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**USAID IMPACT ON COSTA RICA DEVELOPMENT  
DURING 1940-1990: HEALTH SECTOR**

**Leonardo Mata**

**P.O.Box 212  
Guadalupe 2100  
COSTA RICA**

**Telefax (506) 235-7165  
Box 212, Guadalupe 2100  
Costa Rica**

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## ABBREVIATIONS

<b>ADC</b>	<b>Asociación Demográfica Costarricense (Costa Rican Demographic Association)</b>
<b>APS</b>	<b>Atención Primaria de la Salud (Primary Health Care)</b>
<b>AyA</b>	<b>Instituto Costarricense de Acueductos y Alcantarillados (Costa Rican Institute of Aqueducts and Sewerage). Same as SNAA</b>
<b>CENDEISSS</b>	<b>Centro de Docencia e Investigación en Salud y Seguridad Social (Center of Training and Research in Health and Social Security)</b>
<b>CITA</b>	<b>Centro de Investigación en Tecnología de Alimentos (Research Center in Food Technology)</b>
<b>CCSS</b>	<b>Caja Costarricense de Seguro Social (Costa Rican Social Security Bursar)</b>
<b>CDC</b>	<b>Centers for Disease Control and Prevention</b>
<b>CEN</b>	<b>Centro de Educación y Nutrición (Center of Education and Nutrition)</b>
<b>CESPO</b>	<b>Centro de Estudios de Población (Center for Populations Studies)</b>
<b>CINAI</b>	<b>Centro Infantil de Nutrición y Atención Integral (Infant Center of Nutrition and Holistic Care)</b>
<b>CNP</b>	<b>Consejo Nacional de Producción (National Council for [Food] Production)</b>
<b>CONAPO</b>	<b>Consejo Nacional de Población (National Council for Population)</b>
<b>DESAF</b>	<b>Dirección de Desarrollo Social y Asignaciones Familiares (Directorate of Social Development and Family Allowances)</b>
<b>DGEC</b>	<b>Dirección General de Estadística y Censos (General Directorate of Statistics and Census)</b>
<b>DINADECO</b>	<b>Dirección Nacional de Desarrollo Comunitario (General Directorate of Community Development)</b>
<b>GOCR</b>	<b>Government of Costa Rica</b>
<b>IMAS</b>	<b>Instituto Mixto de Ayuda Social (Mixed Institute for Social Aid)</b>
<b>INCAP</b>	<b>Instituto de Nutrición de Centro América y Panamá (Institute of Nutrition of Central America and Panama)</b>
<b>INCIENSA</b>	<b>Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud (Costa Rican Institute of Research and Training in Nutrition and Health)</b>
<b>INISA</b>	<b>Instituto de Investigaciones en Salud (Institute for Health Research)</b>
<b>INS</b>	<b>Instituto Nacional de Seguros (National Institute of Insurances)</b>
<b>IPPF</b>	<b>International Planned Parenthood Federation</b>
<b>LDC's</b>	<b>Less developed countries</b>
<b>MOH</b>	<b>Ministry of Health (Ministerio de Salud)</b>
<b>MIDEPLAN</b>	<b>Ministerio de Planificación y Política Económica (Ministry of Planning and Economic Policy)</b>
<b>MS</b>	<b>Ministerio de Salud (Ministry of Health)</b>
<b>NIH</b>	<b>National Institutes of Health</b>
<b>OCIS</b>	<b>Oficina de Cooperación Internacional en Salud (Office for International Cooperation in Health). Before, OCCASP</b>
<b>OCCASP</b>	<b>Oficina de Cooperación Costarricense-Americana en Salud Pública (Office for Costa Rican-American Cooperation in Public Health). Later, OCIS</b>
<b>PAHO (OPS)</b>	<b>Pan American Health Organization (Organización Panamericana de la Salud)</b>

<b>PCV</b>	<b>Peace Corps Volunteers</b>
<b>PSC</b>	<b>Programa de Salud Comunitaria (Community [urban] Health Program)</b>
<b>PSR</b>	<b>Programa de Salud Rural (Rural Health Program)</b>
<b>PUMAR</b>	<b>Programa de Unidades Móviles para el Area Rural (Program of Mobile Units for the Rural Area)</b>
<b>SAREC</b>	<b>Swedish Agency for Research and Cooperation with Developing Countries</b>
<b>SCISP</b>	<b>Servicio Cooperativo Interamericano de Salud Pública (Interamerican Cooperative Service of Public Health)</b>
<b>SNAA</b>	<b>Servicio Nacional de Acueductos y Alcantarillados (National Service of Aqueducts and Sewerage). Same as AyA</b>
<b>SNEM</b>	<b>Servicio Nacional de Erradicación de la Malaria (National Service for Eradication of Malaria)</b>
<b>UCR</b>	<b>Universidad de Costa Rica (University of Costa Rica)</b>
<b>UFCO</b>	<b>United Fruit Company (Compañía Bananera)</b>
<b>UNICEF</b>	<b>United Nations Children's Fund (Fondo de las Naciones Unidas para la Infancia)</b>
<b>USAID</b>	<b>United States Agency for International Development</b>
<b>WHO (OMS)</b>	<b>World Health Organization (Organización Mundial de la Salud)</b>

## **ABSTRACT**

This work deals with the evolution of the health condition of Costa Rica in the last 50 years, and on how that evolution might have been influenced by international cooperation. Selectively, the analysis focused on the participation of the United States Agency for International Development (USAID), but other influential organizations were discussed. The first section of the text describes the evolution of health during 1900-1940, before the USAID got involved in Costa Rica. Contrary to behavior of other countries, Costa Rica was characterized by an early adoption of the infection paradigm, an element determining the marked emphasis on education and hygiene during the last 150 years. All governments tried hard to alleviate or solve obvious health problems and emergencies. Wisely, the country implemented public health measures, promptly after the know how was known or became available. Generally, programs were holistic and addressed the environment, in order to curtail or interrupt the cycle of parasites and other infectious agents. Thus, programs were directed to the prevention of disease, and they concentrated on sanitation, water supplies, health education, and health services.

The second large section of the text describes with some detail, the possible role that international agencies, especially the USAID, had in the marked changes observed in the health condition of Costa Rica, particularly in the epidemiologic transition, the genesis of primary health care, and other critical advances. The documentation for project analysis showed that both the Government of Costa Rica the USAID had a clear idea of the most relevant health priorities of the country, and that both were committed to collaborate and to find ways to tackle health problems. The influence of the USAID pertains to three periods historically defined. Period 1 - 1945-1959 - was characterized by holistic and ambitious projects with potential effects on health. The period belong to the projects of the "Servicio Cooperativo Interamericano de Salud Pública, SCISP" (Interamerican Cooperative Service of Public Health), which focused on sanitation, water supplies, health services, and control of specific disease and malnutrition. Programs influenced large sectors of the population, and had strong long-lasting effects. Period 2 - 1960-1979 - expanded and consolidation the gains of the earlier period, also by holistic projects with a wide coverage. The resulting health indicators of Costa Rica in the early 1990's were similar to those of more advanced industrial nations. Period 3 - 1980-1994 - was notorious for the concentration of projects on medical care and hospital management, rather than on preventive health. In this period, the USAID projects did not always address the most relevant priorities of the nation. Nevertheless, Costa Rica currently enjoys the highest index of human development in Latin America. Many biological, cultural, economic and political factors have contributed to this accomplishment, among them the contribution of ideas, expertise, and funding from the nation itself, and from international agencies like the PAHO, the USAID and the UNICEF.

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## **A. EVOLUTION OF HEALTH IN COSTA RICA, 1900-1994**

### **A.1 From 1502 to 1900**

When the Spaniards arrived in Costa Rica at Cariari (today's Puerto Limón), the Amerindians seemed well adapted to the environment which for the most part, was undisturbed and free of the maiming diseases prevalent in Europe. Within three centuries, the Amerindians were practically wiped out by genocide, imported epidemic diseases, ensuing malnutrition, and crossing with the Spaniards (Fernández 1889, Denevan 1990, Durán-Luzio 1992). The emerging Costa Rican population was growing very slowly, in poverty, underdevelopment, deficient personal hygiene, lack of environmental sanitation, and poor and monotonous diets. These factors, along with the warm climate and abundant rainfall, favored the endemicity of parasitic infections and malnutrition. Costa Rica did not have mineral resources, nor flat lands for cattle and crops, or a strong labor force to be exploited. Therefore, it was one of the poorest Spanish colonies in the Americas, a situation continuing through the 1920's, although there were subtle gains particularly after the discoveries of Louis Pasteur.

The prevailing and persisting poverty and deprivation did not preclude Costa Rica from doing its best to improve health and education. For instance, José María Castro-Madriz, the most illustrious President Costa Rica ever had, and the founder of the Republic in the 1840's: a) Began the Hospital San Juan de Dios, the University of Saint Thomas, the Normal School (to train teachers) and the Lyceum for Girls; b) Ordered construction of the water supply of the capital city; and the construction of many buildings and roads (Obregón-Loría 1949). Also, the governments constructed impressive hospitals and clinics in the XIXth century, (Table 1), and passed laws and implemented programs to control epidemics of rabies, leprosy, and cholera (Cabezas-Solera 1990, Jaramillo-Antillón 1993).

Meantime, the people crystallized certain attributes which typify the Costa Rican idiosyncrasy: love for work, education, health, freedom, democracy and peace. It is not surprising that such society would rapidly accept and implement the scientific and technological advances in medicine and health stemming from Europe and the United States. For instance, vaccination against smallpox was introduced in 1806 (Cabezas-Solera 1990), and treatment against hookworm disease and tuberculosis began early in the XX century (Pupo 1924). The absence of a formal and stable medical school in Costa Rica until 1961, forced training of physicians overseas, favoring influence of different philosophies, and an opening to foreign knowledge and wisdom.

Around 1900 the dominant pathology was endemic and epidemic infectious diseases, malnutrition, injuries, and other ailments typical of the underdeveloped tropics. Such situation was favored by lack of appropriate technology and the prevailing poor hygiene, sanitation, and diet. News arriving by boat and with physicians trained overseas, had the knowledge advanced by Pasteur, Koch and Bernard. The germ theory of disease gained ground, marking the beginning of hygiene and diseases prevention. Among the most

important advances to follow were the accurate diagnosis of parasitic diseases, and the international cooperation, and development of public health practice.

## **A.2 Birth of Public Health**

### **A.2.a Carlos Durán, the pioneer**

The advance in knowledge of parasitic diseases in Costa Rica goes to Dr. Carlos Durán-Cartín, who trained in Paris and London, and became a Member of the stringent Royal College of Surgeons of England in 1874. At the end of the 1800's, the San Juan de Dios Hospital (see above) lacked operating rooms, and doctors might have to amputate limbs on the floor and without anesthesia. Carlos Durán reorganized the hospital, built operating rooms, started anesthesia and asepsis, brought the first microscope in the country, created the first laboratory for clinical pathology, and began teaching medicine and nursing. Carlos Durán concluded that the progressive "cansancio" (tiredness) that killed hundreds of children and adults especially in rural areas, was hookworm disease, a malady described 60 years earlier in Italy. Durán established the diagnosis, and began treatment and preventive action against this and other parasitic diseases like malaria. Appointed in important political positions (including the Presidency of the nation), he improved the city's network of water supplies and sewers, and founded a sanatorium for tuberculosis (Pupo 1924).

### **A.2.b The Rockefeller Foundation**

In the early XXth's, the Foundation launched a vast campaign to curtail parasitic and bacterial diseases throughout the world. Costa Rica was favored with this cooperation, and the Foundation created and staffed the Department of Ankylostomiasis (hookworm disease) in 1914. Dr. Lois Schapiro headed this laboratory. In 1916 Dr. Schapiro from the Foundation and a resident of Costa Rica, convinced the government to create the Department of School Sanitation, and in 1924, of the first public health laboratory, both funded by the Foundation. The vast and sustained work of these departments is described in details in the Ministry of Government (1916-1927) and the Secretariat of Public Salubrity (thereafter). The Rockefeller Foundation had a leading role in Costa Rica in identifying, diagnosing and control and prevention of the leading health problems. For instance, in 1925 examined 400,000 people for malaria, and in the 1930's surveyed more than 30,000 people for intestinal parasites, and a large survey for pulmonary tuberculosis. These incredible studies were followed by implementation of treatment and preventive programs, in some cases accompanied by evaluation of impact (Núñez-Frutos, correspondence). The intervention of the Foundation required the training of local personnel in field and laboratory procedures, laying ground for public health practice, medical education and biomedical research.

### **A.2.c Solón Núñez, father of public health**

Dr. Solón Núñez-Frutos, a school teacher born in poverty, trained in medicine and public health, at the University of Geneva, and returned to Costa Rica in 1916. Shortly

thereafter he was selected to head the Department of School Sanitation (see above). Solón Núñez was appointed Assistant Director of the Department of Ankylostomiasis. In 1920 he was sent by the Rockefeller Foundation to train in public health at Johns Hopkins. Upon his return, he influenced the government to create the Sub-Secretary of Hygiene and Public Health in the Ministry of Government in 1922 (President Julio Acosta). Solón Núñez was the Minister of Health (or equivalent) in 1920-1936 and 1942-1948 (six administrations). He passed the laws and decrees in 1922-1923 for the protection of public health and public assistance, in 1924 for compulsory construction of latrines, control and prevention of hookworm disease, creation of the first public health laboratory (see above), in 1925 for regulation of food factories, control of snake bites, in 1926 to control contamination of water, in 1927 for notification of tuberculosis, control of opium and derivatives, free treatment for teachers, children and medical officers, creation of the Secretariat of Public Salubrity and Social Assistance, in 1928 for creation of a hospital in Limón, of the Department of Sanitary Engineering, appointment of midwives where there was no doctor, creation of the Department of Vital Statistics, construction of water supplies, in 1931 for the anti-tuberculous Sanatorium, and so forth (Frutos-Verdesía 1979, Jaramillo 1993). Clinics were created for sexually-transmitted diseases (Jaramillo 1993). In 1927 he was appointed Under Secretary of Public Salubrity and Social Protection, which later evolved to today's Ministry of Health. He established compulsory notification of smallpox, yellow fever, rabies, cholera, typhoid, typhus, diphtheria, plague, malaria, tuberculosis and leprosy. Vaccination against smallpox became compulsory and actions for malaria control were strengthened.

Other pioneers of public health were Carlos Pupo-Pérez, Enrique Jiménez-Núñez and Luis Matamoros (the latter two, engineers) who in the early XX century did much for the water supply and sanitary education of the population. The national crude death rate in Costa Rica at that time was 41 per 1,000, and the diarrhea death rate in the capital city was one of the highest in the world (Jiménez & Jiménez, 1901), and the infant mortality about 250 per 1000 (Pupo, 1913). Although national censuses had been carried out in the XIX century, the first systematic and permanent vital statistics commenced at the beginning of the XXth century.

### **A.3 Health and Education versus Militarism**

Costa Rica is unique in having abolished the armed forces in 1949. (Recently, Panama also abolished the armed forces). The suppression of the army was not fortuitous for there were background contributing factors (Mata 1996). The beginning of the attrition occurred in the aftermath of an ephemeral war with Panama in 1920 after which President Julio Acosta, with the stroke of a pen, reduced the forces from 5,000 to less than 1,000 men. Thereon, the army shrunk progressively to near 300 men in 1947, one third of them officers in two barracks. A short bloody civil uprising in 1948 led by José Figueres, empowered a 12-men Junta for 18 months. But dictators in neighboring nations, feeling threatened by Caribbean warriors stationed in Costa Rica, exerted enough influence to have the U.S. State Department press the Junta to reduce such threat. Figueres expelled the Nicaraguans from

Costa Rica who were the most numerous, and announced the suppression of the armed forces on December first, that year. The suppression of the army had been insistently proposed by Colonel Edgar Cardona, then Minister of Public Security, who wanted more funds for education. In 1949, the deputies of the Constituency unanimously decreed the abolition of the armed forces. This action left significant funds to be used for health and education, as shown in **Figure 1** (Mata and Rosero 1988). The absence of the army was a deterrent of political unrest, coup d'états, and armed conflicts, which characterized Costa Rica in earlier times (Obregón-Loría 1981). It also contributed to consolidation of democracy, freedom, justice, and progress in this nation. Costa Ricans expend more in health and education than in national defense and police force. Per capita expenditures for health and education already were high in the late 1920's and 1930's, and increased significantly in the early 1940's during the social reform of that decade (see below). The economic depression after World War I resulted in a considerable reduction in per capita expenditures in health and education. Curiously, expenditures in militarism and police also decreased. After the abolition of the army, there was a coincidental dramatic rise in the budget for health and education (Mata 1984, Mata and Rosero 1988, Mata 1996).

#### **A.4 Evolution of Health, 1900-1950**

Sandy and humid soil, abundant rainfall, warm temperature, and shade from lush vegetation favored survival of hookworm larvae and embryonation of eggs of intestinal worms shed by humans who then were indiscriminate squatters. The deforestation required to make banana plantations produced an optimal ecosystem for proliferation of mosquito vectors of malaria (Mata and Mata 1993). The lack of sufficient safe intra-domiciliary water enhanced endemicity of infectious diarrheal and respiratory diseases. Crowding and deficient diets were factors for the rapid spread of tuberculosis and other infections transmitted by person-to-person contact. Underdevelopment was also conditioned by deficient communication among villages which remained virtually isolated from each other by natural barriers, until the opening of the Interamerican Highway in the early 1940's. The irregular topography of the land forced peasants to build homes in scattered fashion over extensive areas, to keep watch of the family, crops, and livestock. Medical and other services were deficient or nonexistent, and people suffered from unattended illness, disability, and death without medical or paramedical assistance. Nevertheless, in this milieu of poverty and underdevelopment, Costa Ricans somehow slowly improved their health condition.

Since Independence in 1821, most governments gave emphasis to control and prevention of infectious diseases, particularly those carried by water, soil, and food. Early in the XXth century, health education was introduced in the curriculum of grammar schools. Personal hygiene and environmental sanitation were strengthened since the 1920's, and there were serious efforts to improve water supplies, use of latrines, and the quality of milk and other foods. These developments were supported by scientific knowledge emerging in the north. Travelers and doctors trained overseas had a fundamental role in the spread of modern science, techniques, and medicines. The discovery of vitamins and other advances in nutrition and food science, influenced dietary habits of Costa Ricans, especially children.

#### A.4.a Maiming diseases

Malaria, hookworm disease, tuberculosis, leprosy, and other maiming diseases were very common in Costa Rica at that time.

**Malaria.** The lowlands were, as today, the natural habitat of Anopheles albimanus, the local malaria vector. The banana plantations, the workers and the climate, all favored endemic malaria in the Caribbean coast, the year round. The Rockefeller Foundation, already with several years of experience in public health in Costa Rica, carried out a large malariometric survey in 1925, which found a 12.5 per cent prevalence among 400,000 people (AID, 1971). Malaria was circumscribed to the lowlands, and was a serious drain to the nation's economy, of great concern to health authorities and managers of the United Fruit Company (UFCO). Four species of Plasmodium were found at that time: P. falciparum was the most important, for its high prevalence and killing capacity; P. vivax was second as a cause of morbidity; P. malariae and P. ovale were less prevalent. The banana and railway companies had brought hundreds of black workers from Jamaica and other Caribbean islands, because of their known resistance to tertian malaria. But even black children and adults died easily of P. falciparum. Malaria deaths in adults, however, had a profound social impact because they affected the whole family well being and economic condition. Malaria probably accounted for more than 10 per cent of the national mortality in those years, with death rates as high as 250 per 100,000. The malaria death rate then was equivalent to more than one half of the contemporary crude death rate. The UFCO established general hospitals in Golfito, Quepos and Limón, which ran smoothly under American management. The company acquired significant expertise in treating cases, use of larvicides and residual insecticides, and in the control of breeding sites and other environmental approaches.

**Hookworm disease.** While training in England, Carlos Durán-Cartín arrive at the conclusion that the "tiredness" of the Costa Rican workers was due to hookworm disease. Once in Costa Rica, he diagnosed the infection in stools under the microscope, and found the parasite in the intestine of dead persons. He then launched the "Fight against hookworm", a program to treat and prevent the disease. The Rockefeller Foundation conducted a large survey of intestinal parasites in the early 1930's, which revealed almost one half of the persons infected. At that time, fecal pollution of the soil was rampant because latrines were scarce. Furthermore, most laborers went barefoot. The Foundation trained many local people in microscopic diagnosis of intestinal parasites, of great relevance to the future of clinical parasitology. The survey was followed by a program to prevent and control the disease, especially in coffee-growing areas, the main source of foreign currency. Incidentally, a factor in the high infant mortality among children of coffee pickers, was being left unattended by their parents during the coffee harvest. Thus, the Foundation helped in the development of the first daily child care centers in the nation (MS 1936).

**Tuberculosis.** The Rockefeller Foundation also found a high prevalence of pulmonary tuberculosis in a large survey in the mid 1930's, by fluoroscopic examination of the lungs and tuberculin skin tests. This study was followed by BCG vaccination of more

than 300,000 persons. In the ensuing decade, practically no new cases of tuberculosis were detected among vaccinees, and the incidence of pulmonary disease decreased accordingly. BCG vaccination became a routine practice in Costa Rica (as vaccinia inoculation already were), and the need for follow up studies and program evaluation were incorporated in public health practice.

#### A.4.b Crude mortality

Two large series of autopsies were studied at the San Juan de Dios Hospital to assess the relative frequency of causes of death in the 1920's, as compared to the 1970's (Moya et al. 1981). This hospital practically was the only place to go for serious illnesses in the country, and it continues to be the most reputed and busiest. Among 902 autopsies of persons dying in 1927-31, infectious diseases were the main causes of mortality (Table 2). The average age at death was 35 years for women and of 34 years for men. The main causes were tuberculosis, diarrhea, lower respiratory infection (46%) and hookworm, round worm, amebiasis and other parasitic diseases (12%). Malignancies occupied a third place among the causes of mortality (9%), one half of them being gastric cancer. Cardiovascular and renal diseases were less frequent, with 6 and 5 per cent, respectively. Finally, diseases of the central nervous system and digestive tract (other than infectious) represented each 2.5 per cent of the deaths. In this study malaria was not conspicuous, likely because many patients did not make it to the highland hospital due to the severity of falciparum malaria and deficient transportation.

Severe energy-protein malnutrition (EPM) was not recorded as a cause of death then, but undoubtedly nutritional deficiencies were very common, enhancing symptomatology of infectious disease as well as the risk of death. They affected infants, young children, the elderly and some adults. Iodine deficiency was highly prevalent, and 20 per cent of adult women had visible or palpable goiter (Mata et al. 1983). EPM must have been common due to the overwhelming infections and diets consisting of maize (or rice), black beans, and panela. Animal protein was scarce, and vegetables and fruits were not regularly consumed. Panela was consumed in water or chunks, and tooth decay was rampant. There were deficiencies of calories, lysine, tryptophane, vitamins A and D and riboflavin, iron, iodine, and probably zinc (Reh and Fernández, 1955). Judging by the exceedingly high infant mortality in that period (248 per 1000 live births in 1920, 132 in 1940, Figure 2 and Table 3), infants were dying of infections and marasmus, this resulting from the interaction of infectious diseases with a poor nutritional state (Mata 1978a). Older children died of edematous malnutrition (kwashiorkor), known to local pediatricians as "síndrome policarencial de la infancia, SPI" (multiple deficiency syndrome of childhood) (Peña-Chavarría et al. 1948).

About one half of the pediatric beds of the San Juan de Dios Hospital were filled with cases of SPI. Children exhibited pellagroid skin changes and colorless hair or reddish bands in the head ("flag sign"), indicative of periods of protein deprivation and synthesis. In response to such formidable problems, the government reacted with emphasis on

environmental sanitation, health education, and medical care, since the 1920's. In the 1930's, the emphasis was more concern for hygiene, school education, and improved treatment and prevention.

#### **A.4.c Social reform in the 1940's**

This decade can be regarded as one of enactment of social legislation and material accomplishment. Laws were passed for social and labor guarantees, for instance, maximum working time, minimum wages, paid vacations, compensation, retirement plan, and free medical assistance for workers and their families. Programs were established to immunize against communicable diseases, improve nutrition and treat and prevent parasitic and infectious diseases. Law No.107 of June 30, 1941 declared compulsory the wearing of shoes among children of public and private schools. The government organized factories and shoemakers and with the trucks of the Ministry of Public Works, distributed complimentary shoes for virtually all school children, in an excellent case of intersectoral action. The General Law of Health and a Sanitary Code were approved (Salazar-Mora 1993).

Pioneer health institutions were created in the early 1940's (Table 4), such as the "Caja Costarricense de Seguro Social, CCSS" (Costa Rican Social Security Bursar), the "Consejo Nacional de Producción, CNP" (National Council of [food] Production), the "Instituto anti-Cancer" (Anti-Cancer Institute), and dozens of Sanitary Units and social assistance wards. Also, the government built or expanded piped water supplies, sewerage systems, and thousands of latrines and septic tanks. Many school luncheons were established. Emphasis was given to urban and rural cleanliness and the government improved the roads and paved the streets of downtown San José. Special institutions, offices and programs were created, like the Secretary of Labor and Social Service, and the National Board of Housing, to provide decent housing for the poor (Salazar-Mora 1993). In the Education Sector, the University of Costa Rica, the School of Social Work, and many grammar schools were created. An unsurpassed Code of Education was enacted.

#### **A.4.d Expansion of health resources**

As already said, the 1940's were rich in social legislation and material accomplishment. In successive decades, the social gains of the 1940's were preserved and expanded (see Tables 1 and 4). Other institutions emerged, like the "Servicio Nacional de Acueductos y Alcantarillado, SNAA" (National Service of Aqueducts and Sewerage) and the "Instituto Nacional de Vivienda y Urbanismo, INVU" (National Institute of Housing and Urbanism). SNAA was re-named "Instituto Costarricense de Acueductos y Alcantarillado, AyA" (Costa Rican Institute of Aqueducts and Sewerage). It can be safely asserted that for the last 50 years, governments have been more generally concerned with social development than with economic growth. The merit of Costa Rica was to implement this predicate without embracing philosophies that might have generated violence and social disruption.

**Institutional medicine.** The persistent high incidence of morbidity and mortality related to infectious diseases until the early 1970's was a strong stimulus for further development and improvement of institutions of the sector, an impressive apparatus today (see **Table 4**). The numerous State and autonomous hospitals and clinics placed the nation ahead in time and scope of many Latin American countries. Much of this was the result of considerable economic bonanza in the 1970's (the golden decade) resulting from several factors, the more conspicuous one being the high prices of coffee, then the main source of foreign currency. A significant reduction in poverty was measured in the decade (see Céspedes and Jiménez 1995). Around 1970, rural clinics were operated by the Ministry of Health (MOH), while the capital and provincial hospitals were administered by "juntas de protección social" (social protection boards) or the CCSS. Funds to operate the system were produced by the juntas, the national lottery or were wither private (for instance, medical corporations) or from the UFCO.

The growth of the health sector stimulated sustained discussion and planning trying for better models of organization, structure and operation. The "Ley General de Salud" (General Health Law) and the "Ley de Traspaso de Hospitales a la CCSS" (Law to Transfer the Hospital to CCSS) were enacted in the early 1970's (José Figueres, President; José Luis Orlich, Minister of Health; Guido Miranda, Executive President of CCSS) (Mohs 1980, Miranda-Gutiérrez and Asís-Beirute 1989). In this manner, three leading health institutions consolidated: a) the MOH, rector of the sector and primarily responsible for disease prevention and health promotion, operating through central and regional headquarters and urban and rural health facilities; b) the CCSS, responsible for delivery of medical services and some preventive actions through the network of hospitals and clinics (Miranda-Gutiérrez 1994; see **Table 1**); and c) the AyA, that administers most public systems of water supply and sewerages. Human resources in the health sector were already advanced by 1983, with the following rates per 10,000 population: 9.6 physicians, 7.1 graduate nurses, 3 dentists, 2.9 pharmacists, 2.5 microbiologists, and 1.5 social workers. The main supporting staff, including those in rural areas, per 10,000 population, were: 22.7 auxiliary nurses, 5.6 nurse assistants, 2.1 pharmacy auxiliaries, and 1.1 laboratory assistants (Mata and Rosero 1988).

Other institutions of the health sector are the "Instituto Nacional de Seguros, INS" (National Institute of Insurances), a monopoly of insurances, and the state-funded "Universidad de Costa Rica, UCR" which trains most physicians, microbiologists, pharmacists, nurses, and health technicians. Additional institutions of the sector were created in the 1960's and 1970's, including several health research centers (see below). Private clinics were few before the 1960's, but they proliferated steadily in the 1980's and 1990's.

**Rural health.** Most governments improved medical care and preventive services in the rural areas, an issue of great economic, human and political significance. About 1931 "general clinics" were established in various parts of the nation, precursor of the "Unidades Sanitarias" (sanitary units) created soon after. Some units had a field vehicle. Since the medical school did not open until 1961, physicians trained in Europe, North and South

America. Upon return, doctors had to pay "social work" by serving in the general clinics and sanitary units. Thus, most spent considerable time in contact with deprived population, a situation enhancing awareness to search for solutions of community problems.

There were 52 sanitary units in the early 1960's, most of them staffed with a general full time or partime practitioner, a full time nurse, a clerk, and a sanitation inspector for maintenance of the water supply, provision of latrines and other sanitation duties. About one half of the units had a small laboratory and a technician for basic clinical tests. Sanitary units offered basic medical and preventive services primarily to pregnant women and children, and first aid, emergencies and referrals for anyone. Eventually, the units began the follow-up of women and "well-baby clinics", precursors of the primary health care program.

This pioneer investment was fundamental for the development of the "Programa de Unidades Móviles para el Area Rural, PUMAR" (program of mobile units for the rural area) in the 1960's, and the creation of hundreds of Health Centers, Health Posts in the 1970's. Finally, conforming the Programa de Salud Rural, PSR" (Rural Health Program). Before the program, almost one million people (of 2.5 million inhabitants in the nation) lived in sparse communities in distant places. They had to travel long distances to get some kind of medical assistance or health advise, and some never did. With the PSR, these marginal population were visited about twice per year on the average. Coverage rose from 11 per cent in 1973 to 60 per cent in 1983, although it has declined somewhat since then (see below). In 1977, a similar program, the "Programa de Salud Comunitaria, PSC" (Community Health Program) was developed for the semi urban and slum populations, which, lacking medical and health services, were lagging behind the rural area. This program grew rapidly to reach 60 per cent coverage of the target population within three years (Table 5).

Primary health care and other programs suffered the impact of the energy crisis of the late 1970's, and the ensuing recession, economical changes, and structural adjustments of the late 1980's and early 1990's. The prevailing model fostered serious ethical and economic distortions, like excessive benefits and privileges for persons and power groups, administrative inefficiency, waste, state gigantism, and corruption. International bodies conditioned their support to Costa Rica, pressing for structural adjustments and deep reforms of the State apparatus. The resources for health were considerably reduced and the per capita expenditures declined in the 1980's, the "lost decade" (see Figure 1). Consequently, there was a progressive deterioration of the primary health care programs (see below), likely reflected in an increase in infant deaths attributed to problems during pregnancy and delivery. Theoretically, such reforms will result in a healthier national economy (Lizano 1990). Meanwhile, the proposed reform of the health sector (MIDEPLAN-MS) may not be able to alter the current stagnation of health services, while it may complicate matters, as will be discussed at the end of this analysis.

## A.5 Epidemiological Transition, 1940-1970

The fall in mortality due to the main infectious diseases in Costa Rica became clearly evident in the 1940's (Figure 3), and the reduction continued through the 1950's. The trend persisted thereon, but expectedly, absolute decreases were progressively smaller due to the preceding attrition in mortalities. The trend has not ended, probably leaving ahead some surprises (OPS 1978). In contrast, the mortality resulting from non-infectious causes such as cardiovascular diseases and malignancies, which were always there, have remained relatively stagnant (see Figure 3). The conspicuous difference was the logical rise in deaths due to motor-vehicle accidents, reflecting the expansion of highways and increase in number of vehicles. Interestingly, there has not been a significant decline in deaths due to the large group of "other" non-infectious diseases.

The dramatic changes in crude death rates for the main causes in Costa Rica, are also depicted in Table 6. In the period of 1929-1951 (22 years), there were dramatic declines in infectious diseases, as follows (reductions are in parentheses): malaria and typhoid (-75%); intestinal helminths (-74%); diarrheal disease (-62%); acute respiratory infection (-50%); and diseases preventable by immunization (-49%). Non-infectious causes of death also decreased dramatically in the 1929-51 period, like convulsions (-79%). This cause eventually disappeared, likely because it was related to severe diarrhea, dehydration, massive Ascaris infection, encephalitis and meningitis, all of which might appear associated with convulsions. Thus, if those declined in the periods, so convulsions. In contrast, anemia, cardiovascular diseases, cancers, non-infectious respiratory diseases, and violence and motor-vehicle accidents, did not change significantly in the period.

Similarly, crude death rates for infectious diseases in the period 1950-1981 (22 years) decreased dramatically: diarrhea (-95%), acute respiratory infections (-73%), intestinal helminthiasis (-94%) and diseases preventable by immunization (-93%). But non-infectious causes of death also decreased in the period, like nephritis (-67%), and anemia (-78%), probably reflecting reductions in certain infections. Practically there was no change in cause-specific rates due to cardiovascular disease (+2%) and cancer (-7%). There were significant increases in deaths due to motor-vehicle accidents (+200%), chronic respiratory disease (+117%) and diabetes (+43%). Thus, Costa Rica rapidly evolved from the classical prototype of underdeveloped country with prevailing infectious, parasitic and nutritional diseases, to the model of industrial nation in which chronic and degenerative pathologies became relatively more prominent. The nation underwent the transition at an earlier date than most Latin American countries, partly because it invested more than 100 years on education, environmental sanitation, and prevention and treatment of infectious diseases.

The dramatic mortality reduction undoubtedly resulted from significant environmental and educational programs. There was a sustained emphasis on control of fecal waste, improved water supply, wearing of shoes, and health education. Such interventions limited the spread of infections transmitted by contaminated water and hand-to-mouth contact (intestinal helminths, typhoid fever, diarrheal diseases and respiratory infections). Poor

housing, deficient health services, and chronic malnutrition, accounted for the less striking changes in respiratory infection mortality. Also, before the 1960's certain vaccines and antibiotics to fight infections had not been developed. However, improved treatment in the interval led to limited - but nevertheless significant - reduction in deaths due to those infections and in gains in child nutrition. It should be remarked that infectious diseases interfere with the nutritional status through anorexia, nutrient loss, nutrient wastage and other mechanisms. In this manner, the control and prevention of infections undoubtedly was a key factor in the control of malnutrition in Costa Rica (Mata 1992a).

The decline in diarrhea mortality was not as marked as that of other diseases, for instance, from 325 deaths per 100,000 in 1926, to 143 in 1950 (-56%, **Table 7**). The figures indicate that diarrhea morbidity was monumental in that period. Shigellosis and amebiasis were still common in the late 1940's. One must assume that control resulted from gains in education, environmental sanitation and personal hygiene.

## **A.6 Health Condition in 1960-1980**

### **A.6.a Consolidation of the transition**

**Table 6** illustrates that the epidemiological transition had been consolidated by the 1960's and 1970's, after the sharp decline in deaths due to infectious diseases, with cardiovascular causes and cancer becoming relatively more prominent (PAHO 1990). Marked reductions in mortality occurred in the years 1951-1981, as follows: malaria and typhoid (-100%); intestinal helminthiasis (-97%); diseases preventable by immunization (-96%); diarrheal diseases (-96%); and acute respiratory infections (-80%). The period had the benefit of several influences: (a) new or improved products of postwar years, such as antibiotics, vaccines and plaguicides; (b) better practice of hygiene and nutrition; and (c) intellectual and financial cooperation of international health agencies like USAID, PAHO, UNICEF, and World Bank.

### **A.6.b Population explosion**

Costa Rica experienced a population explosion in 1950-55, reaching a Total Fertility Ratio (TFR) of 6.7 children per woman, and 7.1 in 1955-60 (**Table 8** and **Figure 4**). In this decade, the country attained one of the highest birth rates in the world. The event likely was influenced by a drastic reduction in infant mortality (in turn, resulting from a sharp reduction of diarrhea morbidity and mortality), the low availability of contraceptive technology, and the influence the cultural and religious traditions. Also, there might have been some interest in procreating the "niño millón" ("millionth child"), to reach one million population, projected for 1954. There might have been a strong interest to produce such child, especially in the lower social strata, because the family of the niño millón was expected to receive considerable benefits from the State and the private sector.

Thereafter, a notable reduction in the TFR was observed, from 7.1 children in 1955-60 to 3.8 children in 1975, a 46 per cent decrease in 20 years (see **Table 8**). However, there was a slowdown in the trend in the ensuing 20 years, to 3.02 children per woman in 1990, a 20 per cent reduction. The fertility decline was highly correlated with age, being greatest among aging mothers (40 years and more) and smallest among adolescents (less than 20 years old) (see **Figure 5**). The decrease in TFR undoubtedly had a significant impact on the quality of life of mothers and children in the last 40 years, particularly after the 1960's. The determinant factors for the rapid decline in Costa Rica are not well known. Undoubtedly, the drop in infant mortality was a main determinant, as it influenced fertility. Other influences in the period probably were: marked improvement in women's education and modernity, sexual liberation, improved prenatal services and family planning (Rosero 1993) and greater availability of contraceptives in health services, pharmacies, and more recently, supermarkets.

#### **A.6.c Further expansion of health services**

The expansion of the network of Unidades Sanitarias in the 1940's and 1950's, the operation of the "Consejo Nacional de Población, CONAPO" (National Population Council) in the 1960's, and the development of the PSR and PSC in the 1970's, all favored women's (and men's) right to family planning. Soon, positive effects became evident in urban populations, and less prominently in rural areas. Costa Rican women currently have one of the highest rates of usage of modern and classic methods of contraception in Latin America, about 83 per cent (Rosero 1993). And yet, TFR and demographic growth are greater than predicted by indicators such as life expectancy at birth and schooling. This is a matter of concern because fertility is greater among the poorest population, which then has larger demands of resources, government services, and of the ecosystem.

#### **A.6.d Health indicators, 1993**

The improved health condition of Costa Rica place this nation - along with Cuba - just after Canada and the United States (**Table 9**). However, Costa Rica stands out because it has a low per capita income, a very low crude death rate, and relatively favorable low rates of homicides and suicides. On the other hand, Costa Rica is first in human development (mortality in under fives) in Latin American, an index recently proposed by the United Nations (Grant 1994). Also, experts give much credit this nation because of its location right in the torrid tropics, an optimal environment for entrenchment of infectious diseases, malnutrition, poverty and political unrest. In the recent past, health development in the tropics was considered an impossibility. Many believed that it could not be accomplished without violent revolution, and fostered the case of Cuba as a paradigm.

Costa Rica also has better health indicators than some European nations (see **Table 9**). This reflect a reality of abundant and safe drinking water, adequate waste control, homes devoid of firewood smoke and with several bedrooms, efficient health services for most of the urban and rural population, an adequate food supply, almost universal education, control

of arthropods and pests, control of sexually-transmitted diseases, and adequate social legislation. In sum, a healthy environment, adequate sanitation and personal hygiene, and adequate nutrition and education.

Interestingly, other less developed nations in the tropics and subtropics are behaving like Costa Rica, without undergoing violent political commotion, namely, Sri Lanka, Kerala (in India), Taiwan, Uruguay, Rio Grande do Sul (in Brazil), Trinidad-Tobago, and Panama. Costa Rica is peculiar because it improved its health and economic indicators at a faster rate and in a shorter time than Cuba. Furthermore, Costa Rica received considerably less foreign aid than Cuba, while Costa Ricans always enjoyed a greater degree of freedom, democracy, and economic prosperity during the transition than did Cuba. Chile deserves special study because, having greater infant and diarrhea mortalities than Costa Rica in the 1970's, was able to reduce those rates in the 1980's in a shorter period than required for Costa Rica, during a period of tough military rule. What appears to emerge from this discussion is that health progress is attainable under different political and economic models, as long as policies and interventions are scientifically supported, holistic, and directed to well defined targets (Mata 1985).

#### **A.7 Social Pathology**

The health indicators employed by the United Nations to compare countries, primarily reflect biological conditions of the population at large. Since they represent averages, they often mask deficiencies affecting deprived population groups. On the other hand, health indicators often hide conditions affecting the quality of life and the state of well being. Unfortunately, there are no adequate markers to measure certain social determinants that generate suffering or "social pathologies". These encompass problems that often correlated with biological disease and lower survival. Social pathologies are increasing in contemporary society, for instance, community and intra-familial violence, homicides, suicides, teenage pregnancy, unwed mothers, drug abuse, sexual prostitution, loss of self-esteem, consumerism, vagrancy and unhappiness (Mata and Rosero 1988).

On the other hand, there is an excessive accumulation of garbage, a good part of it non recyclable, in the streets of cities and villages, without an adequate population response to cope with it. Almost all motor vehicles in the country lack control of exhaust fumes, while many operate on diesel. Thus, air pollution is increasing, not only in the cities of the Intermountain Central Valley, but in the rural area as well. Due to the cholera scare in 1991, drinking water now carries an excess of chlorine. An increase in environmental noise is evident in cities and some rural populations, related in part to motor vehicles and rock music. Dirtiness of urban areas and households, and nakedness of men and women in the streets - often not related to poverty - are becoming more prevalent.

The high prevalence of single mothers (38%) remains unchanged, while separation and divorce are increasing. Booming tourism has promoted gambling, illicit drugs, and male and female prostitution. Alcoholism affects more than 10 per cent of males of reproductive

age, and it is rising in school children. Increasing illicit drug abuse now includes cocaine and crack, and further complicate the legal alcohol abuse (Míguez 1983). Robberies, rapes, and homicides are rising, very often linked to drug abuse. Consumption of anxiolytic drugs and barbiturics is widespread among housewives, and to a lesser extent, men. Some abuse relates to the high prevalence of open psychotic signs and symptoms found in the general population (Adis 1970). Reports of child, wife, and elder abuse have increased considerably in the last years, and a recent urban survey showed that domestic violence also affects the husbands (Mata 1993). The relatively high homicide rate of the 1950's (a politically turbulent period), that had dropped markedly in the 1960's, started to rise in the 1970's to attain worrisome levels at present (Table 10 and Figure 6). In 1950, suicides were less than one half the homicides, but they have more than doubled in the last years, to equal rates of homicides.

#### **A.8 Emerging Infectious Diseases**

Better and safer vaccines and powerful drugs and antibiotics were produced after World War II. The correct application of public health knowledge and practice led Costa Rica through the epidemiological transition. However, it was a naivete to believe that man could conquer infectious diseases, and that there was no reason to worry much about them (Weller 1996). Microbes and parasites existed before man, evolving with him through millennia. Mosquitos Microbes and mosquitos will persist, whether man likes or not. Epidemiologists were amazed but not surprised by the emergence of "new" infectious diseases or the re-emergence of "old" ones, in developing and advanced countries alike (Wilson *et al.* 1994, CDC 1994). Some seem to be new mutants (human immunodeficiency virus, HIV) or old agents favored by man-made habits or environments (toxic shock syndrome and Legionnaire's disease). Many probably represent old infections that emerged from their ecological niches or were not recognized or diagnosed before.

**New infections.** Intense international travel favored the introduction of HIV in the native populations throughout the world. Costa Rica has a mild epidemic of pattern 1 acquired immunodeficiency syndrome, AIDS (Mata *et al.* 1995), with 900 cases through December 1995. Prevention has not been wholly successful due to the cultural characteristics of the persons at risk, as well as the difficulty to reach them for education and counseling. The rate of anal receptive intercourse without condom in the most affected population remains as high now as it was 10 years ago. Hepatitis B virus infection has a low prevalence. HTLV-4 virus infection is very rare, and there is no evidence of emergence of hantavirus, Lyme disease and other emerging infections of recent concern.

**Old infections.** The relatively stable man's habitats have been somewhat altered in recent years. Several factors have interacted in Costa Rica to potentiate the emergence of some infections, like poverty and urban decay in large populations, immigration of people suffering from malnutrition or carrying pathogenic agents, excessive abuse of antibiotics by medics or through self-medication, deterioration of primary health care programs, poor systems of epidemiological surveillance, and insufficient epidemiologists, researchers and

health staff. Other situations have occurred in Costa Rica: an increase in environmental temperature, alteration in the pattern of rains, decrease in rainfall in most of the nation, deforestation, and decrease of the ozone layer. Some of these changes are related to the cyclic "El Niño Southern Oscillation" (ENSO).

In the late 1980's, some of these changes appeared to have favored the occurrence of outbreaks of shigellosis in Costa Rica, out of camps of poor migrant laborers. In 1989 small outbreaks of leptospirosis occurred in the lowlands, and a larger one in the northern and Pacific regions occurred in 1995. Also in 1989, small outbreaks of paralytic shellfish poisoning were detected, a disease associated with red tides, previously unreported in Costa Rica (Mata *et al.* 1990). Cholera El Tor made its appearance in the country in 1992-1995, but there were only 12 cases in 1992, 13 in 1993, 38 in 1994, and 24 in 1995, most of them imported. The lack of spread should be attributed to the wide coverage of the population with water supply, personal hygiene, and sanitation (Mata, 1994).

There was re-emergence of Plasmodium vivax malaria, favored by the banana expansion that began in the mid 1980's (Mata and Mata 1993). Few cases of P. falciparum also appear each year, but so far there is no emergence of this terrible malady. Malaria got out of hand around 1987 when the number of autochthonous cases surpassed the imported cases. The number of cases rose to 6,900 in 1992, and it has remained around 5,000 per year since then. Dengue reappeared with considerable violence at the end of 1993, in the dry Pacific coast, totalling 5,000 cases. The disease persisted in that area and spread to highland populations in 1994, with more than 10,000 cases, and in 1994 reached the Atlantic coast (Table 11).

Aedes aegypti, the vector, had been cleared from Brazil and other American nations including Costa Rica, with the PAHO campaign directed by Dr. Fred Soper. However, there were reports of mosquito re-introductions (or re-emergence from persisting foci?) in the last decades. Two surveys in three low land urban centers, conducted in 1994, revealed dengue activity before the 1993-1995 epidemics (Mata *et al.* 1996). The recent dengue outbreaks have been linked to the accumulation of urban garbage, immigration from neighboring endemic areas, failure of community participation in vector control, and insufficient action by the State.

Finally, there has been an increased reporting of leptospirosis starting in 1988, with an excess of 175 cases and some deaths in 1995. Although emergent diseases are disturbing, Costa Rica can be regarded as one of the most advanced nations among the less developed nations for the manner it has handled them. For instance, malaria morbidity remains stagnant, dengue morbidity decreased in 1995, the AIDS epidemic shows mild signs of deceleration, and there was no cholera transmission.

## **A.9 Crisis of the Health Sector**

At the present time, the State apparatus of Costa Rica exhibits the following features: symptoms: gigantic, inefficient, irresponsible and low-working bureaucracy; most of the budget is devoted to bureaucracy, leaving limited resources to programmatic activities; rigid budgets precluding new program development for emerging situations; and economic distortions resulting from immorality and corruption (see Mata and Rosero 1988). Some of these situations are difficult or impossible to correct within the "welfare state" that characterizes Costa Rica, the main constraint being the difficulty or impossibility to supervise, evaluate, reduce or terminate deficient programs and staff. (On the other hand, the stability of appointments in the Government, autonomous and some private corporations, probably is a contributing factor to peace, happiness and relatively low suicide rate in this nation).

In the last 40 years, the government has functioned under some sort of social democracy (with mild left ideology), alternating with social Christianity (more liberal). The result has been sui generis, a socialist-like and paternalistic state tolerant of a strong private sector, allowing parallel or duplicate services and enterprises in health, education, agriculture, security and finances. Banking, medical services, education, telecommunication, insurance, electricity, and water and sewerage, are either State monopolies, or State-controlled or regulated activities. The hypertrophy of institutions and bureaucracies tempted the State to engage in operations and activities that generally belong to the private sector. The crisis resulted in the progressive hypertrophy of the CCSS, especially in the last 15 years, without a proportional improvement in services. The present apparatus is gigantic, inefficient, voracious, unreliable, and corrupt, with signs of exhaustion and, sometimes, paralysis.

### **A.9.a Attrition of the Ministry of Health**

Concomitantly, there has been a loss of sector leadership as well as attrition of the MOH. As already discussed, the success of Costa Rica resulted from realistic and holistic public health policies and interventions undertaken by illuminated individuals operating within the MOH and Ministry of Education. Unfortunately, when the epidemiological transition was underway and Costa Rica attained indicators comparable to those of advanced nations, the government emphasis shifted even more from the MOH to the CCSS. Many technocrats equivocally judged that infectious diseases, mother and infant health, and child nutrition had become less important, and therefore, they allocated more resources and political influence to strengthen the CCSS and its hospitals. In Costa Rica, the pursuit of this philosophy resulted in the attrition or elimination of public health laboratories, the decay of primary health care programs, and the reduction of research activities. This behavior contrasted the cases of Canada and England, where there was a sustained interest on health promotion, maternal and child health and the prevention of infectious diseases.

Over the years the CCSS became the leader of the health sector, diminishing the power and influence of the MOH. PAHO was not involved in the evolution of the CCSS prior to 1980, except for a collaboration in the transfer of hospitals to the CCSS and other minor activities (see Jiménez-Fonseca, 1994). In 1980-82 the relationships between CCSS and PAHO strengthened, perhaps with some detriment to the fundamental role of PAHO played in the preventive field. CCSS also took the lead in the relationships with the USAID, which might explain the considerable proportion of loan money directed to institutional medicine after 1980. Also, CCSS became more involved with the international banks. In turn, the banks conditioned their assistance to a profound reduction of the size of the government. Then, the "reform of the State" emerged as a formal government plan to reduce, reorient and modify the State (MIDEPLAN-MS 1993). According to the author, the reform - slowly underway since 1992, introduced changes which instead of solving current health problems, might aggravate them. For instance, primary health care deficiencies triggered by the energy crisis of 1980 continue, while medical assistance is not being improved. Other ills of the health sector remained unsolved.

#### **A.9.b Hypertrophy of the CCSS**

The CCSS is the most powerful financial institution of the nation, with a budget similar to that of the Central Government. It is an insurance system, compulsory for all workers. Its funds are derived from three equal monthly quotas contributed by the worker, the employer and the State. CCSS is supposed to provide, free of charge, all medical services for the worker and his family, as well as compensation (pension) for the aged and for the family in case of death of the worker. Free-lance and the self-employed workers can join voluntarily with monthly quotas matched by State contributions.

Since its inception in 1941, CCSS has been strongly tied to party politics, a negative factor for fulfillment of its main function. Such political subordination is seen in the nature of the Directors of the Board, all political appointees, usually with little or no expertise in medicine and health, except for the occasional physician, who anyhow would not alter the status quo. With time, CCSS progressively became more bureaucratic, with as many administrative staff as health workers. Instead of functioning as a bursar, the entity engaged in the direct provision of medical services, as well as in unrelated activities, like lending money to elite employees, or for private automobiles, houses, and business. CCSS is conspicuous for its softness with the administrative elite, and its austerity with physicians, nurses, and patients - in increasing order. There are luxurious offices, and sumptuous lunches for the meetings of the Board. CCSS has paid generous salaries and compensation to authorities and politically influential employees. The common person takes for granted that corruption exists in acquisitions and other administrative transactions.

CCSS has not been able to cope with the increasing demand for more and better services. Although politicians boast about universal coverage, only 84 per cent of the population was serviced by the Social Security in 1992 (see Jiménez-Fonseca 1994). CCSS has failed to dignify doctors, who often must examine 10 patients per hour or more, without

stimulus, in degrading conditions, for an insufficient compensation. Many CCSS doctors need to practice medicine in the private sector, or must seek for an additional job, sometime non medical. The system tempts some to use CCSS hospitals and clinics for their private patients, an illegal practice (Mata and Rosero 1988). Such unethical arrangement, termed "biombo" (folding screen), is not routinely investigated, but rather tolerated. Large queues and long waiting hours are required for appointments, and patients may have to wait months to see a specialist, get the prescription, or have an operation. Some have died of the illness during the waiting interval. Also, basic medical and laboratory studies, and special drugs, often are not provided by CCSS, alleging lack of funds or technology. Part of the equipment is obsolete or broken, and there are limitations for maintenance and repair.

A large network of private clinics, laboratories, services and specialists has developed in parallel to the CCSS, to satisfy part of the demand of the population. Some of them are located across or in the vicinity of the main hospitals and clinics, favoring use of time and resources financed by CCSS for the private enterprise (Mata and Rosero 1988). Some private services are better than those of the CCSS, and deficient CCSS services force the purchase in the first whenever it can be afforded. This is particularly true for certain emergencies, sophisticated diagnoses, and elective surgery. Many low-paid workers and even house maids buy medical services in the private sector, even when they are CCSS-insured. For instance, at the "Clínica Bíblica" patients are rapidly seen, diagnosed, and treated, in a system favoring doctor-patient interaction. A widespread opinion is that CCSS services are medically better, but dehumanized and specked with malpractice. Over the last 10 years, numerous modern procedures became available in private clinics: ultrasound, cat-scanning, magnetic resonance, fluor-angiography, laser treatment, corneal transplant, intra-urethral resection, umbilical laparoscopy, plastic surgery, viral-antibody tests, enzymatic and hormonal analyses, and so forth. Some of these procedures are not available at all at the CCSS, or the needed equipment might be broken or the reagent exhausted. CCSS is no longer the leader in certain areas, because it failed to transfer, develop and innovate medical technologies. However, most of the best physicians are working at the CCSS, although most also work in the private sector. The CCSS continues to be in the forefront of certain developments, for instance, organ transplant, *in vitro* fertilization, and certain medical research.

Nevertheless, the author believes that the CCSS is a necessary resource because it provides free medical services of average to outstanding quality to most workers of the nation. Thousands of medical consultations and hundreds of surgical operations are performed each day at the hospitals and clinics of the CCSS (see Table 1). CCSS treats - for free - numerous immigrants (for instance, Nicaraguans) and foreign visitors and tourists. Most independent experts justify the existence of the CCSS and would oppose privatization. On the other hand, most agree that the CCSS should undergo profound legislative, structural and administrative changes to make it more effective, less costly and more administratively healthy.

## **B. AMERICAN COOPERATION WITH COSTA RICA**

The United States of America has been involved in international cooperation for a long time. Such activity had the altruistic purpose to improve health and development in host countries (for instance, with the Rockefeller Foundation), while aiming at strengthening bonds with friendly potential partners. Most likely, the philosophical principle underlying international cooperation was the attainment of material progress and social welfare in foreign lands, within a frame of respect, dialogue and peace. Another aim was to promote Western principles of democracy, freedom, human dignity and solidarity.

### **B.1 Cooperation During World War II**

#### **B.1.a Health science and technology**

After the industrial revolution, most discoveries and developments in health sprung from the United States and Western Europe. The U.S. has been the most conspicuous scientific and technological innovator of the XIX and XX centuries. They always shared scientific advances in medicine and health with their partners. Usually, the scientific product resulted from the teamwork effort of Americans, Europeans, and scientists from the less developed countries (LDC's). In general, science evolved in stable and well funded laboratories characterized by an atmosphere of hard work, freedom, competition, respect, dialogue and criticism, all favorable to creativity, innovation and discovery. The scientific and technological revolution in the U.S. suggests that liberal environments are fundamental for the advancement of science and technology. The U.S. have developed and manufactured most of the reliable and effective vaccines for human use, making it possible the prevention of many infectious diseases. They have also produced effective antibiotics, anthelmintic, nutrients and pharmacological drugs, permitting control and treatment of many human diseases and deficiencies. Significant resources have been assigned to mass production of wonder drugs and vaccines, some of which are available at low cost through international cooperation. Great advances occurred during and after World War II, which became rapidly available to the LDC's at relatively low prices, a consequence of competition within the pharmaceutical industry. World eradication of smallpox was declared in 1971, and of poliomyelitis in the Americas in 1991. The last cases of polio and diphtheria in Costa Rica were diagnosed before 1975. Measles eradication is a likely possibility in the American Continent. In Costa Rica there has been a significant reduction in rates of whooping-cough, diphtheria, tetanus, tuberculosis, rubella, mumps, and hepatitis B. Drugs permitted reductions in rates of sore throat, otitis media, pyelonephritis, puerperal fever, gonorrhea, syphilis, tuberculosis, leprosy and malaria. Also, some serious viral diseases can now be effectively treated with drugs.

#### **B.1.b International agencies**

After years of meetings and discussions, U.S. and Latin American delegates met in 1902 in Washington, D.C., to create the International Sanitary Bureau, the precursor of the

Panamerican Health Organization (PAHO). This body agglutinated the American countries and territories in a common effort to study common health problems, and to propose plans for control and prevention, with special regard to conspicuous infectious diseases like malaria, hookworm disease, and tuberculosis. The U.S. has been the main financial supporter of PAHO. This body mobilized the countries to accomplish continental goals like improvement of water supplies and fecal waste disposal, eradication of smallpox and poliomyelitis, control of child malnutrition, prevention of goiter and other nutritional deficiencies, and reduction of morbidity due to measles and other communicable diseases of childhood.

The World Health Organization (WHO) was created in 1948, soon after the foundation of the United Nations. Swiftly, PAHO became the WHO regional office for the Americas. WHO championed the world eradication of smallpox, launched world-wide programs against malaria and other parasitic diseases, started world programs of primary health care, family planning, oral rehydration therapy, and launched concepts like "health for all by the year 2000" and health services research. The U.S. has been the main contributor of ideas and funds to WHO.

The United Nations Children's Fund (UNICEF) has also been primarily supported by the U.S. UNICEF assisted Costa Rica and other nations in the early fight against malaria and other health problems. Later, UNICEF gave more emphasis to primary health care, maternal and infant health, and family planning. James Grant, its former director, championed growth monitoring, oral rehydration therapy, breastfeeding and immunizations (the GOBI program); and more recently, pushed the "baby-friendly hospitals" (Grant 1994).

Also, the U.S. has been a strong supporter of the International Planned Parenthood Federation (IPPF), an agency devoted to reduce demographic pressure through education in reproductive health and responsible parenthood, especially in developing countries. Recently, IPPF became a promotor of women's modernity and self-esteem.

### **B.1.c U.S. aid to LDC's**

The precursors of foreign aid were the Aid of Postwar (1943-1947), the Marshall Plan (1948-1951), and the Mutual Security Act (1952-1960). The Marshall Plan transferred \$17 billion in 1947-51, to boost Western European recovery and to end inflation, recession, and unrest. The reason for such monumental investment was a superior administrative capability in Europe than in Latin America. Aid was initially triggered by military alliances, which were stimulated with many countries after the last election of President Eisenhower. The Truman Doctrine emerged in 1947 to combat terrorism in Greece and Turkey. Such cross country interaction resulted in American foreign aid totalling \$50 billion in 1950-59. In the 1950's and 1960's, new nations were born out of former white-man colonies in Asia, Africa, and to a lesser extent, the American Continent. The new nations obtained aid funds capitalizing on East-West and North-South struggles; one clear goal was to contain Communism. The American aid program for Latin America was a by-product of the

postwar. The distribution of funds among countries generated paradoxes, inequalities, and injustices. During the postwar, the most important donors to Latin America were the U.S., the United Kingdom, and France. Other industrial nations joined once they recovered from the war, for instance, and formed the "Development Assistance Committee (DA)". Donors disbursed bilateral aid through specialized bodies like the U.S. Agency for International Development, the British Overseas Development Administration, the Canadian International Development Agency, and the Swedish International Development Agency (SIDA). Multilateral aid was disbursed through the International Bank for Reconstruction and Development, IBRD (World Bank), and affiliates. Another institution is the International Monetary Fund (IMF) founded in 1944 for the reconstruction of Europe. Its main function was to maintain national currencies in stable balance with each other. IMF played a key role in expanding world trade in the 1950's and 1960's; in less developed countries (LDC's), it supported the balance of payments.

The Agency for International Development (USAID) was established by President Kennedy, under the Foreign Assistance Act of 1961. USAID was previously known as International Cooperation Administration (ICA). The development seems to have been moved by solidarity and compassion for poorer countries, but other factors must have been determinant, for instance, the need for expansion of the American influence, and to have better access to the world population. Some have casted doubt on the altruistic aim in view of the theoretical possibility that the donor would cause damage to the recipient country's economy resulting from long term re-payment of the loan, a position held by nationals and at least one functionaire of the State Department (Bushnell 1968). A clear goal was to blockade the advance of unbalancing anti-American ideological and military forces.

During the influential 3-year mandate of President Kennedy, great impetus was given to social issues in the U.S. Abroad, the main concern of the U.S. was how to raise the Gross National Product (GNP) of recipient nations. The Alliance was primarily concerned with economic growth, on the assumption that it would trigger social development and political maturity. Such ideological position would awake LDC's seeking economic advance (Hapgood 1969). Ten years later, the American Congress would amend the Foreign Assistance Act to make AID directly accessible to the people in greatest need. After this Amendment, the USAID began using concepts like community participation, social development, primary health care, people's basic needs, and participating democracy, previously of the domain of the socialist rhetoric.

Kennedy also created the program of Peace Corps Volunteers (PCV), both to aid people in LDC's and to improve the American image in the continent. The program was very effective in its early years, when idealistic and motivated young American women and men lived, worked, and shared success and failure with the common folk in rural communities. The USAID continued in the Carter administration, and underwent significant changes under Presidents Reagan and Bus. Recently, USAID became more conservative in public health in Costa Rica (Morgan 1993). The impressive health indicators attained by Costa Rica have made this nation not eligible for more aid.

## **B.2 Assistance to Costa Rica**

U.S. aid and cooperation with Costa Rica began in the 1940's (for instance, with SCISP and STICA), justified on military grounds. Construction of the Interamerican Highway, got underway during World War II, to favor communication within American nations. In the early 1960's, the aim of the Alliance for Progress was to prevent another Cuba. In the early 1980's, aid to Costa Rica intended to cushion the negative effects of the Sandinista government. For a discussion of the total USAID investment and operation in Costa Rica, see Fox (1996).

The ties between Costa Rica and the U.S. became stronger once Europe's influence decreased after the 1920's. Many Costa Ricans (often whole families) started to migrate to the U.S., mainly to work and study. Some trained in medicine and health sciences in excellent European and American schools. The returning professionals had a new vision of academic and professional careers. The long-lasting contact between Costa Ricans and North Americans, sealed an invitation by President Franklin Delano Roosevelt to President-elect Rafael Angel Calderón-Guardia and his Belgian wife Yvonne. A terrible cold did not deter the Roosevelts to chat with the Costa Rican couple for hours to talk about their nations and World War II. Ivonne Clays-Spoelders, a beautiful and well educated lady, being fluent in English, translated what was being said. Close ties developed between the couples favored by the fortuitous coincidence that the Delano and Spoelders families had a common origin in the same Belgian community. The friendship lasted until the death of the death of the Roosevelt's (Villegas-Hoffmeister, 1985). The Presidents agreed on a verbal pact of cooperation against the Axis, honored by the Costa Rican declaration of war to Japan on December 7, 1941, followed by similar declarations by the United States and most of the Caribbean nations the following day (US Government 1963). The United States guaranteed protection of Costa Rica and granted significant aid, which was accepted without hesitation. While many people embraced communism in the 1940's, and others were definitely pro-nazi, most Costa Ricans showed a clear proclivity towards the "American way of life". They still are inclined to meet the American people, to know its system and culture.

Friendly visits of American dignitaries strengthened this idiosyncrasy: a) Nelson Rockefeller came in 1942 to inaugurate the "Instituto Interamericano de Ciencias Agrícolas, IICA" (Interamerican Institute of Agricultural Sciences), probably established in Costa Rica instead of Colombia, after the meeting Roosevelt-Calderón; b) Vice-President Henry Wallace in 1943, travelled to rural areas to meet with common folk and plant trees. Being the first American Vice President to visit the nation, thousands to greet him from all over the country. Wallace was worried that a presumed pro-nazi candidate could become presidency in the 1944 elections (Villegas-Hoffmeister 1985); c) President John F. Kennedy who arrived in 1963, pushing the Alliance for Progress. He gave a \$100,000 personal check to help completion of the National Children's Hospital. Monuments and schools were dedicated to him; d) Presidents Ronald Reagan and George Bush visited in the 1980's, and offered military protection in case of aggression or invasion. Costa Ricans were good supporters of these two gentlemen who offered help under systematic threats of invasion. Many babies

were baptized Wallace, Nelson, Jack, Jackie, Kennedy, and Ronald, following the visits. Undoubtedly, such events demonstrated the strong ties of our nation with the U.S.

The onset of the USAID in Costa Rica could not be accurately established; there is no doubt that the needs of this nation were known at PAHO and USAID headquarters, and that these agencies received similar requests for aid from Latin American nations. Some health issues were common to the US and Latin America, and at the turn of the century, some problems were as serious in the U.S. as in its neighbors. One factor favoring aid in Latin America was the liaison between PAHO and the State Department, neighbors in Washington, D.C. The director of PAHO during 1958-1975 (17 years) was Dr. Abraham Horwitz, promoter of the "right to health" (PAHO 1992). Horwitz had good rapport with two conspicuous Secretaries of State: Dean Rusk (1961-69) and Henry Kissinger (1973-1977). Science and technology dominated cooperation under Horwitz. He appointed world renowned scientists to PAHO's Technical Advisory Committee for Medical Research, namely, René Dubos, Carlos Chagas, Bernardo Houssay, John Waterlow, Thomas Weller, and Abe Wolbach. To the author, there was a two-way communication between the recipient country and PAHO-USAID. Problems were internationalized at PAHO-USAID, continental solutions were proposed, approval of funding, provision of technical assistance, and implementation of measures followed. Program evaluation was also considered.

Health in Costa Rica was influenced by the following internal and external factors: a) strong inertia towards the pursue of progress, starting at the beginning around the 1840's, and strengthening at the turn of the century; b) contribution of the Rockefeller Foundation in the 1910's, 1920's and 1930's; c) opening of the Interamerican Highway; d) social, sanitary, and educational reforms in the 1940's and thereafter; e) funding from UNICEF, PAHO, USAID and international banks; and f) abolition of the army in 1949, and its long-lasting effect. On the other hand, global health advances reaching Costa Rica, exerted measurable impact on health. For instance, technologies had notorious effects on the control and prevention of infection especially since the 1920's, improved medical care particularly since the 1930's, vitamins and antibiotics since the 1940's and 1950's, modern vaccines since the 1960's, and modern sanitation and hygiene since the 1950's. The country contributed its own version of primary health care in the 1970's. Finally, a gigantic network of hospitals and clinics was developed from the 1950's through the 1980's, where the emphasis eventually fall in surgical procedures, pharmaceutical drugs, and mechanistic technologies. However, no one can deny the contribution of the CCSS medical services to the quality of life of the Costa Rican population.

### **B.3 USAID Loans for Health in Costa Rica**

#### **B.3.a Documentation**

The following analysis was mostly based on a large volume of documents gathered at the USAID-San José. The author examined the USAID involvement with health issues of Costa Rica since the late 1950's, and himself was involved in the nutrition project effected in

the 1970's. He also had kept updating the data base that serve to describe the evolutionary changes in health and social development in this nation (Mata and Rosero 1988). The USAID documentation was incomplete, while some data was missing altogether. There was little information on names and qualification of foreign and national consultants, firms, and companies involved in project planning, development, and evaluation, especially during the 1980's and 1990's. One complication was the variability in the format and styles used in the projects and reports, which made comparative analyses more difficult. On the other hand there was much variability in the manner the projects were written, implemented, evaluated, and reported. Expectedly, the greatest gap concerned projects funded in the 1940's and 1950's. But difficulties were also encountered in projects authorized in the 1980's and 1990's.

### **B.3.b Number and size of projects**

Twenty-nine USAID loans for health-related projects were approved for Costa Rica from 1951 through 1987 (36 years) for a total of \$33,337,000 (Table 12). Loans were supposed to be paid under very favorable conditions with several years of grace and many years for payment at low interest. In addition, there were 29 usually smaller projects assigned under Title PL-480, for a sum of \$4,984,700 (Table 13). These loans were authorized in concept of imported cereals and other foods, administered by the CNP.

The projects generally addressed high priority health issues, revealing an adequate understanding by both GOCR and USAID of the health situation and needs of the nation. With respect to budget size, 14 projects were under \$500,000, 8 projects ranged from \$500,000 to under one million, and 7 were greater than one million. The biggest loans were to help in the construction of the children's hospital (\$2 million), the metropolitan water supply (\$3.5 million), nutrition and rural health (\$5.97 million), health services support (\$5.9 million), and continued education (\$5.9 million). Except for the nutrition/health project in period 2 (see below), the largest projects were authorized for period 3, for about \$13 million (Table 12). However, inflation and increase in the cost of living must be taken into account when budgets are compared over the 36 year period. The PL-480 projects were smaller, of just a few thousand dollar (Table 13), but there were two large ones, one for rural water supplies (\$1.2 million), and another for school lunch programs (\$920,000). Information on the collaborating entities appear in Table 14, general outcome of the projects and on the main problems encountered during their execution was incomplete (Table 15). Before analyzing the possible impact of the USAID projects on the health of Costa Rica, it seems worthwhile to describe next the magnitude of the expenditures in health incurred by the nation itself.

### **B.3.c GOCR expenditures in health**

Reliable data were available since 1929, and per capita expenditures for health and education in Costa Rica appeared larger than for security and police (see Figure 1). Per capita health expenditures during the 1940-1950's (in 1988 U.S. \$'s) ranged from 24.4 to

39.6, and rose to 122 to 207.4 during the 1960-1970's. Thereafter, expenditures became stagnant or decreased (Mata 1996). In 1988, at the time the USAID was reducing operations in from Costa Rica, the Costa Rican national per capita expenditure in health was \$155.8 (1988 U.S. dollars), which represented 9.2 per cent of the gross national product (OPS 1994). The total sum was equivalent to \$446,493,500. Seventy-six per cent of the sum represented expenditures from public funds (\$118.5), one of the highest State participation in Latin America. Eighty-six per cent of the expenditures in health were funded at the CCSS; the rest were private. Only 14 per cent of the sum derived from the central government. Although this is an impressive effort, the expenditure in health in Costa Rica is many fold smaller than those reported for the US and Canada. Also, ten Caribbean and Latin American countries or territories spent considerably more funds per capita in health than Costa Rica (Caiman Is, Bahamas, Barbados, Antigua/Barbuda, Montserrat, Argentina, Venezuela, St Kitts/Nevis, Trinidad/Tobago and Panama).

USAID authorized loans for \$16 million for health in Costa Rica during the period 1980-94, roughly \$1.1 million per year. This represented only 0.0025 per cent of the yearly national expenditures for health. However, the comparatively smaller USAID funds actually had visible impact on the nation's health, due to at least two factors. One is the lack of flexibility of the local budget, precluding expedite reallocation of funds for new priorities or emerging problems; the other is the primary utilization of the budget to finance bureaucracy (Mata and Rosero 1988). Thus, USAID funding and its mechanism for disbursement (through SCISP and OCIS), came in timely for program implementation, hiring or removal of personnel, and purchase of equipment and supplies.

#### **B.3.d Scenario for evaluation of impact**

Program impact may become visible as changes occurring in populations in the course of time, for instance, in well defined variables, like malariometric indices, prevalence of facility for excreta disposal, percent coverage with water supply, or rates of specific disease morbidity and mortality. Even thou, it is difficult to assess the possible impact of interventions within a changing scenario where there are many simultaneously operating determinants. As described in this text, the country had been a good example of dynamic changes effected in the health sector with each new administration and external influence. On the other hand, the nation always appropriated significant funds for health, especially after the abolition of the army (see **Figure 1**). Again, other agencies contributed significant technical advice, material resources, and considerable funding, to problems being addressed by the USAID (OPS 1994). Additional studies are then needed to determine the type and intensity of interactions between the various agencies, to dissect the impact of their contributions. Above all, one should keep in mind the monumental contribution of Costa Ricans to support the health sector, with more than \$70 per capita (1970 U.S. \$'s) or \$210 per capita (1988 U.S. dollars).

On the other hand, the health sector was constantly changing during the period of intense USAID involvement with Costa Rican health (**Table 16**). Many developments

stemmed from the interaction between PAHO and the State Department, and they influenced the evolution of ideas during the period and thereafter. Certain advances originated directly in Costa Rica, for instance, the implementation of primary health care ("Rural Health Program"), effected several years before the Declaration of Alma Ata (MS/MIDEPLAN 1978, WHO/UNICEF 1978); national reversion of the trend towards premature weaning, resulting in more than 90 per cent of infants starting breastfeeding at the national level; and the early demonstration of practicability of oral rehydration therapy administered in rural homes by the mothers themselves.

#### **B.4 Project Periods**

The USAID projects were arbitrarily assigned to three periods separable by philosophical and operational features, that match evolutionary changes in the nation (Sáenz 1989). Before discussing the USAID involvement, it should be recognized that the health condition of Costa Rica was always influenced by discoveries and ideas generated in distant places, which were rapidly assimilated and internalized. Projects in **Period 1** were effected during the 1940's and 1950's, the most brilliant phase of health intervention in Costa Rica. Projects in **Period 2** were executed during the 1960's and 1970's, consolidated investments in earlier dates, were also very productive. Projects in **Period 3** (in the 1980's and 1990's), departed from previous USAID orientation and were not so productive (see below). In total, the USAID allocated \$33,337,000 for health in Costa Rica, most of which in loans, with a small portion in grants. Most funds were invested in 1962-81; about 2 per cent was spent in 1982-94.

##### **B.4.a Period 1, 1945-1959**

The USAID had expenditures of \$3,983,000 in this period (12% of all USAID money for health), in 5 projects. Due to incomplete files, the sum could be larger. Slow disbursement of such funds was a problem, due to the sluggish and inefficient local bureaucracy. On June 30, 1942, an important agreement was signed by the Minister of Health (Dr. Mario Luján-Fernández, Rafael Angel Calderón-Guardia, President), and a representative of the U.S. supported "Institute for Interamerican Affairs" of Washington, D.C. The agreement was to provide to the GOCR, free of cost, the "Servicio Cooperativo Interamericano de Salud Pública, SCISP" (Interamerican Cooperative Service of Public Health). (Similar units were established in other Latin American nations). SCISP functioned as part of the Secretary of Public Salubrity and Social Protection (later, MOH), with the purpose "to develop activities in public hygiene and construction of sanitary works" (GOCR 1943).

The Director of SCISP was Dr. Thomas Burdell Phinzy, a physician and good friend of Costa Ricans. Salaries and other expenses were covered with external funds provided by SCISP; the staff was hired, supervised or removed by SCISP. Initially, SCISP was supported by a grant of \$500,000, for approximately two years, a large sum in those days. The following activities were began by SCISP in 1942: improvement of water supplies and

sewerages, control of communicable diseases, installment of sanitary units and other health establishments, expansion of the fight against malaria, and construction of latrines and slaughterhouses (GOCHR 1943). Funds were handled in an expedite manner, by persons who improved the receipt, disbursement, and execution of projects. To do its job in Costa Rica, SCISP was housed in the MOH, and had national and American personnel, but with administrative independence from the MOH. SCISP's staff consisted of one national sanitary engineer, and two American engineers who lived in Costa Rica to ensure continuity of projects (Bedoya and Moya, interview 1995). A similar entity was devoted to agriculture, the "Servicio Técnico Interamericano de Cooperación en Agricultura, STICA" (Interamerican Technical Service for Agriculture).

#### **B.4.b Period 2, 1960-1979**

The USAID authorized 40 per cent of all health funds in this period, in 14 projects (\$13,314,000). Activities were wisely directed to expand and culminate jobs of the 1940's and 1950's. There is strong evidence that much of the current efficient and extended sanitary condition had an origin in activities begun in that period. The projects focused on fundamental health issues, like expansion of health infrastructure, development of human resources, improvement of water supplies, control of malaria, building primary health care, improving reproductive health, controlling child malnutrition, and expanding health research.

#### **B.4.c Period 3, 1980-1994**

The 10 projects of this period amounted to \$16,040,000 or 49 per cent of the total USAID funds for health. Most projects departed from the orientation in Periods 1 and 2, in that instead of being holistic and targeting on public health, they centered mainly in the hospitals, for instance, in training of hospital personnel, solving cash deficits of the CCSS, and purchasing pharmaceutical drugs. However, there were funds for primary health care and family planning, although without impact linked to the investment. There were projects for operational research to improve primary health care, maintenance of hospital equipment and training personal in medical emergencies.

#### **B.5 Projects of Period 1: 1945-1959**

The documentation for projects in the period was scarce and incomplete and information had to be extracted in many cases from interviews or persons directly involved in the projects. There were 5 projects in the period, for \$3,983,000 (12% of the total allotted to health). Projects were for holistic works in environmental sanitation, water supply, specific disease control, and technical assistance. There was an emphasis on infrastructure and training of teachers of the beginning children's hospital and medical school. Most of the public health effort was executed through SCISP (see below).

### **B.5.a SCISP**

In 1943, before involvement of the USAID, SCISP had allocated significant funds, to be matched by the GOCR and the Municipalities, totalling 4.3 million colones (about \$770,000, not shown in Table 12). However, the apparently small sum permitted improvement of the sanitation of the country in an unprecedented manner. Sanitary units were built in the cantons of Nicoya, Santa Cruz, Abangares, Orotina, Atenas, Villa Colón, Dota, Orosi, and Turrialba. A maternity was established in Tres Ríos. Support was given to build the Cancer Clinic (formerly known as "Clínica Hernández"). The San José water supply was improved, and the filters of the plant at Dulce Nombre de Tres Ríos were changed. The sewer system of Heredia also expanded to a network of 30 kilometers. The water supplies in Guanacaste, Limón, Tarrazú, and Puerto Cortés were also improved. The reservoir of the water supply system in Tres Ríos was repaired. A modern slaughterhouse was constructed in San José.

These works were accompanied by training and advice by American experts hired by SCISP. This engaged in virtually every sanitation issue that showed deficiencies or needed improvement. In summary, this cooperative projects laid the foundation for much of the sanitary infrastructure expanded in successive periods. The effort elicited sentiments of gratitude among Costa Ricans, and Dr. Thomas Burdell Phinizy became greatly admired. Persons working for SCISP were amazed at the volume and quality of the work performed, with relatively small resources (Bedoya and Moya 1995, Rivera 1995).

### **B.5.b Interamerican Highway**

There were significant funds for road surveys and road construction (fund not shown in Table 12). The tract San José-Taras (24 Km) is an example. The most significant development, however, was the Interamerican Highway (see Esquivel and Angulo 1995), during the Second World War. When the construction of this road began, around 1940, communication in rural areas was by foot, horse or oxcart; in the dry season, some roads allowed motor vehicles. In those days, most peasants went barefoot, children had some degree of malnutrition, and many adults had premature loss of teeth. Life expectancy at birth was not even 45 years. Two americans traversed the track of the road from Rio Grande (Mexico) to Panama, and published a pictorial book showing the prevailing poverty and underdevelopment of the region (Franck and Lanks, 1940). Thus, opening the Interamerican Highway brought a profound impact on communication, agriculture and economics, and on nutrition, health and the quality of life of the whole country and especially of the communities connected by the road (see Kiefer 1972).

Unfortunately, there are no detailed studies at the village level examining the economic and social impact of the highway. However, the author witnessed the effect of the cultural contact with the Americans, resulting from a by-pass made in 1943 through the village of Santa María de Dota (where he then lived), linking Macho Gaff with El Empalme. These points were separated by hills covered with primeval forests and ravines, making

construction of this segment the most difficult one in Costa Rica. Like most communities outside the Intermountain Central Valley, Santa María was markedly isolated from the Valley and the rest of the country, a reason for its underdevelopment. Communication with Cartago and San José was by dirt roads of about 70 kilometers each, accessible after 6-8 hours by horse or 2-3 days by oxcart during the 9-month rainy season. Motor vehicles could get to the village in the dry season, after several hours driving. Farther to the southeast, San Isidro del General and dozens of communities in valleys extending to Panama, were also isolated from the rest of the country, except by occasional DC-3 flights that had just begun. There was no electricity, and health and agriculture services were nonexistent or inadequate. Consumable goods were in short supply or unavailable. Beans, corn, panela and other staples were locally produced. Vegetables and fruits were limited or unavailable for long periods. Fish was usually unavailable.

The influence of the highway on national development can not be denied: (a) It established communication among hundreds of localities, promoting development of health services, agriculture, education, business, and political participation. (b) It changed the economy of villages because Americans paid higher rates for goods and services. (The company earned a commission for every dollar spent on the road). Americans must have been amazed at the very low salaries and prices of food. Eggs increased 400 fold and wages rose 500 per cent within weeks. Many peasants joined in the construction of the road, and women engaged in bakery to supply the "machos" (blonds, Americans). Flour, chocolate, candy, and other consumables were exhausted, so large volumes had to be brought into the villages. (c) It influenced the local diet of "agua dulce" (panela water), panela chunks, coffee, black beans, some vegetables, tortilla, and occasionally red meat or poultry. At the "planteles" of the company (camps with large shops), breakfast included orange juice, ham and eggs, canned sausages or "spam", and oatmeal. For lunch and dinner, meat, potatoes, salads, and other foods were customary. One aim was to improve working output; the other, to collect the fee. Managers and laborers shared the same diet, and villagers started to consume foods that prevent deficiencies of iron, iodine and vitamins, prevalent at that time (see below). The American diet improved physical performance and body weight. Soon villagers planted vegetables gardens, and improved intake of a greater variety of foods. (d) In the road works, there was compensation for those who worked better and harder, something later applied locally. Undoubtedly, the road had a significant effect on the health and quality of life, with a long lasting vectorial effect influencing life to the present, and most likely into the future. Costa Ricans would eventually had found the manner to interconnect the hundreds of separated and isolated communities, but that would have taken a much greater effort and time to accomplish than it did by the highway.

## **B.6 Projects of Period 2: 1960-1979**

There were 14 projects in this period (see **Table 12**) for \$13,314,000, about 40 per cent of the total USAID funds for health. Near 55 per cent of the funds were destined to projects on sanitation, water supplies and sewerages, specific disease control, primary health

care, and infrastructure. The nutrition project (\$5.97 million) amounted to 45 per cent of the funds of this period.

### **B.6.a Health infrastructure**

Considerable efforts were invested by the GOCR to improve the health services infrastructure in the urban and rural areas, namely, Sanitary Units, Health Centers, and Health Posts (Projects 48 and 52, for \$517,000, **Table 12**). This fundamental infrastructure does not appear listed in **Tables 1 and 4**, although it represents more than one hundred units in this Period. Their marked impact will be discussed in the section of primary health care (Mata and Rosero 1988). USAID projects in Period 2 were administered by SCISP.

At the beginning, funds were received by the American Embassy which transferred them to SCISP's accounts for expedite disbursement. More than 20 "planteles" (factories) were constructed by SCISP to manufacture thousands of cement latrines and other works. The larger ones were located in San José, Liberia, Cañas, San Isidro del General, and Siquirres, for a virtual coverage of the nation. Engineer Edison Rivera of the MOH was responsible for the project, and the Municipalities were in charge of installing the latrines on demand, a system still in operation in some parts. Performance was excellent (Rivera 1995, interview), but no records are available on number and geographic distribution of these items. However, the important consideration is that about one half of the rural and urban population benefitted from the project, to the extent that in 1963, 44 per cent of the households had latrines and an additional 30 per cent, septic tanks (national census, DGEC 1963), one of the best performances in Latin America.

No representative surveys of intestinal helminths were made in the 1950's. However, limited studies in school children in 1955-56, in San José, Goicoechea, Desamparados, Alajuelita, Santa Ana, Mora, Puriscal, Acosta, Tarrazú, Grecia, Naranjo, and Poás, revealed more than 90 per cent prevalence of these parasites. Hundreds of thousands of new infections were prevented by containment of feces by the latrine program. People got accustomed to the facility, and eventually assumed their installation and improvement. Prevention of hookworm disease benefitted immensely with the latrines, which precluded fecal contamination of soil, water and food. It is worth mentioning the emphasis on health education in schools and homes, and on wearing shoes, started in 1942 when the Calderón administration enacted legislation making shoes compulsory in public and private schools. Legislation was accompanied by a national program of distribution of complimentary shoes, which virtually covered all school children of the nation.

Environmental fecal pollution in the mid 1950's also was responsible for the high transmission rate of typhoid fever, about 28 cases per 100,000 population. With time, this disease virtually disappeared as a cause of morbidity in Costa Rica. The construction of slaughterhouses also benefitted from the USAID-GOCR cooperation. This project was more modest than that of latrines, but it had significant impact because the small number of units were used as models to replicate outside the project areas. American experts explained

better techniques for butchering, like replacing knives for the killing of animals, raising the animals above the floor for the cut of, and reduce contact with feces. Good procedures were transmitted to butchers of many communities.

One of the most important SCISP actions was the construction of water supply systems throughout the nation. A project of drilling wells started, which eventually evolved into the still operating "Servicio Nacional de Aguas Subterráneas, SENAS" (National Service of Underground Waters). Many treatment plants for sewers and cesspool waters were constructed, as well as model markets in communities obviously deficient in handling of consumable goods. Finally, several model garbage dumps were built, some of which gave way to larger dumps. It is impossible to accurately determine the public health impact of these projects, in part because there was no evaluation. On the other hand, these interventions constituted part of a health revolution in the nation, especially in communities with deficient or absent sanitary conditions.

Construction of hospitals and clinics was not a priority for the USAID, probably because it had placed the emphasis on prevention, more than on treatment. Also, the cost of building hospitals was considerably greater than the sums authorized for the projects. On the other hand, the government and the people always find the way to procure funds for hospitals, granting their importance. The need of a children's hospital was felt during the great epidemic of poliomyelitis in 1954, which crippled and killed hundreds of children. The only facility for sick children at that time was the crowded Pediatric Service of the Hospital San Juan de Dios (CCSS 1990). Thus, the construction of the hospital had a very high priority. The hospital was under construction when President Kennedy visited Costa Rica (March, 1963) and handed out a personal contribution of \$100,000. He also promised U.S. funds to finish the hospital and the USAID approved \$2 million (project 50, **Table 12**). Most experts consider that the American participation was fundamental for the construction of the hospital (Arrea 1995, Lara 1995, Ortiz-Brenes 1995).

The National Children's hospital offers first class medical services for sick children of Costa Rica and neighboring countries. It is a bastion of medicine and science and a resource to improve the quality of life of child and family. The unit has fewer problems than other hospitals of the CCSS network, and it excels in the quality of services. It is a leading training center in Latin America, sought by residents from all over the world. The hospital solves problems through application of international science and an indigenous body of knowledge.

#### **B.6.b Human resources**

One project served to train Costa Rican medical and health professionals (number 47, \$704,000, **Table 12**). The fund was destined to train practically all the medical teachers of the new medical school. The school had been planned in the 1950's by the medical leaders and scientist of that epoch (UCR 1957): Fernando Escalante-Pradilla, Leonidas Poveda-Estrada, Ettore De Girolami, Rodolfo Céspedes-Fonseca, Antonio Peña-Chavarría, Carlos

Sáenz-Herrera, José Manuel Quirce-Morales, Otto Fallas-Monge, Carlos Céspedes-Vargas, José M. Ortiz-Céspedes, Antonio Facio-Ulloa, y Ricardo Marchena (UCR 1957). The first appointed professors included prominent physicians and teachers like Ettore De Girolami, Alfonso Trejos-Willis, Rodolfo Céspedes-Fonseca, Víctor M. Hernández Ash, and Antonio Peña-Chavarría. The new school got involved with the Louisiana State University (LSU), which had an NIH contract approved to establish the International Center for Medical Research and Training (ICMRT) in Costa Rica (LSU 1958). (Four other centers were supported by NIH and other American universities in other nations). The purpose of the center was to research and train Americans in tropical diseases. But these had already decreased in Costa Rica, often almost eradicated (see Table 6 and Figure 3). Contrasting, diarrhea and malnutrition were still major contributors to morbidity and premature death, a reason for ICMRT to focus on them.

LSU got involved in general consulting services, recruiting faculty of the new School for eventual training at LSU, and planning and supervising their fellowships. This was done under a contract with the U.S. International Cooperation Administration (ICA). The first group of scholarships was granted during 1952-68, to young teachers who already were appointed at the new medical school. Fellows trained in anatomy, physiology, biochemistry, and pharmacology. Some fellows from the MOH, received training in sanitary engineering, public health, maternal and child health, and so forth. Sixty-three were trained in the U.S. They received monthly stipends always on time, directly from the State Department. Scholarships were generous, and fellows also received money from Costa Rica, because they maintained their jobs at home. Training was for 6-month periods or shorter, rarely longer, not enough to reach an academic degree. According to the USAID documentation, none obtained a degree through these fellowships. (Two obtained a masters and one a PhD; this, Dr. Jesús María Jiménez-Porras, did internationally recognized research on snake venoms). Most fellows with whom the author conversed, expressed that they were not sufficiently exposed to research, and most stated that they were not impressed with the University. Compared to local research centers, the much larger medical school maintains a low research profile. Many USAID-supported fellows considered that venture some sort of tour, not enough to get acquainted with the language and customs of the host country.

A second group of 44 trainees received USAID support to train for 10-week in the U.S., in 1982-1994. Again, most returned without an academic degree. The bulk of them trained in the US in 1988, in adolescent health. The majority were nurses, engineers and technicians; about 10 per cent were doctors. The selection of candidates was done at the MOH and CCSS, and the selection criteria used was not available. In contrast with the first group (teachers of the medical school), most candidates specialized in fields of low public health priority. Many are currently working in the private sector, and many pass mostly unknown. Presumably, there was not enough emphasis at the time of selection, on vocation and other qualifications, neither was assurance that they would find a job upon return. It could not be ascertained if politics, friendship, and other factors influenced the assignment of scholarships primarily destined to the staff of the CCSS and MOH. On the other hand, research centers did not know about these scholarships, for instance, at the "Instituto de

Investigaciones en Salud, INISA" (Institute for Health Research), and "Centro de Investigación en Tecnología de Alimentos, CITA" (Research Center for Food Technology). Consequently, no applications were submitted from research centers.

Short USAID fellowships intended to promote development in LDC's and to strengthen friendship with nationals, who traditionally felt exploited by the Empire. But short scholarships may backfire, because of language and cultural barriers. The author had a 2-month training in radioisotopes in Puerto Rico in 1958, sponsored by the State Department. While language and culture barriers were minimal, little science was derived from the experience. Short fellowships likely have the opposite effect, poor training and rejection of the American culture. This might explain the anti-American sentiment felt at the medical school. Short-term students in the U.S. probably do not learn enough English and do not overcome the culture shock. To summarize, the first group of trainees were professors of the new medical school; the second group consisted of health professionals from the CCSS and MOH, mostly nurses and public health staff, who had 10-week courses. The author considers that fewer well selected trainees going for the doctorate will yield dividends, because they have a multiplying effect once they return home.

#### **B.6.c Water supply and sewerage**

This is an activity in which foreign aid had a strong positive influence. Abundant water is the salient feature of Costa Rica, resulting in the almost obsessive proclivity of the people to showering, whether they descend from Amerindian, Spaniard, African, or other. The concern to improve the water supply started with the beginning of the Republic in 1821. By mid 1840's, José María Castro Madriz, President of the country, launched a program to improve water supplies in the capital city. Provision of water for most people was not an easy task, and in the 1920's and 1930's deficiencies accounted for high diarrhea morbidity and mortality among children (see **Tables 3 and 7**). Diarrhea death rates were about 400 per 100,000 then, among the highest in the world.

Diarrhea mortality dropped from 333 per 100,000 in 1939, to 165 in 1947 (-50%, see **Table 7**). This significant reduction resulted from large investments in sanitation works in that period, already described. However, no significant improvement was recorded in the ensuing 15 years - despite sustained works in water supply and sanitation. Possible explanations for the apparent setback might be social disorganization, unemployment, and internal migration following the revolution of 1948 (Mata 1981).

It is also possible that the stagnation of the decline of diarrhea noted in the 1940's resulted from the institution of mother-infant separation immediately after the birth of the child, effected in most maternities of the country, as well as the emphasis on feeding infants with cow's milk and commercial formulae. These "modern" practices, introduced by pediatricians and obstetricians trained abroad, enhanced the risk of early weaning and diarrhea (Mata *et al.* 1983). In the mid-1960's, scientifically based programs were started to tackle deficits in quality and volume of water for most of the population. This development

was spurred by the Charter of Punta del Este at the PAHO conference in Argentina in 1961. The countries agreed to improve the water supplies in the following decade, aiming to cover at least 70 per cent of the urban area and 50 per cent of the rural one. The task seemed feasible for Costa Rica, because it already had attained a 65 per cent coverage in 1961 (**Table 17**). (Eventually, the nation reached the goal in 1965).

Such enterprise would not be attained with the GOCR resources alone (Cabada 1995, Fabian 1995); thus, the USAID money was necessary to crystallize the expansion of water supplies (Projects 73, 77, 918, and 924, total \$4.9 million, **Tables 12 and 14**). U.S. consultants visited the nation to appraise the situation of the Metropolitan Area and surroundings. A significant contribution was the "Rader report" (1959), recommending the creation of an independent body to coordinate matters of water supplies and sewerage at the national level, an idea already floating for some time. The body, born in 1961 (President Mario Echandi, José Manuel Quirce, Minister of Health), was named "Servicio Nacional de Acueductos y Alcantarillados, SNAA" (National System of Aqueducts and Sewerage), later changed to "Instituto Costarricense de Acueductos y Alcantarillados, AyA" (Costa Rican Institute of Aqueducts and Sewerage).

The governmental procedures at that time were more bureaucratic and sluggish than they are today, delaying execution of funds for months or years, and only 26-27 per cent of the funds could be disbursed. In view of such difficulty, in 1961 the USAID invited the MOH to sign an agreement to develop an entity to accelerate financial processes (President Mario Echandi). The new body was named "Oficina de Cooperación Costarricense-Americana de Salud Pública, OCCASP" (Office for Costa Rican-American Cooperation in Public Health). But to prevent anti-American feelings at a time of considerable Communist activity, the entity was renamed "Oficina de Cooperación Internacional en Salud, OCIS" (Office for International Cooperation for Health), to this days. The office was fundamental for rapid mobilization of large sums of foreign currency, by-passing paralysis caused by legislation, bureaucracy and politics. In 1965 the GOCR and the USAID agreed to launch a "national technical plan" to speed up development of water supplies within the following three years (President Francisco Orlich). Another agreement was signed with the USAID to secure funds authorized by Law 3741 of August of 1966 (President José J. Trejos, Alvaro Aguilar Peralta, Minister of Health).

**Figure 7** illustrates the evolution of the rates of diarrheal disease mortality and infant mortality in Costa Rica (Mata 1981). The two mortalities were found strongly correlated, and a reduction in the first will automatically reduce the other. There were at least three abrupt declines in both mortalities. The first occurred shortly after the formidable improvements in environmental sanitation effected by the SCISP intervention in the mid 1940's. Diarrhea mortality decreased from 283 per 100,000 in 1941, to 165 per 100,000 in 1947, a 42 per cent reduction. Likewise, there was an important decline in infant mortality. The second marked decline occurred after the SNAA began its operation. Within five years of the new water program in 1964, the diarrhea mortality dropped from 104 per 100,000 in 1966, to 55 per 100,000 in 1971, almost 50 per cent (see **Tables 7 and 15** and **Figure 7**).

Again, infant mortality also diminished. It should be noted that this reduction occurred before the beginning of the primary health care program (to be discussed below). There was a peak of infant mortality in 1969, linked in part to a large measles epidemic from failure to maintain immunizations at that time. The third abrupt decline in the mortalities followed the expansion of primary health care services in the 1970's, and the widening of coverage with water supplies financed by the USAID nutrition project (number 121, with \$5.97 million, **Table 12**). A considerable proportion of this fund was used to build rural water supplies and sanitation works (Cabada 1995, Lugari 1995). The most remote areas were reach with hand-operated water pumps, measles, immunizations, and control of preventable diseases, rehydration therapy, dispersed rural localities in the most remote areas of the nation. The cordial and respectful relations between the GOCR and the USAID were due, in great part, to the charm and understanding of Stephen Knaebel, USAID director in Costa Rica.

Water supply and sanitation, have been the two most important health interventions in Costa Rica. They have permanent effects, and once developed, do not require large investment to maintain or expand to meet population growth. Good water supplies became indispensable in Costa Rica, and communities do whatever is necessary to obtain, maintain and improve them.

#### **B.6.d Sanitation**

Together with safe water supply, the control of fecal waste represents the most important health achievement in Costa Rica. For unknown reasons, Costa Rica did not record the rates of wear of shoes. Likewise, the evolution of prevalence of facilities for waste disposal was not recorded before 1963. In 1963, there was a 74 per cent prevalence of households with toilet (30%) and latrine (44%), one of best in Latin America (**Table 18, Figure 8**). This resulted from the sustained investment GOCR-USAID to build and distribute thousands of latrines (see above). The cooperation was continued by the GOCR, and a small loan (Number 31, \$41,000, **Table 12**). The data from national censuses and home surveys showed rapid increases in homes furnished with toilets or latrines. Furthermore, the current administration plans to provide latrine or water toilets for those that still do not have them.

The GOCR and USAID documentation does not indicate evaluation of impact on health by a steady containment of feces. Two representative surveys of intestinal helminths were conducted in Costa Rica in 1966 and 1992. The prevalence of parasites had decline dramatically in the interval (Mata *et al.* 1985). The 1966 survey was a part of the Central American Nutrition Survey (OIR/INCAP/GOCR 1969). The 1982 survey was part of the national nutrition survey (MS 1985). The decline in helminthic infection was often dramatic, both in urban and rural populations (**Figures 9 and 10**). The decrease was greatest in children. Also, the worm load was considerably smaller in 1982 than in 1966 (Mata *et al.* 1985). Few hookworm infections persisted in adults, likely representing chronic infections and acquisitions during farming. The fact that most infections in 1982 were mild, reflected smaller doses of larvae and or embryonated eggs in the environment.

### B.6.e Malaria

In the 1920's, physicians working in the highlands were impressed with the frequent admissions and deaths due to malaria, even though many patients did not make it to the San Juan de Dios Hospital. Solón Núñez then wrote: "Malaria is the most widely scattered endemic... causing the highest morbidity and mortality rates... its chronic nature, and the anemia and debilitation it produces, makes its control rather than a problem of public health, one of political economy." Initial measures were treatment of patients with quinine, and application of environmental measures to kill the larvae and preventing mosquito breeding and biting.

Changes in human behavior (like the use of mosquito nets) were promoted to reduce exposure to the Anopheles. Environmental and clinical measures reduced malaria mortality from 239 per 100,000 population in the triennium 1929-31, to 138 per 100,000 in 1939-41, a formidable 42 per cent decline (Table 19) (Mata and Rosero 1988). Such changes, however, were of lesser magnitude than those attained through larvicide control and other environmental measures in the Panama Canal Zone. The turning point in malaria control occurred in the 1940's, with the advent of DDT and Dieldrin for residual intra-domiciliary spraying. Commencing in the late 1940's and intensified in the 1950's, this approach had the following consequences: (a) Progressive reduction of parasitemia and morbidity of P falciparum; (b) Dramatic decrease in overall malaria mortality; and (c) Progressive control of human fleas, head lice, and jigger fleas (AID 1971, Mata and Rosero 1988). The latter have been virtually eradicated. Another significant decline was noted in 1949-51, to 60 per 100,000 or 56 per cent reduction from the preceding triennium (see Table 19).

The large offensive program aiming at malaria eradication in Costa Rica commenced on July 15, 1957. Several factors interacted to make that possible: a) Availability of DDT, to which the vector had not yet developed resistance. b) International cooperation spurred by PAHO at the World Health Assembly in Mexico, where the control of malaria was given a high priority. c) Relative economic and political stability. The program consisted in global coverage of the malarious area (30,000 square km, 54% of the national area) with heavy intra-domiciliary spraying of residual insecticides twice a year. In 1961, problems were detected in villages of the Pacific coast, where the main banana plantations and malaria activity were then found. Transmission could not be interrupted due to particular features of the households, human behavior, and vector habits.

To set the program in motion in 1957, Law 2115 was passed (President José Figueres, Minister of Health Rodrigo Loría-Cortés), declaring malaria eradication a matter of public interest, and recommending a national campaign. An important step was the creation of OCCASP in 1961 (mentioned above), to speed up disbursement of loans and grants for malaria eradication and other health programs. The implementation of the malaria program produced a highly devoted and efficient "rural army without weapons", of health workers scanning the malarious area. A key factor in this development the PAHO appointment of Hugo Villegas-Olazábal, a young Peruvian physician assigned to Costa Rica in 1966.

Villegas traversed most of the rural area, and was one of the creators of the rural health program. The malarious area included everyone living below 500 meters, an estimated 350,000, with a good proportion of Nicaraguans. The main malaria vector has always been A. albimanus, and the main species in the last 20 years, P. vivax. The population represents several hundred localities scattered throughout, generally accessed by difficult gravel or dirt roads. At the beginning, coverage of this population seemed an impossibility. Flooding rivers, ravines, lack of lodging facilities, and poisonous snakes were the norm, and several field workers lost their lives on duty. The program succeeded once USAID funds became available (No. 30, with \$9,000), one substantial loan (No. 59, \$0.5 million, see **Table 11**). Most agreed that such funds were fundamental in the early phases (Villegas-Olazábal 1991; Garcés 1995; Sáenz-Jiménez 1995, Rodríguez-Aragonés 1995). There was a further reduction in mortality in 1959-1961, of the order of 2 per 100,000, a decrease of 99.9 per cent from the initial figure in the late 1920's, or a 97 per cent decrease from the previous rate in 1949-51 (**Table 19**). However, morbidity still was very high in 1958-1967 (**Table 20; Figure 11**). For instance, there were almost 1,600 cases per 100,000 people in 1959, a huge rate, especially because most of it occurred in the malarious zone.

Four important elements interacted favorably to assure further control: a) Horacio Ruiz, an energetic and obsessive land surveyor, was appointed director of the program. Horacio Ruiz, an energetic and obsessive land surveyor, had great power, and unlimited power to hire or separate staff. He acquired direct field experience in malaria control while working for the UFCO; (b) Two additional USAID loans were authorized (Nos. 68 and 71, for \$1.1 million, **Table 12**), to provide cash for insecticide, field vehicles and personnel; (c) Agile execution of funds by the administration of SCISP; (d) The advent of DDT and other insecticides after World War II; and (e) An improved malaria treatment in hospitals.

In 1962 the PAHO/WHO evaluating commission found the Costa Rican malaria eradication program very successful and recommended to shift 75 per cent of the malarious area from the attack to the consolidation phase (MS 1971, MSP 1971). Between 1962 and 1964, thorough collective treatment with effective anti-malaria drugs resulted in elimination of persistent foci in small communities, totalling 13,350 people. The program had a setback in 1964 when its relative autonomy was suppressed and its management transferred to the MOH (President Orlich, Max Terán, Minister of Health). The negative effects of such action became promptly evident in the bad and sluggish administration of the program, lack of funds for transport, and a virtual paralysis that lasted more than six months. An evaluation in 1966 evidenced a deterioration of the program and a rise in cases from 1200 to 3000, a 100 per cent increase in the malariometric indices (**Tables 18 and 21; Figures 11 and 12**). Evaluators of the program deemed necessary to shift 75 per cent of the malarious area from the consolidation to the attack phase, a reversal from a previous recommendation (USAID 1971).

To cope with that critical situation, the GOCR (President Trejos; Alvaro Aguilar Peralta, Minister of Health), by decree of 1967, created a relatively independent entity, the "Servicio Nacional de Erradicación de la Malaria, SNEM" (National Service for Malaria

Eradication) (MS 1967). The government also approved the "Plan Trienal de Erradicación de la Malaria" (Triennial Malaria Eradication Plan) financed by a USAID loan of \$500,000 (see **Tables 12 and 14**, USAID 1971). Undoubtedly, PAHO had been in the background of these developments. There were some delays in the implementation of this loan which, together with insufficient local funds, delayed commencement until 1968. Eventually, funds reached \$990,000, including the GOCR counterpart and donations from PAHO and UNICEF.

The new program began early in 1968, aiming at interruption of transmission within three years (MSP 1971). However, this could not be accomplished due to severe malaria outbreaks in 1970 in new banana plantations developed in the Atlantic and Pacific coasts. Nonetheless, the program reduced morbidity from 4,490 cases in 1967 to 351 cases in 1970. Malaria mortality fell to only 0.2 per 100,000 in 1969-1971, for a 90 per cent reduction from the level ten years earlier (**Table 19**). Also, morbidity had fallen 93 per cent by 1970, from 2,839 cases per 100,000 in 1967, to 203 cases per 100,000 in 1970. The innovative program consisted in "collective treatment" every week for 15 months with appropriate anti-malarial drugs. Collective meaning that every inhabitant in the malaria-transmission communities was given two different drugs (MSP 1971, MSP 1973). The anti-malaria program was the first to attempt coverage of most of the rural disperse population within a relatively short period, which favored the eventual crystallization of the "Rural Health Program" (see below). Part of the funds were used to acquire four-wheel drive field vehicles, motorcycles, and boats, fundamental to reach the most disperse and distant localities of the nation.

The highlight of the malaria campaign was the arrival of more USAID funds (MS 1975). The "Plan Quinquenal de Erradicación de la Malaria en Costa Rica, 1971-1975" (5-Year Plan for Malaria Eradication) was funded with a USAID loan of \$610,000, in 1971-1972 (MSP 1970, MSP 1971). Again, PAHO guided this Plan in Costa Rica and neighboring countries. Complications were related to changes in behavior of man and development of resistance to DDT and Dieldrin by the mosquito. Propoxur (WHO-33) was then used in later dates. The program was judged as highly successful and one of the best in the world - or the best according to some experts. It was successful at a time parallel programs were failing in the rest of Central America. The lowest morbidity was recorded in 1982, with 45 cases per 100,000, mainly by *P. vivax*. Malaria mortality declined to 0.2 per 100,000 in the triennium 1969-1971, a 90 per cent reduction, and ceased to be an important mortality cause, up to the present. sd

Satisfactorily, in ten years malaria morbidity was cut from 1,594 per 100,000 in 1959, to 409 per 100,000 in 1969 (**Table 20**). The trend towards eradication was confirmed with the significant decline of the "slide positive rate" (SPR) after implementation of the AID funds, from 2.7 in 1967 to 0.2 three years later (**Table 21; Figure 12**). Also, the trend towards an eventual disappearance of *falciparum* malaria continued, with the number of cases falling from 47 in 1957 to none in 1967 (see **Table 21**).

The influence of USAID on malaria control ended in the 1980's and the SNEM was practically dismantled. The decay of the MOH programs (primary health care, vector control, malaria laboratory, surveillance), in the 1980's, the large banana expansion signed in mid 1980's, the exhaustion of USAID funds, and the shift of emphasis of PAHO to other health issues, set the ground for a progressive recrudescence of malaria during the 1980's and 1990's (see **Table 20**; **Figure 11**). There was a progressive increase in the ratio "autochthonous to imported" malaria (**Figure 13**), a situation apparently overlooked or not given due attention by the health authorities during the period 1984-92. Most reported malaria cases in the 1970's were autochthonous, but in 1981, autochthonous malaria had reached the lowest ration, 27 per cent. Since then, autochthonous malaria had progressively increased, to reach 60 per cent in 1990, and 86 per cent in 1987. Unfortunately, the MOH stopped recording data on origin of the cases in 1994. The Most malaria transmission is circumscribed to the banana zone, might facilitate its control by the government and the companies. On the other hand, there is an increase number of communities outside the banana zone showing malaria transmission, perhaps an omen of an eventual epidemic, or recrudescence of *P. falciparum*, the killing species (Mata and Mata 1993).

#### **B.6.f Primary health care**

Before the Mobile Units, health services in rural communities were delivered by a several dozens of sanitary units. These had a doctor, nurse, two health auxiliaries, health inspector, sanitary inspector, and chauffeur. Activities included follow-up of children, vaccinations, first aid, and health education. Units with maternity beds and a midwife became "Centros Rurales de Asistencia" (rural centers for care). "Puestos de Salud" (health posts) were created thereafter, consisting of modest locales visited fortnightly or monthly by a physician, to see patients, vaccinate, treat, and educate. These efforts had a direct impact on health and well-being of the community, as well as an indirect effect through health promotion and education.

**Mobile units.** There was always interest in improving the health of the rural population of Costa Rica (MSP 1963). In the early 1960's, the USAID supported the "Programa de Unidades Móviles para el Area Rural, PUMAR" (program of mobile units for the rural area), with funds disbursed assistance through OCCASP (MS 1963, Rodó-Duverrán 1995). USAID acquired field vehicles and equipment for PUMAR, which were assigned to the municipalities of Pérez Zeledón, Puriscal, Nicoya, Santa Cruz, and Limón, all of them with large populations with deprived of health services, and were served by deficient roads. PUMAR immunized children against polio, whooping cough, diphtheria, tetanus and measles, and gave medicines for anemia, parasites, and fevers. It provided basic, intermittent preventive and curative services for rural communities.

Part of the success of PUMAR resulted from the enthusiasm and proficiency of its director, Dr. Arturo Romero, an eminent physician from El Salvador, exiled in Costa Rica for several years. Young doctors who joined Romero and his mobile units, had first hand exposure to the reality of the rural areas. Some became public health leaders, like Antonio

Rodríguez-Aragonés, Eliécer Valverde, William Vargas-González, and Guillermo Contreras. There were initial difficulties primarily related to cultural shock from the sudden contact of isolated people to western medicine. Of great advantage was the expedite disbursement of resources by OCCASP, which administered USAID funds. Another significant factor was the direct involvement of USAID experts in the program. Peace Corps Volunteers helped in this development. The greatest contribution of the program was the creation of many Unidades Sanitarias, a precursor of the primary health care program.

**Hospital without walls.** Unrelated to any government plan or influence, the concept of community health service was launched in the 1960's in the region of San Ramón, by Dr. Juan Guillermo Ortiz-Guier. Deeply involved with rural communities, Ortiz-Guier convinced the hospital staff to provide health services at the home (Ortiz-Guier 1995). Auxiliary health nurses and other personnel came out into the dwellings, that is, the "hospital sin paredes" (hospital without walls). People obtained vaccines, first aid, health education, and treatment to contain disease at its inception. The health indicators of San Ramón and surrounding localities showed marked improvements. Ortiz-Guier was in good terms with USAID and other agencies, but the hospital evolved without their input. However, years after this program was in operation, Japanese motorcycles purchased with USAID funds were given to the hospital without walls. The "hospital sin paredes" was wholly supported by the State and the community. While highly successful, replication of the model throughout the nation was not a feasible idea, since it would have required the existence of many doctors with the enthusiasm and charisma of Dr. Ortiz-Guier, an impossibility. Then, an alternative had to be developed, namely, multiple simpler units operating with sub-professional staff: Health Centers and Health Posts, the base of the PSR (rural health program).

**Rural health program.** The conceptualization of the PSR was as follows: In the aftermath of the successful malaria program, in 1978-79 in Tilarán and other communities, rural health workers suddenly realized that malaria transmission had been interrupted, leaving them with little to do. Villagers had been discussing other health problems, for instance, the nature and treatment of the "tiredness" of pregnant women, the dangers facing babies after birth, the best treatments for intestinal worms, or how to improve nutrition and performance. The same interest was noted in other communities of Guanacaste (Villegas-Olazábal 1996). To address this need, key persons were needed to plan, effect and evaluate the program. Two young doctors became leaders, Hugo Villegas, already mentioned, and Eliécer Valverde, who had trained in epidemiology at the Centers for Disease Control, Atlanta. With independence of mind, the doctors challenged dogma and prejudice and began teaching primary health care techniques to the rural army without weapons. These workers had an adequate familiarity with terrain and community, and were already grinded in anti-malaria activities. Additional knowledge and skills were necessary for recognition of signs and symptoms of the leading diseases, referral of patients to higher levels, and handling first aid and emergency situations (Vargas-González *et al.* 1972).

Even thou, the idea of bringing health services to people in the most remote communities of Costa Rica (as barefoot doctors did in Mao's China), seemed an impossibility

in the early 1970's, and furthermore, met with strong skepticism and opposition. The PAHO document of 1972 for the "10-Year Health Plan for the Americas", was a solid base to expand coverage of health services in a significant way. In Costa Rica, meetings were followed by the preparation of documents on rural health (Vargas-González *et al.* 1972, MSP 1973; MS/MIDEPLAN 1978). The main one, the basis for the "Programa de Salud Rural, PSR" (rural health program), was prepared by Drs. Antonio Rodríguez-Aragónés, Eliécer Valverde, Ronald Evans, Lenín Sáenz, and others (MSP 1973). Hugo Villegas was an inspirator (see above) and a supporting person. Ronald Evans had lived in Venezuela where he saw "simplified medicine" in rural areas (which were also known to Hugo Villegas). Early, Dr. William Vargas joined, and prepared a manual for the rural health assistant (Vargas-González *et al.* 1972). All these developments were stimulated by Dr. José Luis Orlich, Minister of Health (President José Figueres). (Meantime, the "hospital sin paredes" was underway). The PSR was discussed in the late 1960's (President José Joaquín Trejos, Carmelo Calvosa, Minister of Health). The program was approved in 1971, the basic documentation prepared in 1972, and the first steps toward implementation were from 1973 onwards (President José Figueres, José Luis Orlich, Minister of Health). The program had the greatest impetus after 1975 (President Daniel Oduber) Dr. Herman Weinstok, Minister of Health, visited the hospital sin paredes to see its operation (Ortiz-Guier 1995). By 1976, the PSR was functioning in hundreds of communities throughout the nation. As mentioned above, the program had its origin in the "silent army without weapons" that controlled malaria, and the input of Drs. Romero, Rodríguez-Aragónés, Villegas, Evans, Ortiz-Guier, Valverde and others. In other words, Costa Rica was prepared to start this glorious program.

The first discussions were with Hugo Villegas, and Alberto Amat (an engineer). Leonilce Alfaro (nurse) trained the first rural health assistants. The first funds came in from the GOCR, UNICEF, PAHO, and later IMAS, DINADECO, and the USAID Nutrition Project (number 516-0121, \$5.97 million, Table 12). The most significant counterpart, however, was the GOCR program of "Desarrollo Social y Asignaciones Familiares, DESAF" (Social Development and Family Allowances, Table 14), an entity collecting 10 per cent tax on all consumable items in Costa Rica (see under Nutrition, this Section). The USAID loan was for nutrition activities *sensu stricto*, but other related activities were allowed, like works in sanitary engineering, rural housing and community organization. The USAID, a long time supporter of the paradigm that lack of food was the main cause of child malnutrition (Berg 1973), was aware of the infectious paradigm proposing that infections actually play a major part in the genesis of acute and chronic malnutrition in most communities, particularly among children (Mata *et al.* 1971, Mata 1978a). It was therefore interesting that the USAID nutrition project contemplated installation of latrines and water supplies in rural areas, maternal and child health programs and primary health care, health education, and community organization, all of which have direct input in prevention and control of infection (USAID 1975). Without USAID funds, it would have been difficult to attain the excellent coverage with primary health care, to be described next.

The PSR had the following characteristics: (a) It targeted on all people without regard to skin color, religion, nationality, economic level, and political affiliation (the program served thousands of Nicaraguans); (b) It evolved centripetally, from the poor distant villages and city slums to the nearest communities and urban centers; (c) The program' staff provided services free of charge, and did not accept personal gifts; (d) Mothers, children, and elders had the highest priority; and (e) It worked in close association with the local health committee and other community organizations. The PSR focused first on communities with less than 500 people, effecting activities through teams formed by one auxiliary health nurse responsible for covering the village quadrant, and one rural health assistant responsible for scanning the scattered most rural communities. At the beginning, rural health workers reached the population by foot, horse or rural vehicles. Later, Japanese motorcycles were acquired to cover the rough country roads, and with boats for difficult water areas, for instance, in the border with Nicaragua. Rural health assistants worked in villages different from those in which they were born or lived (Contreras 1995, Villegas 1996). Generally, nurses were women, and assistants were men. They were young, with completed high school and a course for rural activities. They were relatively well paid, and were shod. Their first duty in each community was to acquaint themselves with village folk, authorities and leaders. Next, to organize the local health committee. Thereafter, they had to draw a rudimentary but accurate map displaying blocks, households, and landmarks (church, stores, slaughterhouse, schools, bars, roads, creeks, bridges, etc.). An accurate census followed, to identify the target population. Other activities were: collect arm pit or mouth temperature, measurement of body weight and length (height) of mothers and children; immunization against polio, measles, diphtheria, pertussis, tetanus and tuberculosis; treatment of malaria, intestinal parasites, and anemia; breastfeeding, promotion of adequate food habits and nutrition, family planning; prenatal care; and oral rehydration therapy. As the program evolved, it was inevitable for rural health assistants to engage in additional activities. They participated with the community in programs of water supply, control of fecal waste and garbage, food safety, and health education. Some negotiated the repair of a road or bridge, or similar problems (Mata and Rosero 1988). They also collaborated with the "Instituto Mixto de Ayuda Social, IMAS (mixed institute of social aid), an entity in charge of housing programs for the poor.

The initial organization of the program goes to Hugo Villegas Olazábal (PAHO), William Vargas-González (who became its director in 1974), and others at the MOH. Leonilce Alfaro, a graduate nurse, is credited for training the first auxiliary health nurses in the program. Misael Meza was involved in training of the first rural health workers. There was considerable opposition to a "program to deliver preventive and medical services in rural areas by high-school graduates, with disregard to the real doctors". There was opposition from the colleges of physicians, nurses and microbiologists. Dr. Manuel Villa-Crespo, then PAHO Representative in Costa Rica, was a leader in the defense of the PSR before the College of Physicians. The School of Medicine was uninterested in the PSR, on the assumption that rural health workers were invading the exclusive field of the medical profession, a position that eventually was rejected even by the most orthodox medics.

The remarkable development of the PSR occurred before the USAID nutrition project got implemented in 1977. Also, an impressive network of hospitals and clinics already existed before the PSR (see **Table 1**), including many sanitary units. But the bulk of the rural population (almost one million) had limited or no access at all to health services. Many died without the opportunity of even seen a doctor. Deficiencies were also evident in many urban sectors. Communication was difficult or impossible in many areas at that time, especially during the rainy season. Part of the problem rested in the broken topography of the country limiting access for thousands of small scattered communities. These often were separated by long distances and natural barriers. A survey conducted by the USAID in 1973 in Costa Rica, identified 4,245 communities, about 12 per cent of them with less than 100 people (**Table 22**). Furthermore, 21 per cent of the households were located at 1-2 km from the nearest school, and 19 per cent additional at more than 2 km from the school. Such distances may require hours by foot, often the only means of transportation. This illustrates why it was difficult to cover the rural areas with adequate health services.

The first Health Post had been established in 1972 in Guayabo (Bagaces, Guanacaste). In 1973, there were 27 Health Posts in the entire rural area, staffed with 43 rural health workers and an effective coverage of 69,000 people (**Table 23**). The estimated rural population without health services was 840,660. With the large budget generated by DESAF, Health Posts increased to 119 in 1975, with 166 health workers and a coverage of 360,000 people, 421 per cent increase (see **Table 23**, **Figure 14**). Coverage reached its peak in 1983-89, when it reached 60-64 per cent coverage of the rural population. In this period, the emphasis of the USAID was on the nutrition project (No. 121, \$5,97 million, **Table 12**), based on the nutrition paradigm which purported that the improvement of the nutritional status was the means to attain health (Berg 1972). But at that time Costa Rica had already eradicated most of the severe and moderate malnutrition (Mata 1975) and was pushing the infection paradigm (Mata *et al.* 1971). Thus, the input of USAID in the development of the PSR was not strong, although important funds were destined for maternal and child health, rural water supplies and sanitation. In reality, the USAID was also supporting the infection paradigm.

A few years after commencement of the PSR, a dramatic decline in infant mortality was noted in many rural areas. In some instances the rural areas were attaining better indicators than some urban zones (Villegas 1977; Rosero 1985). For this reason, the "Programa de Salud Comunitaria, PSC" (Community Health Program) was developed in 1976-77, to deliver basic health services to marginal semi-urban and urban populations. The PSC began with 78 Health Areas, for 19,000 people (22% coverage). The program reached 240 Health Areas, with 600,000 persons (63% coverage). The best performance was in 1979 with 63 per cent coverage (see **Table 23**). This program was also supported by DESAF, and along with the PSR, also received strong support from the "Dirección Nacional de Desarrollo Comunitario, DINADECO" (National Directorate of Community Development), a body with leaders for the promotion of community organization and development.

Both programs were characterized by their enthusiasm and participation of the workers, authorities, and the community, from the beginning in 1972-73, through the early 1980's. Observers from all over the world visited the programs, often turning the initial skepticism for admiration, always marvelling and learning from the experience. One merit of the programs was to have been implemented years before the WHO conceptualization of "health for all by the year 2000", and the proposal to universalize primary health care, immortalized at the Conference of Alma Ata in 1978 (MS/MIDEPLAN 1978). Another merit was the demonstration that rural health workers can be trained to carry out chores that had remained in the domain of physicians and nurses. The program showed that health prevention and medical services could be extended to the most remote rural areas, at a relatively low cost if compared with orthodox systems of health care.

Regarding possible impact of such programs, the coverage and length of exposure to the PSR correlated with an acceleration of the decline in infant mortality (Villegas 1977) (Villegas 1977) (Table 24). An increase in life expectancy at birth was also observed, which was greater in some rural areas than in urban ones. However, one cannot rule out other factors operating simultaneously, for instance, formal education, income, roads, mass communication, water supply, and sanitation (see Figure 14). These factors had positive influences on maternal performance, hygienic practices, and lifestyles. For instance, the risk of death for infants was inversely correlated with the number of years of maternal education, the quality of the father's occupation, and the degree of ruralism of the family (Table 25). Thus, years of mother's schooling, better father's occupation, and lesser level of rural life, all correlated with a lower infant mortality (Behm-Rosas et al. 1987). One clear impact resulted from the training of mothers on oral rehydration therapy, an effective measure to prevent death due to dehydration from infectious diseases, especially acute diarrhea and respiratory infection (Nalin et al. 1978, Jiménez et al. 1982, Pizarro et al. 1979). Confounded variables are water supply, sanitation, and health services, which were improving dramatically during the period, in urban and rural areas alike.

Although a good portion of the decline in infant mortality in Costa Rica could be explained by exposure to the PSR (Rosero-Bixby 1984), such decline occurred years before any significant coverage by the PSR had been attained (Table 14). Specifically, most of the dramatic reduction in diarrheal disease and infant deaths had occurred before 1975, when the PSR was reaching some significant coverage (see Figure 14). Then, one should conclude that water supply (see Table 16), sanitation (see Table 17), better housing, woman's education, child immunizations, and other factors were main determinants of the decline in child mortality. One must also assume that water, sanitation, and other factors operating before 1975, were promoting survival. However, it is fair to propose that improvement of rural health via the PSR and PSC mainly contributed to the trend and sustainability of lower infant mortality and better health.

To summarize, virtual coverage of households with toilet or latrine and with intradomiciliary water was accomplished. The construction of toilet generally is accompanied by an adjacent water basin, and more hand washing. This is one of the most important single

measures to decrease enteric and respiratory infectious. Unfortunately, the censuses did not collect data on this variable to correlate with rates of enteric and respiratory diseases. On the other hand, an increase in bedrooms likely will reduce transmission of enteric and respiratory infections. Again, there is no information on this variable, except in the 1973 national census. That year, 28.3 per cent of the 316,271 households had one bedroom, and 71.7 per cent had at least two. A decline in rates of diarrhea and respiratory infections had occurred by 1973. Such favorable situation 20 years ago reflects the sustained emphasis of governments on housing (FNUAP 1989, DGEC 1963, 1973, 1984), beginning with the pioneer legislation of the 1940's. Housing should now be the highest public health priority in Costa Rica. Further gains in this variable would inevitably reduce overall morbidity and the pressure it exerts on outpatient and emergency services of the CCSS. On the other hand, improved housing has significant positive effects on the quality of life.

The health gains of the 1970's have been consolidated and improved through the 1980's and 1990's, despite the economic recession and adjustments of the 1980's and 1990's. Nevertheless, the biologic health condition of the country did not deteriorate during the "lost decade" and the present decade, but on the contrary, it slowly kept improving to the present (Mata, 1996). Likewise, poverty with its marked positive and negative fluctuations, also showed slight improvements until 1993 (Céspedes and Jiménez 1995).

#### **B.6.g Reproductive health**

**Decline in fertility.** This topic has been covered by Víctor Gómez (1996), but a brief discussion will be made in relation to maternal and child health. As already explained, Costa Rica Experienced a brief demographic explosion in the 1950's and early 1960's, reaching total fertility rates of 7 children per woman in reproductive age. There after a marked decline in women's fertility, and in later dates, a deceleration of the trend with stabilization (see **Table 8** and **Figure 4**). The abrupt decline was greater for women at the peak of reproduction, and for women under 20. Despite the denunciation of wrong doing by the USAID role in family planning in Costa Rica, the reduction in fertility had began years before the USAID participation. One should presume that such decrease was determined by other factors interacting for some time, like the improved women's education, modernity and socioeconomic status, the changing mores and sexual liberation and the greater availability of contraceptives.

USAID began its projects in reproductive health in the late 1960's, and collaborated financially with the "Asociación Demográfica Costarricense, ADC" (Costa Rican Association of Demography). Mr. Víctor Morgan, then executive secretary of this NGO, assembled the "Consejo Nacional de Población, CONAPO" - a nonregistered entity - to coordinate activities of the main bodies interested and/or responsible for reproductive health (Mata and Rosero, 1988). CONAPO integrated efforts of the ADC, MOH, CCSS, "Centro de Estudios Sociales y de Población, CESPO" (Center for Social and Population Studies) at the UCR, and the "Centro de Orientación Familiar" (Family Orientation Center, an Episcopal body). There was great enthusiasm and success in those years in boosting women's modernity and

reproductive health. Health education programs for the rural areas were broadcasted and more than 95 per cent of women listened to the "talks of Don Rafael". Contraceptives were distributed free throughout the nation. In the 1990's, the sustainability and further improvement of gains recorded since the 1960's, should be credited to the PSR and PSC. These programs absorbed family planning activities in deprived rural and urban areas. The USAID provided substantial funds for that, in part from the nutrition project. Other non-USAID direct projects for reproductive health were effected at the same time, and benefits derived therefrom.

**Decay of family planning efforts.** The ADC and the USAID participated in a program of sterilization of women carried out by the CCSS and the private sector in the first half of the 1970's. Tube ligation was done free in the State clinics. Both entities also got involved in male sterilizations, together with the "Caravanas de Buena Voluntad" (Caravans of Good Will). This NGO was supported by a protestant church and the Clínica Bíblica, the most reputed private hospital in Costa Rica (Morgan 1995). Physicians laboring in urban and rural communities were paid about \$70 for each vasectomy performed, seemingly with USAID funds. Vasectomies were performed in State hospitals and rural clinics and also privately. The sterilization program incited an uproar of university professors, communists, conservative physicians, and the Catholic Church. The program was bitterly attacked, and sterilizations were banned except in cases where the life of the mother was endangered. The most negative consequence of the conflict has been the persistence of large numbers of poor, uneducated, and deprived families with large offspring, often without a father. Another loss was the decision of the UCR to shut down CESPO, a very productive center. (A few years later the National University founded the "Instituto de Estudios de Población, IDESPO" (Institute for Population Studies) which has had a lower profile than CESPO.

The family planning activities received a further negative impact during Carazo's administration (1978-82). For personal reasons, the Minister of Planning was strongly opposed to family planning activities. He blocked disbursement of funds for such activities. Curiously, his successor in the Monge administration (1982-86) also behaved likewise, accentuating the setback in programs, especially those for marginal urban and rural areas. Following was a marked decline of ADC activities, and CONAPO stopped meeting. In the same epoch, the USAID shifted efforts from the public to the private sector, and in 1983, promoted the creation of PROFAMILIA. This is a private company protected by local legislation, devoted to marketing contraceptives. The first product was a high quality condom for low and middle social strata, released in 1986. USAID also consented that PROFAMILIA distribute health-related products for mothers and children. CONAPO launched "products" for breastfeeding, techniques for detection of uterine and mammary cancer, surgical gloves, and medical equipment for hospitals. In 1988 the USAID returned to population activities with the CCSS and MOH, but this move did not activate activities with the CCSS and MOH, but this move did not activate CONAPO. Impact on female fertility was not as visible as in more glorious times. PROFAMILIA became self-sufficient in 1993, and the main distributor of low-cost condoms, pills, and intrauterine devices. By 1994 it served 50,000 persons at a cost of \$4 per couple. This, however, is evidently

insufficient for the sized of the sexually active population. The social capital of PROFAMILIA is \$650,000, in nominal shares owned by ADC. PROFAMILIA signed a contract with CEFA COMMERCIAL, the largest distributor of condoms in the country, to capitalize on the company' sales infrastructure and experience. Incredibly, it operates with three staff members (López-Molina, 1995).

#### **B.6.h Child nutrition**

Governments were always interested in improving the nutritional condition of the population (see Section 2). The world crisis of the 1930's affected Costa Rican children. Severe cases of "síndrome policarencial de la infancia, SPI" (poly-deficiency syndrome of infancy) crowded in the pediatrics wards of the San Juan de Dios Hospital. Infant malnutrition was declared a national calamity in 1947, and the National Assembly imposed a tax national and imported beer, to finance school luncheons. Simultaneously, Clodomiro Picado, Costa Rica's foremost scientist, published studies on the pathophysiology of the thyroid gland, with recommendations and legislation to enforce iodine fortification of table salt to reduce endemic goiter (Picado 1943). In 1950 a tax was imposed on export coffee to support School Patronages that managed school food programs. The Department of Nutrition of the MOH was created in 1950, and an agreement with UNICEF followed to permit imports of skimmed milk for children. Costa Rica also became a founding member of the Institute of Nutrition of Central America and Panama (INCAP).

INCAP conducted studies in Turrialba and other communities, showing deficits of dietary vitamin A, riboflavin, calcium and animal protein (Scrimshaw *et al.* 1953, Reh and Fernández 1955). Excessive intake of carbohydrates, especially panela was also shown. Nutrition legislation, a clinic to treat malnourished children, the expansion of school luncheons, the construction of nutrition centers, and the first national nutrition survey, occurred in the 1960's and 1970's under the guidance of Carlos Díaz-Amador (Díaz-Amador, 1993). Four nutrition surveys have been conducted in Costa Rica, the first in 1966 by the Office of International Research (OIR), INCAP and the GOCR (OIR/INCAP/GOCR 1969). The others were executed in 1975, 1978 and 1982, by the MOH of the GOCR (MS 1979; MS 1980, MS 1985, and MS 1986). (See Díaz-Amador 1993).

**Nutritional status: mid 1970's.** During the period of development of nutrition institutions just described, various studies were showing that severe malnutrition was decreasing to very low levels. The phenomenon was attributed to public health and educational programs favoring better maternal and child health, as well as the control and prevention of infectious diseases (USAID 1975). Specifically, several interventions reduced the incidence of intestinal parasites, which are known to cause chronic malnutrition and stunting (Mata *et al.* 1985). The incidence of low birth weight had also decreased, as demonstrated in a large series of newborns in the Carit Maternity (middle and low social strata). In 1970 the rate was 9.1 per cent, and in 1975, 7.2 per cent, one of the lowest in the world (Mata *et al.* 1978). Fetal growth reflects maternal nutrition, and therefore it is an excellent correlate of infant death. Furthermore, one study revealed that severe malnutrition

had decreased in the children's hospital (López *et al.* 1978). In 1973, before the USAID nutrition program got underway, malnutrition accounted for about 1.5 per cent of all infant deaths, a negligible contribution to that mortality. Diarrhea, respiratory diseases, and infections preventable by immunization played a more important role than malnutrition (Figure 15) (Mata and Rosero 1988). Finally, a study of representative villages of different ecosystems showed that energy was the main dietary deficiency, while there was no overt deficit in protein (Brenes and Mata 1978). Before that, it was assumed that animal protein was the main deficiency. Other research was carried on, aided by the USAID fund (see below).

**New legislation and funding.** In the 1970's, the law of "Desarrollo Social y Asignaciones Familiares, DESAF" (Social Development and Family Allowances) was passed, consisting in a 10 per cent tax on all consumables and services, to implement the most ambitious program of nutrition and health in Costa Rica and probably in Latin America. The activities included improving child feedings (1-5 year olds) in more than 500 "Centros de Educación y Nutrición, CEN's" (Education and Nutrition Centers) scattered all over the country. These offered well balanced hot breakfasts and lunches to school children. Thousands of community volunteers collaborated with the program. Funds from DESAF helped the formal beginning of multi-disciplinary nutrition research in 1975, with the creation of three research centers: INISA, INCIENSA, and SIN (see below).

In the early 1980's another tax was passed, to insure funds for sustainability of existing programs and for the first "Centros Infantiles de Nutrición y Atención Integral, CINAI's" (Infant Centers for Nutrition and Holistic Child Care"). The late 1980's and 1990's saw an attrition and relative decay of the nutrition programs, stemming mainly from the lack of support by the government.

**GOCCR-USAID nutrition program.** The USAID authorized \$5.9 million to the GOCCR for nutrition activities (Project 516-0121, Table 12), with 50 per cent disbursed (USAID 1975, 1979). The loan was not for nutrition activities *sensu stricto*, because funds were wisely destined to "preventive health and nutrition" (\$3.5 million), "improvement of rural housing" (\$2 million), and "community organization" (\$0.4 million). It must be realized that the predicate that malnutrition was due to lack of food alone, had been under attack by the author. He was pushing the infection paradigm, stating that the primary factor was infections leading to anorexia, food loss, nutrient wastage and stunting (Mata *et al.* 1971). Furthermore, while at INCAP, the author received a USAID grant for a village maize fortification project, and the results of the study supported the infection paradigm (Urrutia *et al.* 1976, Mata 1995). Thus, it was interesting that the USAID nutrition project, had incorporated the installation of latrines and water supplies, support for maternal and child health and primary health care, and for immunizations, day-care centers, health education, and community organization especially in rural areas (USAID 1975). From the administrative point of view, the nutrition project run relatively smoothly, with some "tico" personality clashes (Burke *et al.* 1980, Pines and Brineman 1981).

Regarding SCISP projects of water supply, and malaria control, the USAID sponsored baseline studies, for instance, to determine the magnitude of the nutrition problem. In 1973 a survey of 41 urban and rural communities in the five health areas of Costa Rica (USAID 1975, **Table 26**), showed "malnutrition" rates from 43 per cent in highland communities, to 63 per cent in remote rural ones. The criterion used to assess the nutritional state was the ratio weight for age, of the Gómez classification (Mata 1978b). This technique was intended for hospitalized children with severe malnutrition, and therefore it magnifies malnutrition when employed in the general population. The approach was criticized by Waterlow and Rutishauser and others, who then proposed the more realistic criteria of "wasting" (deficit of weight for height) (Mata 1978b). Thus, "first degree malnutrition" (75-90% of weight for age) includes small children from small parents and well nourished children that had adapted to a negative environment (**Table 27**). If "first degree malnutrition" is removed from the tabulation, the resulting lower values are more in agreement with the overall health reality, for instance, with the low infant mortality attributable to malnutrition, already mentioned.

The disbursement of the USAID nutrition project fund was delayed for more than two years at the Ministry of Health. On the other hand, there was controversy on how to distribute the enormous sum fund of DESAF in 1975-1977. Juan Carlos Antillón, Vice-Minister of Health, Rodrigo Arias, director of Planning; Luis Fernando Arias, director of CITA; and Leonardo Mata, director of INISA, proposed to the Minister of Health that aid should be given in cash to mothers of poor and marginal populations. President Daniel Oduber, however, was determined to create hundreds of food distribution units, mainly for political reasons. In 1977, a large scale program to develop feeding centers began. Fortunately, there was a collateral effort to construct rural water systems and latrines supported mainly by the GOCR (DESAF). The USAID loan, however, was fundamental to attain the impressive coverage with rural water supplies (see **Table 17** and **Figure 14**), rural sanitation (see **Table 18** and **Figure 14**), and primary and community health care (see **Table 23** and **Figure 14**).

The food distribution activities also received support from the loan, but almost all funding came from the GOCR. For instance, the gigantic food program consumed more than \$40 million of perishable foods per year. The energy crisis and inflation beginning in the late 1970's probably influenced the creation of the "Ferias del Agricultor" (Farmers' fairs or bazaars) by President Rodrigo Carazo. These consist of large open areas where farmers offer their fresh produce - at regulated prices - directly to the customers. Fairs operate Saturday or Sunday from 6 a.m. to 12 noon. They provide a means for people of all social strata to acquire directly from the producers, fresh vegetables and fruits and other perishables. Within a few months, more than 50 fairs were operating, and now there are hundreds in the country, with millions of dollars of floating capital. The fairs have turned Costa Ricans into sustained consumers of a significant variety of vegetables and tropical fruits, an unquestionable nutritional benefit. People can meet in camaraderie, and it is not surprising to spot an ex-President, and other personalities mingling with the common folk.

The huge budgets of DESAF stimulated development of large food industries to supply program needs. Agricultural production in villages increased spurred by the demand for perishables. On the other hand, the proliferation of CEN's and CINAI's was possible with DESAF funding. The CEN has dining room, kitchen, store room, and refrigeration. The minimal staff includes teachers, cook, and janitor; also, it is supported by community volunteers. CINAI's have specialized professionals and personnel for child stimulation. Eventually, more than 7,000 employees were included in the payroll. The possible impact of this large program can not be ascertained without specific studies, which have not been specifically made. There is strong evidence that the cost-benefit of these centers is very large, while the nutritional impact is not greater than would be expected through simple measures (Mata and Rosero 1988). The Calderón administration created the program of "Hogares comunitarios" (community homes), a less expensive - and probably more humane - alternative to child care. In these, funds are given to mothers of the community, selected because of their known ability to rear children successfully. The sums provided vary in accord to the number of children cared for. The program has been successful, and has continued in the present administration.

Malnutrition ceased to be an important contributor to infant mortality in Costa Rica in the 1970's. Chronic and severe malnutrition also became significantly less prevalent (Table 27). Paradoxically, malnutrition was declared a national priority. Further studies showed that the proportion of preschool children with adequate weight for age (90-109%, wt/age), which was stagnant during 1966-1978, to increase significantly by 1982 (see Table 27). Expectedly such increase was steady, although there was no survey made in the interval to prove it. The available data correspond to periodic weighing of preschool children serviced by the primary health care program (Díaz-Amador 1993, MS 1995). These data show a decreasing yearly rate of all grades of malnutrition from 1987 to 1994, despite the prevailing recession and ensuing structural adjustments of the 1980's and early 1990's. Curiously, a slight reduction in the rate of overweight of children under six years, has been noted from 1989 through 1994.

**Impact of nutrition programs.** There is no doubt that the nutrition projects had some positive impact on maternal and child health, particularly from related activities directed to control infectious and parasitic diseases. However, doubt persists as to the effect of food supplementary food progress on nutrition. This poses the question of high cost-benefit of the intervention. When malnourished children are identified through the PSR, they are referred to the CEN or CINAI for nutritional therapy. However, this approach has no impact in the general child population, because most children do not have access to the government program. On the other hand, a one-year long term study of children attending the Puriscal CEN's, showed that they did not improve their food consumption and nutritional status throughout one year (Murillo and Mata 1980). Furthermore, no differences were noted in the nutritional state of cohort children of the "Puriscal Study" (see below), whether they do or do not benefit from the food program (Table 28) (Mata *et al.* 1982). This observation has additional value because children not benefitting from the program generally

live at greater distances than those in the program, probably under more unfavorable environmental conditions than children close to the food centers.

Despite economic recession, the overall nutritional condition of the country improved somewhat during the 1980's (**Table 29**): third degree malnutrition, wastage and stunting continue decreasing (MS 1995); vitamin A deficiency was practically corrected way before the USAID nutrition project, likely due to an improved consumption of vitamin A products and carotene-rich vegetables and fruits. The program of fortification of sugar with vitamin A, operating for several years, was discontinued (Díaz-Amador, 1993). Iron deficiency was partially corrected as hookworm disease and malaria were controlled. The population had increased the intake of iron-rich foods. Goiter had been virtually eradicated by 1978, and with improved roads, people in the highlands had access to fish and foods grown in the iodine-rich coastal areas. Furthermore, a program of iodate fortification of table salt had been in effect for several years. The child population had fewer infections, an improved diet, and better weight and height, already evident in the survey of 1982.

### **B.6.i Health research**

The USAID nutrition project allowed important funds for development of an applied capability to do research. In 1976, it was agreed to give funds to INISA (about \$0.6 million), CITA (about \$1 million), and SIN (about \$0.5 million). The author participated in this process for the following reasons: (a) he had developed the paradigm that infection was a key determinant of acute and endemic malnutrition in LDC's; (b) he was an advisor on environmental biology to the Minister of Health; (c) he had been asked to analyze the 1975 nutrition survey; and d) he was the director of INISA.

**INISA.** The creation of the "Instituto de Investigaciones en Salud, INISA" (Institute for Investigations in Health) was approved by the UCR in 1975. Within a year the center had one office and one multi-purpose microbiology laboratory at the School of Medicine. Two years later, the UCR and the MOH signed an agreement to permit development of the "Estación de Campo" (Field Station) in Puriscal. The station would serve for long-term prospective field studies, within five large research programs: (1) Study of child nutrition, growth and development; (2) Study of breastfeeding and child survival; (3) Study of the etiology, epidemiology and treatment of diarrheal disease; (4) Study of appropriate health technologies; and (5) Monitoring the nutrition of children at the national level. Programs 1 to 4, approved by the USAID, conformed the "Estudio de Puriscal" (Puriscal Study), an attempt to study maternal and child health in rural regions for the first time in Costa Rica. However, the USAID decided that program 5 should serve to develop a unit to monitor the nutritional status: the "Sistema de Información Nutricional, SIN" (system for nutrition information, see below).

INISA's Field Station was successfully developed, and the four activities got underway as the "Estudio de Puriscal" (Puriscal study). Yearly cohorts of infants gestated in Puriscal and born at the Hospital San Juan de Dios, were followed from birth to 2 years of

age, with detailed studies of physical growth, psychomotor development, breastfeeding, dietary habits, incidence of diarrheal, respiratory and other infectious diseases, and immunizations and other health services. The studies planned in 1976-1977 did not start until September, 1979. There were problems at the GOCR: a) the Minister of Health delayed one year the signature of the agreement and the release of funds for INISA; b) the Vice-rector for Research of the UCR blocked for weeks, actions to hire personnel with USAID funds. Eventually, the study fulfilled most of its goals, and INISA was able to publish original and relevant information. The conspicuous product of the Puriscal Study and INISA was: 1) Finding that growth of Puriscal preschool children closely followed the NCHS reference curves (Mata *et al.* 1982a); 2) Collaborate with the Hospital San Juan de Dios, to establish universal rooming-in the maternity, to induce breastfeeding and improve survival (Mata *et al.* 1983); 3) Electrical breast pumps were given to 20 hospitals and clinics to collect colostrum and milk for high-risk neonates; 4) Description of the main microbial etiologies of diarrheal disease, including discovery of the role of *Cryptosporidium* (Mata *et al.* 1984), *Campylobacter* and rotaviruses (Mata *et al.* 1983, Simhon *et al.* 1985); 5) Studies at INISA and Field Station showing benefits of oral rehydration therapy (ORT) to treat dehydration caused by rotaviruses, toxigenic and bacterial diarrheas, studies in collaboration with the University of Maryland and the National Children's Hospital (Nalin *et al.* 1978, Jiménez *et al.* 1982); 6) Definition of the first minimal food basket for Costa Rica (Murillo and Mata 1980); and so forth.

The INISA building was constructed with metal structures donated to the author by the Ministry of Public Works (GOCR), and with funds obtained from the "Fondo de Dos Etapas" (two-step fund), created to disburse GOCR money remanent from USAID and other sources. When the Rector of the University found out that the fund was linked to the USAID, he delayed signature of the agreement for more than one year, fearing criticism from the communists. Later, the energy crisis of 1979 affected the construction of the building. When mismanagement at the "executive office of the plan of investments" (of BID funds) precluded termination of the south wing of the structure, Carmen María Valverde, then executive director of the Nutrition Project, proposed the use of leftover funds from the project to finish the building. This was concluded by a private contractor, in a sixth of the time required to construct the north wing.

The energy crisis and ensuing economic recession of the early 1980's threatened research efforts, but funds were obtained by the author from the Rockefeller Foundation and the International Development Research Center of Canada (IDRC), which pushed INISA through the crisis. With the election of a population geneticist to direct INISA in 1985, research focus and resources shifted accordingly. The initial orientation that made INISA well known and useful was significantly changed. Limited resources remained for continuation of studies on maternal and child health, nutrition-infection interactions, and emergent diseases like AIDS, malaria and dengue. Unfortunately, INISA's role in solving or elucidating genetic problems has been very modest in 11 years of INISA's emphasis in the field (Barrantes *et al.* 1990). Nevertheless, the Institute studies certain priorities, like breastfeeding (Mata 1990), HIV/AIDS (Mata *et al.* 1995), cholera (Mata 1992b, Mata 1994),

dengue (Mata *et al.* 1996), risk factors for cardiovascular disease (Campos *et al.* 1992), cancer epidemiology (Sierra *et al.* 1995), aging (Trejos 1985), child abuse (Krugman *et al.* 1992), and domestic violence (Mata 1993). The effects of the financial crisis and the diminished emphasis of the Institute on previous health research priorities, were compensated in two ways: 1) Creation of a private entity, the Association for Research on Health (ASINSA), to receive and disburse foreign financial support; 2) Permanent staff was contributed after 1987 from the Ministry of Health (Edgar Mohs, Minister of Health). Recent studies on maternal and child health, nutrition and infectious diseases have been supported primarily by the Ministry of Health, the Swedish Agency for Research and Cooperation with Developing Countries (SAREC), the Rockefeller Foundation, and ASINSA. Various approaches to the USAID in recent years to explore possible support, were not replied.

INISA was the leading nutrition and health research center of the nation during 1975-1987 - and managed to release 340 scientific publications. Its contributions were recognized in the nation, and some findings had international repercussion, like the demonstration (simultaneously with the ICDDR,B, Dhaka) that ORT cured dehydration due to viral and bacterial diarrhea, with world-wide application; the advancement of the infection paradigm, widely accepted now; the first description of diarrhea caused by Cryptosporidium; and pioneer studies of AIDS, cholera, and other emergent diseases.

**INCIENSA.** Within two years of the founding of INISA, the GOCR established another health research institute: "Instituto Costarricense de Investigación y Enseñanza en Nutrición y Salud, INCIENSA (Costa Rican Institute for Research and Training in Nutrition and Health). To the author's knowledge, this nation is the only one with two health research institutes (separated by 5 km). Curiously, it was not until 1995 that the School of Public Health started at the UCR. The creation of INCIENSA shows how strong "statism" is in Costa Rica: the government wants to get its hand on everything, even if that implies duplication and waste. INCIENSA has one of the handsomest buildings in the country, originally destined to treat severe malnutrition, a disappearing syndrome. Several times larger than INISA, the center has suffered from local politics, and has shifted the scope of research a few times. There has been duplication between INCIENSA and INISA, INCIENSA and CITA (see below), and INCIENSA and the laboratories of the Ministry of Health. INCIENSA also expanded work to infection and genetics, with projects similar to those of INISA.

**CITA.** The "Centro de Investigaciones en Tecnología de Alimentos, CITA" (Research Center for Food Technology) was a bit older when the USAID started promotion of nutrition and health research. The Center emerged from a joint program of the Ministry of Agriculture and the UCR. CITA has always been wealthy and stable, although with very few scientific papers. However, the center has had a significant role in training teachers, and staff for industry and commerce, while maintaining a close and friendly liaison with almost every important person or factory engaged in food technology.

**SIN.** The "Sistema de Información Nutricional, SIN" (Center for Nutrition Information), was created with the recommendation and funding of the USAID nutrition project. It was originally located within the Office of Information (Presidential House) and later in MIDEPLAN. SIN had problems from its inception. The original project was written by the author to expedite analysis and publication of anthropometric data. It consisted in the tabulation, every six months, of data filled on "one-page-8 variable" with the following: age, sex, birth order, weight, and height of every child reached by the rural and community health programs. Once in the hands of SIN, a significantly more complex formulary was developed, with more than one hundred variables. This upset the rural health workers who already had a busy routine including measuring weight and height of all children at periodic intervals. The result was a strike which, after its resolution, led to refusal of the workers to systematic collection of anthropometric data, an irreparable loss to the present. Later, SIN began periodic surveys of body height of 7-year children, at high cost, to determine the evolution of "stunting" (deficit of height for age), an indicator not recommended for countries like Costa Rica, where famines have not occurred in the last 100 years. Conflicts continued and SIN ceased to exist in the early 1980's (Monge administration).

#### **B.7 Projects of Period 3: 1980-1994**

Ten USAID projects for Costa Rica were approved in the 1980's, totalling \$16 million, 49 per cent of the loan money authorized by USAID for health in this country (see **Table 12**, USAID 1990). Almost one half of this sum was in direct loans; the rest was form regional projects, with a strong influence of the USAID. Conceivably, health issues of Costa Rica were significantly similar to those of other Central American nations, which we know is not always true. The GOCR showed greater ability to disburse these funds than those in previous periods, with 87 to 100 performance. The GOCR, CCSS and several international agencies also provided support (**Table 14**). In addition, 26 PL-480 loans were approved (1984-1993), for a total of \$4,98 million (see **Table 13**). Some difficulties were observed in the execution of the projects (see **Table 15**). In practical terms and excepting the PL-480 loans, the large volume of projects of Period 3 does not correlate with their more limited scope and lesser public health impact when compared with projects of Periods 1 and 2. In general, projects in Period 3 addressed specific issues, usually educational and managerial was a reductionist instead of holistic approach, and with emphasis on medical services rather than on public health. This situation makes Period 3 more difficult to analyze, in terms of aim, scope, evolution, and impact. Finally, the documentation on the projects often was confusing, repetitive, wordy, and sometimes boring, all negative features which might have interfered with a proper judgment of project value.

Period 3 period emphasized substantial financial investment for contracts, consultant fees, and travel of U.S. personnel, a drastic departure from Periods 1 and 2, where projects were devoted to preventive actions and public health, with most of the money invested in the host country. Only three projects of Period 3 were concerned primarily with primary health care (numbers 936-5920, 936-5929 and 597-0007). (There were several small projects

mainly for public health, derived from PL-480 money, see below). The remaining seven projects were devoted to medical services and clinical treatment (numbers 516-0203, 515-0186, 515-0194, 516-0238, 598-01860629, 936-5927, 597-0006, and 938-0285).

### **B.7.a Public health**

**PL-480 loans.** The USAID PL-480 projects were handled by the US Department of Agriculture (USDA), in concept of foods given to CNP. The USAID authorized 26 projects of this sort, totalling \$4,984,700, most of it disbursed in the late 1980's and early 1990's (see **Table 13**). The projects were for sanitary works primarily in rural areas, as follows: 14 aqueducts, 5 sewerage and sanitation systems, 3 health infrastructures, and 4 for support to nutrition and food programs. The GOCR continued requesting assistance for primary health care and rural health, with USAID willingness. No additional PL-480 loans were approved in the last administrations, for lack of the needed congressional votes to approve the donations. The lack of agreement stems from a traditional struggle between the two leading political parties. However, PL-480 approved money has lasted into the early 1990's. It can be safely stated that the PL-480 funds were the most conspicuous aid in Period 3, because they were used for public health works of considerable impact on nutrition and health. This intervention was a continuation of the holistic projects effected during Periods 1 and 2.

**PHC-operational research.** This regional project (936-5920) of \$250,000, 80% disbursed (**Table 12**, USAID 1981) was to perform studies on constraints to effective development and operation of PHC programs, and to establish a database making such information readily available to donor and health planners of the recipient country (USAID 1981). The database, at the USAID/Washington would become available to governments and NGO's. The base would have a standardized format, and would include final reports on individual countries, and a bibliography of related studies. Researches would be encouraged to present results before relevant audiences and to publish them in scientific journals. The regional project, conceptualized at USAID, was offered to 45 LDC's; Costa Rica and 15 others participated. In the early 1980's, PHC programs were receiving the negative impact of the energy crisis and recession. They stopped expanding, and coverage remained stagnant at 60 per cent, or even deteriorated. The project intended to find out more about cost-benefit and impact, probably aiming at reducing costs. The contractor for operations research on PHC seemed to be the Center for Health Services (CHS), through programs like PRICOR, PRITECH and REACH.

The author the Costa Rican project first hand. The project initiative did not come from a Costa Rican, but from an energetic American finishing doctoral studies at Harvard. He approached the author to identify a possible partner in Costa Rica, and another bright individual was invited. The pattern was that the U.S. had funds for international bidding. This was unknown to the author until the recent examination of corresponding showing that other nations were also invited. The emerging "Quality Control of PHC in Costa Rica" project resulted in conflict among researchers, leading to two divergent analysis and two reports. One report found that coverage of PHC continued despite the crisis (Rosero 1987).

The other showed marked deficiencies in PHC (Valadez *et al.* 1988). The funds were used to hire staff and pay honoraria, including the salary of one investigator and one consultant (Valadez *et al.* 1988). The MOH officer involved with the principal investigator, eventually had difficulties with the Minister and accepted a PAHO position in Colombia. It can be safely asserted that the outcome of the study remained mostly unknown to the academia and unapplied by planners of the MOH, a situation complicated by the separation in 1989 of an outstanding MOH physician, in charge of the data base.

**Child welfare/health.** No documents could be found on this project (number 515-0194) (authorized budget \$560,000). Limited information on this project appears in **Tables 12 and 14**). Almost one half of the funds were used to build seven CEN-CINAI units and to repair another three. An analysis had already revealed a very high cost-benefit of the CEN-CINAI's (Mata and Rosero 1988).

### **B.7.b Medical services**

**Health services support.** USAID project 515-0203, authorized \$20 million in 1983, 87 per cent of which was used to supply the CCSS with medical and pharmaceutical products, primarily drugs. The main goal was to help stabilize the CCSS's financial crisis, resulting in part from the failure of the GOOCR to honor an immense debt with the CCSS, in concept of its monthly quotas. No evaluation of this project was available to the author. The problem was not solved with the USAID loan, since the GOOCR's monumental debt continues, and it is now the source of intermittent unrest. On the other hand, the CCSS is responsible for promoting an exaggerated intake of antibiotics, tranquilizers, hypnotics, and analgesics, a serious problems at present.

**Continued education to improve medication.** This project (No. 936-5927, \$6 million for Costa Rica in 1983, almost 90% disbursed, **Tables 12 and 14**) addressed the poor handling of drugs by the CCSS. Its main objective was to solve the cash deficit which interfered with the purchase of good quality pharmaceutical drugs. The situation emerged during the economic recession of the early 1980's. Being regional, other countries likely had similar difficulties regarding acquisition of medical supplies. The specific aims were to develop a library of educational modules to train general practitioners and pharmacists in the proper use of medicines, to implement the modules in selected CCSS hospitals, to train a core of "local master trainers" to assist in the process, to improve the quality of the programs, and to evaluate the project impact (USAID 1988).

The project funded six visits by American technical experts, and the participation of 20 persons in training-to-training workshops. Fifteen modules were developed, with participation of 35 people, with 120 persons receiving at least one module. The evaluation of impact was made through questionnaires passed at the end of the workshops. Participants expressed a high degree of satisfaction with the process. However, logistical problems related to distribution of pre- and post-test formats, interfered with evaluation of improvements in know how before and after the process. The evaluation outcome showed

changes in drug prescription after implementation of modules, in the hospital selected for implementation (La Anexión, Nicoya). Long term changes were noted in non-steroidal anti-inflammatories and antibiotics. The evaluators concluded that the gains were fragile, bound to fail unless continued education is sustained. Therefore, they recommended more training-of-trainers within hospitals, with additional USAID support. A final evaluation was made in 1990 by an American enterprise which described with meticulous detail the time spent in evaluating, repairing and up-grading a broken personal computer destined to the database of the project. There were changes in personnel in the final phase of the project, which threatened its survival. The report concludes that CCSS had not assigned a responsible person or persons for continuation of the cybernetic part of the project (MSH 1990). Who would be in charge of the database? There was no answer to this question.

The cost of the consultants for this project was high: honoraria were high, there were many visits American teams to Costa Rica, and the time invested was long. There was a pre- and post-visit cost for preparation of materials and travel, plus the cost of travel. A significant part of the funds was destined to replenish the drug supply of CCSS. In summary, the project served to solve cash shortages of CCSS, and to contract private U.S. consultants. There is no evidence of a positive impact of this project on the eventual target population (persons with illnesses attending hospitals). No good indicators exist to measure impact of exercises like the one supported by this project. One factual consideration is that this kind of project could be substituted by another relying on local resources, at significantly lower cost. The approach used fostered a malignant dependency on not indispensable foreign assistance.

**Essential drugs and malaria.** USAID regional project (number 597-0007) assigned \$1.3 million to Costa Rica in 1986 (Tables 12 and 14, USAID 1988). Because the project addresses malaria, one may think that it was a true public health effort. In fact, the project concerned with strengthening components of the drug supply systems: a) Technical and scientific subsystem of selection, quality, pharmacological information, resources and utilization of essential drugs; b) Operational subsystems for acquisition, handling, storage, and distribution; and c) Information subsystem to maintain updated information on available drugs (expectedly no more than 50), prices, and suppliers. Management issues in hospitals, quality control, continuing education on pharmacotherapeutics, and so forth, were tackled by CENDEISSS, CCSS; PASCAP, PAHO; the Mexican School of Public Health, and the FDA of the U.S. (PAHO/AID 1986). The evaluators concluded that Costa Rica not only learned more but probably contributed more than other countries. However, the project did not add significantly to the drug supply system of the CCSS, which already was relatively advanced and had one full time pharmacologist. A positive result was the development - with input from PAHO - of the "Laboratorio de Ensayos Biológicos, LEBI" (laboratory for biological tests) at the University of Costa Rica (PAHO/AID 1986).

**Burns treatment center.** Along with the work on emergencies (see below), this project (No. 515-0186, around \$100,000, Tables 12 and 14) tried to improve the treatment of burns. While these have a low incidence, they are a serious cause of disability,

disfiguring, death, and permanent suffering for victims and families. The USAID funds were devoted to train personnel to handle medical emergencies. All the large hospitals developed special units to treat burns using CCSS and USAID resources. A modern and well equipped larger center was established with USAID funds at the Hospital San Juan de Dios, to serve as some sort of advanced coordinating center. This relatively small project produced visible results, among them the consolidation of good burn treatment services in most hospitals.

**Health technology development transfer.** USAID regional project 597-0006, authorized \$400,000 for Costa Rica on 1986, in theory to develop and transfer improved health technologies. In reality, funds were used primarily to train two family doctors, one of whom pursued an academic degree. The documentation available (ICPS 1990, PRAGMA 1990) is dense in thoughts and words about short-term training of the two nationals (there were 20 other trainees from the area), at about \$200,000 each. The reports, prepared by four professionals, summarize the activities of three contractors: State University of New York at Stonybrook (health services financing), Association of University Programs in Health Administration (AUPHA) (management training in health), and Interamerican College of Physicians and Surgeons (clinical training). AUPHA concluded that "the main lesson .. learned is the need for continual renewal of contacts between the project and USAID Mission personnel". The evaluation team for the three components stated: "the major lesson learned is that effective utilization of technical and project services depends on continued dialogue between the contractor and the client or host country". One would have expected that the major lesson learned would have been the application of health technology innovation and transfer to satisfy needs of the recipient nation.

**Emergency medical services manpower development.** This project of \$500,000 (number 516-0238, USAID 1987), disbursed in toto, had the aim to create an infrastructure and educational program to support the National Disaster Preparedness Plan (NDPP) of Costa Rica. Automobile accidents, cardiovascular disease and other emergencies were leading causes of death. Implementation of the project was carried out by The People to People Health Foundation, namely, Project HOPE (USAID 1987). The project had the purpose of: a) training technicians for ambulance services; b) instructing in basic emergencies like hemorrhages and obstetrics; c) support for cardiac emergency; d) certification of technicians; e) training physicians of emergency services at the National Children's Hospital and Hospital Mexico; and f) training nurses. The College of Physicians of Costa Rica tried to block these activities. Initially, instructors came from the U.S., but later Costa Ricans participated. The project was considered too ambitious, and evaluators concluded that USAID should not undertake vast projects like this. On the other hand, the country responded by absorbing part of the task, at the Red Cross, UCR, CCSS hospitals, INS, and the National Commission of Emergencies (Johnson 1990). Thousands of people benefitted from the program, many of whom would have otherwise died or remained maimed from accidents and other emergencies. Contrary to USAID conclusion, the project likely had a long-lasting influence because Costa Ricans have a strong proclivity towards helping the fellow being, while the commotion of emergencies always elicited significant response from

the Red Cross, Civil Defense, and the private sector.

**Skills for maintaining medical equipment.** In 1983, project 598-0629 (regional) authorized \$563,000 to the nation, of which 90 per cent was disbursed (Tables 12 and 14) (USAID 1983). The Pan American Development Foundation (PADF) was in charge of training instructors of vocational and technical schools from selected countries (Costa Rica, Dominican Republic, El Salvador, and others). Instructors got 6-month training at the National Center for Research in Vocational Education (NCRVE, Ohio State University), on electronics, mechanics, small machinery, refrigeration, trouble-shooting, health care equipment, pedagogy, instructional material development, and multi-media teaching aids. These instructors then had to develop permanent medical equipment maintenance and repair skills at the place of origin, and had to train other fellow vocational/technical instructors, using the same material that they obtained during their own training. Each instructor had to train about 20 students per course by the end of the project, for which PADF would provide follow-up technical assistance and instructors. PADF prepared the training program, and hired a Spanish-speaking biomedical trainer, partly because most selected candidates did not know English. The names, qualifications and place of work of the trainees selected from Costa Rica could not be obtained. Furthermore, the success or failure of the project is officially unknown. Did all trainees finish training, did they return to the mother institutions, were they able to train others, did they utilize the developed skills, did they leave for the private sector? These crucial questions apparently have no answers.

Most large CCSS hospitals currently have staff and shops for maintenance and repair, but a general opinion is that the bureaucracies have little capacity for prompt response to problem solving. The crisis of equipment maintenance and repair continues as in the past. To illustrate, the air conditioning of the labor and delivery rooms of the Hospital San Juan de Dios broke in 1994 and remained so for more than months; a private firm had to be hired to solve the crisis; meantime, hundreds of mothers were referred to other maternities. The expensive arthroscope of the Hospital Calderón Guardia was broken for months in 1995. On the other hand, there is no expertise to repair cat-scanners and flow cytometers. The crisis of maintenance and repair of medical equipment could not have been resolved with USAID funds, as long as the current bureaucracy and administration system prevails. What is needed is a profound revision and surgery of the structure and norms ruling in the CCSS. Collaterally, the CCSS should buy many services in the private sector. At any rate, training for repair and maintenance of medical equipment can be done locally by local personnel or the companies themselves, at significantly lower cost.

**Respiratory Training Center.** This regional project (No. 938-0285, Table 12 and 14) assigned about \$400,000 in 1987, to establish a regional respiratory training center, and to develop respiratory therapy departments in selected institutions. Significant gains had materialized in Costa Rica before this project started, for instance, creation of a 2-year medical specialty at the UCR, and respiratory therapy units in 13 hospitals. However, the CCSS did not stimulate these developments, and did not authorize positions for the two physicians, nor for young graduates of the program. A contract was signed with Project

HOPE for five years, which was renewed for another five years, until 1996. In general, this project left a positive impact, mainly by stimulating local input on respiratory therapy, now available throughout the country.

### **C. CONDITIONALITY AND LESSONS LEARNED**

The 50-year collaboration between the GOCR and the USAID was, in general, devoid of serious difficulties and unsurmountable problems. The conditionality of the USAID projects was, in general, realistic and straight forward. It was compatible with national goals and with the ideology of the local people. Also, it was respectful of our sovereignty.

The main lessons of the endeavor, in the health sector, apply to the GOCR and to the USAID as well. They are: 1) Holistic and scientifically-based interventions to prevent infection and malnutrition, generally yield clear and positive results. Examples are the projects under SCISP-GOCR in Period 1, and the malaria eradication projects in Periods 1 and 2; 2) It is feasible to improve the health condition of a tropical country to levels comparable to those of some European industrial nations. To illustrate, infant mortality fell from 67 in 1970 to 23 in 1979 (USAID Period 2); 3) The improvement of the health condition can be accomplished at affordable cost, while preserving democracy and peace; 4) Interventions in institutional medicine may not yield readily visible effects, a contrast with projects in public health (Periods 1 and 2); and 5) Caution should be exerted whenever science and politics are intermingled. A good example of this predicate is the lack or minimal effect observed in Period 3.

Costa Rica will not be considered for USAID cooperation after 1996, owing to its outstanding performance by improving health and national development. The author does not know of any plan to reactivate cooperation with this country. But if the USAID works in Costa Rica in the future, it is suggested that it focus on public health priorities reviving the approach used in Periods 1 and 2. The USAID has an enormous opportunity to get involved in an ambitious intervention on semi-developed countries like Costa Rica. The purpose would be to convert them in showcases to demonstrate that full development can occur in the tropical belt at affordable cost and without armed revolutions. Such project will promote advanced legislation, better administration and government modernization to improve efficiency, reduce waste and corruption, and stimulate creativity and growth. This plan should run collaterally to ulterior advances on promotion of healthy lifestyles, and the preservation of positive features of the local culture that are desirable for health and well being.

To conclude, scientific, holistic and sustainable interventions can move transitional countries like Costa Rica toward levels observed in industrialized nations. Efforts should be made to preserve desirable health features of the local culture.

## **D. SYNOPTIC DISCUSSION**

The role of USAID technical assistance and funds in the overall improvement of nutrition, health and well-being of Costa Rica cannot be denied. AID cooperation with Costa Rica started in the early 1940's, and extended until the early 1990's. Authorization of funds for health, however, had stopped in 1987, once the U.S. decided that this country was developed enough to no longer need U.S. assistance. USAID funding can be examined in three periods differentiated by public health approach, politics, international influence, and outstanding persons in the host countries.

**Period 1** was the most brilliant, when Costa Rica had very serious environmental deficits, and therefore, the implementation of adequate interventions generally resulted in visible changes. In this period, most USAID projects concerned assistance to develop water supplies and improve sanitation, with the final aim to control specific diseases like diarrhea, and malnutrition, and to induce an overall improvement of the sanitary environment to control hookworm and malaria. Most funds were administered by SCISP apparently with great independence and success. The opinions of most experts were favorable to the American enterprise. The main features of this involvement follow: a) projects were based on scientific information, often gathered by the agency itself; b) they generally applied to vast segments of the population; c) they generated strong cooperation within the recipient country; d) most funding was used for infrastructure and local personnel directly involved in the solution of the problem; and f) there were changes in health variables that served to show measurable impact of the projects on the health condition.

Since the projects addressed well-defined issues (for instance, water supply), results could be evaluated with relative accuracy, namely, impact on human populations, and improvements in rates of diarrheal disease and infant mortality. This approach had considerable impact through the projects of Period 1: coverage with water supply, fecal waste disposal, expansion of health services, improvement of food intake, environmental sanitation, and better housing. Impact was observed in the general health condition (nutrition and life expectancy), and a decline in rates of intestinal parasites, typhoid fever, and malaria. The epidemiological transition was already evident during Period 1.

**Period 2.** The philosophical drive behind aid and cooperation in this period was to solve health problems through application of scientific knowledge, to effect impact on large segments of the population. Projects in this period followed the same trend observed in Period 1. The projects had a holistic effect on the nation's health and development. The GOCR, international agencies, and the USAID projects in the period helped to consolidate malaria control, maintained and expanded water supplies and sanitation, improved the nutritional state, reduced the rate of diseases preventable by immunization, reduced female fertility, and so on. Similar to Period 1, most funds were invested in the recipient country,

with a significantly smaller portion used for foreign technical assistance. Since the economic situation had improved, the counterpart was very significant. In fact, budgets contributed by

the GOCR for the nutrition and primary health activities (DESAF), surpassed the total USAID funds in the period.

The evaluation of public health impact revealed clear cut positive changes in maternal and child health, nutrition and deficiencies, control of infectious and parasitic diseases, and increase in life expectancy at birth. The greatest impact resulted from environmental interventions effected primarily by water supply and sanitation. The overall condition was favored by the advance in road infrastructure, transportation, and communication media. One of the most significant developments in Period 2 was the creation of vast programs of primary health for rural areas and marginal urban zones, years before WHO launched the concept of Health for All by the Year 2000 at Alma Ata. The effects were often dramatic, because scientific knowledge had increased considerably, health technology was more developed, there was economic bonanza, and the USAID was more proficient.

**Period 3.** Surprisingly, projects of Period 3 focused on medical issues somewhat distant from the public health realities of the country. They concerned biomedical situations of some importance, but their application would not necessarily lead to better treatments or an improved quality of life. Furthermore, demonstration of possible impact seems extremely difficult. In fact, the studies did not propose any form or procedure to evaluate impact. Even if the problems addressed in Period 3 had been improved or solved, there would not be a manner to determine impact on health parameters, particularly at the national level.

It is possible that the GOCR and the USAID did not focus on the real issues at the time they agreed to use the sizable sums of this period (about one half of the total USAID funds for health). The problems selected for funding could have been approached in simpler manner, using local resources at significantly lower cost. In general, projects of Period 3 did not target on the community but on hospitalized people. The concern with primary health care was insufficient or minimal. In the past, the USAID dealt with the MOH when concerned with the health sector. However, the nature of the projects of Period 3 somehow reflected the gigantism of the CCSS, and the diminished presence of the MOH in recent times. It can be safely stated that in Period 3 the CCSS replaced the MOH. The same phenomenon has occurred with the World Bank and other financial agencies, now working more with the CCSS than with the MOH, supposedly the Rector of the sector.

Oddly, no interviews were available for Period 3, likely because there was more written documentation for this period than for the other two (Waddell, 1995). The projects of Period 3 can not be linked to permanent material goods or infrastructure, except the relatively inexpensive burns unit, and a repair shop, all at the CCSS. One is left with the impression that a large portion of those funds were gone with the wind. The contrast between Periods 1/2 and 3 likely resulted from the drastic change in project-funding policy

**Table 5**  
**COVERAGE OF PRIMARY HEALTH CARE, COSTA RICA 1973-93**

Variable	1973	1983	1993
<b>Rural area:</b>			
Homes visited	1,800	180,000	230,000
Mean home visits per year	2.1	2.1	1.5
Communities visited	490	4,000	4,700
Population covered	69,000	780,000	970,000
% Population covered	11	60	59
<b>Urban area:</b>			
Homes visited	*	110,000	140,000
Mean home visits per year		2.2	?
Population covered		440,000	570,000
% Population covered		40	57

\* The urban program started in 1977.

? = no data available

**Source: Ministry of Health, GOCR**

**Table 6**  
**CRUDE DEATH RATES PER 100,000, FIVE GROUPS OF**  
**SELECTED DISEASES, BY CAUSE, COSTA RICA**

<b>Group of Diseases</b>	<b>1929-1931</b>	<b>1939-1941</b>	<b>1949-1951</b>	<b>1959-1961</b>	<b>1969-1971</b>	<b>1979-1981</b>
Total Crude Rate	2,139	1,744	1,137	808	648	401
Diarrhea	458	329	174	115	70	6
Acute respiratory	242	231	122	89	82	24
Malaria and typhoid	239	138	60	2	0.2	0
Intestinal helminths	149	91	39	16	8	1
Preventable *	111	86	56	30	27	2
Convulsions (<5yr)**	75	41	16	0	0	0
Nephritis	35	55	20	9	3	3
Anemia	29	35	29	9	6	2
Other digestive	72	45	36	21	20	11
Liver	30	33	19	4	5	6
Other genitourinary	29	18	11	6	5	4
Cardiovascular	130	151	127	96	117	99
Cancer	64	59	69	73	69	68
Other respiratory	18	16	15	6	4	13
Diabetes/thyroid	5	5	4	7	9	10
Violence/accidents	50	46	46	33	29	18
Motor vehicle accidents	0	1	1	6	14	18

\* Poliomyelitis, diphtheria, pertussis, tetanus, measles and smallpox

\*\* Probably resulting from microbial and parasitic infections

Source: DGEC; Mata and Rosero (1988)

**Table 7**  
**DEATHS DUE TO DIARRHEAL DISEASES\*, RATES PER 100,000,**  
**AND PROPORTIONATE MORTALITY (% PM), COSTA RICA 1926-94**

<b>Year</b>	<b>Deaths</b>	<b>Rate</b>	<b>% PM</b>	<b>Year</b>	<b>Deaths</b>	<b>Rate</b>	<b>% PM</b>
1926	1,532	324.9	14.2	1961	1,507	120.4	15.6
1927	1,380	292.7	12.9	1962	1,507	120.4	15.6
1928	1,657	336.4	13.8	1963	1,796	131.1	15.8
1929	1,901	377.2	16.1	1964	2,035	143.9	16.6
1930	2,277	327.1	15.0	1965	1,656	109.3	14.2
1931	2,277	431.5	18.1	1966	1,637	104.4	14.4
1932	1,727	320.0	14.6	1967	1,390	86.1	12.4
1933	1,903	345.0	16.6	1968	1,404	84.3	15.8
1934	1,816	321.2	18.1	1969	1,396	82.8	12.1
1935	2,410	417.0	19.1	1970	1,209	69.6	10.5
1936	2,258	381.5	18.4	1971	997	55.4	9.4
1937	2,022	339.9	16.9	1972	1,030	55.9	9.5
1938	1,759	282.1	18.9	1973	860	45.9	8.9
1939	2,129	333.1	16.2	1974	566	29.4	5.9
1940	1,854	282.5	10.2	1975	536	27.2	5.6
1941	1,902	283.0	15.3	1976	365	18.1	3.9
1942	2,740	398.6	20.3	1977	248	11.9	2.7
1943	1,796	254.2	15.3	1978	211	9.8	2.4
1944	1,868	257.6	16.5	1979	164	7.4	1.8
1945	1,766	237.9	16.5	1980	118	5.2	1.3
1946	1,217	157.7	12.2	1981**	122	5.2	1.3
1947	1,324	164.8	12.1	1982	159	6.6	1.7
1948	931	112.7	9.3	1983	228	9.1	2.4
1949	1,596	187.6	16.1	1984	162	6.3	1.6
1950	1,165	143.4	11.9	1985	148	5.6	1.4
1951	999	119.2	10.3	1986	164	5.4	1.6
1952	1,202	138.3	12.1	1987	162	5.8	1.5
1953	1,411	157.1	13.6	1988	131	4.6	1.2
1954	1,230	130.7	11.6	1989	134	5.8	1.5
1955	1,513	158.1	15.1	1990	174	5.8	1.5
1956	1,276	125.8	13.4	1991	116	3.8	1.0
1957	1,668	158.4	15.9	1992	81	2.6	0.7
1958	1,546	140.5	15.9	1993	83	2.6	0.7
1959	1,448	125.9	14.2	1994	108	3.3	0.8
1960	1,493	124.5	14.8				

\* Codes 008 and 009 (WHO 1978); \*\* Code 558 was added in 1981 (WHO 1978).

**Source: 1926-1965, Ministry of Health, Costa Rica (Mata 1981);**  
**1979-1994, DGEC and Ministry of Health.**

**Table 8**  
**FERTILITY RATE PER 1,000 BY AGE OF WOMEN,**  
**COSTA RICA 1973-93**

Year (a)	TFR (b)	Age, years						
		15-19	20-24	25-29	30-34	35-39	40-44	45+
1950-55	6.72	119	334	331	261	203	83	15
1955-60	7.11	121	355	353	276	219	85	16
1960	7.29	122	357	354	297	223	89	16
1965	6.54	111	305	318	256	215	88	16
1966	6.30	109	303	303	243	212	86	15
1967	5.96	108	283	283	228	195	85	14
1968	5.52	104	259	259	215	173	79	12
1969	5.17	103	248	244	197	158	72	12
1970	4.92	102	239	231	188	144	69	12
1971	4.58	99	228	213	172	129	65	10
1972	4.42	102	224	204	161	124	58	10
1973	4.08	101	212	189	144	109	50	10
1974	3.91	104	208	179	136	100	46	9
1975	3.80	104	207	178	130	92	40	8
1976	3.71	105	205	178	124	87	36	7
1977	3.77	106	210	185	128	85	35	5
1978	3.82	106	209	185	133	88	36	6
1979	3.72	106	204	182	131	84	32	5
1980	3.65	106	198	180	130	80	30	5
1981	3.53	101	195	173	126	78	30	4
1982	3.50	97	194	173	127	77	29	4
1983	3.36	94	186	169	121	72	29	4
1984	3.42	95	190	172	125	74	26	3
1985	3.67	101	197	182	137	83	30	4
1986	3.53	99	180	174	131	80	30	3
1987	3.31	96	180	161	121	75	27	3
1988	3.33	97	179	161	119	72	24	3
1989	3.35	100	181	164	123	75	24	3
1990	3.20	94	170	159	118	71	24	3
1991	3.04	92	165	150	110	67	23	2
1992	3.02	91	164	148	109	67	23	2
1990	3.02	89	163	146	106	63	21	1
% Reduction 1950-93		-25	-51	-56	-59	-69	-75	-93

Source: Rosero-Bixby (1979); CELADE (1989); DGEC (1995);

**Table 9**  
**HEALTH, DEMOGRAPHIC, EDUCATION, AND ECONOMIC INDICATORS OF**  
**COSTA RICA, CUBA, UNITED STATES, AND CANADA 1993**

Indicator *	Cuba	CR	USA	Canada
<b>Health:</b>				
Infant mortality/1000 live births	10.0	13.0	9.0	7.0
Under fives mortality/1000	11.0	15.0	10.0	8.0
% With access to water supply	98.0	93.0	na	na
% With access to sanitation	92.0	97.0	na	na
% With access to health services	98.0	80 +	na	na
% Use of oral rehydration therapy	80.0	78.0	na	na
% With completed immunizations:				
poliomyelitis	93.0	90.0	74.0	70 +
measles	98.0	84.0	77.0	85 +
diphtheria/pertussis/tetanus	91.0	90.0	58.0	85 +
tuberculosis	98.0	92.0	na	85 +
tetanus, pregnant women	98.0	68.0	na	na
<b>Demographic:</b>				
% Population growth	0.9	2.8	1.0	1.1
Crude death rate/1000	7.0	4.0	9.0	8.0
Crude birth rate/1000	17.0	27.0	16.0	14.0
Life expectancy at birth	76.0	76.0	76.0	77.0
Total fertility rate, children	1.9	3.2	2.1	1.8
% Babies with low birth weight	8.0	6.0	7.0	6.0
% Family income spent in food	na	33.0	10.0	11.0
% Family income spent in cereals	na	8.0	2.0	2.0
% Urban population	75.0	48.0	76.0	78.0
% Annual population growth	1.7	3.7	1.2	1.3
<b>Education:</b>				
% Literacy rate, adults	94.0	93.0	na	na
% Crude schooling, grammar:				
boys	105.0	102.0	105.0	106.0
girls	100.0	101.0	104.0	104.0
% Crude schooling, secondary:				
boys	84.0	41.0	92.0	106.0
girls	94.0	43.0	91.0	107.0
<b>Economic:*</b>				
Gross national product (GNP) US\$	1,170 +	1,850.0	22,240.0	20,440.0
Mean annual growth of GNP	na	0.7	1.7	2.0
Inflation rate	89.0	23.0	4.0	4.0
% Below absolute poverty				
urban	na	8.0	na	na
rural	na	20.0	na	na
% Central budget for health				
ibid, for education	23+	32.0	14.0	5.0
ibid, for defense	na	2.0	22.0	7.0

\* Indicators for 1991-92; na = not available

Source: Grant (1994)

**Table 10**  
**HOMICIDES AND SUICIDES PER 100,000, COSTA RICA 1950-94**

<b>Year</b>	<b>Homicides</b>	<b>Suicides</b>
1950	2.9	2.3
1951	3.7	2.5
1952	2.8	2.6
1953	3.9	2.6
1954	4.1	3.2
1955	5.6	3.2
1956	4.4	2.6
1957	4.2	2.6
1958	3.7	2.7
1959	2.7	2.3
1960	3.0	2.1
1961	2.9	2.7
1962	3.6	2.4
1963	3.1	3.7
1964	3.4	3.0
1965	3.0	2.2
1966	4.0	3.2
1967	2.5	3.1
1968	2.4	2.7
1969	3.0	3.1
1970	3.7	2.3
1971	4.1	3.0
1972	3.7	3.3
1973	3.3	2.6
1974	3.3	4.2
1975	4.8	4.1
1976	5.5	5.7
1977	4.3	4.4
1978	3.6	4.1
1979	3.6	3.4
1980	5.6	5.4
1981	4.5	4.3
1982	4.1	3.9
1983	3.6	5.5
1984	4.4	4.5
1985	4.7	4.9
1986	4.0	4.9
1987	4.7	4.3
1988	4.0	5.0
1989	4.4	5.8
1990	4.5	5.3
1991	3.7	4.2
1992	4.8	4.8
1993	4.8	5.1
1994	5.8	5.0

Source: DGEC, 1995

**Table 11**  
**MONTHLY CASES OF DENGUE FEVER REPORTED TO THE**  
**MINISTRY OF HEALTH, COSTA RICA 1993-95**

<b>Month</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>
January	0	679	331
February	0	405	137
March	0	329	228
April	0	201	313
May	0	202	693
June	0	1,878	576
July	0	2,695	460
August	0	3,176	716
September	27	1,417	782
October	1,805	1,357	603
November	2,276	996	305
December	493	524	33
<b>Total</b>	<b>4,612</b>	<b>13,929</b>	<b>5,177</b>

**Source: Epidemiologic Surveillance, MOH, GOCR**

**Table 12**  
**TWENTY-NINE USAID HEALTH-RELATED LOANS FOR**  
**COSTA RICA, SUMS ASSIGNED, 1951-87**

<b>Period</b>	<b>Year Started</b>	<b>Project Number</b>	<b>Title of Project</b>	<b>Million Dollar</b>
1950-65	1950	515-0048	Environmental Sanitation	0.223
1951-62	1951	515-0052	Public Health Coop. Service	0.294
1953-?	?	515-0000	Tech. Assist. Support Service	0.762
1957-64	1957	515-0050	Children's Hospital Unit	2.000
1958-68	1958	515-0047	UCR. Medical School	0.704
1963-66	1963	515-0051	National Children's Hospital	0.130
1963-69	1963	515-0049	Rural Mobile Health	0.639
1963-69	1963	515-0917	Health Center Project	0.019
1961-?	1961 ?	515-0030	Specific Diseases Control	0.009
1961-?	1961	515-0031	Environmental Sanitation	0.041
1961-?	1961 ?	515-0918	Diarrheal Diseases	0.007
1960-62	1960	515-0924	Community Water Supply	0.074
1961-72	1961	515-0073	Metropolitan Water Supply	3.497
1961-?	1961 ?	515-0915	Municipal Sewerage	0.002
1963-74	1963	515-0077	Metropol. Emergency Water Supply	1.328
1966-68	1966	515-0059	Malaria Eradication	0.500
1968-70	1968	515-0106	Malaria Eradication	0.490
1971-73	1971	515-0119	Malaria Eradication	0.610
1975-79	1975	516-0121	Nutrition Program	5.968
1984-86	1988	515-0194	Child Welfare/Health	0.568
1984-86	1964	515-0186	APRHOS/Burns Treat. Center	0.115
1983-90	1983	516-0203	Health Services Support	5.998
1987-91	1987	516-0238	Emerg. Med. Serv. Man. Development	0.500
<b>Regional Projects:</b>				
1981-90	1983	936-5920	PHC-Operational Research	0.250
1986-87	1983	936-5927	Continued Education	5.940
1986-88	1986	597-0007	Essential Drugs and Malaria	1.300
1986-88	1986	597-0006	Health Tech. Develop Transfer	0.400
1983-85	1983	598-0629	Skills Train. Med. Equip. Maintenance	0.563
1987-88	1987	938-0285	Respiratory Training Center	0.406
<b>Total</b>				<b>33.337</b>

**Table 13**  
**TWENTY-SIX PL-480 LOANS FOR HEALTH PROJECTS, COSTA RICA 1984-93**

<b>Year Started</b>	<b>Year Ended</b>	<b>Project Number</b>	<b>Title of Project</b>	<b>Thousan Dollar</b>	<b>% Dis-bursed</b>
<b>Aqueducts:</b>					
1988	1990	007	Rio Celeste, Bijagua, Puntarenas	61	100
1987	1990	068	Canaletes, Upala	1,242	100
1993	1995	124	Pocora, Guácimo	116	66
1993	1995	127	Rehabilitation rural aqueducts	492	15
1992	1994	141	Rehabilitation aqueduct Sparza	316	43
1992	1994	148	Reconstruction rural, Turrialba	77	16
1992	1995	149	Rural, Alajuela	154	80
1992	1994	150	Carrillo, Filadelfia	243	75
1994	1994	155	Rural Los Angeles, Sarapiquí	10	100
1994	1995	157	Rural Quebrada Honda, Nicoya	16	50
1993	1994	158	Acosta	117	60
1994	?	159	Reconstruction Orotina	103	99
1994	1995	160	Reconstruction Nandayure	21	100
1993	1995	210	Water tank La Lucha, Siquirres	22	100
<b>Sub-Total</b>				<b>2,990</b>	
<b>Sewerage and sanitation</b>					
1992	1994	145	Sanitary dump San Carlos	0.9	87
1993	1995	142	Pluvial sewerage Upala	<0.1	10
1993	1995	175	Sanitary dump Alfaro Ruiz	0.2	100
1994	1996	176	Sanitary dump, Golfito	2.6	40
1993	1995	192	Sewerage, Quepos	110.0	100
<b>Sub-total</b>				<b>113.8</b>	
<b>Health infrastructure</b>					
1991	1993	106	Health Clinic, Cedral M. de O.	22	100
1993	1995	152	Rural homes for infant care	386	14
1993	1995	208	Health Center Río Grande	16	100
<b>Sub-total</b>				<b>424</b>	
<b>Urban and rural health nutrition:</b>					
1984	?	61	Rural health, San Ramón	1.9	100
1985	1986	72	School lunch program	919.0	100
1983	?	66	National food program	42.0	100
1991	1994	153	Care neglected human groups	494.0	69
<b>Sub-total</b>				<b>1,456.9</b>	
<b>Gran Total</b>				<b>4,984.7</b>	

? = unknown

**Table 14**  
**TWENTY-NINE USAID HEALTH-RELATED LOANS:**  
**COUNTERPART INVESTMENT, COSTA RICA 1950-88**

<b>Period</b>	<b>Project Number</b>	<b>Title of Project</b>	<b>Counterpart*</b>
1950-65	515-0048	Environmental Sanitation	GOCCR/MOH
1951-62	515-0052	Public Health Coop. Service	GOCCR/MOH
1953-?	515-0000	Tech. Assist. Support Service	GOCCR/MOH
1957-64	515-0050	Children's Hospital Unit	GOCCR/Pri
1958-68	515-0047	UCR. Medical School	GOCCR/UCR
1963-66	515-0051	National Children's Hospital	GOCCR/Pri
1963-69	515-0049	Rural Mobile Health	GOCCR/MOH
1963-69	515-0917	Health Center Project	GOCCR/MOH
1961-?	515-0030	Specific Diseases Control	GOCCR
1961-?	515-0031	Environmental Sanitation	GOCCR/MOH
1961-?	515-0918	Diarrheal Diseases	GOCCR/MOH
1960-62	515-0924	Community Water Supply	GOCCR/MOH
1961-72	515-0073	Metropolitan Water Supply	GOCCR/MOH
1961-?	515-0915	Municipal Sewerage	GOCCR/MOH
1963-74	515-0077	Metropol. Emergency Water Supply	GOCCR/MOH
1966-68	515-0059	Malaria Eradication	GOCCR, P, U
1968-70	515-0106	Malaria Eradication	GOCCR, P, U
1971-73	515-0119	Malaria Eradication	GOCCR, P, U
1975-79	516-0121	Nutrition Program	GOCCR/DESAF/MOH
1984-86	515-0194	Child Welfare/Health	GOCCR/MOH/CCSS
1984-86	515-0186	APRHOS/Burns Treat. Center	GOCCR/CCSS
1983-90	516-0203	Health Services Support	GOCCR/MOH
1987-91	516-0238	Emerg. Med. Serv. Man. Dev.	GOCCR/CCSS, PPHF
<b>Regional Projects:</b>			
1981-90	936-5920	PHC-Operational Research	GOCCR/MOH
1986-87	936-5927	Continued Education	GOCCR/CCSS/MOH/UCR
1986-88	597-0007	Essential Drugs and Malaria	GOCCR/CCSS, P
1986-88	597-0006	Health Tech. Develop Transfer	GOCCR/CCSS
1983-85	598-0629	Skills Train. Med. Equip. Maintenance.	GOCCR/CCSS, PADF
1987-88	938-0285	Respiratory Training Center	GOCCR/CCSS, PPHF

\* CCSS = Social Security; DESAF = Social Development and Family Allowances; GOCCR = Government of Costa Rica; MOH = Ministry of Health; P = PAHO; PADF = Pan American Development Foundation; PPHF = People to People Health Foundation; Pri = private contributions; U = UNICEF; UCR = University of Costa Rica; ? = unknown.

**Table 15**  
**TWENTY-NINE USAID HEALTH LOANS: SUCCESS AND PROBLEMS,**  
**COSTA RICA 1951-87**

Period	Project	Success Solving Problem	Problems at Level of:		
			GOCR	USAID	Other *
515-0048	Sanitation	Yes	no	no	
515-0052	SCISP	Yes	no	no	no
515-0000	SCISP	Yes	minor	staff behavior	no
515-0050	Children's Hospital	Yes	no	no	no
515-0047	Medical school	Partial	no	no	candidate selection Phase 2, UCR
515-0051	Children's Hospital	Yes	no	no	no
515-0049	Mobile Units	Yes	no	no	no
515-0917	Rural Health	Yes	no	no	no
515-0030	Disease Control	Yes	no	no	no
515-0031	Sanitation	Yes	minor	no	no
515-0918	Diarrheal Disease	Yes	delays	no	no
515-0924	Water Supply	Yes	delays	no	no
515-0073	Water Supply	Yes	delays	no	no
515-0915	Sewerage	Yes	delays	no	no
515-0077	Water Supply	Yes	delays	no	eruption of Irazú Volcano
515-0059	Malaria	Yes	blockade	no	no
515-0106	Malaria	Yes	no	no	no
515-0119	Malaria	Yes	no	no	no
516-0121	Nutrition	Yes	delays	too much influence	blockade, UCR
936-5920	Operational Research	Unknown	no	no	conflict between researchers
515-0194	Child Welfare	Partial	no	no	unknown
516-0203	Health Services Support	Unknown	no	no	conflict in drug purchase, CCSS
936-5927	Continued Education	Partial		no	failure to maintain, CCSS
597-0007	Essential Drugs	Partial	no	delays	no
515-0186	Burns Treatment Center	Unknown	minor	language barrier	language barrier, CCSS
597-0006	Health Technology	No	no		unknown
516-0238	Medical Emergencies	Partial	minor	no	blockade, College of Physicians
598-0629	Equipment Maintenance	Unknown	no	no	lack of preparedness, no evaluation
938-0285	Respiratory Training Center	Yes	no	no	initial blockade, CCSS

\* CCSS = Social Security; UCR = University of Costa Rica

**Table 16**  
**INTERNATIONAL AND COSTA RICAN DEVELOPMENTS IN THE**  
**HEALTH SECTOR, DURING THE USAID INVOLVEMENT 1960-94**

<b>Period</b>	<b>International</b>	<b>National</b>
1960's	- Health Planning begins: Summit Conference of President's (Kennedy); Planning methodology (WHO/PAHO)	- Diagnosis of Health Condition and Preparation of 10-Year Health Plan; Expansion of Social Security (CCSS); 3-Year Malaria Eradication Plan; Emphasis on Sanitation; Deworming of School Children; Mobile Units; Family Planning and Reproductive Health; Feeding Programs Paradigm: <b>CONTROL OF MALNUTRITION AND INFECTION</b>
1970's	- 10-Year Health Plan for the Americas (WHO); Health for All by Year 2000; Alma Ata 1978; Oral Rehydration Therapy (UNICEF, WHO); Coordination of International Effort: WHO/PAHO, UNICEF, USAID, UNDP, international BANKS; Emerging Infectious Diseases (hepatitis B, herpes)	- 10-Year Health Plan and Community Organization; Beginning of Rural and Urban Primary Health Care 1978*; Creation of Family Allowances Program; General Health Law; Universalization of CCSS; Transfer of Hospitals to CCSS; Development of Oral Rehydration Therapy*; Universal Breastfeeding in Hospitals and Community*; Control of Malnutrition; Hypertrophy of CCSS Paradigm: <b>CONTROL OF INFECTIOUS DISEASES AND MALNUTRITION</b>
1980's	- 4-Year Plan of Health for All by Year 2000 (WHO); Reduced Investment in Health; Armies Deliver Vaccines and Collaborate in Public Health; Emerging Infectious Diseases (HIV/AIDS: malaria, shigellosis, dengue, leptospirosis, plague)	- Attrition of Health Budget; Decay of Health Sector; Continued Growth of CCSS; Emerging Infectious Diseases (herpes, hepatitis B, HIV/AIDS, malaria, rickettsiosis, shigellosis, leptospirosis) Paradigm: <b>CONTROL OF INFECTIOUS AND NON INFECTIOUS DISEASES</b>
1990's	- Environmental Health; Attrition of International Cooperation; Promotion of Healthy Lifestyles; Emerging Infectious Diseases (cholera, Lyme disease, hantavirus, new fevers)	- Primary Health Care Evolves into SILOS and EBAIS; Emphasis Shifted to Chronic Diseases and Cancer; Increase of High Technology and Institutional Medicine; Beginning of Health Promotion; Beginning of Food Safety and Reviewed Concern on Micronutrients; Hypertrophy and Inefficiency of CCSS; Crisis of the Health Sector Continues Paradigm: <b>CONTROL OF NON INFECTIOUS DISEASES AND OF EMERGING INFECTIOUS DISEASES</b>

\* Internationally recognized contributions

**Table 17**  
**INFANT MORTALITY (PER 1,000), DIARRHEA MORTALITY (PER 100,000)**  
**AND % COVERAGE WITH WATER SUPPLY AND**  
**PRIMARY HEALTH CARE, COSTA RICA 1960-94**

<b>Year</b>	<b>IM</b>	<b>DDM</b>	<b>% cov. RH</b>	<b>% cov. UH</b>	<b>WS</b>
1960	76	124			64
1961	69	120			65
1962	74	120			67
1963	78	131			68
1964	89	144			69
1965	84	109			71
1966	72	104			72
1967	68	86			74
1968	66	84			75
1969	74	83			77
1970	67	70			77
1971	61	55			75
1972	59	56			76
1973	48	46	10		76
1974	41	29	17		78
1975	40	27	31		78
1976	35	18	41	12	80
1977	30	12	54	27	80
1978	24	10	55	40	80
1979	24	7	56	74	81
1980	20	5	55	64	86
1981	19	5	48	60	87
1982	20	7	53	50	90
1983	19	9	56	48	93
1984	20	6	57	49	93
1985	18	6	57	53	93
1986	18	5	56	56	93
1987	18	6	57	54	93
1988	15	5	58	52	94
1989	14	6	60	50	94
1990	15	6	59	48	94
1991	14	4	59	44	94
1992	14	3	58	42	94
1993	14	3	57	41	95
1994	13	3	58	38	95

**Table 18**  
**FECAL WASTE DISPOSAL, COSTA RICA 1963-92**

<b>Facility</b>	<b>1963 <sup>1</sup></b>	<b>1973 <sup>1</sup></b>	<b>1984 <sup>1</sup></b>	<b>1986 <sup>2</sup></b>	<b>1989 <sup>2</sup></b>	<b>1992 <sup>2</sup></b>
Total Homes	228,884	330,857	500,030	545,658	604,726	667,315
Toilet (a)	68,705 (30.0)	146,752 (44.3)	332,748 (66.5)	413,392 (75.8)	466,698 (77.2)	552,128 (82.3)
Latrine (b)	101,160 (44.2)	147,752 (44.7)	147,936 (29.6)	124,606 (22.8)	132,413 (21.9)	109,131 (16.3)
(a) + (b)	169,865 (74.2)	294,504 (89.0)	480,684 (96.1)	537,998 (98.6)	599,111 (99.1)	661,259 (99.1)
None (c)	58,976 (25.8)	36,675 (11.1)	19,346 (3.9)	7,260 (1.3)	5,615 (0.9)	5,775 (0.9)

<sup>1</sup> DGEC National censuses, 1963, 1973, 1974

<sup>2</sup> DGEC Home surveys, 1986, 1989, 1992

**Table 19**  
**EVOLUTION OF MALARIA MORTALITY RATES,**  
**COSTA RICA 1929-81**

Triennium	Rate per 100,000	Absolute decrease in interval	Decrease in interval (%)	Decrease after 1929-31 (%)
1929-1931	239.0			
1939-1941	138.0	101.0	42.2	42.0
1949-1951	60.0	78.0	56.5	75.0
1959-1961	2.0	58.0	99.7	99.0
1969-1971	0.2	1.8	90.0	99.9
1979-1981	0	0.2	100.0	100.0

Source: Mata and Rosero (1988)

**Table 20**  
**CASES OF MALARIA AND RATE PER**  
**100,000\*, COSTA RICA 1957-94**

<b>Year</b>	<b>Cases</b>	<b>Rate</b>
1957	1050	950
1958	2130	1857
1959	1899	1594
1960	2000	1618
1961	1673	1304
1962	1583	1189
1963	1224	886
1964	1210	845
1965	2563	1730
1966	3046	1989
1967	4490	2839
1968	1191	730
1969	688	409
1970	351	203
1971	257	145
1972	159	87
1973	161	86
1974	152	79
1975	290	147
1976	473	233
1977	217	103
1978	313	145
1979	307	138
1980	376	165
1981	168	71
1982	110	45
1983	245	98
1984	569	221
1985	734	278
1986	790	291
1987	885	317
1988	1016	354
1989	699	238
1990	1151	382
1991	3273	1060
1992	6951	2178
1993	5033	1539 **
1994	4445	1328 **
1995	4493	1312 **

\* Based on population estimates by CELADE (1992)

\*\* Based on population estimates by CELADE (1995)

Source: MOH, GOCR (1995)

**Table 21**  
**EVOLUTION OF MALARIOMETRIC INDICES, COSTA RICA 1957-94**

Year	Population <sup>1</sup> (a)	Examined <sup>2</sup> (b)	Cases <sup>3</sup> (c)	Slide Positive Rate <sup>4</sup> (d)	Annual Parasite Index <sup>5</sup> (e)	<u>P</u> <u>falciparum</u> <sup>6</sup> (f)
1957	344,044	15,824	1,050	6.6	3.0	47
58	376,657	36,516	2,130	5.8	5.8	153
59	387,191	55,527	1,899	3.4	4.9	121
60	393,560	67,892	2,000	2.9	5.1	84
61	409,302	87,903	1,673	1.9	4.1	18
62	411,794	183,642	1,583	0.9	3.8	5
63	420,029	257,850	1,224	0.5	2.9	
64	423,296	123,172	1,210	1.0	2.8	7
65	440,653	197,751	2,563	1.3	5.8	5
66	460,143	250,135	3,046	1.2	6.6	2
67	479,929	164,109	4,490	2.7	9.3	0
68	492,883	142,029	1,191	0.8	2.4	0
69	519,719	202,362	688	0.3	1.3	0
70	559,346	195,484	351	0.2	0.6	8
71	578,906	185,011	257	0.1	0.4	10
72	595,521	191,152	159	0.1	0.3	3
73	603,856	166,355	161	0.1	0.3	18
74	635,107	154,656	152	0.1	0.2	22
75	642,263	166,814	290	0.2	0.4	31
76	663,842	171,649	473	0.3	0.7	154
77	592,830	175,943	217	0.1	0.4	46
78	608,243	202,284	313	0.1	0.5	28
79	624,422	176,784	307	0.2	0.5	32
80	641,593	166,894	376	0.2	0.6	68
81	659,171	162,861	168	0.2	0.3	9
82	677,445	139,019	110	0.1	0.2	6
83	696,329	119,843	245	0.2	0.3	10
84	717,714	103,987	569	0.5	0.8	9
85	734,508	121,456	734	0.6	1.0	3
86	752,650	113,720	790	0.7	1.0	21
87	771,240	103,456	885	0.9	1.1	32
88	791,986	114,299	1,016	0.9	1.3	27
89	815,032	108,614	699	0.6	0.9	31
90	835,488	112,325	1,151	1.0	1.4	5
91	856,292	130,530	3,273	2.5	3.8	18
92	876,500	149,198	6,951	4.7	7.9	16
93	897,185	140,435	5,033	3.6	5.6	8
94	1,010,325	143,721	4,445	3.1	4.4	3

<sup>1</sup> In malarious area; <sup>2</sup> Slides (persons); <sup>3</sup> Persons positive; <sup>4</sup> (c) / (b) x 100; <sup>5</sup> (c) / (a) x 100;

<sup>6</sup> Cases with P. falciparum and associated species.

Source: USAID and GOCR (1995)

**TABLE 22**  
**NUMBER OF COMMUNITIES, BY SIZE AND MEAN DISTANCE OF**  
**HOUSEHOLDS TO NEAREST SCHOOL, COSTA RICA 1973\***

People in community	Number of communities	Accumulated communities	% People	% People accumulated
<50	837		1.1	
50 -	1,712	2,549	10.6	11.7
100 -	1,135	3,684	18.9	30.6
500 -	375	1,059	13.6	44.2
1,000 -	164	4,223	16.2	60.4
5,000 -	16	4,239	6.5	66.9
20,000 -	5	4,244	8.3	75.2
50,000 +	1	4,245	24.8	100.0
Meters to nearest school		%		%
		Households		Accumulated
< 500		36		
500-999		24		60
1,000-1,999		21		81
2,000 +		19		100

\* USAID Survey, adapted

**Table 23**  
**EVOLUTION OF COVERAGE OF THE RURAL HEALTH AND**  
**COMMUNITY HEALTH PROGRAMS, COSTA RICA 1973-89**

	73	75	77	79	81	83	85	87	89	91	93
<b><u>Rural health program</u></b>											
Communities x 1000	0.49	2.2	3.7	4.0	4.0	4.0	4.2	4.4	4.4	4.6	4.7
Population x 100,000	0.69	3.6	6.5	7.2	7.2	7.8	8.3	8.6	9.3	9.5	9.7
Homes x 10,000	0.18	8.4	14.0	19.0	16.0	18.0	20.0	21.0	30.0	23.0	23.0
Health posts, number	27	119	218	285	292	302	317	330	396	382	390
Health workers, number	43	166	287	429	406	398	442	439	475		754
Health supervisors, number	4	15	22	36	38	36	42	39	45		46
Health workers per 1000 homes	2.40	2.0	2.0	2.7	2.5	2.1	2.2	2.1	1.6		3.3
Coverage, %	11.00	34.0	58.0	61.0	52.0	60.0	62.0	64.0	62.0		59.0
Mean home visits/year		2.1	2.7	3.3	1.5	2.1	1.7	2.4			1.5
<b><u>Community health program *</u></b>											
Community health areas			78	240	224	217	267	281	225	275	273
Population x 100,000			0.2	6.0	5.3	4.4	5.5	6.0	5.0	5.8	5.7
homes x 10,000			3.5	12.0	13.0	11.0	14.0	15.0	14.0	14.0	14.0
Coverage, %			22.0	63.0	52.0	40.0	46.0	47.0	51.0	44.0	57.0
Mean home visits/year			0.7	2.4	1.9	2.2	3.0	1.5			

\* Community health for populations above 2000 people began in 1976.

Source: Department of Community Health, Ministry of Health, GOCR

**Table 24**  
**RELATIONSHIP BETWEEN COVERAGE BY RURAL HEALTH**  
**AND LIFE EXPECTANCY AT BIRTH, COSTA RICA 1970-76**

<b>% Population Served</b>	<b>Life Expectancy, Yr</b>
0	2.4
<25	2.4
25 -49	3.5
50 -74	4.0
75 +	5.1
 <u>Years of coverage</u>	
0	2.4
<1	4.2
1	4.5
2	3.4
3	5.1

**Source: Villegas (1977), adapted**

**Table 25**  
**INFANT MORTALITY AND RISK FACTORS AMONG URBAN**  
**AND RURAL POPULATIONS, COSTA RICA 1963-89**

<b>Group</b>	<b>1963</b>	<b>1970</b>	<b>1980-81</b>	<b>1988-89</b>	<b>Risk</b>
<b><u>Mother's education</u></b>					
Years of school:	<b>Per 1000</b>				
0-3	97	85	35		2.40
4-6	64	59	21		1.95
7-9	45	40	16		1.46
10+	30	21	11		1.00
<b><u>Father's occupation</u></b>					
<b>Agrarian:</b>					
peasant, poor	91	84	31		
land laborer	103	86	24		1.78
peasant, other	71	70	19		1.39
<b>Non-agrarian:</b>					
marginal	82	64	27		1.94
manual worker	79	63	18		1.34
middle group	58	44	14		1.00
<b><u>Location</u></b>					
<b>Urban:</b>					
rest of urban		54	18	15	1.10
intermediate city		57	17	15	1.04
metropolitan		46	17	13	1.00
total			17	14	
<b>Rural:</b>					
disperse			23		1.39
peri-urban			19		1.20
concentrated			19		1.15
total			22	16	

**Source: Behm-Rosas et al. (1987), adapted.**

**Table 26**  
**NUTRITION AND HEALTH INDICATORS BY HEALTH**  
**REGION (HR)\*, COSTA RICA 1973**

Indicator	HR 1	HR 2	HE 3	HR 4	HR 5
Population x 10 <sup>3</sup>	661.2	448.8	277.2	317.4	175.0
% < \$250/yr surveyed < \$250.y	43	55	52	55	41
	54	54	54	57	39
Nutrition, % W/Age					
>110 (overweight)	10.2	9.5	6.1	8.7	9.2
>90 (well nourishe)	46.6	39.1	31.4	35.8	34.7
75-89% Mn I d**	38.0	38.5	44.4	42.8	44.5
60-74, Mn II d	4.3	11.9	16.9	11.5	10.4
<60, Mn III d	0.9	1.0	1.2	1.2	1.2
total Mn	43.2	51.4	62.5	55.5	56.1
	(5.2)	(12.9)	(18.1)	(12.7)	(11.6)
Episodes of infection					
influenza	4,554	3,184	4,373	1,996	2,750
whooping cough	396	126	165	197	175
dysentery	194	145	790	34	60
malaria	16	51	63	12	19
tetanus	5	14	30	25	7
water, % covered					
public water	90	58	61	82	22
private water	3	10	4	7	21
well	1	11	20	3	11
without	6	21	15	8	36
Sanitation, %					
septic tank	50	26	28	28	28
latrine	38	59	37	38	45
without	5	12	18	3	25

\* HR 1: Aserri, Cinco Esquinas, Curridabat, Vuelta de Jorco, etc.  
 HR 2: Arenal, Ciudad Quesada, Desmonte, Jacó, Palmares, etc.  
 HR 3: 27 de Abril, Chomes, La Sierra, Las Juntas, etc.  
 HR 4: Cartago, Cot, Guápiles, Peralta, Quircot, Siquirres, etc.  
 HR 5: Palmar Norte, Pejibaye, Puerto Cortés.

\*\* Mn I: malnourished first degree (Gómez classification)

Source: USAID Survey (1973)

**Table 27**  
**EVOLUTION OF THE NUTRITIONAL STATUS OF PRESCHOOL**  
**CHILDREN, PREVALENCE (%), COSTA RICA 1966-82**

<b>Gómez classification*</b>	<b>1966</b>	<b>1975</b>	<b>1978</b>	<b>1982</b>
First degree malnutrition (I)	43.7	40.9	39.5	30.6
Second degree malnutrition (II)	12.2	11.2	11.3	3.3
Third degree malnutrition (III)	1.5	1.1	0.4	0.3
Overweight	3.8	6.3	7.7	6.9
Adequate	38.8	40.5	40.8	58.9

\* Weight for age as % of standard age  
 I = 75-89%; II = 60-74%; III = < 60 %;  
 overweight = 110 % or more; adequate = 90-109 %

**Table 28**  
**NUTRITIONAL STATUS OF 542 PRESCHOOL COHORT CHILDREN BY**  
**PARTICIPATION IN THE GOCR FOOD PROGRAM, PURISCAL 1982**

Registered in program (children)	% Wt/Ht				% Wt/Age				% Ht/Age	
	TL	A	S	ST	OW	A	I	II+III	A	S
Yes (338)	14.5 *	81	3.8	0.3	12	61	25.7	0.9	98.5	1.5
No (204)	23.5	74	2.4	0	22	59	16.6	0.5	98.5	1.5

Key: Weight for Height:  
 TL = tall, > 109%  
 A = adequate, 90-109%  
 S = short, 80-89%  
 ST = stunted, < 80%

Height for Age:  
 A = adequate, > 89%  
 S = short, < 90%

Weight for Age:  
 OW = overweight, > 109%  
 A = adequate, 90-109%  
 I = I degree, 60-74%  
 II+III = malnourished, < 76%

\* Relative percentage  
 Source: Mata *et al.* (1982).

**Table 29**  
**PREVALENCE (%) OF NUTRIENT DEFICIENCY AMONG**  
**CHILDREN, COSTA RICA 1966-82**

Deficiency, %	1966	1978	1982	% Reduction 1966-82
Very low vitamin A <sup>1</sup>	5.5	0.3	0	100
Low vitamin A <sup>1</sup>	27	2	1.8	93
Low hemoglobin		23	18	
Goiter <sup>2</sup>	18	12	4	78
Deficient protein <sup>3</sup>	23	0	0	100
Deficient calories <sup>3</sup>	51	40	44	14
PEM <sup>4</sup>	14	9	4	71
Stunting <sup>5</sup>	17	8	4	76
Overweight <sup>6</sup>	4	11	10	

<sup>1</sup> Measured in serum

<sup>2</sup> Prevalence in general population

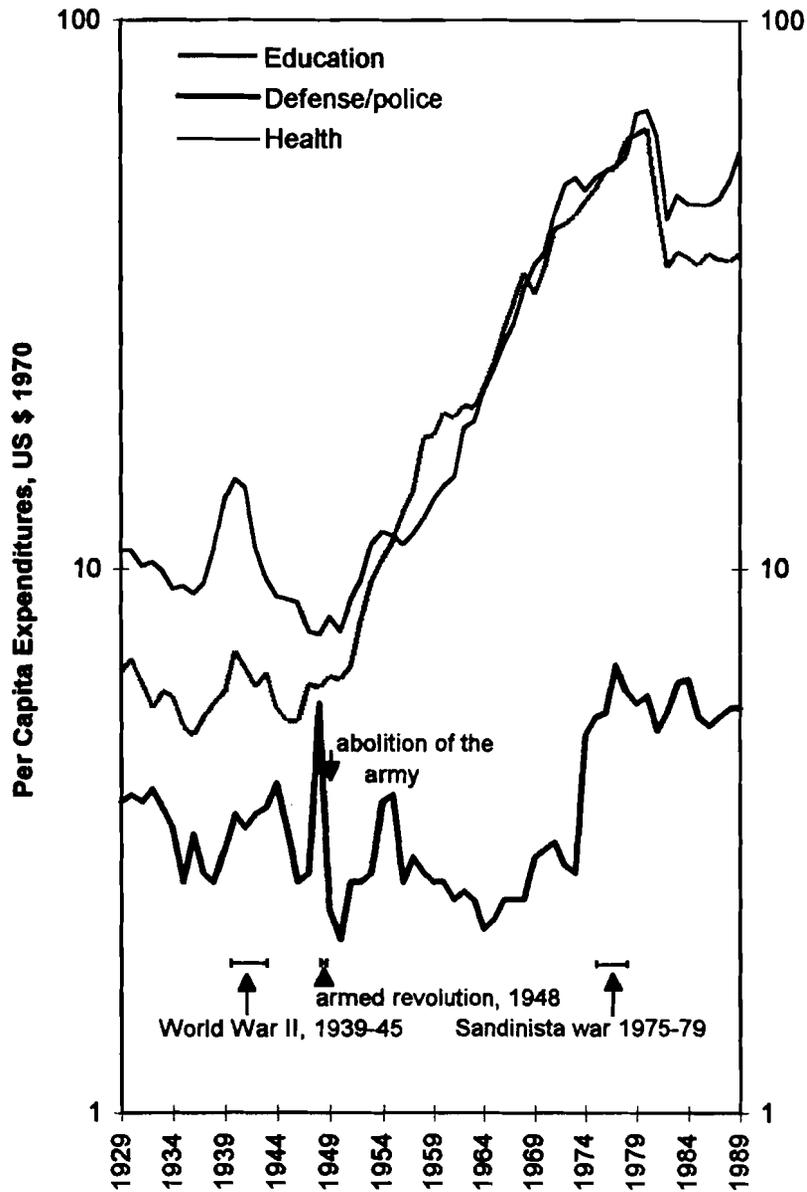
<sup>3</sup> Measured in daily diet

<sup>4</sup> Protein-energy malnutrition: <76% weight for age

<sup>5</sup> Less than 10% height for age

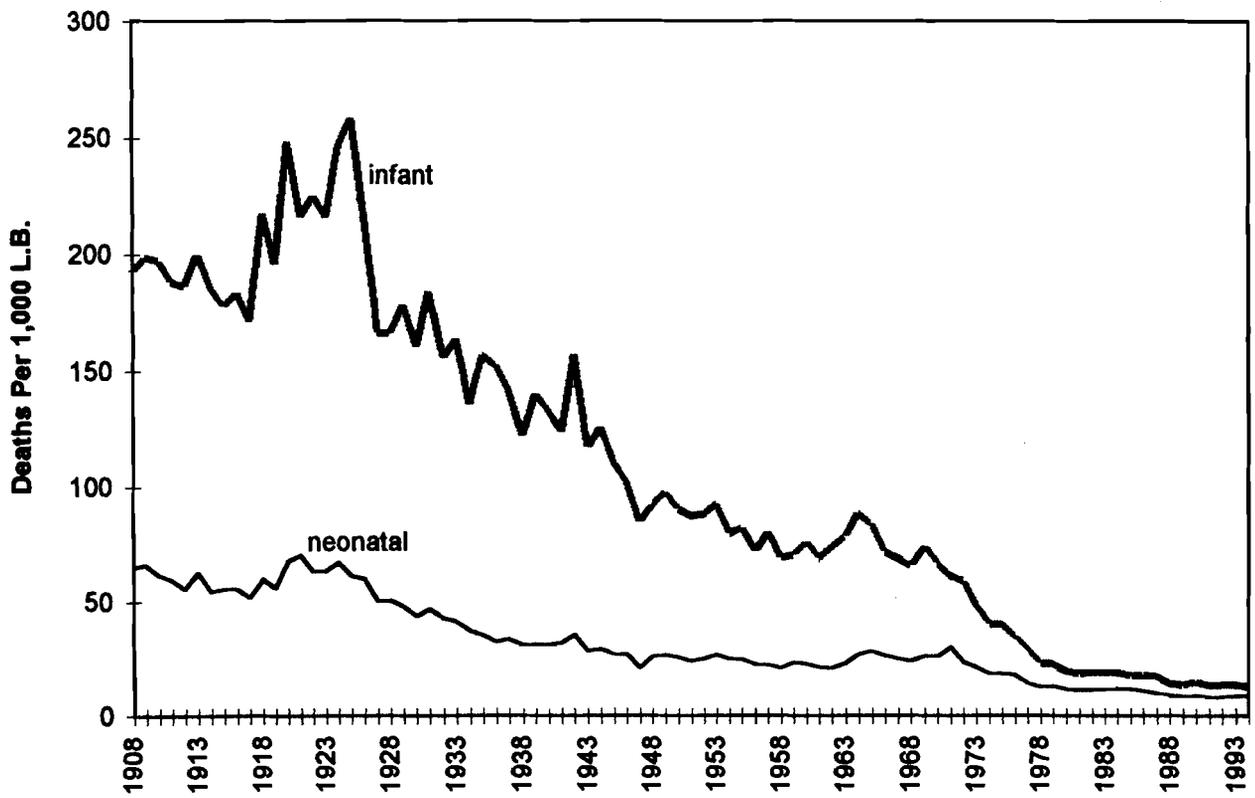
<sup>6</sup> More than 109% weight for age

**Figure 1**  
**EXPENDITURES IN HEALTH, EDUCATION, AND**  
**DEFENSE AND POLICE, COSTA RICA 1929-89**

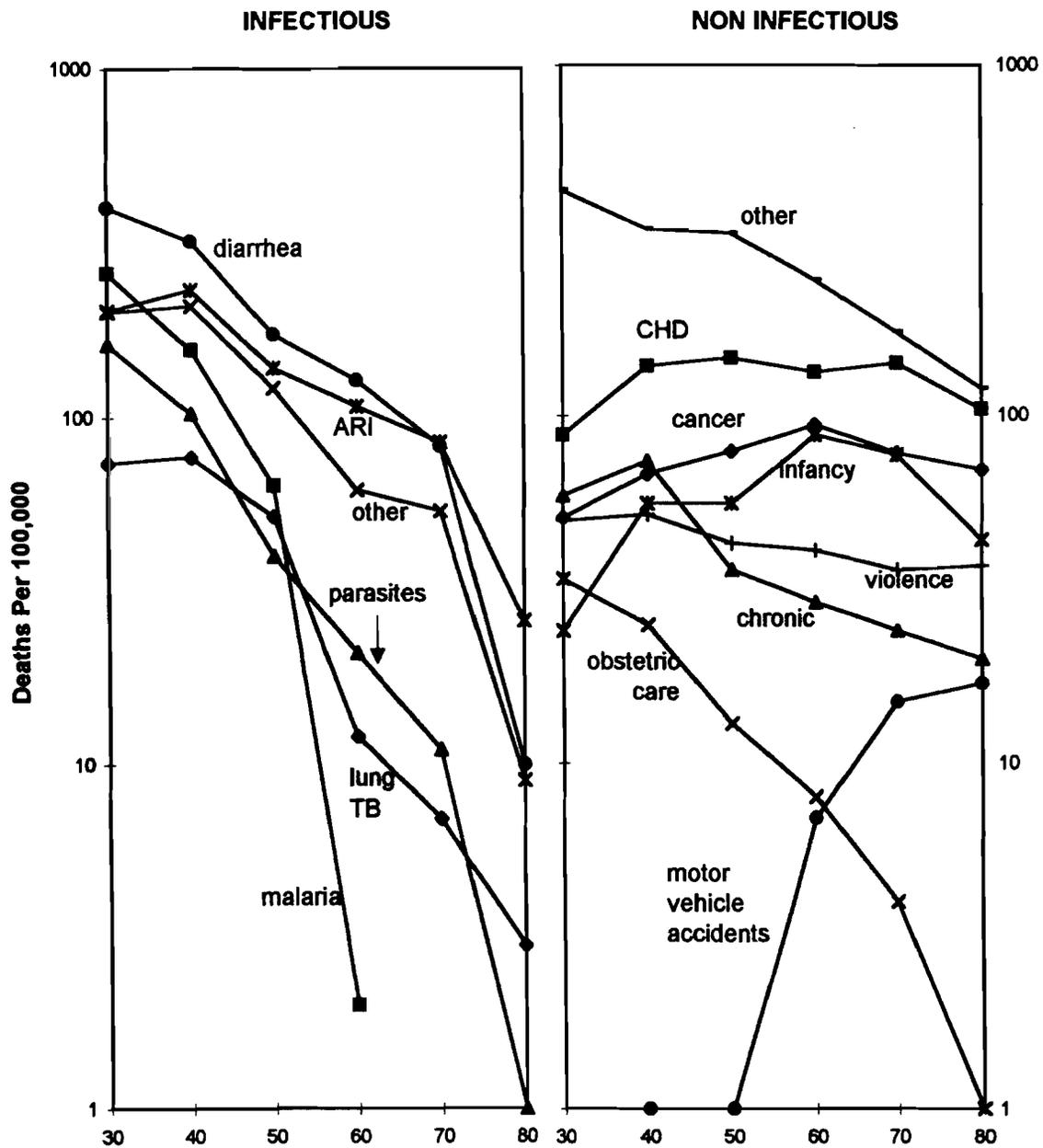


Source: Mata and Rosero (1988), updated

**Figure 2**  
**NEONATAL AND INFANT MORTALITY PER 1,000**  
**LIVE BIRTHS, COSTA RICA 1908-94**

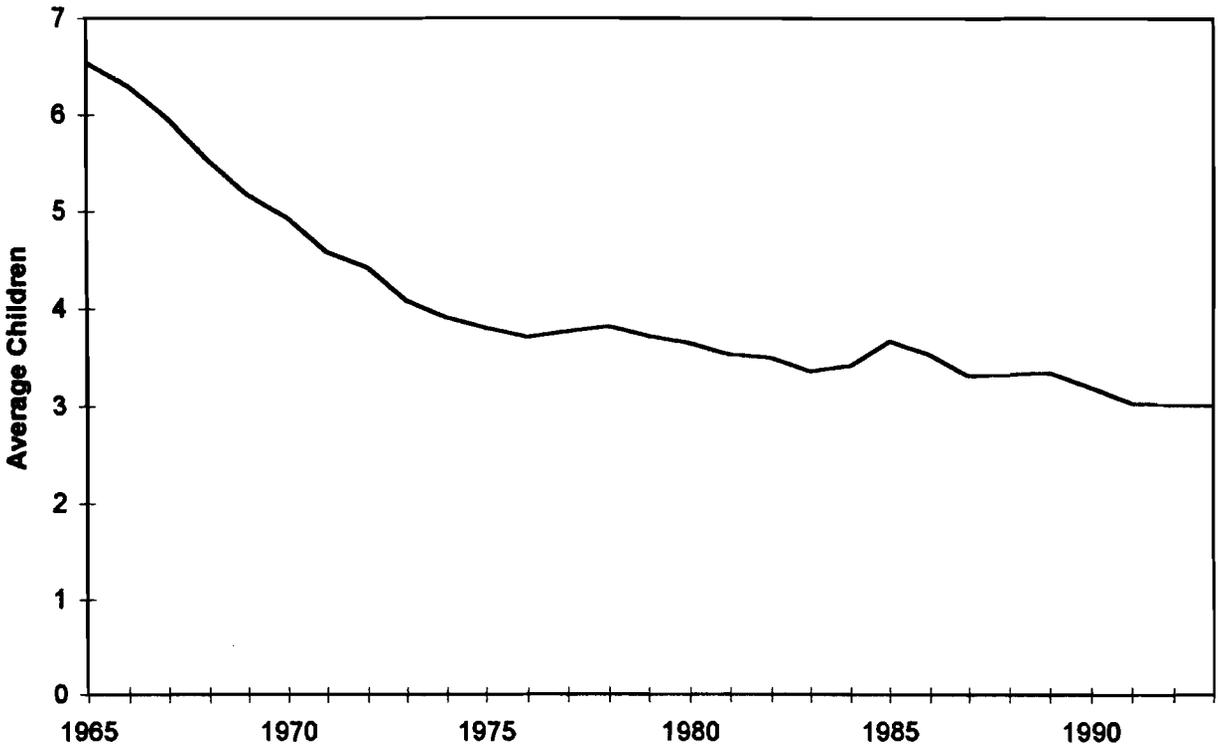


**Figure 3**  
**STANDARDIZED MORTALITY, BY INFECTIOUS AND**  
**NON-INFECTIOUS DISEASES, COSTA RICA 1930-80**



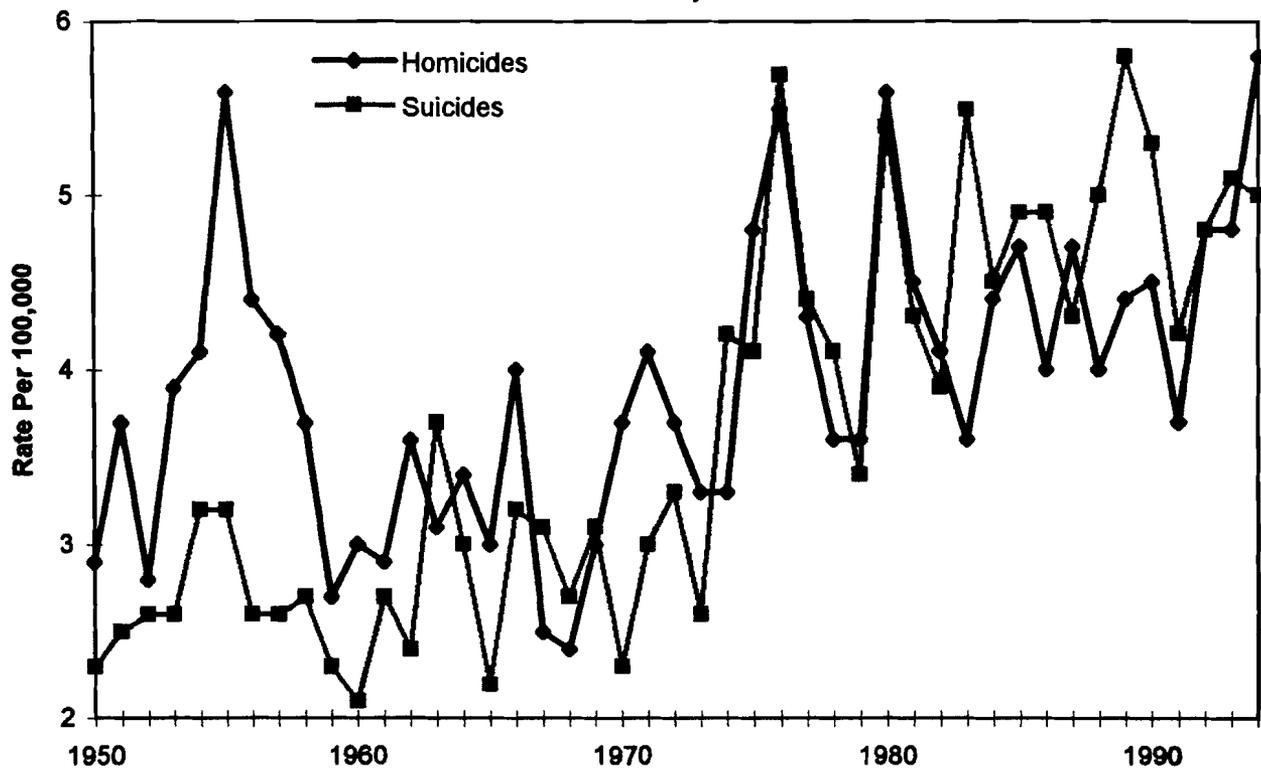
Source: Mata & Rosero (1988)

**Figure 4**  
**FEMALE FERTILITY RATE, COSTA RICA 1965-93**

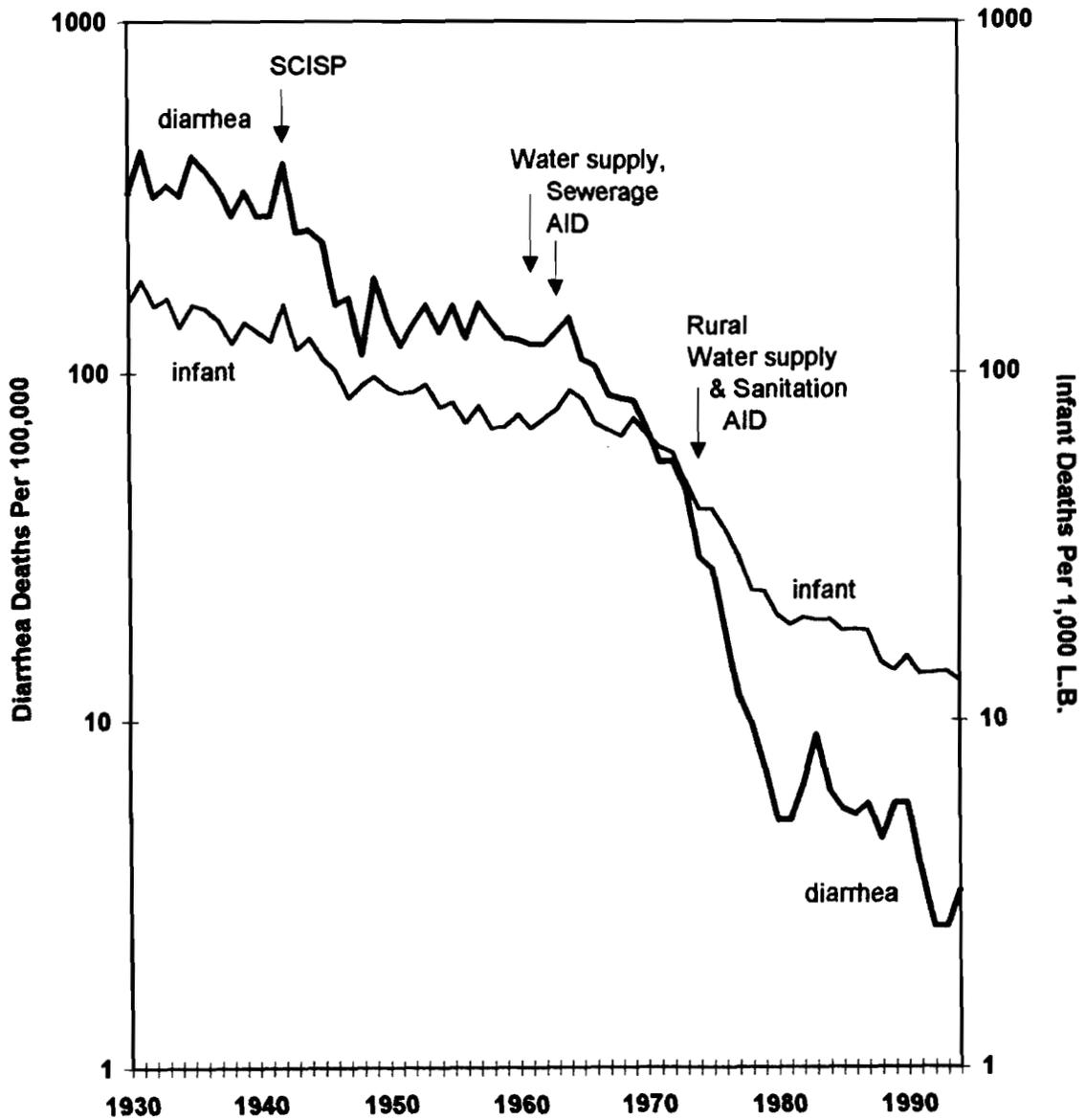




**Figure 6**  
**HOMICIDES AND SUICIDES, COSTA RICA 1950-94**

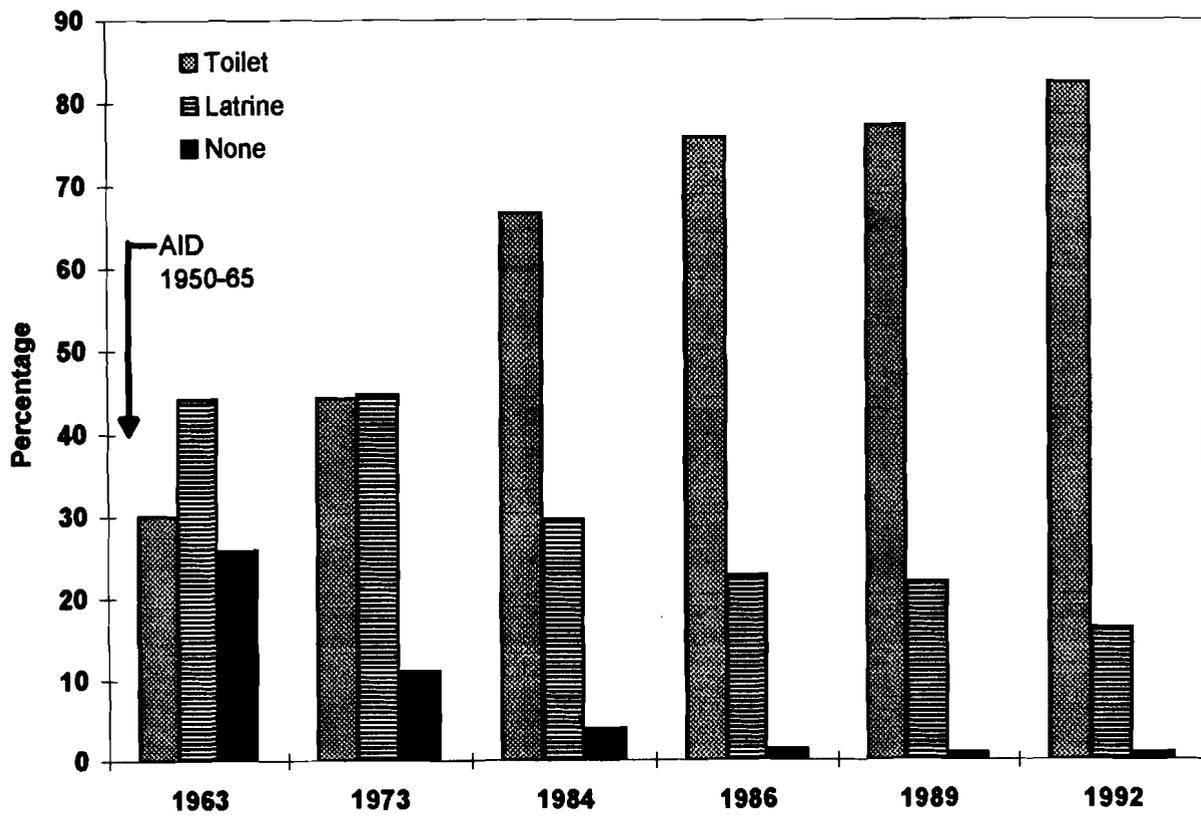


**Figure 7**  
**INFANT MORTALITY AND DIARRHEAL DISEASE**  
**MORTALITY, COSTA RICA 1930-94**

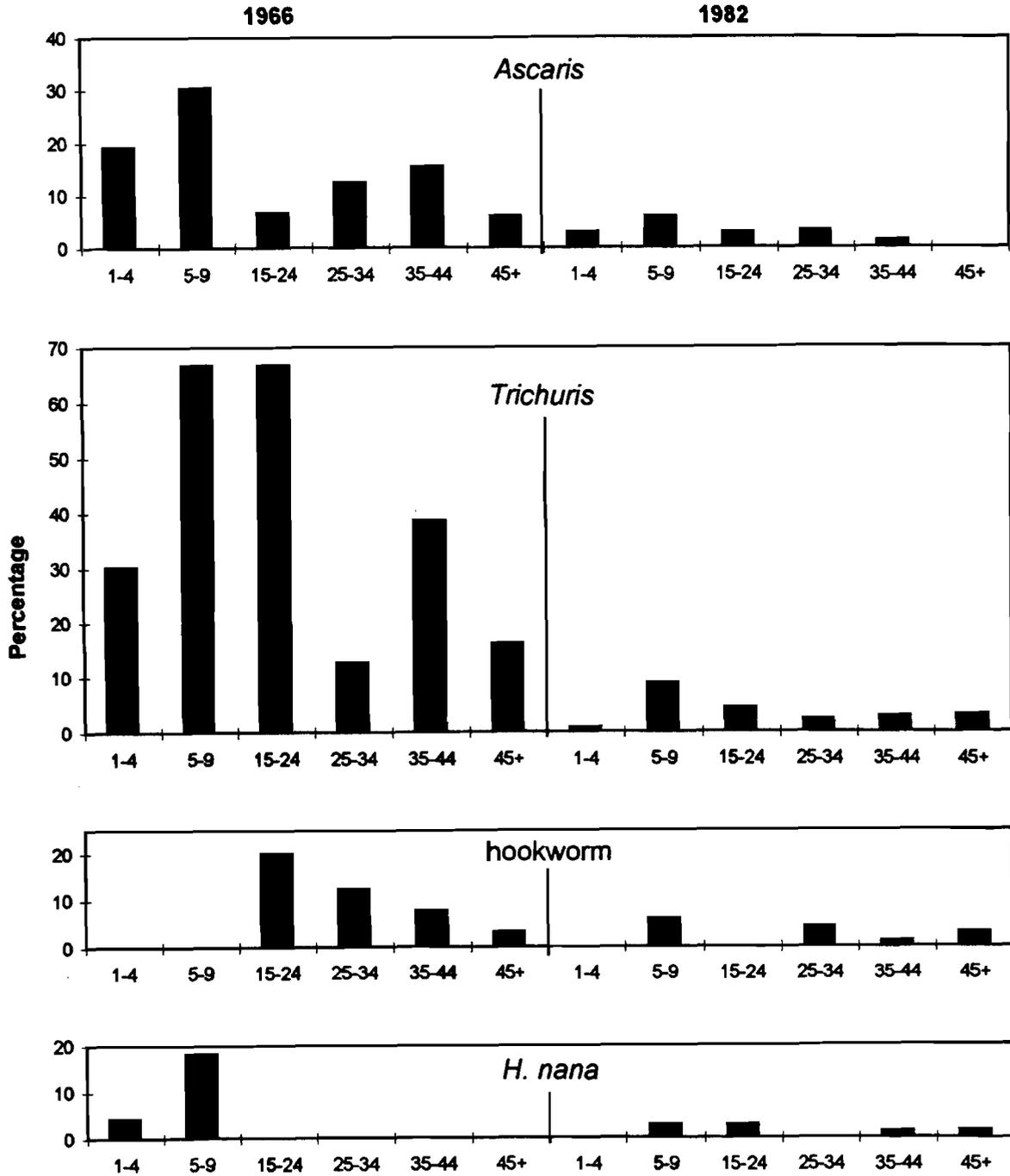


Key: SCISP = Projects of the Interamerican Service for Cooperation in Public Health; AID = Projects of the US Agency for International Development

**Figure 8**  
**PREVALENCE OF FACILITY FOR EXCRETA DISPOSAL**  
**IN COSTA RICAN HOUSEHOLDS, 1963-92**

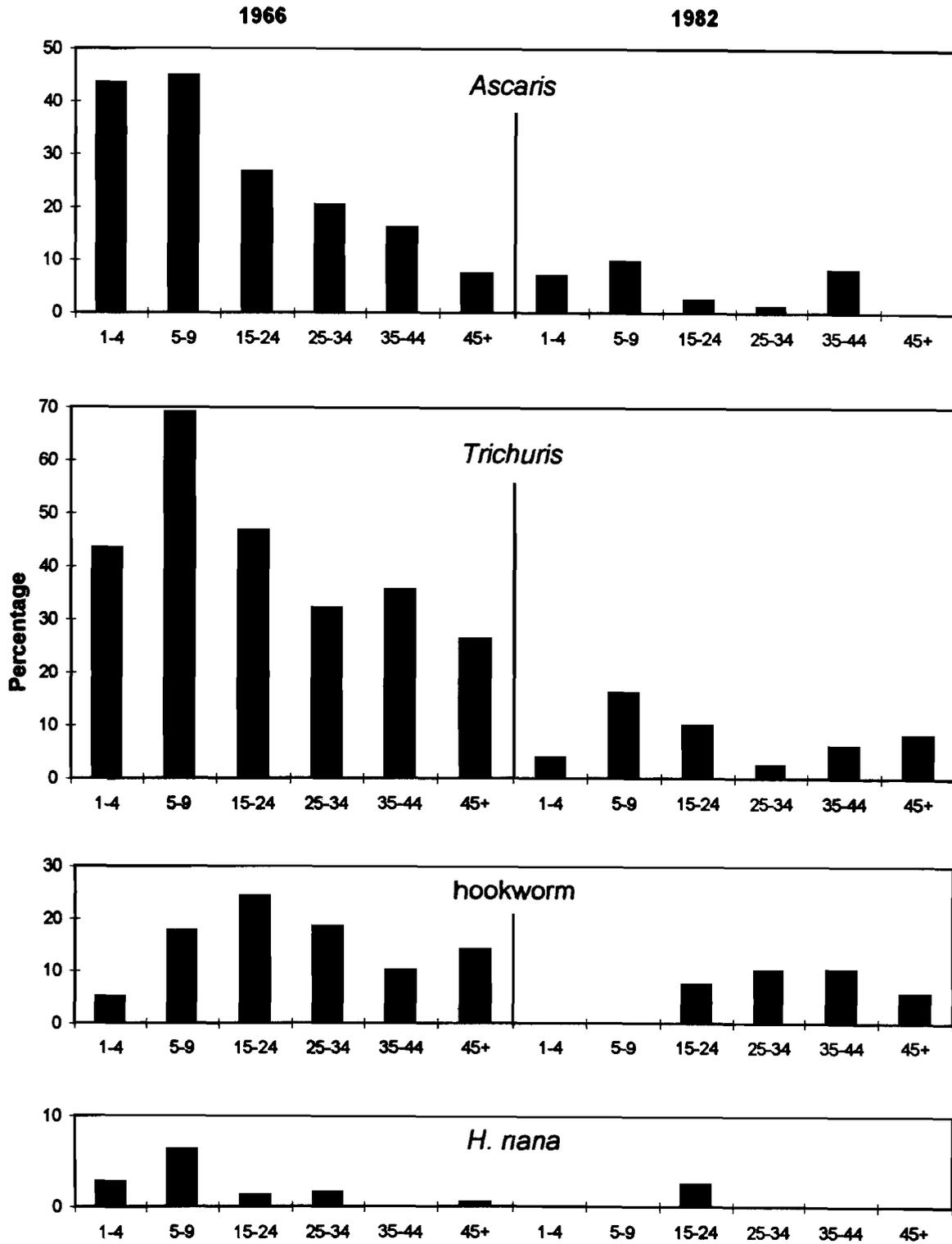


**Figure 9**  
**PREVALENCE OF HELMINTHS BY AGE, NATIONAL**  
**SURVEYS, URBAN COSTA RICA 1966 AND 1982**



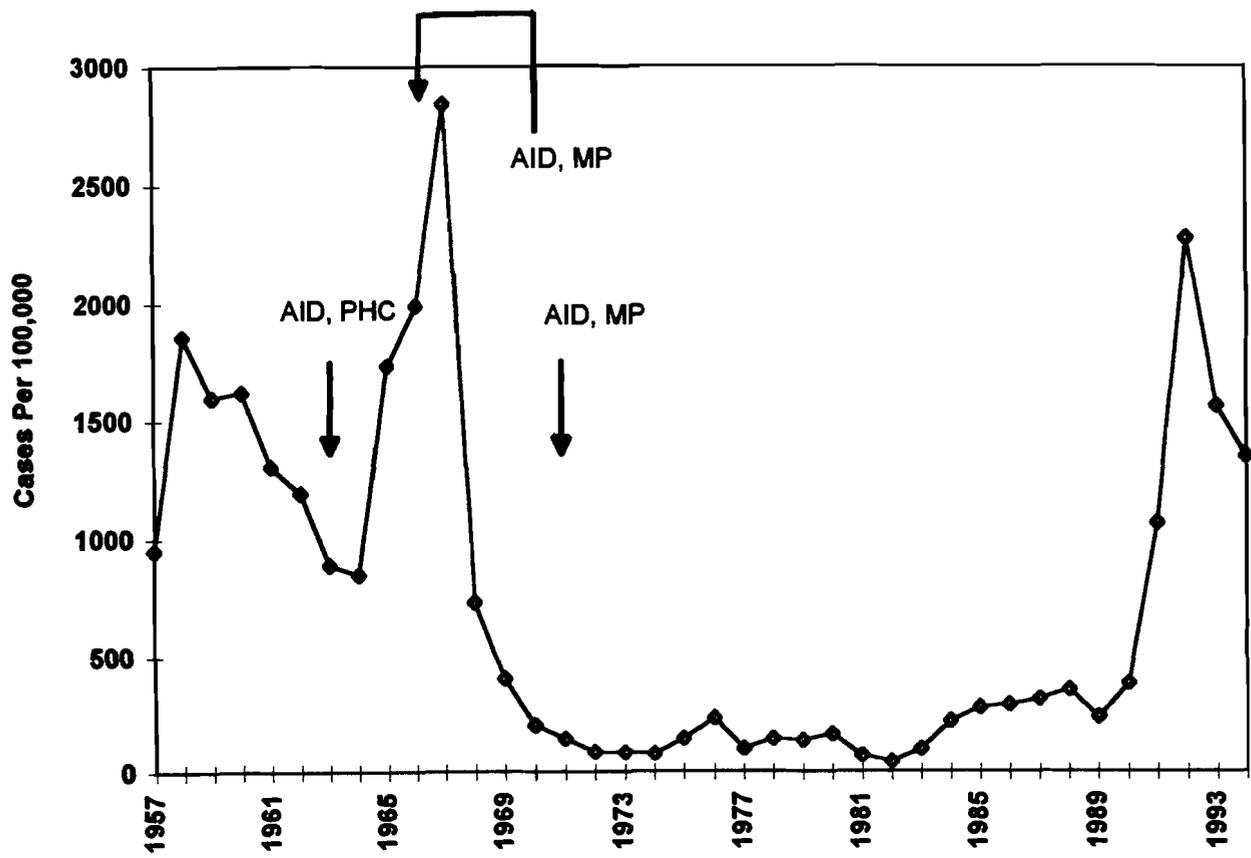
Source: Mata et al. (1985)

**Figure 10**  
**PREVALENCE OF HELMINTHS BY AGE, NATIONAL**  
**SURVEYS, RURAL COSTA RICA 1966 AND 1982**



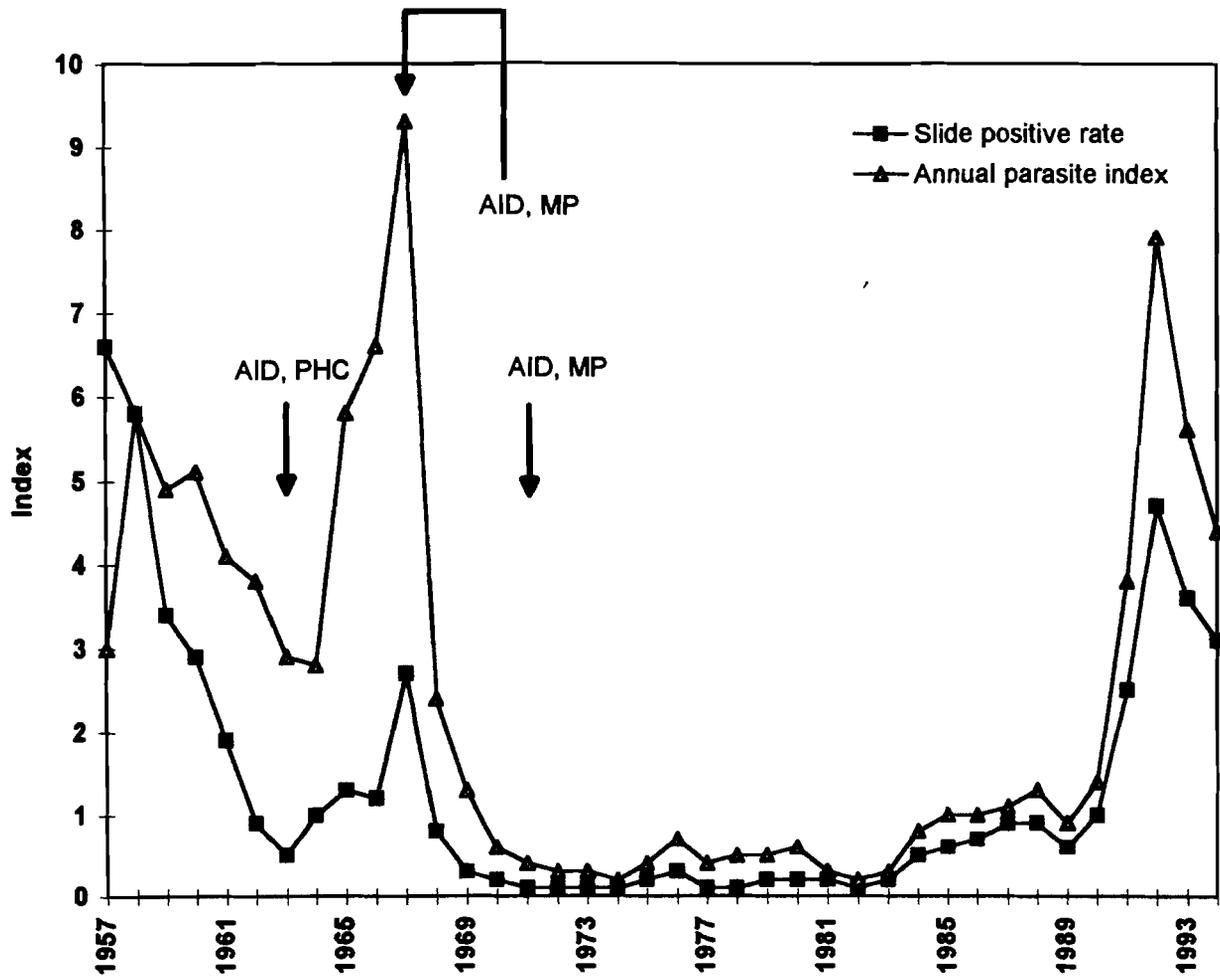
Source: Mata et al. (1985)

**Figure 11**  
**MALARIA MORBIDITY, COSTA RICA 1957-94**



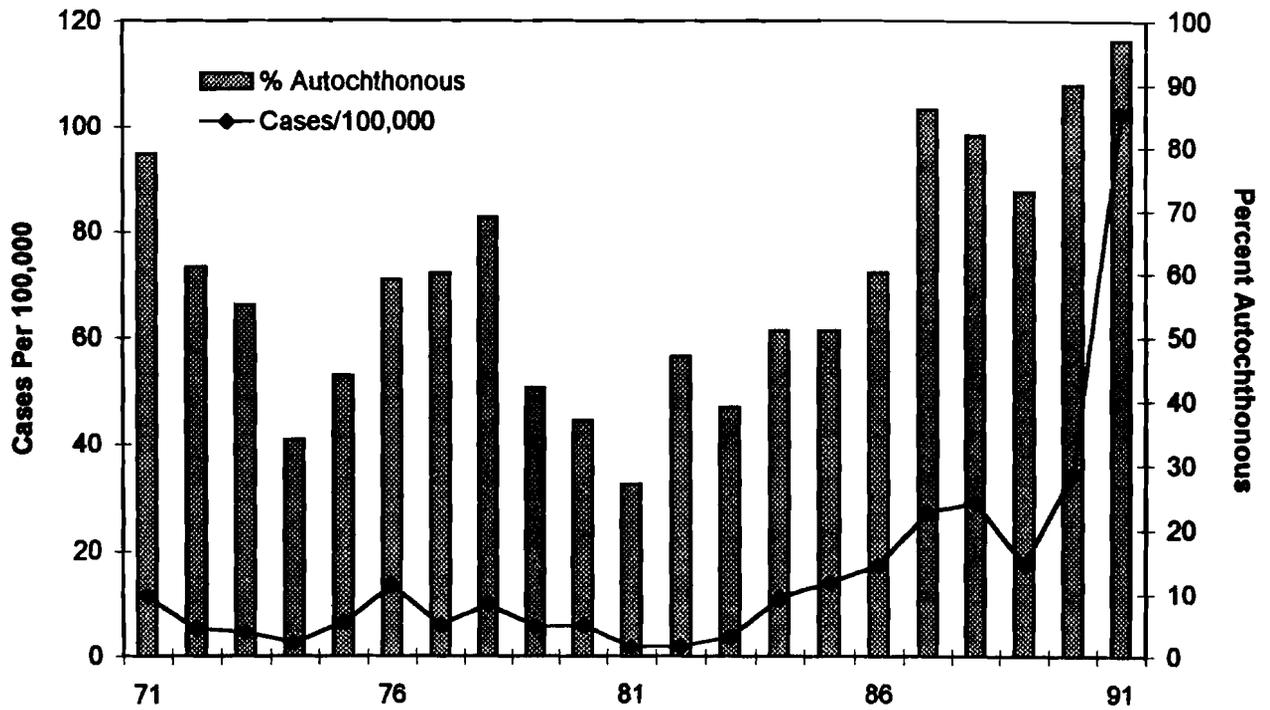
Key: AID, PHC = USAID health care projects; AID, MP = USAID malaria projects

**Figure 12**  
**MALARIOMETRIC INDICES, COSTA RICA 1957-94**



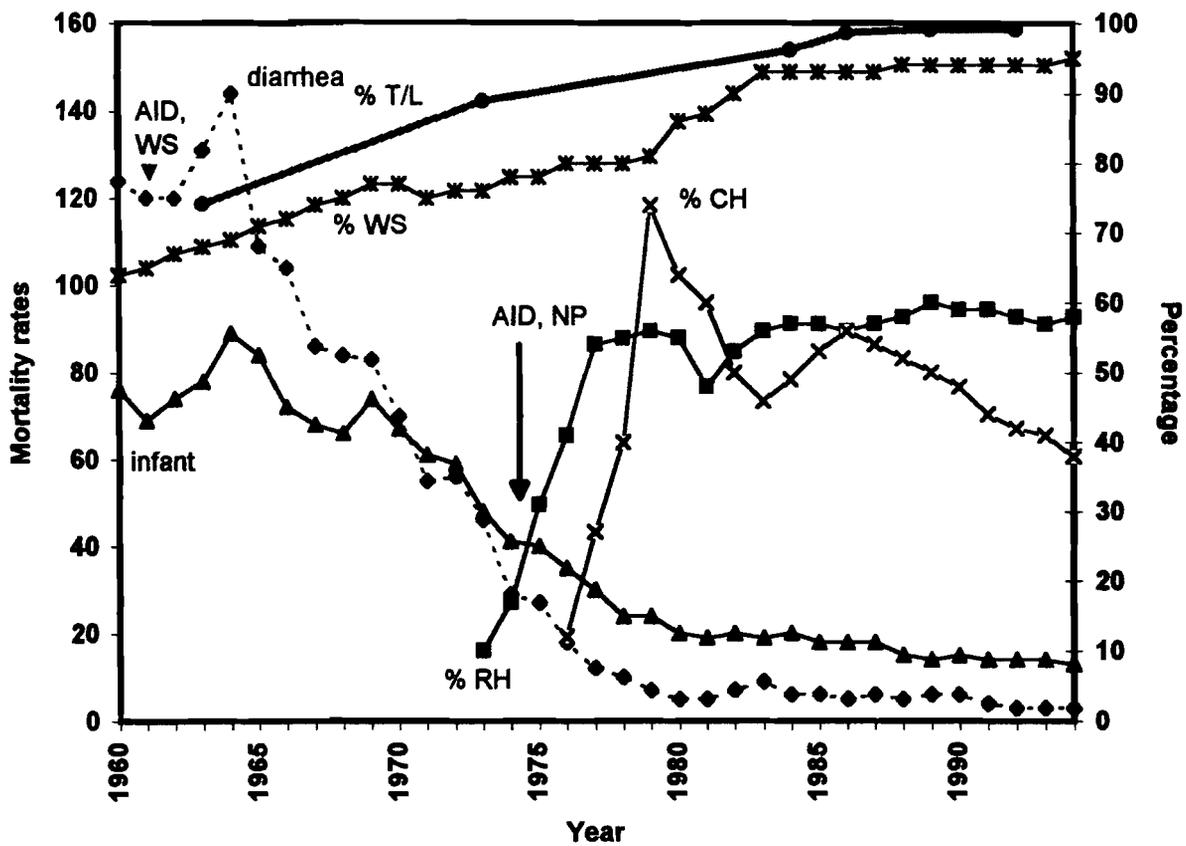
Key: AID, PHC = USAID primary health care projects; AID, MP = USAID malaria projects

**Figure 13**  
**MALARIA MORBIDITY AND AUTOCHTHONOUS**  
**MALARIA, COSTA RICA 1971-91**



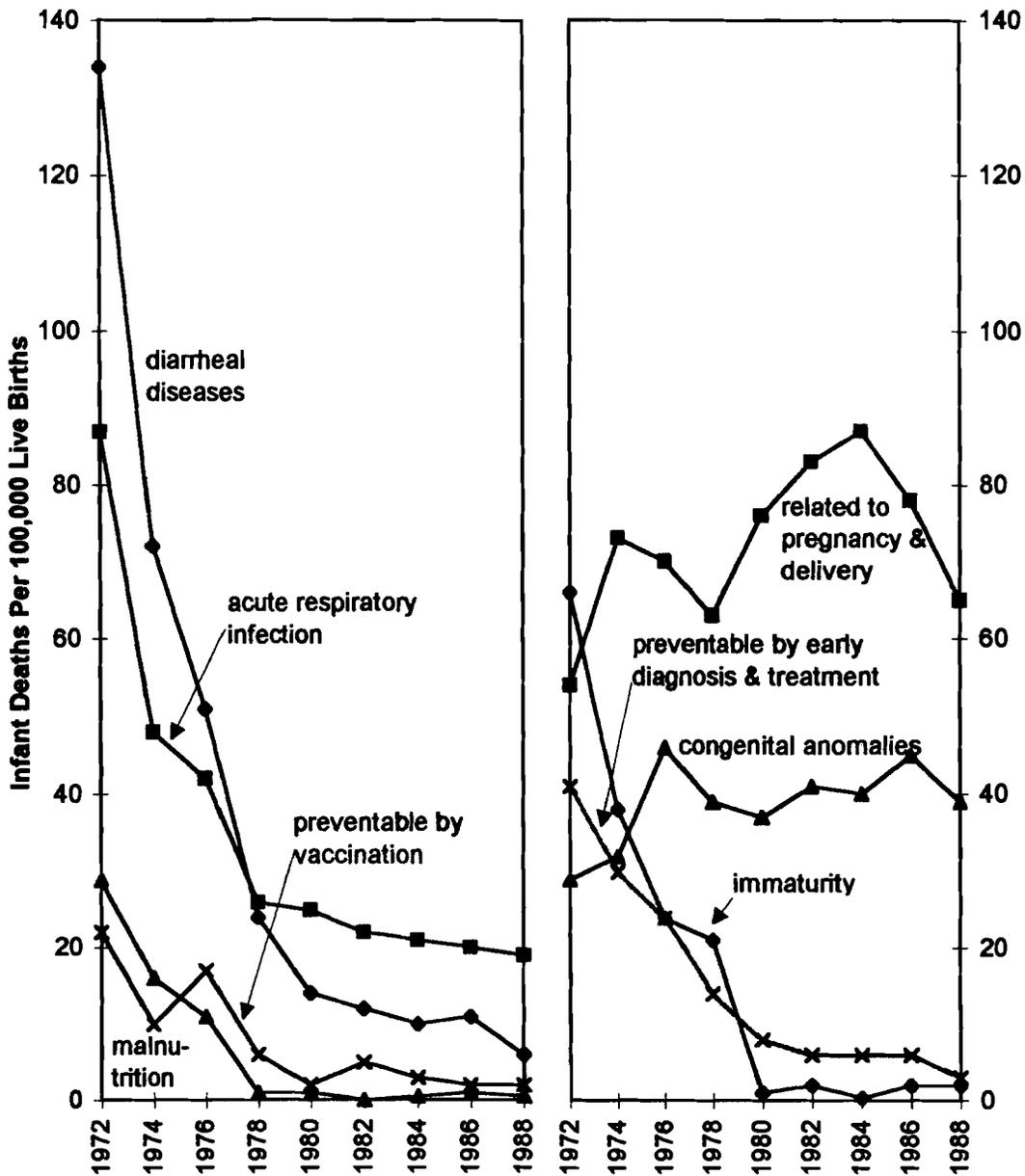
Source: Mata and Mata (1993)

**Figure 14**  
**INFANT DEATHS, DIARRHEA DEATH RATES, AND COVERAGE WITH**  
**WATER, SANITATION, AND PRIMARY HEALTH CARE,**  
**COSTA RICA 1960-94**



Key: T/L = toilet or latrine; WS = water supply; CH = community health services; RH = rural health services; AID, NP = USAID Nutrition Project; AID, WS = USAID Water supply projects

**Figure 15**  
**CAUSES OF INFANT MORTALITY, COSTA RICA 1972-88**



Source: Mata and Rosero (1988), updated

dictated by the U.S. in the 1980's. First, fund allocation hardened making it almost inaccessible to small countries with good health indicators. Secondly, projects approved required investment of significant funds in contracts with U.S. firms. Actually, some private American agencies were established to fish out for USAID funds authorized to LDC's. This resulted in projects with large budgets destined almost entirely to pay expensive consultants. Considerable funds were used for salaries, fees, airplane tickets, and meetings. Little was left to build infrastructure and resources in the recipient country. Furthermore, the new policy disregarded one of the most valuable resource in the recipient country, namely, professionals, technicians and workers with unique enthusiasm and experience, wishing to help their in own country. Such behavior generates, from the start, subrogation in the recipient country, a reversal to colonial times. Can a doctor from New England teach the indigenous people about rural health, emergencies in the jungle, or oral rehydration therapy?

The selection of projects in Period 3 was a drastic and almost total departure from the previous ideological orientation of the USAID that generated great benefits for LDC's, namely, an emphasis in the general population instead of the diseased individual, an emphasis of prevention over treatment, an emphasis in spending most funds in the recipient country, and emphasis on collaborating instead of lecturing. There was the other concern, stated by a USAID officer, who thought the loan system contributes to the sustained inflation in recipient countries. It would be appropriate to know if this is really possible, and if so, the GOCR and the USAID should make the necessary changes. If the USAID is going to engage in further cooperation with Costa Rica, it should focus on high health priorities, emphasize prevention, support primarily holistic interventions, and capitalize on the experience gained in Periods 1 and 2, in order to exert maximum impact.

**A new USAID Period in Costa Rica?** Even if the USAID will leave Costa Rica in 1997, there is room for future cooperation with Costa Rica, for instance to improve the living conditions of the population thriving under poverty. The ideal situation would be a "Marshal plan-like" program, now that Costa Rica and similar nations seem prepared to handle matters more efficiently. The goal would be to improve housing, education of young women, healthy life styles to reduce degenerative and social pathologies, and to improve management and administration. Some needed changes are being implemented underway under the "Reform of the State", but the scope and pace are still too modest.

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with a significantly smaller portion used for foreign technical assistance. Since the economic situation had improved, the counterpart was very significant. In fact, budgets contributed by the GOCR for the nutrition and primary health activities (DESAF), surpassed the total USAID funds in the period.

The evaluation of public health impact revealed clear cut positive changes in maternal and child health, nutrition and deficiencies, control of infectious and parasitic diseases, and increase in life expectancy at birth. The greatest impact resulted from environmental interventions effected primarily by water supply and sanitation. The overall condition was favored by the advance in road infrastructure, transportation, and communication media. One of the most significant developments in Period 2 was the creation of vast programs of primary health for rural areas and marginal urban zones, years before WHO launched the concept of Health for All by the Year 2000 at Alma Ata. The effects were often dramatic, because scientific knowledge had increased considerably, health technology was more developed, there was economic bonanza, and the USAID was more proficient.

**Period 3.** Surprisingly, projects of Period 3 focused on medical issues somewhat distant from the public health realities of the country. They concerned biomedical situations of some importance, but their application would not necessarily lead to better treatments or an improved quality of life. Furthermore, demonstration of possible impact seems extremely difficult. In fact, the studies did not propose any form or procedure to evaluate impact. Even if the problems addressed in Period 3 had been improved or solved, there would not be a manner to determine impact on health parameters, particularly at the national level.

It is possible that the GOCR and the USAID did not focus on the real issues at the time they agreed to use the sizable sums of this period (about one half of the total USAID funds for health). The problems selected for funding could have been approached in simpler manner, using local resources at significantly lower cost. In general, projects of Period 3 did not target on the community but on hospitalized people. The concern with primary health care was insufficient or minimal. In the past, the USAID dealt with the MOH when concerned with the health sector. However, the nature of the projects of Period 3 somehow reflected the gigantism of the CCSS, and the diminished presence of the MOH in recent times. It can be safely stated that in Period 3 the CCSS replaced the MOH. The same phenomenon has occurred with the World Bank and other financial agencies, now working more with the CCSS than with the MOH, supposedly the Rector of the sector.

Oddly, no interviews were available for Period 3, likely because there was more written documentation for this period than for the other two (Waddell, 1995). The projects of Period 3 can not be linked to permanent material goods or infrastructure, except the relatively inexpensive burns unit, and a repair shop, all at the CCSS. One is left with the impression that a large portion of those funds were gone with the wind. The contrast between Periods 1/2 and 3 likely resulted from the drastic change in project-funding policy dictated by the U.S. in the 1980's. First, fund allocation hardened making it almost inaccessible to small countries with good health indicators. Secondly, projects approved

required investment of significant funds in contracts with U.S. firms. Actually, some private American agencies were established to fish out for USAID funds authorized to LDC's. This resulted in projects with large budgets destined almost entirely to pay expensive consultants. Considerable funds were used for salaries, fees, airplane tickets, and meetings. Little was left to build infrastructure and resources in the recipient country. Furthermore, the new policy disregarded one of the most valuable resource in the recipient country, namely, professionals, technicians and workers with unique enthusiasm and experience, wishing to help their in own country. Such behavior generates, from the start, subrogation in the recipient country, a reversal to colonial times. Can a doctor from New England teach the indigenous people about rural health, emergencies in the jungle, or oral rehydration therapy?

The selection of projects in Period 3 was a drastic and almost total departure from the previous ideological orientation of the USAID that generated great benefits for LDC's, namely, an emphasis in the general population instead of the diseased individual, an emphasis of prevention over treatment, an emphasis in spending most funds in the recipient country, and emphasis on collaborating instead of lecturing. There was the other concern, stated by a USAID officer, who thought the loan system contributes to the sustained inflation in recipient countries. It would be appropriate to know if this is really possible, and if so, the GOCR and the USAID should make the necessary changes. If the USAID is going to engage in further cooperation with Costa Rica, it should focus on high health priorities, emphasize prevention, support primarily holistic interventions, and capitalize on the experience gained in Periods 1 and 2, in order to exert maximum impact.

**A new USAID Period in Costa Rica?** Even if the USAID will leave Costa Rica in 1997, there is room for future cooperation with Costa Rica, for instance to improve the living conditions of the population thriving under poverty. The ideal situation would be a "Marshal plan-like" program, now that Costa Rica and similar nations seem prepared to handle matters more efficiently. The goal would be to improve housing, education of young women, healthy life styles to reduce degenerative and social pathologies, and to improve management and administration. Some needed changes are being implemented underway under the "Reform of the State", but the scope and pace are still too modest.

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**Table 1**  
**FORTY-EIGHT PUBLIC HOSPITALS AND CLINICS OF COSTA RICA**  
**BY YEAR OF CREATION OR INAUGURATION**

<b>Hospital, clinic</b>	<b>Year of Creation</b>
<b>1833-1899 (66 years):</b>	
Lazareto, San José, in 1892 named Sanatorio Nacional Las Mercedes (leprosy)	1833
Hospital San Juan de Dios, San José (general)	1845
Hospital San Rafael de Alajuela, Alajuela (general)	1883
Hospital Psiquiátrico Chapuí, San José (mental illness)	1889
Hospital San Vicente de Paul, Heredia (general)	1890
<b>1900-1939 (39 years):</b>	
Hospital Max Peralta, Cartago (general)	1912
Sanatorio para Tuberculosos, Later Sanatorio Durán. 1931, Tierra Blanca (tuberculosis)	1918
Unidad Sanitaria Turrialba, first rural clinic in Costa Rica (general)	1934
<b>1940-1959 (19 years):</b>	
Hospital Rafael Angel Calderón Guardia, San José (general)	1943
Hospital San Carlos, Ciudad Quesada (general)	1946
Instituto Carit, San José (maternity)	1951
Hospital Carlos Luis Valverde, San Ramón (general)	1955
Hospital Enrique Baltodano, Liberia (general)	1956
Hospital San Francisco de Asís, Grecia (general)	1956
Hospital Raúl Blanco Cervantes, San José (tuberculosis; later, elderly)	1958 *
<b>1960-1979 (19 years):</b>	
Hospital Nacional de Niños Carlos Sáenz Herrera, San José (children)	1964 *
Clínica Moreno Cañas, Barrio Cuba (general)	1964
Clínica Clorito Picado, Cinco Esquinas (general)	1965
Hospital México, San José (general)	1969
Clínica Jiménez Núñez, Guadalupe (general)	1970
Clínica Carlos Durán, Barrio Vasconia (general)	1971
Clínica Solón Núñez, Hatillo (general)	1972
Clínica Marcial Fallas, Desamparados (general)	1972
Clínica Marcial Rodríguez, Alajuela (general)	1974
Hospital Monseñor Sanabria, Puntarenas (general)	1974
Hospital La Anexión, Nicoya (general)	1974
Centro Nacional de Rehabilitación, San José (rehabilitation)	1977
Hospital Escalante Pradilla, San Isidro del General (general)	1977
<b>1980-1995 (15 years):</b>	
6 Regional Hospitals: Ciudad Neylly, San Carlos, Tony Facio, San Vito Java, Upala, Los Chiles,	1978-82 **
12 Outpatient Clinics in various parts of the nation (La Cruz, Chomes, Hojancha, Jicaral, San Rafael Heredia, La Cuesta, etc.)	1978-82 **
3 Fringe urban Clinics (Coronado, Pavas, Tibás), Greater San José (general)	1986-90

\* Received minimal AID support.

\*\* Financed significantly with BID funds.

**Table 2**  
**PATHOLOGY IN AUTOPSIES OF PERSONS 14 YEARS**  
**OLD OR OLDER, SAN JUAN DE DIOS HOSPITAL,**  
**1927-31 AND 1976-80**

	1927-31	1976-80	% change
Number of autopsies	902	1000	
Women	321	441	
Men	581	559	
Mean age at death, years			
Women	35	58	+66
Men	34	60	+76
Diagnoses (%)			
Infectious diseases*	46.5	8.5	-82
Parasitic diseases	12.1	0.9	-93
Tumors	9.4	33.2	+253
Cardiovascular diseases	5.5	23.8	+332
Renal diseases	4.6	2.0	-56
Neurological diseases	2.5	7.0	+180
Digestive diseases	2.5	5.6	+124
Other	16.9	10.9	-35

\* Tuberculosis decreased from 24.6% to 5%

Source: Moya *et al.* (1982)

**Table 3**  
**INFANT DEATHS (ID), NEONATAL MORTALITY(NM) AND INFANT**  
**MORTALITY (IM) PER 1,000 LIVE BIRTHS, COSTA RICA 1908-94**

Year	ID	NM	IM	Year	ID	NM	IM
1908	2,951	64.7	192.8	1952	3,739	25.5	88.0
1909	3,098	65.9	198.6	1953	3,956	27.1	92.4
1910	3,125	61.4	197.2	1954	3,820	25.1	79.3
1911	3,171	59.6	188.3	1955	4,009	25.2	82.0
1912	3,190	55.7	186.3	1956	3,685	23.3	71.6
1913	3,550	62.5	200.0	1957	4,155	22.9	80.3
1914	3,449	54.4	185.1	1958	3,711	21.5	68.9
1915	3,332	55.5	177.6	1959	3,904	23.9	69.9
1916	3,347	55.5	183.8	1960	4,034	23.3	75.8
1917	3,253	52.0	171.2	1961	3,803	21.8	69.0 *
1918	4,006	59.9	217.6	1962	4,121	21.3	73.6
1919	3,289	55.8	195.8	1963	4,456	23.4	78.2
1920	4,486	67.6	248.3	1964	4,889	27.3	88.6
1921	3,942	70.1	216.0	1965	4,796	28.8	83.9
1922	4,210	63.2	224.9	1966	4,098	27.1	71.6
1923	4,105	63.3	215.7	1967	3,859	25.8	68.5
1924	4,839	67.1	246.0	1968	3,534	24.5	65.6
1925	5,158	61.2	258.4	1969	3,890	26.9	73.8
1926	4,705	59.9	215.0	1970	3,553	26.7	66.6
1927	3,766	50.4	166.7	1971	3,181	30.4	61.1
1928	3,041	50.6	166.2	1972	3,127	24.2	58.9
1929	4,047	47.9	178.6	1973	2,394	22.0	48.5
1930	3,788	43.6	160.2	1974	2,133	18.8	40.6
1931	4,388	46.8	184.1	1975	2,201	18.8	40.4
1932	3,683	42.9	155.6	1976	1,988	18.4	35.4
1933	3,854	41.5	163.7	1977	1,787	14.6	29.8
1934	3,235	37.6	135.6	1978	1,503	13.0	23.7
1935	3,914	35.6	156.9	1979	1,530	13.3	23.5
1936	3,891	33.0	152.9	1980	1,334	11.8	20.1
1937	3,630	34.1	141.7	1981	1,294	11.3	18.8
1938	3,267	31.6	121.7	1982	1,369	11.7	19.7
1939	3,787	31.8	140.1	1983	1,349	11.9	19.4
1940	3,707	31.5	132.4	1984	1,428	12.3	19.5
1941	3,559	32.3	123.5	1985	1,483	11.9	18.1
1942	3,446	35.8	157.3	1986	1,478	11.1	18.3
1943	3,559	28.9	116.8	1987	1,401	10.1	18.1
1944	3,741	29.7	125.9	1988	1,194	9.3	14.7
1945	3,583	27.4	110.1	1989	1,160	8.8	13.9
1946	3,267	27.8	101.6	1990	1,250	9.1	15.3
1947	3,540	21.5	84.4	1991	1,120	8.2	13.6
1948	3,095	26.6	92.1	1992	1,099	8.7	13.7
1949	3,095	27.1	97.4	1993	1,090	8.9	13.8
1950	3,358	26.1	90.1	1994	1,045	8.9	13.0
1951	3,420	24.3	87.1				

\* Rates for 1965-1989 corrected for sub-registration: 11.9% (1961-65); 10% (1966-65); 8.2% (1971-75); 6.7% (1976-80); 5% (1981-85); 3.1% (1986-94), extrapolated from Chackiel (1987).

Source: 1908-1965, MS, Costa Rica; 1965-1988, CELADE, UNICEF  
(Ortega and González, 1989). 1972-1994, DGEC.

**Table 4**  
**GOVERNMENT INSTITUTIONS AND ORGANIZATIONS**  
**IN THE HEALTH SECTOR, COSTA RICA**

<b>Name</b>	<b>Year of Creation</b>	<b>Main Function</b>
Hospital San Juan de Dios built in 1855	1845	Care of patients of all conditions
Costa Rican Red Cross, Superior Council	1885	Care of disasters and emergencies
Sub-Secretary of Hygiene and Public Health, later Ministry of Health, 1943	1927	Health policy, prevention and primary health care
National Patronage for Childhood (PANI)	1930	Care of abandoned and abused children
National Institute of Insurance's (INS)	1936	Occupational diseases, injuries, insurance
University of Costa Rica: School of Medicine did not start until 1960	1940	Teaching and research in health sciences
Costa Rican Social Security Bursar (CCSS)	1942	Medical care and prevention
National council for Housing, later the National Institute for Urbanism (INVU)	1944	Housing development
National Council of [Food] Production (CNP)	1948	Food storage, sales and price control
Costa Rican Institute for Aqueducts and Sewerage's	1961	Development of water supply and sewerage
Mixed Institute of Social Aid (IMAS)	1971	Aid for the poor
National Institute for Alcoholism (INSA), later: National Institute for Alcoholism and Drug Addiction (IAFA)	1972	Care of alcoholics and drug abusers
General Directorate of Social Development and Family Assignments (DESAF)	1974	Funding government health programs