NATIONAL HEALTH AND SOCIAL DEVELOPMENT IN COSTA RICA: A CASE STUDY OF INTERSECTORAL ACTION

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To the physicians who launched the
Rural Health Program:
Edgar Mohs, Antonio Rodríguez,
and Hugo Villegas.

and

To the humble and silent rural
health workers, who effected one of
the most significant transformations
in the health of Costa Ricans.

Leonardo Mata and *Luis Rosero*

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PREFACE AND ACKNOWLEDGMENTS

In September 1983 the World Health Organization convened a meeting in Geneva, Switzerland on Intersectoral Action for Health. Following that meeting, it was proposed that a document similar to those prepared for Kerala and Sri Lanka be prepared for Costa Rica, in view of the significant advances in health, registered by a country that still retains much of its rural and preindustrial nature. The document was to examine the evolution of health and socioeconomic development during recent decades, and at the same time try to discern possible determinants and their effect on the marked changes observed. Since Costa Rica was a pioneer in developing an infrastructure for primary health care, and was fully committed to the goals set forth in successive meetings of Ministers of Health of the Americas dating back to the Charter of Punta del Este (1962), the document was to identify the intersectoral mechanisms that may have helped facilitate the changes in health indicators.

The Director of the National Institute of Investigations in Health (INISA) of the University of Costa Rica, Leonardo Mata, was approached to coordinate a group of researchers to undertake the preparation of the document. Able professionals in various fields of health and development were willing to cooperate in the task, with the hope that the paper produced would be useful to the World Health Organization in its effort to achieve health for all by the year 2000. Preparation of the document received the support of WHO and the University of Costa Rica. The publication at hand is a result of those efforts and that support.

Although there are considerable amounts of information in Costa Rica collected by the public and private sectors, a significant proportion remains unprocessed and requires editing. The authors had to seek and validate some of the data, however, in general no resistance was encountered in obtaining them.

There was a remarkable lack of material on evaluation of government interventions, and this situation precluded a more thorough analysis and critique of programs in health and related sectors. Gross differences were noted in sets of data derived from different agencies for a given program.

This monograph is not expected to be exempt from occasional inaccuracies. Nor is the interpretation of biomedical, social, and political phenomena free from personal bias or prejudice. However, the authors have tried to be as objective as possible in the expression of their opinions.

Special thanks are due to Carlos Raabe and Sandra Murillo for their contributions to Chapter 2, as well as to Drs. Ben Schwartz, Alberto Simhon, Mark Schneider, and Héctor Medina for valuable editorial help. The challenge and stimulus received from the World Health Organization, and in particular from the WHO Global Program for Intersectoral Action for Health and Dr. Aleya Hammad, were particularly critical to the preparation of this study.

1. THE SOCIOPOLITICAL SCENARIO

> The school will kill militarism, or else militarism will kill the Republic.
>
> Ricardo Jiménez-Oreamuno
> President of Costa Rica, 1922
> (during the inauguration of a school in a former military fortress)

1.1 History

Costa Rica is located in the Central American Isthmus, 10°N. of the equator, neighboring Nicaragua on the north, and Panama on the east. The country is flanked by the Caribbean Sea (northeast) and by the Pacific Ocean (West and South) (see Figure 1.1). Costa Rica has 2.45 million inhabitants (1984 census) and a land area of 51,000 sq. km. The country is poor, with an agricultural economy; it enjoys a democratic system of great political stability, freedom, and respect for individual rights and private property (Table 1.1).

At present, the Central American Isthmus is one of the most violent regions in the world. The 1970s witnessed a civil war in Nicaragua and the consolidation of two strong guerrilla movements in Guatemala and El Salvador, while another civil war started in Nicaragua in 1982. Costa Rica enjoys relative political stability, but may not remain peaceful in the near future, unless some improvement in its socioeconomic status is rapidly attained. In this turbulent region, Costa Rica stands as an educated democracy, with periodic elections and no army. It has a declared policy of disarmed neutrality, and a high degree of respect for individual liberties and private property. To understand the evolution of such a unique state, it is important to know something of its historical development.

Costa Rica was discovered by Columbus during his fourth voyage to the Americas on September 18, 1502. He disembarked in Cariarí, presently Limón, the most important Costa Rican seaport in the Caribbean (Fernández-Guardia, 1941). Spanish chronicles emphasized the easygoing nature of the Costa Rican natives, who were described as "the most beautiful Indians ever seen in the Indies." The Spaniards noted the abundance of gold worn by the natives and were intrigued by their peaceful behavior and friendliness. These latter features contrasted with the hostility encountered in other areas.

Figure 1.1

The Central American Isthmus and the Caribbean Basin.

Table 1.1

Demographic Data, Costa Rica, 1984.

Area: 50,700 sq. km. (19,575 sq. mi.)

Population: 2,450,000

Economy:

Exports:
- Coffee, bananas, beef, sugar
- Processed food, textiles
- Construction materials

Tourism

Consumption:

- Rice, corn, beans
- Poultry, beef, fish, oils
- Fruits, vegetables

There is no petroleum, iron ore, or precious stones; there are no advanced or heavy industries.

Political System:

- Republican democracy
- President, deputies, and local authorities elected by direct vote, quadrennially
- Army banned by the Constitution
- Disarmed neutrality

The many gold ornaments worn by the Amerindians were responsible for the name given to the land: Costa Rica, or "Rich Coast." The decades following the conquest saw a concerted attempt by the conquerors to find mines or auriferous beaches and take the Indians' gold; this resulted in much suffering to the estimated 25,000 to 50,000 natives believed to have lived in Costa Rica at the beginning of the conquest.

Spaniards headed by Juan Vázquez de Coronado began exploration of the country around the mid-1500s. Few skirmishes were recorded, and in this early phase the Spaniards enjoyed good relations and understanding with the Indians. Vázquez de Coronado explored the whole territory in a few months, a feat never repeated. The Spaniards eventually became disinterested in what was in fact a poor land where gold was never found in sufficient quantity, and they did not extensively colonize Costa Rica as they did Guatemala and Nicaragua. The extreme poverty of the country, the scarcity of labor, and the dense forests and jungles kept down the number of large landholdings or "haciendas" in the highlands for virtually two centuries. The lack of mineral resources and other wealth was another constraint for the Europeans. In addition, the lowlands were so hot, humid, and unhealthy that they remained virgin lands practically until the late 19th century.

1.2 Population

The population of the country grew slowly, mainly by inbreeding and some immigration from the poorest provinces of Spain. Although there are several sources of population data for Costa Rica, apparently the best of these are the works of Thiel and Fernández-Guardia (Seligson, 1980). The territory was virtually unpopulated at the time of its discovery and conquest, probably as a result of the thick vegetation and abundant rains that deterred traditional agriculture. The largest Indian population was found in the Nicoya Peninsula, where the land was less mountainous and less rainy than in the rest of the territory, conditions which favored agriculture and Indian settlement.

Archbishop Thiel estimated that in 1522 no more than 27,200 Indians lived in the territory (Table 1.2), while others set the figure at 80,000 by 1563 (Seligson, 1980). This population was reduced by smallpox and measles epidemics (imported from Europe), malnutrition, and violence resulting from transcultural domination. The settlement of Europeans and the development of the "encomiendas," or engagement of Amerindians in the labor force, also played a major role in this decline. The encomienda--a form of slavery--caused disruption of the Indian way of life, violent conflicts, overcrowding, epidemics, malnutrition, and high rates of mortality. When the colonization was

well under way, by the middle of the 16th century, the Amerindian population had been dramatically reduced. Fifty years of Spanish intervention resulted in an attrition of more than 50 percent of the population (Table 1.2), with only 100 Spaniards (almost all men) inhabiting the country.

Table 1.2

Population of Costa Rica, according to 1522 and 1801 Censuses.

Year	Amerindian	Spanish	Mestizo	Black	Mulatto	Total
1522	27,200					27,200
1569	17,166	113		30	170	17,479
1611	14,908	330	25	25	250	15,538
1700	15,489	2,146	213	154	1,291	19,293
1720	13,269	3,059	748	168	2,193	19,437
1741	12,716	4,687	3,458	200	3,065	25,126
1751	10,109	7,807	3,057	62	2,987	24,022
1778	8,104	6,046	13,915	94	6,053	34,212
1801	8,281	4,942	30,413	30	8,925	52,591

Source: Thiel (1844).

Two important factors emerge from examination of the demographic data: the sparse colonization by Spaniards in the poor region, and the significant inbreeding. It should be pointed out that black slaves were introduced from the beginning of the Spanish domination, but that trade did not flourish. In 1700 there were only 154 blacks. Black slaves apparently were not systematically introduced, and there were only 30 in 1801, according to that year's census. We have to assume that these blacks were recent arrivals, since the number of mulattoes had increased to 8,925. On the other hand, their integration apparently was very successful, as there were more than 30,000 mestizos by 1801. Slavery was abolished in 1813, years before than in many of the most advanced nations of the world.

The Spanish immigration and settlement continued through the 19th century, while the Amerindian population continued its attrition and assimilation almost to the point of extinction. Major factors contributing to assimilation were the powerful Spanish Catholic Church, the adoption of the Spanish language and culture by the Indians, and cross-cultural breeding. But the Spaniards also adopted some of the Indian customs, due in part to the lack of European technology and to their extreme poverty. Some Spaniards lived in thatch-roof houses and adopted not only the Indian agricultural methods (burning, planting), their cultivars, and staple foods (maize, black beans, vegetables, and fruits), but also their good hygienic habits, such as frequent bathing. The adoption of facets of the indigenous culture facilitated survival of the Spanish settler in a tough and inhospitable rain forest and jungle, fostering the racial mixture which now characterizes the country. Costa Rica has 2.5 million inhabitants, predominantly Caucasian and mestizo, with a smaller proportion of mulattoes, blacks (about 2 percent), Amerindians (about 1 percent), and other smaller ethnic groups of more recent introduction.

1.3 The Land

Costa Rica's forests create one of the densest natural barriers in the world (Janzen, 1983). The country was wholly covered with thick, rainy, cloudy, and dry forests until the beginning of the 20th century, when systematic deforestation began. By the end of 1960 more than two-thirds of the forests had been converted into pastures, land for crops, and urban areas (Hartshorn *et al.*, 1982). Important efforts to protect natural resources began in the 1970s. Costa Rica currently has about 20 percent of all its land in forests and wildlife reserves protected by special legislation. Furthermore, within the National Parks System more than 20 parks have been established, comprising about 7 percent of all the land (Boza and Mendoza, 1981). It is assumed that such unique natural resources will be preserved for future generations.

The climate is mild-tropical, with average temperatures around 22°C in the Intermountain Central Valley, where 65 percent of the population lives. Temperature on the Pacific and Caribbean coasts fluctuates around 26°C. The country is very mountainous, with altitudes of up to 3,800 m above sea level within a distance of 100 km. The many mountains found within a relatively limited area result in numerous small valleys with abundant water (1,500-4,000 mm rainfall per year), where villagers have settled in ecosystems defined as "rural." The degree of dispersion of the population into small rural communities, some consisting of a few families, is illustrated in Table 1.3 with data from 1973. More than 40 percent of the total population lived in communities of fewer than 1,000 people, while 19 percent of the homes were located at more than 2 km from the nearest school. Most of the urban dwellers and many government officials ignore the marked ruralism that characterizes Costa Rica, a difficulty encountered in implementing primary health programs. However, while the rural condition has not changed substantially in the last 10 years, an adequate primary health care delivery system has been developed.

Table 1.3

Population Distribution and Ruralism in Costa Rica, 1973.

Size of community	Communities: Number	Communities: Cumulative number	Population (%)	Cumulative (%)
<50	837		1.1	
50-	1,712	2,549	10.6	11.7
200-	1,135	3,684	18.9	30.6
500-	375	4,059	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

Distance of dwelling from nearest school, in meters	Households (%)	Cumulative (%)
<500	36	
500-999	24	60
1,000-1,999	21	81
2,000+	19	100

Source: Mata (1978).

Costa Rica is one of the richest biological regions of the world, despite recent deforestation (Boza and Mendoza, 1981; Jansen, 1983). It has more than 1,000 species of trees, more than 1,000 species of orchids, 200 species of mammals including six species of wildcats, 700 species of birds, and hundreds of species of reptiles and fish. The country is one of the niches of the green turtle and of several species of rare animals, one outstanding example being the golden toad.

1.4 Political Situation

The particular background and nature of the Costa Rican people were responsible for a succession of events (Table 1.4) that need to be emphasized in view of the early dates at which they occurred, even when compared with European nations. A striking feature is the low level of

political violence registered throughout the 400 years of its history. (Castillo et al., 1983). This impressive political stability contrasts with a relatively high rate of homicides (4.6 per 100,000 population in 1979-1981) as compared with Sweden (1.4), although it is not as high as that of the United States of America (9.4 per 100,000) in the same period.

Table 1.4

Historic and Civic Landmarks.

Landmark	Date
Columbus discovers Costa Rica	1502
Abolition of slavery	1813
Independence from Spain	1821
First university created[a]	1844
Grammar school (free and compulsory)	1869
Abolition of capital punishment	1882
Universal vote for men	1889
Coeducational high school	1907
Secret vote	1928
University of Costa Rica created	1940
Social legislation[b]	1942
Universal vote for women	1949
Abolition of armed forces	1949

[a]Later closed to promote universal grammar school.
[b]Labor, wages, vacation, compensation, social security.

For about 150 years, Costa Ricans have enjoyed a democratic system with elections every four years, by direct vote, for President, two Vice-Presidents, Deputies, and local municipal authorities. Several parties compete for and share the political power: Social Democratic, Christian Democratic, and a coalition of left-of-center parties.

Costa Rica has never attacked other nations, but was briefly invaded by Nicaragua in 1955. After the Spanish colonization, Costa Rica was never again occupied by any foreign country (Table 1.5). The change in the executive branch of government every four years is followed by replacement of most members of the police forces and of their corresponding directors, who generally are civilians without military training. That, in turn, has precluded establishment of a military tradition in Costa Rica. The emphasis placed on peace and democracy has been accompanied by a significant investment in education and health. Attrition in the police and armed forces and in their budgets has occurred since the beginning of the century, and the army was eventually banned by the Constitution of 1949.

Table 1.5

Political Violence in Costa Rica since Independence.

Type	1821-1890 (70)[a]	1891-1948 (58)[a]	1949-1983 (35)[a]
INTERNAL			
Conspiracy	31	2	0
Assassination[b]	0	0	0
Coup d'état	12	1	0
Rebellion	19	9	0
Civil war	2	1	0
EXTERNAL			
Threat of war	10	1	3
Invasion	5	3	1
War	1	1	0

[a]In number of years.
[b]Of Chief of State.

Costa Rica has been a pioneer in the struggle for civil rights, and gains were quickly achieved, generally without violence (Castillo et al., 1983). Slavery was negligible owing to the lack of wealth and resources, which made it impractical to keep large slave forces. Grammar school became a priority in the last century and was declared free and compulsory in 1869. Costa Rica was the first American country to abolish the death penalty (in 1882), and it has not been reestablished.

Important improvements in the electoral system took place before World War II. A fourth power was created in 1949, the Supreme Tribunal of Elections, which in addition to its permanent administrative and comptrolling authority over elections, supervises all the police forces during election time. Women acquired the right to vote in 1949, and have been elected to the Chamber of Deputies; they have been appointed Ministers, Justices, and to other important posts. In 1986 the first woman Vice-President was elected.

At least three factors seem to have played a role in the development of the present Costa Rican situation:

a) A relative ethnic, cultural, and socioeconomic homogeneity which to some extent prevented the development of too-distinct social classes.

b) A sustained emphasis by governments on education and health--evident since the middle of the 19th century--at the expense of the military, which resulted in the dismantling and eventual abolishing of the army in 1949. Such emphasis led to a literacy rate of 92 percent, an infant mortality rate of 18 per 1,000, and a high degree of political stability.

c) A tradition of social reform that crystallized in the 1940s, when legislation was passed concerning labor conditions, social security, public housing, income tax and other forms of wealth redistribution, and high school and graduate education. The spirit of social justice continued, and in 1975 the Government began investments, among the rural population, of about $40 million, obtained from taxes on sales levied on high income groups.

1.5 Militarism in Central America

The present situation of Costa Rica contrasts sharply with that of the rest of the Central American Isthmus, except Panama, which exhibits comparable social and health indicators. Still, Costa Rica stands apart in the political field when compared with other developing nations that also have attained a high level of health, such as Cuba and Jamaica, in that its political evolution has been relatively free from militarism and has been quite stable in recent decades. Tables 1.6 and 1.7 show military expenditures and size of military forces in Central America; it should be noted that, as Costa Rica does not have an army, the rates actually correspond to police forces, which furthermore do not often carry firearms. Costa Rica virtually does not import or export weapons or other military equipment. It should be stressed again that, while most public servants are protected by the Civil Service Law from dismissal after the change in government every fourth year, the police forces are almost completely removed, preventing consolidation of a military career and the consequent abuse of power.

Costa Rica has enjoyed 35 years of political stability; there was a previous 31-year period of similar stability interrupted by the brief civil war of 1948. Related to the revolution in Nicaragua that toppled the 40-year-old Somoza regime, and to the present guerrilla war in that country, there has been a 3 percent increase in the number of policemen in Costa Rica (Table 1.7). Also, there has been an increase in the number of weapons in the hands of the Government and private individuals, an evident display of security measures for embassies and public buildings, and more men with rifles and submachine guns. There appears to be a correlation between these developments and recent bank robberies, traffic of arms, and other events. Nevertheless, Costa Rica enjoys a relatively positive international image and a good record, according to Amnesty International.

Table 1.6

Expenditures on Defense, as Percentage of the Budget and Per Capita, in Comparison with the Rest of Central America (in US$).

	% of budget				Per capita $
	1960	1965	1970	1973	1980
El Salvador	8.4	10.5	9.4	27.2	11.0
Honduras	12.1	11.8	11.3	14.8	12.0
Nicaragua	14.1	9.5	10.2	9.3	28.0
Guatemala	7.7	9.6	14.8	9.2	14.0
Costa Rica[a]	4.1	3.1	2.5	2.5	3.0

[a]Expenditures are for the police forces, since there is no army.

Source: Mata (1984).

Table 1.7

Estimated Army and Police Forces in Central America (rates per 1,000 population).[a]

	1975	1981	End of 1983	% change in rate 1975-1983
Nicaragua	11,100(4.8)	30,000(10.7)	60,000(21.4)	+459
El Salvador	8,100(2.1)	20,000(4.1)	28,000(5.7)	+171
Honduras	14,200(4.9)	20,000(5.3)	25,700(6.8)	+39
Guatemala	15,000(2.5)	22,000(2.9)	24,660(3.3)	+32
Costa Rica[b]	6,000(3.2)	6,900(3.0)	7,700(3.3)	+3

[a]Not including paramilitary forces and guerrillas.
[b]Police only; since there is no army, most policeman do not carry firearms.

1.6 Economic Situation

The present world economic crisis which began around 1979 has had a markedly negative impact on the Costa Rican economy. The present situation is one of progressive impoverishment, but there is no evidence that the negative trend in the economy has caused a deterioration of health indicators, except for some parameters in certain population groups (see Chapter 5).

Annual growth rates of the gross national product (GNP) and the agricultural and industrial products during the last three decades are shown in Table 1.8. The economy of the country was prosperous during the period 1950-1977, but a decrease in the growth rate of the gross national income (GNI) occurred in 1977. The phenomenon was strongly related to the drop in international prices of agricultural products such as coffee, meat, and sugar, the main output of the Costa Rican economy. The great bonanza in 1976-1977 coincided with excellent international prices for coffee. The other determinant in the negative growth rates was the price of fuel. Two energy crises (in 1974 and 1979), unfavorable food prices in international markets, and poor management resulted in serious setbacks to the Costa Rican economy, evident since 1978.

Table 1.8

Annual Rates of Growth of the Gross National Product and Agricultural and Industrial Products in Costa Rica (in constant 1966 prices).

Period	Gross national product	Agricultural product	Industrial product
1950-1955	8.3	-	-
1955-1960	6.0	-	-
1960-1965	5.1	3.2	9.1
1965-1970	7.0	8.0	9.3
1970-1975	6.0	3.4	8.9
1975-1980	5.4	1.8	5.9
1980-1985	0.3	1.9	0.7

Source: MIDEPLAN.

The years 1979-1980 marked the beginning of the crisis, with recession, inflation, unemployment, and drastic devaluation of the national currency. During 1980-1982 negative rates of GNP, GNI, and private consumption (PC) and the corresponding rates per capita were observed. There is some evidence that the trend slowed down during 1982-1983, with relative stabilization of the currency and some control of inflation. It should be noted that the trend in economic indicators, in the last three years for which data are available (1979-1982), depicts a clear process of progressive impoverishment.

1.7 Socioeconomic and Health Indicators in Central America

The present social situation of Costa Rica contrasts with that of the rest of Central America and is comparable only to that of Cuba. It should be said, however, that the health and economic level of Cuba in the 1950s was significantly higher than that of all Central American countries, including Costa Rica. For instance, the infant mortality rate in 1959 was 57 in Cuba and 70 in Costa Rica. At that time Cuba was a leader in public health and medicine in Latin America. Thus, Costa Rica has shown a more rapid evolution of its social and health indicators than any nation in the Caribbean Basin. The relevant socioeconomic and health indicators for the Isthmus are summarized in Tables 1.9 and 1.10, and are compared with those for Jamaica and Cuba. While the differences are all too obvious, it should be remembered that all nations are showing a tendency towards improvement, according to most indicators released by international agencies. Thus the whole region is in transition, with varying degrees of evolution and different rates of change for the various countries. Panama presents the fastest rate of change after Costa Rica.

The most striking advances in Costa Rica have been achieved in the fields of education and health (Jaramillo, 1983; Mata, 1983; Mohs, 1983). Illiteracy was reduced to 8 percent, and at present there are no differences by sex in recruitment in all levels of training, including the university. Due to an abundance of water from plentiful rainfall, springs, and rivers, the country has developed safe piped water installations for virtually 100 percent of the urban population, and for 80 percent of rural homes. Utilization of numerous rivers for hydroelectric power has resulted in an amazing degree of electrification (Table 1.11), which has been fundamental for improvements in education and development. It is of interest that 92 percent of the districts in the country have electricity and that more than 75 percent of the nation is serviced by the network. In addition, Costa Rica exports electricity from hydroelectric plants to Nicaragua and Panama.

Table 1.9

Socioeconomic Indicators of Caribbean Basin Nations, 1969-1981.

	% Literate male/female (1980)	% Rural population with water (1980)	GNP per capita (1981)	% Rate inflation (1970-1981)	Average index food production (1969-1971=100)
Guatemala	59/44	21	1,140	10.4	96
Nicaragua	61/60	10	860	14.2	87
Honduras	64/62	40	600	9.1	80
El Salvador	70/63	40	650	10.8	104
Panama	87/86	65	1,910	7.6	102
Jamaica	90/93	86	1,180	16.8	90
Cuba	91/92	...	1,410	...	106
Costa Rica	92/92	80	1,430	15.9	110

... Data not available.

Source: Grant (1984).

Table 1.10

Health Indicators of Caribbean Basin Nations, 1979-1981.

	Infant mortality rate (1981)	Life expectancy at birth (1981)	% LBW infants (1979)	% Infants immunized (1980)	
				Polio	Measles
Nicaragua	90	57	...	18	15
Honduras	90	59	...	37	35
El Salvador	80	63	13	47	58
Guatemala	70	59	18	58	45
Panama	29	71	11	50	52
Jamaica	27	71	10	37	...
Cuba	19	73	10	...	56
Costa Rica	19	73	8	87	52

... Data not available.

Source: Grant (1984).

Table 1.11

Advances in Electrification in Costa Rica.

In 1884: Public lighting inaugurated in San José.[a]
In 1984: 95% of electricity produced in hydraulic generators.
21 hydroelectric units; 583,000 kw capacity.
75% of the population has access to electricity.
92% of districts have electricity.
Efficiency is second to that of the United States of America.

[a]Public lighting had been established in New York City by Thomas Alva Edison in 1882.

Electrification (the highest in Latin America) has influenced mass communication. Costa Rica has seven color television stations (one of which is owned by the Government), and private cable television companies. There are five daily newspapers and five weekly papers, the latter published by the Communist party, the University of Costa Rica, the Catholic Church, the Government (laws and decrees), and an English-speaking enterprise. There are 120 radio stations (with an output of about 59,000 kw), of which 60 are AM, 50 FM, and 10 SW. The Government owns 3 radio stations, 14 belong to public and private institutions (the University of Costa Rica has one), and 103 are commercial stations. Costa Rica is linked to the world by underwater cable, microwave, and satellite systems. Telecommunications are a State monopoly, and the telephone service has grown at a yearly rate of 14 percent in the past two decades; in 1982, Costa Rica had 11.9 telephones per 100 persons, the highest rate in Latin America (Castillo *et al.*, 1983). Telephones are available throughout the country, including the remote rural areas; calls cost about US$0.05 for three minutes.

1.8 Health Profile in the 1980s

The health situation will be analyzed in more detail in later chapters and in light of the recent economic crisis. The data show a favorable situation, reflecting several decades of investment in social and economic development. The indicators do not appear to have been

unduly influenced as yet by the recent years of economic crisis, an observation that is of interest in view of the traditional weight ascribed to economic factors as opposed to social development.

Table 1.12 presents a synopsis of the most relevant health indicators of Costa Rica, in comparison with those of other nations chosen arbitrarily (see also Table 1.9). Costa Rica can be categorized as a developing nonindustrial nation with health indicators comparable to those registered a few years ago by some advanced industrial nations. The prevailing health profile of Costa Rica and the analyses of causes of current infant and child mortality, suggest the possibility of a further reduction in morbidity and mortality to levels characteristic of wealthy industrial nations, without undergoing the economic and industrial growth experienced by them. A similar paradox is presented by the contrasting low income and relatively good health indicators in Kerala and Sri Lanka.

This proposition defies the orthodox concept that it is necessary to attain economic and industrial development in order to improve the health conditions of a society. Certainly it is of great interest in the philosophical and practical considerations of health for all by the year 2000.

The considerable investment made in health and education can be observed in the budget distribution for 1983 (Table 1.13), a situation made possible in part by the low expenditure for security and police forces. That investment has resulted in development of an adequate infrastructure and sufficient human resources in those sectors, as well as in public works and other sectors that impact on the quality of life.

The democratic nature of Costa Rican society and the piecemeal evolution of policy led to the development of a complicated and anachronistic health sector. Three institutions are responsible for health care in the country: the "Ministerio de Salud" (Ministry of Health), the "Caja Costarricense de Seguro Social" (Social Security Bureau or Social Security), and the "Instituto Nacional de Seguros" (National Institute of Insurance). The largest budget corresponds to the Social Security Bureau, whose primary role is to care for patients through a network of hospitals. However, most of the preventive and health education activities are assumed by the Ministry of Health, which only has 15 percent of the health budget.

Overlapping functions exist among these institutions. For instance, the Social Security Bureau engages in some preventive medicine (prenatal and child health clinics, immunizations, family planning, health education, and screening for chronic diseases). The Ministry of Health takes care of emergencies and regular medical problems within the network of health centers, in addition to its main role of delivering primary health care and its responsibility for many other public health activities. The National Institute of Insurance provides medical care for labor accidents, at a very high cost, duplicating services already provided by Social Security.

Table 1.12

Health Indicators in Selected Transitional Countries of the Americas, 1981.

Indicators	Costa Rica	Cuba	Jamaica	Panama	Venezuela
Crude death rate, per 1,000	4.0				
Crude birth rate, per 1,000	31.3	18	29	28	36
Life expectancy at birth (years)	73.2	73	71	71	68
Women	73.5				
Men	70.5				
Infant mortality rate, per 1,000	17.7	19	20	21	32
Neonatal mortality rate, per 1,000	10.7				
Child mortality (1-4 yr), per 1,000 (1977-1981)	0.9	0.9	5	2.1	2.6
Child mortality (5-14 yr), per 1,000	0.4				
Maternal mortality, per 1,000	0.4				
% infants <2.5 kg	8.0	10	10	11	11
% mothers breast-feeding at least 3 months	38		57	50	50
% wasting (12-23 months)	3		9		
% one-year-olds fully immunized (1980)					
BCG	82	99		76	
DPT	84	100	39	49	
Poliomyelitis	87		37	50	
Measles	52	56		52	
% population with drinking water					
Urban	100			100	91
Rural	80		86	65	50
Average index of food production per capita	110	106	90	102	104
Daily calorie consumption per capita, as % of requirement	116	122	119	103	112

Source: Grant (1983); United Nations (1982); PAHO (1982).

Table 1.13

Budget of the Government of Costa Rica, 1983.

Sector	Budget (thousands) Colones	US$	% of respective budget[a]
Consolidated Total Budget	76,334,500	1,696,322	100
Health Expenditures	12,244,683	272,104	16.0
Ministry of Health	787,276	17,495	6.4
Social Security Bureau (CCSS)	7,871,617	174,924	64.3
Costa Rican Institute of Aqueducts and Sewers (AA)	737,658	16,392	6.0
Mixed Institute of Social Aid (IMAS)	642,900	14,286	5.3
International Office for Cooperation in Health (OCIS)	163,333	3,629	1.3
Family Allowances (OCAF)	2,029,698	45,104	16.6
Costa Rican Institute of Nutrition and Health (INCIENSA)	12,203	271	0.1
Education Expenditures	8,525,018	189,444	11.2
Ministry of Education	5,855,598	130,124	68.7
University of Costa Rica	1,368,114	30,402	16.0
National University	628,583	13,968	7.4
Institute of Technology	245,217	5,449	2.9
State University "at Distance"[b]	149,375	3,319	1.8
National Institute for Learning	271,667	6,037	3.2
Other	6,464	143	0.1
Other Expenditures	55,564,799	1,234,773	72.8
(Agriculture, revenue, banks, culture, public works, housing, justice, police, etc.)			

[a]Relative percentages of consolidated total budget; the remaining are percentages relative to particular budgets: health, education, other.

[b]Correspondence courses.

There are five levels of health care in Costa Rica (Jaramillo, 1983). The first level consists of preventive and curative actions carried out in the home by the family, a situation made possible by the many years invested in promoting community participation and health education; basic health care by health auxiliaries is given also in the home. The second level is in the community, serviced primarily by the Ministry of Health through a network of health posts and other supporting elements such as mobile units and dental clinics. At this level, health care is provided by auxiliaries and health workers in the prevention and control of certain infectious and parasitic diseases, and in the promotion of health, environmental sanitation, and community organization. The third level consists of general services for ill persons in the community through the network of health centers (Ministry of Health) and clinics (Social Security). Furthermore, care in the home is provided by physicians, nurses, dentists, and laboratory personnel. The fourth level consists of medical services in regional hospitals of the Social Security Bureau through either outpatient clinics or hospitalization. The fifth level of specialized medicine is provided by Class A hospitals (which account for more than 60 percent of the deliveries). There is naturally some overlapping in health care between all the levels.

The creation and development of a rural health program (RHP) several years before the Alma-Ata Conference on Primary Health Care (1978) indicates that Costa Rica was advanced in the conception and implementation of primary health care. Functioning as a separate entity from the Medical School, and with strong opposition from the College of Physicians and heads of departments in the Ministry of Health, the RHP, which began with a few auxiliaries and field workers, extended coverage to more than 50 percent of the total rural population within the brief span of eight years. The present administration is committed to continuing efforts to fulfill the goal of health for all by the year 2000.

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2. THE EVOLUTION OF HEALTH CONDITIONS

> When dealing with malnutrition, the physician --like a sentinel--should raise his voice and collaborate in the correction of its socioeconomic origin. However, the action of other professionals and organizations will bring out the solution to the problem. I am referring to improved production, wages, housing, education and sanitation. In the health field, the intervention of physicians, economists, farmers, sanitary engineers--in a common effort--will be most effective in fostering better nutrition.
>
> Carlos Saenz Herrera, 1944
> Pioneer of Pediatrics in Costa Rica
> (from a lecture at the School of Nursing)

In Costa Rica, the evolution in health and in the social environment have gone hand in hand. However, the parallel does not explain the rapid progress attained in the last decades, particularly because there was not a comparable transition from the traditional way of life to the industrial type of economy, and no dramatic increase in per capita income. Furthermore, the impressive indices attained in 1979 have been maintained despite the serious economic crisis which began at that time and still persists.

While the brief description of the sociopolitical scenario in Chapter 1 hinted at sociopolitical determinants in Costa Rica's health revolution, the present chapter will describe in more detail the evolution of the health and social environment during the present century. Mortality data needed to interpret the phenomena were available in some cases from 1910 and in many instances from 1926 onwards. There is good evidence that most national statistics are reliable. A wealth of recent information has become available through research conducted by the authors.

2.1 Structural-Historical Background

In many respects, the economic and social evolution of Costa Rica has been similar to that of the rest of Latin America. The country has been aligned on the periphery of the capitalist world, depending on the export of tropical agricultural products and the import of manufactured goods. It remains underdeveloped and faces problems such as monoculture, internal imbalance of payments, frequent economic crises related to the instability of international markets, and is subject to increasingly unfavorable terms of trade.

What follows is the historic evolution of Costa Rica, emphasizing those aspects that distinguish it from other Latin American nations, and which appear to have precluded some of the evils that plague other developing countries in the Americas.

2.1.1. **Colonial period and early Republic (mid-16th to mid-19th centuries).** The abundance of minerals, land resources and Indian labor in the early years of the colonization attracted many Spaniards to Mexico, Peru, and other countries, creating a "dual" society of poor masses and wealthy elites (Seligson, 1980). However, few Spaniards settled in Costa Rica. The lack of mineral resources and the sparse Indian population made Costa Rica one of the poorest and most isolated territories in the Americas. The few settlers who arrived turned their attention, by necessity, primarily to farming. A subsistence economy was developed based on small family agricultural units, as opposed to big landholdings or "latifundios" characterized by servant-landlord production relationships.

New settlers developed the land in a primitive way for their own survival. Labor was too scarce to permit expansion of production for commerce. The "hacienda" system was far less extensive in Costa Rica than in other parts of Latin America, and imported slave labor was not feasible for the small farms of early colonists. Thus, Costa Rica was essentially organized around family farms during the 17th and 18th centuries. Although class distinctions existed, they were less obvious than elsewhere in the region. Consequently, Costa Rica evolved as a relatively homogeneous society of poor peasants, a characteristic that conditioned most of its future development (Vega-Carballo, 1980).

2.1.2 **Rise of liberalism (1860-1913).** Important material progress resulted from participation in the world market with the beginning of coffee exports around 1840, and bananas from 1880 onwards. A high degree of freedom and a preoccupation with social development, especially education, were always present. An outstanding feature of the period was the involvement in world capitalism without confiscation or concentration of land. This step was socially less costly than in neighboring countries and was aided in part by an oligarchy devoid of despotic and militaristic attitudes, which, moreover, did not engage in squandering public funds. Benefits from coffee exports were distributed among virtually all peasants in the country, while a coffee oligarchy emerged

and eventually controlled the processing and commercialization of the product (Cardoso and Pérez, 1977). Food production then began to decline as more land was devoted to coffee plantations. Although Costa Rica had always been self-sufficient in food production, by the middle of the 19th century an increasing proportion of food needed to be imported. To attract workers to the large estates, wages had to be fixed at relatively high levels, since labor generally was in short supply. As farmers left their land to become wage laborers, they both accentuated the food shortage and improved the standard of living, albeit in a marginal way. About half of the rural labor force in 1864 consisted of wage earners. Nearly 20 years later, the census showed that the proportion of landless workers had increased by 71 percent.

In the late 19th century, foreign capital entered Costa Rica at an increasingly fast rate. The first railway was constructed with British capital and served to transport coffee to a port on the Caribbean. The development of banana plantations in the coastal plains was the result of American investment. Local producers also began to grow bananas on a limited scale. However, since they owned neither a railway nor a fleet, they were forced to sell the product to foreign companies at lower prices than they could have obtained otherwise. Banana exports rose rapidly, and in 1910 bananas accounted for one-half of the total agricultural exports. The cultivation of bananas during that period was a labor-intensive operation, and as production increased a shortage of labor soon developed. To remedy this situation, black workers were brought from Jamaica.

The cultivation of coffee and bananas had fundamental differences. Coffee became an integral part of the national economy, as it involved local producers and was directly linked to other sectors of the economy. Banana cultivation, on the other hand, was relatively isolated from the national economy. Also, coffee was produced in areas located in the relatively disease-free highlands, while bananas were grown in the isolated coastal areas infested with malaria. Furthermore, the means for banana production were owned and controlled by foreign companies.

2.1.3 Liberalism in crisis (1913-1947). During the preceding period, the country had achieved a notable degree of prosperity, particularly around 1910. In those years the external trade (exports plus imports) exceeded US $200 per capita at 1970 prices, an outstanding figure for the period. Nevertheless, the economy was too vulnerable and heavily dependent on external markets; thus internal and external factors rushed Costa Rica through successive crises, which led to impoverishment and the breaking away from the liberal economic system. The real value of per capita exports (at 1970 prices) dropped from US $114 in 1913, to US $64 in 1918 and US $36 in 1945. The most serious consequences were felt by the low income groups. The emerging middle class saw its expectations of improvement frustrated; many small farmers lost their land, and wage laborers became unemployed or experienced a reduction in real income.

During this period, banana workers tried to unite in an effort to improve living conditions. The first labor strike by nearly all of the 10,000 banana workers was successfully carried out in 1934. Since that time, strikes in banana plantations have occurred periodically, and generally have been successful. The unions of banana workers became a powerful political force and created conditions for the social reform that was carried out in the 1940s, leading to the adoption of a new model of development.

2.1.4 Social democratic model (1948 to present). An armed uprising in 1948 consolidated social reforms initiated during the previous years, and marked the most recent stage of Costa Rican history in which the "welfare state" began to play a central role. During those years, the gross national product per capita (at 1970 prices) varied from US $350 in 1947 to more than US $900 in 1979. Programs to develop the country's infrastructure were initiated, and great advances were made in the social sector. The state broadened its scope of action by controlling certain key elements of the economy (energy, banks, insurance), promoting development through protectionist policies, absorbing most of the unemployed, and orienting key resources to public services. This resulted in the emergence of a sizeable middle class. However, Government control and manipulation of the economy did not radically change the structure of the economic system, because policies favored mainly private investment. On the other hand, social policies became an effective redistributive instrument, directing some of the benefits of social progress to the majority of the population. Unfortunately, the economic crisis that began in 1979 has severely jeopardized this model of development.

2.2 The Economy

2.2.1 From colonial times to 1950. During the colonial period, which concluded in 1821, the Costa Rican economy was mainly subsistence agriculture, with exporting of small quantities of wheat, flour, livestock, maize, cocoa, and tobacco (Rovira, 1982).

Coffee exports began in 1832 after a decade of governmental support. In 1884 the export of coffee increased markedly as a result of its introduction into the English market, and became the main export in 1890, reaching 90 percent of the total value of exports (Facio, 1975).

Although coffee production was developed at the expense of other agricultural products for local consumption, the foreign currency generated allowed the importation of manufactured goods and brought about a substantial improvement in living standards.

Banana exports began in 1880, and their value increased so dramatically that the value of exports reached a level higher than that of coffee. Bananas were the main export from 1905 to 1925 (Facio, 1975).

At the end of the 19th and beginning of the 20th century, the Costa Rican economy could be characterized as "agrarian," specializing in the production of two export crops--coffee and bananas--with strong ties with the corresponding international markets. The standard of living was relatively high during that period, with a GNP per capita estimated at US $350 (in 1970 prices), a high figure for Latin America. Despite the importance of agriculture, the economically active population in the agricultural sector dropped below 60 percent of the general population as a result of the expansion of internal commerce, domestic industry, and services.

From World War I to the mid-1940s, the volume of coffee exports stabilized while that of bananas decreased, as did the world prices of the two commodities. At the same time there were no other exports to compensate for this decline. Thus, during this period there was a drastic fall in the standard of living due to the heavy dependence on international trade, which dropped to lower levels than at the beginning of the century. Concomitantly, imports and public expenditure per capita diminished considerably (see Chapter 4, Table 4.1.), resulting in social unrest. The government responded by taking measures to increase its economic control through creation of a nationalized bank in 1914, a government insurance agency in 1924, and government-supervised loans made by the private banking system since 1936 (Rodríguez-Vega, 1981). In 1940 the government implemented major socioeconomic changes, such as setting up a national medical care system (Social Security Bureau, 1941) and adopting labor reforms concerning minimum wages, maximum working hours per day, holidays, pension benefits, and working conditions.

Although the economy remained stagnant for three decades after 1914, the population increased twofold. Unemployment, however, was not high during that period, partly due to the availability of free land in the Intermountain Central Valley. Land was appropriated by peasants with government consent. While the land redistribution diminished social unrest and increased land tenure by peasants, it also raised the cost of basic services (mainly education), and a vast number of people remained trapped at subsistence levels.

2.2.2. Evolution from 1950 to 1980. In 1950 the GNP per capita was US $347 (at 1970 prices). International trade expanded to the extent that exports and imports per capita reached US $112 and US $92, respectively (see Chapter 4, Table 4.1). Unemployment was quite low, about 4.1 percent of the economically active population. The agricultural sector remained predominant in the economy, accounting for 41 percent of the GNP and absorbing 55 percent of the economically active population (Tables 2.1 and 2.2). Agricultural products constituted the main exports; coffee and bananas accounted for 33 and 58 percent, respectively (Table 2.3).

Table 2.1

Relative Participation of the Agricultural and Industrial Sectors in the Gross National Product, 1950-1985.

Year	Agriculture	Industry
1950	40.9	13.4
1955	38.3	13.3
1960	25.2	13.8
1965	22.9	16.7
1970	21.2	21.2
1980	18.0	22.0
1985	19.5	22.2

Source: Central Bank of Costa Rica.

Table 2.2

Economically Active Population, by Type of Activity, Costa Rica.

	1950	1963	1973	1984
Total	100.0	100.0	100.0	100.0
Agriculture and cattle	54.7	49.8	36.4	31.4
Mines and quarries	0.3	0.3	0.3	0.2
Industry	11.0	11.4	12.9	14.5
Construction	4.3	5.5	6.7	5.2
Services	26.7	32.4	38.5	38.3
Other activities	3.0	0.6	5.2	10.4

Source: General Directorate of Statistics and Census (1950, 1963, 1973, and 1984 Population Censuses).

Both products constituted 49 percent of the value of agricultural production. By contrast, the industrial sector contributed about 13 percent to the GNP and absorbed only 11 percent of the economically active population. The government expenditure per capita (at 1970 prices) was US $41--about 12 percent of the GNP per capita.

Table 2.3

Percentage Distribution of Exports, 1950-1980.

Product	1950	1955	1960	1965	1970	1975	1980
Coffee	32.9	46.1	53.9	41.7	31.6	19.6	24.2
Bananas	58.2	41.0	24.0	25.3	28.9	29.2	19.8
Cocoa	3.7	7.3	6.9	2.0	0.8	1.1	0.4
Other agricultural products	...	2.9	...	6.6	3.4	6.1	7.9
Beef	0	0	5.1	2.9	7.8	6.5	6.9
Sugar	0	0.7	2.2	4.2	4.4	9.8	4.0
Industrial	...	2.0	...	17.3	23.1	27.7	36.8

... Data not available.
Source: MIDEPLAN (1982).

The GNP grew quite rapidly from 1950 onwards, particularly during 1950-1955 and 1968-1970 (see Chapter 1, Table 1.7, and Table 2.4). Despite the rapid population growth during the 1950s and 1960s, the GNP per capita increased by more than 150 percent from US $347 in 1950 to US $892 in 1979, at 1970 prices (see Chapter 4, Table 4.1).

During these three decades (1950-1980), the growth of the agricultural output was lower than that of the GNP, except for the period 1966-1969, when the reverse occurred (Table 2.4). The relatively slow growth of the agricultural sector explains why the share of this sector, expressed as a percentage of the GNP, decreased to 18 percent in 1980. By contrast, industrial output grew faster than the GNP (Table 2.4) and in 1984 this sector's share of the GNP (22 percent) surpassed that of the agricultural sector.

Table 2.4

Annual Rates of Growth of the GNP and the Private Consumption in Costa Rica (in Constant 1966 Prices).

Period	Gross national product (GNP)	Agricultural product	Industrial product	Gross national income (GNI)	Private consumption (PC)	GNP per capita	PC per capita
1960-65	5.1	3.2	9.1	...	...	1.4	...
1965-70	7.0	8.0	9.3	6.4[a]	6.4[a]	4.4	3.3[a]
1970-75	6.0	3.4	8.9	3.4	3.4	2.7	0.8
1975-80	5.4	1.8	5.9	5.8	5.2	2.5	2.5
1976-77	8.9	2.2	12.7	17.4	13.6	6.1	10.7
1977-78	6.3	6.6	8.2	0.8	8.4	3.5	5.6
1978-79	4.9	0.5	2.7	0.6	2.4	2.2	(0.3)
1979-80	0.8	(0.5)	0.8	(0.6)	(1.8)	(2.0)	(4.5)
1980-81	(2.3)[b]	5.1	(0.5)	(10.2)	(8.5)	(4.8)	(10.9)
1981-82	(9.1)	(4.9)	(14.9)	(12.7)	(9.8)	(11.4)	(12.1)
1982-83	0.8	4.4	(1.8)	(3.3)	1.3	(1.8)	(1.5)

... Data not available.
[a]Period 1966-1970.
[b]Parentheses means negative growth.

Source: Céspedes and Lizano (1984); Central Bank of Costa Rica (1983).

The relative attrition of the agricultural sector coincided with a decrease of the economically active population absorbed by the sector to 31.4 percent in 1984 (Table 2.2). The largest reduction in the percentage of the economically active population working in agriculture occurred between 1973 and 1980, also decreasing in absolute terms. Despite the rapid expansion of industrial output between 1950 and 1980, the sector did not generate most of the jobs in this period. Instead, services absorbed a large proportion of the economically active population (Table 2.2).

Despite the relative decline of the agricultural sector, the main Costa Rican exports were agricultural products during 1950-1980. Even in 1980, coffee and bananas accounted for 24.2 and 19.8 percent, respectively, of the total value of exports (Table 2.3). Membership in the Central American Common Market facilitated an increase in industrial exports which reached 36.8 percent of the total in 1980 (Table 2.3).

A striking feature of the pattern of agricultural growth was that it affected equally food production and food exports. As Table 2.5 shows, per capita food production showed about the same trend as that of the total per capita production, i.e., production and exports. Between 1964 and 1977, production and exports increased by 40 percent, but subsequently became stagnant until 1980. These trends contrast with those of most other Central American countries, where export production showed a large increase, while food production often declined in per capita terms. This phenomenon can be explained largely by the fact that most countries adopted a strategy of favoring export production on large farms, often at the expense of small farms where most food crops were grown.

An important aspect of this agricultural growth was that it took place in a rural economy characterized by a markedly unequal distribution of land. According to the 1963 agriculture census, 7 percent of the farms had 62 percent of the cultivable land. And nearly 50 percent of the farms had less than 5 percent of the total land. In 1963 Costa Rica had a Gini coefficient of land distribution of 0.786, which is considered very high, even by Latin American standards. (The Gini measures concentration of land or unequal distribution; a Gini coefficient of 1 shows maximum inequity; 0 is equal distribution among all households.)

Furthermore, the census of 1973 showed that land concentration had increased (Table 2.6). The smallest farms, up to 9.9 hectares per farm, declined in numbers, while their percentage share of the total land declined from 4.7 to 3.8 percent. On the other hand, the number of farms over 200 hectares increased in relative terms, and their share of agricultural land increased from 50.8 to 54.6 percent. Consequently, the Gini coefficient of land distribution increased from 0.786 to 0.822 in the 10-year period. Land reform measures introduced after 1973 have only slightly reduced the inequality. Between 1973 and 1977 the Gini coefficient declined from 0.822 to 0.812, a very small reduction. Land distribution in Costa Rica remained one of the most nonegalitarian in Latin America.

Table 2.5

Agricultural Production in Costa Rica, Per Capita, 1964-1981 (Index: 1961-65=100)

Year	Food	Total
1964	101	101
1965	102	103
1966	108	109
1967	109	110
1968	117	118
1969	123	123
1970	126	125
1971	132	131
1972	135	133
1973	133	132
1974	132	131
1975	138	137
1976	138	138
1977	138	141
1978	136	139
1979	136	138
1980	133	136

Source: Peek and Raabe (1984).

Table 2.6

Percentage of Land Distribution in Costa Rica, 1963-1973.

Hectares (ha)	1963		1973	
	No. of farms	Total ha	No. of farms	Total ha
1-9.9	49.8	4.7	47.8	3.8
10-19.9	15.0	5.1	14.0	3.9
20-99.9	28.2	27.8	29.1	25.1
100-199.9	3.7	11.6	4.7	12.6
200-999.9	2.9	25.0	3.9	29.4
1,000-2,499.9	0.3	9.7	0.4	10.3
2,500 and above	0.1	16.1	0.1	14.9

Source: Peek and Raabe (1984).

2.2.3 Recent economic crisis. Costa Rica is heavily dependent on other countries for some products, such as fuel and iron, and for marketing its own commodities, such as coffee and bananas. This dependence began to create serious difficulties towards the end of the 1970s, when the world recession began to affect the Costa Rican economy. Oil prices rose rapidly and international markets for Costa Rica's export commodities shrank considerably, resulting in a serious negative balance of payments. Thus, ended the period of relative economic prosperity, during which per capita production significantly rose in rural and urban areas, (Céspedes et al., 1984).

Most Latin American countries experienced similar economic difficulties, but in Costa Rica the effect has been especially severe. The rising cost of petroleum and the declining coffee prices eroded the balance of foreign trade to a point where the external debt amounted to more than 10 percent of GDP in 1982, the third highest in Latin America. At the same time, inflation rose from 9.2 percent in 1979 to 37.1 percent in 1981 and 90.1 percent in 1982, also the third highest in Latin America. The impact of these economic changes in GDP was serious. Whereas the real GDP growth rate averaged 5.6 percent during the 1970s, it declined to -2.3 and -9.1 percent in 1981 and 1982. Agriculture seems to have been less affected by the economic decline. The growth rate of production declined, although not as much as that of the rest of the economy. During 1981 and 1982 agricultural output increased 5.1 percent, but during 1982 it declined by 4.9 percent.

2.3 Education and Social Development

The Government of Costa Rica, throughout its historical development, has given priority to strengthening and expanding the educational system. Such concern with education resulted in several notable events: grammar school was declared free and compulsory in 1869, and the General Law of Common Education, passed in 1886, established the fundamental principles for educational development. This law consisted of a blend of various trends and reforms in education prevalent in Latin America at the end of the 19th century. The fundamental aspects of the law were in operation until 1957 as part of the Education Code, a compilation of regulations, laws, and general recommendations updating the Law of Common Education to the needs and development at that time (Monge-Alfaro, 1979).

The Constitutional Law of the University of Costa Rica, passed in 1940, resulted in the centralization of the few schools of higher education, which until then had been scattered and uncoordinated. The University had been closed at the end of the 19th century by the General Law of Common Education, in an effort to allocate more resources to strengthen the primary and secondary school systems. The creation of the University engendered diversification of subject matter and the development of many new careers.

The Political Constitution of 1949 stated: "Public education is an integral process of interrelated cycles, from preschool to University." The new Constitution created a Superior Council in charge of the General Directorate of Official Teaching, established free middle education, and strengthened the newly established University of Costa Rica. Until 1949, primary education had always received first priority; from that year onwards, middle and superior education were given greater attention (Monge-Alfaro, 1979).

The Fundamental Law of Education, promulgated in 1957, was based on the principle that "the State must ensure an equal opportunity of education for everyone, regardless of ethnic, economic, religious or political background." This law aimed to ameliorate the serious educational problems in Costa Rica, including the high rate of students who failed and the decrease in grammar and high school graduates.

The Reform of Middle Education (high school) of 1963 separated the first three years of high school into a first cycle and the next two years into another cycle.

The National Plan of Educational Development was established in 1973 with the following objectives: (a) to raise the level of secondary education, particularly in the less privileged regions, in order to create a more equitable system and to contribute to a more balanced social and economic development; (b) to update the educational system to respond to social and economic needs; and (c) to maintain the level of commitment of the national budget for education (Soto et al., 1982).

2.3.1 **Expenditures on education**. Per capita expenditure was already high during the period preceding World War I, at a level of US $7 (1970 dollars) (Table 2.7 and Figure 2.1). During the war this indicator decreased, but recovered steadily thereafter until the late 1920s. The stagnation of per capita investment in education began in 1930 and was coincidental with a period of severe economic decline. During the following two decades it fluctuated around US $5 per capita, failing to attain the pre-World War I level. The fluctuation of this index coincided with the performance of the national economy during the first half of the 20th century. However, the drop in per capita expenditures in education was less marked than that observed for the whole national product. Thus, at the beginning of the century the expenditure on education represented just about 10 percent of the national budget, while in 1930-1950 it accounted for more than 15 percent. From 1950 onwards, the per capita expenditure on education rose substantially, reaching a record figure in 1980 of US $63.6 (Table 2.7 and Figure 2.1). Such an extraordinary development was due to the following factors:

(a) Increase in gross national product per capita from US $347 in 1950 to $876 in 1980 (in 1970 prices).

Table 2.7

Per Capita Expenditures in Costa Rica (in 1970 US$).

Year	Education	Health	Defense and security
1930	6.9	10.8	3.9
1935	5.2	9.3	2.7
1940	7.1	14.6	3.6
1945	5.3	8.8	3.4
1950[a]	6.3	7.7	2.1
1955	11.3	11.5	3.9
1960	19.3	14.2	2.7
1965	23.8	23.3	2.3
1970	34.4	37.7	3.6
1975	49.3	51.9	5.4
1980	63.6	66.6	5.9
1981	47.2	58.6	4.6
1982	33.9	46.5	5.3
1983	38.3	43.2	6.4

[a]Army was abolished in 1949.
Source: Mata (1985).

(b) Growth of the national budget with regard to the national product, from 12 percent in 1950 to 25 percent in 1980.

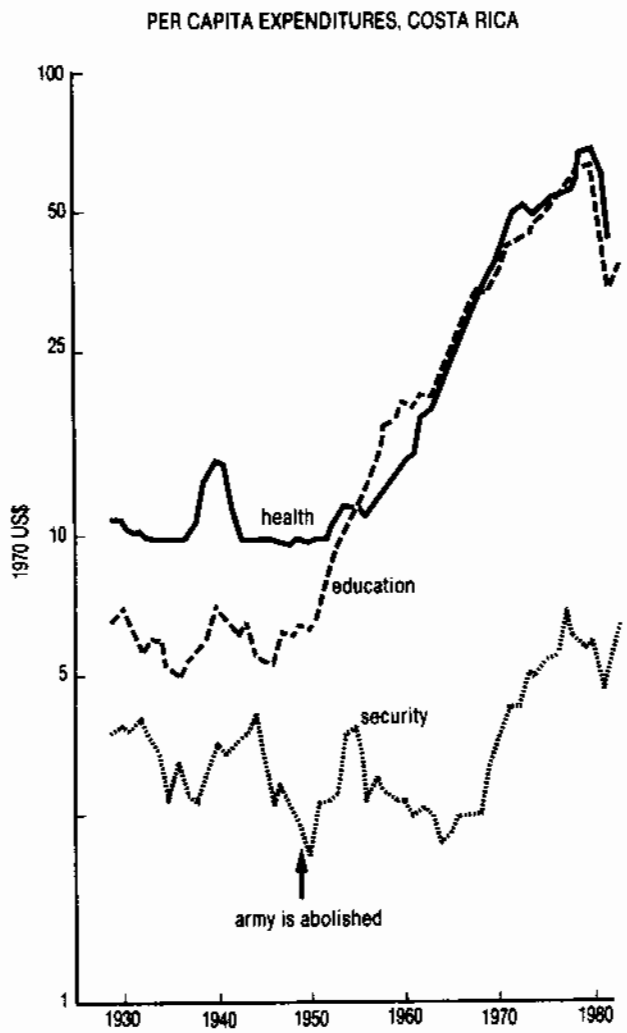
(c) Substantial increase in the proportion of the budget spent on education, from 15 percent in 1950 to 34 percent in 1980.

2.3.2 Educational level. The population of Costa Rica had a low level of education at the beginning of the 20th century. The illiteracy rate in 1910 was 55 percent, and only 9 percent of women 20 to 34 years old had completed primary school. However, grammar school attendance was high even then, as 50 percent of the population 7 to 14 years old had registered in primary school (Tables 2.8 and 4.1).

Even though the reduction in public expenditures in education precluded significant improvement in the levels of primary school attendance or in the proportion of children completing primary school until 1940, the illiteracy rate decreased to the extent that in 1940 it was only 26.7 percent.

Figure 2.1

Per capita expenditures in health, education, and security in Costa Rica (in 1970, US$). Data were obtained from the General Comptroller of Costa Rica. The army, progressively dismantled during this century, reached the lowest level in the late 1940s; it was abolished in 1949 after a brief revolution. Expenditures after 1949 correspond to the urban civil and rural guards.



In 1950 Costa Rica had only 21.2 percent of illiterates among the population 10 years old or older. In addition, 76 percent of children 7-14 years old were registered in grammar school. However, the high dropout rate and the low promotion index precluded a significant increase in educational level, as only 22.1 percent of 20 to 34-year-old women completed grammar school. After 1950 primary school attendance increased steadily. Since 1964 the number of children registered has exceeded the population of 7 to 14 year olds (all children 7 to 14 were in school; some under 7 and over 14 were also enrolled). In turn, illiteracy continued to decrease, reaching the very low current level of 7.6 percent of the population 10 years old or older. However, the most important change was in the level of schooling of the young population. For instance, the percentage of women 20 to 34 years old who completed primary school rose significantly, particularly after 1965, to reach 70 percent in 1982 (Rosero and Caamaño, 1984).

In summary, the emphasis placed on education by successive administrations resulted in a very low illiteracy rate--practically nil in the young population--and in a high proportion of children completing at least grammar school, regardless of sex. This places Costa Rica, along with Cuba, at the vanguard of the tropical countries in the Americas.

Table 2.8

Illiteracy, School Attendance, and Completion, Rates Per 1,000, Costa Rica, 1910-1982.

Year	Illiteracy	Attendance Grammar, 7-14 yr	Completion Grammar, 20-34 yr
1910	548	499	92
1920	429	540	73
1930	330	633	128
1940	267	677	136
1950	212	759	221
1960	156	930	274
1970	112	1085	425
1980	80	1018	655
1982	76	991	703

Source: Rosero and Caamaño (1984).

2.4 Evolution of Public Health

Social medicine in Costa Rica started at the beginning of the 20th century with the 1894 law establishing "village doctors." In 1907 the first major preventive action was the creation of a program called "Fight Against Hookworm Disease." In 1914, members of the Rockefeller Foundation arrived in the country to help control this disease, and some years later the Foundation also gave important support to the anti-malaria campaign. The Ancyclostomiasis Department was created in 1915, and the Nursing School and Sanitation Departments were established in 1916; the Antituberculosis Sanatorium opened in 1918.

2.4.1 Birth of public health action. In the 1920s, organized public health action was started with the creation of the Under-Secretariat of Hygiene and Public Health in 1922; this office was rapidly promoted to ministerial rank in 1927. An important landmark was the passing of the Law for the Protection of Public Health in 1923, which established compulsory notification of diseases, assigning responsibility to municipalities for local hygiene and other health tasks and enforcing allocation of 15 percent of their budgets to that end. Also, the law permitted hospitals and "health homes"--established and supported by public charity and nonprofit organizations--to work under governmental control (Mohs, 1983; Rosero, 1982).

During the 1920s preventive actions were concentrated on hookworm disease, smallpox, school health education, environmental sanitation, and control of epidemics. In the 1930s, actions were broadened to include environmental health and control of drugs, foods, and beverages. The antimalaria campaign initiated in 1928 gained importance. Intermingled with these interventions and with successful movements by the trade unions, a hospital system was established by the banana company. The fight against tuberculosis was intensified in the 1930s, and the "Anti-Tuberculosis League" and the first Sanitary Units of the Ministry of Health were established in 1932, introducing "village doctors" to provide health care to most areas. These programs continued during the decade of the 1940s, and the program "Fight Against Malaria" received greater emphasis.

2.4.2 The social security system. Other important events in those years were the establishment of the Social Security Bureau in 1942, which initially covered only a small portion of the population; the creation of additional Sanitary Units; the installation of sewage systems and water-treatment plants in urban areas; and the construction of canals in mosquito breeding places.

A new stage in the country's public health policy was initiated in 1950 when a modern, complex, and to a certain extent holistic approach was adopted. Advised by the newly created World Health Organization, the Ministry of Health was reorganized, incorporating a Central Assistance Office in charge of interactions with hospitals and the General Health

Office for coordination of preventive medicine programs. Collaterally, medical services provided by the Social Security Bureau were expanded to include the relatives of insured employees. The 1950s witnessed an extraordinary improvement in health conditions as a consequence of intense activities to improve the quality of life. New technologies were imported into the country; for example, streptomycin was added for treatment of tuberculosis and tuberculin for its diagnosis, and in 1952 a massive BCG vaccination program of the general population was accomplished. At the same time, extensive malarious zones were sprayed with residual-action insecticides. These interventions had spectacular results in the control of these two high-incidence diseases, which had long been fought with limited success. Mass vaccination campaigns against typhoid and diphtheria were begun, while the smallpox vaccination program continued.

The success of such programs was due, in great part, to acceptance of modern technology by a relatively well-educated population, with an illiteracy rate of less than 20 percent at that time. Another area of activity that gained importance in the 1950s was nutrition. Nutrition Centers distributed food to mothers and preschool children. There were 37 centers in 1959 and 530 in 1984, to which 32 "Infant Nutrition Centers for Integral Care" were added; in addition, nearly all schools in the country established hot meal dining rooms. In general, from the 1950s onwards, less emphasis was given to hospital medical care, in order to increase support for outpatient care and preventive medicine services. The overall effect of these actions and of an improved quality of life was a reduction in the number of beds per 1,000 inhabitants after the 1950s (Table 2.9).

2.4.3 **Expansion of the infrastructure.** The decade of the 1960s was a period of modest achievement in public health. Although programs under way continued with equal or even greater intensity, their accomplishments were somewhat less, ending a period of important gains through application of relatively simple low-cost measures. Among significant events in the 1960s were the creation of the Faculty of Medicine of the University of Costa Rica in 1961, which led to a marked increase in the number of physicians and surgeons (Table 2.9); in the past they had to be trained abroad or had been brought in. The Costa Rican Institute of Aqueducts and Sewers was established in 1961 and the National Children's Hospital opened in 1964. A mass vaccination program with DPT vaccine also started. Another important factor was the dramatic decrease in fertility (Figure 2.2), promoted in part by the health sector through the Family Planning Program, which doubtless played a role in the spectacular reduction in infant mortality that took place later in the 1970s.

2.4.4 **The decade of achievement in health.** While Costa Rican public health had already shown considerable progress by 1970, with the formulation and implementation of the first National Health Plan in 1971 and the General Health Law in 1973, the health sector underwent several philosophical and programmatic changes. These coincided with an increase in life expectancy from 65.3 years in 1970 to 72.5 in 1980 (Mohs, 1983; Jaramillo, 1983).

Table 2.9

Public Health Indicators in Costa Rica, 1930-1980.

Indicators	1930	1940	1950	1960	1970	1980
Life expectancy, years	42.2	46.9	55.6	62.6	65.4	72.6
Infant mortality rate, per 1,000	172	137	95	80	67	21
Per capita public health expenditure (US$ of 1970)[a]	11	15	8	14	37	65
Expenditure as a percentage of gross domestic product	...	...	2.2	3.0	5.6	7.4
Hospital beds, per 1,000	...	5.6	5.1	4.6	4.1	3.3
Hospital discharges, per 1,000	...	...	9.5	10.1	11.1	11.7
Consultations for health services, per capita	...	...	...	1.1	2.0	2.9
Medically certified deaths, %	44	55	60	65	71	84
Births in hospital, %	...	...	20	49	70	91
Physicians, per 10,000	2.7	2.7	3.1	2.8	5.6	7.8
Population covered by illness and pregnancy insurance, %	0	0	8	15	39	78
Population with piped water, %	...	...	53	65	75	84
Population with sewage disposal, %	...	...	48	69	86	93

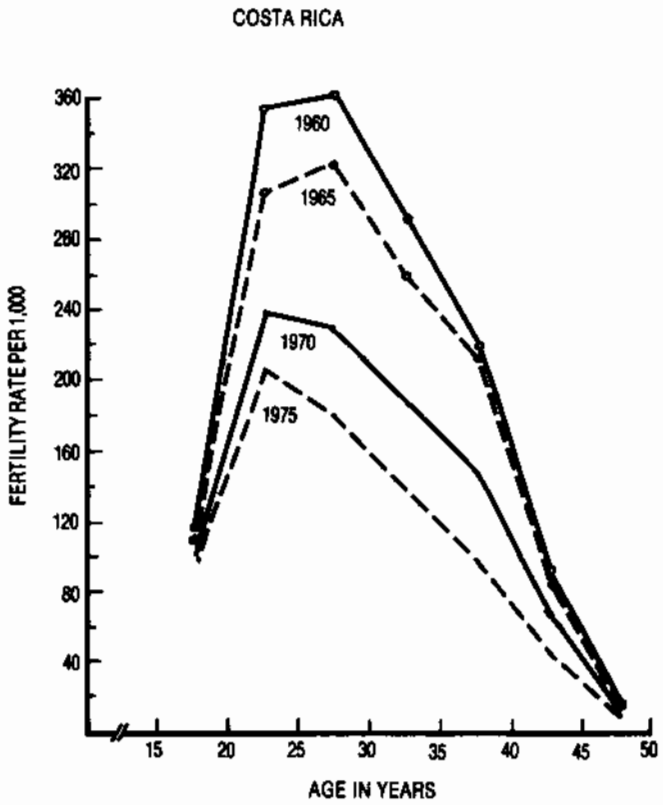
... Data not available.

[a]Expenditures from Ministry of Health, Central Medical-Social Assistance Office, Social Security (from 1942), and the Costa Rican Aqueduct and Sewers Institute (from 1962). Data deflated with the internal price index (US $1 = 5.09 colones, 1970).

Source: Rosero and Caamaño (1984).

Figure 2.2

Fertility rates, by age, Costa Rica, 1960–1975. Note that fertility had been progressively declining since 1960 in all age groups, but especially in those 25 to 35 years old (Source: Ortega, 1977).



The principal accomplishments of the National Health Program were the following:

- Substantial increase in health sector resources (Table 2.9).

- Integration and coordination of institutions and programs, with functions assigned and resources rationalized according to the Plan.

- Provision of health services to the population in all geographical areas and socioeconomic strata through (a) universalization of the Social Security System, making hospital services, outpatient services, and highly specialized medical care available to nearly all the population, without discrimination; (b) rural health and community health programs under the auspices of the Ministry of Health, which permitted marginal groups in dispersed rural and urban fringe areas to receive health services through a primary health care strategy.

- Improvement of the population's nutritional level by means of Nutrition Centers for mothers and preschool children, school hot meal dining rooms, and Infant Nutrition Centers for Integral Care. Although this program had been under way since 1950, increasing numbers of centers were built after 1975 when the Family Allowances Program assumed the increase in cost. Also, during this decade food fortification (vitamin A in sugar, iodine in salt, and vitamins in wheat flour) was financed by the State, which also subsidized certain foods, regulated basic food prices, and enlarged grain storage capacity.

- Active community participation through Health Committees or Boards of Community Development, organizations that actually built health posts. The committees also allocated resources to operate food programs (Nutrition Centers and hot meal dining rooms).

At present, three institutions are responsible for health in Costa Rica: (a) the Ministry of Health--created in 1927--fundamentally in charge of preventive medicine and primary health care. (b) the Social Security Bureau--created in 1942--responsible for all the hospitals providing care to workers and their relatives, accounting for 78 percent of the population; noninsured persons' medical costs are absorbed by the State. Despite a high degree of socialization, there are three small private hospitals, and, while nearly all of the physicians work in public institutions, many have private practices. (c) the National Insurance Institute, which cares for labor and accidental illness, injury, and disability through outpatient clinics or through referral of cases to Social Security. To these institutions should be added the Costa Rican Institute of Aqueducts and Sewers, in charge of safe water supplies and sewage disposal throughout the country.

The expenditure for health in 1980 was estimated at US $65 per capita at 1970 prices (Table 2.9). This figure represents 7 percent of the gross national product, a considerable amount compared even with rich countries, revealing the importance given by the Costa Rican government to social development. The public expenditure on education in the same year was also 7 percent of the gross national product. The health costs are financed by: (a) general revenues derived from taxes and bond issues; (b) Social Security contributions by workers, employers, and the State; (c) profits from the national lotteries; and (d) since 1975, funds from the Family Allowances Program (tax on salaries of employed people and on all sales and services). Foreign aid also provides some support to several programs of the health sector.

The development of public health and particularly its success in the 1970s cannot be considered independently from the political, economic, and social conditions of the country (Rosero, 1982; Mohs, 1982; Jaramillo, 1983; Mata, 1983). First, this development was politically possible due to the social sensitivity of the people in office, who formulated the policies along with other actions tending to redistribute income and benefits through services: the State earned the qualification of "welfare state." Second, it was economically possible because of the relative bonanza and substantial growth of the Costa Rican economy over a prolonged period; for instance, the per capita product grew in real terms, from 1964 to 1979, at an average rate of 4 percent annually. Third, there was the experience, knowledge, institutional organization, resources, and infrastructure created during the previous 50 years, all of which were preserved by democracy, political stability, freedom, and peace.

2.5 Food Consumption and Nutritional Status

This discussion pertains to the evolution of the nutritional status of vulnerable groups, and intends to show that the current situation is chiefly the result of intersectoral actions affecting the quality of life in Costa Rica. The first sections deal with nutritional changes during the period 1966-1982. The second part is a discussion and interpretation of factors that might have conditioned and shaped the nutritional changes observed.

2.5.1 Food consumption. Studies of families showed that nutrient consumption was basically the same in rural families from 1966 to 1978 (Table 2.10); an apparent improvement was not significant. For urban families, however, nutrient consumption levels--specifically, calories and protein--were found to be significantly lower in 1978 than those in 1966, when the same field technique for data collection and analysis was used. These findings were not expected, because during the same period the purchasing capacity of the population increased and food availability also improved. Also, the percentage distribution of families according to energy consumption (Table 2.11) showed little improvement of energy levels.

Table 2.10

Average Nutrient Consumption per Person Per Day, Costa Rican Rural and Urban Families.

	Rural		Urban	
	1966	1978	1966	1978
Energy, Kcal	1,894	2,020	2,330	1,947
Protein, g	53.6	54.0	67.3	58.2
Fat, g	43.9	57.2	66.8	67.8
Carbohydrates, g	332	332	344	284
Calcium, mg	580	614	855	619
Phosphorus, mg	981	1,004	1,157	969
Iron, mg	15.4	14.4	16.3	12.7
Retinol, μg	206	326	586	672
Thiamine, mg	0.76	0.88	0.97	0.84
Riboflavin, mg	0.84	0.94	1.28	1.09
Niacin, mg	10.7	10.1	13.3	11.4
Ascorbic acid, mg	52	49	102	61

Source: INCAP/OIR/MH (1969); Ministry of Health (1980).

Table 2.11

Percentage Distribution of Costa Rican Families, by Energy Consumption Levels, 1966-1978.

Energy intake, % of adequacy	Rural		Urban	
	1966	1978	1966	1978
<25	0	1	0	0
25-49	6	3	1	6
50-74	26	24	22	22
75-99	28	28	23	31
>99	41	44	54	41

Source: INCAP/OIR/MH (1969); Ministry of Health (1980).

The consumption pattern from 1978 to 1982 did not change, despite the fact that the purchasing capacity of the population had decreased with respect to 1982 values, although it remained above that of 1966. In part this may be due to the implementation of Food Education and Nutrition Centers (CENs) and school hot meal dining rooms (CEs) for vulnerable groups (preschool and school children, pregnant and lactating women), which prevented an alteration of food habits in the face of a decreased income. This alone, however, would not explain the constancy in food habits and consumption levels, since the governmental intervention programs affected only a small part of the population. Adequate food and sufficient income must be proposed as the most plausible explanation. The last argument is supported by the structure of the "food basket" calculated from the dietary data of the 1978 survey, which still persisted in a survey made in 1981. (The food basket is the minimum number and quantity of foods and essential household items required to support the prototype rural or urban family.) Thus, the frequency of purchases of basic foods such as rice, beans, milk, and eggs was very similar in both survey years.

On the other hand, a dramatic increase in the minimum cost of the food basket recently occurred in connection with the crisis (Table 2.12),

Table 2.12

Percentage Increments in the Cost of the Food Basket and in Wages for Urban and Rural Costa Rica.

	1980-1981[a]	1981-1982	1982-1983
Food Basket			
Urban	41.0	118.5	35.0
Rural	41.0	119.0	36.3
Average	41.0	118.6	35.5
Wages			
Urban	12.8	70.0	77.8
Rural	12.3	73.1	74.7
Average	12.5	71.1	76.3

[a]There has been a standard methodology to determine the cost of the food basket since 1980.

Source: Murillo (1984).

contrasting with just a moderate increase in minimum wages (Murillo, 1984). Paradoxically, the nutritional status of children under six years of age markedly improved in the period (Table 2.13). Although this will be discussed in detail in the following section, other factors such as control of infectious diseases through education, primary health care, and community organization must have accounted for a large part of this improved nutritional status at the national level, in the absence of increased purchasing capacity.

Consumption of specific nutrients such as vitamin A, iron, and iodine deserves mention. In 1966 the prevalence of low and deficient vitamin A serum levels was 32.5 percent, whereas in 1981 it had decreased

Table 2.13

Prevalence of Moderate and Severe Malnutrition among Preschool Costa Rican Children.[a]

Year of Survey	Survey	Children surveyed	% Stunted	% Malnutrition (< 75% wt/age)	% Change within surveys
1966	INCAP/OIR/MH	791	16.9	13.5	
1975	MH	1,910	7.2	12.5	-7.4
1978	MH	3,069	7.6	8.6	-31.2
1982	MH	1,871		4.1	-52.3

[a]II and III degree, according to the weight-for-age criterion.

Source: Jaramillo (1983).

to 1.8 percent (Table 2.14), with deficiency existing mainly in rural families of very low socioeconomic level. The improvement in Vitamin A serum levels in the last decade has been attributed to government interventions, specifically, fortification of sugar with retinol palmitate, approved in 1974. By then, the Rural Health Program (RHP) was providing immunization, deworming, and other services to families in dispersed rural areas. More construction of rural roads began in the 1970s, opening channels for a continuous supply of agricultural products rich in vitamin A to most towns and villages. Also, in 1974 the "Family Allowance Program" began a food supplementation program in which whole powdered milk was distributed to homes of children under two years of age. It is virtually impossible to ascertain the contribution of each of these factors to the dramatic decline in vitamin A deficiency. Fortification of sugar must have played an important role.

Table 2.14

Prevalence of Children with Low and Deficient Serum Vitamin A Levels, Two National Nutrition Surveys, Costa Rica.

Retinol, µg/100 ml	1966	1979[a]	1981	% Change 1966-1981
<10 (deficient)	5.5[b]	0.3	0	-100
10-19 (low)	27.0	2	1.8	-93

[a]Vitamin A fortification of sugar suspended.
[b]% frequency.

Source: INCAP/OIR/MH (1969); Ministry of Health (1983); Jaramillo (1983).

Iron consumption levels from 1966 to 1978 are presented in Table 2.15. It can be observed that values were lower in 1978, possibly the result of a marked decrease in consumption of foods rich in iron, such as meat. The greatest prevalence of anemia was found in rural children under one year of age. The low prevalence of anemia among older children might be related to mild energy-protein malnutrition (EPM), which limits growth and consequently reduces the requirements of heme elements. However, data in Table 2.13 already showed that this is not the case, as rates of EPM were low and decreased with time. In the 1966 survey 33 percent of the families did not meet iron consumption needs. Furthermore, nearly 20 percent of infants had deficient levels (10 mg/dl) of hemoglobin.

According to data of the Ministry of Health presented in Table 2.16, there has been a reduction in the prevalence of anemia during 1977-1983 in both rural and urban preschool children. As with rates of malnutrition, the low iron consumption figures contrast with the improved hemoglobin levels in the affected groups. This may not be surprising in light of changes in the prevalence and severity of infectious diseases in general and of intestinal parasites, for instance, from 1966 to 1982 (Table 2.17). The dramatic decrease in prevalence of parasites was related to the steady increase in availability of latrines and water toilets, the wearing of shoes by the majority of the population, improved water supplies, an intensive health education program, and systematic deworming in health centers and hospitals and by the population itself.

Table 2.15

Mean Iron Consumption Levels in Urban and Rural Costa Rica, 1966-1978.

	1966	1978	% Change
Urban	16.3	12.7	-22
Rural	17.0	14.4	-15.3
Total	16.6	13.5	-18.7

Source: INCAP/OIR/MH (1969); Ministry of Health (1980).

Table 2.16

Frequency of Low Hemoglobin Levels in Costa Rican Preschool Children, 1977-1983.

	1977	1978	1979	1980	1981	1982	1983	% Change 1977-1983
Erythrocytes	37.0	32.8	15.7	7.7	14.8	7.5	8.3	-77.6
Hematocrit	23.7	19.5	15.0	13.4	13.9	15.3	14.4	-39.2
Hemoglobin	29.9	22.6	17.4	15.3	15.1	17.8	15.3	-48.8

Source: Ministry of Health (1983).

Table 2.17

Reduction in Prevalence of Intestinal Helminths in Costa Rica, 1966-1982.

Helminths	Age groups, years					
	5-9			45+		
	1966	1982	%	1966	1982	%
Urban[a]						
Ascaris	30.3	5.9	-80	6.0	0	-100
Trichuris	66.7	8.8	-87	16.1	3	-81
Hookworm	0	5.9		3.2	3	-6
Hymenolepis	18.2	2.9	-84	0	1.5	
Rural						
Ascaris	44.9	9.7	-78	7.5	0	-100
Trichuris	69.0	16.1	-77	26.3	8.2	-68
Hookworm	17.6	0	-100	14.0	5.7	-59
Hymenolepis	6.3	0	-100	0.5	0	

[a]In 1966, highlands; in 1982, lowlands also included.

Source: Mata et al. (1985).

Table 2.18

Prevalence of Endemic Goiter in Costa Rica, 1952-1979.

Survey period	Age of population (years)	Number of persons	% prevalence	Study
1952-1955	7-18	10% of schoolchildren	18.4	INCAP (1956)
1966	All ages	3,735	18.0	INCAP/OIR/MH (1969)
1975-1978	All ages	2,012	11.9	INISA
1975-1978	0-9	529	6.6	INISA
1979	5-15	4,883	3.6	Ministry of Health (1981)

Source: Mata et al., Cassava Toxicity and Thyroid Research (1983).

Another factor to explain improved values of hemoglobin is the dramatic increase in breast-feeding after 1977, as a result of "rooming-in," promotion of breast-feeding, and other interventions in hospitals and in the field (see Section 2.5.2).

Hence, the Costa Rican experience demonstrates that it is possible for a given population to improve deficient hemoglobin levels in spite of a decreasing iron consumption in the diet, through such collateral actions mentioned above.

Regarding iodine, high rates of endemic goiter were found in the 1966 survey, especially among women. The deficiency has been considerably reduced, as shown in Table 2.18, and the decline has been attributed to a government-supported salt iodinization program initiated in 1974. However, there is evidence that salt iodinization was not carried out properly in Costa Rica. For instance, monitoring of the iodine content in salt samples selected at random revealed suboptimal levels in most samples, while in others iodine content was adequate or excessive, as judged by an epidemic of hyperthyroidism (Mata, 1983). Other factors contributing to the decline in goiter should be considered. Better ways of communication in goitrogenic highland zones improved the availability of foods obtained from the lowlands and oceans. A decrease in consumption of cassava and other goitrogenic foods seems to have occurred, as the current levels of consumption are low (Mata et al., Cassava Toxicity and Thyroid Research, 1983). Another likely factor in the increase is chlorinated piped water, which at present is available to almost 100 percent of the urban and 70 percent of the rural population of Costa Rica. The improvement in water supply began during the 1960s. Water contaminated with certain bacteria and exposed to certain soils appears to be a factor favoring goiter formation. Furthermore, the impressive expansion of the health care system resulted in early diagnosis, treatment, and surgical intervention, with an important impact on the overall prevalence.

As expected from the low prevalence of malnutrition and goiter, cretinism is not now a serious problem in Costa Rica. About half a dozen new cases are diagnosed annually, in contrast with dozens diagnosed per annum before the dramatic changes in hygiene, sanitation, interventions, and health care of the 1970s.

2.5.2 **Nutrient consumption in vulnerable groups.** Several studies of food consumption by preschool children were carried out in Costa Rica during the last 20 years. The studies revealed that the limiting factor is energy rather than protein (Table 2.19). More important, however, is the fact that energy was limited despite an adequate protein consumption. Moreover, consumption did not change through 14 years of observation (1966 through 1980), despite extensive food supplementation programs directed to rural children since 1974. Thus, other factors related to food intake and food utilization rather than to food supplementation should be considered in determining the causality of improved nutrition.

Table 2.19

Adequacy of the Diet of Preschool Children in Costa Rica.

Number of children	Quality	% of the diets		Study
		protein	calories	
...	Adequate	77	49	INCAP/OIR/MH (1969)
	Deficient	23	51	
151	Adequate	100(75)[a]	68(24)	Valverde et al. (1975)
	Deficient	0	32	
47	Adequate	100(83)	60(17)	Brenes and Mata (1978)
	Deficient	0	40	
24	Adequate	100	0	Murillo and Mata (1980)
	Deficient	0	100	
155	Adequate	100	56	Whiteford (1981)
	Deficient	0	44	

... Data not available.
[a]In parentheses, % diets with more than 110% adequacy.

Protein consumption levels remained constant despite an obvious change in protein quality, with cereal and legume protein being replaced, to some extent, by milk protein. The increase in milk consumption has been the consequence of infant feeding programs (food packages and hot meals at feeding centers) and of the intensive nutrition education campaign started by the Ministry of Health in 1974.

The change in composition of the diet probably provided some compensation for the apparent low energy intake levels, the excess protein consumed being used as fuel to compensate for energy deficits, while the better quality of the protein might have contributed to a more efficient nutrient utilization, specifically for protein synthesis.

The low energy intake observed does not appear to have serious biological consequences, according to data obtained in the Puriscal study. This is a long-term prospective observation of yearly cohorts of rural children in the region of Puriscal (Mata, 1982). Briefly, 105 rural infants studied prospectively had a relatively low energy intake,

but were able to grow at the expected rate (Table 2.20) (Murillo et al., 1982), indicating that adequate growth can be attained by rural infants despite a low energy consumption. In interpreting this result, one must consider the living conditions of Puriscal children:

(a) While homes are set in poor rural-dispersed communities, they generally have potable water, latrines or toilets, and enjoy adequate personal hygiene.

(b) Children are followed by health workers of the Rural Health Program, immunized accordingly, and their growth is monitored (Mata, 1982; Mata et al., 1982).

(c) An effective oral rehydration program was established in 1980 for children with acute diarrhea, that also aimed at preventing prolonged episodes and a deterioration of the nutritional state (Jiménez et al., 1982; Mata, 1983).

(d) More than 90 percent of infants are breast-fed for at least one month; more than 50 percent remain at the breast by age 6 months (Mata et al., Diarrhea and Malnutrition, 1983).

Table 2.20

Average Daily Consumption and Increment in Body Weight in 105 Breast-Fed Infants of Puriscal, Costa Rica, 1979-1981.

Age, months	Energy consumption, Kcal	Increment, grams		
		Puriscal	NCHSP, 50th	P
1	453	30.3	30.0	
2	456	40.0	26.7	
3	471	26.7	26.7	
4	481	23.3	20.0	
5	459	20.0	23.3	
6	484	13.3	16.7	

Source: Murillo et al. (1982).

Children with a low energy consumption grew well during infancy and early childhood, as long as they were relatively protected from infection. The assumption is that, if infection is highly prevalent, as in poor traditional and crowded societies, similar food consumption levels do not prevent chronic malnutrition because of the wasting and debilitating effect of infectious diseases (Mata, 1978).

According to the national nutritional surveys, the prevalence of breast-feeding in Costa Rica declined sharply during the 1970s (Jaramillo, 1983). However, from 1978 to 1982 an improvement in the prevalence of breast-feeding was achieved, both in urban and rural areas (Table 2.21). Changes in the rate of breast-feeding occurred across the country and were evaluated by INISA through the longitudinal observation of Puriscal infants. The study showed that the decrease in breast-feeding was probably due to mother-infant separation after delivery, a trend later reversed as a direct consequence of the infants rooming in and other interventions around 1978 (Mata et al., 1982). Furthermore, breast pumps were loaned by INISA to maternity wards throughout the country. The pumps served to stimulate milk secretion, to aid in the formation of the nipple, and to reassure women who felt unable to secrete milk. The pumps were the catalyzing factor for hospital staff to promote breast-feeding.

In addition, the government passed laws in 1974 to protect the mother and child, authorizing a maternity leave of four months with full pay for its employees. It also allowed the working mother to take one hour off daily for lactation.

The diet and nutrition of pregnant women in Costa Rica has not been systematically studied. Prospective study of all rural pregnant women from Puriscal showed that, despite the low nutrient consumption in comparison with the WHO recommended levels, the maternal nutri- tional status is adequate during pregnancy (Table 2.22) (Murillo et al., 1984). Furthermore, the weight gain is sufficient to promote adequate intrauterine growth, and newborns have an average birth weight of 3,112 $\pm$ 473 grams.

In general, Puriscal women live under acceptable hygienic conditions, eat a high-quality protein diet, and undergo prenatal care, contributing to an improved nutrient utilization (Murillo et al., 1984).

Energy expenditure of Puriscal women was significantly reduced in comparison to nonpregnant and nonlactating women (Boesten, 1983), suggesting that the energy consumed was utilized more to maintain body expenditures and fetal growth than to cover physical activity.

Table 2.21

Frequency and Duration of Breast-Feeding in Costa Rica, 1975-1982.

Year	Number of infants	Number breast-fed and (%)	% Change between surveys
1975	427	365 (85.4)	
1978	574	444 (77.4)	-9
1982	426	385 (90.4)	+17

Source: Jaramillo (1983), adapted.

Table 2.22

Mean Daily Nutrient Consumption by Pregnant Women, Puriscal, 1979-1980.

	Trimester		
	1st N=7	2nd N=45	3rd N=111
Energy, Kcal	1,180±526[a]	1,608±367	1,788±521
Energy, Kcal/Kg	22	29	30
Protein, g	37.3 ±21.8	50 ±15.3	48.5 ±20.6
Protein, g/Kg	0.7	0.9	0.8
Iron, mg	9.7 ±5.4	14.6 ±4.1	14.0 ±5.4
Retinol, µg	258 ±164	355 ±296[b]	397 ±442

[a]Mean + S.D.
[b]52 women instead of 45.

Source: Murillo et al. (1984).

2.5.3 Evolution of the nutritional state. Costa Rica showed a marked reduction in the prevalence of malnutrition, according to four national nutrition surveys conducted from 1966 to 1982 (as was seen in Table 2.13). The improvement is also evident from other indicators such as height-for-age (stunting) and weight-for-height (wasting) relationships (Table 2.23).

Malnourished children throughout the country are identified by the Ministry of Health through a nutrition surveillance system operating since 1978. According to their records, the number of children under 1 year of age with some degree of malnutrition decreased from 55 to 16 per year during the period 1978-1982. Despite the small sample size, these data support the findings presented in Table 2.13. The same nutritional pattern is observed for Puriscal children who, in general, are born with adequate birthweight and who exhibit adequate growth and development through school age.

The analysis of the characteristics of severely malnourished children from all over the country, admitted to the National Children's Hospital, also showed a marked decrease in severe energy-protein malnutrition from 1975 to 1981 (Jiménez et al., 1984). Furthermore, there has been a significant reduction of the edematous form, which now is extremely rare, and a shift of malnutrition towards younger ages. Finally, the analysis revealed that most cases were causally related to nonfood factors (see Table 2.24). The predominant associated factors were chronic diarrhea, neurologic problems, congenital defects, massive parasitosis, child abuse syndrome, and other nonfood factors (Jiménez et al., 1984). Primary malnutrition (i.e., due to lack of, or decreased, food intake) was not documented in any case.

However, short stature could be considered a nutritional problem in Costa Rica. A study undertaken at the national level in 1979 among first-grade primary schoolchildren revealed a considerable degree of stunting, which was more common in girls. In 1981 a similar study showed a slight improvement in height. About 30 percent of 1,200 surveyed children showed height deficits of 2 to 8 cm compared with the 50th percentile of the NCHS growth curve. The deficits were related to the socioeconomic condition of the family; the most stunted children belonged to the lowest socioeconomic group.

It can be concluded that the present rates of malnutrition in Costa Rica are within acceptable limits, and that improvements in body weight and height have occurred at a constant rate (Mata, 1983). The control of malnutrition was achieved without a demonstrable increase in food consumption; the control and eradication of infectious diseases played a dominant role, emphasizing the importance of the infection paradigm (Mata and Mohs, 1978; Mohs, 1982). However, the existence of marginal groups (poor urban, poor rural, Amerindians, abandoned children) that show growth deficits, particularly in height, at higher levels than found in the general population, should be taken into consideration by planners and policy makers.

Table 2.23

Evolution of the Nutritional Status of Costa Rican Children 0-4 Years Old, 1966-1978

Survey year	Number of children	Percentage stunted (< 90% height/age)	Percentage wasted (< 76% weight/age)	Reference
1966	791	16.9	14.2	INCAP/OIR/MH (1969)
1975	1910	7.2	12.1	Díaz et al. (1975)
1978	2646	7.6	7.8	Ministry of Health (1980)

Table 2.24

Causality Associations in 112 Children with Severe Malnutrition, National Children's Hospital, Costa Rica, 1981.

Main diagnosis	Number with main diagnosis alone	Number with secondary diagnosis CNS	CAS	CD	Total cases
Chronic or prolonged diarrhea	21	9	10	2	42
Pathology of central nervous system (CNS)	10		3	4	17
Congenital defect (CD)	2	8	4		14
Child abuse syndrome (CAS)	10	2		2	14
Intestinal parasitosis	6				6
Chronic pneumopathy	0	1	3	1	5
Chronic hepatic disease	2		1		3
Prematurity	1	1	1		3
Metabolic disorder	0		1		1
Undetermined	7				7
Total	59	21	23	9	112

Source: Jiménez et al., (1984).

2.6 Demographic Transition and Mortality Trends

It is highly probable that mortality in Costa Rica began its decrease from the mid-19th century on, after the last recorded demographic crisis, the catastrophic cholera epidemic in 1856. The birth rate remained high until around 1960 and even increased in 1960 to a rate of 3.8 percent, one of the highest in the world. Nevertheless, from that year onwards the birth rate began to decline at a rate unmatched in Latin America (Table 2.25).

By 1980 the population growth of 2.7 percent and the birth rate of 31 per 1,000 had remained stable, despite the abrupt decrease observed between 1960 and 1975. On the other hand, the mortality rate in 1982 was as low as that of advanced countries, the life expectancy at birth was close to 73 years of age, and the infant mortality was only 18 per 1,000. These factors, added to an intermediate age structure (highly concentrated in ages when the risk of death is minimal), produced a crude death rate of 4 per 1,000--one of the lowest in the world.

Costa Rica has reliable vital statistics, which makes it possible to closely examine demographic trends, as shown in Table 2.25. It is estimated that death registration has an accuracy near 95 percent, while birth registration accuracy is practically 100 percent. It must be kept in mind, however, that, although vital statistics are reliable for the country as a whole, they may be unreliable for small geographical divisions, which would make it difficult to study death differentials by municipality.

2.6.1 Life expectancy at birth. While life expectancy estimates are available for Costa Rica since 1866 (Table 2.26 and Figure 2.3), it is only since 1950 that they attained credibility because of verifications and editing of the statistical data on which they were based. Estimates prior to 1950 are less precise, but those of 1930 and 1940 are consistent with information available on the population from the censuses of 1927 and 1950 and with birth statistics. Thus they would appear adequate for an appraisal of the levels and trends of mortality in Costa Rica during the first half of the 20th century.

The earliest available mortality estimates for Costa Rica show a favorable situation in comparison with the Latin American averages. This is consistent with the uniqueness of its historical evolution, mentioned in this and the preceding chapters, namely, a relative ethnic, political, and social homogeneity inherited from colonial times, a relatively successful incorporation into the capitalist world through coffee exports, and a lower social cost than that of other countries in the region. It is worth noting that around 1910, a period of great economic progress, the volume of foreign trade per capita in Costa Rica was exceeded only by those of Cuba, Argentina, Uruguay, and Chile.

Table 2.25

Natality, Mortality, Natural Increase, Infant Mortality, and Total Fertility Rates per 1,000, Costa Rica.

Period	Natality	Mortality	Natural Increase	Infant Mortality	Fertility, Children
1910-20	46	30	16	195	...
1920-30	46	27	19	187	...
1930-40	45	23	22	154	...
1940-50	44	18	26	112	...
1950-60	48	12	36	89	6.9
1960	48	10	38	76	7.3
1965	42	9	33	75	6.5
1970	33	7	26	63	4.9
1975	30	5	25	38	3.8
1980	31	4	27	19	3.7
1985	32	4	28	18	3.7

... Data not available.
Source: Rosero (1982), updated.

Table 2.26

Life Expectancy at Birth in Costa Rica, Latin America, and More Developed Countries (MDC),[a] 1870-1980.

Year	Life expectancy, years			Annual gain, years		
	Costa Rica	Latin America	MDC	Costa Rica	Latin America	MDC
1870	28.6[b]	25.0	43.5		0.05	0.17
1880	...	25.5	45.2	0.09	0.06	0.20
1890	...	26.1	47.1		0.11	0.34
1900	34.7	27.2	50.5	0.04	0.17	0.38
1910	35.1	18.9	54.3	0	0.22	0.40
1920	35.1	31.1	58.3	0.71	0.25	0.34
1930	42.2	33.6	61.7	0.47	0.44	0.29
1940	46.9	38.0	64.7	0.87	0.84	0.52
1950	55.6	46.4	69.8	0.70	0.92	0.22
1960	62.6	55.6	72.0	0.06	0.44	0.06
1965	62.9	57.8	72.3	0.50	0.42	0.10
1970	65.4	59.9	72.8	0.84	0.40	0.18
1975	69.6	61.9	73.7	0.60	0.34	...
1980	72.6	63.6	...	...	...	...

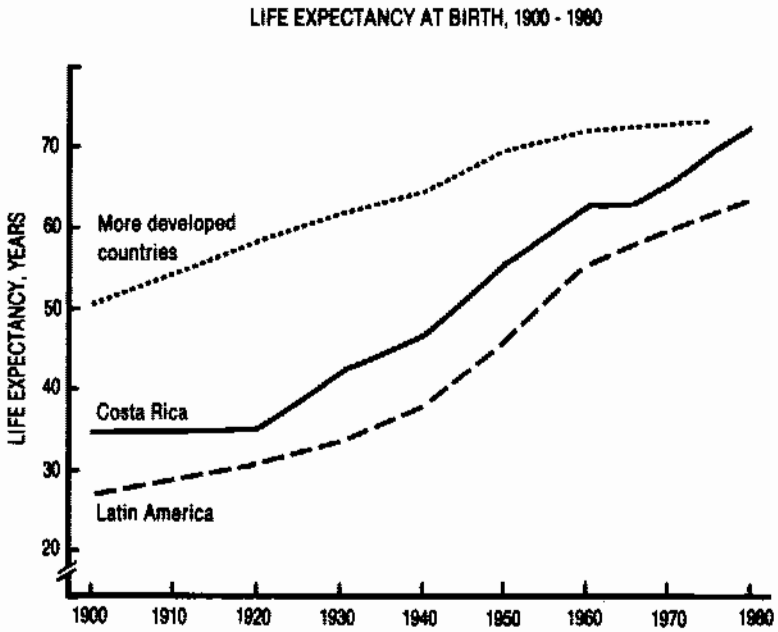
... Data not available.

[a]MDC = Denmark, France, England and Wales, Norway, Netherlands, Sweden, and United States of America (before 1940, only Massachusetts).

[b]Corresponds to 1866.

Figure 2.3

Life expectancy at birth in Costa Rica, Latin America, and more developed countries, 1900-1980.



Latin America as a whole (and Costa Rica) showed an extremely high level of mortality at the beginning of the 20th century when compared with the more developed countries (35 versus 58 years of life expectancy in 1920). Since then, the gap has diminished in a pattern shared by many developing countries. While Latin America showed a tendency towards moderation of this trend in the 1970s, in Costa Rica the gap continued to narrow, reaching mortality levels comparable to those of advanced nations in North America and Europe.

A partial explanation for this unique situation may be found in the historical evolution of Costa Rican society. The information available shows some improvement in life expectancy during the second half of the 19th century. Although mortality estimates are unreliable for that period, it is reasonable to accept that there was moderate progress, especially because there were no additional outstanding crises after the cholera epidemic of 1856. The advances attained in those years were probably due to the application of isolation measures to limit propagation of epidemics and to the improvement in the population's resistance to diseases because of better nutrition. No public health institutions had been built, except for a few charity hospitals, and there are no data showing the existence of any aqueducts, waste disposal systems, or other sanitary works.

During the first two decades of the 20th century, life expectancy remained around 35 years of age, while public health continued to be practically nonexistent. Two events hindering progress were migration to malarious zones on the Atlantic Coast to develop banana plantations, and the economic crisis during World War I, when per capita exports (at 1970 prices) fell from US $114 in 1913 to US $64 in 1918, with a corresponding reduction in living standards.

During the 1920s and 1930s, life expectancy increased from 35 to 46 years, the first significant progress made by the country in this regard. The change coincided with the beginning of the first health programs, and it might be reasonable to think that health programs were the main determinant of this decline, despite their limited coverage. After economic recovery in the 1920s, another economic crisis occurred in 1930, more serious than that during World War I; yet a further decline in mortality was observed. One may conclude that the existing public health programs weakened whatever negative impact the economic crisis might have had.

The 1940s and 1950s represented a period of rapid gains during which life expectancy at birth increased 17 years, from 46 to 63. Costa Rica matched the rest of Latin America, which achieved an increase of 18 years in life expectancy, to a level similar to that observed in more developed countries. Such developments were related to advances in medical and sanitary technology (antibiotics, insecticides, vaccines) that were achieved particularly after World War II, imparting greater efficacy to health programs already being implemented. Additionally, the

government created the Social Security System and reorganized the Ministry of Health while widening its scope of action. Also, during this period, living conditions improved significantly due to sustained economic growth; per capita product increased from US $398 to $474 between 1945 and 1960 (at 1970 prices). Finally, the fact that the old oligarchic-liberal state evolved into a welfare (benefactor) state with greater social sensitivity must be taken into consideration.

During the 1960s, a deceleration in the mortality rates took place in Costa Rica as well as in the majority of the Latin American countries. This was probably from the success of moderate-cost health programs, even though there was no substantial improvement in living standards. In addition, the early 1960s saw a period of economic stagnation, and the country was hit by a natural disaster, when the Irazu volcano erupted and dispersed ashes for two years. These events could explain the leveling off in life expectancy between 1960 and 1965.

In the 1970s there was a new acceleration in the decline of mortality levels. Life expectancy rose from 65.3 to 72.5 years of age, approaching the levels of some developed countries. Even though the decline in this decade was not as fast as that of the 1940s and 1950s, it was more significant--and unique to Costa Rica--because it moved away from the relative stagnation prevailing in Latin America and also occurred at levels in which gains are much more difficult to attain. The explanation for the Costa Rican success was primarily the effective health policies implemented during the decade, along with a rise in the standard of living related to economic growth and redistributive policies by the Government. The high educational level attained by the population; the high degree of communication within the country through a network of roads, electricity, and telephones; and the existing health infrastructure--combined with economic growth--facilitated the implementation of new public health programs.

In short, if a characterization of the country's evolution in mortality is to be attempted, the following four stages could be distinguished:

(a) The era of "natural" mortality (until 1856): very high and unstable rates due to frequent epidemics and mortality crises.

(b) The period of slight mortality decline unrelated to public health measures (from 1857 to 1921): some stability and progress in the control of epidemics was achieved by simple isolation measures; medical care was provided in charity hospitals; significant economic growth was observed until 1913.

(c) The steady mortality decline associated with low-cost sanitary measures and incorporation of new technologies (1922-1970): this is the period of "easy" decline of mortality, without a significant improvement

in living conditions. Up to 1946 the country's economy remained stagnant, while an actual impoverishment of the masses might have taken place; mortality, however, was substantially reduced.

(d) The accelerated mortality decline shifting from the underdeveloped to the developed profile (the 1970s): reorientation and rationalization of health policies under a holistic approach. Improvement in standards of living and nutrition by economic progress and redistributive social policies of a welfare state. The crucial factor seems to have been an extension of primary health services to rural populations traditionally deprived of them.

2.6.2 Mortality decline by age and sex. Table 2.27 shows mortality rates by age groups--and their relative reduction--which account for the increase in life expectancy previously described. The greatest relative decline took place among children 1 to 4 years of age and adolescents, a pattern similar to that observed in other nations. The evolution of infant mortality showed two well-differentiated periods. Up to 1970, infant mortality declined more slowly than that of adults, while from 1970 onwards the opposite occurred. It seems that the most dramatic decline in infant mortality was obtained when health programs were effected with a holistic approach, backed by sustained economic growth that resulted in improved living standards. On the other hand, most of the rapid decline in adult mortality occurred during the period of relative economic stagnation, as a result of low-cost health programs. This suggests that infant mortality is more intimately dependent on the level of welfare and well-being of the population, a fact that will be analyzed in Chapter 3.

Another factor that may have contributed to the acceleration of the infant mortality decline is the dramatic reduction in birth rate registered during the period 1965-1975, a condition leading to fewer births of high-risk neonates (of very young and old multiparous women). Furthermore, the reduced birth rate likely correlates with better child care and survival.

Table 2.27

Age-Specific Death Rates: Costa Rica, 1900-1980, and More Developed Countries (MDC),[a] 1975.

Year	0[b]	1-4	5-19	20-39	40-59	60+
			Rates per 1,000			
1900	196.3	47.26	6.33	14.51	24.85	82.12
1910	208.5	50.60	5.40	12.10	23.98	80.75
1920	176.6	46.55	7.14	14.76	26.36	80.87
1930	171.7	34.86	4.86	8.60	17.04	71.40
1940	137.5	26.86	3.45	7.41	15.83	70.84
1950	95.5	17.12	2.09	4.26	11.25	65.51
1960	80.4	7.96	1.16	2.32	8.03	59.61
1965	81.1	7.75	1.09	2.29	7.73	59.14
1970	66.8	5.66	0.94	2.04	6.94	57.44
1975	39.9	2.36	0.73	1.80	5.92	54.80
1980	20.7	0.97	0.57	1.43	5.20	53.02
PD-1975[b]	11.3	0.57	0.43	1.04	5.70	51.72
			Annual average decrease(%)			
1900-80	2.8	4.9	3.0	2.9	2.0	0.6
1900-20	0.5	0.1	-0.6	-0.1	-0.3	0.1
1920-40	1.3	2.7	3.6	3.4	2.5	0.7
1940-60	2.7	6.1	5.4	5.8	3.4	0.9
1960-70	1.9	3.4	2.1	1.3	1.5	0.4
1970-80	11.7	17.6	5.0	3.6	2.9	0.8
1980-90[c]	6.1	5.3	2.8	3.2	-	0.2

[a]MDC = Denmark, France, England and Wales, Netherlands, Sweden, and United States of America.
[b]Probability of death.
[c]Reduction necessary to reach the 1975 MDC rates by 1990.

Source: Rosero and Caamaño (1984).

Table 2.27 shows the average mortality rates for Costa Rica and seven developed countries around 1975. The comparison illustrates how close Costa Rica's situation is to those nations. This fact poses the question of whether a continued decrease in mortality rates is possible with the available medical-sanitary technology. It might be enough to maintain the rate of decline of the last 10 years in order to reach an even lower figure before the end of the 1980s.

With regard to sex differentials in mortality, Costa Rica has followed the usual pattern of increment of male over female mortality. Thus, while in 1900 women had a life expectancy 1.8 years greater than men (35.4 vs 33.6), by 1980 the difference had widened to 4.7 years (75.0 vs 70.3).

2.6.3 **Mortality differentials.** Table 2.28 compares mortality among children less than 2 years old in Costa Rica and the rest of Latin America, according to mother's level of education, a variable associated with the risk of child death. Relative to the other countries, Costa Rica shows: (a) a lower infant mortality in each educational rank of the mother, and (b) a higher rate of education of women. Thus, in the overall average the difference is nearly twice that in each subclass, and the two components have a similar weight when explaining why Costa Rica has a mortality rate below the Latin American average.

Table 2.28

Probability of Death (per 1,000) under Two Years of Age, by Education of the Mother, Latin America and Costa Rica, 1966-1971.

Years of education	Latin America	Costa Rica	Ratio LA/CR
Total	117	81	1.44
None	150	125	1.20
1-3	118	98	1.30
4-6	91	70	1.20
7-9	61	51	1.20
10+	41	33	1.24
Ratio none/10+	3.7	3.8	

Source: Behm (1982).

After 1970, due to the emphasis of health programs on rural and marginal populations, the differences between high and low levels of maternal education in rural and urban groups were diminished in absolute and in relative terms (Table 2.29). Because of the possibility of error in data derived from sample surveys, as presented in Table 2.29, definitive conclusions cannot be drawn on whether the gap in mortality between different population strata was maintained, increased, or reduced. This question is addressed by Table 2.30, which shows differences in infant mortality between San José and the whole of Costa Rica for the past six decades.

Table 2.29

Infant Mortality Rate, by Residence and Mother's Education, Costa Rica, 1965-1984.

Variable	1965-1969	1970-1974	1975-1979	1980-1984
Global	75	64	22	19
Residence				
Urban San José	51	39	17	25
Other urban	71	75	18	15
Rural	86	71	26	17
Rural vs. urban San José				
Difference	35	31	9	-8
Ratio	1.7	1.8	1.5	0.7
Years of education				
< 4	89	83	33	29
4-6	73	56	20	12
7+	24	40	16	23
< 4yr vs. 7+yr				
Difference	65	43	17	6
Ratio	3.7	2.1	2.1	1.3

Source: Rosero and Caamaño (1984).

The information on mortality differentials illustrates the evolution of the Costa Rican society in the present century. Extreme inequalities during the first half of the century are a consequence of the historical factors already mentioned. In effect, Table 2.30 clearly shows that sanitary policies executed during that period mainly favored the more privileged groups, in this case the inhabitants of San José. This is not unusual and was a logical result of the prevailing social and economic structure. Sanitary progress was achieved first for limited segments of the population (coincidentally, those with better socioeconomic conditions) and afterwards, spread to the rest of the population. What is exceptional in the Costa Rican case is the reversal of the trend taking place in the 1970s, although the foundation for this was laid in the preceding three decades. In the 1970s, differences between mortality in the capital and the rest of the country stopped widening or even decreased.

Table 2.30

Infant Mortality Rate in Costa Rica and San José, 1920-1982.

Period	Rate per 1,000		Difference	
	Costa Rica	San José	Absolute	Percent
1920-24	194.2	171.4	22.8	13.3
1925-29	179.4	144.2	35.2	24.4
1930-34	160.0	120.2	39.8	33.1
1935-39	148.0	101.5	46.5	45.8
1940-44	131.0	89.4	41.6	46.5
1945-49	99.7	64.0	35.7	55.8
1950-54	87.2	56.0	31.2	55.7
1955-59	73.7	51.3	22.4	43.6
1960-64	76.4	49.6	26.8	54.0
1965-69	66.0	45.8	20.2	44.1
1970-74	51.0	36.4	14.6	40.1
1975-79	28.6	23.6	5.0	21.2
1980-82	18.6	19.3	-0.7	-3.6

Source: Rosero and Casmaño (1984).

Therefore, the beginning of the equalization process and the social reforms of the 1940s coincided with establishment of a new model of development, which provided the basis for programs aimed at reducing the differential levels of infant mortality.

2.7 Causes of Mortality

An understanding of the rapid manner in which specific causes of mortality decreased in Costa Rica is obtained by examining rates by disease group for the period 1929-1981. Causes of death were grouped by epidemiologic criteria (Table 2.31). The first group of diseases accounted for most of the mortality when Costa Rica was typically underdeveloped; these diseases frequently were exacerbated by malnutrition, and were perpetuated by the lack of health services. The second group includes a variety of diseases less clearly related than the previous category, but still compounded by malnutrition, and often complicated by or resulting as the sequela of infection; this group also had a marked decline in mortality. The third group includes degenerative and organic disorders--sometimes complicated by infection--which did not decrease as sharply as the first two groups. The fourth group comprises diseases that remained prevalent throughout and are typical of industrialized nations. While the first two groups were tackled with environmental interventions or basic medical care, sometimes through relatively inexpensive measures (e.g., immunizations), the last group can only be modified by considerable change in environmental conditions and life styles. In this group there are also conditions for which no adequate treatment or control measures exist, because of inadequate knowledge of etiology, for instance, congenital defects and immaturity.

Table 2.32 and Figure 2.4 show the evolution of the rates of causes of death from 1930 onwards. Diseases were grouped according to the classification proposed by Preston et al. (1972) and slightly modified to identify mortality due to malaria, ascariasis, and ancylostomiasis, diseases of great importance in the past in Costa Rica. Rates were standardized by indirect procedures based on mortality models by cause, age, and sex, as elaborated by Preston (1976). Standardized rates refer to a population with an age and sex structure like that of Costa Rica in 1950. Rates were also corrected to reflect the level of mortality implicit in the life tables of the corresponding years.

Although an improvement in diagnosis increased the percentage of deaths with medical certification, frequent changes in nomenclature introduced spurious variations in death rates by cause. Figures 2.4 and 2.5 demonstrate the decline of specific mortalities. Mortality attributed to microorganisms and parasites showed, without exception, rapid relative reduction throughout the study period. The fall in mortality due to malaria, parasitosis, and respiratory tuberculosis was especially spectacular. Similarly, mortality rates from diarrhea and acute respiratory infections declined dramatically, mainly after 1965.

Table 2.31

Crude Death Rates Per 100,000, by Cause, Costa Rica, 1929-1981.

Disease or group of diseases	1929-1931	1939-1941	1949-1951	1959-1961	1969-1971	1979-1981
Total	2,139	1,744	1,137	808	648.1	401
Diarrheal diseases	458	329	174	115	70.2	6.0
Acute respiratory infections	242	231	122	89	82.3	24.4
Malaria and typhoid fever	239	138	60	2	0.2	0
Intestinal helminthiasis	149	91	39	18	8	1
Preventable by immunization[a]	111	86	56	30	26.6	1.7
Tuberculosis	92	78	48	11	7.2	3.9
Meningitis	22	16	14	5	6.3	2.6
Typhoid fever, hepatitis	19	9	4	2	0.9	0.6
Rheumatic fever	13	11	9	7	3.6	1.9
Septicemia	11	12	5	2	12.9	2.6
Other infections	24	52	16	6	4.5	1.4
Convulsions (< 5 yr)	75	41	16	0	0	0
Nephritis	35	55	20	9	3.3	3.1
Anemia	29	35	29	9	6.2	1.7
Pregnancy, delivery complications[b]	28	24	12	7	3.8	1.1
Deficiency diseases	19	20	26	6	11.1	1.8
Other, digestive	72	45	36	21	19.6	10.9
Liver disease, cirrhosis	30	33	19	4	5.3	6.1
Other, genitourinary	29	18	11	6	5.5	4.1
Other, respiratory	18	16	15	6	3.9	12.6
Diabetes, thyroid disease	5	5	4	7	9	9.7
Cardiovascular diseases	130	151	127	96	116.7	98.6
Cancer	64	69	69	73	69.1	67.7
Immaturity and other (< 1 yr)	20	46	49	79	43.2	25.0
Congenital defects	6	6	5	12	10.7	13.7
Accidents (other), violence	50	46	46	33	28.8	30.8
Accidents, automobile	0	1	1	6	13.8	18.1
Senility	18	22	18	10	13.7	3.1
Poorly defined	98	41	54	104	49.7	33.5
Residue	34	17	34	23	12	13.4

[a]Poliomyelitis, diphtheria, pertussis, tetanus, measles, smallpox
[b]Includes sepsis of puerperium.

Source: General Directorate of Statistics and Census.

Table 2.32

Distribution of Deaths and Standardized Death Rates by Cause, Costa Rica, 1930-1980.

Cause of death	1930	1940	1950	1960	1965	1970	1975	1980
Crude death rate per 1,000	24.9	20.3	13.0	9.5	9.1	7.0	5.1	4.3
				Distribution per 1,000				
Total	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
1. Respiratory tuberculosis	38	42	40	12	11	9	9	7
2a. Malaria	112[a]	79	50	2	1	0	0	0
2b. Parasitic diseases	70	52	31	22	21	12	5	2
2c. Other infections	86	106	93	67	59	72	38	18
3. Neoplasms	30	40	61	92	98	104	147	169
4. Cardiovascular	60	87	112	125	136	185	224	251
5. Influenza, pneumonia, bronchitis	113	132	107	110	103	106	71	54
6. Diarrheal diseases	177	166	134	139	141	101	48	18
7. Certain chronic (nephritis, cirrhosis, ulcers, diabetes)	35	43	28	28	29	31	54	49
8. Maternal mortality	13	14	10	8	7	6	4	3
9. Certain diseases of infancy	9	26	43	97	122	85	74	65
10. Automobile accidents	0	0	1	8	13	21	37	43
11. Other violence	23	27	33	41	44	48	72	79
12. Other and unknown	234	186	256	250	215	220	218	243
				Standardized rates per 100,000				
Total	2,049	1,857	1,297	977	948	788	563	461
1. Respiratory tuberculosis	74	77	52	12	11	7	5	3
2a. Malaria	260	157	64	2	1	0	0	0
2b. Parasitic diseases	162	103	40	21	18	11	3	1
2c. Other infections	202	210	122	62	55	54	22	9
3. Neoplasms	51	68	79	94	94	78	77	70
4. Cardiovascular	88	138	146	133	134	141	117	104
5. Influenza, pneumonia, bronchitis	203	233	139	108	99	85	42	26
6. Diarrheal diseases	401	322	174	128	130	83	31	10
7. Certain chronic diseases	59	74	36	29	29	24	29	20
8. Maternal mortality	34	25	13	8	6	4	2	1
9. Certain diseases of infancy	24	56	56	88	114	77	56	44
10. Automobile accidents	0	1	1	7	12	15	18	17
11. Other violence	50	52	43	41	41	36	39	37
12. Other and unknown	441	341	332	244	204	173	127	119

[a]Includes fever.

Source: General Directorate of Statistics and Census (crude death rate corrected by authors).

Figure 2.4

Standardized death rates from infectious and noninfectious causes, Costa Rica, 1930-1980. Mortality attributed to all infectious diseases steadily and drastically decreased. Only mortality due to automobile accidents increased.

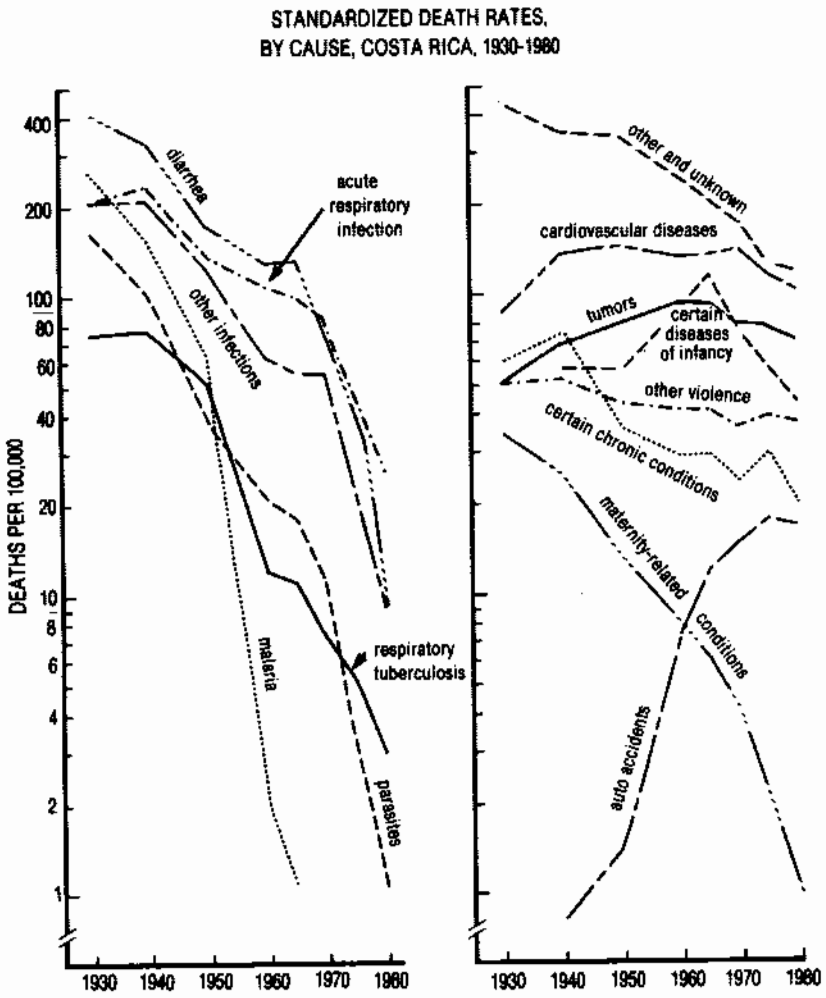
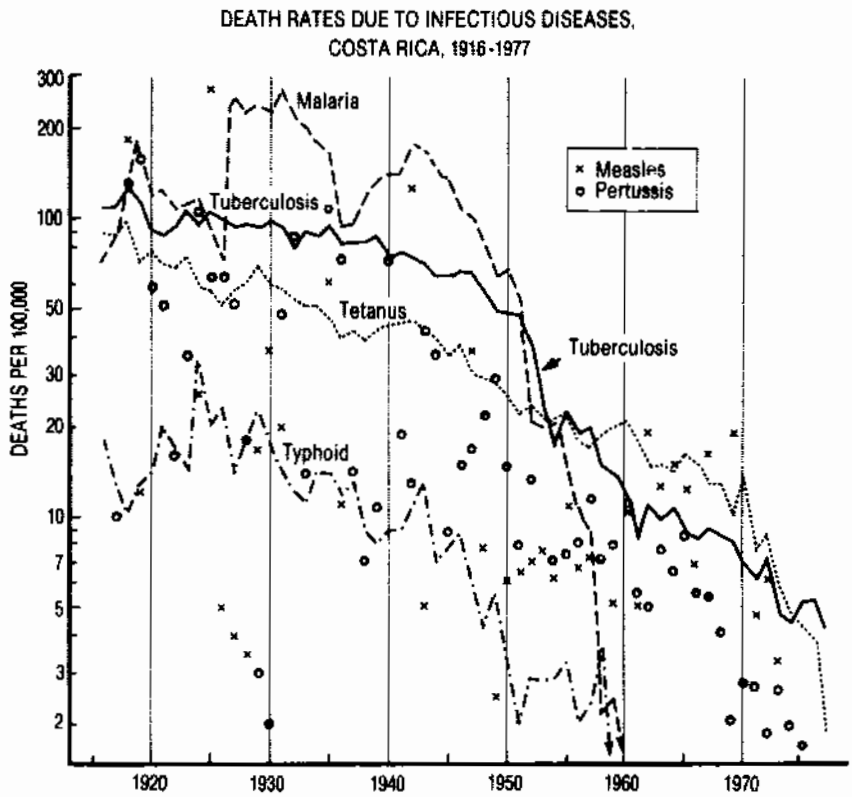


Figure 2.5

Crude death rates attributed to certain infectious diseases, preventable either by immunization or by environmental intervention.



The control of diarrheal diseases was so dramatic that it deserves special mention (Mata, 1983; Mata, 1985). Data are available since 1926. During the late 1920s and during the Depression, mortality rates remained high (around 300 per 100,000 population); this period correlated with a serious economic crisis in Costa Rica (Figure 2.6). Coinciding with improved educational, social, and environmental conditions, mortality decreased during the period 1940-1948. A civil war in 1948 was followed by internal migration, an increase in early weaning, and rapid demographic growth, coincidental with stagnation of mortality during the following 15-17 years. The emphasis on construction of water supplies, improvement in income and education, opening of the National Children's Hospital, and availability of rehydrating solutions for treatment of acute diarrhea with dehydration in all hospitals, clinics, health centers, and posts, were some of the factors related to the precipitous fall in diarrhea mortality in all ages in the last 20 years. The Rural Health Program, started in 1971, emphasized the construction of rural water supplies, immunizations against measles and other diseases, and treatment of severe cases of dehydration in health centers and posts. The control of diarrheal diseases helped to improve the nutritional status of children which, in turn, was a factor in decreasing the risk of premature death.

This relationship is evident in Figure 2.6, where peaks, depressions, and plateaus of the diarrheal disease and infant mortality curves coincide. The correlation of data was very high (Table 2.33), indicating that in all probability the control of diarrheal disease mortality was the major determinant in the reduction of infant mortality in Costa Rica, particularly during the last two decades.

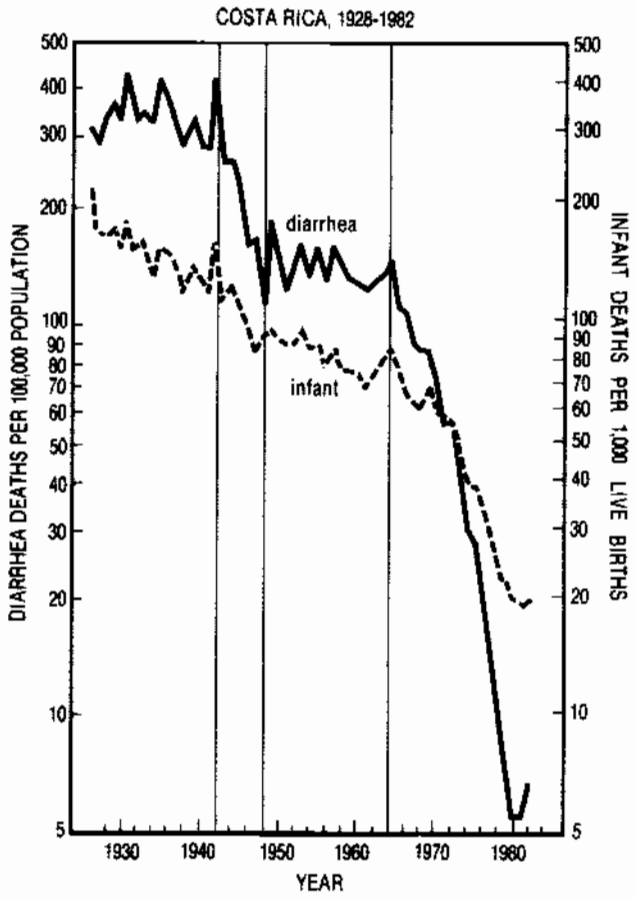
Table 2.33

Correlation between Diarrheal Disease Mortality and Infant Mortality, Costa Rica, 1965-1982.

Type of correlation	Correlation coefficient
Infant mortality rate versus infant mortality due to diarrhea	.986
Infant mortality versus crude diarrheal disease mortality	.970
Infant diarrhea mortality rate versus crude diarrheal disease mortality	.992

Figure 2.6

Crude diarrheal disease death rate and infant mortality rate in Costa Rica, 1926-1982. Note that all peaks, depressions, and plateaus of both mortality curves coincide (Mata, 1985).



On the other hand, causes of death not attributable directly to infectious or parasitic diseases did not show the same behavior, with the exception of mortality due to complications of pregnancy, which showed a relative reduction, as marked as that of infectious diseases. This may be contrasted with mortality due to automobile accidents, which showed a significant increase in recent times. Remaining relatively stable was mortality from accidents and violence, cardiovascular diseases, and cancer; these showed only a slight decline, although they may have been underestimated in the past due to faulty diagnosis and under-reporting.

The facts mentioned above demonstrate a radical change in the structure of mortality by cause (Table 2.34). The virtual eradication of malaria and the control of intestinal parasitosis is outstanding; these diseases accounted for 11 and 7 percent of deaths, respectively, in 1930. Of like importance was the fall of diarrheal diseases, which in 1930 contributed 18 percent of all deaths and in 1980 only 2 percent. Thus, in 1980 Costa Rica had a mortality profile similar to that of more developed countries (although the relatively young age structure accounts for some differences), with more than half of deaths due to cardiovascular diseases (25 percent), cancer (17 percent), and accidents and violence (12 percent).

For certain common infectious diseases, crude mortality rates have been computed from the middle of the period 1910-1920 (Figure 2.5). It is clear that the introduction of new treatments and preventive techniques had a marked effect on mortality. The impact of residual insecticides in the second half of the 1940s, the introduction of antibiotics at the end of the 1940s, and immunizations in the 1960s and 1970s can be easily observed.

However, it would be simplistic to attribute the entire decline to the new technologies. For instance, it can be seen that in the first half of the century, and especially since 1930, mortality from tuberculosis had already shown a substantial reduction, which in absolute terms was of the same magnitude as that taking place in the 1950s and attributed to newly required treatment, diagnosis, and immunization procedures. Therefore, it is evident that a complex set of factors interacted to reduce different causes of death. These include the previous antituberculosis programs; improved nutrition and resistance (itself resulting from diminution of the detrimental effects of infectious diseases); and less environmental contamination resulting from improved personal hygiene, sanitation in urban centers, elimination of breeding sites of flies and gnats, and improvements in food safety.

It is also possible to determine the decline of mortality for different diagnoses with respect to its initial relative importance (Table 2.34). The greatest proportion of the mortality decline in Costa Rica between 1940 and 1980 (at least 75 percent), was due to control of infectious and parasitic diseases. At least 40 percent of the decline

Table 2.34

Percentage Decline in Standardized Death Rates, by Cause, and Contribution to Total Mortality Decline, Costa Rica, 1940-1980.

Causes of death	% Contribution			% Decline
	1940-1980	1940-1960	1960-1980	1940-1980
All causes	100	100	100	75
Attributable to microorganisms	75	87	55	96
6. Diarrheal diseases	22	22	23	97
5. Influenza, pneumonia, bronchitis	15	14	16	89
2a. Malaria	11	18	0	100
2b. Parasitic diseases	7	9	4	99
1. Respiratory tuberculosis	5	7	2	96
2c. Other infectious diseases	15	17	10	96
Not attributable to microorganisms	25	12	45	45
9. Certain diseases of infancy	1	-4	8	61[a]
8. Maternal diseases	2	2	1	96
7. Certain chronic diseases	4	5	2	73
8. Cardiovascular diseases	2	1	6	25
3. Neoplasms	0	-3	5	26[a]
11. Other violence	1	1	1	29
10. Automobile accidents	-1	-1	-2	-1,700
12. Other and unknown	16	11	24	65

[a]Decline from 1965.

Note: The "minus" sign indicates increased mortality.

was attributable to the control of diseases intimately related to environmental hygiene (diarrhea, parasites, and malaria). Another 20 percent of the decline was related to control of influenza, pneumonia, bronchitis, and respiratory tuberculosis, a situation resulting from improved hygiene, resistance, and availability of new and efficient treatment.

On the other hand, there is an important difference in the factors responsible for the decline of mortality. While in the first period infectious diseases contributed to a decline on the order of 90 percent, in more recent years their contribution was 55 percent (Table 2.34). This reflects the access in recent years to specialized medical care through universalization of social security and improvements in welfare. Also important is the contribution made by the control of communicable diseases of childhood, cardiovascular diseases, and cancer. However, even in this second period the principal component of the decline continued to be the control of infectious diseases, namely, diarrhea (23 percent) and respiratory infections (16 percent). This advance resulted mainly from a reorientation and rationalization of health programs, and extension of coverage to the "rural-dispersed" and urban-fringe population through a primary health care strategy, within a framework of social development, redistribution of income, and social benefits.

2.8 Development of Intersectoral Action

One of the best illustrations of the empirical development of intersectoral action in Costa Rica is found in the coordination between the health and education sectors at the beginning of this century, to incorporate health education in the curriculum of grammar schools in urban and rural areas. The Costa Rican primary school program pioneered health education in the Americas and has been one of the most consistent examples of intersectoral cooperation.

Another example of intersectoral action was the coordination of the Directorate of Health, Ministry of Education, Ministry of Public Works, and police forces to improve sanitary education and water supplies in towns and rural communities. In 1942 the government decided to supply shoes to all schoolchildren in the country. Using resources from the central budget, promoting the shoe industry, and utilizing transport of the Public Works Ministry and other resources, Costa Rica provided shoes for more than 250,000 children within a two-year period--virtually the entire child population.

Although there is evidence that intersectoral action has been increasing during the last decades, most branches of the Government still work as separate and uncoordinated entities, often increasing the cost/benefit ratio of individual programs. Intersectoral action (previously known as coordination and cooperation) became a reality in Costa Rica in the last two decades when the Council of Government, comprised of the President, ministers, and executive presidents of institutions, began meeting every week to coordinate their actions.

Creation of the "Consejo Nacional de Población" (CONAPO) (National Population Council) represents a good example of intersectoral action, in that it coordinates all institutions and agencies responsible for, or interested in, population matters. CONAPO implemented the policy--not explicit on paper--which was partly responsible for the dramatic reduction in fertility observed during the 1960s and 1970s. For many years CONAPO received funding for activities of the Ministry of Health and Social Security, as well as those of religious and voluntary agencies, with demonstrable effectiveness. Claims of unethical sterilizations, coupled with ideological and religious protests, had a negative effect on CONAPO'S activities, which were partially assumed by the Ministry of Planning first, and later by the Ministry of Health, with less success.

Establishing the National Secretariat of Nutrition and Food Policy, under the Ministry of Health, was another attempt at intersectoral action. That body included representatives of all institutions and agencies responsible for food distribution, food policy, health policy, and nutrition research. While the Secretariat had positive results during the period 1978-1982, it was subsequently not reappointed.

During the decade of rapid health progress in Costa Rica (the 1970s) there were several unsuccessful attempts to merge the Ministry of Health and the Social Security Bureau into a National Health System. However, all public and charity hospitals were placed under one single institution, the Social Security Bureau.

Until 1970 many rural areas lacked health services, although health benefits were derived from the educational process, environmental sanitation, or specific interventions such as those against hookworm and malaria. The antimalaria program effectively brought the disease under control in the 1950s and 1960s. The infrastructure and human resources of the "Servicio Nacional para la Erradicación de la Malaria" (SNEM) (National Service for Eradication of Malaria) served as an inspiration for the creation of the "Programa de Salud Rural" (PSR) (Rural Health Program) started in 1971. Table 2.35 shows the activities undertaken by the PSR. Development of this program coincided with the economic bonanza derived from good international prices for coffee and other agricultural exports, and from the opening of roads throughout the country. Health posts were inaugurated almost every week and along with them came a new health philosophy based on the creation of "health committees" and the organization of community participation in each "rural-dispersed" (less than 500 persons) and "rural-concentrated" (500 to 2,000 persons) community. The organization of villagers was fundamental for primary health care, and was promoted through collateral actions by another governmental institution, the "Dirección Nacional de Comunidades" (DINADECO) (National Directorate of Communities).

In general, the rural health personnel carried out their task effectively and responsibly. Within a few years, they had contributed to the control (and in some cases eradication) of certain infectious diseases. The drop in infant mortality and the increase in life expectancy at birth was directly proportional to the coverage and number of years of the PSR in the community (Villegas, 1977) (see Chapter 4). In fact, the rate of increase in life expectancy at birth was greater in rural areas served by the PSR than in some urban areas where similar interventions had not been established. It can be safely stated that the quality of life in some rural areas is currently better than in many sectors of the large metropolitan area.

Table 2.35

Activities Carried Out by the Workers of the Rural Health Program (RHP)[a] in Costa Rica.

Acquaintance with the community
Organization of health committees
Census of homes; mapping
Immunizations (polio, DPT, measles)
Deworming
Family planning
Health education
Promotion of breast-feeding
Nutrition education
Prenatal care
Oral rehydration
First aid
Referral of cases
Environmental control
Water supply
Fecal waste
Sewage control
Food safety
Personal hygiene

[a]Communities with fewer than 2,000 inhabitants.

In 1979 intersectoral action was presented in most flow charts of the various Ministries and received impetus from the Office (now Ministry) of Planning. This Ministry launched a program for coordination of governmental interventions in each operational region and subregion of the country. For example, in the subregion of Puriscal--where INISA is conducting a long-term prospective field study on child health--an office of the Ministry of Planning was established to promote dialogue among representatives of the various governmental institutions to decide on priorities for action, to promote development of projects, and to search for and distribute funds for specific goals. The whole effort was oriented to problem-solving for the "extremely or critically poor" stratum, in this way reducing the dispersion of resources among the general population.

With significant participation by INISA, all government entities were represented in the community Council for Development of the Puriscal Subregion. The Council utilized data from INISA's long-term prospective study on child health to monitor situations such as the deterioration of nutrition or health of a given child, and mobilized personnel from the pertinent institutions to establish a diagnosis, possible cause, and measures to correct or ameliorate the problem. This course of action directed resources to the families in real need, namely, the extremely poor. Another role of the Council was to examine projects presented by individuals or authorities of the various districts and communities, to allocate resources, and to distribute those already available according to priorities. Unfortunately, the change of Government (in 1982) plus the current socioeconomic crisis interrupted most of this development. At present, the Health Commissions in each district suffer some inertia from the lack of action of the preceding Councils.

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3. THE PREVAILING HEALTH SITUATION

> The items of the National Budget earmarked for health do not reflect expenses but investments. ...The right to health is closely linked...to the preservation of liberty and peace in the Republic.
>
> Juan Jaramillo
> Ministry of Health, 1982-1986

The preceding chapters have attempted to describe the historic conditions and evolutionary processes that most probably were responsible for the rapid improvement of health indicators in Costa Rica during the last 15 years. The present health situation is controversial and paradoxical, in that the rapid control of infectious diseases, malnutrition, and premature death has been accompanied by a deteriorating health status as measured by parameters other than infant mortality and life expectancy at birth. Social pathology has increased during the present world economic recession, which in the case of Costa Rica was compounded by a very large foreign debt, a fall in international market prices for agricultural products, and the military conflict in neighboring Nicaragua and El Salvador. Even though the present health profile can be considered very favorable when compared with that of most less developed countries, internal economic and social pressures undoubtedly have had a negative effect on the quality of life. Furthermore, the economic constraints of the government have resulted in limitations for funding of certain health programs, especially those affecting primary health care for the rural population.

3.1 The Environment

3.1.1. Environmental sanitation. Most health professionals would agree that there has been a deterioration of the environment in Costa Rica in recent years, as a consequence of deforestation (mentioned particularly in Chapter 5), air pollution by exhaust fumes of combustion motors, accumulation of garbage, increased noise levels, and industrial contamination of the waters. However, other factors with a direct effect on health have improved, for instance, housing, water supply, and excreta disposal. Tables 3.1 and 3.2 show the marked improvement in availability of potable water in urban and rural areas, and the decreasing proportion of dwellings without latrines or toilets. The rapid increase in availability of flush toilets in recent years and the construction of lavatories, which are generally installed alongside, have undoubtedly contributed to interrupting transmission of diarrheal and acute respiratory infectious agents by direct person-to-person contact (Mata, 1985). While at least 23 percent of all houses lacked lavatories, according to the 1973 census, the data of the 1984 national census showed improvements. Other environmental variables with a positive effect on health are electrification and communications, which have had a remarkable development in Costa Rica.

Table 3.1

Piped Water Supply, Costa Rica, 1966, 1980, and 1984.

Type	1966	1980	1984	% Change 1966-80	% Change 1980-84
Urban					
With home connection	90	98		+9	
Supplied	100	100			
Rural					
With home connection	34	62		+82	
Supplied	50	65		+30	
Total					
Supplied	74	82	87	+11	+6

Source: Costa Rican Institute of Aqueducts and Sewers (1982; 1985).

Table 3.2

Excreta Disposal in Costa Rica, 1963, 1973, and 1984.

Service	Number of homes (%) 1963	1973	1984	% Change 1963-73	1973-84
None	58,976 (25.8)	36,675 (11.1)	19,346 (3.9)	-57	-65
Latrine	101,160 (44.2)	147,752 (44.7)	147,936 (29.6)	-0.1	-34
Water toilet	68,705 (30.0)	146,430 (44.3)	332,748 (66.5)	+48	+50
Both	169,865 (74.2)	294,182 (88.9)	480,684 (96.1)	+20	+82
Total homes	228,884 (100)	330,857 (100)	500,030 (100)		

Source: General Directorate of Statistics and Census 1973; 1984.

3.1.2 Pollution. Costa Rica has remained predominantly rural; however, despite the limited development of industry, the use of fertilizers and pesticides in agriculture and the proliferation of motor vehicles have produced significant contamination of the soil, water, and air with dangerous man-made pollutants (see Chacón et al., 1982). Air pollution became particularly severe by 1979, and no special measures have been effected to control pollution by motor fuel exhaust.

The main pollution problem today is from the constant use of pesticides and herbicides in agriculture, with practically no control by the Government. There is no systematic surveillance of environmental contamination, and no control of pesticide residues in wild life, animal products, and foods in general, although some effort in determining contamination levels in these areas is being made in the universities. Male sterility has been found to be associated with indiscriminate use of one particular helminthicide in banana plantations (Ramírez and Ramírez, 1980). Excessively high levels of DDT and other insecticides have been found in human milk.

Efforts were made by one administration (1978-1982) to decrease noise pollution, with limited success. Another administration (1982-1986) has emphasized the control of cigarette smoke, but has not succeeded to date. Some modest action has been taken against pollution of surface waters, but nothing is being done to control motor exhaust fumes.

3.2 Health Care Delivery

3.2.1 Infrastructure. Costa Rica has a semiconsolidated system for delivering health care, but efforts are being made to create a unified National Health System (Casas and Vargas, 1980; Jaramillo, 1983; Mohs, 1983a). The government institutions responsible for health care are listed in Table 3.3. There is a genuine commitment by the Ministry of Health to expand primary health care to all of the population. However, with the present crisis, the various departments may not have the necessary funds to completely fulfill the goal of health for all by the year 2000 (see Chapter 4).

i. Ministry of Health. The Ministry of Health is the primary institution of the National Health System; the Minister of Health is the highest health authority in the nation. There is a commitment to cover the entire population of the country, to control infectious diseases, and to promote health through community organization and preventive and curative measures. The National Health Plan's specific targets have been recently reviewed, and new priorities were established for action in forthcoming years.

The Ministry of Health presently has five Divisions: Programmatic Regions, Epidemiology, Environmental Sanitation, Medical Services, and Administration. The Division of Programmatic Regions includes the Rural

Table 3.3

Government Institutions and Organizations Concerned with the Health Sector, Costa Rica, 1984.

Name	Year founded[a]	Activities
Ministry of Health (MS)	1949	National health policy Health services Primary health care Rural medical services
Social Security Bureau (CCSS)	1943	Medical care Hospitalization, maternity Rehabilitation, care of the handicapped and the aged Pension and death insurance
National Patronage of Childhood (PANI)	1930	Care of abandoned, mistreated, and abused children
National Institute of Insurance (INS)	1948	Care of workers injured in accidents at work
Costa Rican Institute of Aqueducts and Sewers (AA)	1961	Construction and administration of aqueducts and sewers
Mixed Institute of Social Aid (IMAS)	1971	Housing development for the poor, food distribution to marginal groups
National Institute of Alcoholism (INSA)	1972	Care of alcoholics
General Directorate of Social Development and Family Allowances (DESAF)	1974	Funding of health activities of MS, IMS, CCSS, etc.
National Institute of Urbanism (INVU)	1954	Housing development
National Council of Production (CNP)	1948	Storage, marketing, and price control of grains and other foods

[a]Most institutions were preceded by bodies founded years or decades earlier. To illustrate, the Secretariat of Health was founded in 1927; a private program for the care of alcoholics was created in 1954; a small institute of insurance agencies existed in 1924.

and Community Health Departments in charge of primary health care for the small towns and sparsely populated rural areas. To this effect, the country has been divided into five programmatic regions corresponding to the main ecological and geographical zones.

The Division of Epidemiology is in charge of the control of arthropod-borne diseases (malaria, yellow fever, and filariasis), leprosy and tuberculosis, and the surveillance of infectious diseases and other morbidity (Jaramillo, 1983).

The priority given to the Rural Health Program (RHP) is reflected in the size of the human resources allocated for, and the coverage of, the rural dispersed and concentrated populations (Tables 3.4 and 3.5). The primary functions of workers in the rural and community health programs are: (a) census and mapping of the rural dispersed population; (b) immunization against poliomyelitis, diphtheria, pertussis, tetanus, measles, and tuberculosis; (c) treatment of intestinal parasites; (d) primary diagnosis and referral of cases to health centers and hospitals; (e) family planning; (f) promotion of breast-feeding and child nutrition; (g) food distribution; (h) promotion of family health; and (i) community organization. The program reached a peak in 1979 (Table 3.5) (Jaramillo, 1983; Mohs, 1983a). Thereafter, a deterioration of the program occurred, as will be seen in Chapter 5. The negative trend appears to have abated in 1983. The main factors in the decline of some health indicators in 1981-1982 were economic, including an inability to fill vacant posts, to purchase fuel and spare parts for rural vehicles, and to cover per diems for health workers traveling to distant rural areas. Furthermore, the natural deterioration of rural roads was often neglected, and public transportation also worsened, which diminished the success of the RHP.

The RHP is fundamental for the first and second levels of health care, that is, for promotion of health education in the homes and for direct delivery of primary health care in the communities. These activities have had an outstanding role in improving health in Costa Rica (see Chapter 4). Careful comparison of similar communities with and without the benefit of the RHP revealed marked differences in the evolution of life expectancy at birth (LEB). Thus, the yearly increase in LEB was proportional to the coverage of the population by the RHP (Table 3.6). Furthermore, there was a direct relation between the yearly increase in LEB and the number of years of coverage by the RHP (Villegas, 1977; Ortega, 1977). However, a basal yearly increase of 2.4 years of life expectancy was observed even without provision of primary health care, which strongly suggests that there was an improvement in the quality of life, positively affecting child survival in the most rural population.

Table 3.4

Human Resources of the Rural Health Program, 1979-1985.

Resource	1979	1980	1981	1982	1983	1984	1985
Director (Physician)	1	1	1	2	1	1	1
Regional Supervisor (Physician)	5	5	5	5	5	5	5
Field Supervisor[a]	36	36	34	35	36	39	36
Rural Health Assistant[a]	233	250	231	243	241	264	304
Auxiliary Nurse[a]	193	203	162	161	160	158	156
Surveyor	5	5	4	-	-	-	-
Amerindian health promoter	5	6	7	7	9	-	9
Pollster	-	-	-	4	3	-	-

[a]High school graduates with further health training.

Source: Ministry of Health.

Table 3.5

Coverage by the Rural Health Program, 1973-1985.

Year	Rural population (thousands)	Number of health posts	Coverage by RHP			% Population covered
			Communities	Homes (thousands)	RHP population (thousands)	
1973	1,112	50	800	30	115	10.3
1975	1,169	140	2,240	84	360	30.8
1977	1,159	251	3,750	144	650	56.1
1979	1,201	287	4,018	160	717	59.7[a]
1981	1,259	294	3,050	156	640	50.9
1983	1,342	301	4,008	185	777	57.9
1985	1,430	313	4,163	202	835	58.3

[a]Figure represents 95 percent coverage of the rural dispersed population (communities with less than 500 people).

ii. Social Security. The Social Security Bureau, the largest of the health institutions, is also the best funded, with over 80 percent of the total health budget. It is organized for the delivery of medical care through a network of hospitals around the nation. The Bureau divided the country into five programmatic regions that overlap to some extent with those of the Ministry of Health. The institution is always under scrutiny because of failure to cope with excessive demands, its large bureaucracy, and impersonal medical services. Also, there has been an overdevelopment of physical resources and high technology in the hospital system that has led to increasingly more complex and costly medical care, in addition to overt duplication of equipment, human resources, and activities.

There are four Class A hospitals affiliated with the School of Medicine of the University of Costa Rica, and four additional specialized hospitals (neuropsychiatry, rehabilitation, research, etc.) to cover Level Five of health care. Furthermore, there are 20 regional hospitals scattered throughout the nation which permit rapid access to diagnostic and curative services. These correspond to Level Four of health care, primarily hospitalization centers with facilities for obstetrics, some surgery, and treatment. Finally, the Social Security Bureau has 100 clinics dispersed throughout the country (Level Three of health care), which are responsible for diagnosis and treatment of the most frequent illnesses (diarrhea, acute respiratory infection, parasitism, anemia, diabetes, urinary tract infections); prenatal care; family planning; and minor surgery. Social Security theoretically does not intervene in the first and second levels of health care, which are of the domain of the Ministry of Health. However, the immunizations, health education, and prenatal care programs of Social Security are more costly, and may duplicate and overlap in some instances those of the Ministry of Health. Differences in cost reflect, in part, higher salaries in the Social Security; also, Social Security actions are institution-based, and the cost of running health care installations is always high.

The human resources in the country's health sector (Table 3.7) are mainly concentrated in the Social Security Bureau and are unevenly clustered in the hospitals of large metropolitan areas. Rates of health personnel per 10,000 population indicate the favorable position of Costa Rica with regard to most Latin American nations. The level of training of personnel is as follows: auxiliary nurses have a high school degree, while graduate nurses undergo five years of university training; microbiologists and pharmacists train for five years; dentists and physicians for six. Physicians must spend, after internship, one year of "social service," primarily in a rural area. The other health professionals must also comply with training and "social service" requirements in hospitals or rural areas. About 10 percent of the physicians undergo a 3 to 4 years' residence program accredited by the University of Costa Rica; many specialize overseas. Table 3.7 does not include hundreds of paramedical personnel specialized in a diversity of medical technologies (radiology, laboratory services, physiotherapy, etc.) or the personnel in the rural health and community health programs (Table 3.4).

Table 3.6

Percentage of Population Served and Time Served by Rural Health Program, and Increase in Life Expectancy at Birth (ILEB), Costa Rica, 1970-1976.

Population served, %	ILEB, years
0	2.4
<25	2.4
25-49	3.5
50-74	4.0
75+	5.1
Time served, years	
0	2.4
<1	4.2
1	4.5
2	3.4
3	5.1

Source: Villegas (1977).

Table 3.7

Human Resources in the Health Sector, Costa Rica, 1983.

Human Resources	Number	Rate per 10,000 population
Physicians (including field physicians)	2,300	9.6
Dentists	716	3.0
Microbiologists	608	2.5
Pharmacists	702	2.9
Social workers	350	1.5
Graduate nurses	1,700	7.1
Auxiliary nurses	5,532	22.7
Nurse assistants	1,355	5.6
Laboratory assistants	257	1.1
Pharmacy auxiliaries	494	2.1
Sanitary inspectors	131	0.6
Community health assistants	269	1.1
Rural health assistants (PHC)[a]	241	1.1
Auxiliary nurses (PHC)	160	0.7
Field supervisors (PHC)	36	
Regional supervisors (PHC)	5	
Surveyors (PHC)	3	
Amerindian health promoters (PHC)	9	

[a]Personnel engaged in primary health care.

Costa Rica has sophisticated medical care, even by the standards of industrial nations. Clinical medicine, surgery, and diagnosis use modern technology developed in industrialized countries. There are several cobalt sources and ultrasound and computerized axial tomography units. Open heart surgery and corrective surgery for congenital defects are routinely done; more than 1,500 kidney transplants have been performed, most of them successfully. The major medical services are of excellent quality and are internationally recognized.

By contrast, the general operation of the Social Security Bureau is marred by excessive bureaucracy, sluggishness, and impersonal treatment. An example is the daily emptying of outpatient services after 3:00 p.m. (1:00 p.m. in rural areas), when most physicians and other staff leave their jobs to work in private medicine, in other State-paid jobs, or go home. This sudden emptying of hospitals affects the quality of care and is a source of suffering by patients who may need prompt or steady support from a physician. Although hospitals have personnel to cope with emergencies, the general level of care would benefit from a different service arrangement.

Another interesting feature in State hospitals is the pension system, consisting of better equipped and cleaner rooms where medical services are paid by the patient. Some pension services may be better than those in the general hospital service, while payment is lower than the actual cost of the bed. Residents, interns, and other hospital staff provide services in this system, but generally only the physicians directly responsible for hospitalization of the patient, and senior colleagues, receive compensation from this private arrangement.

iii. Other government enterprises. As mentioned in Chapter 1, medical care to workers injured at work is provided by the National Institute of Insurance (INS). Services are offered in outpatient clinics within the main hospitals of the Social Security network by physicians and other staff paid directly by the INS. Surgery and specialized medical care is provided by such hospitals, but rehabilitation is done in a specialized network hospital.

iv. Private and "mixed" medicine. Although more than 80 percent of physicians, microbiologists, and nurses work for the Government (primarily in the Social Security), the private medical sector is strong. It can be safely stated that whoever can afford to pay a private physician will do so to avoid the congestion, depersonalized attention, and slowness of the regular State services. Private medicine is practiced by the most prominent physicians and university professors; the income derived from private practice is often larger than that obtained from the State. It is evident that social medicine, although important for the country's development, has failed to adequately compensate the medical profession. Clinics and offices are concentrated in the cities and often are near the hospitals where physicians work. Private practice generally operates from 3:00 p.m. onward, but physicians in hospitals can use their State-paid time to see private patients and use the pension system to hospitalize and treat their own patients.

In addition to the private practice within the hospital system, there are three major private clinics and several small clinics (ultrasound, orthopedics, pediatrics, etc.) operated by groups of physicians. Most of the private clinics have one affiliated laboratory directed by a professional in clinical microbiology. The majority of dentists and dental workers operate privately; most of the microbiologists are on the Government payroll, but there are about 30 private laboratories in the country. More than one half of the pharmacists are employed by drug stores or in pharmaceutical, cosmetic, and infant food and formula manufacturing and distribution companies.

A system of "mixed medicine" was recently established whereby patients can visit and pay their private physicians, with costs of laboratory tests and prescriptions absorbed by Social Security. Mixed medicine is an effort to humanize medicine, to ameliorate unemployment and improve income among physicians, and to ease the congestion in hospitals and clinics.

3.3 Health Indicators

Current health indicators are excellent despite the serious economic crisis affecting Costa Rica at the present time (Table 3.8). One explanation for this paradoxical situation is that these indicators reflect an immediate past of public health and economic success and are not yet showing the constraints of the present crisis. Another possibility is that the Costa Rican population had already attained a high rate of literacy, health education, and nutrition.

The most impressive indicators are the low mortalities for infants and 1 to 4 years old and the high life expectancy at birth, comparable to those of some advanced European nations. It should be pointed out that the current infant mortality rate in Costa Rica and Cuba is lower than in other less developed nations, and less than those of most Eastern European countries. The low infant mortality rate at the turn of 1982 is attributed to a series of factors reflecting an improved quality of life, such as adequate maternal nutrition (as evidenced by the low incidence of low birthweight), adequate coverage of primary health (prenatal) care, the high rate of hospital births and availability of special medical care for high-risk neonates, improved care of neonates immediately after birth, promotion of breast-feeding, and prospective observation of babies--particularly high-risk infants--in rural areas (immunization, nutrition).

Demographic indicators show stagnation after 1979. The birth rate, which declined faster in Costa Rica than in any other Latin American country, stabilized and even rose from 29 to 31 per 1,000 during 1979-1982. The birth rate decreased in 1983 to 29.9, and, in the study region of Puriscal, the birth rate dropped from 27 to 23 per 1,000 from 1979 to 1983.

Table 3.8

Health Indicators in Costa Rica, 1982.[a]

Infant mortality/1,000 (1983)	18.3
Neonatal mortality/1,000	10.7
Second year mortality/1,000	0.8
Life expectancy at birth, years	73.0
Prevalence (%) of contraception (1980)	
Urban women	69.0
Rural women	61.0
Overall fertility, children (1980)	
Urban women	3.0
Rural women	4.0
Birth rate/1,000 (1980)	31.2
Death rate/1,000 (1981)	4.0
Annual population growth (%) (1970-1981)	2.8
Percent of low birthweight (< 2.5 kg)	8.0
Percent infants breast-fed	90.4
Percent malnourished (0-5 year olds)	
II degree (60-74% weight/age)	3.9
III degree (< 60% weight/age)	0.2
Overweight (> 110% weight/age)	9.9
Percent with goiter (5-15 year olds) (1979)	3.6
Percent deliveries, women < 20 years old	20.0
Percent infants out-of-wedlock	38.8
Percent alcoholics (> 15 years old)	
Men	10.0
Women	1.0
Homicides/100,000 (1979)	4.6
Suicides/100,000 (1979)	4.6
Child abuse syndrome/100,000 (1983)	9.0

[a]All data are for 1982, unless otherwise indicated.

Economic indicators in 1981 showed the deterioration already described, impacting on the per capita investment in education and health as depicted in Figure 2.1. Unfortunately, the programs that are suffering most during the present crisis are those in rural areas, which are unable to compete with the power structures of the large urban elite groups for scarce funds. The Ministry of Health is attempting to correct this imbalance.

The total percentage of the gross national product invested in health remained high and even tended to increase, despite the deterioration of some services. As will be explained in Chapter 5, the main reason for this contradiction is the heavy investment made on very costly programs, particularly the school lunch and food distribution programs, which are overly developed and have a low cost-benefit ratio. One of the reasons for the sustained support of these programs is their political impact; this has created a structure that will be difficult to dismantle.

The dramatic control of infectious diseases has been indirectly responsible for the improved nutritional status of preschool children, and for the lower risk of premature death, particularly in rural and marginal urban population groups (Mata and Mohs, 1978; Mohs, 1982a; Mata, 1983). The current percentage of underweight and stunted children is similar to that observed in many advanced industrial societies. Concurrently, there has been an increase in the rate of overweight preschool children over the last 15 years (Díaz, 1983). Also, the national nutrition survey of 1982 revealed more than twice as many overweight as undernourished children in the country (Jaramillo, 1983). The prevalence of severely malnourished children in 1982 was so low that theoretically it would be feasible to locate and treat all of them. The incidence of obese children has also increased in urban and rural areas alike, and deaths of obese children were recently reported at the National Children's Hospital.

To illustrate the recent change in the health profile, the relative position of the ten main causes of death in the general population in 1970 and 1981 is depicted in Table 3.9. In 1970, acute diarrheal diseases and acute respiratory infections appeared second and third after heart disease. Measles and tetanus occupied the ninth and tenth place. In 1981, none of the infectious diseases, except for acute respiratory infections (displaced to the sixth position), appeared among the first ten causes of death. The first five causes were all related to lifestyles; they demand special preventive actions which are as yet poorly defined and for which more research is required on causality and on methods for educating the population.

The decreased incidence of the traditional diseases of preindustrial societies, namely, malnutrition and infectious diseases, uncovered a different set of public health priorities. Illnesses related to overconsumption, unhealthy lifestyles, stress, and social pathology

Table 3.9

Principal Reported Causes of Death, Rates per 100,000, Mortality (%), and Rank, 1970 and 1981, Costa Rica.

1970				1981			
Cause	Rate	%	Rank	Cause	Rate	%	Rank
Heart disease	86.4	13.0	1	Heart disease	70.9	18.2	1
Diarrheal diseases	70.2	10.5	2	Cancer	61.2	15.7	2
Acute resp. infections	65.3	9.8	3	Accidents	33.7	8.6	3
Cancer	64.9	9.7	4	Perinatal causes	24.5	6.3	4
Perinatal causes	38.0	5.7	5	Cerebrovascular	23.8	6.1	5
Accidents	38.0	5.7	5	Acute resp. infections	18.7	4.8	6
Cerebrovascular diseases	30.4	4.6	7	Congenital defects	14.8	3.8	7
Bronchitis, emphysema	18.7	2.8	8	Diabetes	8.9	2.3	8
Measles	14.0	2.1	9	Chronic lung disease	6.9	1.8	9
Tetanus	12.6	1.9	10	Cirrhosis of liver	5.9	1.5	10

Source: General Directorate of Statistics and Census (1983).

increased in relative and often in absolute numbers. Social pathology includes--among other problems--alcoholism, smoking, drug consumption, family disruption, violence, vagrancy, and prostitution. While the traditional diseases were controlled and prevented with methods that depended not merely on improved quality of life but on specific interventions, the new illnesses require greater individual responsibility, community organization, and government policies in order to induce a positive change.

3.4 Health Priorities

The best way to identify health priorities in contemporary times is to examine morbidity and mortality profiles in the various age groups, social strata, geographic regions, and ethnic and occupational population groups. There is limited information on morbidity; the existing data are derived primarily from visits to the clinics of the Social Security and Ministry of Health. Information is plagued with biases inherent to the way visits are made and recorded. Other morbidity data have been obtained by surveys of outpatient clinics or by prospective observation of a cohort of rural infants and preschool children in their natural setting.

Data from a survey conducted in all Social Security clinics show that acute respiratory infections are the most frequently diagnosed illnesses, with 11.9 percent of the total (Table 3.10), although the overall infectious morbidity is reportedly much lower now than in the recent past (Social Security Bureau, 1984). The marked decrease in hospital beds (Table 2.9) from 4.1 per 1,000 population in 1970 to 3.3 per 1,000 in 1980 is indicative of the reduced morbidity and improved health in recent years. A good indicator of decreased morbidity is the 40 percent reduction of occupied beds in the National Children's Hospital and the closing of its malnutrition ward in 1977 due to the dramatic decline in incidence of severe energy-protein malnutrition over the last 15 years.

Another way of establishing priorities is through examining the profile of hospital discharges, illustrated in Table 3.11 for all Costa Rican hospitals during 1982. The data reveal that 20.3 percent of all discharged persons older than 10 years were women who had given birth with normal deliveries, and an additional 27.4 percent had ailments related to pregnancy (for instance, abortion), childbirth (e.g., pelvic disproportion), or other problems of female reproduction. Interestingly, diseases thought to be important by the general public (cancer) do not appear among the first 15 diagnoses at discharge. Asthma was the first nonobstetrical diagnosis to appear (rank 7), accounting for 2.2 percent of all discharges. It was followed by acute appendicitis (rank 10), representing 1.7 percent of the discharges. Schizophrenic psychosis had an important relative position (rank 11) and accounted for 1.6 percent of the discharges. Diabetes mellitus ranked 15th, but it had a higher level of mortality than all 14 diagnoses previously listed.

Table 3.10

Medical Diagnoses in Outpatient Services, Both Sexes, Social Security and Ministry of Health, Oct.-Nov. 1983.

Diagnoses	Number	%
Acute respiratory infections	10,143	11.89
General examination	5,800	6.80
Skin diseases	5,063	5.94
Checkup of healthy child	2,685	3.15
Prenatal care	2,652	3.11
Headache	2,559	3.00
Hypertension	2,556	3.00
Gastritis, ulcer	2,539	2.98
Digestive tract diseases	2,156	2.53
Family planning	2,086	2.45
Abdominal pain	2,063	2.41
Gynecologic examination	2,013	2.36
Neurosis	1,984	2.33
Arthropathies	1,717	2.01
Lumbalgia	1,691	1.98
Other infectious and parasitic diseases	1,598	1.87
Cytology	1,555	1.82
Malaise or fatigue	1,480	1.73
Other causes	30,930	36.26
Undetermined	2,035	2.38
Total	83,305	100.00

Source: Social Security Bureau (1983).

Table 3.11

First 15 Diagnoses of Hospital Discharge, Persons 10 Years Old or Older, 1982, Costa Rica.

Rank	Code	Diagnosis	Number (relative %)
1	650	Normal delivery	31,984 (20.3)
2	644[a]	Premature delivery	9,414 (6.0)
3	637[a]	Abortion, nonspecified	6,531 (4.2)
4	664[a]	Traumatisms of female genitals	5,238 (3.3)
5	654[a]	Abnormalities of pelvic tissues	4,939 (3.1)
6	656[a]	Fetal and placental problems	3,943 (2.5)
7	493	Asthma	3,516 (2.2)
8	626[a]	Menstrual alterations	3,131 (2.0)
9	645[a]	Postmature pregnancy	2,892 (1.8)
10	540	Acute appendicitis	2,600 (1.7)
11	295	Schizophrenic psychosis	2,526 (1.6)
12	653[a]	Pelvic disproportion	2,383 (1.5)
13	454[a]	Varices of lower limbs	2,379 (1.5)
14	854	Intracranial traumatism	2,318 (1.5)
15	250	Diabetes mellitus	2,233 (1.4)
Subtotal			86,027 (54.7)
Total discharges			157,368 (100)

[a]Pathology related to human reproduction

Source: Social Security Bureau (1984).

Undoubtedly, health problems affecting women's reproduction occupy the first priority in absolute numbers and in a variety of pathologies, as indicated by hospital discharges in Costa Rica. The situation does not necessarily correlate with the priority given to care for women, which appears to be lower than required.

For a better understanding of the rapid change in health status in Costa Rica in the last few years, the causes of death, expressed as proportionate mortality by age, are presented in Table 3.12 (Mata, 1983). It should be noted that most deaths in 1981 were of persons 45 years old or older (66 percent), followed by deaths among infants (14.5 percent) and of persons 15-44 years of age (14.3 percent). This represents a striking change from the pattern observed two decades ago, in which infant deaths accounted for a much larger proportion of the total. The significance of a death in the community has also changed: the death of an infant in rural areas was readily accepted with resignation 40 years ago, while it is a tragedy now. The death of an adult, an often shocking event in the past, is generally accepted with pragmatism today.

In Table 3.12, figures for the four main causes of death are underlined. In all age groups, the four main causes accounted for 63 to 77 percent of all deaths, an observation of practical consideration when analyzing priorities. Among infants, perinatal problems, congenital defects, respiratory infections, and other infectious diseases predominated. In preschool children, infectious and parasitic diseases, acute respiratory infections, traumatisms and intoxications, and congenital defects were the most common. For school children, traumatisms and intoxications accounted for a third of all deaths, followed by tumors, diseases of the central nervous system, and acute respiratory infections. Among adolescents and young and mature adults, traumatisms and intoxications accounted for almost one half of all deaths, and were followed by tumors, cardiovascular diseases, and diseases of the digestive tract. In adults 45 years of age or older, a third of the deaths were attributed to cardiovascular diseases and a fifth to tumors, followed by "ill-defined" deaths and traumatisms and intoxications. However, since the majority of deaths occurred in this age group, the cardiovascular diseases turned out to be the main cause of overall mortality, as shown in Table 3.9. The same applies for tumors and accidents, which occupied the second and third places. Control of infections remains an important priority--acute respiratory infections persist as an important cause of death among children and occupy the sixth place in the overall national mortality. The increased relative importance of perinatal problems and congenital defects illustrates the necessity of adapting primary health care programs to new priorities and thus stands as one of the great challenges of modern public health.

Still another way of looking at priorities is by population groups with special risks. According to this viewpoint, infants, preschool children, and mothers represent the first priority when considered as a long-term investment for Costa Rican society. Because mothers and infants can be easily reached by primary health care, and because health

Table 3.12

Mortality Percentage, by Cause of Death and by Age, Costa Rica, 1981.

Cause of death	Age, years <1	1-4	5-14	15-44	45+
Perinatal problems	43.5[a,b]				
Congenital defects	21.2	12.6	5.9	1.4	0.1
Acute respiratory infections	12.4	16.6	7.3	3.5	9.2
Infectious diseases	8.5	21.1	5.9	2.9	2.3
"Ill-defined"	6.3	11.7	5.5	4.3	11.7
Central nervous system diseases	2.4	8.5	11.4	4.2	0.9
Traumatisms and intoxications	1.5	13.0	33.6	41.2	5.5
Tumors	0.2	5.7	16.8	15.5	22.3
Cardiovascular diseases	1.3	1.3	4.1	13.3	35.1
Digestive tract diseases	0.5	2.8	1.8	4.7	5.2
Total deaths	1,302	247	220	1,287	5,934
Four most common causes	77.1	63.3	69.1	74.7	72.1

[a]Percent of deaths in age group.
[b]Four most common causes appear underlined.

education that reaches the mother spreads to the rest of the family, extension of coverage to this group is especially important. Another particular group at risk is the elderly, who are recognized as a growing demographic force. Finally, adolescents (particularly young girls, who account for 20 percent of all pregnancies) and workers in industry and agriculture are populations at risk and which should receive priority attention, since much of the social pathology seen today occurs in these groups.

In Costa Rica there are several "minority" or special population groups that deserve particular attention. They have different historical and economic backgrounds and present particular challenges to public health action. The most prominent of these groups are the blacks (about 2 percent of the population), most of whom live on the Atlantic Coast,

concentrated mainly in Limón, the main seaport on the Caribbean. The bulk of the black population is descended from the labor force brought from the Caribbean islands by the banana and railway companies at the end of the last and beginning of the present centuries. This population was supposed to return to its homeland at the end of its contracts, but the companies did not fulfill their agreements. By 1940, generations of English-speaking and Patuá-speaking blacks, unfamiliar with Spanish and lacking Costa Rican citizenship, were trapped on the Atlantic Coast without the legal option of reaching the highlands. The Government granted Costa Rican citizenship to all blacks in the early 1940s, and shortly thereafter they began migrating to other areas. Integration has been rapid, and most of the blacks are now bilingual. They contribute to the labor force in the service sector, but are primarily engaged in traditional and primitive agriculture. The blacks are also an important pressure group in union struggles for better labor and social conditions. This group exhibits slightly unfavorable health indices compared with the rest of the country and is at a relative disadvantage in terms of health service coverage.

Another minority group is the Amerindians (1 percent of the population), who live in several tribes scattered throughout the country. These Indians belong to different language groups and exhibit different degrees of assimilation to the Costa Rican culture. Their main problem is derived from threats and attempts by non-Amerindian people to dispossess them of their land, and the acquisition of lifestyles which are deleterious to their culture, for instance, early weaning, certain Western food habits (consumption of excessive sugar and salt), and alcoholism. Amerindians are not integrated into the food production scheme of the country, and carry out an independent form of subsistence agriculture that permits preservation of certain of their positive cultural traits. However, their overall situation is better than that of indigenous groups in some industrialized countries, for example, the American Hopi and Navajo Indians, because alcoholism and unemployment are very low among the Costa Rican Ameridians. (L. Mata).

About 4 percent of the Costa Rican population lives in slums, locally referred to as tugurios. Slums predominate in the capital of San José, but are also found in other provincial capitals and in canton seats. Tugurios in Costa Rica generally offer better conditions than the classical favelas or shantytowns of other Latin American capitals. Much of the difference relates to the better social condition of the Costa Rican population and to community success in obtaining benefits shortly after formation of the slum. The periodic observation of the tugurio "Colonia Linda Vista," which developed overnight in 1981 on one side of a hill about 7 km from downtown San José, revealed dramatic changes in just over three years (Murillo, 1983). First, a common water faucet was connected; then, in a few weeks, electricity; within a year piped water had been

installed. Many houses are made of good materials, and television antennas and a few old automobiles and motorcycles can be seen. In general, people look well-nourished and relatively well-dressed. An excessive prevalence of severe malnutrition was detected in 1981, but these cases belonged to families who presented the same problem in the area from which they came (Murillo, 1983). Unemployment and alcoholism in tugurios is greater than the national average (Míguez, 1983a). The tugurio population is covered by primary health services. Some of the tugurios of the past decades are not considered slums any longer. One of them, the "Barrio de Las Latas," now has paved roads, all the basic services, and relatively good housing; it is inhabited by all social strata including occasional artists and school teachers. The main problem in some tugurios is one of social pathology: poverty, violence, and alcoholism. Much could be done if primary health care services were specifically oriented toward these problems.

Finally, another group posing special health and social problems is the population engaged in particular agricultural jobs. In the banana plantations there has always been a climate of political unrest. Regular outbursts of violence have occurred as workers led strikes for better wages and fringe benefits, despite the fact that they enjoy the highest income and best living conditions of all Costa Rican workers engaged in large-scale agriculture (Seligson, 1980). The problem is fundamentally social. The land is owned by foreign companies, and there is no well-structured community to which workers could attach and develop a coherent social organization and better community life.

The large coffee plantations have evolved dramatically toward more efficient production, and have replaced resident laborers classically tied to the land by migrant labor forces, which definitely enjoy a better status than in other countries. Unwanted pregnancy and consumption of alcohol and marijuana are problems during the coffee harvest--the school vacation period--posing a special danger to adolescents.

Cattle ranches occupy large tracts of land--Costa Rica has as many cattle as people--but employ very few workers since cattle are left loose to graze. Thus, the cattle industry benefits a small elite with much political influence.

The country has an incipient industry, and working conditions, although not optimal, are better than those seen in other Central American countries. This is indicated by comparative statistics, minimum wages, and supportive social services such as labor legislation, social security, and insurance--which are recognized to be more extensive and better in Costa Rica than elsewhere on the Isthmus.

3.5 Health Conditions

3.5.1 Perinatal health. As shown in Chapter 2, most Costa Rican women are hospitalized for delivery, which undoubtedly accounts for the low maternal mortality rate. This may have a negative side, since some deliveries may be handled by inexperienced interns or residents. It is recognized that the work of midwives in the relaxed environment of the home precludes deleterious manipulations during childbirth--use of oxytocin, epidural anesthesia, and cesarean sections--as observed in traditional communities (Mata, 1978a). Table 3.13 shows the childbearing situation in the area under investigation by INISA (Mata, 1982). Alarmingly high rates of conduced and cesarean deliveries are recorded for the rural area of Puriscal as well as in the rest of the country (Social Security Bureau, 1984). In one private clinic the rate of cesarean sections reached the dramatic figure of 60 percent in 1980 (Table 3.14). A possible explanation for this excessive surgical intervention is an increased number of hospital deliveries due to a sustained high birth rate in the last five years, an increased rate of hospitalizations (reaching 92 percent in 1983), and a relatively static number of hospital beds. The average number of days of hospitalization for delivery (including cesarean) decreased within 5 years from 4 to 2.5 days. There is no doubt that the medical staff feels a need to accelerate delivery. Another probable factor is undue medical intervention to teach students and improve surgical procedures. Negative effects on perinatal health and survival are to be expected, including a higher incidence of anoxia (from a combination of epidural anesthesia and oxytocin), hyaline membrane disease (due to cesarean section performed prematurely), and cerebral palsy from delivery by insufficiently trained young medical interns and practitioners.

Table 3.13

Childbirth Characteristics, Two Cohorts of Puriscal Women, 1979-1981.

Birth	Cohort 1 (1979-1980)	Cohort 2 (1980-1981)
Spontaneous	195 (35.8)	213 (41.8)
Conduced	245 (45.0)	189 (37.1)
Cesarean section	77 (14.2)	87 (17.1)
Forceps	12 (2.2)	8 (1.6)
Induced	3 (0.6)	6 (1.2)
Other	12 (2.2)	7 (1.4)
Total	544	510

Source: Mata (1982).

Table 3.14

Frequency of Cesarean Section in Costa Rica, June-November 1980.[a]

Hospital or clinic	Births	% Cesarean
Private clinics		
Católica		60
Bíblica		35
Santa Rita		32
Hospitals, Social Security		
México	2,688	27
Monseñor Sanabria	1,419	24
Calderón Guardia	3,180	19
Instituto Carit	3,319	18
San Juan de Dios	4,617	17
Max Peralta	2,430	16

[a]Annual rate was similar in 1983.
Source: Vargas et al. (1981).

The evolution of perinatal health problems is depicted, in terms of infant mortality rates by cause, in Table 3.15 and Figure 3.1. The dramatic decline in infant mortality was the result of a reduction in all groups of causes except one: complications during pregnancy and childbirth, a condition requiring attention because of its deleterious long-term sequelae. Mortality from this cause increased. The occurrence of central nervous system disease as a determinant of malnutrition (Table 2.24) attests to the importance of the long-lasting consequences of perinatal events on infants from urban and rural homes alike. For reasons that are not yet clear, incidence of hyaline membrane disease has significantly decreased in one hospital where this has been evaluated (Table 3.16) (Mata et al., 1984). No data were obtained for the other hospitals. The present profile of neonatal morbidity and mortality demands sophisticated technologies, which would be less of a pressing need if preventive actions were stronger.

3.5.2 Infectious diseases. There are two sources of data on infectious diseases morbidity: the prospective field study of Puriscal (Mata, 1982a), and the reports on notifiable diseases obtained by the Ministry of Health (1983) and the Social Security Bureau (1984).

Table 3.15

Infant Mortality by Groups of Causes, Costa Rica, 1972-1984. (Rates per 1000 live births)

Groups of causes and ICD codes	1972-1974	1980	1981	1982	1983	1984
Diarrhea, 1-9, 70	10.7	1.4	1.1	1.2	1.6	1.1
Respiratory, 460-519	6.6	2.5	2.2	2.2	1.6	2.2
Immaturity, 777	5.0	1.2	0.7	0.5	0.6	1.2
Complications in pregnancy and delivery, 90, 760-76, 778-79	6.4	6.5	7.1	8.0	7.7	7.9
Preventable by vaccination, 32, 33, 37, 55	2.2	0.1	0.2	0	0.1	0.1
Malnutrition, 260-69	1.4	0.2	0.2	0.5	0.2	0.3
Preventable by early diagnosis and treatment, 38, 320, 345, 380-84, 520-77, 680-709	3.4	0.8	0.5	0.6	0.6	0.6
Not preventable and residue	10.0	6.4	6.0	5.7	6.2	5.5
Infant mortality rate	45.7	19.1	18.0	18.7	18.6	18.9

Longitudinal observation of cohorts of rural infants showed exceedingly low morbidity rates compared with those of a similar rural population in Guatemala, where environmental conditions were very deficient in terms of sanitation, education, and personal hygiene (Mata, 1978a). While no significant differences were noted in food consumption by pregnant women, infants, and preschool children between the two populations (Mata, 1982b), morbidity rates were several times greater in the Guatemalan village than in Puriscal, as shown in Table 3.17 (Castro et al., 1982). The only possible explanation for the difference is that in the Guatemalan village there are greater opportunities for exposure to and transmission of infectious diseases because of the substandard living conditions (Mata, 1982b). Further studies on the epidemiology of diarrheal and respiratory diseases have shown that they were infrequent in Puriscal; diarrheal diseases present an attack rate of only 0.6 per child per year during the first 18 months of life (13 times less than in their Guatemalan counterparts) (Simhon and Mata, 1985). Furthermore, a very low rotavirus endemicity and pathogenicity was registered (Table 3.18), probably related to infrequent transmission of virions and lower infectious doses than expected in typical traditional rural societies.

Figure 3.1

Causes of infant mortality in Costa Rica, 1973-1982. In six years, the infant mortality rate declined by one half. Deaths from all causes decreased proportionately, except deaths due to complications of pregnancy and delivery, which remained unaltered or even increased during the observation period.

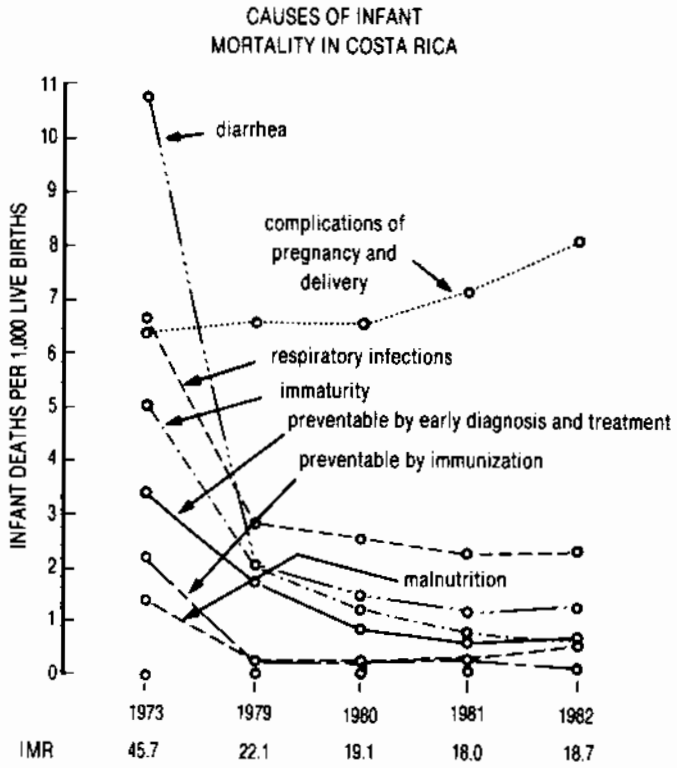

Table 3.16

Hyaline Membrane Disease (HMD) and Interventions, San Juan de Dios Hospital, Costa Rica.

Year	Intervention[a]	Number of live births	Number of preterm infants (<38-wk gestation)	HMD, cases (rate per 1,000 preterm infants)			
				Observed cases	Observed minus expected[b] case rate, as %	Observed deaths	Observed minus expected[b] death rate, as %
1976	A	7,629	589 (7.7)	154 (261.5)		47 (79.8)	
1977	B	8,582	618 (7.2)	161 (260.5)	-0.4	37 (59.9)	-24.9
1978	B + C	8,931	597 (6.7)	133 (222.8)	-14.8	33 (55.3)	-30.7
1979	B + C + D	8,638	437 (5.1)	85 (194.5)	-34.5	41 (93.8)	+17.5
1980	B + C + D	8,978	412 (4.6)	67 (162.6)	-60.8	16 (38.8)	-51.4
1981	B + C + D	8,879	541 (6.1)	36 (66.5)	-74.6	8 (14.8)	-81.4
1982	B + C + D	9,271	620 (6.7)	62 (100)	-61.7	13 (20.9)	-73.8
% Change in rates 1976-1982			-13	-62		-74	
Significance[c]			>0.05	<0.01		<0.01	

[a]A = mother-infant separation and formula feeding; B = rooming-in and breast-feeding; C= human colostrum; D = early mother-infant interaction.
[b]The 1976 rates (261.5 and 79.8 per 1,000 live births) were assumed to be the expected values for 1977-1982.
[c]Test of equality, 1976 vs 1982.

Source: Mata et al., Malnutrition (1984).

Table 3.17

Incidence of Infectious Diseases per 100 Person-Months, Cauqué and Puriscal Infants.

Age, months	Number of infants	Person-months	Diarrhea and dysentery	Lower respiratory infection	Mild respiratory infection
			Cauqué, 1964-69		
0-5	45	270	33.3	15.9	25.2
6-11	45	270	62.9	23.0	33.7
			Puriscal, 1979-81		
0-5	115	690	4.5	5.5	11.7
6-11	114	684	7.5	7.7	23.9
			Ratio Cauqué/Puriscal		
0-5			7.4	2.9	2.2
6-11			8.4	3.0	1.4

Source: Mata (1978); Castro et al. (1982).

The other sources of data are the periodic reports of notifiable diseases sent to the Ministry of Health by physicians of hospitals, clinics, health centers, and posts from all over the country. The surveillance system omits diarrheal disease and in general yields an underestimate of the national morbidity. But the consistency observed between weeks, months, and years denotes that the rate of omissions must be rather constant. Table 3.19 shows the annual number of cases of infectious and parasitic diseases and their rates per 100,000 population, for the years 1981 and 1983.

Acute respiratory infections are by far the most important contributors to the national infectious morbidity. Influenza shows a yearly incidence of 765 cases per 100,000 (Table 3.19). In Puriscal, lower respiratory disease (bronchitis, bronchopneumonia) is as common as diarrhea, while mild respiratory infections (e.g., common colds) are several times more frequent (Table 3.17). While morbidity remains high, the number of fatal respiratory infections has decreased significantly in the last few years (Mohs, 1983b) as a result of greater education of the population and improved diagnostic and treatment methods.

Table 3.18

Incidence of Diarrheal Disease and of Rotavirus Diarrhea in Contrasting Population Groups.

Ecosystem	Cases of all diarrhea (incidence per child/years)	Cases of rotavirus diarrhea (incidence per child/years)	Rotavirus diarrhea (%)	Rotavirus pathogenicity (%)
Cauqué, Guatemala 1964-1969 (N = 132.5)[a]	1050(7.9)	109(0.8)	10.4	65.7[b]
Matlab, Bangladesh 1978-1979 (N = 120)	727(6.1)	34(0.3)	4.7	-
Winnipeg, Canada 1976-1979 (N = 139)	165(1.2)	40(0.3)	24.2	80.0
Puriscal, Costa Rica 1981-1984 (N = 70.7)	44(0.6)	5(0.1)	11.4	12.8

[a]Observed child-years.
[b]Rotavirus diarrheas divided by all rotavirus x 100.

Source: Mata et al., Control and Eradication (1985); Simhon et al. (1985).

Among diseases preventable by vaccination, poliomyelitis and diphtheria have not occurred at all since 1974, while tetanus, measles, and pertussis are virtually controlled. Tuberculosis control--which depends on adequate nutrition, good housing, BCG vaccination, and adequate diagnostic and therapeutic measures--has also been significantly reduced. Smallpox was eradicated in 1938, and yellow fever in 1952.

Of the waterborne infections, typhoid fever has significantly decreased. Viral hepatitis, particularly by the B virus, is endemic, although primarily localized in certain cantons.

The drastic reduction of scarlet fever and particularly of rheumatic fever was probably due to availability of pasteurized milk and adequate diagnostic and treatment measures in all health centers and clinics of the country. Increasingly reduced rates of otitis media, fatal pneumonia, mastoidectomies, and pleural decortication have been reported in recent years at the National Children's Hospital (Mohs, 1982a).

Of the so-called "tropical diseases," kala-azar, onchocercosis, and schistosomiasis have not been found in Costa Rica. Malaria has been under control in the last few years, with limited morbidity and without mortality (Table 3.20). Most malaria cases are imported from Nicaragua, but there is little transmission within Costa Rica despite population displacement and migration along the northern border. The leprosarium was closed in 1979 and the few hundred known cases of leprosy receive ambulatory care. Chagas disease is endemic in many regions, but more information in needed on the prevalence and incidence of clinical cases and on the overall significance of the disease in Costa Rica; existing focuses are related to housing deficiencies (Zeledón and Vargas, 1984).

Cutaneous leishmaniasis is the only one of the so-called tropical diseases that is prevalent in Costa Rica (about 2,000 cases reported yearly), particularly in eight cantons where incidence rates exceed 140 per 100,000 population, mainly in forested areas (Hidalgo and Jaramillo, 1977). Bancroft's filariasis is limited to a very small area around the seaport of Limón, mainly affecting its black population; cases of elephantiasis are not being detected at the present time (Paniagua, 1985).

Sexually transmitted diseases are second to acute respiratory and diarrheal infections, with annual rates of 400 cases of gonorrhea and 100 of syphilis per 100,000 population--evidently underestimated figures.

Table 3.19

Annual Rates (per 100,000) of Communicable Diseases of Compulsory Notification, Costa Rica.

Disease	1981	1983
Epidemic influenza	19,078 (816.0)	18,855 (765.5)
Poliomyelitis	0	0
Diphtheria	0	0
Pertussis	168 (7.0)	74 (3.1)
Tetanus	11 (0.5)	7 (0.3)
Measles	170 (7.1)	39 (1.6)
Tuberculosis, all forms	388 (16.2)	363 (15.1)
Viral hepatitis, all forms	2,562 (106.8)	2,650 (110.4)
Typhoid fever	9 (0.4)	7 (0.3)
Scarlet fever	282 (11.8)	339 (14.1)
Rheumatic fever	46 (1.9)	143 (5.9)
Malaria	189 (7.9)	245 (10.2)
Cutaneous leishmaniasis	1,248 (52.0)	2,497 (104.0)
Leprosy	71 (2.9)	32 (1.3)
Gonorrhea	9,085 (378.5)	9,715 (404.8)
Syphilis, all forms	1,894 (78.9)	2,443 (101.8)
Rabies in animals[a]	1	0

[a]No rabies in humans reported.

Source: Ministry of Health (1983a).

Table 3.20

Population in Malarious Areas in 1984 and Annual Recorded Cases of Malaria, 1981-1984.

Groups	Population[a] 1984 malarious areas	Recorded cases			
		1981	1982	1983	1984
Group 1					
Countries where eradication of malaria has been certified[b]	77,953	1,599	972	914	1,206
Group 2					
Argentina	3,752	323	567	535	437
Costa Rica	718	168	110	245	569
Panama	2,037	340	334	341	125
Paraguay	2,701	73	66	49	554
Subtotal	9,208	904	1,077	1,170	1,685
Group 3					
Brazil	55,927	197,149	221,939	297,687	370,257
French Guiana	73	769	1,143	1,051	1,021
Guyana	836	2,065	1,700	2,102	3,017
Suriname	281	2,479	2,805	1,943	3,849
Subtotal	57,117	202,462	227,587	302,783	386,144
Group 4					
Subregion A					
Dominican Republic	6,060	3,596	4,654	3,801	2,370
Haiti	4,818	46,703	65,354	53,954	54,896[c]
Subregion B					
Belize	160	2,041	3,868	4,595	4,117
El Salvador	4,132	93,187	86,202	65,377	66,874
Guatemala	3,104	67,994	77,375	64,024	74,132
Honduras	3,867	49,377	57,482	37,536	27,332
Mexico	41,639	42,104	49,993	75,029	85,501
Nicaragua	3,165	17,434	15,601	12,907	15,702
Subregion C					
Bolivia	2,469	9,774	6,699	14,441	16,338
Colombia	18,600	60,972	78,601	105,360	55,268
Ecuador	5,276	12,745	14,633	51,606	78,599
Peru	6,361	14,812	20,483	28,563	32,621[d]
Venezuela	13,156	3,377	4,269	8,400	11,127[e]
Subtotal	112,807	424,116	485,214	525,593	524,877
Total	257,085	629,081	714,850	830,460	913,912

[a]Population in thousands.
[b]12 countries and territories.
[c]Information to September.
[d]Information to October.
[e]Information to November.

Source: Pan American Health Organization. Health Conditions in the Americas, 1981-1984.

3.5.3 Intestinal helminthiasis. Helminthic infection is a good indicator of the level of soil pollution with feces. As shown in Table 2.17, the overall prevalence of intestinal helminths drastically decreased in urban and rural areas, as determined by two national surveys conducted 16 years apart with the same methodology (Mata et al., Control and Eradication, 1985). The decrease in prevalence was accompanied by an important reduction in intensity of infections, as shown in Table 3.21.

Table 3.21

Reduction in Intensity of Infection by Intestinal Helminths, 1966-1982, Costa Rica.

Eggs per gram of feces	Age, years <1			Age, years 5-9		
	1966	1982	% Δ	1966	1982	% Δ
Ascaris						
100-900	4.1	3.1	-24	13.4	3.2	-76
1,000-9,900	6.1	0	-100	23	6.5	-71
10,000-49,000	1.2	0	-100	6.8	0	-100
50,000+	0	0		1.7	0	-100
Trichuris						
100-900	8.2	3.1	-62	48.6	16.1	-67
1,000-1,900	2	0	-100	10.8	0	-100
2,000-4,900	0	0		6.2	0	-100
5,000+	0	0		3.4	0	-100
Hookworm						
100-900	6.1	0	-100	15.3	0	-100
1,000-9,900	0	0		1.4	0	-100
10,000+	0	0		0.9	0	-100

Source: Mata et al., Control and Eradication (1985).

Presently, moderate and severe helminthic infections are very rare, a situation that can only be explained by the combination of several factors, namely, control of fecal waste (Table 3.2), an improved supply of potable water (Table 3.1), periodic deworming of the population as part of the primary and secondary health care programs, and widespread use of shoes, particularly rubber boots in rural areas. Among the helminthiases, those undergoing a soil phase (namely, Ascaris and Trichuris) showed the sharpest decrease. Hookworm virtually disappeared among children under 10 years of age, but some chronic infections are occasionally detected in older children and adults. It is of interest that Taenia (of cattle and swine) and Hymenolepis nana (related to poor housing, rodents, and fleas) diminished over the 16-year span between surveys. The control of the common infectious, parasitic, and tropical diseases has shifted attention to other infectious diseases that were unknown in the recent past. One of them is abdominal angiostrongyliasis (Morera and Céspedes, 1971), increasingly recognized as a problem affecting and often killing children (Loría-Cortés and Lobo-Sanahuja, 1980). Paragonimiasis may occur in rare instances (Brenes, et al., 1980), and cases and an occasional outbreak of fascioliasis also occurs (Mora et al., 1980; Mora et al., 1981; Arroyo et al., 1981).

3.5.4 **Malnutrition and overnutrition.** There was significant reduction in the incidence of low-birthweight infants (< 2.5 kg) in Costa Rica, from 9 percent in 1970 to 7.2 percent in 1975 (Mata et al., 1978). Since then the rate has remained constant and now fluctuates around 8 percent, the lowest in Latin America. This excellent situation denotes adequate nutrition, health, hygiene, and care of pregnant women.

The control of infectious and parasitic diseases in the last two decades has undoubtedly resulted in important improvements in nutrient digestion, absorption, and utilization at constant levels of consumption (Mata, 1978b; Mohs, 1982a). Also, with improved public and private transportation there has been a decrease in physical exertion among certain population groups. Furthermore, food supplementation programs available to preschool and school children within easy reach of the center, and school lunch programs, have influenced food habits. Costa Rica has been bombarded by promotions for canned and processed foods and carbonated beverages.

All these factors in conjunction probably accounted for the rapid increase in the number of overweight infants and preschool children, collateral to the decreased rates of moderate and severe energy-protein malnutrition, Table 3.22 (Jaramillo, 1983; Díaz, 1983). While the prevalence of severely malnourished children was only 0.2 percent in 1982, the rate of overweight children in the same year was 9.9 percent, that is, 50 times greater. If, as seen in Table 2.17, most severe malnutrition is secondary to chronic diarrhea, congenital defects, child abuse, and other primary factors, it can be stated that the main nutritional problem in Costa Rica is not a limited availability of food, but rather poor lifestyles, inadequate food habits, and social pathology (López et al., 1978; Mata et al., 1980; Jiménez et al., 1985).

3.6 Chronic and Degenerative Diseases

There are no data on morbidity from chronic and degenerative diseases comparable to that for infectious diseases. It is generally accepted, however, that such diseases as cancer, diabetes, hypertension, cardiovascular disorders, skin diseases, orthopedic diseases, and others occupy the bulk of the resources of the hospital network and private medical practice. One of the challenges of applied research would be to establish more accurately the morbidity rates for such diseases in order to see patterns that would shed light on causality and on measures for control and prevention.

3.6.1 **Morbidity.** The morbidity survey conducted by the Social Security Bureau (see Table 3.10) on the relative importance of causes of consultation revealed that chronic and degenerative diseases represent about 30 percent of the total illness demanding some medical care.

Table 3.22

Prevalence (%) of Malnutrition and Overweight Among Infants and Preschool Children, Costa Rica, 1966-1982.

Year of survey	Number of children	Undernutrition			Overweight
		II	III	II+III	
1966	791	12.0	1.5	13.5	3.8
1975	1910	11.2	1.1	12.3	8.3
1978	3069	8.2	0.4	8.6	11.3
1982	1871	3.9	0.2	4.1	9.9

[a] II = 60-74% weight/age; III = <60% weight/age.
[b] >110% weight/age.

Source: Jaramillo (1983); Díaz (1983).

3.6.2 **Cancer mortality.** Cancer has been selected because it occupies an important position in the overall national mortality, and because of the importance attached to it by the medical profession and the general public. Furthermore, there is an excellent National Registrar of Tumors in Costa Rica. The cancer mortality data for 1972 (the earliest reliable statistics) and for 1981 are listed in Table 3.23 for the whole country by type of cancer.

In general, cancer mortality shows a slight decline. Most cancer deaths are from cancer of the stomach, with a rate of 22.4 in 1972 declining to 17.2 per 100,000 in 1981. Costa Rica, Japan, and Chile have the highest incidence of stomach cancer in the world (Sierra and Barrantes, 1983). Since there is no evidence that treatment for this cancer has improved, to account for a mortality decrease of 23 percent in a 9-year span, the present rate must reflect an improvement in host and environmental factors affecting this type of cancer.

Cancer of the respiratory tract may be increasing, as is the incidence of smoking among urban women. Cancer of the breast, pancreas, cervix, and prostate follow in frequency after cancer of the stomach and of the respiratory tract, increasing from 1972 to 1981. Cancer of the liver and the colon also increased during this period.

Significant efforts are being made to improve diagnosis and therapy of cancer in children, particularly leukemias, and significant advances have been made with regard to treatment and increased survival (Jiménez et al., "Results of Treatment," 1984).

3.7 Accidents

As indicated in Figure 2.5, automobile accidents and traumatisms in general have increased as a consequence of the growing number of motor vehicles. The predominance of motor vehicle accidents among all causes of death was already evident in 1970 (Table 3.24); a rate of 13.9 deaths per 100,000 was recorded for that year. The emphasis on preventive education and the economic crisis, which has limited purchase of cars and fuel, probably explain the stagnation of the rate over the past 11 years.

Analysis of hospital records of accidental deaths of children in connection with motor vehicles by Dr. Emilia León of the Ministry of Health showed that some deaths do not occur on the road, but in the garage. Furthermore, death by drowning and submersion--which occupy second place in mortality--was shown again by Dr. León as not always occurring in rivers or oceans, but in utility sinks in the home. Sinks made of concrete ("pilas de lavar") are almost universal in homes of both the poor and the rich. They are sufficiently deep and customarily are left filled with water for washing dishes and clothes. Automobile accidents and drowning deaths pose another challenge for family education through the primary health care approach.

Accidental poisoning is generally related to pesticides used in agriculture or to ingestion of drugs and chemicals by children. Drugs are generally distributed by the Social Security Bureau or purchased over the counter and are stored in homes within the reach of children (Vargas et al., 1978). During a six-week national strike by physicians in 1982, the overall rate of child accidental poisoning decreased by 30 percent, a phenomenon attributed to the reduced number of prescriptions during the strike (Mohs, 1982b). Nevertheless, there was an impressive reduction in mortality from accidental poisoning over an 11-year period, which could

In general, cancer mortality shows a slight decline. Most cancer deaths are from cancer of the stomach, with a rate of 22.4 in 1972 declining to 17.2 per 100,000 in 1981. Costa Rica, Japan, and Chile have the highest incidence of stomach cancer in the world (Sierra and Barrantes, 1983). Since there is no evidence that treatment for this cancer has improved, to account for a mortality decrease of 23 percent in a 9-year span, the present rate must reflect an improvement in host and environmental factors affecting this type of cancer.

Cancer of the respiratory tract may be increasing, as is the incidence of smoking among urban women. Cancer of the breast, pancreas, cervix, and prostate follow in frequency after cancer of the stomach and of the respiratory tract, increasing from 1972 to 1981. Cancer of the liver and the colon also increased during this period.

Significant efforts are being made to improve diagnosis and therapy of cancer in children, particularly leukemias, and significant advances have been made with regard to treatment and increased survival (Jiménez et al., "Results of Treatment," 1984).

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Table 3.23

Cases, Rates per 100,000, and Rank of Main Reported Cancer Deaths, Costa Rica, 1972 and 1981.

Tumor	1972			1981		
	Number	Rate	Rank	Number	Rate	Rank
Stomach	409	22.4	1	403	17.2	1
Trachea, bronchi, lung	78	4.3	2	148	6.3	2
Uterine, other	57	3.1	3	0	-	-
Breast	47	2.6	4	71	3.0	4
Pancreas	43	2.4	5	59	2.5	6
Cervix	39	2.1	6	82	3.5	3
Prostate	35	1.9	7	65	2.8	5
Leukemia, other	35	1.9	7	19	0.8	12
Esophagus	31	1.7	8	28	1.2	10
Related to respiratory/ digestive tracts	28	1.5	9	0	-	-
Gall bladder	23	1.3	10	49	2.1	8
Brain	23	1.3	10	49	2.1	8
Lymphosarcoma, other	22	1.2	11	0	-	-
Liver	21	1.2	12	57	2.4	7
Colon	18	1.0	13	48	2.1	9
Myeloid leukemia	18	1.0	13	48	2.1	9
Rectum, sigmoid	17	0.9	14	21	0.9	11
Not specified	141	7.7	-	132	5.6	-
Total	1,246	68.3		1,555	66.5	

Source: Ministry of Health (1983b).

be related to the provision of a 24-hour telephone service in the National Children's Hospital, and to improved diagnosis and treatment by the medical profession. Also, there is more public awareness now about poisonings and the need for prompt medical care.

Homicide, a component of social pathology, will be discussed separately.

Table 3.24

Accidental Deaths and Rates per 100,000, by External Cause of Lesion, Costa Rica, 1970 and 1981.

	1970		1981	
External Cause	Deaths	Rate	Deaths	Rate
Motor vehicle	241	13.9	292	13
Drowning and submersion	143	8	179	8
Accidental fall	47	3	113	5
Homicide	65	4	106	5
Suicide and self-injury	41	2	97	4
Transport accident	41	2.4	37	2
Accidental poisoning	39	2.2	15	0.7
Accident by fire	10	0.6	14	0.6
Accident by firearm	15	0.9	9	0.4
Not specified	4	0.2	93	4
All other	75	4.3	25	1

Source: Ministry of Health.

3.8 Mental Illnesses

The best study on the incidence of mental disorders was based on a national random sample of 750 persons 18 years or older, belonging to 368 rural and 50 urban families, surveyed in connection with the national nutrition survey in 1966-1967 (Adis et al., 1970). Mental illness is a frequent and serious problem. Two percent of rural males and 2.6 percent of rural females had frank psychosis (schizophrenic, affective, organic), and the corresponding figures for urban males and females were 7.3 and 5.1 percent, respectively. Phobic, depressive, anxious, and other types of psychoneurosis were found in 23.8 percent of the rural males and 47 percent of the rural females. The prevalence for urban males and females was, respectively, 14.6 percent and 37.2 percent.

Among the personality features investigated (psychopathic, sexual maladjustment, schizoid, paranoid, cycloid, compulsive, passive-aggressive), passive-aggressive dependency (PAD) was exceedingly frequent: 63 percent of the rural males and females had moderate PAD, and 7 percent and 12 percent, respectively, exhibited severe PAD. The corresponding figures for the urban population were 54 percent and 53 percent (moderate) and 2 percent and 5 percent (severe).

Alcoholism was frequently associated with psychosis, and the prevalence rate for 1966-1967 was similar to that reported 15 years later by Míguez (1983b).

There are no recent data on the extent of mental illness, but no improvement over the profile described by Adis et al., (1970) is to be expected. The high frequency of mental and personality disorders represents a challenge for future public health, particularly in terms of preventive actions integrated into the primary health care approach.

3.9 Social Pathology

Social pathology includes alcoholism, drug consumption, prostitution, homosexuality, vagrancy, and violence. Some of these problems cannot be classified as true diseases; they are generally related to societal conditions and social practices. However, poor traditional societies that are somewhat isolated from western influences are virtually exempt from these types of social pathology (Mata, 1978a). Social pathology is a determinant in many infectious and organic diseases as well as a contributor to severe malnutrition. Five problems have been selected for this discussion in view of their public health significance, their interrelatedness, and because some data are available: homicide and suicide, alcoholism, prostitution, homosexuality, and child abuse.

3.9.1 Homicide and suicide. There are no complete statistics on all forms of violence in the country; the police records in the various cantons and districts have this information, but it has not been analyzed. The general impression is that the overall level of nonfatal violence and physical aggression in Costa Rica has decreased dramatically in the last three decades. This judgment is based on the virtual disappearance of fist and machete fights in bars, streets, and other places. On the other hand, official data show that the rate of homicide was low and stable (4.6 to 4.9 per 100,000) during 1970-1979 (Table 3.25). Suicide and nonintentional self-induced death has almost doubled in the same period, probably because at present there is less need to hide suicide, since the Roman Catholic Church is now less severe regarding suicide than in the past. The impression is that homicides have changed from the traditional forms to more complex, violent, and often sadistic ways, as revealed by press reports from the Agency of Judicial Investigation and medical accounts. It should be noted, however, that the homicide rate in Costa Rica, although higher than in Sweden and Switzerland, is about one half the rate of that in the United States, and several times less than

those in neighboring Latin American countries (Table 3.25) (United Nations, 1974, 1980). A considerable proportion of the homicides have a background of alcoholism, and many killings and other violent behaviors are carried out under the influence of heavy alcohol consumption.

Table 3.25

Homicide and Suicide Rates per 100,000 in Selected Countries.

	Homicide		Suicide	
Country	Year	Rate	Year	Rate
El Salvador	1970	31.2	1969	7.6
Nicaragua	1968	26.2	1968	0.7[a]
Colombia	1969	14.1	1967	6.5
Guatemala	1969	14.1	1968	4.2
Ecuador	1970	10.8	1970	2.3
United States	1970	9.0	1972	11.0
Cuba	1970	7.8	1970	11.9
Costa Rica	1970	4.9	1970	2.4
	1979	4.6	1979	4.2
Panama	1971	3.7	1969	3.9
Canada	1970	3.0	1970	11.2

[a]Considered grossly underestimated.
Source: United Nations (1974, 1980).

3.9.2 **Alcoholism.** This is the most important of all the social pathologies, and, according to some, the most important health problem of the nation. Studies conducted by Míguez (1983b) at the National Institute on Alcoholism (INSA), revealed that 10 percent of the men and 1 percent of the women over 15 years of age are classified as alcoholic (Table 3.26), that is, "one who has any of the following symptoms: inability to abstain from drinking, inability to stop drinking, or withdrawal symptoms" (Míguez, 1983b). Furthermore, 18 percent of the males and 3 percent of the females over 15 years of age are considered excessive drinkers, that is, "one who drinks two or more times a month (or the equivalent in number of times a year) and whose pure alcohol intake is 120 cc or more (if male) or 60 cc or more (if female) during a single day or single sitting" (Míguez, 1983b). Only 16 percent of the men and 52 percent of the women were shown to be nondrinkers, while a prevalence of 14 percent men and 4 percent women "former drinkers" (those who have abstained from drinking for a year or more) was also reported.

Table 3.26

Estimated Population by Drinking Patterns in Costa Rica, based on an 18-Canton Survey, Weighted for Size of Local Populations, 1 January 1982.

	National population over 15 years old					
	Males		Females		Total	
Drinking category	Number	%	Number	%	Number	%
Nondrinkers	115,202	16	378,682	52	493,884	34
Quasi-abstainers	56,161	8	164,708	22	220,869	16
Moderate drinkers	246,966	34	131,620	18	378,586	26
Excessive drinkers	127,443	18	22,059	3	149,502	10
Alcoholics	69,842	10	6,618	1	76,460	5
Former drinkers	104,403	14	31,618	4	136,021	9
Total	720,017	100	735,305	100	1,455,322	100

Source: Míguez (1983a).

Many children under 15 years of age also consume alcohol because having liquor in the home and offering it to relatives and guests has become an increasingly predominant feature of social behavior in the last three decades.

The problem of alcoholism in Costa Rica is in some way perpetuated by the State. The National Factory of Liquors (FNL), controlled by the Government, produces the bulk of the hard spirits (guaro, rum, gin, and others). Beer is manufactured in breweries by private companies. Guaro is a clear liquor, almost 40 percent alcohol, distilled from panela and cassava; rum is guaro with added caramel (from sugar), which gives it a brownish color. Both guaro and rum are sold without undergoing an aging process. In addition, peasants distill "contraband guaro" from sugarcane, using primitive instruments. Contraband guaro contains excessive quantities of furfural, acetone, and methanol, making it quite toxic. The special flavor and low price of contraband guaro is appealing to some people, particularly in rural areas. The Government forbids contraband guaro (hence its name) and punishes its producers. Also, the State-created INSA, part of the Ministry of Health, invests in health education

campaigns against alcohol consumption. The Ministry of Health has recently passed a decree to have all television and radio advertisements for alcohol and tobacco state that their consumption is dangerous to health. At the same time, the State has reduced taxes on all imports of spirits to discourage bootlegging. Finally, the Government permits admittance of children--with their parents--to bars. Thus, we have a State that manufactures alcoholic beverages, facilitates imports of foreign spirits, and allows children in bars, while at the same time banning contraband guaro, attempting to educate the population not to drink, placing the drunkard in jail, and supporting services for alcoholics as well as research on alcoholism. A draft law against alcoholism has been before Congress in the last three Administrations, but has not even been discussed. The problem of alcoholism in Costa Rica is not worse than that of other nations with similar ambivalent policies toward alcohol consumption.

Table 3.27 summarizes the kinds of alcoholic beverages consumed in Costa Rica, according to Míguez's study (1983a; 1983b). The majority of alcoholics consume hard spirits, alone or in combinations (particularly guaro, beer, and rum); excessive drinkers tend to consume less guaro than do alcoholics. Consumption of whisky, which is imported and very expensive, is high. The proclivity of excessive drinkers toward alcoholism is noteworthy, as the study revealed that 10 percent of them become alcoholics within a year (Table 3.28). An important proportion (22 percent), however, turns to moderate drinking, and only a few (3.7 percent) become abstainers or quasi-abstainers.

Although alcohol consumption in Costa Rica has not reached the dimensions observed in France and the Soviet Union, it nevertheless has a tremendous economic and social impact on the quality of life and on national development. That 10 percent of all males above 15 years are alcoholics must have a serious impact on the budget and well-being of their families. Furthermore, family disruption, prostitution, child abuse, vagrancy, and corruption are often related to alcoholism of the father, mother, or other members of the family.

Table 3.27

Types of Drinks Consumed by Drinkers and Excessive Drinkers, Costa Rica, 1981-1982.

	% of subjects who reported drinking indicated beverage						
Drinking category	Beer	Rum	Guaro	Whisky	Gin	Contraband guaro	Other beverages
Excessive drinkers	69.0	28.1	16.1	11.8	3.3	0.8	2.9
Alcoholics	60.6	20.5	46.6	9.1	8.3	5.7	3.8

Source: Míguez (1983a).

Table 3.28

Drinking Categories of 376 Subjects Previously Classified as Excessive Drinkers, One Year After Initial Survey, Costa Rica, 1982.

New drinking or other category	%
Abstainers and quasi-abstainers	3.7
Moderate drinkers	22.1
Excessive drinkers	33.8
Alcoholics	10.1
Refused interview	3.5
Not located	24.7
Incomplete data	2.1
Total	100.0

Source: Míguez (1983a).

3.9.3 **Prostitution.** Prostitution has always existed in Costa Rica, but there are no concrete statistics on the number of persons involved. Prostitutes are arbitrarily classified as "open" when their identity is easily determined and "covered" when it is not. Open prostitution is supervised by the State. The Ministry of Health enforces bimonthly control of overt prostitutes, and extends to them a "health card" which can be demanded by customers. There are several hundred open female prostitutes operating in the country, primarily in the main seaports and the capital. Furthermore, there are about 100 open male prostitutes among an estimated 1,000, many of them transvestites, who are under periodic control by the Ministry of Health. Obviously, there is no estimate of the number of actual female and male prostitutes, but it is in the thousands, and may have increased recently due to the economic crisis and tourism. Visitors have expressed the opinion that open prostitution in the streets--at its peak during the economic bonanza of the 1970s--appears to have diminished during the last years of economic crisis; hidden prostitution seems to have increased.

One recent study on prostitution was based on a random sample of 348 interviews from a total of 1,241 female prostitutes attending the Ministry of Health Anti-venereal Consultation in a 22-day period (Acuña *et al.*, 1982). Table 3.29 summarizes some results of this survey and reveals that there were no differences in several characteristics with respect to the general population of women, including literacy rate; this rate did not vary significantly between the two groups. As expected, alcoholism and sexually transmitted diseases (STD) among prostitutes were much more common than that in the general female population. Most prostitutes earn a low income during the few years they are engaged in prostitution, and they experience a rapid deterioration of health. However, an elite group of prostitutes manages to remain active and in apparently good health for long periods and with relatively high incomes.

There is no reference in the Acuña study, however, to the problem of male prostitution. In a recent investigation of lifestyles, sexual practices, and ELISA antibodies to HTLV-III/LAV, male prostitution was revealed as a source of serious health problems (Mata and Ramírez, 1986). A survey of about 70 male prostitutes, mainly transvestites, showed an average of 4-10 rectal penetrations per day, almost universal receptive anilingus, and frequent drug abuse (primarily alcohol, marijuana, and glue inhalation). Interviews of this population revealed that there are at least 100 open male prostitutes in the capital city and many more operating under anonymity. In addition to their sexual and drug problems, some have mental and psychic disturbances, and some of the transvestites also suffer from the hormonal treatment and breast development they undergo. STD, diarrhea, amebiasis, and hepatitis B are naturally more frequent problems in this population. Since it is mainly bisexual men who seek out male prostitutes, the prostitutes are undoubtedly a reservoir for infection of bisexual men, their spouses, and their children.

Table 3.29

Characteristics of Female Prostitutes in San José, Costa Rica, 1981.

Variable and frequency
Age (yr): < 25 (33%); 25-34 (42%)
Residence: With her family (32%)
Education: Illiterate (9%); primary (52%)
Social Security: Yes (28%)
Training: None (74%); sewing, secretary, etc. (26%)
Previous occupation: Yes (75%)
Maid (23%); waitress (16%); worker (8%); other (28%)
Age (yr) at initiation in prostitution: < 18 (31%); 18-22 (36%);
23-27 (21%); 28-32 (8%); 33+ (4%)
Number of living children: None (17%); 1-2 (46%); 3-4 (27%)
Contraception: None (18%); pill (55%); sterilization (14%); IUD (5%)
Sexually transmitted diseases (STD)[a]
None (17%) Gonorrhea (69%); syphilis (22%); soft chancre (16%)
Prevention of STD: Medical checkups (66%); vaginal douchings (66%); examination of customers (51%); vaginal lozenges (38%); condoms (16%)
Alcohol consumption: Yes (53%)

[a]Some women had more than one.
Source: Extracted from the work of Acuña et al., (1982).

The problem of male prostitution is undoubtedly more serious than realized by officials and the population at large. More research to characterize the group, its origin, problems, and implications for society is urgently needed.

3.9.4 **Homosexuality.** There has been an increase in homosexuality in the country, particularly during the 1970s, witnessed by the proliferation of bars, discotheques, saunas, key clubs, and restaurants of predominantly or exclusively gay and lesbian customers. The study of lifestyles and HTLV-III antibodies already mentioned has revealed similar sexual practices among male homosexuals in Costa Rica as those described in advanced industrialized nations. The interviews also revealed that male homosexuality is very common in the capital city, involving the middle and upper classes primarily. According to estimates by well-educated gays who have been interviewed by the authors, no less than 10 percent of all men are homosexual or bisexual in Costa Rica.

However, the levels of promiscuity and drug abuse are definitely lower in Costa Rica than in advanced countries. The proportion of antibody to HTLV-III is also very low (< 5 percent by the ABBOTT EIA) (Mata and Ramírez, 1985). AIDS is just beginning. Three Costa Ricans acquired AIDS in the United States, but only one had had contacts with Costa Ricans prior to his contracting AIDS; one was found repeatedly reactive by the ELISA. The study has documented frequent travel of Costa Rican gays to countries where AIDS is epidemic. On the other hand, many gays come to Costa Rica for business or specifically to seek sex. It can thus be expected that the virus has already been introduced by homosexuals into the country, as is evident from the antibody findings and the occurrence of two cases compatible with ARC or LAS (Mata and Ramírez, 1985). Also, there have been five cases of AIDS in hemophiliacs who received imported factor VIII. The wife of one hemophiliac with AIDS also developed the disease and died (Cordero-Murillo et al., 1986).

3.9.5 **Child abuse.** Engaging children in heavy labor and the physical punishment and abuse of children used to be features of Costa Rican culture. Attitudes have changed in the last two or three decades, after new ideas on child rearing were introduced from the United States and Europe (the Gesell and Spock influences). Beating children, punishing them with a whip, secluding them in a room, or restricting their food intake were common three decades ago, and may still be practiced in some families in urban and rural areas. Today, however, most people are aware that these practices are unacceptable.

The "battered child" or "child abuse" syndrome came to public attention almost 20 years ago when a child was supposedly killed by missionaries in a home for abandoned children. This incident received much attention by the press and triggered public interest in denouncing cases of child abuse. Incest and sexual abuse have been known to exist since time immemorial; there is the common belief in Costa Rica that such practices prevail more in rural areas than in the cities, a claim not supported by any data. Some peasants believe that the superficial contact of the penis with a girl's genitals will result in the cure of

gonorrhea. Our knowledge of cultural beliefs and behavior leading to child abuse has increased since the creation of the National Children's Hospital in 1964, which permitted better compilation of medical records and the collection of data on social factors. A higher report rate, improved diagnosis, and the liberalization of sex in the last 15 years probably accounts for the high frequency of gonorrhea in girls (infants to 11 years old) resulting from fondling and other forms of sexual abuse, including penetration.

The incidence of child abuse syndrome (which includes neglect, battering, and sexual abuse), as recorded in the National Children's Hospital in the last 15 years, is presented in Table 3.30. The rate was low until 1977, fluctuating between 0.8 and 2.02 cases per 100,000 population. It rose sharply in 1978 to 3.65. While it is accepted that reporting of child abuse has improved over the years, the increase coincided with the initiation of the economic crisis. The rise in rates also coincided with an apparent increase in the birth rate due to a greater number of women of fertile age. Child abuse reached alarming proportions in 1980-1983: almost 10 cases per 100,000 inhabitants. This rate, however, is less than that reported for the United States, where it is grossly underestimated (Kempe and Kempe, 1978).

Table 3.30

Rates of Child Abuse Syndrome (per 100,000), Costa Rica, 1970-1983.

Year	Population, thousands[a]	Number of children[b]	Rate
1970	1,732	27	1.56
1971	1,779	36	2.02
1972	1,825	19	1.04
1973	1,871	15	0.80
1974	1,918	22	1.15
1975	1,964	28	1.43
1976	2,012	31	1.54
1977	2,061	33	1.60
1978	2,110	77	3.65
1979	2,219	110	4.96
1980	2,278	110	4.83
1981	2,338	171	7.31
1982	2,400	201	8.38
1983	2,463	241	9.78
1984 (Jan-Mar)	2,528	64	10.13[c]

[a]General Directorate of Statistics and Census (estimated after 1973).
[b]Children under 12 years old, National Children's Hospital.
[c]Extrapolated from 3-month observation.

It has recently been noted that malnutrition (wastage and stunting) is significantly more frequent in abused children than in the general child population (Mata et al., 1980). Furthermore, child abuse syndrome is increasingly being detected among the constellation of factors leading to severe protein-calorie malnutrition in children (López et al., 1978; Jiménez, et al., 1985). Thus, malnutrition is one of the manifestations of child abuse syndrome, of which physical and sexual abuse appear to be the dominant acute features.

3.9.6 Other manifestations of social pathology. Intimately interwoven with alterations of behavior, alcoholism, prostitution, homosexuality, violence, and other forms of social pathology are family disruption and out-of-wedlock pregnancy, obvious problems in Costa Rican society. Illegitimate children have always been abundant in Costa Rica, but the prevalence has risen and has stabilized around 50 percent, the increase contributed mainly by adolescents. The phenomenon appears more prevalent in the provinces of Limón and Guanacaste, where health and social indicators are more deficient than in the rest of the country. The divorce rate had remained low until 1975 (2.2 per 100 marriages), but increased drastically in recent years, reaching a yearly incidence of 12.8 per 100 marriages or 10 per 1,000 population (1982). These factors are frequently found in the background of child abuse syndrome (Mata et al., 1980) and of severe protein-calorie malnutrition (López et al., 1978; Jiménez et al., 1985).

3.10 Health Research

In Costa Rica health research in the distant and recent past did not reflect priorities or did not have a clear orientation toward solving the main health problems of the nation. Even when a disease was recognized as important, such as hookworm disease and tuberculosis, practically no research was initiated. Actions were oriented more toward treatment and eventually prevention by transferring knowledge and technology obtained overseas. While this behavior appears logical in view of the limited resources and development of science in Costa Rica, it is unfortunate that research on problems like snake bites, mycotic infections, very rare diseases, and even senescence received greater emphasis by leading scientists of the time than diarrhea, malaria, and malnutrition, which, although much more significant, were grossly neglected. Furthermore, emphasis was placed on problems that did not exist in the country or which had a low incidence, a situation that still prevails among some contemporary workers in less developed countries, who pursue low-priority questions while ignoring the major and always-changing spectrum of pathology. Concurrently, there has been a limited development of the national social sciences and a lack of orientation of resources toward research on the distribution and determinants of social pathology, important by itself and for its implications for infectious and degenerative diseases.

3.10.1 Priorities. While we realize that the situation in Costa Rica is similar to that in most less developed countries, in that they generally tend to copy research programs of advanced nations, much could have been gained if the health priorities had been taken into consideration (Weller, 1963). The systematic and permanent review of the health profile of the various population strata--by age, sex, social factors, and other variables--undoubtedly will orient research efforts toward a more profitable path. This kind of approach began in 1975 with the creation of the Institute of Investigations in Health (INISA) within the University of Costa Rica, which collaborates with the Ministry of Health and the Social Security Bureau. In addition, other research centers had already been in operation to tackle specific health problems.

Research is still pursued according to the interests of particular individuals who study specific problems either because of overseas influences, a particular affinity for a given problem, or even as a result of improvisation or the novelty of the subject. For example, the identification of Cryptosporidium as a cause of diarrhea in rural and urban immunocompetent children (Mata et al., "Cryptosporidiosis," 1984) resulted in a proliferation of interest in identifying this parasite routinely; the situation was favored by the simplicity of diagnosis of the coccidium (a simple staining of fecal smears). However, this parasite is relatively unimportant as a cause of diarrhea compared with rotaviruses and the enterotoxigenic Escherichia coli, which are more difficult to diagnose and are for the most part neglected (Mata et al., 1983).

The overdevelopment of biomedical research today contrasts with the limited investment in health research. Moreover, within biomedical research there is an inordinate interest in certain parasites, venoms, and hematologic and metabolic diseases that account for only a very small part of the total morbidity and mortality, and represent a proportionately small share of the cost of medical care. This differs markedly from the limited (or nonexistent) research on the quality of hospital care, perinatal and obstetrical problems, accidents, poisonings, respiratory diseases, obesity, and other illnesses that represent the bulk of the prevailing pathology in Costa Rica.

The need to research relevant problems according to priorities, without damaging existing resources, is quite evident. Efforts should include operational research on medical services and primary health care. This becomes more obvious when one realizes that the dramatic growth of the infrastructure for medical care during the 1970s contrasts with the stagnation of health indicators in recent years, particularly with the apparently rising perinatal mortality. The needed research should consider a modification of infrastructure to reduce superfluous medicine, to improve care in areas evidenced by deteriorating indices, to reduce duplication of equipment and services, to coordinate activities now dispersed in hospitals at a very high cost, and to reduce the cost-benefit of the whole system of medical care.

Collaterally, new elements will have to be researched on the primary health care system, which emphasize ailments that depend on the quality of life and that were not considered before when the dominant pathology was from infectious diseases and malnutrition. Observing priorities for health services research is fundamental for meeting the goal of health for all by the year 2000.

3.10.2 **Research institutes and centers.** Over the last 15 years, Costa Rica has increased the number of research centers primarily or secondarily interested in human health. This development coincided with the creation of the Vice-presidency of Research Affairs in the University of Costa Rica and with the National Council of Scientific Research and Technology (CONICIT). It is difficult to determine how much these two structures influenced the present level of research or how much they themselves resulted from a national push for the development of science, already evident prior to their creation. Costa Rica is at the vanguard of biomedical research in Central America and its progress is proportionately similar to that of Mexico, Venezuela, and Chile.

The main research institutes and centers dealing with human problems are listed in Table 3.31. In the table, the centers with an emphasis on clinical studies are noted. INISA, in the University of Costa Rica, uses the epidemiologic approach for field, hospital, and bench research of health priorities.

The centers vary in the emphasis given to identifying priorities, in the time devoted by scientists to research, in policy on funding, in emphasis on scientific publication, and even in interpretation of ethical issues. An adequate evaluation of institutes and research centers, especially in terms of cost-benefit and justification of their effort, has not been made.

In addition to the centers listed in Table 3.31, there are others that carry out research related to health issues:

- Institute of Economic Investigations (IIE), University of Costa Rica (UCR)
- Center of Investigations in Food Technology (CITA), UCR
- Institute of Investigations in Psychology (IIP), UCR
- Institute of Social Investigations (IIS), UCR

Finally, there are several scientists in hospitals and universities who work independently or in small groups. Some of them may contribute and publish individually more than an entire research center.

Table 3.31

Health Research Centers in Costa Rica.

Institute or Center	Fields
University of Costa Rica	
Institute of Investigations in Health (INISA)	Maternal and child health, infectious diseases, nutrition, genetics, aging, AIDS
Institute "Clodomiro Picado" (ICP)	Immunology, ophidism, venoms
Center of Investigations and Diagnosis in Parasitology (CIDPA)	Parasitology
Center of Investigations in Hemoglobinopathies (CIHATA)[a]	Hematology
Center of Investigations in Cell and Molecular Biology (CIBCM)	Hepatitis, leishmaniasis, Chagas' disease
Ministry of Health	
Costa Rican Institute of Investigations in Nutrition and Health (INCIENSA)[a]	Malnutrition, immunology genetics, food safety
National Institute on Alcoholism (INSA)	Alcoholism
Department of Vector Control	Vector-transmitted diseases
Department of Nutrition	Nutrition monitoring
Social Security	
Laboratory of Investigations (LI),[a] National Children's Hospital	Hematology, infectious diseases, oncology
Costa Rican Association of Demography	
Department of Sociodemographic Investigations (DISD)	Demography, contraception
National University	
Institute of Social Investigations and Population (IDISPO)	Demography, social determinants
Ministry of Development and Planning	
Department of Social Research	Social and health indicators
Ministry of Labor	
System of Nutrition Information (SIN)	Nutrition surveillance
International centers	
Latin American Center of Demography (CELADE)	Demography
International Center of Medical Research (ICMR)	Hepatitis, AIDS

[a]Emphasis on clinical studies.

The fruits of research do not necessarily reach the desired target or, if they do, they may not be applied either because they defy orthodoxy, or because they conflict with the bureaucracy or with political agendas. Nevertheless, in Costa Rica there is a readiness to listen to scientists, and results are generally assimilated and applied expeditiously. New research is made available through internal reports and publications (mainly in Spanish) in five journals printed in the country; many papers are also published in international journals.

The greatest obstacle for the application of research findings, in addition to those outlined above, is the overblown State apparatus, in which the bureaucracy's inertia and interest in self-perpetuation detract from the pursuit of national priorities. For instance, if it is demonstrated that food distribution programs are costly and of little or no benefit, any modification or cancellation of the programs to divert resources to areas of greater need would be virtually impossible under the present democratic system. A state of virtual paralysis exists in some areas that makes it impossible for well-intentioned individuals to use scientific knowledge for improving health conditions.

Given the importance of research for national development, institutes and centers must be preserved and strengthened. They should also be stimulated and guided to focus their investigations more on national problems. Basic and applied research have already contributed to national and international science on previously unknown or undefined conditions such as abdominal angiostrongyliasis (Morera and Céspedes, 1971); proximal renal tubular acidosis (Brenes et al., 1977); biochemistry and classification of snake venoms (Jiménez-Porras, 1970; 1973), hemoglobinopathies (Saénz et al., 1977), paragonimiasis (Brenes et al., 1980); hereditary deafness (León et al., 1981); malnutrition (Mata, 1978b); and diarrheal diseases (Mata et al., "Diarrhea," 1983). Basic and applied health research has furnished a scientific basis for implementation of oral rehydration therapy (Nalin et al., 1978; Nalin et al., 1979; Pizarro et al., 1979; Mata, 1981; Jiménez et al., 1982); promotion of bonding, breast-feeding and perinatal health (Mata et al., Malnutrition, 1984); and development of the basic food basket (Murillo and Mata, 1980). The whole substance of this and the preceding two chapters attests to the importance of applying knowledge and adapting technology to local conditions, and also of conducting systematic evaluation of the changes adopted.

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4. THE CORRELATION BETWEEN DEVELOPMENT, PUBLIC HEALTH ACTION, AND HEALTH CONDITIONS

> That more than 25 percent of the population live in communities with less than 500 inhabitants poses a challenge to our organization, which does not reach that population--precisely the poorest, the ill and [those] in greatest need.
>
> It is not a matter of only integrating and perfecting what already exists, but of creating a new organization, an infrastructure for health conceived according to our reality, and capable of transforming it.
>
> Edgar Mohs, Director
> National Children's Hospital, 1970
> (in a document for the creation of the Rural Health Program)

4.1 Historical Analysis

Table 4.1 and Figure 4.1 present the detailed evolution in infant and adult (20-49 years) mortality rates, derived from vital statistics without corrections. The respective curves in Figure 4.1 can be compared with economic indicators such as foreign trade (FT$), educational development (EDUC), health expenditure (HE$), and fertility (MF) observed in this century; the figure also illustrates the basic points mentioned in the previous chapter regarding the decline of mortality in Costa Rica.

From 1920 onwards both rates showed a tendency to decline systematically, but with differences in certain periods during which progress in health care was greater. The most rapid reduction in adult mortality was registered in the 1940s and 1950s, while that of infant mortality occurred in the mid-1960s. The difference created a gap between both mortalities, which reached its maximum around 1965. This corroborates what was noted previously, that infant mortality, until recently, fell behind adult mortality.

Table 4.1

Indices of the Health and Socioeconomic Situation, Costa Rica, 1910-1982.

Year	IMR 1	AMR 2	GNP$ 3	EXP$ 4	IMP$ 5	GOV$ 6	EDC$ 7	HE$ 8	ILLT 9	ENR 10	EDUC 11	ASIS 12
1910	197	149	...	94	85	58	68	6	548	499	92	...
1911	188	142	...	97	91	75	66	6	536	539	94	...
1912	186	128	...	102	87	58	72	7	524	551	98	...
1913	200	111	...	103	86	56	68	7	512	567	93	...
1914	185	119	...	101	64	60	64	9	501	580	89	...
1915	178	108	...	88	39	39	52	6	489	570	81	...
1916	184	126	...	82	48	28	39	4	477	593	78	...
1917	171	115	...	77	38	27	32	4	465	555	74	...
1918	186	161	...	59	23	23	17	3	453	507	69	...
1919	196	147	...	98	42	35	17	3	441	460	69	...
1920	219	169	...	71	97	27	31	3	429	540	73	...
1921	182	117	...	60	46	27	37	4	418	574	75	...
1922	188	120	...	77	44	24	38	5	406	579	83	...
1923	179	119	...	67	50	26	36	5	395	599	84	...
1924	203	126	...	85	61	29	40	8	383	558	88	...
1925	205	132	...	83	69	35	43	5	372	569	95	...
1926	181	117	...	95	69	33	49	6	361	585	102	...
1927	167	100	...	87	81	33	49	86	350	575	108	402
1928	166	114	...	96	87	33	48	93	343	595	117	420
1929	178	110	...	88	96	51	65	108	336	615	122	446
1930	160	102	...	80	52	47	69	108	330	633	128	459
1931	184	104	...	74	44	40	62	101	323	649	125	415
1932	156	98	...	48	31	38	56	103	317	665	117	369
1933	164	101	...	63	37	38	60	99	310	662	114	391
1934	136	94	...	48	48	35	59	92	304	703	114	497
1935	157	94	...	44	42	36	52	93	297	692	114	471
1936	153	93	...	45	48	35	50	90	291	679	115	466
1937	142	93	...	54	56	35	54	94	285	692	115	556
1938	122	94	...	48	59	36	57	108	279	674	121	531
1939	140	95	...	42	78	39	60	134	273	677	132	543
1940	132	86	...	34	76	43	71	146	267	677	136	561
1941	124	87	...	44	76	47	66	141	269	692	138	559
1942	157	80	...	40	46	41	61	109	255	701	141	547
1943	117	78	...	43	71	42	65	96	250	727	145	571
1944	125	76	...	35	71	33	56	89	244	726	155	612
1945	110	73	...	36	84	34	53	88	238	724	165	602
1946	102	66	294	40	92	32	53	87	233	735	175	584
1947	108	62	338	55	115	34	62	77	228	778	191	590
1948	92	60	344	98	90	38	61	76	222	740	204	607
1949	97	51	346	101	91	68	64	82	217	759	212	612

(continued)

Table 4.1 (Cont.)

Year	IMR 1	AMR 2	GNP$ 3	EXP$ 4	IMP$ 5	GOV$ 6	EDC$ 7	HE$ 8	ILLT 9	ENR 10	EDUC 11	ASIS 12
1950	90	47	347	112	92	41	63	77	212	759	221	594
1951	87	42	340	115	101	40	67	88	206	756	224	593
1952	88	37	368	127	117	52	81	96	200	745	226	563
1953	92	35	409	130	121	61	95	111	194	857	228	584
1954	79	32	398	134	125	62	104	117	188	826	227	594
1955	82	31	428	118	128	73	113	115	182	876	228	601
1956	72	30	401	88	123	67	127	111	177	904	235	638
1957	80	30	419	105	120	71	139	116	171	919	240	629
1958	75	28	453	112	110	72	174	124	166	903	248	631
1959	74	26	453	86	106	72	175	134	161	912	257	646
1960	74	25	474	94	108	74	193	142	156	930	274	649
1961	69	24	475	85	105	76	189	148	151	928	282	670
1962	74	27	486	91	111	85	199	181	146	960	292	671
1963	78	26	509	88	115	82	197	186	142	991	298	678
1964	87	26	516	100	121	86	215	212	137	1006	303	717
1965	76	26	544	93	148	87	238	233	133	1029	307	682
1966	65	24	568	105	138	101	273	258	129	1036	329	679
1967	62	24	585	105	136	106	308	280	124	1058	338	682
1968	60	23	611	116	137	106	342	324	120	1070	364	692
1969	67	22	633	119	150	101	326	359	116	1080	392	706
1970	62	24	656	133	183	112	354	367	112	1085	425	693
1971	56	23	680	121	180	135	418	451	109	1080	455	724
1972	54	22	719	139	168	142	425	509	105	1086	490	750
1973	45	21	754	159	183	159	441	496	102	1091	506	749
1974	38	22	775	181	283	155	470	513	98	1060	527	765
1975	38	21	779	181	256	153	493	539	95	1033	545	768
1976	33	19	795	201	263	173	537	569	92	1057	563	808
1977	28	19	842	259	319	168	538	574	89	1062	581	816
1978	22	27	872	244	329	193	605	625	86	1044	606	835
1979	22	18	892	234	349	204	621	726	83	1025	630	827
1980	19	18	876	218	335	211	636	653	80	1018	655	851
1981	18	15	835	196	231	160	472	585	78	1015	682	856
1982	19	15	740	155	151	130	339	386	76	991	703	...

Sources and definitions:

1,2 IMR = Infant mortality rate per 1,000.
AMR = Adult mortality rate (ages 20-49) per 10,000.
DGEC, Anuarios Estadísticos. Rates without corrections, except in the years 1918 to 1926, during which period it seems that deaths of 1-year-old children were tabulated as less than 1 year of age.

(continued)

Table 4.1 (Cont.)

3. GNP$ = Per capita Gross National Product in 1970 US$. ECLAC, 1978, and Central Bank of Costa Rica (for the conversion to dollars, the equivalence of 1 US$ = 5.09 colones was utilized, estimated by ECLAC for 1970).

4,5. EXP$ = Per capita exports in 1970 US$.
IMP$ = Per capita imports (CIF) in 1970 US$.
Data from Albarracín and Pérez (1977), DGEC, and Central Bank of Costa Rica, converted to 1970 prices with the United States' index.

6. GOV$ = Per capita expenditures of the Central Government in 1970 US$. Several reports from the Ministry (Secretariat) of the Treasury. Data deflated with the internal price index and the equivalence of 1 US$ = 5.09 colones.

7. EDC $ = Government's per capita expenditure in education (includes subsidies) in tenths of 1970 US$.

8. HE$ = Per capita expenditure in public health in tenths of US$. Prior to 1927 these figures represented the operational expenditures of the Ministry (Secretariat) of Health and also hospital assistance; from 1943 the expenditure for sickness and pregnancy insurance of the Caja Costarricense de Seguro Social (CCSS) was added, and from 1961 that of the Instituto Costarricense de Acueductos y Alcantarillados (A y A).

Sources: the same as 6 (above) and reports from the Ministry of Health, CCSS and A y A.

9. ILLT = Rate (per 1,000) of illiterates in population 10 and more years of age.

10,11. ENR = Enrollment in grammar and high school (per 1,000 youths 7-14 years old).

EDUC = Percentage of women 20-34 years old with complete primary education (estimation).

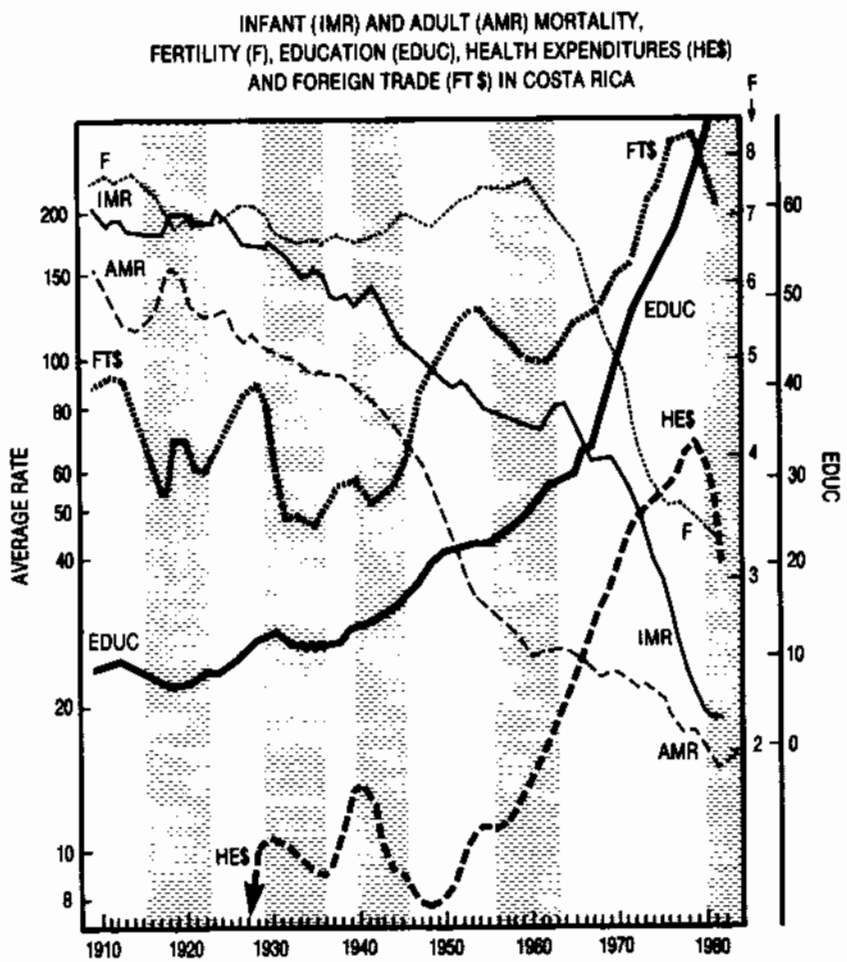
Source: Rosero, 1985.

12. ASIS = Proportion (per 1,000) of deaths with medical assistance (certified from 1950 onwards).

Sources: DGEC, Anuarios Estadísticos; from 1933 to 1940 Luros, 1941.

Figure 4.1

Evolution of infant (IMR) and adult (AMR) mortality rates, fertility (F), education (EDUC), health expenditures (HE$), and foreign trade (FT$), Costa Rica, 1910-1982. Shaded areas show approximately the periods of crisis. Left scale: IMR per 1,000; AMR per 10,000. Right scales: F (total fertility, marital) as number of births; FT$ = per capita foreign trade (in 1970 US$); EDUC = percentage of women 20-34 years old with complete primary education.



It is noteworthy that the period in which each of these rates showed the fastest decline coincided with the two periods in which the economic indicators registered an important and sustained increase: from 1945 to 1954 and from 1965 to 1979, approximately. This demonstrates the favorable effect of economic growth in reducing death risks, but does not imply that the former is the only or most important determinant of the latter. Figure 4.1 also shows that from 1910 through the mid-1940s the decrease in per capita foreign trade reflected an economic crisis of the oligarchical-liberal model. For more than 30 years economic progress seemed alien to Costa Rica. During those years were alternating periods of economic contraction and expansion, but the general tendency was one of stagnation. It was not until 1949 that the country's foreign trade recovered the level it had in 1910, of about US $200 (1970 dollars) per capita. In spite of this, mortality rates were substantially reduced during the period. It can be inferred that during the first half of the century, the fundamental determinants in reduced mortality rates must have been factors other than economic growth, that is, public health action, initiated in the 1920s, implementation of health technology developed in advanced countries, and, probably, social development.

The increments of foreign trade indicators and other social and economic indices permit one to distinguish those periods that approximately correspond to economic crises in Costa Rica, which are shaded in Figure 4.1; during these periods, the decline of mortality rates tended to slow down. Computing separately the annual rate of relative decline of mortality for normal years and during periods of economic crisis (Table 4.2) revealed that mortality in the years of economic contraction tended to decrease at a slower rate than in normal years. This negative effect becomes even clearer with the realization that the impact of economic crises took some time to become manifest. The case of infant mortality is the most illustrative: while in normal times the rate of annual decline reached 5.2 percent, in years of crisis, when a lag greater than one year is assumed (lower panel in Table 4.2), the trend was reversed and annual increases of up to 0.5 percent were observed.

These results indicate that progress in health conditions was influenced by the country's economic situation, which in turn was closely tied to external factors (prices of export products). The dramatic consequences of the economic dependency of Third World countries on world markets are evident, and are especially pertinent inasmuch as a new period of economic recession has been affecting Costa Rica since 1980. Thus, it should not come as a surprise that infant mortality improvement came to a standstill after 1980.

Figure 4.1 shows that the major changes in women's education, fertility, and public health expenditure took place after the 1960s. The percentage of women who had completed primary schooling, which had increased from 10 percent to 27 percent between 1910 and 1960, reached 65

Table 4.2

Annual Decline of Infant and Adult Mortality Rates in Periods of Economic Crisis, Costa Rica, 1910-1982.

Period	Infant			20-49 years		
	Without delay	1-year lag	2-year lag	Without delay	1-year lag	2-year lag
	Mean annual decline (%)					
1911-14	1.4	1.9	1.0	5.1	5.9	2.3
1915-23[a]	-0.2	-1.9	-1.6	-1.2	-2.8	-1.5
1924-29	-0.3	3.7	1.3	1.4	3.7	4.1
1930-36[a]	1.3	0.9	5.1	2.5	1.2	1.4
1937-39	2.2	1.7	-0.1	-0.4	2.4	2.4
1940-45[a]	2.6	2.9	0.9	4.1	4.2	5.5
1946-55	2.6	3.1	2.6	8.1	7.5	6.9
1956-63[a]	0.3	-2.6	0.3	2.0	1.6	1.6
1964-80	6.7	8.5	8.3	2.0	3.0	3.2
1981-82[a]	0.7	-5.0	...	8.3	0.0	...
Total (1911-82)	2.8	2.8	2.8	2.9	2.9	2.9
Years of crisis	1.4	-0.5	1.0	2.0	0.7	1.4
Years without crisis	3.8	5.2	4.5	3.6	4.5	4.0
Difference	2.4	5.7	3.5	1.5	3.8	2.6

[a]Period of economic crisis.

The minus sign indicates an increase in mortality.

percent in 1980, as a result of significant improvements in school enrollment of children in the 1940s and 1960s. The total fertility rate, fluctuating between 6 and 7 children since the beginning of the century, was reduced from 7.5 in 1960 to 3.4 in 1980. Health expenditure, which in 1930 reached US $11 per capita and was only US $14 in 1960, rose to US $68 per capita in 1979. Since the acceleration in the fall of infant mortality was related to all these changes, the causality of this phenomenon deserves further study.

It is then evident that in the 1960s and 1970s there were a number of interrelated favorable circumstances which induced an accelerated reduction in infant mortality. The phenomenon was probably the result of multiple factors, and it is difficult or impossible to pinpoint single determinants, but rather to conclude that changes were effected through favorable circumstances. The fact that an acceleration in the fall in infant mortality did not occur until the 1970s may be explained by an imbalance in the cause-effect relationships during previous years. Above all, it could be explained in terms of an accumulation of favorable conditions that were necessary, but not sufficient, to induce the changes. In fact, a qualitative change in public health policy was required, and this took place in the 1970s, as indicated in Chapters 2 and 3.

In any case, the important point in Figure 4.1 is the existing association between the historic mortality trend and the multiple components of the country's evolution. High correlation coefficients among the various curves were then obtained, as follows:

	Correlation with Mortality	
	Infant	Adult
Education (EDUC)	-96	-96
Foreign trade (FT$)	-86	-82
Fertility (F)	+83	+54
Health expenditure (HE$)	-79	-82

Logarithmic linear correlations were calculated between relative values of variables; basic information for the calculations appears in Table 4.1. These coefficients, which obviously were highly significant, are self-explanatory, but it is worth noting that infant mortality appeared more associated with the country's socioeconomic development than adult mortality.

Table 4.3

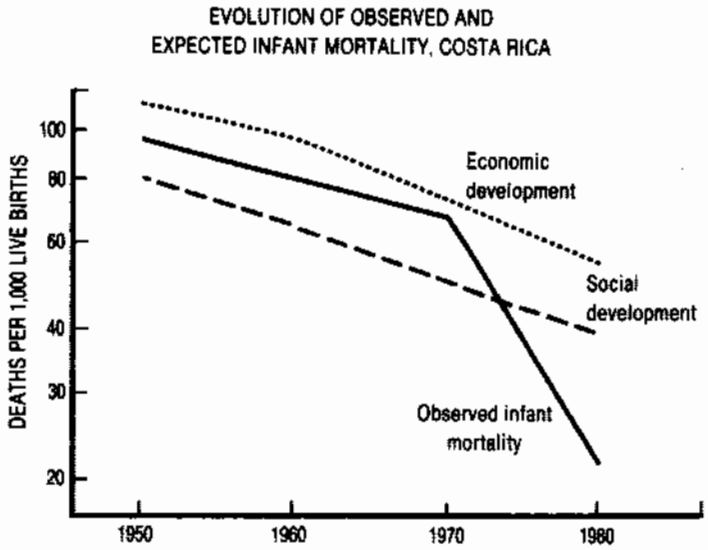
Indices of Development Levels (IDL) and Expected Infant Mortality, Costa Rica, 1950-1980.

Variable	1950	1960	1970	1980
	Indices of development levels			
Economic (mean)	(38)	(45)	(56)	(65)
Dwellings with electricity	42	54	63	71
Automobiles	41	59	69	74
Telephones	40	41	52	71
Workers in agriculture	32	43	53	66
Industrial product	30	33	42	49
Energy consumption per capita	29	32	46	51
Product per capita	53	60	67	74
Social (mean)	(53)	(60)	(68)	(75)
Literacy	65	69	73	77
Students, primary and secondary school	34	51	67	80
Circulation of newspapers	60	61	64	67
Mortality				
Life expectancy at birth	46	60	67	97
Infant mortality	45	53	59	91
		Rate per thousand		
Observed infant mortality	95	80	67	21
Expected according to means of IDL				
Economic	111	97	73	55
Social	80	64	49	39
Economic and social	101	86	65	49

Sources: Rosero (1983); Mauldin and Berelson (1978).

Figure 4.2

Expected infant mortality rate (IMR) in Costa Rica based on economic and social development, as compared with observed IMR, 1950-1980, Costa Rica.



4.2 Correspondence with levels of development

A way to inquire into the effect of various factors on mortality is to examine quantitative relations established in transnational studies. A model developed at the United Nations to study the determinants of fertility is particularly useful in the present analysis (Mauldin and Berelson, 1978). In this model, there is, for a wide array of economic, social, and demographic indicators, a "corresponding" value for a theoretical index of development ranging between 0 and 100. The values of such indices in Costa Rica, during 1950-1980, have been calculated for seven economic and three social indicators (Table 4.3), and with the means of these two sets of values, the infant mortality rates were calculated according to the "correspondence" model. The expected rates appear in Figure 4.2 and are compared with the observed mortality rates.

The fact that Costa Rica is a more advanced country socially than economically is clearly observed in the expected infant mortality rates: those corresponding to the first type of development are lower between both extremes--at a higher level than that reached by economic development, but not as high a level as that achieved by social sectors such as education. However, the Costa Rican infant mortality for 1980 departed from this socioeconomic conditioning, since its value (20 per 1,000) is considerably lower that the expected one as either a function of the national economy (55 per 1,000) or the social reality (40 per 1,000). Apparently the health sector had assumed a leading position in accounting for this situation.

From 1950 to 1970 the hypothetical rates corresponding to economic and social development decreased by 34 and 39 percent, respectively, and the true rate did so by a similar magnitude (29 percent), following a tendency which coincided with the general progress of the country. But between 1970 and 1980, the reduction in infant mortality (69 percent) was approximately three times the expected value (20 or 25 percent).

What singular events occurred in the 1970s in Costa Rica to account for the notable departure from the model validated in numerous countries? It is possible that the phenomenon occurred through a substantial modification in an uneven distribution of income and welfare, which is not contemplated in this type of model based on national averages. However, there is no evidence to support this hypothesis. For instance, the studies of de Céspedes (1979) and Trejos (1983) showed that the 40 percent of the population with the lowest income in 1971, earned 15 percent of the total income, while in 1977 the proportion for this group was reduced to 11 percent.

Presumably, then, the phenomenon under study is primarily the result of public health policies implemented in the 1970s. According to the results obtained by application of the corresponding model with the level of development, it seems that around two-thirds of the impressive reduction in infant mortality in the last decade is attributable to qualitative changes incorporated in the health sector, as already mentioned.

Table 4.4

Mean, Standard Deviation, and Coefficient of Variation in Infant Mortality Rate (per 1,000), 79 Cantons of Costa Rica, 1964-1982.

Period	Mean IMR	Standard deviation	Coefficient of variation (%)
1964-65	72	21	29
(1967-70)[a]	(70)	(19)	(51)
1968-69	63	22	35
1972-73	50	18	36
1974-75	40	23	58
1976-77	37	13	34
1978-79	23	7	33
1980-81	19	7	38
1982	19	7	36
	Mean absolute annual reduction		
1965-72	2.8	2.3	81
1973-80	4.9	3.1	63
	Mean relative annual reduction (%)		
1965-72	4.9	4.3	87
1973-80	13.1	6.7	51

[a]Estimated values by Brass's method using information from the 1973 census.

Source: General Directorate of Statistics and Census (various years).

4.3 Ecologic Analysis

The following is an analysis of the rapid reduction in infant mortality in the 1970s, with information on the country's cantons. Cantons are small political-administrative divisions, of which Costa Rica has 81. The "level" of the canton infant mortality circa 1970 was estimated through indirect techniques (Brass's method) applied to data from the 1973 census. The "tendency" was estimated using the rates of vital statistics, assuming that deficiencies which affect them (i.e., differential underregistration and errors in declaration of the mother's canton of residence) did not vary much during the study period. The purpose of this analysis is to determine: (a) the relationship between the rate with which mortality dropped in the canton, and (b) the changes occurring during the decade and their characteristics. The multiple regression technique was used to sum up the wealth of information that the analysis requires and the variety of relationships that it implies.

The evolution of the mean and standard deviations of the cantonal rates between 1964 and 1980 (Table 4.4) confirm two facts already mentioned: the acceleration of the relative decrease of infant mortality (5 percent per annum in 1965-1972, versus 13 percent per annum in 1973-1980), as well as the reduction in differentials (standard deviation of around 20 until 1972-1973, and of around 7 towards the end of the 1970s). A cautionary note must be made, in that the cantonal data may be flawed, especially during the 1960s. The reason is underregistration of deaths --small for the country as a whole but large in a few localities with higher mortalities--which seriously affects estimates of mortality "levels" in that period. This problem is resolved by using the estimate based on the census information, while the estimates of the relative declines can be accepted as credible.

4.3.1 The situation circa 1970. Cross-sectional studies have shown that around 1970 the cantonal infant mortalities were strongly correlated with almost any type of indicators of the quality of life (Porras, 1976; Haines and Avery, 1982). This is simply another way of studying mortality differentials which, as mentioned, reflect clearly how conditions under which children are born and reared determine their survival opportunities.

Mean values of a set of cantonal socioeconomic and health indicators, by three levels of mortality, are shown in Table 4.5. It can be seen that this classification, in general, also categorizes cantonal characteristics, so that the most advantageous conditions correspond to the "low" mortality group. For instance, in this group the consumption of electricity was 888 kw per capita; in the intermediate group, it was 178 kw; while in the high mortality group it was only 62 kw. All coefficients of simple correlations with mortality were significant. But the risks of death were lower (more than 70 percent correlation), especially when the proportion of hospital deliveries was higher, when there was good water supply, or when fertility was lower. At the other extreme (low correlation), it should be noted that not always did a low mortality coincide with availability of hospital services or with greater coverage.

Table 4.5

Various Development Indicators from the Cantons of Costa Rica, Grouped by Infant Mortality Rate (IMR), Circa 1970.

Indicators	Total	IMR circa 1970 Low	Medium	High	(r%)
Rank of IMR per thousand	30-100	39-59	60-70	80-100	
IMR per thousand	68	48	69	89	
% of births	100	33	36	31	
Number of cantons	79	21	31	25	
Socioeconomic and environmental					
General index	58	86	50	39	(-74)
% work force in agriculture	34	6	40	57	(66)
% families below poverty level	24	15	29	27	(32)
Per capita electricity consumption (kw)	376	888	178	62	(-54)
Per capita housing expenditure (Colones)	139	307	66	45	(-52)
Density, inhabitants per sq. km	37	1022	75	16	(-46)
Distance from Capital (km)	92	12	104	161	(66)
Enrollment in school (% females aged 7-14 years in 1963)	51	60	48	45	(-60)
Population covered by Social Security (%)	67	100	37	48	(-24)
Hospital care					
General index	66	86	63	49	(-68)
Distance to nearest hospital	21	5	16	14	(50)
Hospital discharges per 1,000 population	124	124	116	132	(-25)
% institutional births	71	93	69	51	(-83)
Secondary care					
General index	51	71	43	38	(-56)
Per capita physician-hours, Social Security	16	23	14	11	(-40)
Outpatient consultations per 1,000 population	188	262	159	146	(-53)
Environmental sanitation					
General index	84	97	85	69	(-76)
% with piped water supply	68	96	69	43	(-75)
% with sewage disposal	87	98	85	78	(-62)
General fertility rate per 1,000	142	108	139	181	(79)

Note: Figures are averages of cantons weighted by number of births in 1973.
r = simple coefficient correlation.

Table 4.6

Partial Correlation Coefficients (r) Between Infant Mortality Rate (IMR) and the Ecologic Situation in Cantons, Circa 1970.

Controlled variable	Explanatory variable of IMR: Environment	Hospital care	Secondary health care	Sanitation	Fertility
			Simple correlation with IMR (%)		
None	-74	-68	-56	-76	79
			Partial correlation with IMR (%)		
Environment	-	-15[a]	-8[a]	-46	56
Hospital care	-42	-	-18[a]	-48	59
Secondary health care	-59	-49	-	-64	71
Sanitation	-40	-16[a]	-23	-	43
Fertility	-42	-28	-33	-30	-
All	-28	11[a]	-11[a]	-17[a]	39

[a]Not significant at 5% confidence level.

Note: Multiple correlation coefficient R = 84%.

The indices summarizing the different groups of variables are useful in studying whether correlations persist after controlling for certain parameters. Table 4.6 shows that the canton's socioeconomic "environment" and fertility maintain a significant influence on mortality, independently of the other variables. The index of environmental sanitation (availability of water and toilet) is significant after controlling for the effect of the remaining variables, but it loses significance when socioeconomic level and fertility are simultaneously controlled. Also, the indices for hospital services and "secondary" services (basically, hospital outpatients) ceased to be associated with infant mortality as soon as one controls for the degree of the canton's socioeconomic development.

In summary, around 1970 the cantons' socioeconomic development and fertility were the only variables emerging from the partial correlation analysis with a completely independent effect on infant mortality. This is not to say that direct interventions by the health sector (measured by the three indices already mentioned) were devoid of importance as determinants of infant mortality. What it does mean is that their effect was not independent of other variables. In other words, it appears that health activities up to 1970 were concomitant with economic and social progress. Surely these activities were the principal instrument through which the latter acted upon the former. They were not, however, autonomous, in that they could not or did not aim to break away from the economic and social determinism exerted over infant health programs, as well as directly over infant mortality. An exception was the lowering of fertility, which was partly due to actions taken in the health sector. Environmental sanitation also seems not to be included in the above statement, but since its effect interacts with that of fertility, in the end it does not appear to be significant.

4.3.2 **Changes during the decade of the 1970s.** In Table 4.7 cantons are regrouped as a function of the relative decrease (annual percentage) in infant mortality from 1972 to 1980. The groups with the highest relative reductions had the highest mortality at the beginning of the period. As already discussed, this is an additional sign that Costa Rica had reduced its mortality differential. There was also a negative correlation between the decline in mortality and the degree of welfare or sanitary conditions at the beginning of the period. It must be emphasized that those privileged cantons which formerly had better conditions for diminishing their mortalities are, paradoxically, those with more moderate advances during the 1970s. Which changes or which new elements came into play in this decade to alter the previous "order"? To address this question, one must examine information relating to changes occurring in the cantons. First, the degree of the decrease in mortality was compatible with variations registered by all indicators presented (all correlation coefficients were positive). It is also clear that the indicators of health interventions showed greater association with the phenomenon under study than with social and economic progress. In particular, implementation and extension of rural and community health programs were outstanding, as indicated by the high correlation observed, followed closely by utilization of outpatient services of the Social Security and Ministry of Health.

Table 4.7

Various Development Indicators for the Cantons of Costa Rica, Grouped by the Percentage Reduction in Infant Mortality Rate (IMR), 1972-1980.

Indicators	Total	IMR Reduction			(r%)
		Low	Medium	High	
Range of annual reduction of IMR (%)		5-10	10-16	17-29	
Median annual reduction IMR (%)	13	6	13	20	
% of births (1973-80)	100	28	47	25	
Number of cantons	79	21	33	25	
		Situation circa 1970			
IMR per 1,000 (1967-70)	68	53	70	77	(31)
Index of socioeconomic status	58	81	53	51	(-22)
Index of hospital care	66	84	62	61	(-23)
Index of secondary health care	51	72	46	42	(-18)
Index of environmental sanitation	84	94	81	80	(-14)
General fertility rate per 1,000	142	116	149	149	(16)
		Change in the 1970s			
Relative socieconomic progress					
General index	36	21	42	41	(17)
Electricity (increment %)	87	33	111	101	(15)
Building (increment %)	73	33	89	89	(10)
Education (increment %)	29	28	30	29	(2)
Social Security coverage (increment %)	94	62	106	106	(16)
Hospital care					
General index	31	16	37	38	(30)
Distance from hospital (reduction in kms)	6	0	7	9	(29)
Hospital discharges (change in rate per 1,000)	-6	-10	-12	9	(7)
Institutional births (absolute increment)	13	5	15	16	(24)

Table 4.7 (cont.)

Indicators	Total	IMR Reduction			(r%)
		Low	Medium	High	
Secondary health care					
General index	39	31	37	52	(38)
Physician hours Social Security (increment rate per 1,000)	15	12	12	24	(22)
Outpatient consultations increment rate per 1,000)	90	63	94	113	(37)
Primary health care					
General index	44	17	53	58	(42)
Rural and community health (% coverage)	39	13	48	51	(39)
Vaccination index (DPT, measles, tetanus)	28	12	31	40	(23)
Community participation (% with committee in 1980)	44	24	44	67	(31)
Piped water supply (% increment)	20	6	29	23	(13)
Fertility (reduction in general rate per 1,000)	6	-3	11	10	(27)

Note: Figures are averages of cantons weighted by number of births in 1973-80. r = simple correlation coefficient.

The information in Table 4.7 merits special analysis. For instance, the nature and magnitude of the effect of each of the variables or the problems inherent in measurement need to be discussed. Interestingly, for each of the two factors frequently mentioned as a cause of low mortality, namely, educational improvements (r = 2 percent) and water supply improvements (r = 13 percent), the cantonal information does not offer empirical evidence of a significant association. The lack of association may be due to deficiencies in measurement (the 1984 census may allow improvement), or to a lesser impact of changes occurring during the

decade, as compared with previous years. For instance, in 1970 illiteracy was reduced to 13 percent, while 75 percent of the dwellings already had piped water. At any rate, the available information does not support the belief that recent improvements in these two factors were the cause for the rapid decrease in infant mortality in the 1970s.

4.3.3 The impact of community health care. Since many of the variables analyzed are interrelated, it is worthwhile to study their partial associations. These are presented in Table 4.8 for the indices of different groups of explanatory variables. The initial profile of welfare and availability of various kinds of health services was found to be negatively correlated with the decrease in mortality. Obviously, this cannot be considered a causal relationship. What seems to have happened is that the focus of health programs resulted in a greater reduction in mortality in the cantons that initially had the least favorable conditions for a decline. In particular, primary health care programs clearly demonstrated this focus. As can be seen in Table 4.8, when the effects of primary health care programs are controlled for, the correlation of indices describing the initial correlation change in sign and acquire a logical causality. It should be noted that simple correlations of negative sign, which were initially observed, represent a spurious association. Actually, the cantons that had accumulated greater advantages in the past tended to reduce their mortality more intensely in the 1970s. This element remained hidden by the focus of health programs.

Among the changes in the decade, the increment in primary health care (basically community preventive medicine) and secondary health services (outpatient services), showed the highest and strongest association with the phenomenon under study. The correlation coefficients (around 40 percent) were significant and retained their magnitude after controlling for all and each one of the effects of the remaining variables. It can be concluded, therefore, that they are genuine determinants of the reduction in infant mortality.

The quantitative improvement in hospital services (reduction of distances to clinics, increase in rate of institutional deliveries) showed important associations with the reduction in mortality. However, it seems that these improvements took place in the same cantons in which a decided strategy for primary health care was implemented. For this reason, after controlling for this last variable, the effect of hospital services virtually disappeared, which implies that hospital services were not determinants of the phenomenon observed. However, their merit must be recognized, as they reach even the most isolated localities. One of the remarkable characteristics of the decade was the creation of regional hospitals and peripheral clinics throughout the country. This was quantified and taken into account in the analysis. The obvious support provided by hospitals to the rest of services in the lower levels of medical care has not been quantified. It is also possible that the separation of different types of health services made here is somewhat artificial.

Table 4.8

Partial Correlation Coefficients (r) between Decrease in Infant Mortality Rate (IMR) 1972-1980 (dependent variable) and the Initial Situation of Cantons and Changes in that Situation during the Period.

Controlled variable	Explanatory variables: initial situation				
	Socioeconomic environment	Hospital care	Secondary health care	Sanitation	Fertility
	Correlation with percentage decrease in IMR				
None (simple r)	-22	-23	-18[a]	-14[a]	16[a]
Initial IMR	1[a]	3[a]	-2[a]	15[a]	-14[a]
Initial socioeconomic environment	-	-8[a]	4[a]	4[a]	0[a]
Initial hospital care	-6[a]	-	-4[a]	8[a]	0[a]
Initial secondary health care	-13[a]	-14[a]	-	-4[a]	8[a]
Initial sanitation	-18[a]	-20	-13[a]	-	8[a]
Initial fertility	-16[a]	-16[a]	12[a]	-11[a]	-
Socioeconomic progress	-14[a]	-15[a]	-11[a]	-5[a]	9[a]
Increment in hospital care	-3[a]	2[a]	-3[a]	6[a]	1[a]
Increment in secondary health care	-19[a]	-24	-18[a]	-14[a]	15[a]
Increment in primary health care	20	12[a]	5[a]	22	-16[a]
Fertility reduction	-11[a]	-13[a]	-9[a]	-3[a]	2[a]
All	34	-12[a]	0[a]	18[a]	-15[a]

Table 4.8 (cont.)

Controlled variable	Explanatory variables: change in decade				
	Socioeconomic progress	Increment hospital care	Increment secondary health care	Increment primary health care	Fertility reduction
	Correlation with percentage decrease in IMR				
None (simple r)	17[a]	30	38	42	27
Initial IMR	5[a]	15[a]	39	30	13[a]
Initial socioeconomic environment	1[a]	20	37	41	19[a]
Initial hospital care	4[a]	20	39	38	19[a]
Initial secondary health care	9[a]	24	38	38	22
Initial sanitation	12[a]	27	38	45	23
Initial fertility	12[a]	25	38	42	22
Socioeconomic progress	-	24	38	39	24
Increment in hospital care	2[a]	-	40	31	16[a]
Increment in secondary health care	16[a]	32	-	35	31
Increment in primary health care	-9[a]	4[a]	30	-	13[a]
Fertility reduction	13[a]	21	41	35	-
All	22	5[a]	37	34	26

[a]Not significant at 5% level.

The effect of a reduction in fertility in the decade lost its statistical significance when several interrelated variables were accounted for. But significance was recovered in a model in which all the variables were included at the same time. This confirms that there exists an independent relationship between the regulation of fertility and the decrease in infant mortality.

The possible effect of contemporary socioeconomic progress on the reduction of infant mortality finally became significant. In order to reach this result, however, it was necessary to remove interferences induced by the rest of the variables.

Finally, it was possible to construct a model that, with the available information, explains better the relative reduction of the cantonal infant mortality in the decade of 1970. The model includes variables significantly and independently associated with the others. These are:

	"Apparent" association (simple r)	"Independent" association (beta)
Starting infant mortality	.31	.49
Starting socioeconomic environment	-.22	.67
Starting fertility	.16	-.38
Socioeconomic progress in the decade	.17	.27
Increment in secondary health care	.38	.33
Increment in primary healh care	.42	.52
Reduction in fertility	.27	.29
All (determination coefficient)		.64

1

The explanatory capacity of the model as a whole (determination coefficient of 64 percent) was satisfactory. It may be increased by improving the specification of the model, for instance, by inclusion of variables whose quantification had not been possible, or probably by improving the measurement of variables analyzed (the data of the 1984 census make a valuable contribution in this regard).

The "beta" coefficients measure the final or independent effect of each variable. Beta coefficients are interpreted as the number of standard deviations by which the dependent variable would be modified (percentage of mean annual reduction in IMR) if the respective independent variable were increased by one standard deviation, and the rest kept constant. The magnitude of this coefficient permits one to reach conclusions regarding which explanatory variable (or variables) is the most important under the theoretical condition of all else remaining the same.

Infant mortality at the beginning of the 1970s was included in the model. This can be interpreted as meaning that an intervention aimed at reducing infant mortality will induce a greater percentage of reduction if the mortality is already high. If the dependent variable had been the absolute reduction, and not the relative reduction, the effect would have been even greater. With other models of mortality change (for instance, the logistic) it is probable that the initial level would lose importance as an explanatory variable. The fact is that there does not seem to exist a linear relation between interventions and results. These tend to be small when the risk of death is already low.

The most important explanatory variable was the initial socioeconomic environment (beta = 67 percent). This means that the accumulation of well-being in the past created favorable conditions for diminution of the cantonal mortality. This is a very important result, since it was intuitively believed that this had occurred in Costa Rica, albeit without strong evidence. The same applies to the fact that starting fertility was included in the model with a negative sign. In this case the effect is that those cantons which did not reduce their fertility in previous years were less successful in reducing their infant mortality.

Initial conditions have theoretical importance in explaining what has happened in Costa Rica, but they lack practical relevance since, obviously, at the time for action nothing can be done about starting conditions. From this point of view, it is of greater interest to examine the effects of recent changes on the phenomenon under study. Among them the most outstanding (beta = 52 percent) is primary health care, which includes, in order of importance, the rural and community health programs, the intensity of the vaccination campaign, the degree of community participation (measured by the formation of associations for community health in the cantons), and the increase in water supply. Other changes in the 1970s according to the model--which had an autonomous influence over the reduction in mortality--are the increment in secondary health care, fertility control, and socioeconomic progress.

The "beta" coefficients of association are a statistical abstraction whose interpretation poses certain difficulties. They express the explanatory power of a variable. But their potentiality may or may not have been exploited by the country. They should not then be taken as the contribution that the variable has actually made to the phenomenon. The

example of the reduction in fertility better illustrates the point. Its coefficient of association (beta = 29 percent) results from the observation that in cantons with similar characteristics and changes, the greatest reduction in fertility was accompanied by the largest fall in infant mortality. This is a statistically significant association strongly pointing out a genuine determinant of the decrease in mortality. However, in many cantons fertility was not reduced but, quite the opposite, increased. This resulted in a national average of fertility reduction that was rather moderate and, thus, was a modest contribution to the variable for the country's reduction in mortality.

The model permitted, at the same time, an estimate of the expected reduction in infant mortality, as a function of national averages of change for the different explanatory variables. In Figure 4.3, the lower curve indicates the expected evolution of infant mortality according to the model, which should approximately follow, as it does indeed, the real rates. The curves on top indicate the expected trend in the absence of the determinant in question. Only variables that describe changes occurring in the decade are considered. In order to include variables describing initial conditions, a multiequational model would have been necessary, logically allowing for modifications in the initial mortality, as well as a number of suppositions difficult to formulate regarding the level of these starting conditions. The difference between the two extreme curves indicates the total expected reduction as a function of observed changes in the decade, which can be separated into individual contributions by each one of the variables.

The lower part of Figure 4.3 shows that 41 percent of the reduction in infant mortality can be explained in terms of primary health care actions. Thus, these actions are the principal determinants of the phenomenon described. Increased medical care at the intermediate level (outpatient service) also made an important contribution (32 percent). The reduction in fertility accounted for a modest contribution (5 percent). Considering that a part of the latter is also attributable to health interventions (family planning), according to the model, primary health care actions accounted for nearly three quarters of the marked decrease in infant mortality occurring in Costa Rica from 1972 to 1980. The remaining quarter would be due to recent socioeconomic progress. As indicated before, such estimates do not take into account the socioeconomic advance or the decrease in fertility occurring prior to the 1970s.

The disaggregation of the determinants in the reduction of infant mortality is a national average. Obviously it may be different in certain subpopulations. In order to explore this point, four groups of cantons were distinguished according to their mortality levels at the

Figure 4.3

Effects of different variables on the trend of infant mortality rate in Costa Rica, according to its explanatory model. Note that primary and secondary health care accounted for most of the reduction in infant mortality.

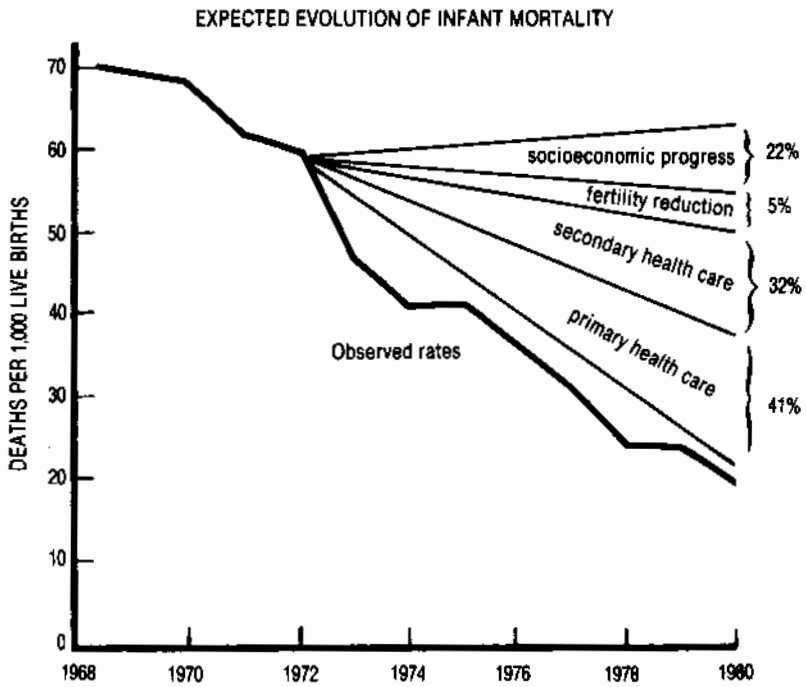


Table 4.9

Contribution of Different Factors to the Decline in Infant Mortality Rate (IMR), 1972-1980, in Four Groups of Cantons.

Factors	Groups of Cantons			
	I	II	III	IV
IMR (per 1,000) circa 1970	> 68	> 68	< 68	< 68
Annual decrease in IMR 1972-80	> 13	< 13	> 13	< 13
Number of cantons	30	9	18	22
Percentage of births	35	13	19	35
Total annual reduction (%)	17	11	17	8
Total contribution (%)	100	100	100	100
Socioeconomic progress	21	23	28	21
Fertility reduction	8	11	-4	-6
Improvement in secondary health care	27	22	45	56
Improvement in primary health care	44	44	31	29

beginning of the 1970s and to the rapidity with which infant mortality dropped during the decade. For each of the groups the estimates obtained with the national averages were replicated (Table 4.9). The contribution of primary health care in the cantons where mortality was high (44 percent) was clearly the most important, but not in those cantons in which it was moderate (a contribution of around 30 percent). In the latter the reduction in mortality seemed to have been caused mainly by so-called secondary health care (around 50 percent). Socioeconomic progress showed a similar contribution (between 21 and 28 percent) in the four groups of cantons. In contrast, the reduction in fertility only had an effect in those cantons that had a high infant mortality.

The effect of the Rural Health and Community Health Programs on the evolution of the infant mortality rate by canton from 1964 to 1980 may also be classified according to the mean coverage of these programs during the 1972-1980 period (Figure 4.4). It can be observed that the cantons that were not targets for these programs because they had a higher level of development (less than 25 percent of coverage) remained static regarding the decline of infant mortality throughout the period.

In contrast, the cantons with more than a 25 percent coverage showed a clear acceleration in the decline of mortality precisely in the period when the programs were in existence (1972 and following years). The more notable case was for cantons with a coverage of more than 75 percent, which moved from an infant mortality rate of 80 per 1,000 at the end of the 1960s to an unusually low rate of only 16 per 1,000, lower than any other group of cantons, 10 years later. The infant mortality rates around 1965, shown in Figure 4.4, are not reliable, due to the fact that at that time underregistration of infant deaths was quite high (estimated around 15 percent), and probably affected the rural zones more, which subsequently would have a wider coverage by the programs under study.

Table 4.10 corroborates the previous findings. For example, it can be seen that the annual rate of decline of infant mortality remained at 7 or 8 percent before and after 1972 in the cantons with less than 25 percent coverage by the Rural and Community Health Programs--representing 40 percent of the total births. In 1968-1969 those infants had a probability of death during their first year of life of around 50 per 1,000. The other cantons--which were the main target of the programs--had an infant mortality more than 50 percent higher in 1968-1969 (around 75 per 1,000), although a much greater rate of decline, reaching up to 15 percent annually during 1973-1980, from 4 percent annually during 1965-1972.

The classification of cantons according to level of involvement in agricultural activity (Table 4.10) corroborates the previous comments. It shows that before the Rural and Community Health Programs were established, the distinction produced an important rural-urban differential that no longer occurs. To stress the important role of the programs under study, it can be observed at present that the only populations that show an infant mortality substantially higher (35 per 1,000) than the national average (21 per 1,000), are those located in small rural hamlets not reached by primary health care.

Figure 4.4

Infant mortality rate in cantons according to coverage by the Rural and Community Health Programs during 1972-1980, Costa Rica. Source: Rosero (1983).

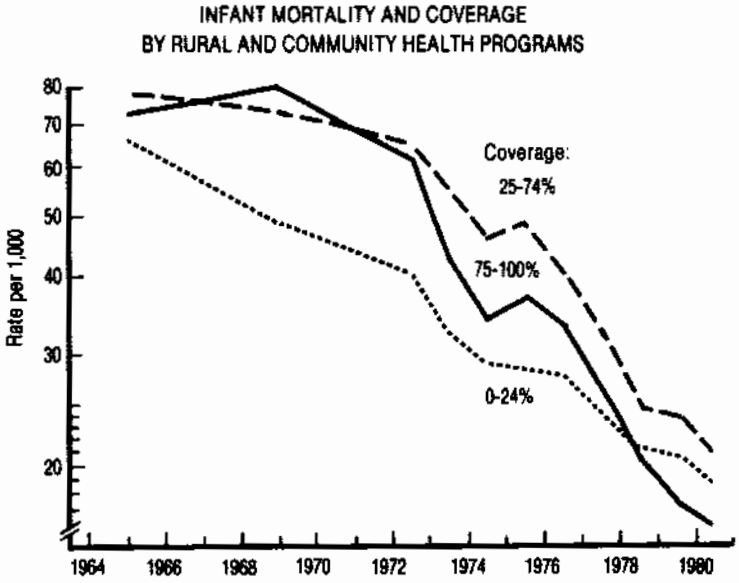


Table 4.10

Decline in Infant Mortality Rate in Cantons of Costa Rica by Mean Coverage of Rural and Community Health Programs and by Level of Agricultural Activity.

Mean coverage, 1972-1980 (%)	Weight (% of births)	Infant mortality rate (per 1,000)		Mean annual decline in IMR (%)	
		1968-1969	1979-1980	1965-1972	1973-1980
		All Cantons			
Total	100	64	21	5	12
0-9	15	49	21	8	7
10-24	25	49	19	8	7
25-49	13	64	23	3	14
50-74	37	76	22	4	15
75-100	10	80	17	5	16
		Cantons with less than 50% of agricultural population			
Total	56	58	20	6	11
0-9	14	45	19	9	7
10-24	24	49	20	6	10
25-49	5	63	22	5	13
50-74	11	86	25	5	15
75-100	22	88	19	5	19
		Cantons with 50% or more of agricultural population			
Total	44	71	21	3	14
0-9	1	84	35	6	8
10-24	1	37	25	8	5
25-49	8	64	24	1	15
50-74	26	71	24	3	14
75-100	8	78	17	5	16

Source: Rosero (1983).

These results corroborate the singular importance that health intervention programs, such as primary health care, had in Costa Rica in the 1970s. They had both qualitative and quantitative value: they served the population in greatest need and to a great degree neutralized one of the most serious forms of social injustice: the inequitable treatment of human beings, especially children, who are confronted with life-threatening conditions.

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5. CONSTRAINTS TO FURTHER HEALTH IMPROVEMENT

> A nation that spends more than it has, or that lives on loans in order to enjoy a comfort for which it has not paid, will exhaust its resources and eventually become an international beggar.
>
> Clodomiro Picado
> Pioneer scientist of Costa Rica (at a discussion on hunger in Costa Rica, 1941)

5.1 Introduction

Chapters 2 and 3 contrasted Costa Rica's favorable health indices —comparable to those of more advanced nations—with the deteriorating quality of life reflected in an increasing social pathology. The latter may have been accentuated by the prevailing socioeconomic crisis, or it might be a natural consequence of the tendency toward the "consumer model" characteristic of advanced nations.

The present level of social pathology is of great concern, although it is recognized that it may not be worse than that observed in advanced industrial nations which are plagued with violence, alcoholism, dissatisfaction, sexually transmitted diseases, and mental illness. Costa Rica has been free so far of child pornography, and relatively free of child prostitution and other evils present in some affluent societies.

Cross-cultural comparisons can result in questions about whether the health gains registered in Costa Rica and other western democracies really reflect an improved quality of life. For example, what is the significance of a decrease in morbidity, suffering, and death from infection and malnutrition in light of a concurrent increase in family breakdown, alienation, lack of solidarity, and mental illness?

The priority in Costa Rica should be a sustained emphasis on primary health care (PHC) to cover the remaining 30 percent of the rural population still unprotected. This can be achieved by strengthening

political commitment, allocating adequate funds, developing innovative programs of continued control and eradication of infectious diseases, perfecting family planning and prenatal and perinatal care, promoting health, and monitoring children's growth (Mata et al., 1982a; Jaramillo et al., 1984). Additional activities should encompass identification and support for children with handicaps and learning difficulties through the PHC and educational infrastructures.

The challenge in the immediate future, however, is to learn more about the determinants of the current social pathology in order to chart avenues for its control and prevention. The knowledge gained could be used to modify the contents of the PHC package and other intervention programs, emphasizing intersectoral action for a better utilization of available resources.

In a poor country such as Costa Rica, these recommendations may not be easily implemented if the health policy is equivocal, if adjustments in attitudes toward causality are not made, or if a political decision to effect the required actions is not firm in the face of the orthodoxy and the electoral interests of the moment.

5.2 Role of Intersectoral Action for Health in Costa Rica

Intersectoral action is expected to have a decisive, positive effect on attaining the goal of health for all by the year 2000, and has already played a key role in improving health in Costa Rica over the last decades. Influenced by strong leadership--generally the President or other influential persons--officials from several sectors have shared ideas to develop ambitious programs. For example, in the early 1940s significant emphasis was given to the control and prevention of hookworm disease. A comprehensive program resulted, comprising (a) education of schoolchildren regarding the causes and transmission of hookworm disease; (b) education of the community through posters depicting the lifecycle of the parasite; (c) promotion and distribution of latrines; and (d) provision of shoes to schoolchildren. The program was so dynamic that within two years virtually every schoolchild in the country had received a pair of shoes.

This intervention occurred at a time when the Ministry of Health was evolving from the modest Subsecretariat of Health. The implementation of the anti-ancylostomiasis program required the coordination of several sectors, including education, public works, health, the police, and the army.

Other examples of intersectoral action for health involved the Government and the private sector as well as international cooperation. The guidance of the Rockefeller Foundation, the Pan American Sanitary Bureau, and, more recently, the World Health Organization, cannot be denied. One of the most illustrative cases of multisectoral cooperation

was the development of the National Service for Eradication of Malaria (SNEM), established under the influence of PAHO/WHO, with support from foreign and national funds and the resources of the Ministry of Health and other Government entities. In fewer than two decades Costa Rica succeeded in controlling malaria, perhaps the most important health accomplishment of the century, in a clear demonstration that intersectoral interventions can be effective. Attaining the consolidation phase in malaria control involved setting up an infrastructure for rural health work that later on permitted its utilization in the Rural Health Program (RHP). This remarkable accomplishment of malaria control is not recorded in scientific publications; yet the benefits are clearly evident in the marked decline in malaria deaths (Table 5.1), which mainly benefited men working in the lowlands and, indirectly, their families.

Table 5.1

Evolution of Malaria Mortality Rates in Costa Rica, 1929-1981.

Period	Rate per 100,000	Absolute decrease in interval	Decrease in interval (%)	Decrease from 1929-1931 (%)
1929-1931	239			
1939-1941[a]	138	101	42	42
1949-1951[b]	60	78	57	75
1959-1961	2	58	97	99
1969-1971	0.2	1.8	90	99.9
1979-1981[c]	0	0.2	100	100
1982-1984	0	0	0	100

[a]Social reform began.
[b]Holistic malaria eradication program began in the 1950s.
[c]Primary health care began in the 1970s.

Source: Rosero-Bixby and Mata (1985).

5.2.1 Intersectoral action in the 1970s. This decade was characterized by an increase in intersectoral health efforts. The coordination of sectors for the promotion of family planning was provided by the Rican Demographic Association, a nongovernmental agency that fostered the National Council of Population (CONAPO). This body had representatives from the Ministries of Health and Education; semiautonomous Government enterprises such as the Social Security Bureau, the University of Costa Rica, and the National University; and nongovernmental agencies such as the Costa Rican Demographic Association and two religious centers concerned with the family. For more than a decade CONAPO engaged in actions supporting family planning in Costa Rica; this period coincided with an acceleration in the birth rate decline, the sharpest ever recorded in Latin America.

The implementation of the Rural Health Program (RHP) required the cooperation of the Ministry of Health and other Government branches such as the Ministry of Labor and the Ministry of Public Works, which built rural roads, health centers, and health posts. The Ministry of Labor operates the Family Allowances and Social Development Program, a fund derived from taxes on sales and salaries that is allocated for investment in health and social benefits for the poorest social strata. UNICEF provided substantial funds and intellectual support at the beginning of the program (Mohs, 1985). The Ministry of Health was (and still is) underfinanced and could not possibly have carried out the enormous task of developing the resources required by the RHP, had it not been for UNICEF, USAID, and Family Allowance funding. The organization and training of rural health workers and the program contents were the responsibility of the Ministry of Health, and its conception and implementation preceded the International Primary Health Conference's Declaration of Alma Ata by several years. The RHP was shown to be responsible for the most significant increase in child survival in the country's history (Villegas, 1977; Mohs, 1982; Mata, 1983; Rosero-Bixby, 1986) (see Chapter 4).

Programs to improve education and environmental sanitation in the 1960s were intensified in the 1970s, when significant impetus was given to high school education without sex discrimination, and to water supplies and excreta disposal in sparsely populated rural areas. Improved income, education, rural roads, and lifesaving measures in the primary, secondary, and hospital health care delivery systems undoubtedly accounted for the dramatic reduction in diarrhea and other infectious diseases in this decade (Mata, 1983; Rosero-Bixby, 1986) (see Chapter 4).

In the late 1970s, intersectoral action was involved in providing peer review groups for food programs and research on human subjects. The Secretariat for Policy on Nutrition and Food was created to deal with national and international food programs and related issues. The Interinstitutional Committee on Research with Human Subjects was also established to examine research protocols dealing with testing of new drugs and vaccines. These two groups are appended to the Office of the Minister of Health and have representatives from Government and non-Governmental

sectors. For instance, the Secretariat for Policy on Nutrition and Food has members from the Ministries of Health, Planning, Education, Agriculture, and Labor, and from three research centers: National Institute of Investigations in Health (INISA); Research Center on Food Technology (CITA); and the Costa Rican Institute of Nutrition and Health (INCIENSA).

The Interinstitutional Committee on Research with Human Subjects has members from the Ministry of Health; the Social Security Bureau; the Colleges of Physicians, Pharmacists, and Microbiologists; the National Council of Science and Technology (CONICIT); INISA; and INCIENSA.

Other intersectoral action for health effected during the 1970s was followed by a significant improvement in incidence and duration of breast-feeding. Such action resulted from the coordination of a research program with hospital interventions, specifically, early mother-infant interaction, rooming-in, and feeding of colostrum to high-risk neonates (Mata et al., 1984). These interventions in the maternity department of the San Juan de Dios Hospital were followed by (a) a significant increase in incidence and duration of breast-feeding; (b) a significant decrease in early neonatal and child abandonment; and (c) a significant decrease in early neonatal morbidity and mortality from infectious diseases (Table 5.2). While the evaluation of these interventions was done by scientists of INISA, the procedures themselves were initiated by the staff of the San Juan de Dios Hospital; the prospective observation of mothers and infants in the Puriscal study area was the responsibility of INISA, in coordination with the Ministry of Health (Mata et al., "Puriscal, VII," 1982).

These interventions were soon replicated in hospitals throughout the nation, resulting in notable improvements in the incidence and duration of breast-feeding at the national level. Thus, because more than 90 percent of women now initiate lactation, there are marked improvements in the nutrition and health of children. At the same time, there has been a drop in powdered milk sales that has led to the closing of one of the prominent milk formula companies.

Another instance of effective cooperation at scientific institutions resulted in the implementation of the oral rehydration program at the national level. Studies begun in 1977 at the National Children's Hospital, the University of Maryland, and the National Institute of Investigations in Health (INISA) led to (a) proof that an oral rehydration solution (ORS) with either sucrose or glucose was equally satisfactory in rehydrating children with viral and bacterial diarrheas (Nalin et al., 1978; 1979); (b) adaptation of the standard WHO/UNICEF ORS packet to local conditions (Mata, 1980); (c) successful rehydration of neonates with various types of hydroelectrolyte imbalance using ORS (Pizarro et al., 1980); (d) transfer of the technology to rehydrate children from the hospital to the mothers (Pizarro et al., 1979), including rural women in the home (Jiménez et al., 1982); and (e) a national program of oral rehydration established with expanding coverage and an ensuing reduction in mortality (Mata, 1980; López, 1985).

Table 5.2

Changes in Perinatal Health Associated with Hospital Interventions,[a] San Juan de Dios Hospital, 1975-1984.

Period	Early abandonment, Cases (rate)[a]	Diarrhea		Bronchopneumonia	
		Cases (rate)[b]	Deaths (rate)	Cases (rate)[b]	Deaths (rate)[b]
1975		59 (118.7)	3 (6.0)	45 (84.5)	6 (12.1)
1976	19 (21.1)	135 (229.2)	3 (5.1)	32 (54.3)	4 (6.8)
1977	10 (10.9)	72 (121.3)	1 (1.6)	35 (56.6)	6 (9.7)
1978	6 (6.9)	62 (103.8)	0	27 (45.2)	1 (1.7)
1979	6 (6.7)	55 (125.8)	0	18 (41.2)	0
1980	4 (4.5)	14 (34.0)	0	22 (53.4)	0
1981	4 (4.4)	1 (1.8)	0	13 (24.0)	2 (3.7)
1982	6 (6.4)	1 (1.6)	0	8 (12.9)	2 (3.2)
1983	6 (6.6)	14 (19.0)[c]	0	10 (13.6)	6 (8.2)
1984	7 (6.0)	4 (4.8)	0	1 (1.2)	0

[a]Per 10,000 liveborns.
[b]Per 1,000 liveborns under 38 weeks of gestation.
[c]Increase in diarrhea cases from an outbreak related to improper cleaning of bottles.

Source: Mata et al. (1984) and unpublished sources.

Despite these efforts, most Government branches frequently work as separate and uncoordinated cells, and this often increases the cost-benefit ratio of programs they formulate and administer. Yet a significant degree of Costa Rica's success in attaining its present health indicators has been the result of intersectoral actions for health. Costa Ricans tend to be eager to obtain and apply new information and to be receptive and willing to change. Changes are often effected without legislation or directives emanating from high authorities, but are frequently the result of subtle interdepartmental cooperation at the local, regional, or central levels.

5.2.2 Intersectoral action at the regional level. About five years ago, intersectoral action first appeared on the organizational charts of most ministries and departments, and was further promoted by the Office of Planning, now called the Ministry of National Planning and Economic Policy (MIDEPLAN). This entity initiated governmental interventions within each operational region and subregion of the country. In the subregion of Puriscal--where INISA is conducting a long-term prospective field study on child health (Mata et al., "Puriscal, IX," 1982), the Ministry of Planning opened an office to promote meetings of representatives of the various governmental institutions, to set priorities for action, to promote development of projects, and to search for, and distribute, funds and resources. The effort was oriented toward solving problems of the "critically poor" who generally suffer from indiscriminate dispersion of resources. Representatives of the entities listed in Table 5.3 constituted the Council of Development of the Puriscal Subregion.

The Council met regularly for about two years and utilized data from INISA's long-term prospective study on child health to monitor problems in the community, such as the deterioration of nutrition or health of certain children. This resulted in the mobilization of personnel from the pertinent offices to discover and diagnose problems, to establish possible causes, and to take measures aimed at correcting or ameliorating the problems. In this way scarce resources were optimized by being directed to the families in real need. Another role of the Council was to examine projects by individuals or authorities from the various districts and communities and to allocate resources according to priorities.

During this period (1980-1982), Puriscal children exhibited the best health and highest survival ever recorded, capitalizing on a decade of economic bonanza and effective intersectoral action (Mata et al., "Puriscal, IX," 1982). The study showed that the country had the potential to systematically collect and analyze data in order to know, at

Table 5.3

Council of Development of the Puriscal Region, Costa Rica.[a]

Ministry of Planning
Ministry of Health (MH)
Social Security Bureau (CCSS)
Ministry of Agriculture (MAG)
Ministry of Education (MED)
Family Allowances Program (OCAF)
Municipality of Puriscal
Institute of Investigations in Health (INISA)
Branches of Banks in Puriscal
National Institute on Alcoholism (INSA)
National Patronage of Childhood (PANI)
Mixed Institute of Social Aid (IMAS)
National Directorate of Communities (DINADECO)

[a]Circa 1981.

any time, which families or children had, or were at risk for, poor health. The tool employed to monitor health was the child's growth curve. Faltering child growth would identify a family requiring assistance. In this way, the available resources of the community could be selectively channeled to the families in need. The program implemented in the Puriscal subregion was labeled Interinstitutional Coordinated Program of Health Actions (PICAS) (Mata et al., "Puriscal, IX," 1982). It did not require additional personnel or extra investment, except for the few hours per week invested by the members of the Council for their periodic meetings. Council members felt that the Council and its actions were worthwhile and of particular significance to the community. In this way, a functional classification of families was effected for rational use of community and governmental resources. It is of interest to note that the health intervention in Puriscal preceded the GOBI proposition of UNICEF (Grant, 1984).

A change of Government in 1982, added to the current socioeconomic crisis, interrupted most of the development in Puriscal. However, some impact from the actions undertaken by the Council is still being felt in the rural area of Puriscal. Intersectoral actions are currently being discussed and some have been taken by subsequent administrations.

5.2.3 **Toward a national health system.** During the 1970s--the decade of rapid health progress in Costa Rica--attempts to coordinate activities between the Ministry of Health and the Social Security Bureau were discussed, but met with failure. Nevertheless, all public and charity hospitals were successfully placed under the Social Security Bureau, except for the "Hospital Without Walls" (a pioneer program of the

primary health care approach in Costa Rica), which remains under the Ministry of Health. However, the Social Security Bureau still duplicates several services and programs of the Ministry of Health, for instance, immunization, prenatal care, and growth and development clinics.

The last administration (1982-1986), under the leadership of the Minister of Health, attempted to establish a National Health System. Coordination of services was possible in some rural areas, where it was feasible to merge the human and physical resources of the Ministry of Health and the Social Security Bureau. However, coordination has not been successful at the central level. The reorganization of health services into a system "capable of reaching the total population without discrimination by age, sex, ethnicity, place of residence, and type of work, at an affordable cost and compatible with dignity" was a goal of the Ministry of Health. The following conditions are necessary to fulfill this goal (Jaramillo, 1984a, b):

(a) Coordination of the Ministry of Health, the Social Security Bureau, the Costa Rican Institute of Aqueducts and Sewers, the National Institute of Insurances, and other entities of the health sector.

(b) Integration of health services (already under way in 28 areas, combining physical plants, human resources, and health programs. The process should not be improvised, but based on the pyramid structure of health services, which begins with simple actions at the family level and eventually reaches the clinic and university hospital.

(c) Application of preventive technology and methods encompassing integrated services for health education, prevention, treatment, rehabilitation, and applied research. In the model, hospitals and clinics operate within the context of the social environment and the community, and not only as centers for curative medicine.

(d) A strategy for primary health care for promoting and delivering health to marginal and rural populations.

(e) Community participation, primarily through the Health and Social Security Councils, of recent creation in all cantons of the country, in order to promote and crystallize community participation for the monitoring and care of its own health.

The fulfillment of the present plan may be hampered by several factors, such as constraints imposed by the crisis and possible disagreements in assigning priorities. Additionally, a deteriorating social condition, demographic stagnation, exhaustion of resources, and budgetary restrictions may obstruct the optimal realization of the goal of health for all by the year 2000.

5.3 Deterioration of Social Conditions and the Economic Crisis

The main result of the worldwide recession and national economic crisis has been a progressive impoverishment of the population (Céspedes et al., "Crisis y empobrecimiento," 1984), compounded by the "spoiled attitude" of Costa Ricans nursed by the welfare-provider state (the "philanthropic ogre" of Octavio Paz) and the relative economic bonanza of the 1970s. Features of this impoverishment are recession, 10 percent unemployment, more than 400 percent devaluation of the currency, loss of purchasing power, and deterioration of the infrastructure. Also, there is an obvious lack of cash as well as capital flight and fear of investment by nationals and foreigners. Before and after the onset of the crisis, the government received large and often ill-advised loans, and in 1982 the external debt reached the sum of US$2.5 billion, or about $1,000 per capita, an astronomical sum, on which the interest is barely being paid (external debt was almost US$4 billion in 1985). Moreover, the military conflicts in Nicaragua and in El Salvador have aggravated the crisis in Costa Rica: many civilians and high officials have taken sides in the struggle, despite a national commitment to disarmed neutrality proclaimed in 1983. Thousands of poor Nicaraguans have migrated to Costa Rica, and significant instability is observed along the border with Nicaragua. There has been an increase in violence, frequently related to immigrants, refugees, and emissaries specifically sent to destabilize the country. In 1985 Costa Rican rural guards were killed by Sandinista forces on Costa Rican territory. As a result, the police force is being strengthened and is beginning to work like a small army.

One consequence of the crisis, in addition to those already mentioned, is loss of the purchasing power of the "colón," the national currency. Conflicts over family budgets may be a factor underlying the increased divorce rate and the dramatic rise in child abuse syndrome (see Table 3.30). However, there were signs of deterioration in social conditions before the economic crisis began. One example is an increase in the rate of homicides, traditionally the lowest in Central America, although it remains well below rates in Guatemala, El Salvador, Honduras, and Nicaragua; another is the liberation of sexuality and the increase in homosexuality, which started long before the crisis.

There also appears to be an increase in internal political and social unrest in Costa Rica in the last six years, manifested in greater dissatisfaction, street demonstrations, labor strikes (the longest and most costly in the country's history occurred in 1968 in the Pacific banana plantations), and community violence expressed by road blockades, particularly in the last two years. The main factors underlying this behavior seem to be economic difficulties, administrative corruption, lack of basic services (water, housing, roads, transport) and poor wages. The first hunger strike occurred in October 1986 and involved 10 persons demanding solutions for problems of housing and corruption. Radical

parties have been involved in the organization and execution of public protests, but the contribution of nonleftist groups is increasingly evident. Some people tend to play down the importance of such events, since even advanced nations like England, France, and the United States suffer from similar periodic outbreaks of social unrest. Nevertheless, these phenomena are more prevalent in Costa Rica now than ever before.

It is difficult if not impossible to know if the deterioration in social conditions is due to the economic crisis alone, or to the progressive alienation of a transitional society that wants increased material wealth now. In forums where the current Central American crisis is discussed, there is agreement that social conditions would improve if per capita income were significantly improved, along with better distribution of income and resources across the social strata. Examples of successful cases where this has occurred are Taiwan, South Korea, and Singapore, where a significant increase in the standard of living was experienced by the bulk of the population. However, the opinion of most Costa Rican experts is that respect for authority, willingness to work hard, acceptance of austerity, and other characteristics often associated with Asians are not commonly detected in Costa Rica. It would be interesting to know more about the level of social pathology and the quality of life in those successful countries to determine whether this is a model that should be emulated.

Recent analyses of the crisis in Costa Rica reveal a slow but encouraging economic recovery, as evidenced by a trend toward revitalization of the economy, stabilization of inflation, and improvement of economic indices (Céspedes et al., "Estabilidad sin crecimiento", 1984; MIDEPLAN, 1984). While these gains are beneficial for Costa Ricans and the Government, it should be recognized that much of the "miracle" has been the direct result of increased flow of U.S. currency (funneled primarily through the U.S. Agency for International Development to back the Costa Rica currency), estimated at about US$1 million per day, or about $150 per person per year. A prevalent opinion is that the Nicaraguan conflict has been a factor in the United States' decision to support Costa Rica.

5.3.1 **Stagnation of health indices.** It appears evident that the economic recession and consequent impoverishment in Costa Rica must have affected the health situation. However, despite the severity of the crisis, the main health indices have remained relatively stable, with the exception of a slight rise in infant mortality in 1982, which was not statistically significant and which was corrected during 1983. Despite the absence of overt deterioration in health indicators, they have stagnated, and it is possible that infant mortality, life expectancy at birth, and other indices may not improve much in the remainder of the decade.

The effect of the economic crisis is exacerbated by significant expenditures in low cost-benefit programs and in excessive bureaucracy, while the expansion of other programs to cover the entire rural population is neglected. Other complications are the inability to implement novel solutions, the limitations of medical supplies, and the failure to expand basic services in some rural areas, such as water supply, primary health services, sanitation, housing, and welfare.

5.3.2 **Faltering infant mortality.** An examination of infant mortality over the past few years reveals more specifically the effects of the economic crisis. Due to the excellent data collection and registration of births and deaths and to the small size of the country, infant mortality rates (IMR) are accurate and are available by mid-year. The IMR had been rapidly decreasing, as illustrated in previous chapters; the lowest rate was recorded in 1981 (Table 5.4), but increased slightly during 1982 in most cantons. A marked deterioration in IMR was noted in several cantons of the greater metropolitan area (see Table 5.5). A graphic display of rates in the decade, however, illustrates that IMR had been stagnant since 1979, in direct correlation with the onset of the crisis (Figure 5.1) (Mata and Rosero, 1985).

Table 5.4

Infant Mortality Rate per 1,000 Live Births in Costa Rica.

Year	Neonatal	%Δ[a]	Total infant	%Δ[a]
1970	25.19		61.52	
1971	25.13	-0.24	56.46	-8.96
1972	22.77	-10.36	54.44	-3.71
1973	20.77	-9.63	44.78	-21.57
1974	17.72	-17.21	37.57	-19.19
1975	18.11	+2.20	37.87	+0.79
1976	17.41	-4.02	33.15	-14.24
1977	14.94	-16.53	27.84	-19.07
1978	13.05	-14.48	22.27	-25.01
1979	12.58	-3.74	22.08	-0.86
1980	11.17	-12.62	19.10	-15.60
1981	10.74	-4.00	17.96	-6.35
1982	11.06	+2.98	18.85	+4.96
1983	11.25	+1.75	18.59	-1.39
1984	11.76	+4.57	18.95	+1.93
1985	11.22	-4.59	17.64	-6.93

[a]Change in rate from previous year.

Source: General Directorate of Statistics and Census.

Table 5.5

Neonatal and Infant Mortality Rates per 1,000 Live Births in Cantons of the Province of San José, Costa Rica.

Canton	Neonatal			Infant		
	1981	1982	%Δ[a]	1981	1982	Δ%
Central[b]	14.85	15.30	+3	21.16	21.17	
Escazú[b]	11.80	12.47	+6	19.31	15.59	-19
Desamparados[b]	11.96	13.08	+9	17.63	21.17	+20
Puriscal[b]	6.41	9.06	+41	11.22	18.13	+62
Tarrazú	0	12.50		3.45	20.83	
Aserrí	9.79	9.64	-2	19.59	19.27	-2
Mora	9.17	17.44		21.41	26.16	
Goicoechea[b]	11.29	10.47	-6	15.53	16.65	+7
Santa Ana[b]	18.39	11.59	-37	23.41	24.83	+6
Alajuelita[b]	13.05	9.04	-31	20.50	15.37	-25
Coronado[b]	10.06	14.47	+44	17.24	27.50	+60
Acosta	9.22	18.22		16.13	27.33	
Tibás[b]	8.86	9.53	+8	14.96	12.33	-18
Moravia[b]	9.39	15.19	+62	19.95	21.50	+8
Montes de Oca[b]	9.20	12.66	+38	13.79	18.99	+38
Turrubares	18.02	17.39		18.02	34.78	
Dota	8.00	0		16.00	26.32	
Curridabat[b]	12.79	13.72	+7	15.35	16.21	+6
Pérez Zeledón[b]	8.73	5.31	-39	13.82	12.28	-7
León Cortés	0	4.88		5.24	19.51	

[a]Increment (+) or reduction (-) as percentage.
[b]Cantons with more than 500 live births per year.

Source: General Directorate of Statistics and Census.

A logical reaction of the medical community to the stagnation in infant mortality was to claim an increase in malnutrition. However, observations in the Puriscal study area and records of hospital admissions show the contrary. A prospective study in Puriscal shows no overt increase in the rate of either prematurity or fetal growth retardation that could account for the marked increase in neonatal and postneonatal mortality (Table 5.6). The sharpest mortality increase was during the postneonatal period, because many infants with perinatal problems survived the neonatal period because of medical intervention, only to die later.

Figure 5.1

Neonatal and postneonatal infant mortality in Costa Rica, 1970-1982, fitted by regression analysis. Note that stagnation of infant mortality began in 1979.

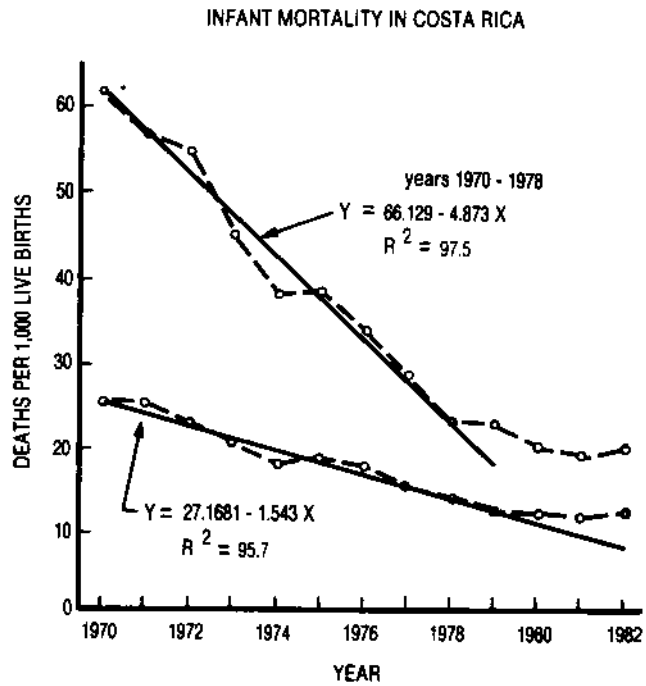


Table 5.6

Prematurity and Fetal Growth Retardation in Puriscal.

Year	Number of live births	Percentage			Infant mortality		
		Preterm <37.5wk	Term <2.5kg	All <2.5kg	Neonatal	Post-neonatal	Total
1980	624	6.2	4.7	8.2	5(8.1)[a]	1(1.6)	6(9.6)[a]
1981	624	3.7	3.9	5.3	4(6.4)	3(4.8)	7(11.2)
1982	662	5.8	5.4	8.2	9(13.6)	5(7.6)	14(21.5)
1983	627	5.6	3.7	6.8	17(27.1)	5(8.0)	22(35.1)
% change in rate, 1980-1983					+179	+375	+214

[a]Deaths (rate per 1,000 live births).

Source: Puriscal Study, INISA.

5.3.3 Deficits in prenatal and perinatal care. The recent increase in infant deaths is related to deficits in prenatal care and childbirth practices at the national level, as was already mentioned in Table 3.15 and Figure 3.1. There is no evidence of an excess of deaths associated with infectious diseases, diarrhea, or malnutrition, either in Puriscal or at the national level.

A retrospective study of Puriscal women who delivered preterm (PT) or at-term small-for-gestational age babies (TSGA), or who delivered babies who subsequently died during infancy, did not show differences in diet composition during pregnancy, or in the rate of weight gain during pregnancy. By contrast, there was an increased frequency of high-risk pregnancies among the group of infants who died in the neonatal period or who were TSGA, compared with those of adequate weight and gestational age. In the group of problematic infants, the frequency of pathology during pregnancy (hypertension, anemia, vaginal bleeding, etc.), of induced and cesarean delivery, and of unwanted pregnancy was significantly greater than in the control group (infants without problems). Further scrutiny of the cases revealed four sets of associated factors, related to high-risk pregnancies and poor pregnancy outcomes, as well as to diminished infant survival in Puriscal:

(a) Insufficient primary health care (PHC). As indicated in Table 3.5, there was a decrease in coverage at the peak of the crisis (1981) because of unfilled rural health posts, and insufficient resources to repair field vehicles, purchase fuel, or cover the rural workers' per diem.

(b) Deterioration of infrastructure. Many rural roads could not be repaired, and several rural public transport routes were sometimes impassable. Difficulties of access to health facilities were complicated by the diminished currency value, which prevented many women from being able to afford bus fare and the fee for the Social Security prenatal clinic.

(c) Irregularity in family planning. This resulted from many factors, among them a scandal over alleged illegal sterilization of women, which led to a virtual ban on the procedure. In addition, the pronatalist position of two consecutive Ministers of Planning and other high officials obstructed family planning programs that were based on contraceptives, and a professional conflict between physicians and nurses regarding the right to prescribe contraceptives resulted in prohibiting nurses from writing them. Moreover, the recently reiterated Vatican position on birth control has undoubtedly had its influence.

(d) Inadequacy of medical care during childbirth. This factor emerges clearly from national data, but its importance has been ignored by some obstetricians. The apparent deterioration in perinatal care (see Figure 3.1 and Table 3.15) may not be wholly related to poor medical practice, but may also be influenced by an increase in the number of pregnancies with no corresponding increase in the number of hospital beds. This might result in physicians resorting to conduced deliveries, cesarean sections, and other interventions. Research would be required on this issue to determine the factors responsible for the increase in intervention during childbirth and its associated pathology, such as hyaline membrane disease, hypoxia, and cerebral palsy.

It is interesting to note that the infant mortality rate during 1983 declined slightly, to 18.5 per 1,000 live births, not significantly different from the 18.8 rate observed in 1982, and that the forecast is that the crisis will not alter this and other health indicators. This slight improvement coincides with efforts by the Ministry of Health to resume extension of primary health care services to unprotected areas (Jaramillo, 1984b), and with the overall stabilization of economic indicators recorded at the national level (MIDEPLAN, 1984; Céspedes et al., "Estabilidad sin crecimiento," 1984).

5.3.4 Increase in social pathology. While it would be premature to determine the overall effect of the crisis on the health situation in Costa Rica, a facet of much concern is the abrupt increase in divorces and child abuse syndrome (CAS) described in Chapter 3. While the CAS rates discussed were from the National Children's Hospital--the main pediatric reference center in the country--they reflect primarily

the situation in the Intermountain Central Valley, and are most likely underestimated if applied to the nation as a whole. It is difficult to know how much of the increase in CAS is due to improved reporting, and how much of it reflects family responses to pressures that were avoided in the past by attributing children's deaths to malnutrition-infection interactions or other causes. It is also possible that the increase is the consequence of Costa Rica's transition toward a more Western prototype, reflected also in the increased rate of divorces and increasing teenage pregnancy and prostitution.

Some current problems affecting children result from insufficient prenatal care, but others result from the deteriorated socioeconomic condition. This is particularly true regarding CAS where urgent measures are needed to detect signs predictive of aggressive behavior at the delivery table. According to Kempe and Kempe (1978), a simple interview with the mother (and, it is hoped, with the father) near the time of birth will predict about 70 percent of postnatal parental abuse. In order to implement a program to detect families at high risk for CAS, however, allocation of funds is necessary, and this appears unlikely at present because of economic constraints and significant utilization of resources in low cost-benefit programs.

Thus, the economic crisis impacts children through difficult social conditions characterized by low income, unemployment, poor housing, and other factors, which indirectly favor child morbidity and mistreatment. Among the determinants bearing directly on child health are budgetary restrictions that preclude rapid implementation of preventive and curative measures, such as improving childbirth practices and prospective surveillance of infants and young children within the primary health care approach.

5.4 Population and Natural Resources

In the long run, the effects of both excessive population and environmental exploitation may determine whether Costa Rica will remain a paradise in the tropics, or will follow the path of other nations that now face severe deterioration of their environments, for instance, Haiti, the Dominican Republic and El Salvador. While Costa Rica only has 2.5 million inhabitants, demographic pressure is already evident. Considerable controversy exists regarding policies for achieving optimum population size in relation to food production and preservation of the ecosystem.

5.4.1 Demographic pressure. The Population Council, using calculations based on a reasonable hypothesis of population growth for Costa Rica ("medium" hypothesis), estimated 3.7 million inhabitants by the year 2000 (Table 5.7) (Rosero-Bixby, 1981). However, "replacement" fertility will not be attained by the year 2000, because that would require an unusually rapid decline in the number of children per woman, an unlikely possibility.

Table 5.7

Population Estimates for Costa Rica, 2000-2040.

Concept	Population estimates 1	2	3
Year fertility reaches "replacement" level	2000	2020	2040
Population attained in year of "replacement," millions	3.7	6.1	9.8
Year of "zero growth"	2090	2110	2130
Population increase after year of replacement, millions	2.2	2.7	3.6
Percent population increase after year of "replacement"	59	44	37
Population attained the year of "zero growth," millions	5.9	8.8	13.4

Source: Rosero-Bixby (1981).

Moreover, demographic growth with its own inertia cannot be drastically altered within a short span. Thus, while in the year 2000 the hypothetical fertility estimate might be at the level of replacement of each generation, the demographic inertia means a further wait of about 90 years to attain "zero growth" (see Table 5.7). By then, the population would have increased another 2.2 million people.

Population estimates for the year 2020 and 2040 are also shown in Table 5.7. It should be noted that a greater population growth than presented in the example could conceivably occur, although the current trend is one of steady decline.

5.4.2 Evolution of population structure. When considering health care in less developed countries, one rarely thinks about the problem of aging. However, the changes in morbidity, mortality, and fertility in Costa Rica have been so rapid that they have had a major impact on the structure of the population. Table 5.8 shows the age distribution of people in Costa Rica for 1950 and 1975, and includes projections up to the year 2075 according to the "medium" hypothesis (Trejos and Ortega,

1985). By the year 2000 a significant reduction in the population of children is expected, while the percentage of elderly people would be significantly increased from 5.3 to 7.3. Moreover, greater changes have been projected for the year 2075. No marked variation in the proportion of elderly persons is expected thereafter.

For a country that presently has 126,000 persons 60 years old or older, it is difficult to imagine a figure of 262,000 by the year 2000 or 1.2 million by the year 2050 (Table 5.9). Important adjustments in the contents of the primary health care package and in intersectoral action are required to cope with an aging population about which not much is known at present and for which no clear-cut technologies or interventions are available to control and prevent their health problems.

5.4.3 Interrelations between land and population. Costa Rica has remained largely rural. Efforts to accelerate industrialization--for instance, through the Central American Common Market--have not been successful, and the Costa Rican economy still depends on export of agricultural products, either raw or partially treated. Large-scale agricultural development is limited to the lowlands; most of the country is very mountainous and the peasants must engage in traditional forms of food production.

Land tenure in Costa Rica is a sensitive issue, because 58 percent of the landholders possess less than 4 percent of the total arable land, according to the Agrarian Census of 1973. By contrast, 1 percent of the landholders own more than 25 percent of the arable land. Furthermore, 80 percent of the farms encompass 467,750 hectares (averaging 5,800 ha. per farm), which is equivalent to 45 percent of the total arable land of the country, assuming that 20 percent of the land is for cultivation. Among the big landholdings are foreign-owned banana and African palm plantations on the fertile coastal plains, which take the best land out of production that might have provided locally consumed food crops.

The situation has not improved in the last ten years. A slow but sustained process has occurred whereby more land has been concentrated among even fewer people--people who were already landholders (Seligson, 1980; Peek and Raabe, 1984). Furthermore, the former Institute of Lands and Colonization, or ITCO (now the Institute of Agrarian Development, or IDA), appears to have contributed to the process, contrary to the objectives for which it was created (Seligson, 1982). The present situation of land tenure gave Costa Rica a high Gini index, and made it 12th on the list of most inequitable nations in the world regarding land distribution (World Handbook of Political and Social Indicators, 1972).

In the absence of marked changes in agricultural practices or in diversification of production and industrialization, a population increase will inevitably lead to an increase in demand for land. Since this demand may not be satisfied, a decrease in food production per capita might be expected, as has occurred in other parts of the world.

Thus, population increase, with other factors remaining constant, inevitably leads to "saturation" and serious social consequences.

In Costa Rica several measures have buffered the impact of population growth in the recent past, such as deforestation, increased imports of energy (petroleum) and staple foods (wheat), and a steady increase in foreign loans. The consequences of these measures were conversion of very fertile arable land into urban areas and roads, depopulation of certain rural areas, new slums, recession, unemployment, and impoverishment (OFIPLAN, 1977). Other effects have been the enormous foreign debt, increases in the price of land, and land sales to foreigners.

Figure 5.2 illustrates some changes in land distribution according to national censuses conducted during the period 1950-1971 and to estimates obtained thereafter (Tosi, 1974). The most dramatic event is deforestation, which reached the startling average of 70,000 hectares per year during the 1970s, resulting in grasslands that only benefit an elite class of cattle ranchers (Mata, 1979). Little increment was noted in the percentage of land devoted to crops. Obviously, almost no wild national lands are left for future generations (Tosi, 1974).

Collateral efforts by environmental protection groups and by the Government fortunately led to the creation of the National Park System and the preservation of large forests as national reserves where deforestation is banned, as described in Chapter 1 (Boza and Mendoza, 1981).

Table 5.8

Aging of the Population of Costa Rica, 1950-2075.

Age, years	Percent population					
	1950	1975	2000	2025	2050	2075
0-14	43.5	42.0	32.6	24.5	20.8	19.7
15-59	51.2	52.8	60.1	61.4	59.5	57.1
≥ 60	5.3	5.2	7.3	14.1	19.7	23.2

Source: Trejos and Ortega (1985).

Table 5.9

Estimates of the Elderly Population in Costa Rica, 1950-2075.

Year	Population ≥ 60 years old x 10^3	% increase	Population ≥ 80 years old x 10^3	% increase
1950	45.0		4.2	
1975	103.0	129	8.6	105
2000	262.0	154	25.5	196
2025	719.4	175	63.3	151
2050	1,179.4	101	176.1	178
2075	1,465.3	20	258.6	47

Source: Trejos and Ortega (1985).

5.4.4 Arable land and population. Of the various hypotheses of demographic growth, the most accepted theory ("medium") predicts a population of about 3.4 million by the year 2000 (Ortega, 1977). However, if the present growth rate is maintained as a result of the crisis and impoverishment, the population by the year 2000 could reach 4 million (Table 5.10).

According to the various estimates of land availability, saturation of the land is imminent. The total arable land per capita can be calculated according to two alternative hypotheses (Mata, 1981). One includes intermittent agriculture, and estimates that around 20 percent of the total land is fit for cultivation (the rest comprises, e.g., reserves, swamps, volcanoes, bodies of water, and ravines). The other alternative estimates that only 10 percent of the land is arable, and this land requires intensive cultivation with vast energy input. According to the first alternative, Costa Rica will have about 3,000 square meters of arable land per capita by the year 2000. If, per the second theory, only 10 percent of the land were available, the total land per

Table 5.10

Arable Land in the Year 2000, by Five Hypotheses of Population Growth, Costa Rica.

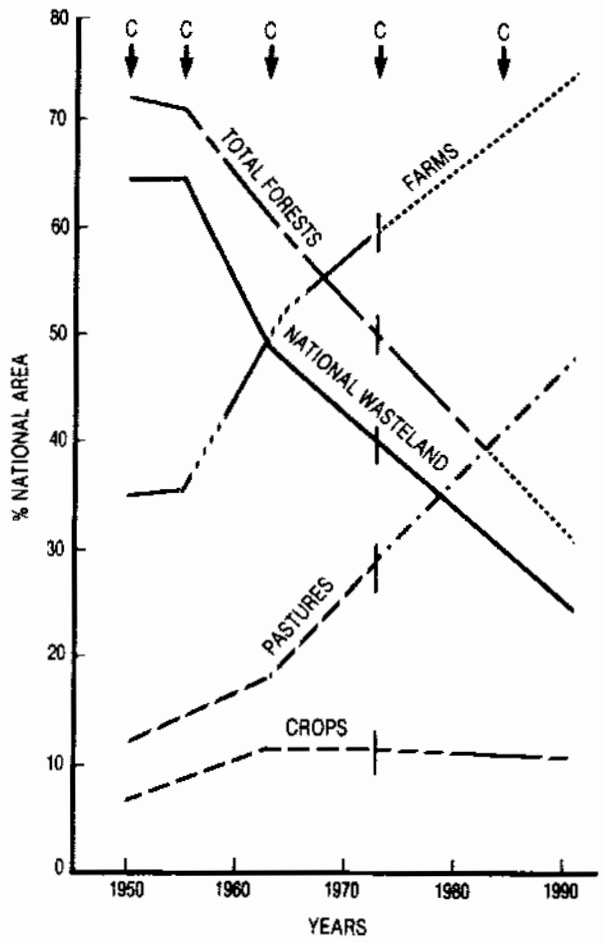
Hypothesis	Population, thousands	Arable land per capita, m^2	
		20%,[a] intermittent agriculture	10%,[a] intensive agriculture
Replacement	3,303	3,358	1,678
Low	3,185	3,196	1,598
Medium	3,377	3,014	1,507
High	3,618	2,814	1,407
Constant	4,007	2,541	1,270

[a]Percentage of the total land available for cultivation (see text).

Source: Mata (1981).

Figure 5.2

National area distributed according to land use in Costa Rica, 1950-1971 (censuses) and 1972-1990 (estimated).
Source: Tosi (1974).



capita would be reduced by one half, and the land would have become saturated. Under this hypothesis, given that about 2,000 square meters are required to generate the needed food with intensive agriculture, fertilizers, and an abundant water supply, sufficient food might not be produced, and serious social distress might result.

The "medium" hypothesis of population growth projects around 3.4 million people by the year 2000, which coincides with the current declining trend. If present growth is maintained, the population will reach about 4 million by 2000 and 6.2 million by 2020. Assuming that all the land of Costa Rica is fit for cultivation (which is not true), the density attained would be 124 people per square kilometer, or 1.2 persons per hectare (see Table 5.11). However, if only 20 percent of the land is arable--a more realistic figure (Tosi, 1974)--the demographic density would be 617 per square kilometer, or 6.2 persons per hectare. This figure is close to that of Bangladesh, assuming that 90 percent of its land is suitable for cultivation (Mata, 1981).

Table 5.11

Estimated Population Density,[a] by Arable Land, Costa Rica.

Year	Population, thousands	Persons per Km^2 100%	Persons per Km^2 20%[b]
1977	2,061	41	202[c]
2000	4,122	81	405
2020	6,289	124	617[d]

[a]According to 2.6% per year growth rate.
[b]Percent of land fit for cultivation.
[c]Two inhabitants per hectare.
[d]This density approaches that of Bangladesh in 1977 (Mata, 1981).

Most Costa Ricans cannot conceive of the possibility that their land could reach a saturation point, and do not realize that the country is approaching the overpopulated condition of nations such as El Salvador. Several measures have so far ameliorated the mounting problems of land distribution and food production. A modest agrarian reform permits settlement of peasants, who urgently need land or who are affected by natural disaster, in newly deforested areas. These measures have been palliative and have resulted in additional deforestation and in the creation of young communities, some with serious health problems. Land may be given to farmers without provision of the minimum health infrastructure, and new settlements may become plagued by bacterial and parasitic diseases.

The mounting population problem could be alleviated if unexpected resources were discovered. The past and present administrations have engaged in the search for petroleum without success. A more plausible solution would be the promotion of industry while avoiding social deterioration, but the character of Costa Ricans appears to preclude the development of a model like that of Taiwan or South Korea in the near future, for the reasons mentioned above.

If Costa Rica remains an agrarian society and the population keeps growing at the present pace, the country may soon enter a crisis of food production, crowding, and social distress. A logical escape would be to promote a national policy of land utilization compatible with the nutritional well-being and health of the population and with a clear view of the need to preserve the environment and natural resources. This policy should exist parallel with a national population policy aimed at growth stabilization at a level that would not overtax land resources, food production, or the ecosystem. Finally, in order to satisfy the goal of health for all, the government must strengthen both its own and private primary health care programs (Mata, 1981).

5.5 Budgetary Constraints

It appears evident that the top priority of the government, given the present situation, is to protect natural resources, to promote a further reduction in fertility, to maintain successful interventions and low cost/benefit programs (e.g., inmunizations and prenatal care), to expand primary health care to cover the rest of the nation, and to maintain the policy of neutrality and peaceful coexistence (especially with Nicaragua). These tasks are feasible in Costa Rica, particularly in view of the remarkable success recorded in the 1970s. Furthermore, the investment required to fulfill the health-for-all goal, which entails covering the approximately 30 percent of the rural population still unprotected, is significantly less costly than that used to maintain less beneficial food programs. To illustrate the point, the structure of the government's budget will be discussed briefly.

5.5.1 **Functional budget of the Central Government.** The overall budget of the central government of Costa Rica during the period commencing in 1976 (the peak of the economic bonanza) and ending in 1983 (one year after the peak of the economic crisis) is displayed in Table 5.12. The figures for the health sector listed in that table represent about 10 percent of the total investment in health (see also Table 5.13); the difference, not shown in Table 5.12, corresponds to the budget of several autonomous and semiautonomous institutions such as the Social Security Bureau (CCSS) and the Mixed Institute of Social Aid (IMAS). In Table 5.12, the health sector includes the Ministry of Health--which has a relatively small portion of the health budget--funds for environmental sanitation (control of plagues, latrines, etc.), and funds for the Costa Rican Institute of Aqueducts and Sewers (AA).

The data reveal the stability of investment in the various sectors through times of bonanza and crisis, which may indicate a lack of creativity in modifying the budget according to changing priorities, or else a chronic stagnation and inability to modify the status quo. It should be noted that the budgets for education, agriculture, and transport were cut during the crisis, while expenditures for security increased slightly. There was stagnation in expenditures for industry and energy--increased activity in these sectors might have resulted in a diminution of the current economic crisis.

5.5.2 **Expenditures in the health sector.** Table 5.13 displays the budget of the health sector from 1976--the peak year of the economic bonanza--to 1982, which was the peak year of the present economic crisis. The first row, "Central Government," corresponds to the first row in Table 5.12, roughly 10 percent of the total expenditures in the health sector. It should be noted that about 70 percent of the budget corresponds to the Social Security Bureau and the Institute of Medico-Social Assistance (INAMES), which up to 1980 financed several charity hospitals. These hospitals were transferred in 1981 and 1982 to the Social Security Bureau, with the exception of the "Hospital Without Walls," which still remains under the Ministry of Health. The budget of the Costa Rican Institute of Aqueducts and Sewers (AA) increased slightly, and that of the Family Allowances Program (OCAF) also showed a moderate relative increase. The latter fund is derived from taxes on services and sales. Again, an outstanding stability of the proportion of the budget directed to the health sector is noted through periods of bonanza and crisis, perhaps, as stated above, resulting from the inability of different administrations to redistribute the budget according to changing priorities and needs.

What is more distressing, however, is the inflated expenditure on curative medicine (the Social Security Bureau), particularly because the evidence presented in Chapter 4 strongly indicates the limited value of curative medicine for fulfillment of the health-for-all goal. This situation resulted from the piecemeal evolution of the health system and was supported by the adoption of an inadequate health paradigm in the recent past. The model engendered a vast and powerful network of hospitals and thus may be limiting resources for primary health care programs.

5.6 Ideological Uncertainty

The extreme poverty that prevailed in Costa Rica before World War II set the stage for development of a national social conscience that has influenced all its governments, particularly those since 1940. Costa Rica effected a social development model instead of an economic one, a crucial decision for attaining the favorable health conditions recorded in the 1970s, without necessarily reaching the economic structure of industrial nations. However, the overgrowth of the public sector and the inefficient bureaucracy are the targets of criticism from growing sectors of the population, which are now immersed in ideological uncertainly.

5.6.1 Size of the government apparatus. The emphasis on social progress, ideological pressure from left-of-center parties, and the growth of the Social Democratic Party have contributed to the formation of an exceedingly large state apparatus. There are 157,000 employees in the public sector, representing about 20 percent of the total labor force of the country (General Directorate of Statistics and Census, 1984). The condition is looked at favorably by those desiring a socialist or Communist system, while it is criticized by those who wish to maintain a mixed economy or who would like to see a reduction of the state apparatus. There is wide support at present for a return to a more liberal position, meaning a reduction--or at least a freeze--of the state bureaucracy, a decrease in state intervention, and a promotion of private enterprise and small businesses and cooperatives. Also, there is mounting pressure to allow competition for state monopolies, such as the banking system, insurance, and some industries.

The four most recent administrations have promised a reduction in public expenditure, and all campaigning presidential candidates have promised to do so; these promises, however, have not been fulfilled. The present crisis, with its social pressures, has not permitted a reduction or freeze in the public sector because of the increase in unemployment and general suffering that would result. Governments appear unable to adopt coherent policies to effect changes, whether they involve moving more toward the left or a return to a more liberal form of government. Thus, the proliferation of institutions, offices, and bureaucracies has been the norm in the last 15 years for institutions and programs in the education and health sectors (see Table 5.14).

In recent years, the overgrowth of the state apparatus has been a sensitive issue in negotiations with the International Monetary Fund (IMF). The IMF has requested a decrease in the budgetary deficit--which would impact on social programs and infrastructure--as a condition for additional funds. The last two administrations have strongly opposed such demands, and the public sector continues to grow at a rate of about 7,000 new jobs per year. This growth, however, has been a buffer to unemployment.

Table 5.12

Functional Classification of the Budget of the Central Government of Costa Rica, 1975-1985.

	1975 (8.6)[d]	1977 (8.6)	1979 (8.6)	1981 (20.5)	1983 (44.5)	1985
Health[a]	196[e]	232	372	618	1,310	1,303
	(6.7)	(5.0)	(5.3)	(6.4)	(5.5)	(4.2)
Education	926	1,449	2,132	2,838	5,910	6,573
	(31.5)	(31.1)	(30.5)	(29.5)	(25.0)	(21.0)
Housing	8	5	18	116	497	276
	(0.3)	(0.1)	(0.3)	(1.2)	(2.1)	(0.9)
Agriculture[b]	181	91	221	223	1,088	454
	(6.2)	(2.0)	(3.2)	(2.3)	(4.6)	(1.5)
Industry[c]	14	26	29	95	53	70
	(0.5)	(0.6)	(0.3)	(1.0)	(0.2)	(0.2)
Energy	5	10	7	7	18	30
	(0.2)	(0.2)	(0.4)	(0.1)	(0.1)	(0.1)
Transport	442	732	1,143	1,304	1,515	3,137
	(15.1)	(15.7)	(16.4)	(13.6)	(6.4)	(10.0)
Other	1,164	2,108	3,057	4,414	13,257	19,450
	(39.6)	(53.3)	(43.8)	(45.9)	(56.1)	(62.2)
Total	2,936	4,653	6,979	9,615	23,648	31,293

[a]Ministry of Health, environmental sanitation, water supply, and sewers; excludes CCSS, OCAF, housing for the poor (see also Table 5.13).
[b]Agriculture, irrigation, drainage.
[c]Industry, commerce, mining.
[d]/In parentheses, colones exchange rate for US$1, at midyear.
[e]Millions of colones; percentage of total budget in parentheses.

Source: MIDEPLAN (1984).

5.13

Government Expenditures in the Health Sector, Costa Rica, 1976-1983.

Institution or agency[a]	1976	1977	1978	1979	1980	1981	1982
Central Government	227[b] (9.5)	232 (9.8)	364 (9.5)	372 (8.1)	683 (11.7)	618 (10.5)	1,156 (12.8)
CCSS	1,221 (50.9)	1,116 (47.2)	2,094 (54.4)	2,385 (52.1)	2,976 (50.9)	3,755 (63.6)	5,872 (64.9)
INAMES	556 (23.2)	474 (20.1)	691 (18.0)	1,010 (22.1)	1,156 (19.8)	369 (6.3)	336 (3.7)
OCIS	23 (1.0)	33 (1.4)	39 (1.0)	50 (1.1)	53 (0.9)	68 (1.2)	116 (1.3)
AA	117 (4.9)	134 (5.7)	141 (3.7)	188 (4.1)	278 (4.8)	312 (5.3)	334 (3.7)
OCAF	253 (10.6)	375 (15.9)	519 (13.5)	572 (12.5)	703 (12.0)	779 (13.2)	1,234 (13.6)
Total	2,397	2,364	3,848	4,577	5,849	5,901	9,048

[a]Central Government = Ministry of Health, including environmental, sanitation, rural water supply, and sewers.
CCSS = Social Security Bureau.
INAMES = Institute of Medico-Social Assistance.
OCIS = Office of International Cooperation for Health.
AA = Costa Rican Institute of Aqueducts and Sewers.
OCAF = Control Office of Family Allowances.
[b]Millions of colones; relative percentage in parentheses.

Source: MIDEPLAN (1984).

Apart from the issue of reducing the level of social misery, the Government spends heavily on programs of questionable impact or of very low cost-benefit. Some of these were based on health paradigms adopted with- out serious scientific scrutiny as to their validity in justifying various interventions.

5.6.2 **Evolution of health paradigms.** According to Mohs (1984), the progress of Costa Rica during the 1970s was related to the implementation of measures fitting the "infectious-disease paradigm" which postulates that the control of infectious diseases would eventually lead to improved nutrition and health of the population. This paradigm is supported by long-term prospective observation of rural children, showing that infectious diseases are the main determinants of wasting, stunting, and death of infants and young children (Mata, 1978a). Concomitantly, no overt deficiencies in food consumption were discovered, and, when the deficiencies appeared, they were related to the presence of infections that reduce food digestion, absorption, or utilization (Mata, 1978a).

Before the 1970s, the "nutrition paradigm" had prevailed, and had influenced the development of the medical school, the hospitals, and curative medicine, as well as the food distribution programs. The main health problems before the 1970s were malnutrition and infectious morbidity and mortality, all of which increased the demands for beds and medical services. Most public health thinkers and planners contended that the solution to the problem would rest in improving the nutritional status, hence the emphasis on building up the Nutrition Department of the Ministry of Health and on enlarging the national hospital capacity (Mohs, 1984).

One philosophical consideration of the "nutrition paradigm" was that the eventual solution of the health situation would only be achieved by a change in socioeconomic structure (a revolution), followed by strong State intervention in the health sector and other issues (Mohs, 1984). The local communists frequently joined the Social Democrats and other rival parties, and all eventually used similar and often indistinguishable language. Moreover, the Cuban "miracle of health" in the 1960s had much influence in Costa Rica, as it did in many Latin American countries.

The "infectious-disease paradigm" was recognized in the 1970s (Mohs, 1984), and the Ministry of Health initiated the Rural Health Program (primary health care) which is one of the most impressive developments in Costa Rican history, and eventually brought down infant mortality (see Chapter 4). It is difficult to determine how much of the new philosophy derived from the training in pediatrics and epidemiology received by the key people involved in the change (Drs. Edgar Mohs, Antonio Rodríguez, and Hugo Villegas), how much resulted from the availability of recently developed technologies (e.g., the poliomyelitis and measles vaccines), or how much was determined by the preceding success in bringing down fertility and in controlling malaria. The field studies of malnutrition infection in the Guatemalan village of Santa María Cauqué (Mata, 1978a) had an influence on conceptualization of the infectious-disease paradigm.

Table 5.14

Governmental Institutions and Programs Created by the Government of Costa Rica in the 1970s.

Name	Year
Social and Health Sectors	
Mixed Institute of Social Aid (IMAS)[a]	1971
National Institute on Alcoholism (INSA)	1973
National Commission on Amerindian Affairs (CONAI)	1973
Family Allowances and Social Development Fund (OCAF or DESAF)[b]	1975
Costa Rican Institute of Research and Teaching on Nutrition and Health (INCIENSA)[c]	1977
Ministry of Health Programs	
Rural Health (PSR)[a]	1973
Dental Health (PSD)	1975
Nutrition and Alimentation (PAN)[b]	1975
Community Health (PSC)[a]	1976
Education Sector	
Costa Rican Institute of Technology (ITCR)	1971
National University (UNA)	1973
National Council of Scientific Research and Technology (CONICIT)	1973
National Commission on Loans for Education (CONAPE)	1977
University Colleges (CUNA, CUC, CUP)	1980

[a]Concerned secondarily with food programs.
[b]Concerned primarily with food programs.
[c]Nutrition recuperation clinic.

Whatever the origin of the paradigms, the important consideration is that infant mortality was significantly reduced, while at the same time a marked improvement of the nutritional status occurred as a result of global and specific actions that curtailed infectious and parasitic infections. The changes appeared correlated with improvements in mothers' education, a reduction in the incidence of low birthweight infants, and

the control of infectious diseases, particularly diarrhea, respiratory infections, measles, and pertussis. On the other hand, there were no important changes in the quality or quantity of the diet during the period in which the dramatic improvement in nutritional status took place. In fact, an overall reduction in consumption of calories and iron was detected at the national level (see Chapter 2). More important than the academic discussion on causality is the fact that the improved nutrition and health--to the level of some industrial nations--was accomplished without a violent revolution, with preservation of democracy and peaceful coexistence. This finding speaks highly of Costa Rica in view of its still high fertility and the outlawing of abortion. Cuba has a significantly lower fertility rate than Costa Rica. On the other hand, abortion is permitted in Cuba, and this undoubtedly contributes to a lower neonatal mortality rate. Furthermore, health indices in Costa Rica evolved more rapidly than in Cuba and actually matched them, without a change in political structure. During the last five years, these two countries have recorded an almost identical infant mortality.

Despite historical and scientific evidence that interventions based on the infectious-disease paradigm were partly responsible for the miracle of health of the 1970s, the "nutrition paradigm" prevailed during the 1970s and 1980s. This has resulted in an overgrowth of nutrition programs that have indirectly limited further health improvements by competing for resources, which threatens fulfillment of the goal of health for all.

5.6.3 Proliferation of food and nutrition programs. As shown in Table 5.14, there was a proliferation of institutions and programs in the 1970s, several of which focused on nutrition and feeding activities. Paradoxically, this development coincided with rapidly declining malnutrition rates (Mata and Mohs, 1976). Furthermore, the malnutrition problem had been unintentionally exaggerated by the use of inadequate criteria for evaluating nutritional status (Mata, 1978) concomitantly with an equivocal interpretation of the interrelationships between growth and such environmental factors as food consumption and infection (Mata and Mohs, 1976; Mata et al., 1976; Mata, 1978b; Anderson, 1979). For instance, there was an unjustified emphasis on the role of protein and neglect of the calorie deficit in the diet of Costa Rican children (Valverde et al., 1977); an emphasis on food consumption without consideration for weight loss induced by infectious disease (Mata, 1978b); an excessive focus on diet during pregnancy and not on the role of morbidity and physical exertion during pregnancy as causes of prematurity and fetal growth retardation (Mata et al., 1976).

These faulty concepts contributed to the justification for food distribution programs. The modest or nil effect of such programs has been obvious, but the emphasis on food supplementation programs continues up to the present time. In more than 30 years, the Ministry of Health has not evaluated the programs, in spite of limited observations

by external groups offering strong scientific evidence that the programs do not reach the target population, or do not have a nutritional impact or acceptable cost-benefit ratio (Anderson, 1979; Murillo and Mata, 1980; Mata et al., 1982a).

The Center of Education and Nutrition (CEN), which provides hot meals for preschool children and mothers, is not accessible to most people living beyond a radius of one kilometer. This means that most rural people who theoretically would benefit from a diversification of diet are excluded (see ruralism in Chapter 1, Table 1.3). Furthermore, the evaluation of one CEN showed that supplementary feeding appears to substitute for the food consumed at home (Murillo and Mata, 1980). The social and educational implications of a possible disruption of family relationships from children attending feeding centers need to be determined. In addition, no differences have been found in the nutritional status of children who attend versus those who do not attend feeding centers (Murillo and Mata, 1980).

The same can be said of the milk distribution program. Although it has wider coverage, it does not appear to induce nutritional differences in the beneficiaries (Mata et al., "Puriscal, VII," 1982). Furthermore, there have been several claims of alleged discrimination based on political affiliation in the selection of beneficiaries for this particular program.

The Center of Comprehensive Child Care (CINAI), a more costly unit than the CEN, has a very small number of beneficiaries, just 1,112 in 1982. Along with nutrition, its expected benefits include more stimulation and education for the children. Again, no differences between the nutritional status of those who attend the CINAI and those who do not have been demonstrated. The psychological and behavioral benefits of the CINAI have not been evaluated. However, the CINAI is important for mothers who must leave their children during working hours. Regarding school lunch programs, they are not expected to have any impact on nutrition and survival, as malnutrition is not seen in schoolchildren in Costa Rica.

In a comparative study of two poor rural settings in Guatemala and Costa Rica, where the only relevant differences seemed to be those related to education, hygiene, and interventions to curtail infectious diseases (all of which were better in the Costa Rican setting), food consumption by infants, young children, and pregnant and lactating women was remarkably similar in both places. Marked differences in child morbidity, mortality, and physical growth were found between the two areas: the health and survival scenario was superior in the Costa Rican setting. In light of the remarkably similar food consumption patterns in both populations, the differences observed must be attributed to contrasts in the incidence and intensity of infectious processes (Mata, 1982b).

On the basis of this comparison, the following rule of thumb was proposed: whenever an excess of malnutrition and mortality occurs among all age groups, a situation of inadequate food supply must be expected; this is the usual condition in less developed societies during prolonged war or natural disaster, and often appears in association with high levels of infectious morbidity. However, when malnutrition is confined only to infants and young children, such as in Central America, the primary causal role is infection and social pathology rather than inadequate food supply (Mata, 1982b).

The whole concept of supplementary feeding in a country like Costa Rica seems obsolete because there is no evidence of food shortage, even during times of crisis. Furthermore, the studies on causality of malnutrition in children admitted to the National Children's Hospital reveal that almost all severe cases of malnutrition are related to causes other than a shortage in food supply, for instance, massive parasitosis; congenital defects; cerebral palsy; child abuse syndrome; and organic, degenerative, and social pathology (López et al., 1978; Jiménez et al., 1985). Exceptions should be made for disaster conditions, refugee camps, and certain slums in which feeding centers are justified if combined with activities for women, for example, mothercraft centers, which are recognized as having positive social benefits.

Despite strong scientific evidence supporting the relevance of the infectious-disease paradigm, the emphasis on costly nutrition programs prevails, and is imposing serious philosophical and budgetary limitations on fulfillment of the health-for-all goal. It thus appears that the crisis has weakened an already ambivalent health policy, in some cases leading to the adoption of an invalid paradigm.

5.6.4 Cost of food versus primary health care programs. Table 5.15 presents the distribution of the funds for the Family Allowances and Social Development Program, created in 1975 to finance the increasing demands of health sector activities, especially in rural areas. It is of interest that 35.1 percent of the total fund is destined for the purchase of food alone, in comparison with only 19.2 percent to support most of the infrastructure of rural and community health programs as well as that of the food programs themselves (e.g., staff, transport, vaccines, medicines). The considerable cost of building up the infrastructure to the present level is not shown in the table. It should be remembered that the food is for school lunches, feeding centers, and food distribution programs, all of which have questionable nutritional impact. This consideration alone would not be so serious if extension of primary health care to the rest of the country had not already been limited because of budgetary constraints.

Table 5.16 presents data on the number of beneficiaries and costs of the nutrition programs, including the CINAI, at the peak of the crisis.

The most revealing observation is the significantly greater cost of intramural (CEN, CINAI) versus extramural food distribution programs. As expected, the programs vary dramatically in number of beneficiaries and in cost; the larger the number of beneficiaries, the less costly the program.

Furthermore, Table 5.16 reveals the impact of the crisis on cost, primarily as a result of the devaluation of the currency in 1982. The decreased budget during this year resulted in cutbacks in the scope of the food programs (38 CENs were closed down), in reduced food distribution, and in some changes in composition of the meals and food packages distributed. However, there was a continued steady reduction in severe malnutrition during the crisis years (1979-1983), despite the relative attrition in the programs mentioned. This phenomenon is further evidence that the nutrition paradigm does not apply to the present situation in Costa Rica.

Each Center of Education and Nutrition (CEN) costs US$58.8 per child per year. Each CEN has a school teacher, a nutrition assistant, and a cook; it has its own building and equipment. The CINAI is considerably more expensive, costing US$408.9 per child per year, or US$1.4 per child per day (assuming 288 days per year). A CINAI may be staffed with a special education teacher, a psychologist or social worker, a nutrition assistant, a cook, and a helper. The cost of one CINAI was US $13,375 per year in 1982, and is about US$20,000 per year at current exchange rates.

A comparison between costs of the Rural Health Program (RHP) and Food and Nutrition Programs (FNP) is presented in Table 5.17. Again, the effect of the crisis was evident in the marked increase in cost of the RHP without a concomitant extension of coverage. It should again be stressed that due to the influence of the nutrition paradigm, health posts and coverage of the rural population were sacrificed, in 1981, to continued expansion of CEN activities (20 new CENs were opened in 1981, while 9 health posts were closed down). The stagnation of primary health care activities was also discussed in Chapter 3 (see Tables 3.4 and 3.5). The cost of the FNP is about 7 times greater than that of the RHP. Because the number of RHP beneficiaries is larger, the cost per person is even less compared to the FNP. The RHP includes activities that reach the whole family and the community, some with long-lasting effects, such as education and vaccination. The activities of the FNP focus on the preschool child and less frequently on the mother or other members of the family. The FNP strengthens the image of a welfare-provider state and contributes to the ideological uncertainty that has characterized the last 15 years of Costa Rican health policy.

Table 5.15

Budget of the Family Allowances Fund (OCAF), Costa Rica, 1984.

	Colones, millions	U.S. dollars, millions[a]	Relative percentage
Food (for feeding centers or distribution)	618	14	35.1
Health infrastructure (rural health, nutrition education centers, dental health, etc.)	339.4	7.7	19.3
Health research	14.8	0.3	0.8
Other (housing, pensions, etc.)	513.5	11.7	29.2
Other	272.8	6.2	15.5
Total	1,758.5	39.9	99.9

[a]US $1 = 44 colones.

Source: System of Nutrition Information, OCAF (1984).

Another complication has occurred. During recent years, a group of politically active women, along with two deputies, have succeeded in getting legislation passed that would tax exports to collect about US$75 million per year for the construction of more CINAIs. The rationale for such an action appears logical--working women need to have high-quality day care for their children. Concrete plans to construct several hundred additional CINAIs have been made. The expenditure needed to support 500 CINAIs would represent a sum 20 times greater than that required to expand primary health care to the rest of the rural population. The latter undoubtedly would bring down infant mortality, improve health, and help fulfill the goal of health for all.

Table 5.16

Coverage and Cost of Food Programs Supported by the Family Allowances Fund (OCAF) in Costa Rica, 1982.

Food Program	Number of beneficiaries	Cost, US dollars[b] Total per year	Per person/year	Per person/day[d]
A. Ministry of Education				
1. School dining rooms (CE) (hot meals)				
School children	305,375			
Teachers and staff	11,030			
Subtotal	316,405	4,647,383.3	14.7	0.05
B. Ministry of Health				
1. Centers of Education and Nutrition (CEN) (hot meals and education)				
Preschool children	24,608			
Schoolchildren	4,972			
Mothers	2,789			
Subtotal	32,369	1,901,991.7	58.8	0.20
2. Centers of Comprehensive Child Care (CINAI) (hot meals, education, stimulation, hygiene)				
Preschool children	1,112	454,750.3	408.9	1.4
3. Health Centers and Health Posts (milk distribution)				
Preschool children	69,171[a]	1,710,909.7	24.7	0.08
Total	419,057	8,715,035.0[c]	20.8	0.07

[a]Other members may consume the milk.
[b]Exchange rate US $1 = 60 colones; cost of food donated by CARE was excluded.
[c]This sum does not correlate with that in Table 5.12 due to differences in exchange rate a year of budget. Smaller food programs are not included.
[d]Estimated for 288 days.

Source: Fernández et al. (1984).

Table 5.17

Resources and Costs of Rural Health and Food and Nutrition Programs in Costa Rica, 1973-1983.

Program	1973 (8.6)[a]	1977 (8.6)	1980 (20.5)	1981 (20.5)	1982 (60)	1983 (43)
Rural Health Program (RHP)						
No. health centers	62		75	80	85	86
No. health posts	50	251	293	284	294	301
No. rural health assistance		231	256	238	238	250
No. auxiliary nurses		175	203	162	159	161
No. beneficiaries x 10^3	115	690	717	641	723	777
(% coverage)	(10)	(60)	(57)	(48)	(54)	(58)
Cost of program, US $ x 10^3		3,360	1,872	2,235	1,206	2,477
Cost per child per year		4.86	2.61	3.48	1.67	3.18
Food and Nutrition Program (FNP)						
Centers Education-Nutrition (CEN)	147		538	558	520	520
Centers Comprehensive Child Care (CINAI)	0		33	33	34	34
School Dining Room (CE)			n.a	n.a	2,103	2,885
No. professionals, auxiliaries			n.a	n.a	367	370
No. cooks, helpers			n.a	n.a	2,926	3,000
No. beneficiaries x 10^3			n.a	n.a	419	498
Total cost of program, US $ x 10^3			n.a	n.a	8,715	n.a
Cost per child per year			n.a	n.a	20.8	n.a
Ratio FNP/RHP						
Total cost					7.2	
Cost/child					12.5	

[a]Exchange rate with US $ shown in parentheses.
n.a. = Data not available at FNP headquarters.

Source: Ministry of Health; Ministry of Education.

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6. CONCLUSIONS

1. Health in Costa Rica has improved considerably in the last 40 years, but especially during the 1970s, when health indices approached those of some advanced industrialized nations. The likely determinants of this rapid improvement are: a) emphasis by all administrations on social rather than economic development; b) improved environmental sanitation, housing, and income; c) emphasis on education without sex discrimination; d) extension of primary health services to most of the rural areas; e) adoption of health and medical technologies to tackle the main health problems; and f) intersectoral action in planning and executing health programs.

2. These elements were brought together through more than 100 years of historic evolution, during which education, democracy, observation of human rights, and peace were fostered. At the same time, the army was progressively dismantled and was eventually abolished in 1949. Budgetary priority was given to education and health.

3. Primary health care (PHC)--referred to as the Rural Health Program (RHP) in Costa Rica--was identified as the most effective intervention to reduce infant mortality. This was followed by secondary health care and by child spacing, which was not as successful as expected. The PHC program (the Rural Health Program) included development of a sanitary infrastructure (water supply and latrines); organization of the community; periodic house visits to immunize against measles, poliomyelitis, diphtheria, pertussis, and tetanus; deworming of the population; referral of medical problems to higher levels of care as needed; and nutrition and health education, including prenatal care and family planning.

4. The infrastructure for PHC in Costa Rica is simple. A staff of 1,000 workers covers the whole country; the program is less expensive and more effective than other health interventions or programs.

5. Intersectoral action for health can be easily identified in the evolution of planning and the execution of health programs, even before this modern concept came into being. Coordination was not always effected by mandate or decree but was the result of affinity and cooperation among individuals in the various sectors.

6. The onset of the economic crisis in 1979 marked the beginning of a faltering or stagnation of health indicators. Infant mortality and birth rates stabilized around 18 and 30 per 1,000, respectively. However, child malnutrition continued to decrease progressively to low levels, and life expectancy at birth increased steadily, to reach an average of 73.7 years (76 for women).

7. The crisis coincided with a rise in infant mortality in certain districts and cantons, and corresponded to failures in family planning, lack of or incomplete prenatal care, morbidity during pregnancy (anemia, hypertension, infection), and deficiencies in hospital delivery practices. The increase in infant mortality was not found to be associated with malnutrition in the mother or the child.

8. The nutritional status of women and children did not deteriorate during the crisis, and malnutrition rates continued to decline. Apparently the many decades of investment in health and education have permitted maintenance of these indices in the face of a crisis, provided a critical level has been attained. It must be assumed that such critical point corresponds to an infant mortality of 20 per 1,000 live births or less.

9. Deterioration of the quality of life in recent years has been measured by environmental decay, overcrowding, economic stress, and social pathology (violence, child abuse, divorce). While these phenomena seem related to the crisis facing Costa Rica, the possible influence of other factors cannot be dismissed--among them, the overcrowding in cities and towns and changes in lifestyles, including drug abuse, sexual liberation, and increased violence in the news media. Furthermore, part of the problem is related to the conflicts in Nicaragua and El Salvador, the effects of which have extended to Costa Rica.

10. The main health problems of the country today are: in children: fetal immaturity, congenital defects, tumors, accidents, and infections; in young adults: accidents, occupational and degenerative diseases; in older adults and the aged: cardiovascular diseases, tumors, accidents, and health problems typical of the elderly. Many health problems of contemporary society are related to persistent environmental deficiencies and to added complications of modern society: alcoholism, alienation, tension, and other mental health problems.

11. The emergence of new pathologies and the persistence of older problems call for a combined strategy of maintenance and improvement in existing low cost-benefit interventions, along with the development of other interventions to cope with the newer problems. Since many health problems are related to lifestyles, the PHC infrastructure should be adapted to include operational components that organize and educate the population to participate in the prevention of these types of problems and to detect and control them at an early stage of development.

12. A growing understanding of the determinants of health problems is required in order to formulate community actions aimed at prevention and control. Basic, applied, and operational research is needed to meet the new challenges. Having research centers focus on health priorities is fundamental for further improvement, as well as for rational utilization of resources.

13. The present crisis has interrupted the expansion of PHC and has endangered the possibility of fulfilling the goal of health for all by the year 2000. Part of the problem stems from large expenditures on very costly interventions of doubtful impact. The food program is a case in point: it has great political (electoral) importance, yet it controls resources that could better serve to fulfill the goal of PHC in the near future. Similar examples can be found in the inflated network for curative medicine.

14. Low-priority interventions are effected when inadequate health paradigms are adopted. History shows that once a paradigm is established, it is difficult to uproot. The adoption of inadequate paradigms seems to be the most significant deterrent to the rapid expansion of PHC in rural areas that are still unprotected.

15. Researchers and health advocates should continue the struggle to influence politicians and policy-makers to base health policies on priorities identified as critical by scientific scrutiny.