origin at the "traditionally" accepted significance levels of .01 or .05.

Table 2D contains four subtables addressing the issue of participation in other continuing programs since 1974 (the year of the Promotora phase-out). A priori, we might expect participants in the Promotora Program to be more active in these other programs, for two reasons. First, their longer term of residency in Candelaria provided greater opportunity to learn of these programs. Second, the Promotoras themselves may have played an active role in referring mothers to these

programs. Our expectations were borne out in only two cases: the family planning program and the food distribution program (PINA). In the latter, so few mothers participated (only 12) that the result is hardly meaningful.

Family size, a factor thought to be related to nutritional status, is itself difficult to measure. Multiple-family housefolds and extended families complicate the definition of family size. Table 2E presents four subtables—each conveying a different sense of family size. Participating mothers have more children under 15. The most dramatic entries in this table are in the column for one child: only 4.9% of participants had one child under 15, while 36.1% of nonparticipants had only one young child. This result is consistent with our earlier findings that participant mothers were older and in families of longer existence.

Surprisingly, we find that participating mothers live more frequently in single-family households—46.85% to 63.1%. As expected, the size of the nuclear families for participants is higher (as it should be if there are more children under 15). The combined effect of participants having larger nuclear families but smaller numbers of families per household is that the **overall** size of household does not differ significantly between participants and nonparticipants. Probably immigrants and new families in the nonparticipant group are "doubling-up" more frequently than more established families.

The two groups are virtually identical with regard to education level. Table 2F shows clearly that mothers in the two groups attain the same level of education. The relationship between father's education and participation is almost statistically significant, with nonparticipants having more fathers in the extreme categories.

With regard to access to sewer and water, so few residents of Candelaria did not utilize those services (3.6% and 2.8%,

respectively) that a comparison between participants and nonparticipants is virtually meaningless. Similarly, stove ownership was nearly universal (97.2%). The univariate distributions of these variables are presented in Table 2G. (Mothers were given the opportunity to differentiate between sole ownership of a stove and shared ownership, but only one mother acknowledged shared ownership.)

Unlike many rural communities, Candelaria does not have a cash economy. Measures of expenditure and/or income in regions where home-grown crops and/or barter economies are found tend to be misleading. In this data set, we must be concerned only with distortions due to poor memory and accounting or due to falsification by respondents.

Let us first look at expenditures. Table 2H contains the comparison between participating and nonparticipating families with respect to **weekly** food expenditures and monthly expenditures for other items. The two groups do not differ significantly on weekly food expenditures but do differ with regard to expenditures on monthly rent, utilities, education, and "other" items. The nonparticipant families tend to have more families on the extremes with regard to monthly expenditures. (Note that the total number of respondents answering the question concerning monthly expenditures dropped to 365. This is an indication of the difficulty in answering such a question.)

The measurement of income in Candelaria is made more complex because of the existence of a subsidy program. Participants do not differ from nonparticipants on income; however, more participants receive the subsidy (65.1% as compared to 47.4%), and those that do, receive the higher subsidies; Table 2I indicates these results.

A final factor often considered important in the determination of socioeconomic status—along with income and education—is occupation. With regard to occupation, there is

no agreed-upon convention as to which occupation is "better." Therefore, it is inappropriate to address the directionality of a relationship between occupation and participation. For the mother, the occupation question asked only for information on days away from home. Even here, it is not possible to state that fewer days away from home is categorically better than more. Table 2J relates both the occupation of the household head and "work-intensity" of the mother to participation. For the mothers, there is no statistical difference between participants and nonparticipants. However, the occupation of the household head is significantly related to participation. A higher percentage of household heads among the nonparticipants work as sugar cane cutters.

In summary, we must conclude that there are substantial and important differences between participating and nonparticipating mothers. Participating mothers are older, more given to participation in other programs, have larger nuclear families in households with fewer families, and have more cash to spend.

2. CHILDREN

We now make similar comparisons for the children included in the survey. (In all the tables that follow, the 66 children over 24 months old whose mothers participated but who did not participate themselves are **nonparticipants.**)

Given that participating mothers were older than nonparticipants, we might expect that their children were also older. Table 3A verifies this contention. All age categories up to 31-36 months have a higher percentage of nonparticipants than participants. Similarly, from 49-54 months, we find higher percentages of participants. The test shows that the overall relationship is significant. Similarly, the birth orders of the participating children are higher than those of the

nonparticipants. Fifty-five percent of the nonparticipants were first or second born; only 33.6% of the participants were among the oldest children in their families.

By contrast, participants and nonparticipants are distributed equally over sex (Table 3B). With regard to breastfeeding, there is a difference (not quite statistically significant) between participants and nonparticipants; however, the first subtable as presented is somewhat misleading (Table 3C). The confusion arises among children still being breastfed. Because participants are older than nonparticipants, there are fewer participants of an age to be breastfed. Therefore, the fact that a higher percentage of nonparticipants is currently being breastfed is misleading. We generated two additional tables to clarify the nature of the relationship—one table for children under two and another for children over two. The "direction" of the relationship is clearer in these two tables (nonparticipants have higher percentages breastfed for short time periods or not at all) but the relationships are no longer close to significant. The weak trend in each age group, being the same in both, results in a marginally significant relationship when the age groups are pooled.

Again, the tendency of Promotora Program participants to avail themselves of other programs and services would lead one to expect participating children to show a higher rate of immunization than nonparticipants. Table 3D shows this to be the case.

In summary, participating children are different from nonparticipating children. They are older, have been breastfed more, and have been immunized against more diseases. After consideration of some methodological issues in the next section, we will compare participants to nonparticipants on the remaining questions of the interview. For children, we will look at nutritional status and disease; for mothers, at fertility.

However, the comparisons on these factors, which can be viewed as measurements of program efficacy, must account for the other existing differences in groups as enumerated above.

METHODOLOGICAL ISSUES

As noted earlier, this report is one of several prepared as part of a larger research project to analyze community-level nutrition programs. During the course of that larger project, several related methodological problems have repeatedly confounded the analysis. Two of these problems have a direct bearing on the Candelaria Revisited data set: the selection of a standard for measuring nutritional status, and the selection of a functional form to describe the relationship between age and nutritional status. As we shall see, these two problems are inextricably related.

We have shown that in the survey the participants were not "matched" to the nonparticipants. One method of accounting for the differences in the two groups is the application of multivariate statistical analysis—a method that controls statistically for the differences between groups. We will use regression analysis, a technique by which the significance of a single variable in explaining the variance in a dependent variable can be established, given the strength of explanation of other independent variables. For example, it is possible to determine the significance of participation in explaining the variance in nutritional status, given the explanatory power of other variables such as age, income, and sex.

To illustrate the methodological issues related to choice of standard, we will select a "simple" multivariate model—one hypothesizing that nutritional status is a function of only two variables: age of child and participation (we will expand this model later). This model requires that two decisions be made. First, we must select a standard for measuring nutritional status; then we must select the functional form of the equation.

Selection of a Growth Standard

The determination of the nutritional status of preschool children is a difficult task. It is especially challenging in a field (as opposed to a

clincial) setting. The generally accepted method of quantifying nutritional status in the field is to compare one or more anthropometric measurements on a child to standards derived for comparable children. Inadequate growth as demonstrated by anthropometric deficiency is taken as an indication of malnourishment.

This method leaves two unresolved questions: What is the appropriate anthropometric measurement? and, What is the best standard? With regard to the appropriate measurement, we limit the discussion to those measures taken during the Candelaria Revisited survey.

The height, weight, and age of each child were recorded (all but 8 children were weighed, while height was recorded for all but 40 children). Therefore, it was possible to define nutritional status with a measure of stunting (the ratio of actual height to the standard height for the child's age: height/height(age), a measure of wasting (the ratio of actual weight to the standard weight for the child's height: weight/weight(height), and the most frequently used measure of the combined effects of stunting and wasting (the ratio of actual weight to the standard weight for the child's age: weight/weight(age). The relative merits and drawbacks of the three measures--in theory--are discussed elsewhere (Keller, Donoso, and DeMaeyer, 1976). We will consider each measure here from an empirical perspective.

For the composite measure of nutritional status, weight/weight(age), we applied three distinct "standards" (sets of "normal" weights for each age). These were the Candelaria Standard, the Colombia Standard, and the Harvard Standard. Although originally thought to be a unique local standard, the Candelaria Standard is nothing more than the Gomez Standard with a new name (Gomez et al., 1955). Weight charts based on this standard were used as part of the Candelaria Program by the Promotoras. The Colombia Standard is a **sex-differentiated** standard based on a sample of "normal" Colombian children. The Harvard Standard is a unisex standard derived by averaging the 50th percentile scores for boys and girls in the 1969 edition of the Textbook of Pediatrics (Nelson, 1969). Table 4A lists the weights-for-ages for the three standards applied

to calculate the weight/weight(age) ratios.

For the stunting measure, we had only the Colombian Standard and the Harvard Standard as references. There was no set of heights for ages in Candelaria. The values comprising these standards are in Table 4B. Finally, for the wasting measure, we had only the Harvard Standard. It is presented in Table 4C. In the analysis that follows, we will apply each of the six measures of malnourishment formed by applying the three available standards to the corresponding anthropometric data.

Selection of a Functional Form

By definition, using the growth standards and anthropometric ratios described above, there should be no relationship between nutritional status and age in a healthy population. To illustrate this, consider a weight/weight(age) standard. The nutritional status of an individual is the weight/weight(age) score where the denominator is the average (usually median) weight observed in children of the given age in a population presumed to be healthy. In any other healthy population, the children of the same age should exhibit the same distribution of weights; therefore, the average percent of the standard for a given age should be the standard, and the "b" coefficient should be zero in the equation NS = a + b • Age. Similar arguments can be made for the other ratios--height/height(age) and weight/weight(height).

However, for populations suffering from some malnutrition, empirical analysis often discloses a relationship between the ratio score and age. In other words, the degree of deficiency in a population suffering from malnourishment is not constant over all ages. If one looks at many malnourished populations, the nature of the empirical relationships between nutritional status (measured with one of the ratios described above) and age is similar. The marked similarity is so great, in fact, that one tends to seek an underlying theoretical explanation for the empirical reality. One such explanation is that the typical undernourished child tends to show accelerated deterioration after weaning (between 6 and 8 months), followed by some recovery as both its resistance to disease and ability to "take

care of itself" increases.

Whatever the theoretical underpinnings, in an empirical study one must specify the nature of the relationship between age and nutritional status. For example, a test of the hypothesis that participating children in Candelaria were healthier than their nonparticipating counterparts can be carried out using the statistical technique of regression. To implement this test, one must do more than hypothesize that a relationship exists: one must specify a mathematical form to enable the test.

Unfortunately, the appropriate functional form is itself a function of the standard chosen to compute the nutritional status ratio. The rate of proper growth embodied in the standard will determine the magnitude of the accelerated deterioration as well as the magnitude of recovery. Figures 1A, 1B, and 1C are the graphs of the mean percentage of standard achieved for different age groups, using the composite measure of nutritional status—weight/weight(age)—for the three standards applied to the Candelaria Revisited data. The rate at which the curves fall and level off are quite different for the standards. The anticipated "recovery" predicted by the theoretical explanation of the existence of a relationship is apparent for the Candelaria Standard only.

Resolution

Figures 1A, 1B, and 1C suggest that the appropriate functional form for describing the relationship of nutritional status and age is a function of the standard used to define nutritional status. Furthermore, it can be shown that the ultimate result of an analysis to determine program impact is, in turn, dependent on both the selection of the standard and choice of functional form.

To illustrate this, a regression model was formulated that embraced the hypothesis that nutritional status was determined by only the age of the child and its participation in the program:

$$\text{Nutritional Status} = f\ (\text{Age, Participation})$$

In all, eleven functional forms were enumerated: eight with single-term transformations of age and three with more complex transformations

involving multiple terms. Participation was always defined by a dummy variable which was set to "Ø" for participants and "1" for nonparticipants. Each model was "run" for each of the six nutritional status measures available (the three weight/weight(age), two height/height(age) and weight/weight(height) scores).

Table 5A displays the results of the "runs" for the single-term transformations. The overall predictive capability of each equation, often called the "goodness of fit," is given by the coefficient of determination or R^2. The significance of each explanatory variable (the transformation of age and participation) is determined by a t-test of the hypothesis that its own coefficient is different than Ø. The transformations are arrayed according to the "ladder of re-expressions" that traverses, in an orderly fashion, the possible curves which can be derived through simple transforms (Mosteller and Tukey, 1977; p. 79).

As expected, the best fit (highest R^2) lies with a different transformation for each of the different measures of nutritional status. Consider, first, the weight/weight(age) models. Inverse of age is the best fit for Candelaria weight/weight(age) with an R^2 of .140. Inverse of square root of age is the best fit for Colombia weight/weight(age) with an R^2 of .041, while natural log of age is best for Harvard weight/weight(age) with an R^2 of .07.

The significance of the contribution or the participation variables also improves and then worsens as one moves up the "ladder of re-expression." However, the functional form that shows the highest significance of participation is never the same as the one providing the best fit of the overall relationship. In only **one** case is participation significant: the Candelaria-weight/weight(age) standard as a function of the natural log of age. (How misleading would this report be if the authors chose to present only that model[)

Similar patterns emerge for the height/height(age) and weight/weight(height) columns—except that the predictive ability of the equations is generally poorer than the equations involving the composite measure of malnutrition. In the equations using height/height(age), the

participation variable is never even close to significant (using the classical .05 level of significance).

Table 5B portrays the three more complex functional forms. Model I, with age and age-squared, fits our theoretical claim that children tend to lose ground to the standard until some time after weaning and then recover. Model II allows for a second turning point in the curve, one that often appears in programs where older, healthier children are dropped from the program. Finally, Model III was included because the "inverse" forms yielded the best fits in the simple models. In general, the R^2 values were higher—the significance of the participation variable was lower.

In the more extended analysis that follows, we must select a "standard" and a "functional form." Otherwise, we would present each equation sixty-six times! The point is that the selection of the "standard" and "functional form" are judgments of the analyst—judgments that determine the outcome. The "science" of statistics cannot substitute for sound theoretical and/or empirical evidence that a particular standard or functional relationship is appropriate.

In what follows, we will limit our consideration to the Candelaria Standard and include the quadratic form of age in our equations (we will use age and age-squared). We have used the Candelaria-weight/weight(age) standard because it was used during the program as the diagnostic standard for malnourishment. We will use age and age-squared because the parabolic shape suggested by that functional form is consistent with the hypothesis that children go through a period of risk and then recover.

ANALYSIS OF PROGRAM IMPACT

At the outset of this report, we posited the two questions of primary interest: Were participating children healthier than nonparticipants? and, Did participating famiies behave differently (better) than nonparticipants? To answer these questions, several methodological problems first had to be resolved. A suitable definition of participating children had to be made, and a comparison of participants and nonparticipants had to be made to enable us to account for basic differences. Finally, the issue of model

specification for hypotheses concerning nutritional status—the primary health indicator in a nutritional study--had to be addressed. The importance of the judgments made in resolving each problem was so great that a detailed explanation was deemed appropriate.

Nutritional Status

The nutritional status of children born into participating families following termination of the progam appears to be no better than children in nonparticipating families. Some indicators of nutritional status in older children show significant improvement and others do not.

One test of the hypothesis that participating children are healthier than nonparticipants is a comparison of the nutritional status of the two groups at the time of the resurvey. However, we know that the groups are not "matched"; therefore, a multivariate statistical technique is needed to control for the differences in the two groups. Of course, we are limited to consideration of the variables incorporated in the survey. It makes little sense to speak of differences in consumption patterns or amounts when there are no data. We did see that in participating families mothers were older, nuclear families were larger, families per household were fewer, and money was more available. Similarly, participating children were older, had more older siblings, breastfed more, and had greater immunization rates. Our model to perform the test must account for these differences.

However, we know that some of these variables are highly correlated and tend to illustrate the same underlying phenomenon. Specifically, several of these differences reflect the fact that participating families are in a more advanced stage of the life cycle. That participating mothers are older, live in larger nuclear families, have more children and are "richer," are consequences of this more advanced stage in life. To reduce distortion due to multicollinearity in our model, we will choose only a subset of the variables known to differ in the two groups—participants and nonparticipants.

To test the difference with respect to nutritional status of participants and nonparticipants, we specify a model in which the dependent variable is the weight/weight(age) score using the Candelaria Standard. To control for differences among the children, the independent variables must include age, age-squared, birth order, and indicator of duration of breastfeeding, and an indicator of immunization level. These last two are difficult to construct. With regard to breastfeeding, it is unclear how to include children currently being breastfed. The duration of breastfeeding in these cases is not known. Also, it can be argued that the duration of breastfeeding should not be treated as an interval variable—four months of breastfeeding should not be considered to be "twice" as good as two months. (Besides, the question concerning breastfeeding called for categorized answers; therefore, we could not treat the responses as an interval variable.) In an effort to include breastfeeding, we constructed a "dummy" variable whose value was "Ø" if the child was currently being breastfed or had been breastfed for five months or more.

The immunization question in the survey could best be quantified by counting the number of immunizations given to a child. Although this ignores the information concerning that shots or combinations of shots were received, it does give some indication of the level of protection through immunization.

To control for differences among the mothers (families), the independent variables must include suitable indicators of the more advanced stage in the life cycle attained by participants. In our first formulation, we include the mother's age, the number of family units per household, and the monthly expenditures on other items for the family. We do **not** include the size of the nuclear family, because this variable was highly correlated with mother's age. Finally, we choose the expenditure variable rather than income, because fewer families (741) responded to the income question than the expenditure question (827).

The coefficients, their significances, and the R^2 values of the regression run using this formulation are presented in Table 6A. As expected, the participation variable is not significant, nor is our

constructed variable for breastfeeding. Surprisingly, the age of the mother was also not significant. All other variables were significant.

Several other points should be made about Table 6A. The R^2 value of .163 is only .041 higher than the R^2 for our sample model using just age, age-squared, and participation. The addition of the 6 other variables explained only 4 percent more of the variance in weight/weight(age). Also, because of missing values in some of those 6 variables, Table 6A is based on only 755 children. The simple model encompassed 848.

At this point, we could conclude that participation in the Candelaria Program may not have significantly contributed to the nutritional status of the children in Candelaria two years after the intervention. If we carry the analysis a bit further, we can learn something more about the reasons for this result. Recalling that children under two years of age could not have participated directly in the program, it makes some sense to look at that group of children--and the older children too--as separate groups. Table 6B displays the results of regressions for Model 1 for children under two and children over two. Participation is nearly significant in the older group. However, if we drop the number of immunizations from the equation for children over two, participation becomes a significant explanatory variable at the .05 level. It would appear that participation in the program accounted for improved nutritional status in older children, but the benefit or participation was not passed on to the siblings. The most surprising difference in the two groups is the explanatory power of age in "predicting" nutritional status. Age is not at all significant in the children over two. (If we look back at the graphs of nutritional status and age, our surprise will lessen.) This strongly suggests that children over two maintain their nutritional status; they neither recover nor worsen. Children under two, however, experience steady deterioration.

Model I was constructed to control statistically for those factors known to be different in the participant group when compared to nonparticipants. There are other variables in the survey that are related to nutritional status--at least, in theory. To test the theory, a second model includes all the variables of the first, plus the sex of the child and its disease

"history" during the fifteen days prior to the survey. Sex is introduced into the model as a dummy variable where a male is "0" and a female is "1." These disease questions in the survey asked for the number of days of both diarrhea and other sickness in the fifteen days prior to the survey. These variables were included in that same form. Table 7 displays the results of a regression using the second model. The three added variables are significant but the R^2 (overall explanatory power) rises only .022.

Disease

Participating children suffer less from diarrhea than nonparticipants. However, this relationship does not carry over to other diseases. In this last model, we introduce the short-run disease histories of the children of Candelaria. A second test of the hypothesis that participating children are healthier than nonparticipants is a comparison of the prevalence of disease in the two groups. This proves to be a difficult task when the data for the comparison are derived from a survey. Let us explore the reasons for this difficulty.

The questions in the Candelaria Revisited survey pertaining to disease called for fifteen-day recall by the mother of the number of days the child had diarrhea and/or other diseases in that time period. Thus, the data required judgment by the mother (unlike weight), both with regard to the **number** of days and the **severity** of disease. With regard to diarrhea, one might expect more consistent responses from participating mothers who had the experience of assessing diarrhea severity with the Promotoras during the Program period.

Furthermore, the count of days of diarrhea and other sickness in a fifteen-day period is not particularly discriminating in a single fifteen-day period. In Candelaria, 671 out of 855 respondents (78.4%) had no diarrhea during the 15-day priod, while 532 out of 855 (62.2%) had no other diseases. Thus, most children report "Ø" days of diarrhea and sickness--leaving too few children reporting a "number" of days to allow for much variance in this variable.

With this appraisal of the potential for problems in our analysis in

mind, we can begin. The symbiotic relationship between nutritional status and diarrheal disease is now a well-accepted fact. Therefore, we would expect diarrhea to be worst in a population among those age groups where nutritional status is worst, and vice versa. Figure 2A is a graph of the mean number of days of diarrhea by age group for participants and nonparticipants in Candelaria (note the very low means!). The shape of these curves is as expected, with peaks in the second year. Furthermore, with the exception of the children in the age group of thirty-seven to forty-eight months, the participants have less diarrhea than the nonparticipants. One cause of the rise in diarrhea among the children sixty-one to seventy-two months old could be the added exposure to diarrhea-causing agents in the schools.

Figure 2B is a similar graph for other sickness. The shapes are similar to the curves for diarrhea without the marked increase in disease among the older children; only here, the younger participants show more disease than the younger nonparticipants. People ascribing to the theory that disease is often transmitted to youngsters from older children hypothesize that participant children are more at risk because they have more older siblings.

We would like to test the hypothesis of the significance of participation, using a regression analysis similar to that used in comparing groups with respect to nutritional status. To do this, we must use the number of days of diarrhea and sickness as the dependent variables. But, as previously noted, these variables are highly skewed because of the overabundance of cases assuming the value "Ø." To illustrate what happens when we take this approach, we use models very similar to Model I in our analysis of nutritional status. The results are in Tables 8A and 8B.

The attempt to explain the variance in the diarrhea variable has only **one** significant independent variable: number of family units in the household. This is not a particularly instructive result, but it is not all that unexpected. The model does somewhat better with regard to other sickness. Age and age-square are significant. Given the nature of the variables, we conclude that the regression approach is not appropriate.

Returning to the graphics of Figures 2A and 2B, we can conclude that it **appears** that participants are better off with regard to diarrhea than nonparticipants. With regard to disease, however, we cannot draw such a conclusion. If we recall Figures 1A and 1B, the graphs of mean nutritional status against age, we can see that the conclusion drawn from the graphics with regard to nutritional status was also unclear: Participants in four age categories were better off than nonparticipants, but a consistent relationship did not exist.

In summary, simple graphic comparisons between participants and nonparticipants reveal that participants are better off than nonparticipants with respect to diarrhea, but the relationship is less clear with respect to nutritional status and other sickness. Using more complicated techniques, the conclusions with regard to diarrhea are less straightforward but were judged to be consistent with graphic comparisons.

Pregnancy History

Fewer participating mothers in all age categories were pregnant than were their nonparticipating counterparts two years following program termination.

The second question posed at the start of this paper concerned behavioral differences between participants and nonparticipants. The best indicator of family behavior in the survey is the pregnancy history of each mother during the two years between the end of the Promotora Program and the survey. Fewer pregnancies by participating mothers would indicate a "behavioral" difference between the two groups.

We have already argued that participating families were in a more advanced stage of their life cycles than nonparticipating families; therefore, we would expect fewer pregnancies. The multivariate techniques used earlier are more difficult to apply in testing the hypothesis that the fewer pregnancies are attributable to the program and not merely a result of natural aging. The number of pregnancies in a two-year period does not have a continuous underlying distribution (there are a finite number of pregnancies possible in 2 years--1 or 2, barring miscarriages).

Consequently, we begin with some simpler bivariate techniques.

Tables 9A through 9E are two-way contingency tables displaying the bivariate distribution of participation and pregnancy since 1974 (yes or no) for mothers in five different age groups. In every case, the percentage of participating mothers who were pregnant is less than the percentage of nonparticipating mothers. In the two youngest age groupings, the relationships were statistically significant using a Chi-square test. Because these age groupings cover the most fertile years, we are inclined to assert that program participants behaved differently with regard to having children.

However, there are other potential explanations of this result. In Table 2D we showed that mothers who participated in the Promotora Program had a higher participation rate in the family planning program. Tables 10A and 10B are two-way contingency tables displaying the bivariate distribution of participation and pregnancy for participants in the family planning program and for mothers who did not participate. In both cases, fewer program participants were pregnant (statistically significant using Chi-square tests in both cases). The difference in percent pregnant was widest among participants in the family planning; this strongly suggests that the reinforcement of ideas arising from participation in both programs is the most effective strategy for discouraging pregnancy.

Our attempts to use regression analysis to test for the significance of program participation in explaining differences in the number of pregnancies experienced by mothers in Candelaria produced results that, once again, illustrate the constraints on statistical analysis. We proposed several models to perform the test and got different results. The simplest model expresses number of pregnancies as a function of mother's age and participation in the Promotora Program. Table 11A displays the results. Program participation is significant; participants experience fewer pregnancies. If we add a variable representing the number of months the mother used some birth control method, participation is no longer significant (Table 11B). However, participation is strongly associated with duration of exposure to birth control. If we add yet another variable, size

of nuclear family, participation is once again significant (at the .05 level as shown in Table 11C). Our full model—including income plus subsidy, mother's education, and a dummy variable for participation in the family planning program—shows participation in the Promotora Program to be significant (Table 11D). Once again, the choice of model determines our results, but in this instance there exists a strong rationale for selecting the model that results in participation becoming statistically significant.

The magnitude of the difference in pregnancy rate is dramatic indeed: **thirty percent** lower in participants.

CONCLUSIONS

In spite of the considerable indeterminacy inherent in the analytic portions of this analysis, some very striking conclusions can be drawn from the data. Summarizing the results described in the previous section, we can say:

1. The nutritional status of childrn born into participating families following termination of the program **appears to be no better** than children in nonparticipating families.

2. The nutritional status of children who actually participated in the program two years earlier is less clear. Some of our analytic indicators show an improved condition and others do not.

3. Children from families that participated two years previously appear to **suffer less from diarrhea** than children in nonparticipating families. Different methods of analysis generated inconsistant conclusions in this instance. However, since the mother's recall of diarrhea is a notoriously weak method of measuring prevalance and severity, underreporting is common. On balance, we are confident that this conclusion is valid.

4. Other diseases do not appear to be significantly affected by participation two years following termination of the Promotora Program, although this lack of relationship may be due to the field-level difficulties in accurate measurement.

5. Fewer participating mothers in all age categories were pregnant than were their nonparticipating counterparts.

> Depending on the measure used, **the pregnancy rate was roughly thirty percent lower in participants** two years following termination of the Program. This finding holds true regardless of the analytics used and is probably the strongest relationship in the study. Since there was a government-operated family planning program in existence during the entire period, there is strong evidence that reinforcement arising from exposure to the outreach aspects of the Promotora Program resulted in considerable synergism.

During the course of this entire Research Program we have been concerned with the question of the level of intensity of project effort necessary to have a meaningful impact on the target population. The pregnancy rate finding is clearly an example of one level of service, that when intensified by the Promotora Program, results in a dramatic increase in impact. But no difference could have easily been an outcome as well. While we do not yet have much analytic evidence on this intensity question, it is undoubtedly one of the most significant policy issues facing sponsors of interventions, and may be worthy of further investigation.

FIGURE 1A

MEAN PERCENT OF STANDARD VS. AGE, CANDELARIA STANDARD

	PARTICIPANTS		NONPARTICIPANTS	
AGE	N	PCT	N	PCT
0-12	63	101.0	81	106.0
13-24	50	92.1	70	90.4
25-36	54	92.9	104	90.0
37-48	74	92.4	75	90.4
49-60	92	93.4	60	95.3
61-72	88	96.9	37	92.6
TOTAL	421	94.9	427	94.1

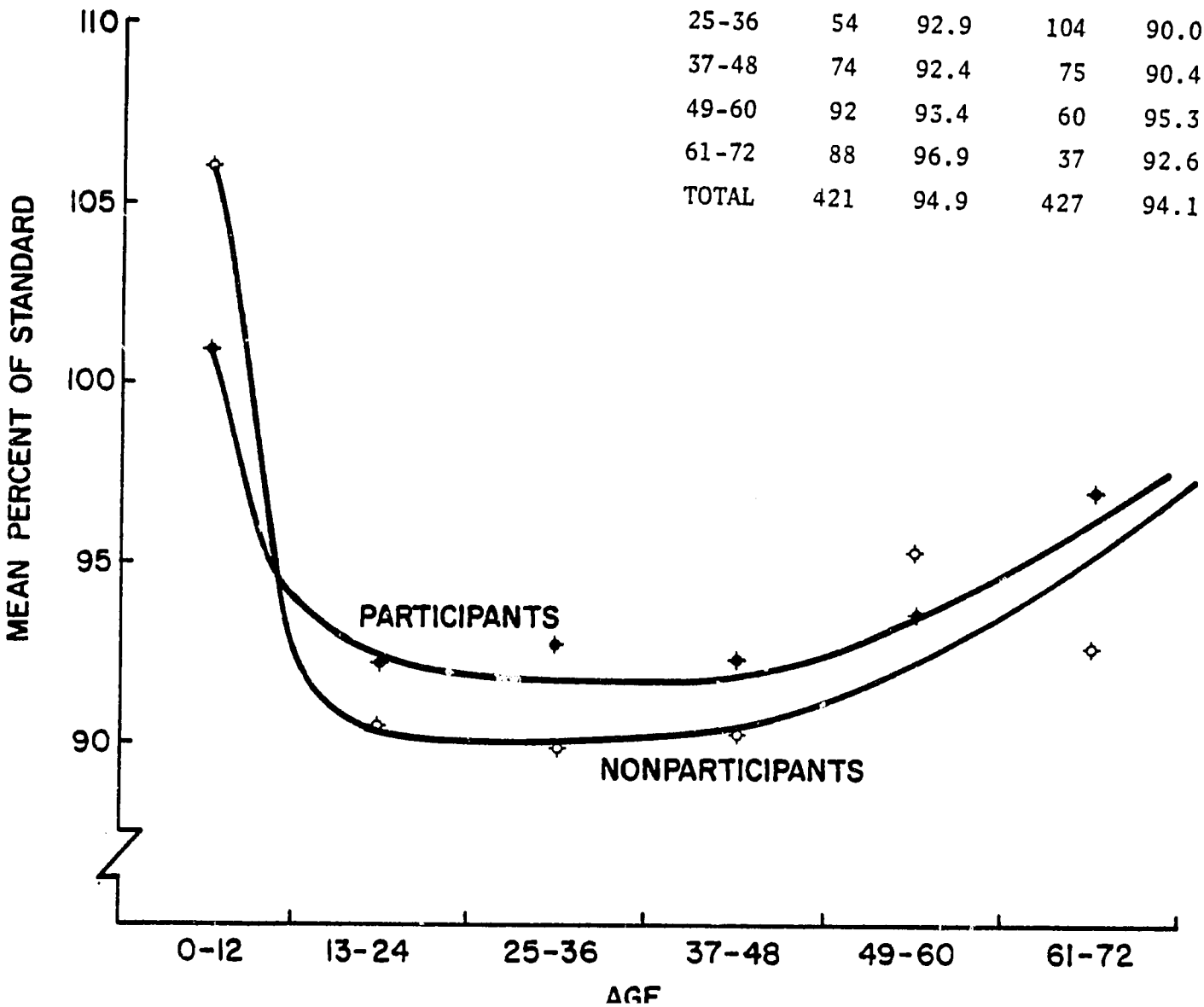


FIGURE 1B

MEAN PERCENT OF STANDARD VS. AGE, COLOMBIA STANDARD

	PARTICIPANTS		NONPARTICIPANTS	
AGE	N	PCT	N	PCT
0-12	64	96.8	82	99.1
13-24	50	91.0	70	89.2
25-36	54	93.0	104	90.2
37-48	74	92.0	75	90.5
49-60	92	91.9	60	93.7
61-72	88	91.7	37	87.8
TOTAL	422	92.7	428	92.1

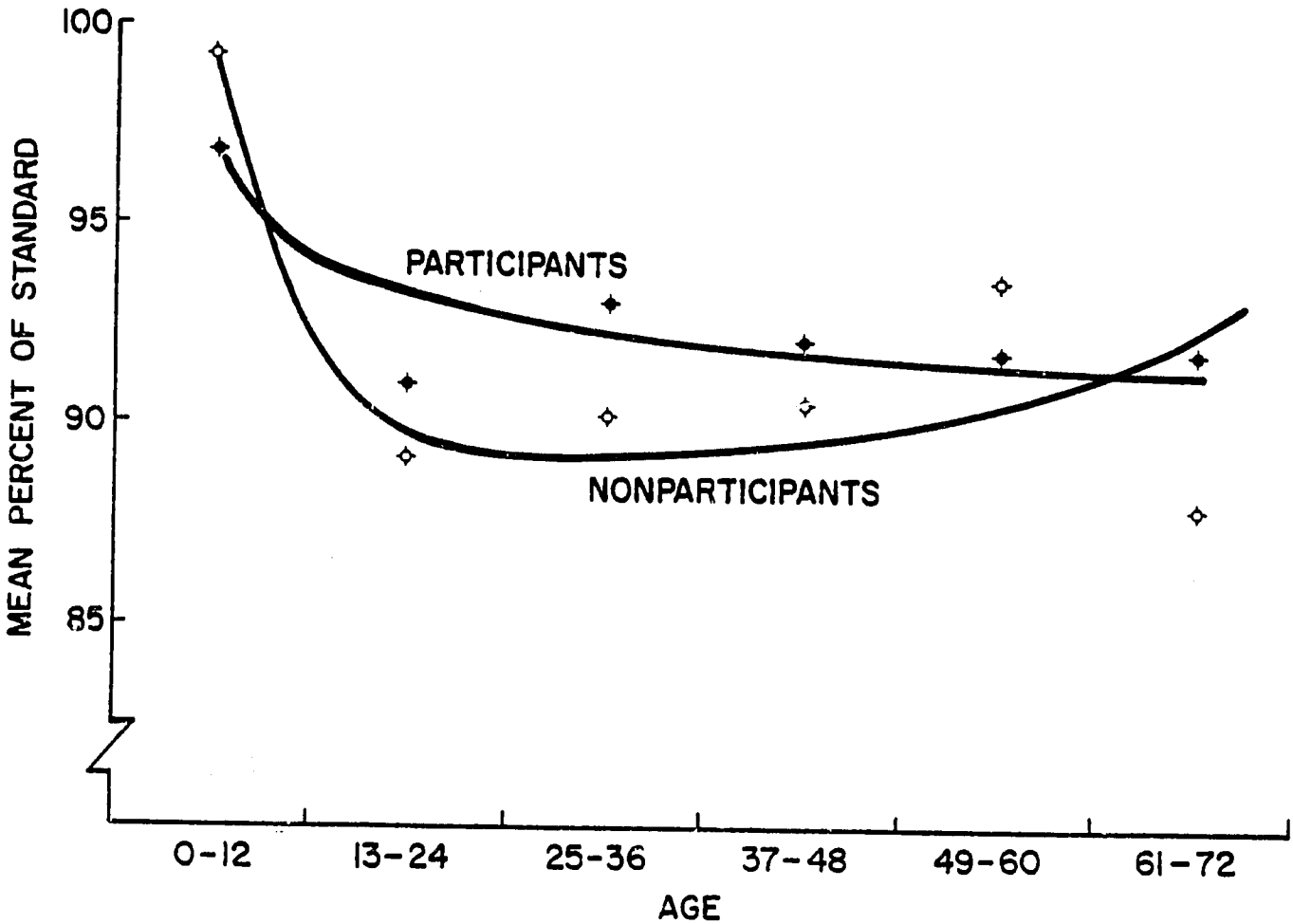


FIGURE 1C

MEAN PERCENT OF STANDARD VS. AGE, HARVARD STANDARD

	PARTICIPANTS		NONPARTICIPANTS	
AGE	N	PCT	N	PCT
0-12	64	93.3	83	97.1
13-24	60	87.9	70	86.5
25-36	54	89.9	104	87.2
37-48	74	87.6	75	85.7
49-60	92	86.8	60	88.6
61-72	88	86.9	37	83.3
TOTAL	422	88.5	429	88.6

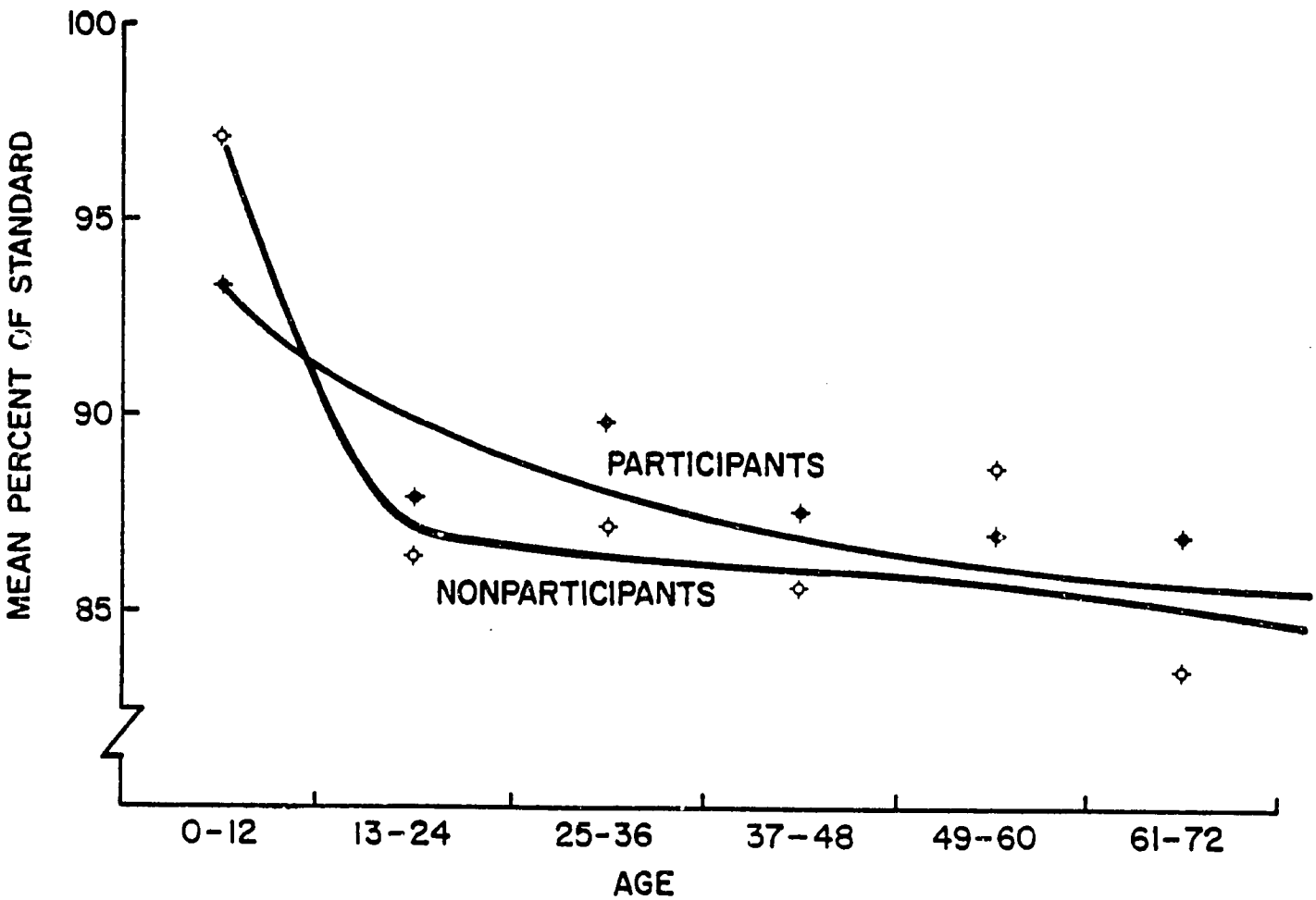


FIGURE 2A

MEAN DAYS OF DIARRHEA IN LAST 15 DAYS VS. AGE

	PARTICIPANTS		NONPARTICIPANTS	
AGE	N	PCT	N	PCT
0-12	66	1.26	84	1.86
13-24	50	1.70	71	2.97
25-36	53	1.26	105	1.65
37-48	73	1.19	74	.89
49-60	92	.36	60	1.05
61-72	89	.57	38	1.11
TOTAL	423	.96	432	1.65

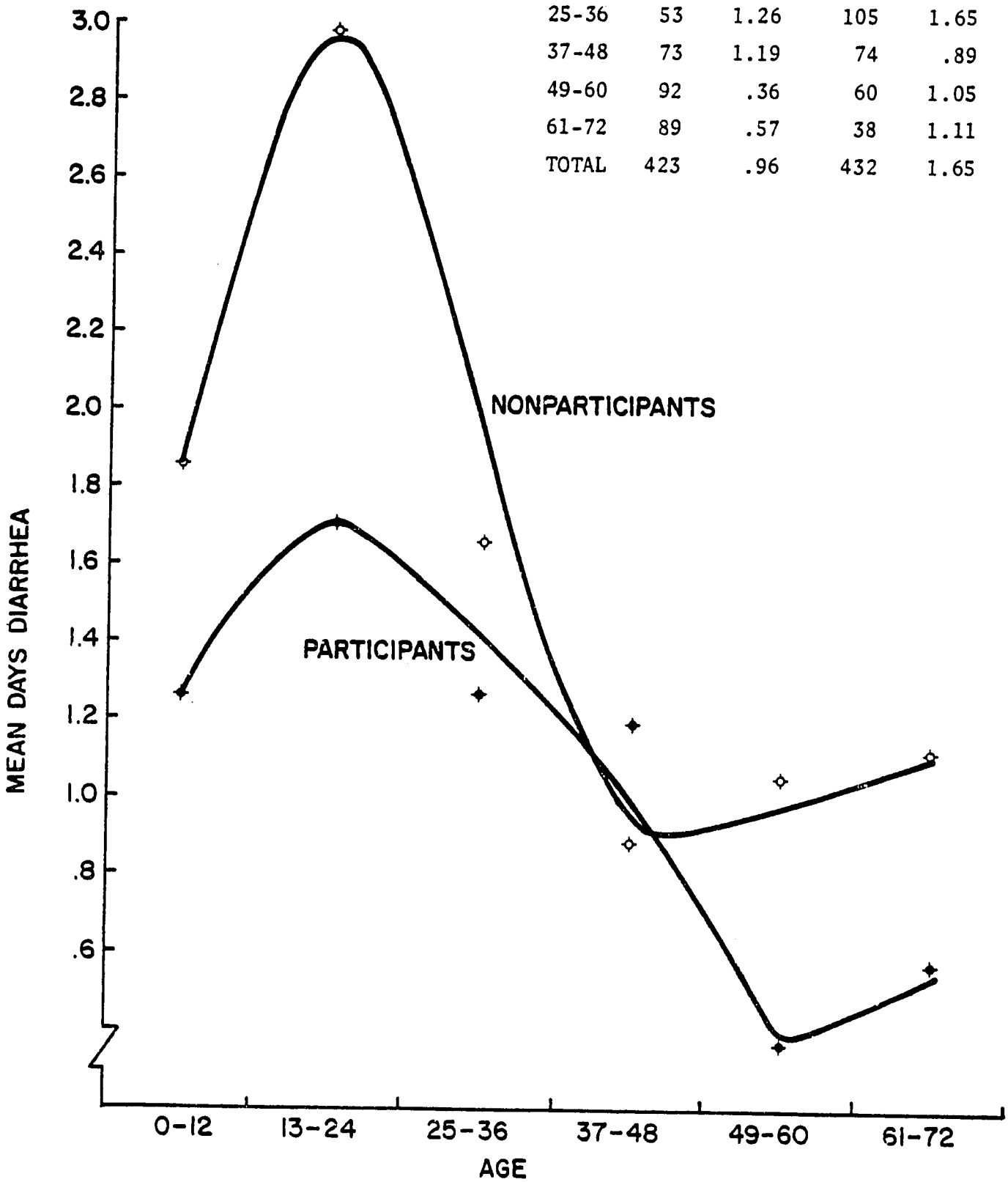


FIGURE 2B

MEAN DAYS OF OTHER SICKNESS IN LAST 15 DAYS VS. AGE

	PARTICIPANTS		NONPARTICIPANTS	
AGE	N	PCT	N	PCT
0-12	66	3.70	84	2.49
13-24	50	4.10	70	4.11
25-36	53	4.64	105	3.20
37-48	73	2.47	74	3.86
49-60	92	1.66	60	3.23
61-72	90	1.79	58	1.92
TOTAL	424	2.80	431	3.22

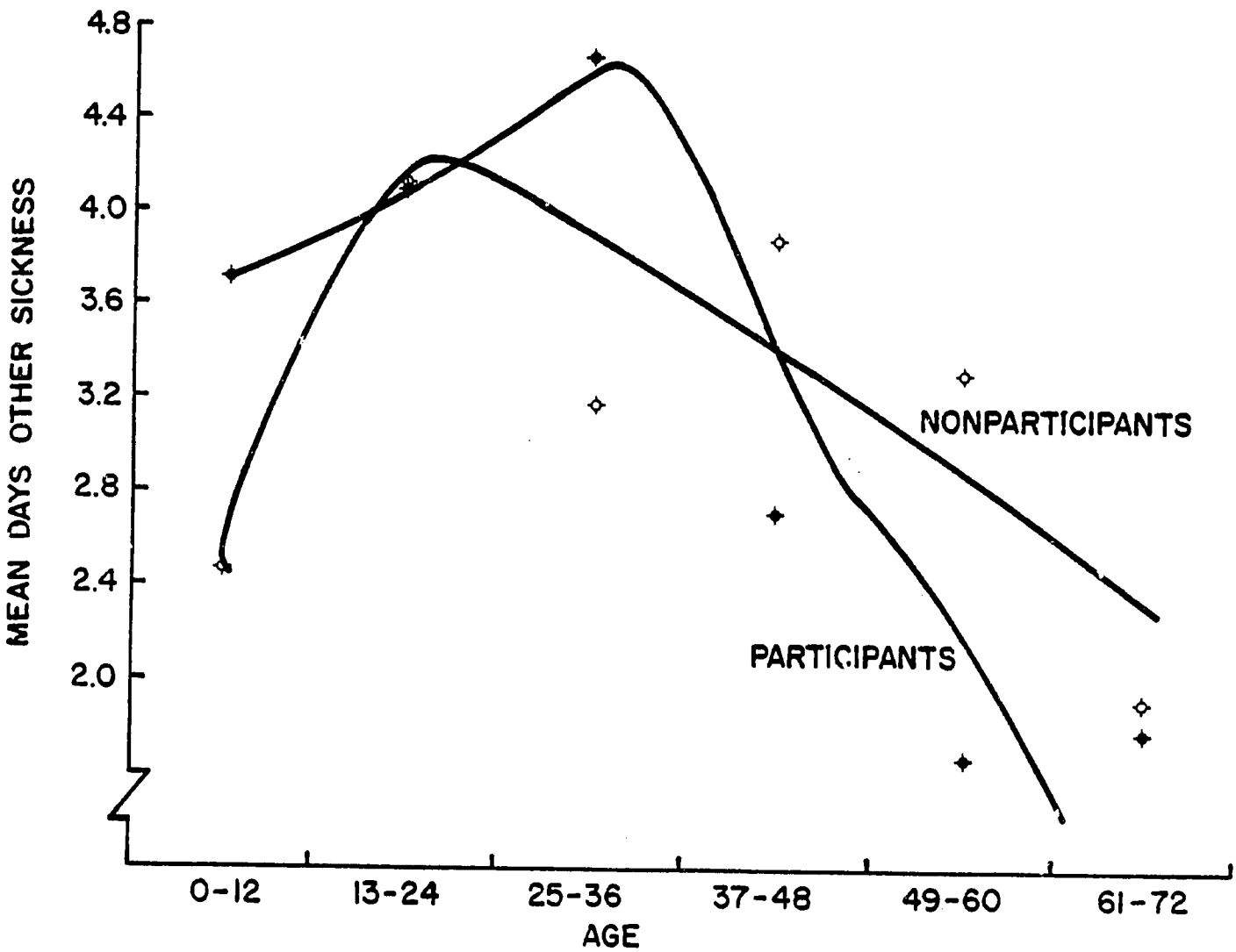


TABLE 1

PARTICIPATION STATUS BY CHILD'S AGE

	Child Less Than 25 Months	Child is 25 Months or Older
Mother and Child Participated	--	310
Mother Participated Child Did Not	116	66
Neither Mother Nor Child Participated	155	212

TABLE 2A

AGE OF MOTHER VERSUS PARTICIPATION OF MOTHER

	Age of Mother in Years					
	15-24	25-29	30-34	35-39	40-56	TOTAL
Participants	52 (20.3%)	57 (22.3%)	62 (24.2%)	47 (18.4%)	38 (14.8%)	256 (100%)
Nonparticipants	107 (46.1%)	56 (24.1%)	29 (12.5%)	20 (8.6%)	20 (8.6%)	232 (100%)
TOTAL	159 (32.6%)	113 (23.2%)	91 (18.6%)	67 (13.7%)	58 (11.9%)	488 (100%)

X^2 = Chi-Square = 46.4 DF = 4 Significant at any level

TABLE 2B

TENURE IN CANDELARIA VERSUS PARTICIPATION

	Years Lived in Candelaria					
	1-2	3-5	6-10	11-20	Over 20	TOTAL
Participants	1* (.4%)	25 (9.7%)	73 (28.4%)	86 (33.5%)	72 (28.0%)	257 (100%)
Nonparticipants	70 (30.4%)	69 (30.0%)	30 (13.0%)	31 (13.5%)	30 (13.0%)	230 (100%)
TOTAL	71 (14.6%)	94 (19.3%)	103 (21.1%)	117 (24.0%)	102 (20.9%)	487 (100%)

X^2 = 171.08* DF = 4 Significant at any level

* The presence of only one case in participant cell: 1 to 2 violates the assumptions of Chi-Square

TABLE 2C

PLACE OF ORIGIN AND PARTICIPATION

	Origin				
	Town	City	Rural	Candelaria	Totals
Participation	128 (48.5%)	57 (21.6%)	45 (17.0%)	34 (12.9%)	264 (100%)
Nonparticipation	102 (44.2%)	60 (26.0%)	44 (19.0%)	25 (10.8%)	231 (100%)
Totals	230 (46.5%)	117 (23.6%)	90 (18.0%)	50 (11.9%)	495 (100%)

$X^2 = 2.21$ DF = 3 Significant at .52 level

TABLE 2D

PARTICIPATION IN OTHER PROGRAMS SINCE 1974 VERSUS PARTICIPATION

Prenatal Program

	Yes	No	Totals
Participation	109 (41.6%)	153 (58.4%)	262
Nonparticipation	90 (38.8%)	142 (61.2%)	232
Totals	199 (40.3%)	295 (59.7)	494

X^2 = .40 DF = 1 Significant at .52

Family Planning

	Yes	No	Totals
Participation	87 (32.8%)	178 (67.2%)	265
Nonparticipation	54 (23.3%)	178 (76.7%)	232
Totals	141 (28.4%)	356 (71.6%)	497

X^2 = 5.56 DF = 1 Significant at .02

Food Distribution (PINA)

	Yes	No	Totals
Participation	10 (3.8%)	355 (96.2%)	265
Nonparticipation	2 (.9%)	231 (99.1%)	233
Totals	12 (2.4%)	486 (97.6%)	498

X^2 = 4.48* Significant at .03

Growth and Development

	Yes	No	Totals
Participation	53 (20.0%)	212 (80.0%)	265
Nonparticipation	41 (17.6%)	192 (82.4%)	233
Totals	94 (18.9%)	404 (81.1%)	498

X^2 = .47 DF = 1 Significant at .49

* Too few cases in cell No-Yes violates assumptions of Chi-Square

TABLE 2E

SIZE OF FAMILY MEASURES VERSUS PARTICIPATION

Children Under 15

	One	Two	Three	Four	Five	6 - 10	Totals
Participation	13 (4.9%)	59 (22.3%)	51 (19.2%)	44 (16.6%)	40 (15.1%)	58 (21.9%)	265
Nonparticipation	84 (36.1%)	48 (20.6%)	40 (17.2%)	28 (12.0%)	21 (9.0%)	12 (5.2%)	233
Totals	97 (19.5%)	107 (21.5%)	91 (18.3%)	72 (14.5%)	61 (12.2%)	70 (14.1%)	498

X^2 = 92.46 DF = 5 Significant at any level

Families in Household

	One	Two	Three	4 - 6	Totals
Participation	124 (46.8%)	79 (29.8%)	39 (14.7%)	23 (8.7%)	265
Nonparticipation	65 (27.9%)	84 (36.1%)	57 (24.5%)	27 (11.6%)	233
Totals	189 (38.0%)	163 (32.7%)	96 (19.3%)	50 (10.0%)	498

X^2 = 20.29 DF = 3 Significant at .0001

Size of Nuclear Family

	Up to 4	5 - 6	7 - 9	Over 10	Totals
Participation	70 (26.6%)	76 (28.9%)	79 (30.0%)	38 (14.4%)	263
Nonparticipation	116 (49.8%)	65 (27.9%)	38 (16.3%)	14 (6.0%)	233
Totals	186 (37.5%)	141 (28.4%)	117 (23.6%)	52 (10.5%)	496

X^2 = 36.00 DF = 3 Significant at any level

Size of Household

	Up to 5	6 & 7	8 & 9	10 & 11	12 - 14	15 - 19	Over 20	Totals
Participation	38 (14.4%)	51 (19.4%)	36 (13.7%)	40 (15.2%)	45 (17.1%)	30 (11.4%)	23 (8.7%)	263
Nonparticipation	26 (11.2%)	37 (15.9%)	39 (16.8%)	32 (13.8%)	54 (23.3%)	30 (12.9%)	14 (6.0%)	232
Totals	64 (12.9%)	88 (17.8%)	75 (15.2%)	72 (14.5%)	99 (20.0%)	60 (12.1%)	37 (7.5%)	495

X^2 = 6.58 DF = 6 Significant at .36 level

TABLE 2F

EDUCATION LEVELS VERSUS PARTICIPATION

Mother's Education

	None	Primary	High/Tech.	Totals
Participation	29 (11.0%)	209 (79.5%)	25 (9.5%)	263
Nonparticipation	18 (7.7%)	185 (79.4%)	30 (12.9%)	233
Totals	47 (9.5%)	394 (79.4%)	55 (11.1%)	496

X^2 = 2.69 DF = 2 Significant at .26 level

Mother's Literacy

	Neither Read Nor Write	Read	Read & Write	Totals
Participation	41 (15.6%)	45 (17.1%)	177 (67.3%)	263
Nonparticipation	31 (13.4%)	39 (16.8%)	162 (69.8%)	232
Totals	72 (14.5%)	84 (17.0%)	339 (68.5%)	495

X^2 = .54 DF = 2 Significant at .76 level

Father's Education

	None	Primary	High/Tech. or University	Totals
Participation	17 (7.5%)	187 (82.7%)	22 (9.7%)	226
Nonparticipation	19 (10.8%)	129 (73.3%)	28 (15.9%)	176
Totals	36 (9.0%)	316 (78.6%)	50 (12.4%)	402

X^2 = 5.34 DF = 2 Significant at .07 level

TABLE 2G

ACCESS TO SEWER, WATER, AND STOVE

House Connected to Central Sewage Disposal System?

	Yes	No	Total
NUMBER	479	18	497
PERCENTAGE	(96.4%)	(3.6%)	

House Has Piped Water Supply?

	Yes	No	Total
NUMBER	484	14	498
PERCENTAGE	(97.2%)	(2.8%)	

Stove Owned?

	Yes	No	Total
NUMBER	486	12	498
PERCENTAGE	(97.6%)	(2.4%)	

TABLE 2H

EXPENDITURES VERSUS PARTICIPATION

Weekly Food Expenditures (Pesos)

	100-200	200-300	300-400	400-500	500-700	700-1000	Totals
Participation	8 (3.3%)	19 (7.8%)	47 (19.3%)	57 (23.4%)	82 (33.6%)	31 (12.7%)	244
Nonparticipation	7 (3.2%)	23 (10.6%)	57 (26.4%)	55 (25.5%)	54 (25.0%)	20 (9.3%)	216
Totals	15 (3.3%)	42 (9.1%)	104 (22.6%)	112 (24.3%)	136 (29.6%)	51 (11.1%)	460

$X^2 = 7.90$ DF = 5 Significant at .16 Level

Monthly Miscellaneous Expenditures (Pesos)

	100-300	300-500	500-700	700-1000	1000-2000	Totals
Participation	87 (45.8%)	42 (22.1%)	22 (11.6%)	30 (15.8%)	9 (4.7%)	190
Nonparticipation	89 (50.9%)	44 (25.1%)	15 (8.6%)	12 (6.9%)	15 (8.6%)	175
Totals	176 (48.2%)	86 (23.6%)	37 (10.1%)	42 (11.5%)	24 (6.6%)	365

$X^2 = 10.00$ DF = 4 Significant at .04 Level

TABLE 2I

INCOME AND PARTICIPATION

	Monthly Family Income (pesos)					
	100-300	300-500	500-700	700-1000	1000-2000	Totals
Participation	14 (6.3%)	49 (21.9%)	78 (34.8%)	59 (26.3%)	24 (10.7%)	224
Nonparticipation	11 (5.6%)	56 (28.7%)	77 (39.5%)	38 (19.5%)	13 (6.7%)	195
Totals	25 (6.0%)	105 (25.1%)	155 (37.0%)	97 (23.2%)	37 (8.8%)	419

$X^2 = 6.67$ DF = 4 Significant at .15 Level

	Subsidy		
	Yes	No	Totals
Participation	170 (65.1%)	91 (34.9%)	261
Nonparticipation	109 (47.4%)	121 (52.6%)	230
Totals	279 (56.8%)	212 (43.2%)	491

$X^2 = 15.69$ DF = 1 Significant at .0001 Level

	Subsidy Amount (Pesos)					
	0-100	100-200	200-300	300-400	400-1000	Totals
Participation	4 (2.4%)	31 (18.6%)	43 (25.7%)	32 (19.2%)	57 (34.1%)	167
Nonparticipation	12 (11.0%)	37 (33.9%)	18 (16.5%)	19 (17.4%)	23 (21.1%)	109
Totals	16 (5.8%)	68 (24.6%)	61 (22.1%)	51 (18.5%)	80 (29.0%)	276

$X^2 = 21.29$ DF = 4 Significant at .0003 Level

TABLE 2J

OCCUPATION VERSUS PARTICIPATION

Occupation of Household Head

	Sugar Cane Cutter	Sugar Mill	Own Business	Other Employment	Public Employee	Other	Unemployment	Totals
Participation	107 (41.8%)	66 (25.8%)	31 (12.1%)	30 (3.1%)	8 (3.1%)	7 (2.7%)	7 (2.7%)	256
Nonparticipation	110 (50.0%)	41 (18.6%)	20 (9.1%)	22 (10.0%)	7 (3.2%)	18 (8.2%)	2 (.9%)	220
Totals	217 (45.6%)	107 (22.5%)	51 (10.7%)	52 (10.9%)	15 (3.2%)	25 (5.3%)	9 (1.9%)	476

$X^2 = 14.53$ DF = 6 Significant at .02 Level

Occupation of Mother

	Works less than 3 Days/Wk	Works a Full Week	Does Not Work - Stays Home	Totals
Participation	5 (1.9%)	21 (7.9%)	239 (90.2%)	265
Nonparticipation	3 (1.3%)	13 (5.6%)	217 (93.1%)	233
Totals	8 (1.6%)	34 (6.8%)	456 (91.6%)	498

$X^2 = 1.39$ DF = 2 Significant at .49 Level

TABLE 3A

AGE, BIRTH ORDER VERSUS PARTICIPATION

Age (Months)

	0 - 6	7 - 12	13 - 18	19 - 24	25 - 30	31 - 36	37 - 42	43 - 48	49 - 54	55 - 60	61 - 66	67 - 72	TOTAL
Participants	34 (8.0%)	32 (7.5%)	25 (5.9%)	25 (5.9%)	28 (6.6%)	26 (6.1%)	36 (8.5%)	38 (8.9%)	40 (9.4%)	52 (12.2%)	43 (10.6%)	45 (10.6%)	426
Nonparticipants	50 (11.5%)	34 (7.9%)	35 (8.1%)	36 (8.3%)	62 (14.3%)	43 (9.9%)	36 (8.3%)	39 (9.0%)	27 (6.2%)	33 (7.6%)	21 (4.8%)	17 (3.9%)	433
Totals	84 (9.8%)	66 (7.7%)	60 (7.0%)	61 (7.1%)	90 (10.5%)	69 (8.0%)	72 (8.4%)	77 (9.0%)	67 (7.8%)	85 (9.9%)	66 (7.7%)	62 (7.2%)	859

$X^2 = 51.89$ DF = 11 Significant at any Level

Birth Order

	1 - 2	3 - 5	Over 5	Total
Participants	142 (33.6%)	155 (36.6%)	126 (29.8%)	423
Nonparticipants	240 (55.7%)	127 (29.5%)	64 (14.8%)	431
Total	382 (44.7%)	282 (33.0%)	190 (22.2%)	854

$X^2 = 48.08$ DF = 2 Significant at any Level

TABLE 3B

SEX VERSUS PARTICIPATION

	SEX		
	Male	Female	Totals
Participation	210 (49.3%)	216 (50.7%)	426
Nonparticipation	214 (49.5%)	218 (50.5%)	432
Totals	424 (49.4%)	434 (50.6%)	858

X^2 = .049 DF = 1 Significant at the .94 Level

TABLE 3C

BREASTFEEDING VERSUS PARTICIPATION

BREASTFEEDING

	Never	0 to 1 Month	2 to 4 Months	5 to 9 Months	10 Months or More	Currently	Totals
Participation	50 (11.9%)	31 (7.4%)	73 (17.4%)	63 (15.0%)	137 (32.7%)	65 (15.5%)	419
Nonparticipation	61 (14.4%)	49 (11.5%)	84 (19.8%)	52 (12.2%)	108 (25.4%)	71 (16.7%)	425
Totals	111 (13.2%)	80 (9.5%)	157 (18.6%)	115 (13.6%)	245 (29.0%)	136 (16.1%)	844

X^2 = 10.62 DF = 5 Significant at .059 Level

BREASTFED CHILDREN UNDER 24 MONTHS OF AGE

	Never	0 to 1 Months	2 to 4 Months	5 to 9 Months	10 Months or More	Currently	Totals
Participation	12 (10.4%)	6 (5.2%)	15 (13.0%)	7 (6.1%)	11 (9.6%)	64 (55.1%)	115
Nonparticipation	21 (13.5%)	19 (12.3%)	26 (16.8%)	11 (7.1%)	12 (7.7%)	66 (42.6%)	155
Totals	33 (12.2%)	25 (9.3%)	41 (15.2%)	18 (6.7%)	23 (8.5%)	130 (48.1%)	270

X^2 = 7.36 DF = 5 Significant at .19 Level

BREASTFED CHILDREN UNDER 25 MONTHS OF AGE

	Never	0 to 1 Month	2 to 4 Months	5 to 9 Months	10 Months or More	Totals
Participation	38 (12.5%)	25 (8.2%)	58 (19.1%)	56 (18.4%)	127 (41.8%)	304
Nonparticipation	40 (14.8%)	30 (11.1%)	58 (21.5%)	41 (15.2%)	101 (37.4%)	270
Totals	78 (13.6%)	55 (9.6%)	116 (20.2%)	97 (16.9%)	228 (39.7%)	574

X^2 = 3.79 DF = 4 Significant at .44 Level

TABLE 3D

IMMUNIZATION HISTORY VERSUS PARTICIPATION

	None	One*	Two*	All*	Totals
Participation	88 (21.5%)	44 (10.8%)	54 (13.2%)	223 (54.5%)	409
Nonparticipation	139 (32.9%)	42 (10.0%)	34 (8.1%)	207 (49.1%)	422
Totals	227 (27.3%)	86 (10.3%)	88 (10.6%)	430 (51.7%)	831

X^2 = 16.45 DF = 3 Significant at .0009 Level

*Note: "One" means immunization for one of the following, DPT, BCG or Polio.

"Two" means immunization for two of the above.

"All" means all three.

TABLE 4A

WEIGHT FOR AGE STANDARDS USED IN CANDELARIA REVISITED

AGE-IN-MONTHS	CANDELARIA-STD	HARVARD-STD	COLOM-STD-WT-FEM	COLOM-STD-WT-MAL
0	.00	3.40	3.00	3.26
1	3.50	4.30	3.95	4.35
2	4.50	5.00	4.70	5.20
3	5.19	5.70	5.35	5.90
4	5.88	6.30	6.00	6.60
5	6.50	6.90	6.60	7.12
6	7.12	7.40	7.10	7.60
7	7.61	8.00	7.58	8.05
8	8.09	8.40	8.03	8.50
9	8.46	8.90	8.37	8.85
10	8.83	9.30	8.69	9.17
11	9.11	9.60	8.99	9.46
12	9.39	9.90	9.28	9.74
13	9.64	10.20	9.55	10.00
14	9.88	10.40	9.81	10.24
15	10.13	10.60	10.06	10.48
16	10.34	10.80	10.30	10.70
17	10.54	11.00	10.53	10.90
18	10.75	11.30	10.75	11.10
19	10.96	11.50	10.96	11.30
20	11.16	11.70	11.16	11.50
21	11.37	11.90	11.35	11.70
22	11.58	12.05	11.53	11.88
23	11.79	12.20	11.70	12.06
24	12.00	12.40	11.87	12.23
25	12.20	12.60	12.03	12.40
26	12.40	12.70	12.19	12.57
27	12.60	12.90	12.35	12.74
28	12.77	13.10	12.51	12.90
29	12.93	13.30	12.67	13.06
30	13.10	13.50	12.83	13.22
31	13.23	13.70	12.98	13.38
32	13.37	13.80	13.13	13.53
33	13.50	14.00	13.28	13.68
34	13.63	14.20	13.42	13.83
35	13.77	14.40	13.56	13.99
36	13.90	14.50	13.70	14.13
37	14.05	14.70	13.84	14.28
38	14.21	14.85	13.98	14.43
39	14.36	15.00	14.12	14.57
40	14.49	15.20	14.26	14.71
41	14.62	15.35	14.39	14.84
42	14.75	15.50	14.52	14.97
43	14.87	15.70	14.65	15.10
44	15.00	15.85	14.78	15.23
45	15.12	16.00	14.92	15.36
46	15.25	16.20	15.06	15.50
47	15.37	16.35	15.20	15.64
48	15.50	16.50	15.34	15.78
49	15.63	16.65	15.48	15.93
50	15.75	16.80	15.62	16.08
51	15.88	16.95	15.76	16.23
52	16.00	17.10	15.91	16.38
53	16.13	17.25	16.06	16.54
54	16.25	17.40	16.21	16.70
55	16.36	17.60	16.37	16.86
56	16.47	17.70	16.53	17.02
57	16.58	17.90	16.70	17.19
58	16.68	18.05	16.87	17.34
59	16.79	18.25	17.04	17.51
60	16.90	18.40	17.21	17.68
61	17.02	18.60	17.39	17.86
62	17.13	18.80	17.57	18.04
63	17.25	19.00	17.75	18.22
64	17.37	19.20	17.93	18.40
65	17.48	19.40	18.11	18.59
66	17.60	19.60	18.30	18.78
67	17.71	19.80	18.49	18.97
68	17.82	20.00	18.68	19.16
69	17.93	20.20	18.87	19.35
70	18.03	20.40	19.07	19.54
71	18.14	20.60	19.27	19.73
72	18.25	20.80	19.47	19.93

TABLE 4B

HEIGHT FOR AGE STANDARDS USED IN CANDELARIA REVISITED

AGE-IN-MONTHS	HARVARD-HGT-STD	COLOM-STD-HT-FEM	COLOM-STD-HT-MAL
0	50.40	48.40	49.50
1	54.80	53.80	55.20
2	58.00	56.40	59.00
3	60.00	60.00	61.20
4	62.30	62.00	63.20
5	64.40	64.00	64.80
6	65.70	65.60	66.70
7	67.60	67.10	68.00
8	69.20	68.50	69.50
9	70.70	69.80	71.00
10	72.20	71.10	72.20
11	73.50	72.40	73.50
12	74.70	73.50	74.70
13	76.00	74.60	75.80
14	77.10	75.60	77.00
15	78.10	76.60	78.10
16	79.30	77.70	79.20
17	80.50	78.70	80.20
18	81.40	79.60	81.20
19	82.70	80.60	82.20
20	83.50	81.20	83.20
21	84.40	82.20	84.10
22	85.40	83.30	85.00
23	86.30	84.20	85.90
24	87.10	84.90	86.60
25	88.00	85.80	87.20
26	88.80	86.50	88.20
27	89.70	87.30	88.90
28	90.40	88.10	89.60
29	91.30	88.80	90.30
30	91.80	89.50	91.00
31	92.60	90.30	91.70
32	93.30	90.90	92.30
33	94.00	91.60	93.00
34	94.70	92.30	93.70
35	95.30	93.00	94.30
36	96.00	93.70	95.00
37	96.60	94.30	95.60
38	97.30	95.00	96.20
39	97.90	95.60	96.80
40	98.40	96.20	97.40
41	99.10	96.80	98.00
42	99.70	97.40	98.50
43	100.30	98.00	99.10
44	101.00	98.60	99.70
45	101.60	99.10	100.20
46	102.10	99.70	100.80
47	102.70	100.30	101.20
48	103.30	100.80	101.90
49	103.80	101.20	102.20
50	104.50	101.90	102.90
51	105.20	102.40	103.20
52	105.70	103.00	104.00
53	106.20	103.50	104.30
54	106.80	104.00	104.90
55	107.30	104.60	105.50
56	107.90	105.10	105.90
57	108.20	105.60	106.20
58	108.50	106.10	106.90
59	108.70	106.60	107.40
60	109.00	107.10	107.90
61	.00	107.60	108.40
62	.00	108.10	108.90
63	.00	108.60	109.40
64	.00	109.10	109.80
65	.00	109.60	110.30
66	.00	110.00	110.70
67	.00	110.30	111.20
68	.00	110.90	111.60
69	.00	111.40	112.00
70	.00	111.90	112.50
71	.00	112.30	112.90
72	.00	112.80	113.40

TABLE 4C

WEIGHT FOR HEIGHT STANDARD USED IN CANDELARIA REVISITED

HEIGHT-CMS	WEIGHT-KARVARD
52	3.80
53	4.00
54	4.30
55	4.60
56	4.80
57	5.00
58	5.19
59	5.50
60	5.69
61	6.00
62	6.30
63	6.60
64	6.89
65	7.19
66	7.50
67	7.80
68	8.10
69	8.39
70	8.69
71	9.00
72	9.19
73	9.50
74	9.69
75	9.89
76	10.19
77	10.39
78	10.60
79	10.80
80	11.00
81	11.19
82	11.39
83	11.60
84	11.80
85	12.00
86	12.19
87	12.39
88	12.60
89	12.80
90	13.10
91	13.39
92	13.60
93	13.80
94	14.00
95	14.30
96	14.50
97	14.69
98	15.00
99	15.30
100	15.60
101	15.80
102	16.10
103	16.39
104	16.69
105	17.00
106	17.30
107	17.60
108	18.00

Table 5A

SAMPLE REGRESSION MODELS USING DIFFERENT STANDARDS AND FUNCTIONAL FORMS

	WEIGHT/WEIGHT (AGE)									HEIGHT/HEIGHT (AGE)						WI/WI (HI)		
	CANDELARIA			COLOMBIA			HARVARD			COLOMBIA			HARVARD			HARVARD		
	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG
FORM A	.108			.018			.022		(.0001)	.005		(.14)	.014		(.0069)	.006		(.106)
INVERSE OF AGE SQUARED		.286	.000		.105	.0001		.115	.000		.019	.082		.031	.005		.029	.201
PARTICIPATION		-.011	.215		-.007	.420		-.0004	.963		.003	.387		.005	.172	-.011		.084
CONSTANT		.941	.000		.923	000		.881	.000		.953	.000		.938	.000		.995	.000
FORM B	.140			.032			.045			.013		(.004)	.037			.008		(.046)
INVERSE OF AGE		.312	.000		.136	.000		.158	.000		.032	.002		.052	.000		.039	.070
PARTICIPATION		-.014	.118		-.008	.331		-.002	.795		.003	.449		.005	.200		-.011	.075
CONSTANT		.928	.000		.917	.000		.874	.000		.957	.000		.935	.000		.993	.000
FORM C	.140			.041			.065			.021		(.0002)				.009		(.031)
INVERSE OF SQ.RT. OF AGE		.314	.000		.154	.000		.190	.000		.042	.0001		.070	.000		.043	.043
PARTICIPATION		-.017	.056		-.010	.233		-.005	.567		.002	.557		.004	.252		-.012	.065
CONSTANT		.884	.000		.894	.000		.845	.000		.945	.000		.923	.000		.987	.000
FORM D	.1000			.038			.070			.024			.082			.008		(.008)
NATURAL LOG OF AGE		-.046	.000		-.026	.000		-.034	.000		-.008	.000		-.015	.000		-.007	.065
PARTICIPATION		-.019	.035		-.012	.158		-.008	.345		.001	.705		.003	.352		-.012	.058
CONSTANT		1.106	.000		1.01	.000		1.002	.000		.980	.000		.986	.000		1.018	.000

Table 5A (continued)

	WEIGHT/WEIGHT (AGE)									HEIGHT/HEIGHT (AGE)						WT/WT (HT)		
	CANDELARIA			COLOMBIA			HARVARD			COLOMBIA			HARVARD			HARVARD		
	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG
FORM E	.053			.029			.060			.023		(.0001)	.080			.006		(.091)
SQUARE ROOT OF AGE		-.016	.000		-.011	.000		-.004	.000		-.004	.000		-.007	.000		-.002	.165
PARTICIPATION		-.018	.052		-.013	.134		-.010	.248		.0009	.795		.003	.464		-.012	.060
CONSTANT		1.046	.000		1.000	.000		.977	.000		.976	.000		.980	.000		1.010	.000
FORM F	.025			.020			.047			.015		(.002)	.064			.005		(.151)
AGE		-.001	.000		-.0009	.000		-.001	.000		-.0003	.0007		-.0007	.000		-.0002	.337
PARTICIPATION		-.016	.096		-.012	.151		-.010	.245		.001	.761		.003	.478		-.012	.067
CONSTANT		.991	.000		.962	.000		.937	.000		.965	.000		.963	.000		1.002	.000
FORM G	.006		(.095)	.012		(.0075)	.031			.007		(.057)	.038			.004		(.215)
AGE SQUARED		$-.6\times10^{5}$	.043		-9×10^{5}	.002		$-.1\times10^{4}$	.000		$-.3\times10^{5}$	.029		$-.8\times10^{5}$	.000	$-.1\times10^{5}$		.638
PARTICIPATION		-.012	.229		-.011	.193		-.009	.278		.002	.635		.003	.436		-.012	.080
CONSTANT		.962	.000		.945	.000		.915	.000		.959	.000		.952	.000		.998	.000
FORM H	.002		(.520)	.008		(.025)	.023			.004		(.215)	.025		(.0008)	.004		(.218)
AGE CUBED		$-.4\times10^{7}$	.399		$-.1\times10^{8}$	.008		$-.2\times10^{8}$	.000		$-.2\times10^{7}$	.144		$-.1\times10^{6}$		$-.1\times10^{7}$		.756
PARTICIPATION		-.009	.346		-.011	.221		-.008	.355		.007	.537		.003	.317		-.011	.086
CONSTANT		.953	.000		.940	.000		.907	.000		.957	.000		.947	.000		.996	.000

Table 5B

REGRESSIONS WITH MORE COMPLEX FUNCTIONAL FORMS

	WEIGHT/WEIGHT (AGE)									HEIGHT/HEIGHT (AGE)						WT/WT (HT)		
	CANDELARIA			COLOMBIA			HARVARD			COLOMBIA			HARVARD			HARVARD		
	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG	R^2	COEFF	SIG
MODEL I	.122			.034			.063			.037			.104			.009		(.074)
AGE		-.009	.000		-.004	.000		-.004	.000		-.002	.000		-.003	.000		-.001	.050
AGE SQ.		.0001	.000		.0004	.0005		.00004	.0001		.00002	.000		.00003	.000	1×10^{-4}	-1×10^{-4}	.076
PARTICIPATION		-.005	.590		-.009	.316		-.006	.493		.003	.405		.005	.201		-.010	.108
MODEL II	.164			.059		.081				.038			.104			.016		(.014)
AGE		-.022	.000		-.012	.000		-.011	.000		-.003	.002		-.003	.002		-.005	.003
AGE SQ.		.0006	.000		.0003	.000		.0003	.000		$.5\times10^{-4}$	.225		$.5\times10^{-4}$	.225		.0001	.009
AGE CUB.		-.00004	.000		$-.2\times10^{-5}$	.000		-2×10^{-5}	.0001		$-.3\times10^{-6}$	.232		$-.1\times10^{-6}$	.750		$-.1\times10^{-5}$	.018
PARTICIPATION		-.004	.634		-.008	.334		-.005	.513		.003	.397		-.005	.202		-.010	.119
MODEL III	.152			.050			.085			.036			.105			.010		(.045)
INV AGE		.613	.000		.484	.000		.651	.000		.183	.000		.298	.000		.129	.060
INV AGE SQ.		-.330	.001		-.380	.001		-.538	.000		-.165	.000		-.266	.000		-.101	.166
PARTICIPATION		-.016	.075		-.010	.222		-.005	.522		.002	.596		.004	.237		-.012	.065

TABLE 6A

MODEL I: TEST OF SIGNIFICANCE
OF PARTICIPATION IN EXPLAINING NUTRITIONAL STATUS

Dependent Variable = Days of Diarrhea
in Last 15 Days

N = 762

R^2 = .053

Significance of Overall Regression = .0000

Variable	Coefficient	Significance
Age	-.0035	.870
Age-Squared	-.0002	.412
Birth Order	-.039	.478
Breastfed (1= Now or over 4 months)	.042	.855
Number of Immunizations	-.117	.189
Sex (1 = Female)	.124	.578
Mother's Age	-.0069	.732
Family Units in Household	.253	.008
Monthly Miscellaneous Expenditures	-.0005	.125
Participation (1 = Nonparticipant)	.370	.116
Constant	1.29	.006

TABLE 6B

MODEL I: SEPARATING CHILDREN UNDER 2 FROM THOSE OVER 2

Dependent Variable = Weight/Weight(Age) Ratio
Using Candelaria Standard

Children Under 2			Children Over 2	
N = 245			N = 510	
R^2 = .307			R^2 = .109	
Overall Significance = .0000			Overall Significance = .0000	
Coeff.	Sig.	Variable	Coeff.	Sig.
-.0340	.000	Age	.0013	.651
.0009	.000	Age-squared	-.000005	.865
-.0052	.307	Birth Order	-.0112	.000
.0211	.308	Breastfed	-.0075	.469
.0156	.044	Number of Immun.	.0110	.007
-.0016	.414	Age of Mother	.0018	.046
-.0137	.082	Family Units in H.H.	-.0043	.328
.00001	.620	Monthly Misc. Expenditures	.00006	.000
-.0115	.583	Participation	-.0166	.117
1.2670	.000	Constant	.8469	.000

TABLE 7

MODEL II: EXPANDED MODEL TO TEST SIGNIFICANCE OF PARTICIPATION IN EXPLAINING NUTRITIONAL STATUS

Dependent Variable = Weight/Weight(Age) Ratio
Using Candelaria Standard

N = 751

R^2 = .19

Significance of Overall Regression = .0000

Variable	Coefficient	Significance
Age	-.0089	.000
Age-squared	.0001	.000
Birth Order	-.0093	.0001
Breastfed (1=Now or over 4 months)	.0116	.236
Number of Immunizations	.0058	.129
Age of Mother	.0012	.162
Family Units in Household	-.0077	.057
	.00004	.004
Days of Diarrhea in Last 15	-.0045	.005
Days of Other Sickness in Last 15	-.0021	.003
Sex (1 = Female)	-.0211	.024
Participation (1 = Nonparticipation)	-.0095	.338
Constant	1.1000	.000

TABLE 8A

MODEL TESTING SIGNIFICANCE OF PARTICIPATION ON DIARRHEA

Dependent Variable = Weight/Weight (Age) Ratio
Using Candelaria Standard

N = 755

R^2 = .163

Significance of Overall Regression = .0000

Variable	Coefficient	Significance
Age	-.0092	.000
Age-Squared	.0001	.000
Birth Order	-.0096	.000
Breastfed (1 = Now or over 4 months)	.0087	.377
Number of Immunizations	.0075	.046
Age of Mother	.0012	.182
Family Units in Household	-.0084	.039
Weekly Miscellaneous Expenditures	.00004	.002
Participation (1 = Nonparticipant)	-.0111	.267
Constant	1.0790	.000

TABLE 8B

MODEL TESTING SIGNIFICANCE OF PARTICIPATION ON OTHER DISEASE

Dependent Variable = Days of Diseases Other Than Diarrhea in Last 15 Days

N = 761

R^2 = .044

Significance of Overall Regression = .0002

Variable	Coefficient	Significance
Age	.112	.001
Age-squared	-.0018	.0001
Birth Order	.129	.135
Breastfed (1= Now or over 4 months)	.151	.683
Number of Immunizations	-.453	.002
Sex (1 = Female)	.222	.529
Mother's Age	-.0313	.329
Family Units in Household	.040	.794
Monthly Misscellaneous Expenditures	.0003	.574
Participation (1 = Nonparticipant)	-.075	.841
Constant	2.82	.022

TABLE 9A

PARTICIPATION VS. PREGNANCY

Preg. since '74

	Yes	No	Total
Participant	35 (67.3%)	17 (32.7%)	52
Nonparticipant	89 (83.2%)	18 (16.8%)	107
Total	124 (78.0%)	35 (22.0%)	159

X^2 = 5.14 DF = 1 SIG = .023

TABLE 9B

PARTICIPATION VS. PREGNANCY

Preg. since '74

	Yes	No	Total
Participant	31 (54.4%)	26 (26.8%)	57
Nonparticipant	41	15	56
Total	72 (63.7%)	41 (36.3%)	113

X^2 = 4.33 DF = 1 SIG = .037

TABLE 9C

PARTICIPATION VS. PREGNANCY

Preg. since '74

	Yes	No	Total
Participant	24 (38.7%)	38 (73.1%)	62
Nonparticipant	15 (51.7%)	14 (48.3%)	29
Total	39 (42.9%)	52 (57.1%)	91

X^2 = 1.37 DF = 1 SIG = .242

TABLE 9D

PARTICIPATION VS. PREGNANCY

Preg. since '74

	Yes	No	Total
Participant	24 (51.1%)	23 (48.9%)	47
Nonparticipant	13 (65.0%)	7 (35.0%)	20
Total	37 (55.2%)	30 (44.8%)	67

X^2 = 1.10 DF = 1 SIG = .294

TABLE 9E

PARTICIPATION VS. PREGNANCY
MOTHERS BETWEEN 40 AND 56

Preg. since '74

	Yes	No	Total
Participant	7 (18.4%)	31 (81.6%)	38
Nonparticipant	4 (20.0%)	16 (80.0%)	20
Total	11 (19.0%)	47 (81.0%)	58

X^2 = .02 DF = 1 SIG = .884

TABLE 10A

PARTICIPATION VS. PREGNANCY

Preg. since '74

	Yes	No	Total
Participant	36 (41.4%)	51 (51.6%)	87
Nonparticipant	38 (70.4%)	16 (29.6%)	54
Total	74 (52.5%)	67 (47.5%)	141

X^2 = 11.23 DF = 1 SIG = .0008

TABLE 10B

PARTICIPATION VS. PREGNANCY

Preg. since '74

	Yes	No	Total
Participant	89 (50.0%)	89 (50.0%)	178
Nonparticipant	123 (69.1%)	55 (30.9%)	178
Total	212 (59.6%)	144 (40.4%)	356

X^2 = 13.48 DF = 1 SIG = .0002

Table 11A

PREGNANCIES SINCE 1974 = (AGE, PARTICIPATION)

Dependent Variable =

N = 488

R^2= .107

Significance of Overall Regression = .0000

Variable	Coefficient	Significance
AGE OF MOTHER	-.025	.000
PARTICIPATION (1=Mother participated)	-.176	.006
CONSTANT	1.547	.000

Table 11B

PREGNANCIES SINCE 1974 = (AGE, PARTICIPATION, BIRTH CONTROL)

Dependent Variable =

N = 472

R^2= .204

Significance of Overall Regression = .000

Variable	Coefficient	Significance
AGE OF MOTHER	-.023	.000
PARTICIPATION (1=Mother participated)	-.093	.133
MONTHS USED BIRTH CONTROL	-.018	.000
CONSTANT	1.640	.000

TABLE 11B: PREGNANCIES SINCE '74 = (AGE, PARTICIPATION, BIRTH CONTROL)

Table 11C

PREGNANCIES SINCE 1974 = (AGE, PARTICIPATION, BIRTH CONTROL, SIZE OF FAMILY)

Dependent Variable

N = 470

R^2= .213

Significance of Overall Regression = .000

Variable	Coefficient	Significance
AGE OF MOTHER	-.029	.000
PARTICIPATION (1=Mother participated)	-.124	.048
MONTHS USED BIRTH CONTROL	-.017	.000
SIZE OF NUCLEAR FAMILY	.030	.027
CONSTANT	1.63	.000

Table 11D

FULL MODEL

Dependent Variable =

N = 396

R^2= .206

Significance of Overall Regression = .000

Variable	Coefficient	Significance
AGE OF MOTHER	-.026	.000
PARTICIPATION (1=Mother participated)	-.139	.037
MONTHS USED BIRTH CONTROL	-.017	.000
SIZE OF NUCLEAR FAMILY	.043	.005
INCOME + SUBSIDY	-.001	.129
MOTHER'S EDUCATION	.024	.151
PARTICIPATION IN FAMILY PLAN (1=No)	-.088	.272
CONSTANT	1.559	.000

APPENDIX

DICTIONARY DOCUMENTATION

FOP: CR.CHIL
DATA SET LOCATION: K4JX:CR.CHIL
DICTIONARY LOCATION: IDPR:CR.CHIL#
DATE: JUN 3, 1980

THIS DATASET CAN BE DESTROYED.
THIS DATASET CAN BE REPLACED.
USE COUNT: 1

DATA SET DESCRIPTION:
CANDELARIA REVISITED DATA--CHILDREN INFORMATION IDPR/01-23-80

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
F(1)	FAMILY-NUMBER	FNUM	REQUIRED	FAMILY IDENTIFICATION NUMBER
F(2)	INDIVIDUAL-NUM	INUM	REQUIRED	NUMBER OF THE INDIVIDUAL WITHIN THE FAMILY
F(3)	ORIG-ID-NUM	OIDN	REQUIRED	IDENTIFICATION NUMBER IN ORIGINAL SURVEY
F(4)	DAY-OF-BIRTH	DOB	REQUIRED	DAY OF BIRTH
	CATEGORIES			
	MISSING	M	99	MISSING
F(5)	MONTH-OF-BIRTH	MOB	REQUIRED	MONTH OF BIRTH
	CATEGORIES (ONLY)			
	JANUARY	JAN	1	JANUARY
	FEBRUARY	FEB	2	FEBRUARY
	MARCH	MAR	3	MARCH
	APRIL	APR	4	APRIL
	MAY	MAY	5	MAY
	JUNE	JUN	6	JUNE
	JULY	JUL	7	JULY
	AUGUST	AUG	8	AUGUST
	SEPTEMBER	SEP	9	SEPTEMBER
	OCTOBER	OCT	10	OCTOBER
	NOVEMBER	NOV	11	NOVEMBER
	DECEMBER	DEC	12	DECEMBER
	MISSING	M	99	MISSING
F(6)	YEAR-OF-BIRTH	YOB	REQUIRED	YEAR OF BIRTH
	CATEGORIES (ONLY)			
	Y68	Y68	68	YEAR OF 1968
	Y69	Y69	69	YEAR OF 1969
	Y70	Y70	70	YEAR OF 1970
	Y71	Y71	71	YEAR OF 1971
	Y72	Y72	72	YEAR OF 1972
	Y73	Y73	73	YEAR OF 1973
	Y74	Y74	74	YEAR OF 1974
	Y75	Y75	75	YEAR OF 1975
	Y76	Y76	76	YEAR OF 1976
	MISSING	M	99	MISSING

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.CHIL

F(#)	FIELD NAME	ADDR	VALUE	DESCRIPTION
F(7)	AGE-IN-MONTHS	AGE	REQUIRED	AGE IN MONTHS
	CATEGORIES			
	MISSING	M	99	MISSING
F(8)	SEX	SEX	REQUIRED	SEX
	CATEGORIES (ONLY)			
	MALE	M	1	MALE
	FEMALE	F	2	FEMALE
	MISSING	MISS	9	MISSING
F(9)	BIRTH-ORDER	BORD	REQUIRED	BIRTH ORDER
	CATEGORIES			
	MISSING	M	99	MISSING
F(10)	BIRTH-WEIGHT	BWT	REQUIRED	BIRTH WEIGHT
F(11)	BREAST-FEEDING	BRF	REQUIRED	BREAST FEEDING
	CATEGORIES (ONLY)			
	CURRENTLY	CURR	1	CURRENTLY
	ZER-TO-ONE	ZTOO	2	ZERO TO ONE MONTHS PREVIOUSLY
	TWO-TO-FOUR	TTOF	3	TWO TO FOUR MONTHS PREVIOUSLY
	FIV-TO-NINE	FTON	4	FIVE TO NINE MONTHS PREVIOUSLY
	TEN-TO-FIFT	XT15	5	TEN TO FIFTEEN MONTHS PREVIOUSLY
	OVER-FIFT	OV15	6	OVER FIFTEEN MONTHS
	NEVER	NEV	7	NEVER
	MISSING	M	9	MISSING
F(12)	DAYS-DIAR-15	DD15	REQUIRED	NUMBER OF DAYS CHILD HAS HAD DIARRHEA IN THE 15 DAY PERIOD PRIOR TO THE SURVEY
	CATEGORIES			
	MISSING	M	99	MISSING
F(13)	DAYS-SICK-15	DS15	REQUIRED	NUMBER OF DAYS CHILD SICK OF OTHER DISEASES IN THE 15 DAY PERIOD PRIOR TO THE SURVEY
	CATEGORIES			
	MISS	M	99	MISSING
F(14)	BROUGHT-SICK	BRSK	REQUIRED	PLACE WHERE CHILD WAS BROUGHT IF SICK
	CATEGORIES (ONLY)			
	SS-LCSS	LCSS	1	SOCIAL SECURITY-LCSS
	SS	SS	2	SOCIAL SECURITY
	SS-PRIVATE	PRIV	3	SOCIAL SECURITY-CAJANAL (PRIVATE)
	DOCTOR	DOC	4	PRIVATE DOCTOR
	HOSPITAL	HOSP	5	HOSPITAL
	OTHER	OTH	6	OTHER
	STAY-HOME	HOME	7	STAYED AT HOME

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.CHIL

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES (CONTINUED)			
	MISSING	M	9	MISSING
F(15)	IMMUNIZ	IMM	REQUIRED	IMMUNIZATION
	CATEGORIES (ONLY)			
	DPT	DPT	1	DPT
	POLIO	POL	2	POLIO
	BCG	BCG	3	BCG
	DPT-POLIO	DP	4	DPT AND POLIO
	DPT-BCG	DB	5	DPT AND BCG
	POL-BCG	PB	6	POLIO AND BCG
	ALL	ALL	7	ALL
	NONE	NONE	8	NONE
	MISSING	M	9	MISSING
F(16)	WEIGHT	WT	REQUIRED	WEIGHT IN KILOGRAMS
F(17)	HEIGHT	HT	REQUIRED	HEIGHT IN CENTIMETERS
F(18)	ARM-CIRC	AC	REQUIRED	MID-ARM CIRCUMFERENCE IN CENTIMETERS
F(19)	HEAD-CIRC	HC	REQUIRED	HEAD CIRCUMFERENCE IN CENTIMETERS
F(20)	EDEMA	EDEM	REQUIRED	EDEMA
	CATEGORIES (ONLY)			
	PRESENT	PRES	1	PRESENT
	ABSENT	ABS	2	ABSENT
	MISSING	M	9	MISSING
F(21)	SKIN-CHANGES	SKIN	REQUIRED	SKIN CHANGES
	CATEGORIES (ONLY)			
	PRESENT	PRES	1	PRESENT
	ABSENT	ABS	2	ABSENT
	MISSING	M	9	MISSING
F(22)	EYE-CHANGES	EYE	REQUIRED	EYE CHANGES
	CATEGORIES (ONLY)			
	PRESENT	PRES	1	PRESENT
	ABSENT	ABS	2	ABSENT
	MISSING	M	9	MISSING
F(23)	PROT-BELLY	BELY	REQUIRED	PROTRUDING BELLY
	CATEGORIES (ONLY)			
	PRESENT	PRES	1	PRESENT
	ABSENT	ABS	2	ABSENT
	MISSING	M	9	MISSING
F(24)	MONTH-FIRST-VIS	MFV	REQUIRED	MONTH OF FIRST VISIT BY THE PROMOTORA

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.CHIL

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES (ONLY)			
	JANUARY	JAN	1	JANUARY
	FEBRUARY	FEB	2	FEBRUARY
	MARCH	MAR	3	MARCH
	APRIL	APR	4	APRIL
	MAY	MAY	5	MAY
	JUNE	JUN	6	JUNE
	JULY	JUL	7	JULY
	AUGUST	AUG	8	AUGUST
	SEPTEMBER	SEP	9	SEPTEMBER
	OCTOBER	OCT	10	OCTOBER
	NOVEMBER	NOV	11	NOVEMBER
	DECEMBER	DEC	12	DECEMBER
	NON-PART	NIP	13	NON PARTICIPANT IN PROGRAM
	MISSING	M	99	MISSING
F(25)	YEAR-FIRST-VIS	YFV	REQUIRED	YEAR OF FIRST VISIT BY THE PROMOTORA
	CATEGORIES (ONLY)			
	Y68	Y68	68	YEAR OF 1968
	Y69	Y69	69	YEAR OF 1969
	Y70	Y70	70	YEAR OF 1970
	Y71	Y71	71	YEAR OF 1971
	Y72	Y72	72	YEAR OF 1972
	Y73	Y73	73	YEAR OF 1973
	Y74	Y74	74	YEAR OF 1974
	Y75	Y75	75	YEAR OF 1975
	Y76	Y76	76	YEAR OF 1976
	NON-PART	NIP	13	NON PARTICIPANT IN PROGRAM
	MISSING	M	99	MISSING
F(26)	AGE-FIRST-VIS	AGEF	REQUIRED	AGE IN MONTHS AT FIRST VISIT BY THE PROMOTORA
	CATEGORIES			
	NON-PART	NIP	98	NON PARTICIPANT IN PROGRAM
	MISSING	M	99	MISSING
F(27)	WT-FIRST-VIS	WTFV	REQUIRED	WEIGHT AT FIRST VISIT BY THE PROMOTORA-NN.N KILOGRAMS
F(28)	HT-FIRST-VIS	HTFV	REQUIRED	HEIGHT AT FIRST VISIT BY THE PROMOTORA-NNN CMS
F(29)	MONTH-LAST-VIS	MLV	REQUIRED	MONTH OF LAST VISIT BY THE PROMOTORA
	CATEGORIES (ONLY)			
	JANUARY	JAN	1	JANUARY
	FEBRUARY	FEB	2	FEBRUARY
	MARCH	MAR	3	MARCH
	APRIL	APR	4	APRIL

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.CHIL

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES (CONTINUED)			
	MAY	MAY	5	MAY
	JUNE	JUN	6	JUNE
	JULY	JUL	7	JULY
	AUGUST	AUG	8	AUGUST
	SEPTEMBER	SEP	9	SEPTEMBER
	OCTOBER	OCT	10	OCTOBER
	NOVEMBER	NOV	11	NOVEMBER
	DECEMBER	DEC	12	DECEMBER
	NON-PART	NIP	13	NON PARTICIPANT IN PROGRAM
	MISSING	M	99	MISSING
F(30)	YEAR-LAST-VIS	YLV	REQUIRED	YEAR OF LAST VISIT BY THE PROMOTORA
	CATEGORIES (ONLY)			
	NON-PART	NIP	13	NON PARTICIPANT IN PROGRAM
	Y68	Y68	68	YEAR OF 1968
	Y69	Y69	69	YEAR OF 1969
	Y70	Y70	70	YEAR OF 1970
	Y71	Y71	71	YEAR OF 1971
	Y72	Y72	72	YEAR OF 1972
	Y73	Y73	73	YEAR OF 1973
	Y74	Y74	74	YEAR OF 1974
	Y75	Y75	75	YEAR OF 1975
	Y76	Y76	76	YEAR OF 1976
	MISSING	M	99	MISSING
F(31)	AGE-LAST-VIS	AGEL	REQUIRED	AGE IN MONTHS AT LAST VISIT BY THE PROMOTORA
	CATEGORIES			
	NON-PART	NIP	98	NON PARTICIPANT IN PROGRAM
	MISSING	M	99	MISSING
F(32)	WT-LAST-VIS	WTLV	REQUIRED	WEIGHT AT LAST VISIT BY THE PROMOTORA-NN.N KILOGRAMS
F(33)	HT-LAST-VIS	HTLV	REQUIRED	HEIGHT AT LAST VISIT BY THE PROMOTORA-NNN CMS
F(34)	PROG-PART	PP	REQUIRED	PROGRAM PARTICIPATION
	CATEGORIES (ONLY)			
	PARTIC	PART	1	PROGRAM PARTICIPANT (INFO RECORDED FOR OLD ID OR PROGRAM HISTORY)
	NON-PART	NONP	2	NON-PARTICIPANT
	MISSING	M	9	MISSING

DICTIONARY DOCUMENTATION

FOR: CR.MOTH
DATA SET LOCATION: K4JX:CR.MOTH
DICTIONARY LOCATION: IDPR:CR.MOTH#
DATE: JUN 3, 1980

THIS DATASET CAN BE DESTROYED.
THIS DATASET CAN BE REPLACED.
USE COUNT: 1

DATA SET DESCRIPTION:
CANDELARIA REVISITED DATA--FAMILY INFORMATION IDPR/01-23-80

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
F(1)	FAMILY-NUMBER	FNUM	REQUIRED	FAMILY IDENTIFICATION NUMBER
F(2)	ORIG-ID-NUM	OIDN	REQUIRED	IDENTIFICATION NUMBER IN ORIGINAL SURVEY
F(3)	AGE-OF-MOTHER	AGMO	REQUIRED	AGE OF MOTHER IN OCTOBER 1976
	CATEGORIES			
	MISSING	M	99	MISSING
F(4)	YEAR-ARRIVED	YOA	REQUIRED	YEAR WHEN FAMILY ARRIVED IN CANDELARIA
	CATEGORIES			
	MISSING	M	99	MISSING
F(5)	PLACE-ORIGIN	ORIG	REQUIRED	PLACE OF ORIGIN
	CATEGORIES (ONLY)			
	TOWN	TOWN	1	TOWN (300 TO 700 POPULATION)
	CITY	CITY	2	CITY
	RURAL	RUR	3	RURAL
	CANDELARIA	CAND	4	CANDELARIA
	MISSING	M	9	MISSING
F(6)	NUM-YRS-PART	NYP	REQUIRED	NUMBER OF YEARS PARTICIPATED IN THE PROMOTORA PROGRAM
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	NON-PART	NIP	8	NON-PARTICIPANTS
	NOT-REM	NR	9	DO NOT REMEMBER
F(7)	PART-PRE-PROG	PREN	REQUIRED	PARTICIPANT IN PRENATAL PROGRAM AFTER JANUARY 1974
	CATEGORIES (ONLY)			
	YES	YES	1	YES
	NO	NO	2	NO
	MISSING	M	9	MISSING

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.MOTH

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
F(8)	PART-FAM-PLAN	PP	REQUIRED	PARTICIPANT IN FAMILY PLANNING PROGRAM AFTER JANUARY 1974
	CATEGORIES (ONLY)			
	YES	YES	1	YES
	NO	NO	2	NO
	MISSING	M	9	MISSING
F(9)	PART-FOOD-DIST	PINA	REQUIRED	PARTICIPANT IN FOOD DISTRIBUTION PROGRAM (PINA) AFTER JANUARY 1974
	CATEGORIES (ONLY)			
	YES	YES	1	YES
	NO	NO	2	NO
	MISSING	M	9	MISSING
F(10)	PART-GROW-DEV	PCGD	REQUIRED	PARTICIPANT IN PROGRAM FOR CONTROL OF GROWTH AND DEVELOPMENT AFTER JANUARY 1974
	CATEGORIES (ONLY)			
	YES	YES	1	YES
	NO	NO	2	NO
	MISSING	M	9	MISSING
F(11)	CHIL-LT-15	CH15	REQUIRED	NUMBER OF CHILDREN LESS THAN 15 YEARS OLD
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	SEVEN	SEV	7	SEVEN
	EIGHT	EIG	8	EIGHT
	NINE	NIN	9	NINE
	TEN	TEN	10	TEN
	MISSING	M	99	MISSING
F(12)	FAMS-IN-HOUSE	FIH	REQUIRED	NUMBER OF FAMILY UNITS IN THE HOUSE
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	MISSING	M	9	MISSING
F(13)	PERS-IN-HOUSE	PIH	REQUIRED	NUMBER OF PERSONS RESIDING IN HOUSE

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.MOTH

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES			
	MISSING	M	99	MISSING
F(14)	PERS-IN-NUC-FAM	PINF	REQUIRED	NUMBER OF PERSONS CONFORMING THE NUCLEAR FAMILY
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	SEVEN	SEV	7	SEVEN
	EIGHT	EIG	8	EIGHT
	NINE	NIN	9	NINE
	TEN	TEN	10	TEN
	ELEVEN	ELE	11	ELEVEN
	TWELVE	TWE	12	TWELVE
	THIRTEEN	THI	13	THIRTEEN
	FOURTEEN	FOTN	14	FOURTEEN
	FIFTEEN	FFTN	15	FIFTEEN
	SIXTEEN	SXTN	16	SIXTEEN
	MISSING	M	99	MISSING
F(15)	NUM-PREV-PREG	NPP	REQUIRED	NUMBER OF PREVIOUS PREGNANCIES
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	SEVEN	SEV	7	SEVEN
	EIGHT	EIG	8	EIGHT
	NINE	NIN	9	NINE
	TEN	TEN	10	TEN
	ELEVEN	ELE	11	ELEVEN
	TWELVE	TWE	12	TWELVE
	THIRTEEN	THI	13	THIRTEEN
	FOURTEEN	FOTN	14	FOURTEEN
	FIFTEEN	FFTN	15	FIFTEEN
	SIXTEEN	SXTN	16	SIXTEEN
	SEVENTEEN	SVTN	17	SEVENTEEN
	EIGHTEEN	EGTN	18	EIGHTEEN
	MISSING	M	99	MISSING
F(16)	NUM-PREG-1974	NP74	REQUIRED	NUMBER OF PREGNANCIES FROM 1974 UP TO NOW (INCLUDING CURRENT PREGNANCY IF ANY)

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.MOTH

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	NONE	NONE	8	NONE
	MISSING	M	9	MISSING
F(17)	NUM-ABOR-STILL	NAS	REQUIRED	NUMBER OF ABORTIONS AND STILLBORNS
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	SEVEN	SEV	7	SEVEN
	EIGHT	EIG	8	EIGHT
	NINE	NIN	9	NINE
	TEN	TEN	10	TEN
	NONE	NONE	88	NONE
	MISSING	M	99	MISSING
F(18)	NUM-AB-ST-1974	AS74	REQUIRED	NUMBER OF ABORTIONS AND STILLBORNS SINCE JANUARY 1974
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	NONE	NONE	8	NONE
	MISSING	M	9	MISSING
F(19)	NUM-LIVE-BORN	NLB	REQUIRED	NUMBER OF LIVE BORN
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	SEVEN	SEV	7	SEVEN
	EIGHT	EIG	8	EIGHT
	NINE	NIN	9	NINE
	TEN	TEN	10	TEN
	ELEVEN	ELE	11	ELEVEN
	TWELVE	TWE	12	TWELVE
	THIRTEEN	THI	13	THIRTEEN
	FOURTEEN	FOTN	14	FOURTEEN
	FIFTEEN	FFTN	15	FIFTEEN

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.MOTH

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES (CONTINUED)			
	SIXTEEN	SXTN	16	SIXTEEN
	MISSING	M	99	MISSING
F(20)	PRE-SC-DEAD-1974	DS74	REQUIRED	NUMBER OF CHILDREN 5 YEARS OF AGE OR LESS WHO DIED SINCE JANUARY 1974
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	NONE	NONE	8	NONE
	MISSING	M	9	MISSING
F(21)	WIFE-EDUCATION	WEDU	REQUIRED	WIFES EDUCATION LEVEL
	CATEGORIES (ONLY)			
	PRIMARY	PRIM	1	PRIMARY
	HIGH-TECH	HS	2	HIGH SCHOOL AND/OR TECHNICAL SCHOOL
	HIGHER-ED	UNIV	3	HIGHER EDUCATION
	NONE	NONE	8	NO SCHOOLING
	MISSING	M	9	MISSING
F(22)	WIFE-YRS-COMP	WYC	REQUIRED	NUMBER OF YEARS COMPLETED BY WIFE FOR THE EDUCATION CATEGORY STATED ABOVE
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	MISSING	M	9	MISSING
F(23)	WIFE-LITER	WLIT	REQUIRED	LITERACY OF WIFE
	CATEGORIES (ONLY)			
	READ-ONLY	READ	1	READS ONLY
	READ-WR	RWR	2	READS AND WRITES
	NONE	NONE	8	NEITHER READS NOR WRITES
	MISSING	M	9	MISSING
F(24)	HUSB-EDUCATION	HEDU	REQUIRED	HUSBANDS EDUCATION LEVEL
	CATEGORIES (ONLY)			
	PRIMARY	PRIM	1	PRIMARY
	HIGH-TECH	HS	2	HIGH SCHOOL AND/OR TECHNICAL SCHOOL
	HIGHER-ED	UNIV	3	HIGHER EDUCATION
	NONE	NONE	8	NO SCHOOLING
	MISSING	M	9	MISSING

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.MOTH

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
F(25)	HUSB-YRS-COMP	HYC	REQUIRED	NUMBER OF YEARS COMPLETED BY HUSBAND FOR THE EDUCATION CATEGORY STATED ABOVE
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	MISSING	M	9	MISSING
F(26)	BIRTH-CONTROL	MOBC	REQUIRED	METHOD OF BIRTH CONTROL
	CATEGORIES (ONLY)			
	IUD	IUD	1	IUD
	PILL	PILL	2	PILL
	RHYTHM	RHY	3	RHYTHM
	CONDOM	COND	4	CONDOM
	WIFE-STER	WSTE	5	WIFE STERILIZED
	HUSB-STER	HSTE	6	HUSBAND STERILIZED
	OTHERS	OTH	7	OTHERS
	MISSING	M	8	MISSING
	NONE	NONE	9	NONE
F(27)	MONTHS-BC-1974	BC74	REQUIRED	NUMBER OF MONTHS OF UTILIZATION OF BIRTH CONTROL IN 1974
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	SEVEN	SEV	7	SEVEN
	EIGHT	EIG	8	EIGHT
	NINE	NIN	9	NINE
	TEN	TEN	10	TEN
	ELEVEN	ELE	11	ELEVEN
	TWELVE	TWE	12	TWELVE
	NONE	NONE	88	NONE
	MISSING	M	99	MISSING
F(28)	MONTHS-BC-1975	BC75	REQUIRED	NUMBER OF MONTHS OF UTILIZATION OF BIRTH CONTROL IN 1975
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR

DICTIONARY DOCUMENTATION
(CONTINUED)

POP: CR.MOTH

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES (CONTINUED)			
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	SEVEN	SEV	7	SEVEN
	EIGHT	EIG	8	EIGHT
	NINE	NIN	9	NINE
	TEN	TEN	10	TEN
	ELEVEN	ELE	11	ELEVEN
	TWELVE	TWE	12	TWELVE
	NONE	NONE	88	NONE
	MISSING	M	99	MISSING
F(29)	MONTHS-BC-1976	BC76	REQUIRED	NUMBER OF MONTHS OF UTILIZATION OF BIRTH CONTROL IN 1976
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	FIVE	FIV	5	FIVE
	SIX	SIX	6	SIX
	SEVEN	SEV	7	SEVEN
	EIGHT	EIG	8	EIGHT
	NONE	NONE	9	NONE
F(30)	SEWER-SYSTEM	CSDS	REQUIRED	HOUSE CONNECTED TO CENTRAL SEWAGE DISPOSAL SYSTEM
	CATEGORIES (ONLY)			
	YES	YES	1	YES
	NO	NO	2	NO
	MISSING	M	9	MISSING
F(31)	PIPED-WATER	PWS	REQUIRED	PIPED WATER SUPPLY IN HOUSE
	CATEGORIES (ONLY)			
	YES	YES	1	YES
	NO	NO	2	NO
	MISSING	M	9	MISSING
F(32)	STOVE-HOUSE	STOV	REQUIRED	STOVE IN HOUSE
	CATEGORIES (ONLY)			
	YES-PRIV	PRIV	1	YES, JUST FOR HUSBANDS FAMILY
	YES-SHARED	SHAR	2	YES, BUT SHARED WITH OTHER FAMILY
	NO	NO	3	NO
	MISSING	M	9	MISSING
F(33)	POSSESSIONS	POSS	REQUIRED	FAMILY POSSESSIONS
	CATEGORIES (ONLY)			
	RADIO	R	1	RADIO
	TV	T	2	TV
	RAD-TV	RT	3	RADIO AND TV

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.MOTH

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES (CONTINUED)			
	TELEPHONE	P	4	TELEPHONE
	TEL-RAD	PR	5	TELEPHONE AND RADIO
	TEL-TV	PT	6	TELEPHONE AND TV
	TEL-TV-RAD	PTR	7	TELEPHONE, TV AND RADIO
	REFRIG	I	8	REFRIGERATOR
	REF-RAD	IR	9	REFRIGERATOR AND RADIO
	REF-TV	IT	10	REFRIGERATOR AND TV
	REF-TV-RAD	ITR	11	REFRIGERATOR, TV AND RADIO
	REF-TEL	IP	12	REFRIGERATOR AND TELEPHONE
	REF-TEL-RAD	IPR	13	REFRIGERATOR, TELEPHONE AND RADIO
	REF-TEL-TV	IPT	14	REFRIGERATOR, TELEPHONE AND TV
	R-T-TV-RAD	IPTR	15	REFRIGERATOR, TELEPHONE, TV AND RADIO
	SEW-MACH	S	16	SEWING MACHINE
	SM-RAD	SR	17	SEWING MACHINE AND RADIO
	SM-TV	ST	18	SEWING MACHINE AND TV
	SM-TV-RAD	STR	19	SEWING MACHINE, TV AND RADIO
	SM-TEL	SP	20	SEWING MACHINE AND TELEPHONE
	SM-TEL-RAD	SPR	21	SEWING MACHINE, TELEPHONE AND RADIO
	SM-TEL-TV	SPT	22	SEWING MACHINE, TELEPHONE AND TV
	SM-T-TV-RAD	SPTR	23	SEWING MACHINE, TELEPHONE, TV AND RADIO
	SM-REF	SI	24	SEWING MACHINE AND REFRIGERATOR
	SM-REF-RAD	SIR	25	SEWING MACHINE, REFRIGERATOR AND RADIO
	SM-REF-TV	SIT	26	SEWING MACHINE, REFRIGERATOR AND TV
	SM-R-TV-RAD	SITR	27	SEWING MACHINE, REFRIGERATOR, TV AND RADIO
	SM-REF-TEL	SIP	28	SEWING MACHINE, REFRIGERATOR AND TELEPHONE
	SM-REF-P-R	SIPR	29	SEWING MACHINE, REFRIGERATOR, TELEPHONE AND RADIO
	SM-REF-P-TV	SIPT	30	SEWING MACHINE, REFRIGERATOR, TELEPHONE AND TV
	ALL	ALL	31	ALL
	NONE	NONE	32	NONE
	MISSING	M	99	MISSING
F(34)	FAM-EXP-FOOD	FEF	REQUIRED	FAMILY EXPENDITURES ON FOOD PER WEEK
F(35)	FAM-EXP-MTS	FEM	REQUIRED	FAMILY EXPENDITURES PER MONTH ON RENT, UTILITIES, EDUCATION AND OTHER
F(36)	OCC-HEAD	OCCH	REQUIRED	OCCUPATION OF HEAD OF FAMILY
	CATEGORIES (ONLY)			
	CANE-CUT	CUT	1	SUGAR CANE CUTTER
	SUG-MILL	MILL	2	SUGAR MILL FACTORY

DICTIONARY DOCUMENTATION
(CONTINUED)

FOR: CR.MOTH

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
	CATEGORIES (CONTINUED)			
	OWN-BUS	OWN	3	OWN-BUSINESS
	EMP-OTH	EMOT	4	EMPLOYED IN OTHER THAN SUGAR MILL FACTORY
	PUB-EMP	PUBL	5	PUBLIC EMPLOYEE
	OTHER	OTH	6	OTHER
	UNEMP	UNEM	8	UNEMPLOYED
	MISSING	M	9	MISSING
F(37)	OCC-MOTH	OCCM	REQUIRED	OCCUPATION OF THE MOTHER OF THE CHILDREN
	CATEGORIES (ONLY)			
	WORK-3	WLT3	1	WORKS LESS THAN THREE DAYS PER WEEK
	WORK-OUT	WORK	2	WORKS OUTSIDE THE HOUSE
	STAY-HOME	HWP	8	DOES NOT WORK AND REMAINS AT HOME
	MISSING	M	9	MISSING
F(38)	NUMBER-WORK	NPW	REQUIRED	NUMBER OF PERSONS BESIDES FATHER OR MOTHER WHO HAVE A JOB
	CATEGORIES (ONLY)			
	ONE	ONE	1	ONE
	TWO	TWO	2	TWO
	THREE	THR	3	THREE
	FOUR	FOU	4	FOUR
	NONE	NONE	8	NONE
	MISSING	M	9	MISSING
F(39)	FAM-INCOME	INC	REQUIRED	TOTAL FAMILY INCOME PER MONTH
F(40)	REC-SUBSIDY	SUBS	REQUIRED	RECEIVE A SUBSIDY
	CATEGORIES (ONLY)			
	YES	YES	1	YES
	NO	NO	2	NO
	MISSING	M	9	MISSING
F(41)	SUBSIDY-PESOS	TSIP	REQUIRED	TOTAL SUBSIDY IN PESOS

DICTIONARY DOCUMENTATION

FOR: CR.ANTH
DATA SET LOCATION: IDPR:CR.ANTH
DICTIONARY LOCATION: IDPR:CR.ANTH*
DATE: JUN 3, 1980

THIS DATASET CAN BE DESTROYED.
THIS DATASET CAN BE REPLACED.
USE COUNT: 1

DATA SET DESCRIPTION:
02-05-80/IDPR

F(#)	FIELD NAME	ABBR	VALUE	DESCRIPTION
F(1)	FAMILY-NUMBER	FNUM	REQUIRED	FAMILY IDENTIFICATION NUMBER
F(2)	INDIVIDUAL-NUM	INUM	REQUIRED	NUMBER OF THE INDIVIDUAL WITHIN THE FAMILY
F(3)	AGE-IN-MONTHS	AGE	REQUIRED	AGE IN MONTHS
	CATEGORIES			
	MISSING	M	99	MISSING
F(4)	SEX	SEX	REQUIRED	SEX
	CATEGORIES (ONLY)			
	MALE	M	1	MALE
	FEMALE	F	2	FEMALE
	MISSING	MISS	9	MISSING
F(5)	WEIGHT	WT	REQUIRED	WEIGHT IN KILOGRAMS
F(6)	HEIGHT-CMS	HTCM	REQUIRED	HEIGHT IN CENTIMETERS
F(7)	CAND-STD-WT-AGE	CAWA	REQUIRED	STANDARD WEIGHTS FOR GIVEN AGES IN CANDELARIA AND PRIMOPS
F(8)	COL-STD-WT-AGE	COWA	REQUIRED	STANDARD WEIGHTS FOR FEMALES FOR GIVEN AGES IN COLOMBIA
F(9)	HAR-STD-WT-AGE	HSWA	REQUIRED	STANDARD WEIGHTS FOR GIVEN AGES FOR RED POTATOE VERSION OF THE HARVARD STANDARD
F(10)	COL-STD-HT-AGE	COHA	REQUIRED	STANDARD HEIGHTS FOR FEMALES FOR GIVEN AGES IN COLOMBIA
F(11)	HAR-STD-HT-AGE	HSHA	REQUIRED	STANDARD HEIGHTS FOR AGES FOR RED POTATOE VERSION OF THE HARVARD STANDARD
F(12)	HAR-STD-WT-HT	HSHH	REQUIRED	WEIGHT IN KILOGRAMS

M I D A S

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