

Epidemiological Bulletin

PAN AMERICAN HEALTH ORGANIZATION

Vol. 16, No. 4

December 1995

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, consequently, 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

IN THIS ISSUE . . .

- Acute respiratory infections in the Americas
- New Non-Communicable Diseases Program at PAHO
- Outbreak of Venezuelan Equine Encephalitis, 1995
- Summer courses in Epidemiology in 1996
- Publication: *Health Statistics from the Americas, 1995 Edition*

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 480-486 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 pneumonia 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.

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 greater 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.

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

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 receiving 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.

Bibliography

1. Jelliffe, D.; Pediatrics. En: King M., ed., Medical Care in Developing Countries, Nairobi, Oxford University Press, 1966, Chapter 13.
2. Pio, A.; "La magnitud del problema de las infecciones respiratorias agudas". II Regional Seminar on Acute Respiratory Infections in Children and Child Survival. PAHO/WHO.
3. Arias, S.; Benguigui, Y.; Bossio, J. "Infecciones Respiratorias Agudas en las Américas". PALTEX Series for health program managers No. 25. Washington, DC:PAHO/WHO, 1992.
4. "Neumonía en los Niños: Estrategias para hacer frente al desafío". Report of the First International Advisory Meeting on the Control of Respiratory Infections. AHRTAG, 1992.
5. Pan American Health Organization. "Health Situation in the Americas. Basic Indicators 1995". Health Situation Analysis Program. Division of Health and Human Development. 1995.
6. Neumonía y otras infecciones respiratorias en niños: una bibliografía selectiva anotada. Volume I: Articles published before 1991. WHO/CDR/93.27. PAHO/HMP/ARI/93.19, 1993.
7. "Los antibióticos en el tratamiento de las infecciones respiratorias agudas en niños menores de cinco años" PNSP/91-01. PAHO/WHO, Washington, DC, 1991.
8. "Bases técnicas para las recomendaciones de la OPS/OMS sobre el tratamiento de la neumonía en el primer nivel de atención". PAHO/HMP/ARI/92.1. 1993.
9. "La administración de suplementos de vitamina A y la neumonía en la niñez". PAHO/HMP/ARI/93.18, 1994.
10. "Aspectos epidemiológicos, sociales y técnicos de la contaminación del aire en locales cerrados creada por el consumo de combustibles de biomasa." Report of a WHO advisory meeting. June, 1991. HMP/ARI/03/93, 1993.
11. "Indoor Air Pollution from Biomass Fuel." Working documents from a WHO advisory meeting. June, 1991. PAHO/HMP/ARI/93.6, 1993

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