

# Costa Rica saves infants' lives

Between 1970 and 1980 the infant mortality rate in Costa Rica fell from 68 to 20 per 1000 live births. Socioeconomic gains during the 1970s helped to bring this about but the main factor consisted of health interventions, especially primary care programmes.

Costa Rica covers an area of about 50 000 square kilometres. Approximately half of its 2.5 million inhabitants live in rural areas. The economy is based on exports of tropical products, predominantly coffee and bananas. In 1983 the gross national product per capita was US\$ 1020.

The country is more developed socially than economically. The increased life expectancy seen over the past decade suggests that economic underdevelopment is no longer a determinant of survival opportunities. In 1984 the illiteracy rate was only 7% and almost all children were attending school. Costa Rica enjoys political stability and has constitutionally renounced the maintenance of an army.

## Decline in infant mortality

The decrease in Costa Rica's infant mortality rate began to accelerate in 1972 (see figure), following the drawing up of the first national health plan and the institution of

universal social security. All public hospitals were transferred to the social security system between 1973 and 1976, and rural and urban community health programmes were started in 1973 and 1976, respectively. For 17 years prior to 1972 the reduction averaged 2.3% per year; between 1972 and 1980 the average annual decrease was 13% (1). Both neonatal and postneonatal infant mortality were affected. The downward tendency was especially marked for neonatal mortality; the annual reduction was 0.3% for 1955-72 and 8.7% for 1972-80. This accelerated decline was all the more remarkable because the chiefly endogenous origin of neonatal deaths makes them comparatively difficult to prevent. The reduction of the risk of death in the first month of life accounted for 34% of the decrease in infant mortality between 1972 and 1980, contrasting with its contribution of only 5% in the 1955-72 period. None the less, in the period 1972-80 the major reason for the decline in the infant mortality rate continued to be the reduction in postneonatal mortality.

Infant deaths declined in respect of all categories of cause except two: that associated with complications of pregnancy and delivery, and that of congenital

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anomalies. The control of diarrhoeal diseases and acute respiratory infections accounted for 51% of the decline in infant deaths during the 1972-80 period. Immunization, mainly against tetanus and measles, contributed 8% and the prevention of other infectious diseases, e.g., septicaemia and meningitis, by diagnosis and treatment, contributed 10%. Also affecting the 1972-80 decline was the control of deaths attributable to premature birth (14%) and malnutrition (5%).

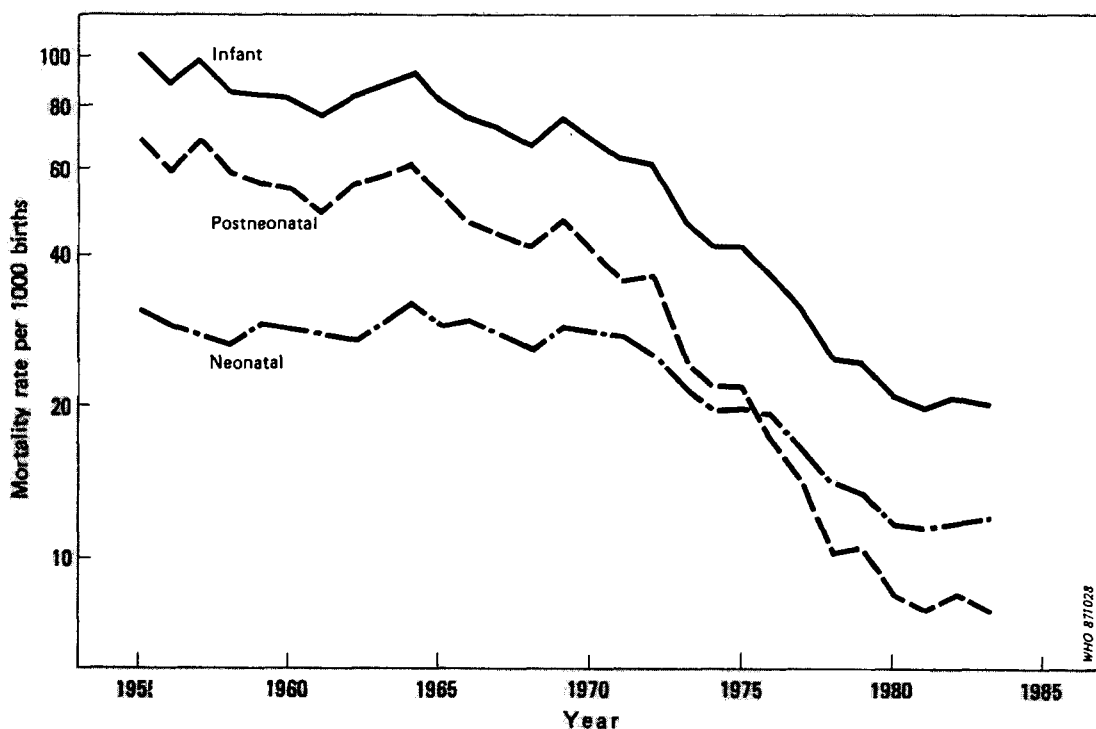
The control of infection through sanitation, immunization and other improvements in child care therefore remained paramount in the betterment of child health in the 1970s. However, premature birth and other causes of neonatal death, the control of which requires expensive services, also became important determinants in this period.

## Socioeconomic factors

There is much evidence indicating that the economic and social conditions into which children are born strongly influence their survival. Consequently, infant mortality has frequently been used as an indicator of the standard of living. Poverty, ignorance, isolation, lack of basic services, and excessive fertility may make children more vulnerable to disease as well as hinder access to, or reduce the efficacy of, medical services.

Whereas the most marked reductions in infant mortality occurred during the 1970s, those in adult mortality were experienced during the 1950s and 1960s. These declines coincided with the only periods of sustained economic growth, as indicated by foreign trade per capita at constant prices. During

Infant, neonatal and postneonatal mortality rates in Costa Rica, 1955-83.



economic crises the pace of reduction in mortality slowed down. The average reductions in infant and adult mortality during frequent periods of economic recession amounted to 1.4% and 2.0% a year respectively; the corresponding figures for normal periods were 3.8% and 3.6%. As 1980 marked the beginning of a new economic recession it is not surprising that the drop in infant mortality became less steep about this time. Nevertheless, the decrease in mortality during the first half of the twentieth century cannot be explained by economic factors. Despite economic stagnation, mortality rates decreased substantially from 1910 to 1949.

Improvements in education and public health, and the adoption of new treatments or preventive techniques seem to have influenced mortality independently of the economic situation. The largest changes, those in women's education, in fertility, and in expenditure on health, took place after 1960. Thus, the sharp decrease in infant mortality in the 1970s seems to have resulted from the interaction of various favourable factors.

The education of mothers is one of the most clearly identifiable determinants of infant mortality. As a consequence of improvements in children's schooling in the 1940s and 1950s, the percentage of women with complete primary education rose from 17% in 1960 to 65% in 1980. A strong negative correlation between women's education and child mortality in Latin America and Costa Rica has been demonstrated (2), although recent evidence shows that this relationship has become less pronounced (3). Programmes of primary care, especially home visits by health workers, have improved the access of poor mothers with little education to medical services and to knowledge about the causes of disease. Between 1960 and 1980 the total marital fertility rate declined from 7.6 to 3.4

births. This led to a decline in the proportion of high-risk pregnancies associated with closely spaced births, the extremes of reproductive age, and grand

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multiparae. Even though the decline in fertility did not reduce the proportion of adolescent pregnancies, it resulted in an increase in birth intervals and a remarkable reduction in higher-order births. It has been estimated that the latter factor alone was responsible for 24% of the decline in the Costa Rican infant mortality rate between 1960 and 1977 (4).

Apart from the economic and social factors, family planning had an important influence, extending the fertility transition to the rural and urban poor (5). Two-thirds of those who used contraception in 1981, including almost 90% of agricultural labourers, benefited from state services. The adoption of family planning, besides reducing risk factors, has indirect effects on child health which are difficult to quantify. The quality of life is improved, a nonfatalistic attitude is adopted, and children in small families receive more parental attention than those in large ones.

Socioeconomic change explains only a third of the observed reduction in infant mortality

that occurred between 1970 and 1980, and the health policies of the 1970s seem to have been largely responsible for the decline. However, the public health programmes should not be considered in isolation. They had the support of a socially sensitive government system, of substantial economic growth since 1964, and of a relatively homogeneous, well-educated population.

### Health interventions

Costa Rica's first national health plan was implemented in the 1970s. Per capita expenditure on public health increased from US\$30 in 1970 to \$155 in 1980. Public health programmes fell into two categories:

- primary health care for population sectors not previously served;
- extension and improvement of medical services under the social security system.

Basic primary care was given through rural and urban health programmes. By 1980, 60% of the population benefited from domiciliary services, including quarterly visits to homes by health workers. Immunization against poliomyelitis, diphtheria, pertussis, tetanus and measles

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was given to 95% of children. Sanitation activities were intensified, particularly in rural areas, and community participation in local health programmes was encouraged. By 1984, almost all households had a system of

sewage disposal and 87% had piped water. The hospitals of the Ministry of Health, often poor in resources and services, were transferred to the social security system. Insurance coverage for illness had reached 70% of the population by 1980. The social security system doubled the number of centres offering outpatient services and tripled the amount of contracted physician-hours between 1970 and 1980.

An analysis of the relative impact in 1970 of socioeconomic development, fertility regulation, hospital care, outpatient services, and primary health care on infant mortality seemed to show that the latter was strongly correlated with all five independent variables. However, the influence of the three indices of health intervention disappeared when the effects of socioeconomic development and fertility were allowed for. This meant that the health services were not independent of socioeconomic development up to 1970 — they were better in the more developed cantons, which consequently had lower infant mortality rates.

A further analysis showed that the relative decline in the infant mortality rate between 1972 and 1980 was inversely correlated with the five variables of status in 1970. In other words, the privileged cantons that had the best living conditions up to 1970 showed the smallest decrease in infant mortality during the 1970s. Many of the differentials in mortality were neutralized and the former order of development, i.e., the accumulation of the greatest achievements in a few privileged regions, was altered by new factors. When the improvements in health services during the 1970s were included in the regression model, the indices of status in 1970 no longer showed an inverse association. These health programmes of the 1970s induced a major reduction in infant mortality in cantons that initially had less favourable conditions for progress.

Among the changes that took place during the decade, the development of primary care, in particular of rural and urban health programmes, immunization, the encouragement of community participation, and the provision of drinking-water, emerged as the most influential in the relative decline in the infant mortality rate. Also independently correlated with the decline were, in order of importance, secondary care, fertility regulation, and socioeconomic progress.

Multiple regression analysis suggests that the extension of primary care accounted for 41% of the decline in the infant mortality rate between 1972 and 1980, while increased secondary medical care accounted for 32%. Socioeconomic progress contributed 22%, and the decline in fertility only 5%. Fertility played a small role because it was already low in many cantons and actually rose in almost half of them. This analysis did not take into account the decline in fertility or the socioeconomic advances prior to 1970, which probably had a large effect on events during the following decade.

Similar analyses were performed in groups of cantons categorized according to both the level and trend of infant mortality. The contribution of primary care was most marked in cantons with relatively high mortality around 1970. In cantons where infant mortality had been relatively low at this time, the reduction was brought about mainly by improvements in secondary health care. Socioeconomic progress affected the different groups of cantons similarly, and fertility reduction influenced only those with a high initial mortality.

A previous study showed that cantons in which rural and urban health coverage was 75% or greater experienced a fall in the infant mortality rate from 80 to 17 per 1000 in the 1970s, while those in which coverage

was practically nil showed a smaller decline, from 49 to 21 per 1000 (3).

Primary care programmes were therefore targeted on the people in greatest need, with a view to reducing one of the worst aspects of social injustice — the uneven distribution of mortality in childhood.

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From 1970 to 1980 the infant mortality rate in Costa Rica fell from 68 to 20 per 1000 live births. Socioeconomic gains during the 1970s, including considerable improvements in the educational level of women, substantial economic growth, and a large decline in the birth rate, certainly helped to bring this about. However, the main factor consisted of health interventions, especially primary care programmes. Up to three-quarters of the decline was evidently attributable to contemporary improvements in public health services. Furthermore, by targeting interventions on the underprivileged, primary care reduced differentials in child mortality related to socioeconomic status. □

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