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Infant Mortality in the Americas

Background

It is the general consensus that health is both a product and a determinant of the overall developmental process, which has as its goal the common welfare. Increasing recognition is given to the close relationship between traditional indicators of health and factors in the socioeconomic environment, such that the former have come to be considered indices of social development. Infant and preschool mortality rates are especially viewed as such because of their attendant emotional overtones.

The relationship between the number of deaths among children under one year and the number of live births in the same period has a significance that transcends the mere interpretation of the vital statistics contained in the numerator and denominator. The fact that the infant mortality rate in one country is 60 per 1,000 live births and 15 in another not only points to biological phenomena but also suggests the influence of housing, nutrition, education, environmental health, and other aspects that characterize the style and quality of life within a particular society.

Recent years have seen the development of technologies to prevent and successfully treat the pathologies that cause a large number of infant deaths. Application of these technologies in developed countries brought

about a significant and continuing decrease in mortality at an early age. This stirred great hopes in developing countries, where deaths due to these preventable diseases represented more than 60% of total deaths. It was then possible to envision a large reduction in mortality by applying "appropriate technologies" long before achieving changes in the conditions of socioeconomic underdevelopment prevailing in those countries. It was thought that "mortality trends are distinctly neutral with respect to socioeconomic events. Economic misery is no longer an effective barrier to a vast emergence of possibilities for survival in the underdeveloped areas" (1). This thought, which Stolnitz expressed in the 1960s, seems overly optimistic in view of the results observed for that decade in Latin America. In the course of analyzing the goals the countries set for that period, the Pan American Health Organization found that barely one-third of the targeted 50% reduction in infant mortality had been met: infant mortality was reduced by 18% in Middle America and 24% in South America (2).

More accelerated progress began in 1970, however, especially in those countries that undertook integrated health programs emphasizing preventive measures and the application of appropriate technologies for maternal and child care. The decrease was more rapid in almost

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all of those countries, ranging from 2% to 86% during the period 1971 to 1975. Four showed reductions over 50%, thus reaching their goal for the decade. Ten countries achieved reductions of more than 30%. All the countries under consideration achieved their own national goals, which were set according to feasibility at the beginning of the decade.

In regard to mortality levels in children in the first years of life, Latin America and the Caribbean is in an intermediate position between the developed countries and Africa and Asia, with lower levels than the latter two regions. Latin America and the Caribbean is a region in transition, with relatively developed health systems and average coverage that provide numerous possibilities for the widespread application of appropriate technologies. As a result, it is interesting and useful to study mortality in this age group, since it yields greater results at lower cost.

Various deficiencies in record-keeping for both live births and deaths have, unfortunately, limited an adequate understanding of infant mortality. The lower the age, the fewer deaths are recorded, so that data on mortality from 1 to 4 years are generally more reliable than are data on neo- and postneonatal mortality.

The difficulties and valid limitations that must be considered when analyzing a numerical figure are multiplied when interpreting differentials between countries with different recording systems and levels of development. Nonetheless, the consideration of the available figures provide interesting information. In the developing countries, knowing how to interpret health indicators correctly, despite their limitations, has been a constant challenge.

In recent years, infant mortality has decreased in all countries in the Region of the Americas. This decrease has not been even in all countries, and the disparity is repeated in the separate subregions.¹

When the subregions are ordered according to the decrease they have experienced in infant mortality rates for the periods 1970-1975 and 1980-1985 (Table 1), Northern America appears in first place, with a 33%

Table 1. Infant mortality rate in the subregions of the Americas for the periods 1970-1975 and 1980-1985.

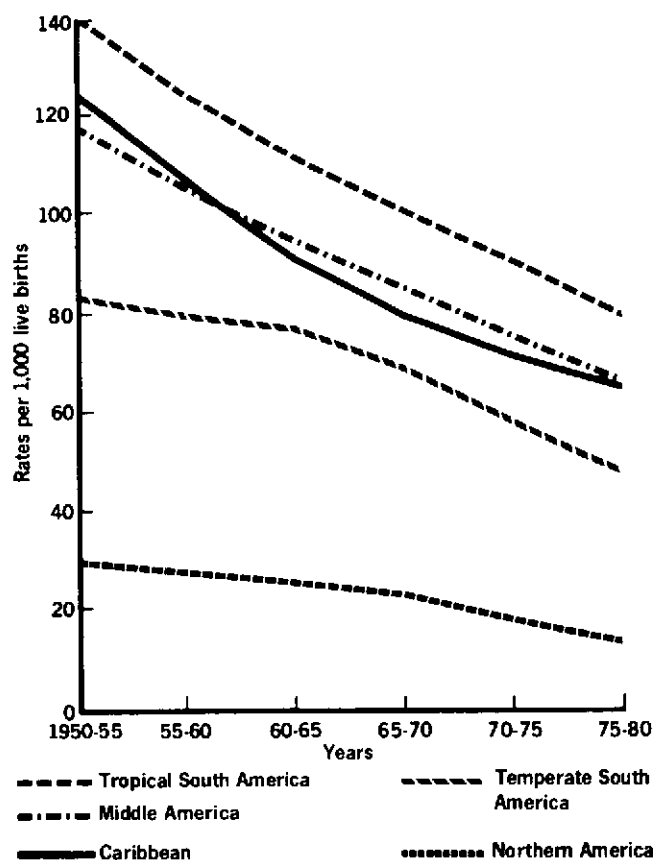
Percentage of observed decrease	Subregion	Infant mortality rate	
		1970-1975	1980-1985
33	Northern America	17.9	12.0
26	Temperate South America	56.4	41.8
25	Middle America	74.6	56.3
23	Tropical South America	90.7	69.7
18	Caribbean	70.7	57.8

Source: Maternal and Child Health Program, PAHO.

decrease; Temperate South America appears second with 26%; Middle America appears third with 25%; Tropical South America appears fourth with 23%; and the Caribbean appears fifth and last with 18%. Figure 1 illustrates the trend in the infant mortality rate for 1950-1955 and 1975-1980.

The disparity in the decline in infant mortality is also reflected in the different values for this indicator in Northern America and the other subregions. Comparison of mortality in Northern America with that in Tropical South America for the respective two periods in-

Figure 1. Trends in infant mortality in the subregions of the Americas, from 1950-1955 to 1975-1980.



¹Subregions: *The Caribbean*: Anguilla, Antigua and Barbuda, Bahamas, Barbados, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Netherlands Antilles, Puerto Rico, Saint Christopher and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands, Virgin Islands (UK), Virgin Islands (US). *Middle America*: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama. *Northern America*: Bermuda, Canada, United States of America. *Temperate South America*: Argentina, Chile, Uruguay, Falkland Islands. *Tropical South America*: Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Venezuela.

Table 2. Infant mortality rates per 1,000 live births in some countries of the Americas, 1960-1985.

Country	1960-1965	1965-1970	1970-1975	1975-1980	1980-1985
Argentina	59.7	57.4	51.3	47.2	43.2
Barbados	60.8	46.4	33.8	27.0	25.5
Bolivia	157.5	151.3	151.3	138.2	124.4
Brazil	109.4	100.1	94.9	82.4	72.4
Canada	26.3	21.3	16.4	12.2	10.4
Chile	107.0	89.8	69.5	46.3	40.0
Colombia	84.5	74.2	66.9	59.4	53.3
Costa Rica	70.6	60.3	50.9	29.3	25.7
Cuba	38.7	39.2	33.8	22.5	20.4
Dominican Republic	110.0	96.3	83.6	73.1	65.5
Ecuador	132.3	114.5	100.1	86.0	77.2
El Salvador	128.0	112.0	101.0	86.0	77.2
French Guiana	—	—	57.6	47.9	40.5
Guatemala	128.1	115.3	90.2	79.0	67.7
Haiti	170.5	150.3	134.9	120.9	108.2
Honduras	136.8	124.0	110.7	95.4	81.5
Jamaica	54.4	47.0	42.0	30.1	26.2
Martinique	47.7	42.5	34.8	23.0	21.0
Mexico	86.3	78.5	68.6	59.8	52.1
Nicaragua	136.4	122.2	108.9	96.5	84.5
Panama	55.5	46.7	43.8	36.2	32.5
Paraguay	80.6	66.9	52.6	48.6	45.0
Peru	152.2	132.7	106.5	93.5	81.9
Suriname	63.5	54.6	46.7	39.2	33.8
Trinidad and Tobago	48.0	45.0	40.4	34.8	29.9
Uruguay	47.9	47.0	46.3	41.7	37.6
United States	25.2	22.2	18.1	14.0	12.1
Venezuela	76.9	64.9	52.4	44.8	38.6

Sources: Maternal and Child Health Program, PAHO. Mortality and Health Policy. Rome: CELADE, April, 1983. (IESA/ICP. 1984/EGIV/12).

dicates that the rates were 5.3 and 5.8 times higher in Tropical South America; the gap between countries with low and high infant mortality is widening.

The analysis by country (Table 2) indicates a general decrease in mortality, although there are significant fluctuations for individual countries. In Bolivia, for example, the decrease is only 21%, while it is 64% in Costa Rica.

During the period 1970-1975, seven countries had infant mortality rates in excess of 100 per 1,000 live births. Bolivia had the highest rate, with over 150 per 1,000. Canada and the United States were the only countries with infant mortality rates under 30.

For the period 1980-1985, only two countries in the Region show mortality rates over 100 (Bolivia and Haiti); nine countries have rates below 30. Only eight countries have mortality rates over 70, but 47% of the population of Latin America and the Caribbean lives in these countries which are all in the tropical region. In contrast, mortality ranges between 37 and 43 deaths per 1,000 births in Temperate South America.

At the beginning of the 1980s, two Latin American countries, Cuba and Costa Rica, had achieved rates

below 20 per 1,000 live births. The records for both countries are considered reliable.

Neonatal and Postneonatal Mortality

It is common practice in analyzing infant mortality to break down mortality for children under one year of age into neonatal (under 28 days) and postneonatal (28 days to 11 months, 29 days). It is also commonly accepted that neonatal death is related more to biological factors (endogenous mortality), while postneonatal death is principally linked to factors related to socioeconomics and harshness of the environment (exogenous mortality). It is thus considered more difficult to reduce neonatal mortality, and significant efforts on the part of the more complex institutionalized services are required to do so. Postneonatal mortality could be significantly reduced by applying basic health care methods along with improvements in socioeconomic conditions. The study of postneonatal mortality is therefore of interest in characterizing levels of infant health.

Table 3 shows that only six countries had higher neonatal than postneonatal mortality rates in 1968. The number of countries increased to 15 in 1978, largely due to reduced mortality for the postneonatal group.

A comparison of neonatal mortality rates for 1968 and 1978 shows decreases in most countries. The decrease was most notable in Ecuador and Chile, which reduced neonatal mortality by 15 and 13 deaths per 1,000 live births, equaling a percentage reduction of 48% and 41%, respectively.

The same decreasing trend is noted for postneonatal mortality, but the changes are even more dramatic than they are in neonatal mortality. Chile showed the greatest decrease in the postneonatal mortality rate which went from 52 to 20 deaths per 1,000 live births (a percentage reduction of 61%).

It is difficult to study the causes of death for infants under one year because of problems involving under-registration and the absence of a death certificate. In addition, it is even more difficult to analyze the causes of death for infants under one year and children aged 1 to 4 in the developing countries of the Region because

Table 3. Neonatal and postneonatal mortality rates per 1,000 live births in countries of the Americas for the years closest to 1968 and 1978.

Country	Neonatal mortality		Postneonatal mortality	
	1968	1978	1968	1978
Antigua	12.4	14.1	18.3	8.2
Argentina	25.7	22.2	35.4	18.6
Bahamas	32.9	21.7	13.0	14.0
Barbados	-	21.7	-	7.2
Belize	23.3	-	28.5	-
Bermuda	15.2	14.8	8.1	-
Canada	13.9	8.2	5.4	4.1
Cayman Islands	-	13.9	-	10.4
Chile	31.6	18.5	51.8	20.2
Colombia	-	18.8	-	20.5
Cuba	23.1	14.6	15.9	7.9
Dominica	23.4	15.0	34.5	6.9
Dominican Republic	-	15.9	-	14.9
Ecuador	30.4	15.9	55.7	41.6
French Guiana	13.7	-	33.8	-
Guatemala	-	29.6	-	42.6
Honduras	9.7	9.8	24.3	21.5
Martinique	-	9.8	-	13.0
Mexico	23.5	21.7	40.7	35.3
Montserrat	-	33.6	-	8.4
Nicaragua	11.9	5.5	41.2	16.3
Panama	19.9	17.6	19.7	15.3
Paraguay	-	-	-	-
Peru	26.5	-	40.5	-
Puerto Rico	-	16.3	-	4.5
Saint Christopher and Nevis	-	22.6	-	18.9
Saint Vincent and the Grenadines	-	17.9	-	20.2
Saint Lucia	-	13.5	-	15.7
Suriname	-	32.5	-	11.0
Turks and Caicos Islands	-	17.1	-	-
United States	16.1	9.5	5.6	4.3

Source: Statistics Office of PAHO.

a large number of these deaths is categorized as being due to causes that are "ill-defined" or "unknown." For a selected group of countries, the percentage of deaths included under this category varied from 5 in Barbados, to 29 in Nicaragua, and to 30 in Ecuador. The effect that problems in classifying data have on the levels and trends for each specific cause of death is unknown. This should be kept in mind when analyzing specific health problems for infants under one year.

Table 4 shows the distribution of deaths in children under one year and from 1 to 4 years, according to groups of causes. Group A includes causes involving the respiratory system, excluding tuberculosis; Group B includes causes involving the digestive system, including enteritis and dysentery; Group C includes causes of perinatal mortality; Group D includes infectious and parasitic diseases; Group E includes accidents and other violent deaths; Group F includes neoplasms; Group G includes other causes, excluding ill-defined causes; and Group H includes ill-defined and unknown causes.

Following the classification proposed by Erica Taucher (3), groups A, B, and D can be considered particularly susceptible to reduction through basic health measures such as oral rehydration and sanitation, early treatment at the primary level, and vaccination. In contrast, the causes of perinatal mortality require more complex and costly care and could be reduced when services are more developed. The discrepancy between the overall decrease in infant mortality and the percentage increase for death due to perinatal causes is an indirect measure of the effect of basic health care activities.

If perinatal deaths around 1979 are excluded, the most significant group of causes was B (diseases of the digestive system) which reached 25% in El Salvador, 25% in Mexico, 37% in Nicaragua, and 28% in Trinidad and Tobago. Group A, diseases of the respiratory system, appeared in first place in Colombia with 24%, Guatemala with 22%, and Mexico with 30%.

Excluding perinatal causes, it can be said that groups A, B, and D are still responsible for 45% of deaths in the first year of life where the diagnosis was recorded (these groups represented more than 70% at the end of the last decade).

General Comments

This study summarizes and analyzes relatively recent data on infant mortality in the Americas. The purpose is to update the figures, outline the trends observed over recent decades, note some changes in the pattern of infant deaths, and evaluate the effect that certain

health measures and programs have on changes in infant mortality. Although an overview of the Region indicates significant progress in terms of the coverage and validity of records, considerable imprecision and omission persist. Conclusions must therefore be drawn with caution.

In the 1970s, the large majority of countries in the Region experienced decreases in infant mortality at a more accelerated pace than in the preceding decade. Nonetheless, great differences still exist among the subregions and even among countries within the same subregion. It is also known that there are extreme variations in infant mortality in each country, and that in Latin America and the Caribbean there are large seg-

ments of the population in which children are exposed to avoidable high risks.

In general, the achievements of the 1970s in Latin America and the Caribbean exceed those of the 1960s. Reductions in infant mortality have occurred despite an unfavorable economic environment and sometimes, in countries whose socioeconomic evolution is regressive. Given a trend of increasing unemployment and decreasing distribution of income during that period, one would predict at least stagnation in the infant mortality figures, had the relationship between economic factors and health sector variables observed in the 1960s continued (4).

Health measures alone cannot determine the level

Table 4. Percentage distribution of deaths in children under one year and from 1-4 years, by specific groups of causes,^a in selected countries of the Americas, around 1979.

Country	Year	Under one year								Total
		A	B	C	D	E	F	G	H	
Argentina	1979	11.8	10.4	37.0	10.0	2.5	0.3	13.6	14.4	100.0
Barbados	1978	16.0	4.0	48.0	11.2	3.2	1.6	10.8	5.2	100.0
Colombia	1977	23.7	23.2	22.0	8.9	1.0	0.2	9.9	11.1	100.0
Costa Rica	1979	12.7	9.8	38.1	7.2	1.4	0.8	8.2	21.8	100.0
Cuba	1978	14.2	8.7	43.1	6.9	b	0.4	6.1	20.6	100.0
Dominican Republic	1978	8.3	17.2	17.5	14.4	0.6	0.2	11.0	20.8	100.0
El Salvador	1974	14.7	25.1	16.1	6.0	0.4	0.1	7.6	30.0	100.0
Guatemala	1978	21.7	19.2	29.1	10.6	b	0.1	5.8	13.5	100.0
Mexico	1976	30.1	25.3	17.3	6.9	2.0	0.2	3.0	15.2	100.0
Nicaragua	1977	10.2	36.5	2.1	14.4	0.7	0.2	7.3	28.6	100.0
Trinidad and Tobago	1977	13.8	27.5	40.8	2.0	2.2	0.2	7.0	10.9	100.0
Uruguay	1978	7.9	11.7	42.9	7.4	1.9	0.2	8.2	19.8	100.0
Venezuela	1978	11.8	18.0	32.5	8.5	2.8	0.2	9.0	17.2	100.0

From 1 to 4 years										
Country	Year	A	B	C	D	E	F	G	H	Total
Argentina	1979	13.4	10.9	—	11.9	17.8	5.0	9.7	31.3	100.0
Barbados	1978	34.6	—	—	—	19.2	15.4	7.7	23.1	100.0
Colombia	1977	23.7	23.0	—	17.4	7.3	1.2	3.7	23.8	100.0
Costa Rica	1979	13.1	10.2	—	15.3	21.1	4.0	3.6	32.7	100.0
Cuba	1978	20.5	6.3	—	12.3	b	8.4	5.9	46.6	100.0
Dominican Republic	1978	14.3	16.8	—	9.7	5.1	0.7	4.7	48.7	100.0
El Salvador	1974	11.8	31.8	—	6.1	2.5	0.4	2.7	44.7	100.0
Guatemala	1978	19.6	31.6	—	22.2	b	0.3	5.6	20.7	100.0
Mexico	1976	24.0	26.1	—	16.8	7.7	0.9	4.3	20.2	100.0
Nicaragua	1977	9.5	31.0	—	19.7	4.4	0.7	3.1	31.6	100.0
Trinidad and Tobago	1977	15.0	35.3	—	1.5	21.1	3.0	7.5	16.6	100.0
Uruguay	1978	11.8	8.3	—	4.8	21.4	8.7	8.8	49.4	100.0
Venezuela	1978	19.4	16.4	—	10.8	13.6	2.6	10.6	26.6	100.0

Source: *Health Conditions in the Americas, 1977-1980*. Washington, D.C.: Pan American Health Organization, 1983. (Scientific Publication No. 427).

^aThe groups are defined as follows:

- A - Causes related to the respiratory system, excluding tuberculosis (ICD-9, 460-519);
- B - Causes related to the digestive system, including enteritis and dysentery (008, 009, 520-579);
- C - Perinatal mortality (760-779);
- D - Infectious and parasitic diseases (000-007, 010-136);
- E - Accidents and other violent deaths (E800-E999);
- F - Neoplasms (140-239);
- G - All other causes, except ill-defined and unknown diseases; and
- H - Signs, symptoms, and ill-defined morbid conditions and unknown causes (780-799).

^bIncluded in Group G.

of infant mortality, and in no way can they be considered a permanent remedy to the social inequalities and incongruities that accompany underdevelopment. Data that reflect a reduction in infant mortality should be viewed cautiously while seeking, on the one hand, to determine the validity of the data and, on the other, to analyze the effect of certain conceptual and technological advances on health services delivery.

Since the end of the 1960s, some Latin American and Caribbean countries have begun to formulate and apply a health services concept with a predominantly preventive focus, which emphasizes basic and highly effective measures, promotes the use of appropriate technologies, and seeks to involve the community. These ideas are contained in the strategy for primary health care already outlined in the III and IV Special Meetings of the Ministers of Health in the Americas held in 1972 and 1977, respectively (5). The International Conference on Primary Health Care at Alma-Ata, USSR in 1978 (6) signified worldwide endorsement of this concept. At that Conference, various countries of the Americas gave an account of their achievements in applying the strategy for primary care. The effect of the primary health care strategy should be taken into account in any analysis of mortality trends in Latin America and the Caribbean over the past decade. Such an analysis should shed light on the strategy's effectiveness in different social situations and in different developmental contexts.

In this respect, it is appropriate to ask what has been the effect of modern technology in preventing and treating disease, especially that which is systematized under the primary health care measures concept. Changes in the relative importance of different causes of death, as well as the decrease in deaths because of the application of specific techniques, suggest that the health sector's ability to reduce infant and preschool mortality has increased. This reduction would seem to derive from the health sector's real and increased capacity to apply its knowledge to wider segments of the population and to place priority on those who are exposed to greater risks (7). The experiences of various countries in the Region point to a possible broadening of the effects of health intervention in infant mortality, which implies greater responsibility on the part of the health sector and its leaders. Failure to respond appropriately would be even more condemnable because effective tools for reducing infant deaths are available.

While the data presented permit only a preliminary understanding of the problem, they do provide a valid direction for research that should be undertaken to analyze the infant mortality problem in greater depth. This research would include case studies in countries that apply these technologies; studies of programs using them in defined geographical areas; an exhaustive study of the reciprocal relationships between economic development, distribution of income, employment, and community behavior; and the evaluation of technologies applicable to other diseases that are considered highly important factors influencing infant mortality.

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For additional bibliographic references on this topic, consult: Maternal and Child Health Program (HPM), PAHO, 525 Twenty-third Street, N.W., Washington, D.C. 20037, USA.

(Source: Maternal and Child Health Program, PAHO.)