

Infant Mortality in Cuba, 1969–1988¹

RAÚL RIVERÓN CORTEGUERA,² NORMA E. RÍOS MASSABOT,³ &
ROBERTO CARPIO SABATELA⁴



The available statistical data indicate that Cuban infant mortality fell substantially, by roughly 74.5%, between 1969 and 1988. Especially great gains were made against late neonatal (7–28 days) and postneonatal (28 days–11 months) mortality, though reduction in early neonatal (0–6 days) mortality was also substantial, amounting to about 64.0%. In general the gains were spread fairly evenly among the country's provinces, with infant mortality tending to remain higher in the eastern provinces than in the central and western regions. A key factor contributing to these improvements was a policy decision made in the early 1960s that assigned high priority to the health sector and led to major improvements in health service organization, quality, and coverage. Other associated changes that seem to have made significant contributions to this trend include improvements in living standards, sanitary and epidemiologic conditions, outpatient medical care, hospital care, and health technology.

Infant mortality is one of the most sensitive and commonly used measures indicating the health status of a population (1,2). In this vein, various studies have documented a close connection between infant mortality and other indicators of the quality of life in a given area. Such other measures include the population's level of education, conditions of housing sanitation and hygiene, accessibility and quality of medical care, the proportion of low birthweight newborns, income levels, differences between ethnic minorities, etc. (3–6).

The main advantages of using infant mortality are as follows: it is easy to estimate, easily understood, and generally available every year in uniform and comparable terms for all the provinces or states of a given country. Furthermore, with certain limitations, this is true in virtually all countries of the world (7). Hence, related as it is to a variety of social, economic, and cultural factors, infant mortality constitutes an indicator of the standard of living of a given population and the socioeconomic development of a nation. (An "adequate standard of living" as the term is employed here includes free access to health and education services, adequate housing, guaranteed employment, equitable food distribution, and sufficient income to enjoy recreational facilities—8.)

Comparisons of infant mortality in different countries have a long history. These comparisons, which have sometimes been used for political purposes, have generally shown a close connection between high infant mortality and other indicators of social poverty (9). However,

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²Auxiliary Professor and Chief of the Pediatrics Department, "Gral. Calixto García" Faculty of Medicine, Superior Institute of Medical Sciences of Havana.

³Professor of Biostatistics, Superior Institute of Medical Sciences of Havana; and National Director of Statistics, Ministry of Public Health.

⁴Titular Professor, Pediatrics Department, "Gral. Calixto García" Faculty of Medicine, Superior Institute of Medical Sciences of Havana.

such comparisons must be made with care, because even though the infant mortalities of different countries are usually comparable, the reliability of the data can be affected by underreporting of infant deaths and by the way in which the term "live birth" is defined.

Most unreported infant deaths occur among subjects less than seven days old, mainly in countries where birth care is generally poor or where most deliveries occur outside of hospitals. In such countries, primary registration tends to be incomplete and infant mortality tends to appear lower than it is (10).

Regarding the definition of "live birth," the definition used in Cuba is the one recommended by the World Health Organization—that is, "live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached" (11).

As pointed out elsewhere (12), the statistical data provided by member country reports to international agencies—data that delineate the health situations in those countries—are usually plagued by underrecording; and, indeed, it has been found in various instances that a significant share of all the deaths occurring annually in certain countries were never recorded.

This was the situation prevailing in Cuba until 1965, when a law was enacted to adopt the definition of "live birth" proposed by WHO as the official definition (13). The Eighth Revision of the International Classification of Diseases (1965) was adopted for coding causes of death in 1968 (11), and in 1969 the Ministry of Public Health issued Ministerial

Resolution No. 513, which enlarged the number of Registration Centers and Collection Centers of that ministry (hospitals or polyclinics) involved prior to issuance of the burial permit (14,15). Implementation of an Infant Mortality Reduction Program, begun in 1970 (16) and continued under the National Maternal-Infant Health Program (17), has also helped to improve the quality of death registration throughout the country.

In general, these records indicate that infant mortality in Cuba is relatively low. Indeed, a report by the United Nations Children's Fund (UNICEF) published in 1989 with infant mortality figures for 1987 ranked Cuba twenty-sixth among those countries with the lowest infant mortality in the world (18).

The purposes of this article are to report on the Cuban infant mortality record over the last 18 years and to describe the factors that made pertinent reductions possible. More specifically, it presents annual mortality data for different infant age groups from 1969 through 1986. It cites the principal causes of deaths in accordance with the Eighth Revision of the *International Classification of Diseases* (ICD) through 1978, and in accordance with the Ninth Revision of the ICD from 1979 through 1986. It also indicates the different components of infant mortality, showing the percentages of all infant deaths in Cuba attributed to different causes. In addition, it provides provincial data and points out the circumstances believed to have contributed to reduced infant mortality in recent years.

MATERIALS AND METHODS

A study was made of data on infant mortality, its leading causes, and its various components during the period 1969–1988, as compiled in the official publications of the National Statistics Directorate (Dirección Nacional de Estadísticas) of

the Ministry of Public Health. The figures presented in those publications were obtained through the system for permanent compilation and registration of medical death certificates. Until 1972 one standard certificate was used to record all deaths. Beginning in 1973, however, this form was used only to record deaths occurring on or after the seventh day of life, while for those dying before the seventh day a perinatal death certificate was executed that also served for recording fetal deaths. Both certificates comply with the recommendations of the *International Classification of Diseases (ICD) (15)*.

From 1969 through 1978, deaths were recorded on the basis of their underlying causes (as set forth in the Eighth Revision of the ICD). In 1979, following the appearance of the Ninth Revision of the ICD (19), this procedure was changed, deaths thereafter being recorded on the basis of their principal causes.

Regarding the general approach followed, the causes of death noted on the death certificate by the attending physician (so that burial procedures can be carried out in a timely manner) are subsequently modified by a provincial commission. This is done after the commission's receipt of a report on the clinical pathology discussion carried out at the hospital when the autopsy results become available. Following this modification process, the certificate is sent to the National Statistics Directorate for consideration (20).

This death registration system was evaluated twice during the study period to determine the completeness of its coverage. (Mortality data are processed on standard IBM equipment.) The first evaluation, conducted in 1974 (21), found an underrecording of deaths from all causes in all age groups amounting to 3.9%. The second, conducted in 1980 (22), found an underrecording amounting to 0.5% (15).

The birth data used to determine the

denominator of infant mortality were obtained from the birth registration system, whose coverage (in compliance with Law 1179—see reference 13) is very close to complete. Among the other advantages of this system:

- It requires use of the international definition of "live birth."
- It ensures that every live birth is registered in the hospital prior to discharge.
- It provides good coverage (between 90% and 99%) of the births occurring during the 1969–1986 study period.

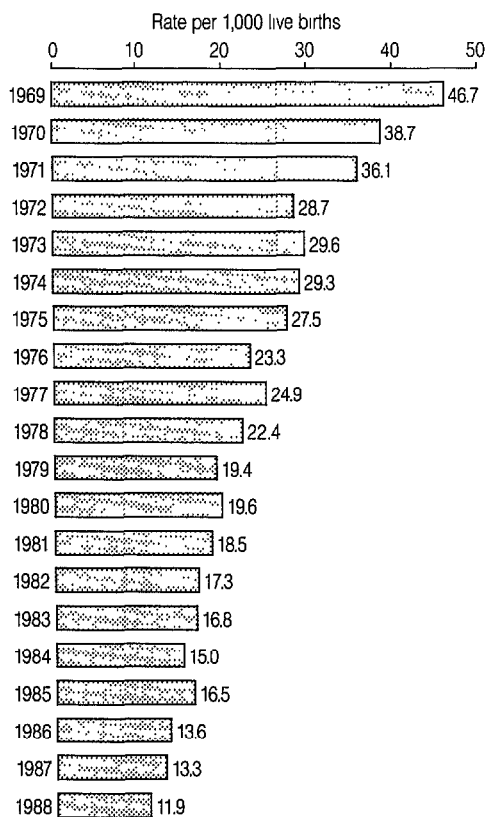
RESULTS

Figure 1 shows infant mortality in Cuba from 1969 through 1988, while Table 1 shows the various components of infant mortality in this period. Regarding these components, the data in Table 1 indicate that early neonatal mortality (deaths per thousand live births of infants under seven days old) declined 63.9% over the study period—from 16.9 deaths per thousand live births in 1969 to 6.1 in 1988. Even so, early neonatal mortality came to account for a larger share of all infant deaths (36.1% of all infant deaths in 1969 as compared to 51.2% in 1988) during this period.

Late neonatal mortality (deaths on the seventh through the twenty-seventh day of life) declined 77.0% during the study period—falling from 8.7 deaths per thousand live births in 1969 to 2.0 in 1988. Unlike early neonatal mortality, this late neonatal mortality came to play a less significant role in infant mortality as time passed—accounting for 18.7% of all infant deaths in 1969 as compared to 16.8% in 1988.

Postneonatal mortality (deaths from the twenty-eighth day through the remainder of the first year of life) declined

Figure 1. Infant mortality in Cuba, 1969–1988.



Sources: World Health Organization, *World Health Statistics Annual* (30), and Ministerio de Salud Pública de Cuba, annual reports (31).

82.0%—from 21.1 deaths per thousand live births in 1969 to 3.8 in 1988; and, like late neonatal mortality, its role in infant mortality declined during the study period. (Postneonatal mortality accounted for 45.2% of all infant deaths in 1969 as compared to 32.0% in 1988.)

Table 2 shows mortality from the 19 leading causes in infant death in the period 1969–1978. As may be seen, noteworthy reductions occurred in mortality from acute respiratory infections, diarrheal diseases, certain bacterial diseases, sepsis, meningitis, and various perinatal disorders. At the same time, slight increases were observed in mortality from

congenital anomalies, conditions of the placenta and cord, anoxic and hypoxic conditions not classifiable elsewhere, and violence.

Table 3, providing similar data for 1979–1987, shows reductions in infant mortality from almost all the listed causes. Especially notable declines were recorded in mortality from acute diarrheal diseases and septicemia.

Provincial data on infant mortality in the years 1970–1987 are shown in Table 4. These data point to considerable declines, ranging from 59.0% in Las Tunas to 79.8% in Isla de la Juventud. In general, while the reductions were fairly evenly distributed among all the provinces, mortality appeared somewhat lower in the western and central provinces and somewhat higher in the eastern provinces.

DISCUSSION AND CONCLUSIONS

This decline in infant mortality appears to have come about through improvements in maternal and child care that arose primarily from a policy decision dating back to the beginning of the Revolution—a decision according priority to the health sector from the early 1960s onward. Besides being directed at improving public living conditions, this decision prompted immediate establishment of a national health system. National system coverage was then expanded through a proliferation of health personnel, hospitals, and polyclinics throughout the country. These personnel and facilities, which extended their services into the most remote areas, based their activities on the principle that medical care should be provided by medical personnel (university graduates) assisted by nursing personnel and technicians in a broad range of health fields.

Various authors, including Rohde (23), have pointed out that reductions of in-

Table 1. Recorded early neonatal, late neonatal, postneonatal, and overall infant mortality in Cuba during the 1969–1988 study period, showing the number of deaths and deaths per thousand live births in each category as well as the percentages of all infant deaths in each category.

Year	Early neonatal mortality (<7 days)			Late neonatal mortality (7–27 days)			Postneonatal mortality (28 days–11 months)			All infant mortality (<1 year)		
	No. of deaths	Deaths per 1,000 live births	% of all infant deaths	No. of deaths	Deaths per 1,000 live births	% of all infant deaths	No. of deaths	Deaths per 1,000 live births	% of all infant deaths	No. of deaths	Deaths per 1,000 live births	% of all infant deaths
1969	4,147	16.9	36.1	2,149	8.7	18.7	5,203	21.1	45.2	11,499	46.7	100.0
1970	4,192	17.7	45.7	1,434	6.1	15.6	3,547	15.0	38.7	9,173	38.7	100.0
1971	4,132	16.1	44.8	1,484	5.8	16.0	3,616	14.1	39.2	9,232	36.1	100.0
1972	3,886	15.6	54.5	866	3.5	12.1	2,377	9.6	33.4	7,129	28.7	100.0
1973	3,593	15.9	53.7	780	3.5	11.7	2,314	10.2	34.6	6,687	29.6	100.0
1974	3,224	15.9	54.2	600	3.0	10.1	2,122	10.4	35.7	5,946	29.3	100.0
1975	2,863	14.8	54.0	495	2.6	9.4	1,941	10.1	36.6	5,299	27.5	100.0
1976	2,327	12.4	53.2	504	2.7	11.6	1,539	8.2	35.2	4,370	23.3	100.0
1977	2,167	12.8	51.5	427	2.5	10.1	1,617	9.6	38.4	4,211	24.9	100.0
1978	1,828	12.3	55.0	339	2.3	10.2	1,159	7.8	34.8	3,326	22.4	100.0
1979	1,614	11.2	58.0	291	2.0	10.5	875	6.1	31.5	2,780	19.4	100.0
1980	1,529	11.2	56.8	272	2.0	10.1	889	6.5	33.1	2,690	19.6	100.0
1981	1,446	10.6	57.4	252	1.9	10.0	822	6.0	32.6	2,520	18.5	100.0
1982	1,548	9.7	56.1	288	1.8	10.4	923	5.8	33.5	2,759	17.3	100.0
1983	1,480	9.0	53.3	284	1.7	10.2	1,014	6.1	36.5	2,778	16.8	100.0
1984	1,409	8.5	56.5	243	1.5	9.7	844	5.1	33.8	2,496	15.0	100.0
1985	1,479	8.1	49.3	380	2.1	12.7	1,138	6.3	38.0	2,997	16.5	100.0
1986	1,166	7.0	51.5	285	1.7	12.5	811	4.9	36.0	2,262	13.6	100.0
1987	1,297	7.2	54.3	346	1.9	14.5	744	4.2	31.2	2,387	13.3	100.0
1988	1,144	6.1	51.2	375	2.0	16.8	716	3.8	32.0	2,235	11.9	100.0

Source: Cuba, Ministry of Public Health (37).

Table 2. Infant mortality in Cuba, 1969–1978, classified by cause according to the *International Classification of Diseases, Eighth Revision (11)*.

No.	List "A"	Detailed list	Causes of death	Deaths per 1,000 live births in:									
				1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
1	134	776	Anoxic and hypoxic conditions not classifiable elsewhere	3.4	6.6	7.4	6.4	6.9	6.6	6.2	4.6	4.0	4.2
2	126–130	740–748, 750, 759	Congenital anomalies	3.4	3.6	3.7	3.6	3.8	4.1	4.3	4.0	3.9	3.8
3	089–092	460–466, 480–486	Influenza and pneumonia	9.6	5.3	4.9	3.1	3.3	3.6	3.5	3.1	3.8	3.0
4	135	760–763, 769, 773, 771–779	Other causes of perinatal mortality	7.7	5.3	4.2	3.9	3.4	3.7	3.4	3.1	3.3	2.6
5	005	007–009	Enteritis and other diarrheal diseases	6.7	5.6	5.1	2.8	3.2	3.0	2.6	2.0	2.6	1.6
6	131	764–768, 772	Difficult labor and birth lesions	2.5	2.0	2.1	1.8	1.7	1.6	1.7	1.7	1.7	1.8
7	021	005, 021, 024, 027, 031, 038, 039	Other bacterial diseases; sepsis	6.7	5.0	4.5	2.7	2.9	2.2	1.8	1.5	1.5	1.2
8	E138–E148	E800–E999	Violent deaths	0.5	0.7	0.7	0.6	0.7	0.8	0.8	0.6	0.7	0.7
9	072	320, 322	Meningitis	1.2	0.9	0.8	0.5	0.6	0.7	0.7	0.6	0.6	0.5
10	084	420–429	Other heart diseases	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2
11	101	550–553, 560	Intestinal obstruction and hernias	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
12	133	774, 775	Hemolytic disease of the newborn	0.5	0.5	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.2
13	079	321, 333, 341, 344, 346–358, 370–373, 376–380, 384–389	Other diseases of the central nervous system and sense organs	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1
14	132	770–771	Conditions of the placenta and cord	0.3	0.5	0.5	0.6	0.7	0.8	0.6	0.5	0.9	0.9
15	065	260–269	Avitaminosis and other nutritional deficiencies	0.5	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
16	137	780–793, 795, 796	Poorly defined symptoms and morbid states	0.3	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.2
17	104	526–530, 534, 536, 537, 561–570, 572, 573, 576, 577	Other diseases of the digestive system	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18	066	243–246, 251–258, 270–279	Other diseases of the endocrine system and metabolism	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
19	093	490–493	Bronchitis, asthma, and emphysema	0.3	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1
			All other causes	2.1	1.5	1.3	1.9	1.1	0.8	0.4	0.3	0.6	0.4
			Total	46.7	38.7	36.5	28.7	29.6	29.3	27.5	23.3	25.0	22.3

Source: Reports of mortality by causes sent to PAHO (1969–1978).

Table 3. Infant mortality in Cuba, 1979–1987, classified by principal cause according to the *International Classification of Diseases, Ninth Revision (35)*.

No.	PAHO list	Detailed ICD list	Principal causes of death	Deaths per 1,000 live births in:								
				1979	1980	1981	1982	1983	1984	1985	1986	1987
1	45.5	768–770	Hypoxia, asphyxia, and other respiratory conditions of the fetus and newborn	7.0	6.7	6.0	5.5	5.0	4.7	5.0	4.2	4.3
2	44.3	745–747	Congenital anomalies of the heart and circulatory system	1.6	1.8	1.5	1.8	1.7	1.6	1.9	1.5	1.5
3	31.0, 32.1–32.3	480–487	Diseases of the upper respiratory pathways including bronchitis, influenza, and pneumonia	1.6	1.7	1.6	1.4	1.7	1.3	1.8	1.2	1.1
4	41.1, 45.3, 45.9	760, 764–766, 771, 772, 775–779	Other causes of perinatal morbidity and mortality	1.9	1.9	2.0	1.5	1.5	1.5	1.3	1.2	1.4
5	44.9	743–744, 748–759	Other congenital anomalies	1.4	1.5	1.4	1.2	1.3	1.3	1.2	1.3	1.2
6	01.7	007–009	Acute diarrheal diseases	1.0	1.1	1.0	1.0	1.2	0.7	1.1	0.6	0.7
7	45.2, 45.4	761, 763, 767	Maternal complications and birth traumas	0.6	0.7	0.9	0.7	0.7	0.5	0.6	0.5	0.4
8	E47–E56	E800–E999	Accidents and violent deaths	0.7	0.8	0.6	0.6	0.7	0.5	0.6	0.5	0.5
9	22.1	320–322	Meningitis	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.4
10	44.1–44.2	740–742	Spina bifida, hydrocephaly, and other anomalies of the central nervous system	0.7	0.7	0.7	0.5	0.5	0.5	0.4	0.4	0.3
11	03.8	038	Septicemia	0.7	0.7	0.6	0.7	0.5	0.5	0.4	0.2	0.2
12	28	415–417, 420–429	Diseases of the pulmonary circulation and other heart diseases	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.2
13	22.9, 24	323–326, 330–337, 341–344, 346–359, 380–389	Diseases of the central system and sense organs (except eyes)	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.3	0.1
14	03.6	036	Meningococcal infection	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.2
15	18	240–259, 270–279	Diseases of the endocrine glands, metabolism, and immune system	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
16	34.4	550–553, 560	Hernias of the abdominal cavity and intestinal obstruction without mention of hernia	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
17	34	530–543, 555–558	Diseases of the digestive apparatus (except hernias of the abdominal cavity and intestinal obstruction without mention of hernia)	0.0	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18	45.6	773–774	Hemolytic diseases and other forms of jaundice	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
			All other causes	0.9	0.4	0.8	0.9	0.4	0.4	0.4	0.4	0.4
			Total	19.4	19.6	18.5	17.3	16.8	15.0	16.5	13.6	13.3

Source: Reports of mortality by causes sent to PAHO (1979–1987).

Table 4. Infant mortality in Cuba by province, 1970–1988.

Province	Infant mortality (deaths per 1,000 live births) in:																		% decline 1970–1988	
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987		1988
Pinar del Río	33.5	34.2	27.4	28.8	23.6	27.6	24.8	29.2	26.1	20.4	20.5	18.0	18.0	16.7	13.7	14.9	13.5	12.3	10.0	70.1
Habana	36.9	32.7	28.7	26.1	33.3	29.9	22.2	18.9	17.8	19.0	15.6	14.6	15.3	14.2	14.2	15.2	14.0	12.3	13.1	64.5
Ciudad de la Habana	39.5	26.4	23.9	21.7	24.7	24.6	19.9	21.4	18.0	16.2	17.4	15.9	14.3	14.2	12.9	14.0	12.3	11.2	10.6	73.2
Matanzas	38.7	35.8	23.0	23.7	24.6	22.5	20.9	22.5	18.7	14.9	14.0	16.0	12.2	13.0	12.9	14.5	12.2	13.6	12.5	67.7
Villa Clara	34.9	30.4	21.3	21.9	18.6	17.7	17.0	17.0	17.0	15.6	18.2	17.9	15.4	16.1	14.1	15.3	12.1	11.7	11.0	68.5
Cienfuegos	38.1	34.8	28.8	21.3	23.0	20.3	16.9	18.2	20.2	17.2	18.1	16.4	16.6	19.6	13.8	17.0	10.7	10.1	8.9	76.6
Sancti Spíritú	35.8	39.2	27.0	22.9	24.3	21.2	17.9	18.0	21.0	20.5	18.8	18.3	16.0	14.7	16.4	18.6	12.7	12.5	11.3	68.4
Ciego de Avila	40.3	44.7	26.6	35.2	40.7	32.5	25.9	23.2	19.0	20.2	21.0	19.1	16.3	15.3	16.3	15.4	15.7	13.6	12.5	69.0
Camagüey	43.1	48.9	35.2	36.4	40.7	34.7	26.1	27.1	22.7	18.3	22.3	22.1	21.2	14.9	12.9	15.7	14.4	14.0	13.0	69.8
Las Tunas	36.8	50.8	36.6	29.0	31.0	34.3	25.2	28.3	24.3	26.1	21.5	19.1	17.9	20.5	17.8	21.9	16.7	18.3	15.1	59.0
Holguín	38.3	46.4	30.1	33.5	34.1	28.6	25.2	30.7	29.8	18.5	19.7	19.3	18.7	16.7	15.6	16.9	13.9	13.7	10.6	72.3
Granma	45.7	42.1	34.4	37.8	33.1	26.7	24.3	28.9	26.7	23.9	22.4	20.0	19.4	21.0	18.3	19.0	13.9	13.1	13.5	70.5
Sancti Spíritú	36.3	33.6	26.1	31.3	28.2	27.9	23.2	28.8	23.4	19.5	23.0	19.1	18.4	19.2	15.4	16.4	14.1	14.6	11.8	67.5
Guantánamo	41.8	45.6	36.0	34.6	29.6	25.9	23.3	24.2	23.8	24.1	24.1	23.3	21.6	20.2	18.6	18.9	15.4	16.9	14.7	64.8
Isla de la Juventud	51.1	53.6	28.9	46.5	28.0	21.1	21.8	21.8	29.9	14.7	16.2	15.5	10.6	12.0	13.5	23.7	13.4	13.6	10.3	79.8
Total	38.7	36.1	28.7	29.6	29.3	27.5	23.3	24.9	22.4	19.4	19.6	18.5	17.3	16.8	15.0	16.5	13.6	13.3	11.9	69.3

Source: Annual reports (1973–1988) of the Cuban Ministry of Public Health (37) and State Statistics Committee.

infant mortality in industrialized countries have come about largely through improvements in the general standard of living rather than through advances in medical care. Rohde suggests that the high infant mortalities of developing countries could be reduced without waiting for economic development—because most infant deaths have a small number of causes and appropriate technologies exist for reducing the leading ones of these. However, he also underscores the need for appropriate political will on the part of the government if infant mortality is to be reduced to any substantial extent.

Since the beginning of the 1960s the Cuban Ministry of Public Health has promoted immunization programs (most especially ones directed against poliomyelitis), has launched a program for control of acute diarrheal disease, has expanded and developed services for the care of newborn and premature infants, has established an antituberculosis program, and has implemented a general infant mortality reduction program. In addition, at the present time it is developing a national maternal and child health program (24).

A more detailed examination of the situation suggests that improvements in several broad areas—including changes in living standards, sanitary and epidemiologic conditions, outpatient medical care, hospital care, and health technology—may also be regarded as having contributed to improved maternal and child care and the resulting fall in infant mortality during the study period.

Living standards improved in several ways. For one thing, the nutritional status of the general population and especially the infant population improved notably—particularly through institution of systems designed to distribute food in an equitable and affordable manner. Also, unemployment disappeared—removing a leading cause of hunger and

poverty with an especially severe impact on mothers and their children. In addition, improvement of the population's educational level had a direct impact on maternal and child health; and improvement of housing (including elimination of slums, construction of hygienic urban housing, and creation of new communities in the countryside) helped foster environmentally sound conditions for infant health.

Regarding sanitary and epidemiologic conditions, an epidemiologic surveillance system was instituted to monitor nutritional status, acute diarrheal and respiratory infections, and other matters. The sanitary conditions of the nation were bettered by upgrading water quality and wastewater treatment. And the immune status of both urban and rural infants was improved (25).

Regarding outpatient medical care, this was augmented and developed—yielding both qualitative and quantitative improvements and projecting health services into the community while encouraging community participation in the programs undertaken (26). (In this same vein, regular work with mass and community organizations was conducted.) Also, the health system created the "family physician," who was charged with safeguarding the health of the population served; and efforts were made to ensure early provision of services to pregnant women.

With respect to hospital care, wards were created for patients with acute diarrheal diseases and acute respiratory infections, and orders were given to admit every child at any risk presenting at an emergency ward with an acute diarrheal or respiratory infection. Policy also encouraged the presence of mothers accompanying their children in all pediatric wards, including intensive care wards, everywhere in the country (27). The percentage of babies delivered at health in-

stitutions was increased to 98% of all deliveries, and provision was made for reviving newborns in the delivery rooms of all obstetric units in the country (28). More generally, neonatology services were developed and modernized, neonatology was established as a medical specialty, and graduate nursing courses in neonatology were instituted (29). In addition, 32 pediatric intensive-care wards were created throughout the country, and these were provided with scientifically and technologically advanced equipment of the highest quality.

Regarding adoption of new technologies, provision was made for determination of alpha-fetoprotein in order to detect congenital anomalies produced by incomplete closure of the neural tube. An infant cardiology center was established in the city of Havana for surgical treatment of congenital cardiopathies. Screening of umbilical cord blood was conducted for the early detection of phenylketonuria, hypothyroidism, and other diseases. And four hemodialysis units were established for treatment of renal insufficiency.

In general, all of these developments—most proceeding from the basic step of assigning high priority to the health sector—appear to have been largely responsible for the beneficial reductions in infant mortality observed in the study period.

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Yellow Fever Virus in Haemagogus Mosquitoes

In January of this year, the Ministry of Health of Trinidad and Tobago reported confirmation of yellow fever virus activity confined to the forested area in the southeastern part of the island of Trinidad. The virus has been isolated from *Haemagogus* mosquitoes only, and the island of Tobago is free of virus activity. Full surveillance and control measures are under way.

There is no evidence of yellow fever virus activity in vertebrates, including humans. However, vaccination against yellow fever would be advisable for persons planning to enter the area of Trinidad where the virus was isolated. There have been no human cases of yellow fever in the country since 1979.

Source: World Health Organization. *Wkly Epidemiol Rec* 64(3):20, 1989.