Nutrition, Family Planning, and Health Promotion: The Guatemalan Program of Primary Health Care

Aarón Lechtig[1]
John W. Townsend[1]
Francisco Pineda[1]
Juan Jose Arroyo[1]
Robert E. Klein[1]
Romeo de Leon[2]

ABSTRACT: *This paper describes SINAPS, a program of primary health care in Guatemala, planned by the Ministry of Public Health (MOH), Pan American Health Organization (PAHO), and the Institute of Nutrition of Central America and Panama (INCAP). The objective was to design, implement, and evaluate a program of primary health care in Guatemala based on service delivery by non-professional personnel. These personnel consist of Auxiliary Nurses (AN), Rural Health Technicians (RHT), Rural Health Promoters (RHP), and Traditional Birth Attendants (TBA).*

SINAPS activities are focused on immunizations, food supplementation, oral rehydration of children suffering from dehydration, family planning, perinatal surveillance, and promotion of health and environmental sanitation, with the participation of the community. This limited set of interventions is aimed at controlling the most important causes of death and disability in mothers and children in a cost-effective way. (BIRTH 9:2, Summer 1982)

Introduction

The SINAPS program began in March 1980 in three experimental health districts of Eastern Guatemala with a total population of approximately 70,000. The rural population covered by SINAPS suffers from a high prevalence of malnutrition, illiteracy, infectious diseases, high infant and child mortality, and low life expectancy. As in many other populations of the world, this situation is produced by complex social, cultural, biological, and environmental factors.[1,2] The climate is hot and dry; the terrain is rugged; arable land is scarce; and most of the rural population is engaged in subsistence farming of corn and beans. The estimated median family income is $400 per year, and most of the houses lack sanitary facilities. Children average 2-3 years of school attendance and adult functional illiteracy is high. In this population caloric intake, and not protein, appears to be the main dietary deficiency.

About 80 percent of the children below five years of age suffer some degree of growth retardation in height. Infant and child (1-4 years) mortality are high—infant deaths total about 100 per 1,000 live children. The main causes of death during infancy and preschool ages are dehydration due to diarrhea, lower respiratory in-

---

This paper was presented to the SINAPS Coordinating Committee by the Program Co-Directors, Doctors Romeo de Leon *and* Aaron Lechtig, *to the conference "Technological Approaches to Obstetrics: Benefits, Risks, Alternatives II," on Oct. 17, 1981 in San Francisco, CA; and to the workshop "Family Planning and Health Components in Community-based Distribution Projects" in Charlottesville, VA on Jan. 12-15, 1982.*

This research was partially funded by AID Contract AID/DSPE-C0032-491 and PAHO Grant PX 491.

[1] Scientists, Division of Human Development, Institute of Nutrition of Central America and Panama (INCAP), Apartado 11-88, Guatemala, C.A.

[2] Chief, Division of Human Resources, Ministry of Public Health, Guatemala

0730-7659/82/020097-08 $2.00

fections, measles, whooping cough, perinatal related problems, neonatal tetanus and malnutrition. Since induced abortion is a main cause of maternal death, a high demand for modern contraceptive methods is expected in this population.

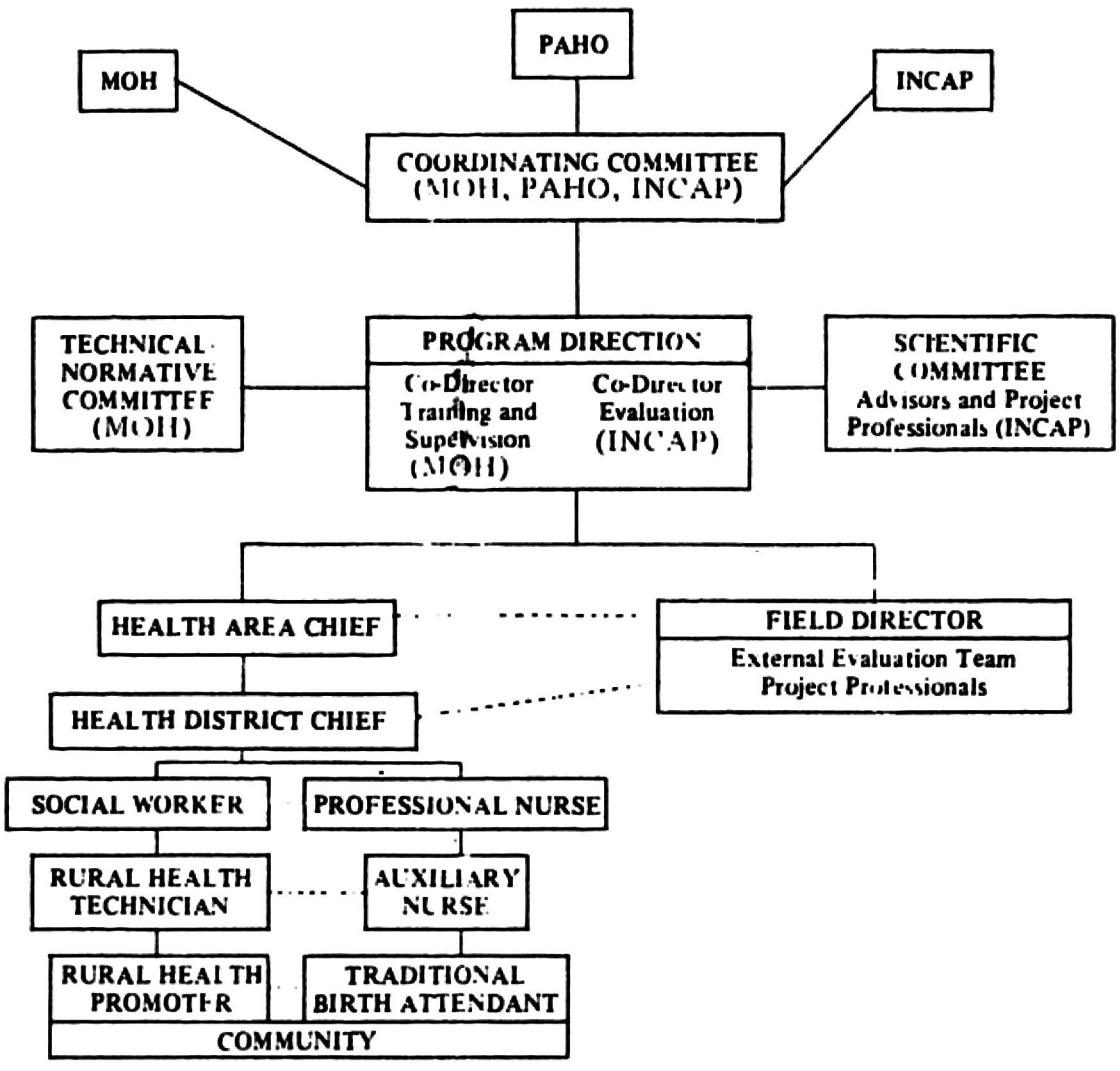
Accordingly, the purpose of the authors was to design a primary health system that is replicable under similar conditions. Because the interventions had to be limited to the most cost-effective ones in terms of impact on infant and child mortality, emphasis was placed on vaccination against whooping cough, neonatal tetanus, measles, poliomyelitis, and tuberculosis, wide distribution of oral rehydration salts (a beverage called supersuero), perinatal surveillance, nutritional supplementation for those identified as malnourished, encouragement of long-term breastfeeding, increase of contraceptive use in order to correct the effects of short birth interval and the high prevalence of induced abortion, and, finally, to correct poor environmental sanitation by promoting the installation and use of latrines. Figure 1 presents the SINAPS organization chart.

Nonprofessional Health Providers

The Rural Health Promoter (RHP) and the Traditional Birth Attendant (TBA) are responsible for delivering the first level of health services, with the supervision and support of the Rural Health Technician (RHT) and the Auxiliary Nurse (AN), respectively. All health services delivery, training and supervision of auxiliary personnel, is the responsibility of the Ministry of Health, through the corresponding Chief of each Health District.

Training of the Rural Health Promoter (RHP) is conducted during one-day sessions each two weeks by the Rural Health Technician (RHT). After each session the Rural Health Promoter implements the corresponding service in the community. For example, during the training for detection and treatment of persons with malnutrition, this activity is implemented in the community. The training of Traditional Birth Attendants (TBA) follows a similar strategy and it is carried out at monthly intervals by the Auxiliary Nurses.

FIGURE 1. SINAPS Organization Chart



The District Chief, aided by the Social Worker, when available, instructs the Rural Health Technicians bi-weekly on the topic that will be discussed with the Rural Health Promoters, during the same week. The District Chief is also in charge of monthly monitoring of the training activities performed by the Rural Health Technician and the Auxiliary Nurses.

Table 1 presents data on the characteristics of a random sample of 135 of the 405 Rural Health Promoters currently active in SINAPS. The average age of the Rural Health Promoters is 27 years; about half are females, half of them married or in common law union, most with at least one grade of formal education, two-thirds Catholic, and 20 percent with previous experience as Rural Health Promoters.

Table 1. Characteristics of SINAPS Rural Health Promoters (n = 135).

	Mean ±S.D.			
Age	27.4 ± 9.8 (15-73)			
Sex	Male 48.9%	Female 51.1%		
Marital Status	Single Without Children 49.6%	Currently In Union 44.5%	Other[1] 5.9%	
Year of Schooling	None 11.1%	1-3 34.8%	4-6 48.1%	More than 6 6.0%
Religion	None 16.3%	Catholic 69.6%	Protestant 13.3%	Other 0.8%
Percentage with prior experience as Rural Health Promoter	20.0%			

[1] Other includes single with children, widowed, divorced or separated.

As of December 31, 1981 there were 24 training centers for Rural Health Promoters and 18 for Traditional Birth Attendants. On average there was one Rural Health Technician supervising and training twenty-four Rural Health Promoters, and one Auxiliary Nurse supervising thirteen Traditional Birth Attendants. In total, 405 Rural Health Promoters participated in monthly training and supervision sessions, with an attendance of 88.3 percent and a coverage of 93.7 percent of the families. In addition, 226 Traditional Birth Attendants completed their first year of training during April 1981, with an average attendance rate of 85.8 percent.

Table 2. Tasks carried out by the Rural Health Promoter.

1. Map and Census
2. Vaccinations
3. Detection of Mothers and Children at High Nutritional Risk
4. Oral Rehydration
5. Distribution of Food Supplements and Food Orientation
6. Primary Curative Care
7. Encouragement of Long-Term Breastfeeding
8. Resupply of Pills and Condoms to Users
9. Health Promotion and Environmental Sanitation

In order to insure maximum coverage and to minimize barriers to the use of health services, SINAPS operations are based on two strategies: the household visit and community meetings at short intervals. A household visit is made every two months to all of the families assigned to the Rural Health Promoter, during which the RHP provides routine services such as census, delivery of oral rehydration salts, and contraceptives. The average visit lasts about half an hour. In addition, follow-up visits are made to those with malnutrition, dehydration due to diarrhea, severe infection, to resupply oral contraceptives, or to provide emergency first aid. Other activities of SINAPS are implemented by means of community meetings at short intervals about two months apart. For example, in each community there is a meeting for vaccination and detection of malnutrition every two months until the coverage is 100 percent. The tasks carried out by the Rural Health Promoters and Traditional Birth Attendants are presented in Tables 2 and 3, respectively.

Table 3. Tasks Carried out by the Traditional Birth Attendant.

1. Care of Normal Pregnancy, Birth and Puerperium
2. Referral of High Risk Mothers to the Health Service
3. Referral of all Newborns and their Mothers to the Health Service
4. Detection of Newborns at High Nutritional Risk

Figure 2a: Birth Coupon with included tape to measure newborn's arm circumference.

ENTREGAR ESTE CUPON A LA FAMILIA PARA QUE LO ENSEÑE EN LA MUNICIPALIDAD Y DESPUES LO ENTREGUE EN EL PUESTO DE SALUD.

ESCRIBA UNA X SI EL NIÑO

Nació Vivo

Nació Muerto

ESCRIBA UNA X SI EL RECIEN NACIDO

Es Hombre

Es Mujer

ESCRIBA UNA X EN EL COLOR DE LA MEDIDA DEL BRAZO

Fecha de Nacimiento: _____ Hora de Nacimiento _____

Nombre del Padre _____

Nombre de la Madre _____

MIDA EL BRAZO IZQUIERDO DEL NIÑO CON LA PARTE ROJA _____ Nombre de la Comadrona

DESNUTRIDO NUTRIDO

Medical Back-up and Referral

Most of the activities performed by the Rural Health Promoters are of a preventive nature. For example, immunizations and measurement of arm circumference (Figures 2a and b) to detect malnutrition are performed by the Rural Health Technician while the Rural Health Promoter provides information to the community to insure that most of the population will be covered. For each activity the health workers have clearly written instructions describing when a patient should be referred to the closest Health Post or Health Center for follow-up medical care. For referral purposes a coupon has been designed and is used in all the Experimental Health Districts.

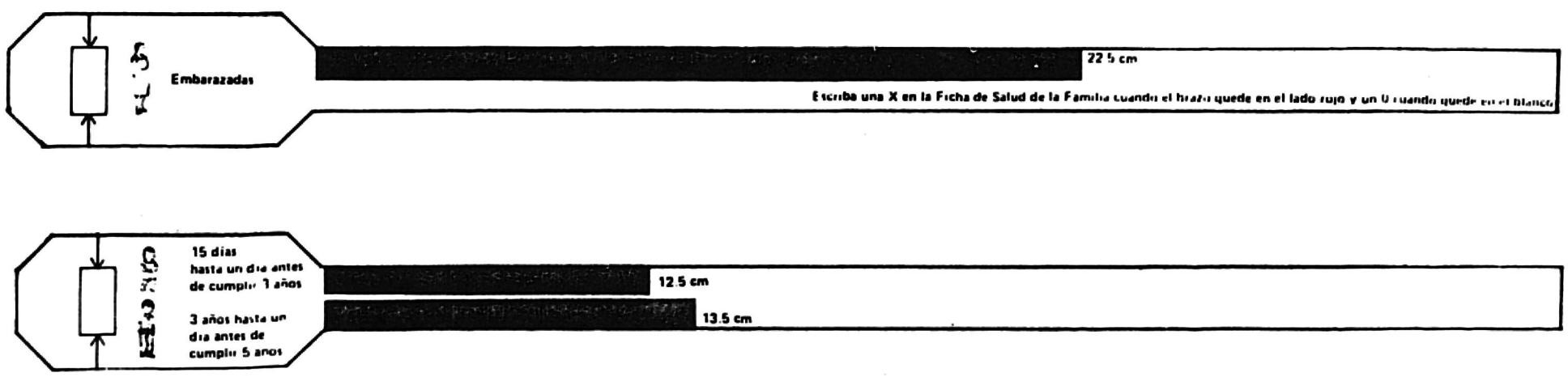
Program Evaluation

SINAPS program evaluation is performed through two different approaches. 1) The internal evaluation is based upon Ministry of Health records of service activities. 2) The external evaluation is carried out by INCAP staff, which survey random samples of households in the experimental and control Health Districts before and after the implementation of health services delivery.

Internal Evaluation

Most of the information for the internal evaluation is collected by the Rural Health Promoter by means of the family health record and coupons for referral or coupons to assign malnour-

Figure 2b: Tapes to measure pregnant women's and children's arm circumference, an index of nutritional status.



ished persons to the food supplementation program. The Traditional Birth Attendant uses the birth coupon (Figure 2a) to refer newborns and their mothers to the health services. The mothers turn their birth coupons in to the corresponding health service during their postnatal examination. Based on these data the Chief of the Health District sends a quarterly report to the Health Area Chief. Summaries of these reports are then processed through the regular channels of the Ministry of Health.

External Evaluation

External evaluation is designed as illustrated in Table 4. Experimental and control health districts were selected at the outset of program

Table 4. Design of SINAPS External Evaluation.

	Baseline Survey	Primary Health Care Intervention	Endline Survey
Experimental Health Districts[1]	Yes	Yes	Yes
Control Health Districts	Yes	No	Yes

[1] These Health Districts were randomly assigned to either the experimental or the control condition. The total number of Health Districts in the three participating Health Areas is 17. The control group is receiving regular MOH services.

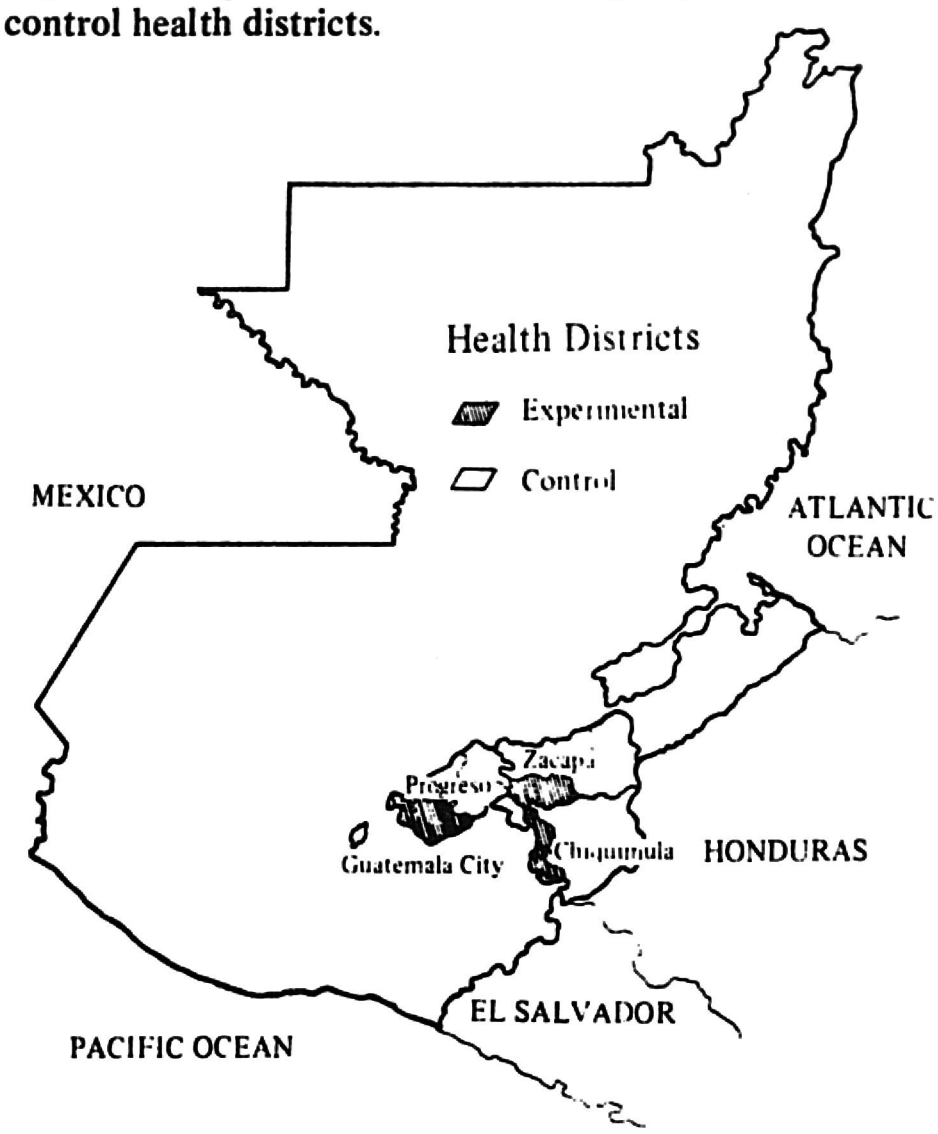
planning. Using a survey team, SINAPS conducted interviews in both experimental and control communities (Figure 3) at the outset of the program and after 6-9 months of program implementation. Coverage of the interviews in both the baseline and endline surveys was more than 95 percent and the total number of interviews was sufficiently large to detect changes in prevalence of malnutrition and of contraceptive users. In addition, the survey team completed 226 quality control re-interviews in the baseline, and 88 in the endline periods to document the reliability of the survey data.

Program Results

Total Population Vaccination Coverage

With 93.7 percent of the RHP's reporting, the total population covered as of December 31, 1981 was 70,179 including 12,839 children under 5 years of age, 14, 598 women between 15 and 49

Figure 3. Map of Guatemala showing experimental and control health districts.



years of age and 1,012 pregnant women. The results presented in Table 5 indicate high vaccination coverage for DPT and polio first dose and for BCG in children from 2 to 60 months of age. Coverage of vaccination against measles in children and against tetanus in pregnant women is not as high though still significantly higher than in the control health districts. What is more important than central trends, the ranges in cover-

Table 5. Vaccination coverage in children under 5 years of age and pregnant women.

Type of Vaccine	Coverage[1]
–DPT/Polio (2 to 60 months)	
1st Dose	93.1
2nd Dose	81.8
–Measles (6 to 60 months)	74.0
–BCG (2 to 60 months)[2]	95.7
–Tetanus Toxoid (pregnant women)	
1st Dose	67.7

[1] Coverage is calculated by the ratio of the number vaccinated/number susceptible during the period x 100. As of December 31, 1981.

[2] Including those vaccinated before SINAPS implementation, as demonstrated by scar in the shoulder.

Table 6. Coverage of detection and treatment of malnourished children and pregnant women[1]

Indicator	Total Number of Persons	Coverage (%)
Number of children from 2 to 60 months of age		
Measured by RHP	10,651	85.8
Detected as malnourished	1,525 (14.3%)	
Receiving food supplements and nutrition education	1,525	100.0
Number of Pregnant Women		
Measured by RHP	656	48.5
Detected as malnourished	173 (26.4%)	
Receiving food supplements and nutrition education	173	100.0

[1] Source of Information: Internal Information System. Ministry of Public Health. As of December 31, 1981

age among the Experimental Health Districts were still too large (about 30 percentage points), an indication of the need for better supervision.

The data collected through the external evaluation (baseline and endline) surveys, clearly indicate also an increase in vaccination coverage for all vaccines for children and mothers significantly from the baseline to the endline in the Experimental Health Districts ($p<.01$). The results from these surveys were remarkably similar to those presented in Table 6 as reported by the RHPs, a finding that suggest high reliability of data collected through the Internal Information System.

Food Supplementation and Prevalence of Malnutrition

Table 6 shows the coverage of detection and treatment of malnutrition as reported by the RHPs. Detection of malnourished children and pregnant women was carried out by means of the arm circumference tapes and limits presented in Figure 2b. Coverage of measurement of arm circumference was high for children and relatively low for pregnant women, a finding similar to that reported in Table 5 on coverage of vaccinations and due to the fact that the delivery activities are conducted during the same community meetings. As of December 31, 1981, 100 percent of the children and pregnant women identified as malnourished were receiving food supplements and food education through their local RHPs.

Data from the external evaluation surveys indicated no significant changes in the prevalence of malnutrition between the Experimental and Control Health Districts. No significant impact was expected in this area, as the food supplementation program was implemented five months before the beginning of the endline survey, when effective arrangements could be implemented between the MOH and CARE.

Oral Rehydration

A total of 83.7 percent of the households with children under 5 years of age received bags of "supersuero" as well as information from the RHPs on how and when to use it. Just as impor-

Table 7. Response of mothers to the question: "What did you do the last time your child under five years of age had diarrhea for more than two consecutive days?"[1,2]

	Number of Mothers	Used "Supersuero"or Oral Rehydration Salts (ORS)	Used Drugs from Pharmacy (not including ORS)	Visited a Health Center or Post for Treatment	Did Nothing or Used a Household Remedy
Baseline					
Control	(n = 490)	(1) 0.2%	(349) 71.2%	(107) 21.8%	(33) 6.7%
Experimental	(n = 630)	(2) 0.5%	(424) 67.3%	(134) 21.3%	(70) 11.1%
Endline					
Control	(n = 542)	(1) 0.2%	(401 74.0%	(99) 18.3%	(41) 7.6%
Experimental	(n = 716)	(271) 37.8%	(331) 46.2%	(83) 11.6%	(31) 4.4%

[1] The change in use of "supersuero" in the Experimental Health Districts from the baseline to the endline was statistically significant ($p<.01$).

[2] The drugs that are commonly used for the treatment of diarrhea are antibiotics, mixtures of pectin and kaolin, iodine based preparations and popular products including bicarbonates and laxatives.

Table 8. Percentage of non-pregnant women between 15-44 years of age in union who use a modern contraceptive method

	Experimental		Control	
	Baseline (n = 726)	Endline (n = 700)	Baseline (n = 536)	Endline (n = 533)
Female sterilization	6.3%(46)	7.7%(54)	5.6%(30)	6.4%(34)
Oral Contraceptives	3.6 (26)	4.6 (32)	7.3 (39)	7.9 (42)
Condoms	0.8 (6)	2.7 (19)	0.2 (1)	0.6 (3)
Program Total	10.7 (78)	15.0 (105)	13.1 (70)	14.8 (79)
IUD	1.4 (10)	1.1 (8)	1.1 (6)	1.3 (7)
Others[1]	1.5 (11)	0.6 (4)	0.9 (5)	1.9 (10)
Total	13.6 (99)	16.7 (117)	15.1 (81)	18.0 (96)

[1] Other methods include: injections, foams, jellies, tablets, diaphragms and vasectomies.

[2] The difference between program totals in the baseline and endline surveys in the Experimental Area is significant: $\chi^2=5.77$, df-1, $p<.05$. The difference between baseline and endline in the Control Area is not.

tant is that 61.9 percent of the mothers receiving "supersuero" knew how to prepare it and when to use it properly. Another 23.2 percent of the mothers knew how to prepare it but were not sure when to use it. In this sample 57.0 percent used the "supersuero" received.

Table 7 reports mothers' responses to the question, "What did you do the last time your children under 5 years of age had diarrhea for more than two consecutive days?" Data from the baseline and endline surveys in the Experimental Health Districts indicates that use of "supersuero" increased dramatically (from 0.5 to 37.8%) while the use of drugs from the pharmacy and the use of the Health Posts facilities for diarrhea was reduced considerably.

Data from the endline survey indicated an overall increase in the use of MOH services of 9.1 percent in the Experimental and 7.4 percent in the Control Districts during the same period. Use of the Health Posts for the treatment of diarrhea remained high (18.3%) in the control Health Districts.

Family Planning

Table 8 presents the percentage of non-pregnant women in union between 15 to 44 years of age who used a modern contraceptive method at the time of the baseline and endline surveys. For all modern methods the prevalence increased in both the Experimental and Control Health Districts by about 3 percent. However, for methods available within the SINAPS Program (oral, condoms and female sterilization) the increment was 4.3 percent (40% increase) between the baseline and endline surveys ($p<.05$) in the Experimental Health Districts. A non-significant increase of 1.7 percent (13% increase) was found in the Control Health Districts. The endline survey was conducted from 3 to 6 months following the household level distribution of orals and condoms.

A comparison between users and non-users of contraceptive methods indicated that users tend to be older (32.0 ± 6.7 vs. 29.8 ± 7.8 years, $p<.01$) with more years in union (13.6 ±6.7 vs. 11.6 ±7.7 years, $p<.01$) and a larger number of pregnancies (5.4 ±2.7 vs. 4.9 ±3.4, $p<.05$). They also are somewhat heavier as evidenced by significantly larger arm circumference (1.8 cm. larger). In addition, users as opposed to non-users tend to live in more urban settings (34.0% vs. 16.4%, $p<.01$) and are more literate, (56.6% vs. 26.6%, $p<.01$). They have more schooling (33.5% vs. 13.8%, $p<.01$) and work more frequently in income producing tasks (27.4% vs. 15.7%, $p<.01$). In general, the emerging pattern was that contraceptive users are a much more "modern" group, regardless of age differences (due largely to those selecting female sterilization) or location in the SINAPS area. Thus, despite the almost universal availability of oral contraceptives and condoms in the Experimental Health Districts, contraceptive users appear to be a higher socioeconomic group.

In contrast with the relatively small changes in prevalence of contraceptive use, a large increment was found in the Experimental Health Districts in the ability to recall or recognize the names of the contraceptive methods (from 59.5% to 71.2%). For program methods (orals, condoms and female sterilization), the increment was even greater, from 69.1 to 85.2 percent. Though it is recognized that the ability to name a method is quite different from being able to describe how to use it and where to obtain it, this increase in knowledge may be the first step in increasing overall contraceptive use.

Mortality

No consistent changes in infant or child mortality were found either through the external evaluation surveys or the Internal Information System. Though there was a drop in child mortality rates (1 to 4 years of age) in the Experimental Health Districts from 11.4 to 4.9 per 1,000 children alive ($p<.01$), yearly fluctuations in mortality are common and additional data are being sought to interpret these results.

Cost of SINAPS Service Delivery Activities

The net additional cost per capita of SINAPS activities at the Health District level is estimated at $0.99 the first year and $0.72 the second and subsequent years. The most expensive component of the program is the training and supervision of voluntary personnel due to the cost of per diem for attendance of this personnel at training sessions and the additional gasoline required per month for supervision. It should be noted that the administrative costs of managing the program at the Health Area level and above are not included (approximately $0.20 more per capita per year).

Budgeted expenditures by the MOH in the SINAPS Health Districts in 1980 were approximately $2.00 per capita (exclusive of hospital, central administration and training costs).

The total cost of SINAPS may vary depending on the need for additional Rural Health Technicians, the necessity of using CARE foods, previous vaccination coverage, and the availability of oral rehydration salts and contraceptives. The MOH usually allocates money in the regular budget for rural health promoter training, vaccines, transportation of CARE foods and other services.

The total additional cost of SINAPS for all rural population in Guatemala is approximately $5.94 million the first year and $4.32 million in subsequent years, assuming national coverage of 6 million persons in rural areas. This amount represents less than 4 percent of the MOH national budget in 1980.

Acknowledgements

The authors wish to express their gratitude to Dr. Roquelino Recinos Méndez, Minister of Public Health of Guatemala, to Dr. Angel Paz Cojulún and Dr. Leonel Barrios, Director General and Deputy Director General respectively, of the Health Services Bureau, Ministry of Health of Guatemala, for their valuable contribution in making a reality of this project. Also, to Dr. Rudy Gutierrez, Dr. Salavdor Baldizón, Lic. Rolando Duarte, Lic. Hedi Deman, nurse Mercedes de Castillo and Miss Marta Amanda Barrera, members of the SINAPS team.

Finally, the authors express their gratitude to Dr. Jorge Osuna and Carlos Hernán Daza, from PAHO (Washington, D.C.) and to Drs. James Heiby, Gerald Bailey and Duff Gillespie from AID-DSB, Population Research Office for their help and encouragement to conduct this project.

References

1. Lechtig A, Klein RE: Effect of Food Supplementation during Pregnancy and Lactation on Infant Mortality, Morbidity and Physical Growth. Arch. Latinoamer. Nutr., 29(4)(suppl. 1):99-142, 1979.
2. Lechtig A, Klein RE: Estado Biologico de la Poblacion Guatemalteca: Definicion, Causas y Estrategias de Acción para Mejorarla. Rev. Col. Med. (Guatemala). 29(3):93-106, 1978.
3. National Census, Republic of Guatemala, 1973.
4. National Health Plan, Ministry of Public Health and Social Welfare. Republic of Guatemala, 1978.
5. Pan American Health Organization. Health for all by the year 2000: Strategies. PAHO Documento No. 173. PAHO; Washington, D.C., 1980.
6. SINAPS, Evaluation Model SINAPS Internal Document, 1981. SINAPS Program, INCAP, Aptdo. 1188, Guatemala, Guatemala.
7. SINAPS, Model for Health Services Delivery. SINAPS Internal Document, 1981. SINAPS Program, INCAP, Aptdo. 1188. Guatemala, Guatemala.
8. SINAPS. Supervision Model. SINAPS Internal Document, 1981. SINAPS Program, INCAP, Aptdo. 1188, Guatemala, Guatemala.
9. SINAPS, Training Model. SINAPS Internal Document, 1981. SINAPS Progam, INCAP, Aptdo. 1188, Guatemala, Guatemala.