

Problems of infant morbidity and mortality in countries of Central and South America differ from those encountered in the United States. The nature of these differences and the consequences for action which flow from them are discussed in this paper.

DEATH AND DISEASE IN INFANTS AND TODDLERS OF PREINDUSTRIAL COUNTRIES

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UNLIKE the United States and other developed countries, the problem of infant mortality in Latin America is twofold. We are concerned not only with giving a child the right to live, but also the right to stay alive. It would be unrealistic to study one problem without the other. Public health workers in preindustrial Latin American countries cannot concentrate their efforts completely on perinatal mortality until the conditions causing high mortality in late infancy and early childhood are controlled. Therefore, in analyzing mortality rates of Latin American children, I will not limit myself to perinatal and infant death, but I will also refer to deaths occurring after the first year, up to the age of five.

I have selected three countries: Costa Rica, Chile, and Guatemala as representing the problems of death and disease in infants and toddlers in preindustrial countries. These countries were chosen, not only because the needed data were available, but because, as we will see later, they offer a varied scope as regards the mortality and morbidity of Latin American children.

In Table 1 we can appreciate that fetal, as well as neonatal mortality rates, are high in Latin America, as compared with those of the United States. Actual rates are probably higher be-

cause there is poor registration, particularly in this category. Both of these rates, however, if expressed as an average of the three countries, are only about twice those of the United States. I say only about twice, because the average mortality rate for children from 1 to 11 months and from 1 to 4 years of age are, as we can also notice in Table 1, 8 and 15 times greater, respectively.

For Chile, the rate for children 1-11 months is 10 times greater than that of the United States, and the rate for children 1-4 years in Guatemala is 30 times greater than the same rate for North American children.

Another way of analyzing the situation, and making differences more apparent, is by studying the distribution of deaths by age as percentages of all deaths. In so doing, we find that the deaths under five years of age in the U. S. account for only 8 per cent of the total number of deaths as compared to 42 in Guatemala, 51 in Chile and 54 in Costa Rica. This means then, that about half of all the deaths in Latin America occur in children under five years of age.

The distribution of these deaths by age groups, as a percentage of the total number of deaths under five, is presented in Table 2. Here we may notice not only marked differences between

Table 1—Changes in the Risk of Death During Early Life in Four Selected Countries

Country	Death Rates			
	Fetal	28 Days	1-11 Months	1-4 Years
Costa Rica (1960)	16.3	21.2	41.9	7.3
Chile (1957)	28.4	35.5	78.9	10.1
Guatemala (1960)	30.1	36.9	55.0	32.9
United States (1957)	13.0	19.1	7.2	1.1

the Latin American countries and the U. S., but also among the individual countries themselves. Almost 40 per cent of the deaths under five in the U. S. are concentrated during the first week of life. In the Latin American countries, this percentage is only 10 to 15. A significant drop is observed in the U. S. after the first week—the number of deaths from 7 to 28 days is only about one-half of those occurring during the first week; in the Latin American countries the decrease is much lower. The deaths during the total neonatal period in the U. S. represent more than half of the deaths occurring during the first five years of life and only less than one-fourth in Latin America.

In Latin America the mortality from 1 to 11 months of age is still very high. In Chile it drops very fast after one year, but in Guatemala this is not the case, as the second and third years of life still carry a heavy toll; Costa Rica represents an intermediate situation.

This table also includes fetal deaths, expressed, to maintain the same scale, as percentage of the deaths under five; the differences are marked. The fetal deaths in the U. S. are equivalent to more than half of the deaths under five, for Latin America the proportion is only one-fifth or less.

These marked differences in the distribution of death by age can be also appreciated in Figure 1. Here we have selected for comparison the two extreme conditions, that of the United States and Guatemala. Here we may note why emphasis has justly been given to perinatal mortality in the U. S. and why, even though this is a serious question in Guatemala, it is proportionately small when compared with the magnitude of the more pressing problem of saving those children who have managed to survive their first four weeks of life.

Comparing these two countries once more, but now only with regard to infant mortality, Table 3 presents the

Table 2—Age-Specific Mortality as Per cent of Total Mortality Under Five Years in Four Selected Countries

Age	Costa Rica (1960)	Chile (1957)	Guatemala (1960)	United States (1957)
7 days	15.1	14.6	11.1	39.5
7-28 days	10.2	10.0	9.4	23.1
1-11 months	49.8	54.6	30.6	23.9
1 year	14.2	12.8	23.4	—
2 years	5.4	4.6	12.9	13.5
3 years	3.1	2.1	7.8	—
4 years	2.2	1.3	4.8	—

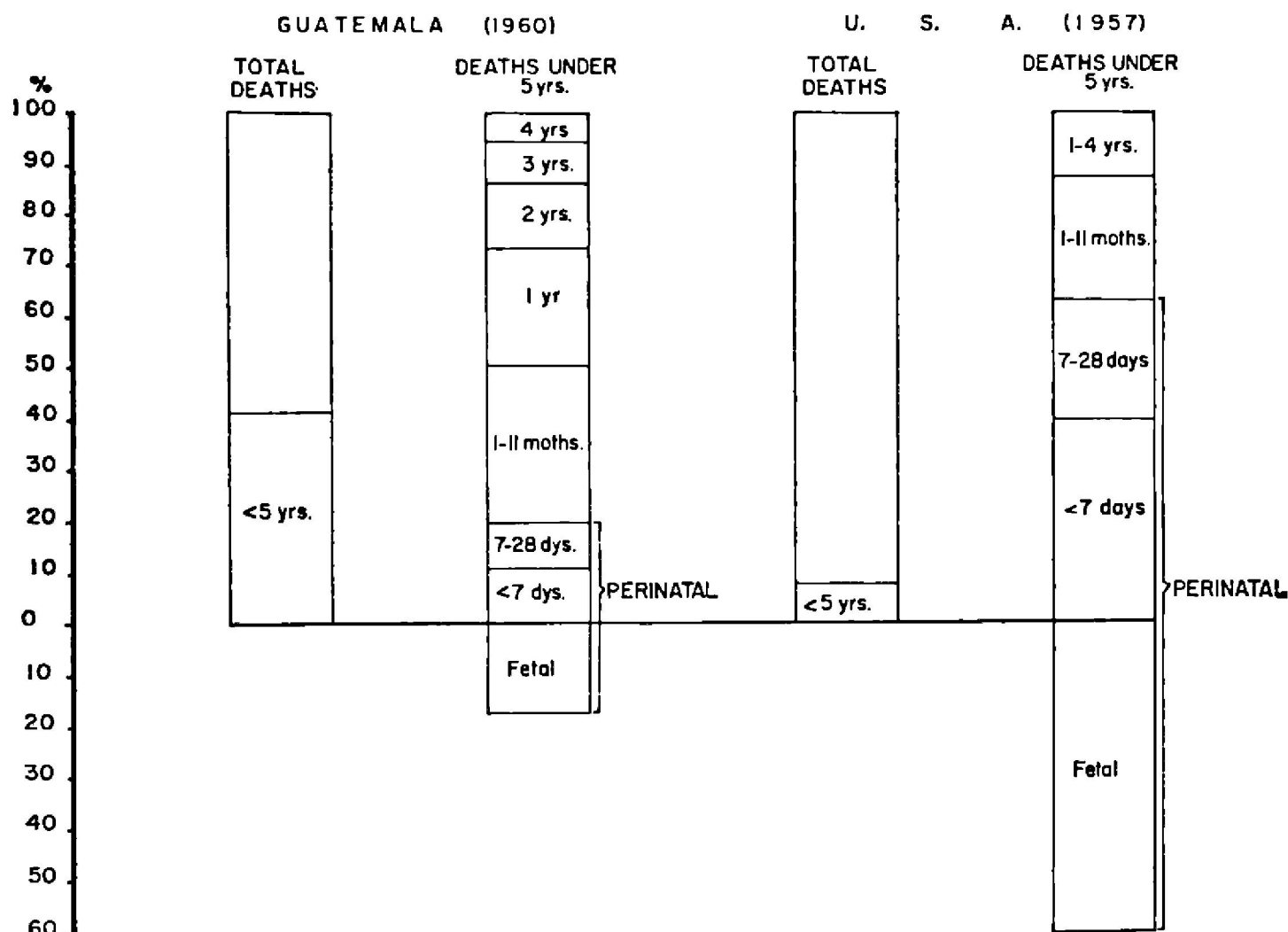


Figure 1—Age Distribution of Deaths in the United States and Guatemala

deaths by age groups expressed in percentage of the total number of deaths under one year. Here we can see that half of the deaths occurring under one year in the U. S. are concentrated during the first three days of life and almost three-fourths in the neonatal period. In Guatemala, more than half of the deaths under one year occur after one month of age, and although it is not shown here, a significant proportion of these deaths are observed during the second half of the year when the mortality rate in the U. S. is insignificant.

Returning to the problem of children under five, Table 4 shows the infant mortality rate and the age-specific mortality rates for children from one to four years old in the three selected Latin American countries. Here I would like to call attention again to the very high mortality rates of preschool children, particularly for Guatemala. The usual way of presenting vital statistics

in which the rates for children from one to four are combined does not permit a clear exposition of the marked differences among these countries; notice that Chile, although having a greater infant mortality rate, shows a significant drop in the risk of death after the first year and even more rapidly further on. In Guatemala, the mortality rate after the first year is still extremely high and though it drops afterwards, the rates for the second, third, and fourth years are still very high.

An analysis of the causes of mortality is unfortunately very difficult due to the inaccuracy of official records. In most of the Latin American countries a large proportion of deaths are registered without medical certification. The cause of death which appears in the official vital statistics records is, many times, only the impression of the parents or the personal judgment of the

Table 3—Per cent Age Distribution of Infant Mortality in Guatemala and the United States

Country	1 Day	3 Days	1 Week	28 Days	1-11 Months
Guatemala (1960)	7.7	12.8	21.7	40.1	59.9
United States (1957)	31.6	55.2	63.1	72.6	27.4

registrar. There is, however, enough information from specific hospital studies to indicate that the major causes of perinatal mortality in Latin American countries parallel those in the United States. Prenatal care is still extremely deficient for Latin American mothers and a large majority of births occur without medical attention. It is, therefore, not surprising that all the causes of death of the fetus or of the newborn associated with pregnancy, delivery, or of congenital origin are high. Furthermore, environmental conditions contribute to an increase in neonatal deaths. This is the case, for example, of tetanus neonatorum which is still highly prevalent in many regions of Latin America. Its magnitude is difficult to establish at present because the disease is usually not recognized.

After one month of age the respiratory infections play the most important role as causes of death for small infants. During the second half of the first year and particularly during the second year of life, diarrheal disease becomes the major health hazard and the most important cause of death in most areas of Latin America. Infectious diseases, mainly measles and whooping cough, are also important factors con-

tributing to the morbidity and mortality of infants and toddlers.

The role of the nutritional deficiencies in infant and childhood morbidity and mortality merit a special comment; without entering into a discussion of the possible role of malnutrition in the mother in perinatal mortality—a critical problem for which as yet we do not have enough information. I wish to refer again to Table 4. The differences in the distribution by age of deaths under five between Chile and Guatemala can be explained in large part by the differences in the nutritional problems of these two countries, giving an idea as to the magnitude of the role nutritional deficiencies play in the mortality of children.

In Chile, a majority of the children are weaned during the first few months of life. Nutritional factors are, therefore, operating at a maximum during the 1-11-months period, and although nutritional deficiencies continue to exist, they are less dangerous after the first year of life. In Guatemala, on the other hand, most children are weaned around or after one year and the majority of cases of severe protein-calorie malnutrition are observed during the second and third years of life.

Table 4—Infant Mortality Rates and Age-Specific Death Rates in Three Selected Latin American Countries

Country	I.M.R.	1 Year	2 Years	3 Years	4 Years
Costa Rica (1960)	63.1	14.6	6.2	3.9	3.0
Chile (1957)	114.4	29.9	9.3	4.2	2.5
Guatemala (1960)	91.8	64.1	34.0	20.1	13.2

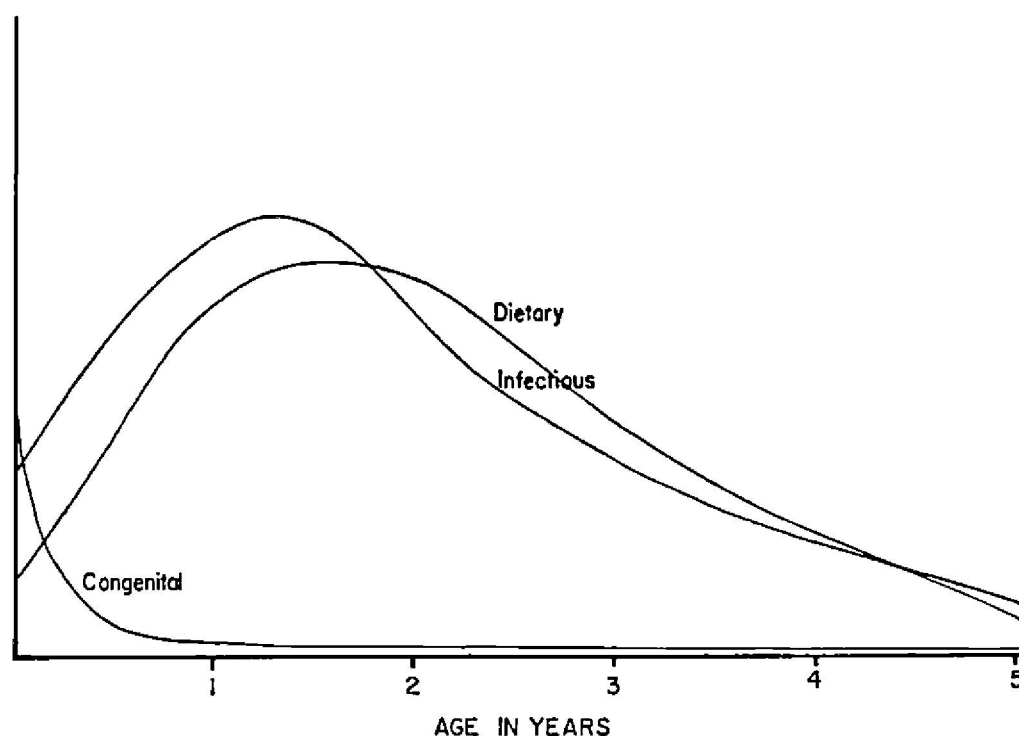


Figure 2—Schematic Representation of the Relative Importance of Three Suggested Major Acting Forces in Infant Mortality

They do not become infrequent until the age of five or six years. Costa Rica once more has an intermediate situation in this regard. Therefore, the nutritional factors seem to be the major determinant of the differences observed among these countries.

Summary

In summarizing, I would like to cite Mouriquand,* the French pediatrician, who in analyzing the evolution of infant mortality in Europe suggested three major acting forces which he called "le danger alimentaire," "le danger infectieux," and "le danger congenital." These three forces of mortality: nutritional deficiencies, infectious processes, and congenital factors operate with variable intensity during the different periods in the life of the child as indicated schematically in Figure 2.

These forces of mortality have been controlled to a different degree throughout the world. In the developed countries, the nutritional forces have been reduced practically to zero; infections

have been minimized, thus the major problem today is the control of the force Mouriquand called "le danger congenital." This accounts for the attention being given to perinatal mortality by the developed nations.

In preindustrial countries, however, "le danger alimentaire" and "le danger infectieux" are still operating full force. Small children during the weaning and postweaning period are those who suffer most from the effect of these factors. The weaning period represents a crisis during which the nutritional deficiencies and the infectious processes act synergistically, each one enhancing the harmful effect of the other.

The large majority of children in these areas are breast fed during the first months and they are, therefore, well nourished during this period. When they are weaned early, as in Chile, they usually are given some cow's milk, instead of the breast. Oftentimes, however, the amount of milk offered is insufficient and it is also withdrawn completely and replaced by cereal preparations (usually only the water in which the cereals have been cooked) when the child gets sick, particularly if he has diarrhea, which happens frequently.

* Mouriquand. Cited by Arbelo, C. A. *Evolution de la Mortalité infantile en Espagne (1901-1956)*. Courrier 9:481-483, 1959.

When neither cow's milk nor other adequate substitutes for breast milk are available, as is the case for the majority of the population of Guatemala, the child is usually weaned late, often after one year. Then the child is given, of the foods available to the family, only those which are considered safe for him. His diet then consists of "tortilla," the water in which black beans have been cooked, a few vegetables, occasional fruits, bread, and coffee. It is not until the child is about three or four years of age that he receives, in significant amounts, the usual foods eaten by adults, including beans and some meat. Not until the age of five or six is the child completely incorporated into the usual family diet.

It is, therefore, easy to understand why the weaning and postweaning period is so critical from the nutritional point of view and why most cases of severe malnutrition occur during this period. Furthermore, it is also during this period that the child enters for the first time into more direct contact with a very unsanitary environment. While he is being breast fed, he is relatively protected, but when he starts to be bottle fed, and he himself is able to put things into his mouth and to move around in a very dirty environment, he starts to suffer from frequent attacks of diarrhea. Having lost the passive immunity transmitted by the mother, and with the increased exposure to other children and adults, the child also starts to suffer from frequent respiratory infections and from the common infectious diseases of childhood.

The interaction of these two factors, on the one hand the infectious process

contributing with the dietary factors toward nutritional deficiencies, and on the other these deficiencies aggravating the infectious processes by diminishing resistance, makes life precarious for these small children. It would, therefore, be unwise to devote a major effort in Latin America, as in other areas having similar conditions, toward the reduction of perinatal death. With the limited resources at hand, it is of greater urgency to save the thousands of children who are dying, during the weaning and postweaning period, because of malnutrition and infectious diseases.

The latest official vital statistics reports of the countries studied were not available to us; for the calculation of some figures, data corresponding to a recent year were used when the one for the year indicated was not available. Direct information provided by the Vital Statistics Department of some countries as well as data from the following sources were used:

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