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Acute respiratory infections in the Americas

Since the mid-1960s acute respiratory infections (ARI) (ICD-9, 460-466, 480-487) have been recognized as one of the three most important problems affecting child health, together with diarrheal diseases and malnutrition. In terms of both mortality and morbidity, ARI have been among the five leading causes of death, consultations, and hospitalization in children under 5 in all the developing countries.

With the strides made in the control of diarrheal disease in most of these countries since the mid-1980s, ARI became the leading cause of death in children under 1 year of age and in children 1 to 4 years. Even in the developing countries recording the lowest total mortality rates in these age groups, ARI were the third leading cause of death in children under 1 year following diseases originating during the perinatal period and congenital anomalies. They were also the second leading cause of death in children aged 1 to 4 years; accidents were the first cause.

Beginning in this period, ARI control became a real challenge for most developing countries, as health care activities were targeted to reducing the leading causes of mortality and morbidity in children under 5 years of age.

Current situation

There are four major aspects in the analysis of the ARI problem and, consecuently, the design of control measures: mortality, morbidity, quality of care, and the prevalence of risk factors.

Mortality

Pneumonia is the leading cause of mortality for the diseases grouped under ARI and is responsible for 85% of the total deaths from these causes. For this reason, most of the information available for analysis of ARI as a cause of mortality concerns pneumonia. However, other ARI diagnoses (influenza, bronchitis, bronchiolitis) are occasionally included in the analysis, due to the general deficiency in the information on mortality from specific causes, especially when the information concerns young children in developing countries.

These certification problems add on to the existing problems related to the quality of the total mortality figures for the developing countries of the Americas--problems that are exacerbated in the registration of deaths in children under 5 years of age.

Available PAHO estimates indicate that mortality from ARI in children under 5 (including pneumonia, influenza, bronchitis, and bronchiolitis) ranges from 16 deaths per 100,000 in Canada to 3,072 in Haiti (Table 1). Haiti is a country in which ARI represent from 20% to 25% of total deaths in children less than 5 years: or, 1 out of every 4 deaths of children under 5 is due to ARI.

Most of the developing countries in the Americas, report low ARI mortality rates. However, there is a marked gap between the developed countries of the Region (Canada, the United States) and the developing countries. For example Costa Rica and Cuba, which have the lowest mortality rates of the developing countries of the Region, report rates seven times higher than those of Canada.

The highest percentage of these deaths from ARI occur in children under 1 year of age and are due to pneumonia and influenza. Available PAHO estimates on mortality from these causes show marked differences

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in mortality in children under 1 year of age, ranging from 8 deaths per 100,000 live births in Canada to 2,352 in Haiti (Table 1). There are also very marked differences among developing countries of the Region with regard to mortality due to pneumonia.

Table 1
Estimated mortality rate in children under 5 years of age
Total deaths and deaths due to ARI and pneumonia and influenza
(Circa 1994)

Country	Deaths under 5 years		Deaths under 1 year	
	Total	ARI	Total	Pneumonia and influenza
Argentina	30	150	26	117
Bahamas	21	168	19	154
Barbados	19	114	16	85
Belize	46	368	36	688
Bolivia	100	1,500	74	1,480
Brazil	67	804	57	467
Canada	8	16	7	8
Chile	17	238	14	227
Colombia	42	546	32	358
Costa Rica	14	112	12	119
Cuba	12	108	10	82
Dominican Republic	62	558	48	245
Ecuador	62	1,054	44	392
El Salvador	56	392	43	176
Guatemala	81	1,215	51	903
Guyana	62	620	46	345
Haiti	128	3,072	98	2,352
Honduras	73	657	44	264
Jamaica	23	253	17	139
Mexico	37	555	30	450
Nicaragua	64	960	53	504
Panama	27	162	21	116
Paraguay	56	1,288	42	563
Peru	83	2,573	59	1,251
Puerto Rico	14	42	12	79
Saint Kitts and Nevis	32	256	27	95
St. Vincent and the Grenadines	23	138	18	61
Saint Lucia	23	161	19	72
Suriname	40	320	31	171
Trinidad and Tobago	22	264	17	143
United States	10	30	8	14
Uruguay	22	176	19	80
Venezuela	31	248	26	161

Note: ARI (comprises ICD-9 codes 460-466 and 480-487); pneumonia and influenza comprises ICD-9 codes 480-487.

Clarifications
- The estimates of infant mortality rate and the rate in children under 5 were made by the PAHO, Health Situation Analysis Program, Division of Health and Human Development.
- Mortality rates from ARI in children under 5 were estimated on the basis of estimated total mortality in children under 5 and the percentage of registered deaths from ARI in the same age group for the latest available year between 1988 and 1993.
- Mortality rates from pneumonia and influenza in children under 1 were estimated on the basis of PAHO infant mortality estimates and the percentage of registered deaths from pneumonia and influenza in the same age group for the latest year available.

The estimates that have been made show large differences in officially reported data by some of the countries in the Region (Table 2). Except in the case of Belize, where the estimate is eight times greater than the 1989 rate, and in Perú, where the estimate is three times greater in the same year; in other countries official information sources report mortality rates that are less than half of those reported in the 1994 estimations.

Thus, the description of mortality from pneumonia and influenza in the Region, based on information collected systematically by the countries, turns out to be limited, which is the reason why the estimates present a picture that is closer to reality.

Table 2

Mortality from neumonia and influenza in children under 1 year of age, in selected countries of the Americas* (Estimated and official figures)

Country	Mortality from pneumonia and influenza		
	Estimates(*)	Official Information (**)	
	Rate	Year	Rate
Argentina	117	1991	99
Bahamas	154	1987	231
Barbados	85	1991	95
Belize	688	1989	73
Bolivia	1,480	...	...
Brazil	467	1989	349
Canada	8	1991	8
Chile	227	1991	195
Colombia	358	1991	159
Costa Rica	119	1991	88
Cuba	82	1990	88
Dominican Republic	245	1985	375
Ecuador	392	1990	296
El Salvador	176	1991	116
Guatemala	903	1984	1,007
Guyana	345	1984	270
Haiti	2,352	...	...
Honduras	264	...	...
Jamaica	139	1985	185
Mexico	450	1991	267
Nicaragua	504	1991	394
Panama	116	1989	68
Paraguay	563	1988	493
Peru	1,251	1989	279
Puerto Rico	79	1991	59
Saint Kitts and Nevis	95	1985	98
S. Vincent and the Grenadines	61	...	...
Saint Lucia	72	1988	55
Suriname	171	1990	84
Trinidad and Tobago	143	1991	103
United States	14	1991	15
Uruguay	80	1990	97
Venezuela	161	1989	128

... Data not available
(*) Circa 1994
(**) The official information corresponds to the latest year available sent by the country.
Source: Health Situation Analysis Program, Division of Health and Human Development.

Table 3

Percent decline in mortality from pneumonia and influenza in selected countries of the Americas, 1985 and circa 1994

Country	Mortality from pneumonia and influenza *		
	1985	Circa 1994	Percent decline
Argentina	134	117	12.69
Barbados[1]	92	85	7.61
Belize[2]	424	688	-62.26
Canada	10	8	20.00
Chile	304	227	25.33
Colombia	243	358	-47.33
Costa Rica	142	119	16.20
Cuba	169	82	51.48
Dominican Republic	375	245	34.67
Ecuador	439	392	10.71
El Salvador[1]	140	176	-25.71
Guatemala[2]	1,207	903	25.19
Jamaica[1]	136	139	-2.21
Mexico	436	450	-3.21
Nicaragua	300	504	-68.00
Panama	90	116	-28.89
Paraguay	587	563	4.09
Peru	1.924	1,251	34.98
Puerto Rico	85	79	7.06
Trinidad and Tobago[2]	91	143	57.14
United States	19	14	26.32
Uruguay	90	80	11.11
Venezuela	155	161	-3.87

[1] 1984
[2] 1986
* Estimates

In addition to recording high mortality from pneumonia and influenza, in a large number of developing countries no decreases in these rates have been seen in recent years. Comparing the estimates for 1985 with those for 1994 (Table 3), it can be seen that in several countries the estimates for 1994 are grater and in others, the differences between these rates are less than 20%, representing an annual reduction rate of less than 3%.

The large difference between mortality from pneumonia and influenza in the developed and the developing countries is even greater if one considers the fact that both Canada and the United States lowered their rates by 20% or more during the period from 1985 to 1994 (20% and 26.3% respectively). Thus the distance separating the two groups of countries increased in 1994.

The causes that explain the observed differences are undoubtedly complex and include considerations not only related to the health area. For purposes of analysis, however, it is feasible to attribute these differences to the following classes of factors:

- The difficulty of access to health services, resulting in a large number of in-home deaths of children without receivins care from health personnel. The lack of access of the population to health services, and the lack of adequate antibiotics for early treatment are some of the factors commonly associated with these deaths.
- The inadequate quality of the care provided by many health service establishments, indicated by the lack of standardized criteria for the early detection of warning signs of pneumonia by health personnel and the community.

Morbidity

Studies on the annual incidence of ARI episodes in children under 5 years of age have concluded that this incidence is similar in both developed and developing countries. In all studies it was found that on average a child less than 5 years old living in an urban area suffers between six and eight ARI episodes annually, including cough, cold, rhinorrhea, bronchitis, bronchiolitis, pneumonia, etc. The studies carried out in rural areas yielded a lower rate of incidence, estimated at four to six ARI episodes annually. The factors related to this difference may be attributed to the reduced concentration of environmental pollutants that irritate the mucous membranes of the respiratory tract.

In contrast, a marked difference in the incidence of pneumonia has been observed between developed countries and developing countries, where this indicator can reach a level of between 150 and 200 pneumonia episodes per 1,000 children per year. In addition, differences have been found in the etiology of these cases: predominantly bacterial in the developing countries, but with a high prevalence of viral pneumonias in the developed countries.

The high incidence of pneumonia, added to the prevalence of risk factors in children (malnutrition, overcrowding, low level of care provided to children in the home), means that in developing countries, the incidence of complications in pneumonia cases is greater frequent than in the developed countries, and the mortality rates are correspondingly higher. The following risk factors stand out: low birthweight, the lack or short duration of breast-feeding, malnutrition and the lack of vitamin A, the lack of vaccinations or incomplete vaccinations, air pollution inside the home, and drops in temperature. In these cases pneumonia becomes an associated risk factor that increases the likelihood of death or serious disease in the child.

The availability of information on morbidity in countries of the Region is scarce, and the same factors which affect the quality of information on mortality are also present, aggravated by the absence of a system to collect data and perform systematic data analysis, something that already exists with respect to mortality.

However, health services data available from special studies show similar morbidity profiles. This profile reflects a high incidence of ARI in children (representing between 40% and 60% of pediatric consultations in the health services), and the low relative weight of pneumonia in the total consultations for ARI (less than 10% in most of the studies).

On the other hand, the information obtained from hospital records yields a higher relative weight for pneumonia, given that it is one of the leading causes of hospitalization from ARI in children, along with cases of severe bronchial obstruction. In most hospitals in the developing countries, ARI represent between 20% and 40% of all pediatric hospitalizations. Most of these hospitalizations are due to pneumonia, and a smaller percentage to bronchitis, bronchiolitis and bronchial obstruction syndrome.

Quality of Care

Although the low quality of the care received by children under 5 years of age in health service establishments was already mentioned as one of the factors associated with high mortality, this element also has an impact on a very important problem for the control of ARI: the use of medications in treatment.

ARI are the leading cause of antibiotic administration to children under 5 years of age. In most of the studies conducted, 50% or more of ARI cases treated in the health services received antibiotic treatment, despite the fact that most of these cases did not require them. The improper use of antibiotics promotes bacterial resistance and can produce potentially harmful effects on the health of the child.

In addition to antibiotics, other unrecommended drugs are used to treat ARI in children, such as cough and cold syrups, many of which contain substances that are potentially harmful as a result of their role in suppressing the child's natural defense mechanisms.

The management of ARI cases that do not present signs of severity or pneumonia does not require the administration of antibiotics or other drugs. The outpatient management of these cases can be conducted by treating the symptoms. Syrups and other drugs that are used for cough and cold, in addition to being expensive, contain combinations of different drugs that sometimes have opposite or adverse effects, and which can turn out to be harmful to the child.

Objectives of ARI control

The PAHO/WHO Regional ARI Control Program has proposed two principal objectives, based on the magnitude of the problem in the developing countries of the Americas and the availability of strategies for their achievement:

- ♦ Reduction of mortality from pneumonia in children under 5 years of age, an objective that is basically intended to:
  - Prevent deaths associated with flawed care provided to children by health personnel (such as

failure to detect danger signs and failure to administer antibiotics to children who need them).

- Prevent deaths associated with late consultations to health facility (failure of mothers and other caretakers to identify danger signs).
- Prevent deaths in the home resulting from a failure to seek health care services (lack of access of the population to health care providers).

♦ Reduction of the use of antibiotics and other drugs for ARI treatment in children under 5 years; this objective is:

- Prevent the administration of antibiotics to children who are seen for cough, cold, grippe, bronchitis or non-streptococcal pharyngitis.
- Prevent the administration of syrups for cough and cold that contain drugs that are potentially harmful to the child.
- Discourage the self-prescription and administration of antibiotics as treatment for ARI, by mothers and other family members, for children under 5 years.

In addition to the above, the Regional Program has proposed two other objectives:

♦ Reduction of the frequency of complications from acute infections of the upper respiratory tract, an objective intended to:

- Reduce the incidence of deafness or hypoacusis due to the poor management of otitis media episodes.
- Reduce the incidence of rheumatic fever in children that is associated with the failure to administer antibiotics in cases of streptococcal pharyngitis.

♦ Reduction of the incidence and severity of acute infections of the lower respiratory tract, an objectives intended to:

- Reduce the incidence of pneumonia associated with measles and whooping cough.
- Reduce the incidence of severity-increasing risk factors: low birthweight, malnutrition, failure to breast-feed, indoor air pollution.

Strategies

The two principal control strategies presented to the countries of the Americas by PAHO/WHO beginning in 1990 continue to be recommended for achieving the proposed objectives for ARI control in developing countries. These are: standard ARI case management, and vaccination against measles and whooping cough.

Standard ARI case management

Standard ARI case management brings together the entire set of criteria for classification, diagnosis, treatment and evaluation of ARI cases that have been developed by PAHO/WHO on the basis of the latest scientific information available concerning the sensitivity and specificity of signs and symptoms, the effectiveness of antimicrobial treatment, and the use of other drugs in ARI treatment.

Standard case management, in addition to including specific elements for early identification of pneumonia cases and other severe ARI require hospitalization or outpatient antibiotic treatment, also includes the signs and symptoms that mothers and others responsible for the care of children under 5 years of age should observe in order to make a prompt visit to a health care facility.

Vaccination against measles and whooping cough

Vaccines against measles and whooping cough help to prevent pneumonia cases and deaths associated with these two diseases.

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Source: Communicable Disease Program, Division of Disease Prevention and Control, HCT/HCP, PAHO.

New Non-Communicable Diseases Program at PAHO

The Global and Regional Predominance of Non-Communicable Diseases

Estimates of global and regional cause-of-death patterns reveal that, by 1990, noncommunicable causes had superseded communicable, maternal and perinatal causes in all areas of the world except for Sub-Saharan Africa and the Middle Eastern countries (Table 1). If one includes former injuries among the non-communicable causes of death, then only in Sub-Saharan Africa (SSA) does the former category still dominate the mortality profile. (1) In all but SSA, noncommunicable diseases (NCDs) now dominate the age-specific mortality profile in all age groups over 14 years.

Table 1
Distribution of deaths from three groups of causes, by region, 1990

	Number of deaths (x 1,000) attributed to:			
Region[a]	I. Communicable, maternal and perinatal causes	II.Non-communicable causes	III. Injuries	Total, all causes
EME	439 (6.2)[b]	6,238 (87.6)	445 (6.2)	7,121
FSE	136 (3.6)	3,264 (86.8)	362 (9.6)	3,762
CHN	1,343 (15.1)	6,519 (73.4)	1,023 (11.5)	8,885
LAC	966 (32.3)	1,733 (57.9)	293 (9.8)	2,992
OAI	2,306 (41.8)	2,736 (49.6)	477 (8.6)	5,519
MEC	2,026 (46.2)	1,966 (44.8)	392 (8.9)	4,384
IND	4,060 (43.3)	4,700 (50.2)	611 (6.5)	9,371
SSA	5,415 (68.2)	1,898 (23.9)	624 (7.9)	7,937
World	16,690 (33.4)	29,055 (58.1)	4,227 (8.5)	49,971

[a] EME, Established Market Economies; FSE, Former Socialist Economies; CHN, China; LAC, Latin America and the Caribbean; OAI, Other Asia and Islands; MEC, Middle Eastern Crescent; IND, India; SSA, Sub-Saharan Africa.

[b] Figures in parentheses are percentages of deaths from all causes.

Source: Murray CJL, Lopez AD: page 27, Table 2. Reference 1.

In Latin America and the Caribbean (LAC), estimated mortality from all causes in 1990 (in thousands) was 2,992. Of this, communicable, maternal and perinatal causes accounted for 966 (32.3%) and injuries for 293 (9.8%), while NCDs accounted for 1733 (57.9%). Within the NCD category, cardiovascular disease accounted for 786.7 (45.4%), malignant neoplasms 341.0 (19.7%), and diabetes mellitus 85.2 (4.9%).

The impact of morbidity from these cause groups has also been estimated for 1990 in terms of disability adjusted life years (DALYs). NCDs also dominate on this measure in LAC, accounting for 54.2% of the impact, followed by the communicable, maternal and perinatal cause group at 28.1% and injuries at 17.7% (Table 2).

Table 2
Percentage distribution of YLD[a] according to region, by broad cause group, 1990

	Cause group[b]			
Region[c]	I	II	III	All causes
EME	0.9	8.0	0.7	9.6
FSE	0.4	4.1	0.5	5.0
CHN	4.1	12.1	2.2	18.4
LAC[d]	2.7 (28.1)	5.2 (54.2)	1.7 (17.7)	9.6
OAI	3.9	8.0	1.6	13.6
MEC	2.4	5.7	1.7	9.8
IND	5.3	12.2	2.2	19.7
SSA	6.3	6.1	2.0	14.4
All regions	26.0	61.4	12.6	100.0

[a] YLD are expressed as a percent of the global YLD. They referto DALYs due to year of live lived with a disability.

[b] Grupo I = Communicable, maternal and perinatal causes
Group II = Non-communicable causes
Group III = Injuries and poisonings

[c] EME, Established Market Economies; FSE, Former Socialist Economies; CHN, China; LAC Latin American andthe Caribbean; OAI, Other Asia and Islands; MEC, Middle Eastern Crescant; IND, India; SSA,Sub-Saharan Africa.

[d] Figures within parentheses refer to within-row percentages for LAC only.

Source: Adapted from Murray CJL, Lopez AD, page. 61. Table 4, Reference 1.

Unlike Canada and the United States, where reductions on the order of 15% in the proportional mortality from diseases of the circulatory system were seen during the period 1980-90, many countries in LAC experienced an increase attributable to this cause group (2). Individual trends for selected countries are presented in Table 3.

Table 3
Proportional mortality from diseases of the circulatory system (% based on deaths from defined causes), selected countries, 1980 and 1990

Country	1980	1990
Argentina	46.6	46.4
Belize	29.7	24.7
Brazil	32.1	34.4
Canada	47.6	40.1
Chile	29.4	29.0
Colombia	27.4	30.9
Costa Rica	27.6	28.9
Cuba	43.4	43.5
Dominican Republic	23.9	27.2
Ecuador	14.9	20.7
El Salvador	8.5	20.6
Mexico	17.6	20.3
Panama	27.8	29.3
Paraguay	30.3	36.9
Peru	11.8	19.4
Puerto Rico	40.5	34.0
Suriname	31.8	33.5
Trinidad and Tobago	45.9	38.4
United States	50.6	43.3
Uruguay	44.1	41.4
Venezuela	27.3	29.3

Source: Adapted from Health Conditions in the Americas, 1994 Edition, Table 39. Page 219, Reference 2.

The impact of cancer throughout the Americas has greatly increased (by 73% overall from the early 1960s to the late 1980s) as shown in a recent 25-year analysis (Table 4) (2).

Table 4

Estimated annual deaths from malignant neoplasms, in the Americas, 1960-1964 and 1985-1989

Year	Total	Men	Women
Region of the Americas			
1960-1964	520,000	270,000	250,000
1985-1989	900,000	470,000	430,000
North America			
1960-1964	315,000	170,000	145,000
1985-1989	540,000	290,000	250,000
Latin America and the Caribbean			
1960-1964	205,000	100,000	105,000
1985-1989	360,000	180,000	180,000

Source: Health Conditions in the Americas. 1994 Edition, Table 48, page 230, Reference 2.

Proportional mortality from this cause group has increased in virtually every country, as illustrated in Table 5. Proportional mortality from external causes also increased in virtually all countries (see Table 6) (2).

Table 5

Proportional mortality from malignant neoplasms (% based on deaths from defined causes), selected countries, 1960-1964 and 1985-1989

Country	1960-1964	1985-1989
Argentina	20.6	18.7
Barbados	11.9	19.5
Belize	7.6	9.0
Canada	17.3	26.9
Chile	11.5	19.9
Colombia	6.1	13.4
Costa Rica	12.8	21.2
Cuba	16.0	19.5
Dominica	6.2	18.2
Dominican Republic	3.8	8.9
Ecuador	3.6	11.2
Grenada	9.7	13.1
Jamaica	10.8	17.5
Martinique	11.0	22.9
Mexico	4.2	10.2
Nicaragua	3.7	7.0
Panama	8.5	15.3
Paraguay	9.2	10.4
Peru	5.9	12.5
Puerto Rico	14.9	15.9
Saint Vincent and the Grenadines	5.6	13.2
Suriname	9.2	11.1
Trinidad and Tobago	8.7	13.2
United States of America	16.3	23.1
Uruguay	22.0	24.7
Venezuela	10.7	13.8

Source: Adapted from Health Conditions in the Americas, 1994 Edition, Table 46, page 228, Reference 2.

Table 6

Trends in proportional mortality from external causes (% based on deaths from defined causes), selected countries, 1960-1964 and 1985-1989

	Period	
Country	1960-1964	1985-1989
Argentina	8.2	6.9
Barbados	3.0	4.8
Belize	4.2	12.1
Canada	8.2	7.5
Chile	7.9	13.3
Colombia	8.7	22.5
Costa Rica	5.7	11.4
Cuba	7.4	11.9
Dominica	1.8	5.8
Dominican Republic	4.7	9.1
Ecuador	6.2	14.2
Jamaica	4.5	3.3
Martinique	6.7	9.0
Mexico	7.8	15.5
Panama	8.4	13.7
Paraguay	7.3	8.7
Puerto Rico	8.5	9.2
Saint Lucia	3.2	7.9
Saint Vincent and the Grenadines	0.9	7.3
Suriname	8.2	12.6
Trinidad and Tobago	6.1	8.6
United States of America	7.3	7.2
Uruguay	6.4	6.4
Venezuela	11.1	15.8

Source: Adapted from Health Conditions in the Americas, 1994 Edition, Table 31, page 206, Reference 2.

Much of the mortality, morbidity, and socio-economic impact of these and other non-communicable conditions is preventable through lifestyle modification and specific interventions.

Establishment of a PAHO Program for Non-communicable Diseases

In recognition of the predominance of NCDs among causes of morbidity and mortality throughout the Americas, the Director of PAHO, early in 1995, established a new technical cooperation program. This is in addition to other activities relevant to noncommunicable diseases (e.g. healthy lifestyles, food and nutrition) which remain active elsewhere in the Organization, most notably in the Division of Health Promotion and Protection.

The new Non-Communicable Disease Program (HCN) is located within the Division of Disease Prevention and Control (HCP), and has a staff complement of three professional and two support posts. The program has a mandate to strengthen the capacity of the organization in support of specific prevention and control initiatives in member countries.

During the first few months, much effort was devoted to planning and consultation in order to clarify the role and modus operandi of the program. A limited number of priorities were selected for the coming biennium (1995-97), key internal relationships have been

identified, and a method of working defined. A team approach will be emphasized.

Initial priorities include surveillance of disease impact, risk factor intervention (with emphasis on cardiovascular disease), cervical cancer prevention, cancer registry development, diabetes initiatives, and support for injury prevention.

The program will place emphasis on technical capacity building, including support for demonstration projects within countries. It will work in consultation and interprogrammatic collaboration with other technical programs, in the interests of integrating non-communicable disease prevention and control within the context of primary health care.

Envoi

The following quotation from Murray and Lopez (1994) sums up the situation. "While recognizing the need for continued vigilance over communicable, maternal and perinatal mortality, it is important to realize that globally the non-communicable diseases have already emerged as the leading causes of death in developing regions. Even in poor countries, the epidemiological transition is under way with profound implications on the demand for health care to address the burden of chronic diseases. Moreover, with a number of cost-effective interventions targeted to communicable disease mortality in children, it is reasonable to expect the proportion of mortality due to noncommunicable diseases to increase. At present the risk of death from non-communicable diseases during adulthood (15-60) years is considerably higher in the developing world than in the Established Market Economies, suggesting that the future, in effect, has already arrived."

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Source: Non-Communicable Diseases Program, Division of Disease Prevention and Control, HCP/HCN, PAHO.

Health Situation in the Americas
Basic Indicators, 1995

	Selected Indicators of mortalty					
Country	IMR	5MR	MMR	Country	IMR	5MR	MMR
Anguila	26	34	...	Guyana	46	62	180
Antigua y Barbuda	19	23	...	Haiti	98	128	457
Argentina	26	30	52	Honduras	44	73	220
Aruba	8	10	...	Jamaica	17	23	115
Bahamas	19	21	21	Martinique	10	12	...
Barbados	16	19	20	Mexico	30	37	45
Belize	36	46	147	Montserrat	12	15	...
Bermuda	13	15	...	Netherlands Antilles	15	18	...
Bolivia	74	100	247	Nicaragua	53	64	150
Brazil	57	67	140	Panama	21	27	60
Canada	7	8	3	Paraguay	42	56	235
Cayman Islands	8	10	8	Peru	59	83	261
Chile	12	17	34	Puerto Rico	12	14	...
Colombia	32	42	140	Saint Kitts and Nevis	27	32	...
Costa Rica	12	14	40	Saint Lucia	19	23	...
Cuba	10	12	32	Saint Vincent and the Grenadines	18	23	6
Dominica	14	18	...	Suriname	31	40	31
Dominican Republic	48	62	90	Trinidad and Tobago	17	22	49
Ecuador	44	62	120	Turks and Caicos Islands	19	22	...
El Salvador	43	56	140	United States of America	8	10	8
French Guiana	20	23	...	Uruguay	19	22	38
Grenada	20	25	...	Venezuela	26	31	63
Guadeloupe	11	13	...	Virgin Islands (UK)	20	23	...
Guatemala	51	81	220	Virgin Islands (US)	13	15	...

Note: Data extraxted from the brochure: *"Health Situation in the Americas. BASIC INDICATOTS 1995"*. (PAHO/HDP/HDA/95.03).

... Data not available

IMR: Infant mortality rate (1994) (per 1,000 live births)
MR5: Under 5 years mortality rate (1994) (por 1,000 live births)
MM5: Maternal mortality rate (latest year available between 1987-1993) (per 100,000 live births)

Outbreak of Venezuelan Equine Encephalitis, 1995

Venezuelan equine encephalitis (VEE) is a disease of horses, mules, and donkeys caused by an alphavirus, which is known to occur only in this hemisphere. The virus of VEE can be transmitted to humans by mosquito bites and occasionally causes epizootics and epidemics.

Through serologic test, the VEE virus has been classified in six subtypes I to VI, as shown in table 1. The subtype I has seven recognized variants, which include the vaccinal strain TC-83. The variants A, B and C of the subtype I are the main cause of epizootics and epidemics. (20)

Background

Since the isolation of the VEE virus in 1938 in the state of Aragua, Venezuela, several outbreaks, and epizootic-epidemics (Epizoodemics) have been notified in 12 countries in the Americas: Peru, Ecuador, Colombia, Venezuela, Trinidad and Tobago, Costa Rica, Nicaragua, Honduras, El Salvador, Guatemala, Mexico, and the United States.

During the period 1935-1961 outbreaks were reported in eleven years occurring mostly in Colombia and Venezuela, but also in Trinidad and Tobago, and Peru. Between 1962 and 1973 outbreaks occurred every year except in 1965.

Trends in proportional mortality from external causes (% based on deaths from defined causes),The largest epizootic and epidemic was caused by the subtype I variant B. It was initiated in Colombia in 1967 and extended to Ecuador, Venezuela, Central America, Mexico, and finally reached Texas in the United States in 1971. During this epizoodemic a number of 38,000 to 50,000 equine deaths were reported; close to 31,000 human cases and 310 deaths were notified in Ecuador and 200,000 human cases in Colombia. (1) (10)

After this epizoodemic, the surveillance of equine encephalitides has declined in most of the countries of Latin America and the Caribbean, particularly in the last 18 years. The few countries that reported clinical cases consistent with equine encephalitides obtain no laboratory confirmation. In Latin America and the Caribbean, laboratory diagnosis of equine encephalitides has practically ceased.

Some countries have continued to utilize the weekly information system of the Pan American Foot-and-Mouth Disease Center (PANAFTOSA), which reports by quadrants the occurrence of syndromes compatible with equine encephalitis of viral origin, locating the site of occurrence in the Cartesian coordinates of every country.

Table 2 presents a summary of the information received from the countries during the period 1989-1994. The limited participation of the countries is evident, since only Argentina, Bolivia, Brazil, Colombia, Ecuador, El Salvador, Guatemala, Paraguay, and Venezuela reported. In 1994, Panama and Peru started reporting. (13), (16).

With the limited information provided during the period October 1989-December 1994, it has been possible to confirm the existence of enzootic areas in various countries where clinical episodes of equine encephalitides were frequently reported like some of these areas in Colombia and Venezuela.

Table 1

Occurrence of reported foci of syndroms consistent with equine encephalitides and number of weeks reported, 1989-1994

	Years					
Country	1989	1990	1991	1992	1993	1994
Argentina	0/10 (1)	2/52	3/52	N/I(2)	N/I	N/I
Bolivia	N/I	6/31	0/49	0/52	0/52	0/46
Brazil	0/2	8/41	3/41	4/52	3/49	2/52
Colombia	2/13	11/52	8/53	28/53	7/52	19/52
Ecuador	N/I	N/I	0/20	0/52	1/52	0/52
El Salvador	N/I	10/9	11/19	23/24	7/27	N/I
Guatemala	0/1	1/36	8/53	3/46	2/52	0/51
Panama	N/I	N/I	N/I	N/I	N/I	N/I
Paraguay	0/9	0/21	0/52	0/50	0/52	0/52
Peru	0/9	0/21	0/52	0/50	0/52	0/52
Venezuela	0/5	2/49	0/46	4/52	7/52	0/52

(1) Number of occurrence of foci/number of weeks reported
(2) Did not report (NI)

Source: Pan American Foot-and-Mouth Disease Center (PANAFTOSA)

Outbreak of Venezuelan Equine Encephalitis (VEE) 1995

The 1995 outbreak of VEE occurring in Venezuela and Colombia was originated through an increased viral activity in the areas where the disease was observed since 1993 in a susceptible equine population. Unfortunately, because of the lack of laboratory diagnostic services, typing of the VEE virus was not made on previous outbreaks.

The Outbreak in Venezuela

Between December 1992 and January 1993, the sanitary officers of Venezuela reported an outbreak of VEE in the State of Trujillo. Twenty eight equine clinical cases and 12 deaths were recorded. The localities involved were: La Catalina, Zapatero, La Urbina Rio Seco, Agua Caliente, and Albaricol, all of them neighboring the Agua Viva dam that was filled in August 1992. Thirty nine human febrile cases were also reported. In this occasion isolation of the VEE virus showed involvement of the enzootic subtype ID. (15) (18)

In June 1993, outbreaks were also reported in the State of Zulia, involving 55 human cases and 66 equines.

Following these outbreaks, vaccination campaigns were developed in the western states of Venezuela. No outbreaks were reported in 1994.

In May 23, 1995 a report of a syndrome compatible with equine encephalitis was made in the localities of Cacique Manaure and Monseñor Iturriza in the State of Falcon at the northwest of the country. This outbreak continued spreading toward the northwest, but also to the south. The disease appeared in the north of the State of Yaracuy in June 7, in the localities Aroa, Yumare and Socremo of the municipality of Bolivar. At this time, vaccination of 1,435 equine was initiated in the neighbor state of Lara. In the last fifteen days of August reports of sick and dead horses preceded a report of nine human cases in the municipality of Urdaneta at the northeast of the state of Lara. Investigation of the report showed 15 human suspected cases and 29 equine deaths. (15)

The disease progressed through the north of the State of Lara as well as through the north of the state of Falcon toward the Lake of Maracaibo, reaching the east side of Zulia state at the end of August.

The disease was first reported in the west side of Zulia state in August 28, affecting the districts of Mara and Paez located at the northwest of Maracaibo Lake.(7) In these districts most of the febrile human cases were reported. Isolation of the virus was made at the National Institute of Hygiene and later it was typified by the University of Texas and University of Yale. The identified VEE virus was the subtype I variant C. (5) (2)

During September, outbreaks were reported in the state of Carabobo, neighbor to Yaracuy state which notified increased incidence of human febrile cases. VEE virus isolation was made from two human cases. (8) During October, reports and confirmation of VEE causing sick and dead equine have been made in two additional states: Cojedes and Guarico. In summary the geographical extension of the epizootic-epidemic in Venezuela covered seven states: Zulia (50% of its territory), Falcon (100%); Lara (15%), Yaracuy (100%); Carabobo (15%), Cojedes (less than 5%) and Guarico (recent outbreak). (6)

Since the beginning of the epidemic to October 31, national authorities reported 11,390 human febrile cases compatible to VEE and 16 deaths. The disease has been confirmed in 185 human cases through viral isolation and/or hemagglutination inhibition test. About 500 clinical equine cases and 475 dead animals, including horses, mules and donkeys have been notified (Table 3). (6) (7)

Table 2

Human and equine cases reported in Venezuela*

		Human Cases			Equine Cases	
Department	Date of first report	Suspected	Confirmed	Deaths	Clinical Cases	Dead Animals
Falcon	May 23	555	38	1	86	
Yaracuy	June 10	73	3	2	56	
Lara	July 23	173	26	-	82	
Zulia	Aug. 28	10.558	116	13	272	
Carabobo	Sept. 10	31	2	-	-	
Cojedes	Oct. 10	-	-	-	6	
Guarico	Oct. 23	-	-	-	2	
TOTAL		11.390	185	16	504	475 (1)

* Data up to October 31, 1995
\- No information
(1) Global data provided

Venezuelan equine encephalitis was most striking in the state of Zulia causing more than 10,000 human cases including few cases in the city of Maracaibo and 272 equine cases were reported.

Control measures have consisted on:

1. Quarantine of affected states which included: Zulia, Falcon, Yaracuy, Carabobo, Cojedes and Guarico. This quarantine, implies restriction of movement of solidungulates within and outside states.
2. Equine vaccination. Since the beginning of the epizootic, a number of 163,214 equine (horse, mules and donkeys) have been vaccinated which represent 69.3% of the population in affected states and a total of 206,208 equine in the country (27.4%) (6) (8).
3. Spraying insecticides for vector control.
4. Medical care to human febrile cases. Treatment has been symptomatic. Those patients presenting nervous signs are being hospitalized.

VEE in Colombia

During the first week of September, rural health services of the localities of Mayapo, Manaure and El Pajaro in the department of La Guajira reported an increased number of patients having fever, headaches, muscle pain, prostration and vomiting. Few patients developed convulsions and other neurologic symptoms.

The disease spread to the southwest following particularly the Caribbean Sea seashore and bordering localities with Venezuela. A natural barrier, the Sierra Nevada of Santa Marta prevents a direct southern spread and helped in establishing preventive immune equine barriers through vaccination along these only passways to the departments of Magdalena and El Cesar. Sick and dead equine cases were preceding the epidemic of febrile human cases.

From the beginning of the epizootic epidemic to October 31 the disease was confined to the department of La Guajira, except by the occurrence of a recent outbreak in equine in the northern locality of Guachaca in department of Magdalena. (2) (9).

To October 31 a total of 14,156 human cases compatible with VEE were reported. From that number, 1,258 required hospitalization and 26 were reported dead as a result of VEE. (See Table 4). (10) (11).

Based on random survey in the hospitals of Manaure, Riohacha, Uribia and Maicao, it was observed that all age groups were equally affected. The case fatality rate was estimated as 0.7% and only 4% of the acute illness patients developed neurologic symptoms, primarily among children. (9) (19)

Table 3

Cases reported in La Guajira, Colombia* 1995

Locality	Date of First Report	Number of Consultations	Total Suspected Cases	Hospitalized Cases	Number of Deaths
Riohacha	Sept. 12	5,420	3,867	103	3
Maicao	Sept. 15	6,289	1,362	68	8
Manaure	Sept. 10	12,488	7,013	1,030	14
Uribia	Sept. 14	3,945	1,914	57	1
Total		**28,142**	**14,156**	**1,258**	**26**

* Data up to October 31, 1995

The Control Measures taken in Colombia consisted on:

1. Emergence medical care to ill to avoid deaths, was developed, mobilizing medical doctors, nurses and Red Cross volunteers to reinforce local health personnel. Symptomatic treatment was undertaken and patient having neurologic signs were hospitalized.
2. Restriction of movement from and within the department, of La Guajira. Equine concentrations, as commercial, exhibitions and sports were restrained in the rest of the country.
3. Equine vaccination. National authorities, reported vaccination of 29,700 horses, mules and donkeys in La Guajira, representing almost the totality of the population (96.0%). Authorities proceeded with the equine vaccination in the entire country, reporting a total of 860,000 vaccinations, covering 59.6% of the total equine population of the country. (3) (17)
4. Vector control. Entomologic surveys in affected areas detected large numbers of *Aedes taeniorhynchus, Psorophora confinnis and Deinoceritis sp.* Campaigns to eradicate mosquito vector consisted in spraying with malathion and larvicide treatment of breeding sites. (2) (11)
5. Public awareness through massive media, was undertaken
6. Epidemiological surveillance of human and equine was reestablished for the affected Department and the rest of the Colombian territory through a daily report of human and equine cases having signs consistent to equine encephalitides.

Associated factors for the 1995 VEE outbreak occurrence

The 1995 VEE outbreak in Colombia and Venezuela was the result of several associated factors that act interdependently.

1. Diminished equine vaccination. Information obtained in the affected areas of La Guajira showed that no vaccination was made in a period of three years in most places. While in Venezuela, vaccination coverage was very low in some states, like in Guarico where out of an equine population of 94,000 only 3% were vaccinated (8) (17).
2. Lack of sustained epidemiological surveillance. As it was mentioned in the background of this paper, the epidemiological surveillance almost disappeared from the countries. The laboratory diagnostic services were limited and practically absent in Colombia. This situation contributed to discourage the field services in sending samples for laboratory analysis. (17).

The poor intersectoral coordination of the health and Veterinary services finally outbursted when restructuring the official diseases surveillance and control services, in the countries. The information was unnotified among the national and local institutions, preventing the adoption of appropriate prevention and control measures.

3. Limited knowledge on the ecology of equine encephalitides. This epizootic - epidemic like others in the past were associated with heavy rains and flooding, favoring reproduction of a wide variety of arthropods insects, particularly mosquitos, vector of diseases. *Psorophora sp* and *Aedes taeniorhynchus* were found abundant in Colombia and VEE virus was isolated from pools of there vectors (21) (10).

Mosquito population not only might increase under favorable climatic conditions, but also they might be displaced by air currents, flooding and other environmental phenomena. Diseases also are displaced with them.

Additionally, other mosquitos have been recognized as transmitters for VEE virus in Colombia and Venezuela, establishing a wide variety of vectors, that probably are using equal variety of vertebrate hosts for their intrinsic viral cycles.

Since the largest epizootic-epidemic of 1969-1973 no other major outbreaks had been recognized in the area of Zulia, Venezuela and La Guajira, Colombia, suggesting that the main epizootic viral strains (subtype A, B, C) were almost extinct. However, the outbreak that occurred in Trujillo in 1993, that was caused by the enzootic VEE virus ID showed serological relation to virus IC and some genomic homogeneity (14). These findings might be indicative of mutagenic activity in local viruses resulting also in modifications of their pathogenic behaviors. (14) (18).

However, the recent VEE subtype IC virus strain isolated during this outbreak has similarities with the past IC isolated in 1963. (23)

The VEE virus has been isolated from rodents considering as reservoirs of the disease in wildlife, particularly because of their short life and high reproduction capacity might perpetuate the virus in a susceptible population, which is constantly renewed. Population reservoirs, particularly rodents which are able to maintain an enzootic cycle of the VEE virus suffer changes as well in population numbers, diseases resistance or susceptibility and population displacements.

4. Increased viral activity was advertised through minor outbreaks occurring in same districts, as it was reported to PANAFTOSA, since 1993. (13)

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Source: Division of Disease Prevention and Control, Veterinary Public Health Program, HCP/HCV, PAHO.

Summer Courses in Epidemiology in 1996

The Johns Hopkins University School of Hygiene and Public Health is sponsoring the Fourteenth Annual Graduate Summer Program in Epidemiology, to be conducted from 17 June to 5 July 1996. The program includes: principles of epidemiology; introduction to biostatistics; methods in epidemiology; intermediate biostatistics; applications of the case-control method; clinical trials: issues and controversies; epidemiologic methods for planning and evaluating health services; cohort studies; methods of health risk assessment; infectious disease epidemiology; nutritional epidemiology; outcomes and effectiveness research; epidemiology of tobacco, alcohol and other drug dependence; epidemiology of AIDS; use of microcomputers in epidemiology; writing and reviewing epidemiologic papers; meta-analysis; epidemiology and public policy; updates in methods for analysing longitudinal data; advanced topics in SAS programming; new paradigms/new approaches to management of epidemiological studies. Proficiency in the English language is required.

Further information is available from Helen Walters, Program Coordinator, Graduate Summer Program in Epidemiology, The Johns Hopkins University, School of Hygiene and Public Health, 615 North Wolfe Street, Baltimore, Maryland 21205. Tel. (410) 955-7158; Fax (410) 955-8086; E-mail: HWALTERS@PHNET.SPH.JHU.EDU

Tufts University at Medford, Massachusetts, The New England Epidemiology Institute, and the Post-graduate Medical Institute are sponsoring the Sixteenth Annual New England Epidemiology Summer Program, to be conducted from 10 June to 5 July, 1996. This year The New England Epidemiology Institute will be offering one and two week sessions which will cover the following topics: introduction to epidemiology; conducting epidemiologic research; theory and practice of epidemiology; epidemiologic basis for causal inference; introductory biostatistics; regression and categorical data methods; survival analysis; meta-analysis; clinical research; pharmacoepidemiology; epidemiologic methods for health care utilization research; epidemiology in developing countries; cancer epidemiology; perinatal epidemiology; genetic epidemiology; occupational and enviromental epidemiology; use of biomarkers in epidemiology; scientific writing and ethics and epidemiology. Proficiency in english is essential.

For more information contact Nancy A. Dreyer, Program Director, The New England Epidemiology Institute, Dept. PA-PAN, One Newton Executive Park, Newton Lower Falls, MA 02162-1450. Tel. (617) 244-1200; Fax (617) 244-9669; E-mail: epidemiol@aol.com

The University of Michigan School of Public Health announces the Thirtieth-one International Graduate Summer Session in Epidemiology to be conducted from 7 to 26 July, 1996. Three, two and one-week courses will be offered. Three-week courses include: applied epidemiology for health practitioners; fundamentals of epidemiology; fundamentals of biostatistics; and design and analysis of sample survey data. Two-week courses include: basic computer applications in epidemiology and genetic epidemiology.

One-week courses include: basic concepts of clinical epidemiology; clinical trials, design and conducts; clinical trials, analytic methods; introduction to the logistic model; analysis of survival, and follow-up data; introduction to cancer epidemiology; advanced concepts and methods in cancer epidemiology; cancer prevention; occupational epidemiology; enviromental epidemiology and risk assesment; epidemiology of injuries; epidemiologic methods and injury control; epidemiology of violence; epidemiology of aging; epidemiology of mental disorders; update in infectious diseases; emerging infections; sexually transmitted diseases and HIV; nutritional epidmeiology; epidemiologic issues in women's health: controversies and challenges; concepts and

methods in reproductive epidemiology; pharmacoepidemiolgy; epidemiology of substance abuse; methods in medical quality assessment; current issues in infection control; advanced computer applications in epidemiology; behavioral modification; epidemiology and health policy; scientific writing; ethics, epidemiology and public health research; epidemiology and the law; and cardiovascular epidemiology. Proficiency in the English Language is needed.

For further information contact Dr. David Schottenfeld or Jody Gray, Administrative Coordinator, Graduate Summer Session in Epidemiology, The University of Michigan, School of Public Health, 109 S. Observatory Street, Ann Arbor, Michigan 48109-2029. Tel. (313) 764-5454; Fax (313) 764-3192; E-mail: umichgss@sph.umich.edu

The Department of Epidemiology and Biostatistics, McGill University will hold its Eleventh Annual Summer Program in Epidemiology and Biostatistics from 6 to 31 May and from 3 to 28 June, 1996. General topics will include: principles and methods of epidemiology; epidemiologic research I: study design; statistical inference; pharmacoepidemiology I, II and III; clinical epidemiology; cardiovascular epidemiology; health in developing countries; infectious and parasitic disease epidemiology; multivariate analysis; practical issues in protocol development.

For more information contact Elinor J. Masson, Coordinator, Annual Summer Program, Department of Epidemiology and Biostatistics, McGill University, Purvis Hall, 1020 Pine Avenue West, Room 38B, Montreal, Quebec, Canada, H3A 1A2. Tel. (514) 398-3973; Fax (514) 398-4503; E-mail: elinor@epid.lan.mcgill.ca

The Sixth Summer Session in Intermediate Epidemiology sponsored by the Health Situation Analysis Program, of the *Pan American Health Organization*, will be conducted from 29 July to 16 August, 1996 at the College of Public Health, University of Southern Florida, Tampa, Florida. The courses being offered are: intermediate methods in epidemiology; statistics applied to epidemiology and the use of software packages, and the use of epidemiology in the programming and evaluation of health services. Students are required to have approved basic training in epidemiology. Courses will be conducted in Spanish, but participants must be able to read English.

For more information and application: Carlos Castillo-Salgado, HDA/HDP, Pan American Health Organization, 525 Twenty-third Street, NW, Washington, DC 20037. Tel. (202) 861-3327; Fax (202) 861-5230.

The Fourteenth International Course in Applied Epidemiology, conferring diploma status recognized by the National Autonomos University of Mexico, will take place from 1 to 26 of July 1996 in Mexico, D.F., under the coordination of the *Department of Epidemiology of the Ministry of Health of Mexico*. The course is designes to develop two broad subject-matter areas: the first includes theoretical and methodological aspects of epidemiological practice and the second, specific subject areas of applied epidemiology, such as epidemiology of communicable diseases and of chronic diseases, enviromental epidemiology and epidemiology of addiction. Other subjects are: basic and intermediate epidemiology; basic and intermediate biostatistics; design of research protocols; introduction to Epi-Info 6.0 for epidemiologic analysis; multivariate analysis in epidemiology; selected topics in clinical epidemiology and injury epidemiology.

For further information, contact: Dirección General de Epidemiología; Francisco de P. Miranda núm. 177; Col. Lomas de Plateros; Tel: 593-36-61. Registration deadline: 14 June, 1996.

Publication

Health Statistics from the Americas, 1995 Edition

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Dissemination of information is a critical component of the technical cooperation provided by the Pan American Health Organization; every unit in PAHO, whether at Headquarters or the country level, carries out activities in this regard. Data and information are fundamental ingredients of health situation analysis, a type of analysis that should underlie social and health policymaking, health services organization, and planning and execution of health programs, and that should inform decisions which affect the future of people and nations.

Publication of the series *Health Statistics from the Americas* was begun in 1991, to complement the quadrennial publication *Health Conditions in the Americas* and fulfill PAHO's mandate to collect and disseminate information on the health status of the population in the Region's countries. Previous issues have included summarized presentation of the entire contents of the PAHO mortality database; estimated sex-and-age specific death rates by broad groups of causes; mortality due to the cause groups of the PAHO 6/61 list; and historical summaries of reported cases of selected communicable diseases.

The present volume is the third in the series, the issuance of these publications having been deferred in 1993 and 1994 during the preparation of *Health Conditions in the Americas,* itself a source of abundant statistical information. This 1995 Edition presents mortality trends in the countries, by age group and sex, for selected groups of causes; the latest mortality data received by PAHO, summarized using the 6/61 list; reducible gaps in mortality, with respect to country groupings and to the Region of the Americas; and selected demographic estimates and projections.

The PAHO Health Situation Analysis Program, Division of Health and Human Development, is the technical unit responsible for preparing the material included in this publication.

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