# Epidemiological Bulletin

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# Integrated Management of Childhood Illness (IMCI) in the Americas

**Introduction**

In the countries of the Americas almost 757,000 children under the age of 5 die each year from illnesses that could have been prevented easily or treated. To address this problem, the Pan American Health Organization/World Health Organization (PAHO/WHO) and the United Nations Children's Fund (UNICEF) have been cooperating with the countries in the adoption of standard case management using the strategy — Integrated Management of Childhood Illness (IMCI).

The strategy was developed by both international organizations, and its main purpose is to reduce mortality from prevalent childhood illness in children under 5 years of age; prevent and reduce the number and severity of cases of these illnesses; improve the quality of the care provided to children in the health services; promote child health in the routine care provided by the health services; and extend integrated care to the community level.

In the mid-1990s, the World Health Organization (WHO) estimated that approximately 70% of the ll .6 million deaths of children under 5 years of age that occur annually in the developing countries of the world were attributable to five illnesses (Figure 1).

Acute respiratory infections (ARI) and diarrhea were the two leading causes of mortality. responsible for more than l out of 3 deaths in this age group. Malaria and measles were responsible for 1 out of 10 deaths. and malnutrition was found to be an associated cause in more than half of the total number of deaths in children under 5 (Figure 1).

In the Region of the Americas. these five illnesses account for half of the 500,000 deaths in children under 5 years of age, and among them, ARI and diarrhea are the two leading causes of death, responsible for 20% of the deaths in each category (Figure 1). Malaria is a health problem of lesser magnitude, with fewer than 1% of the deaths in the group: and although malnutrition appears largely to be an associated cause of death in children under 5, it nevertheless represents proportionately less of a burden than in the rest of the world: 19% of the deaths in children under 5 are associated with this cause.

The high frequency with which children were affected by these diseases, which no longer pose a public health problem in the developed countries, was one of the principal motives for designing new strategies that would fumish the tools for the prevention. early diagnosis, and proper treatment of this group of illnesses.

In this regard. the IMCI strategy was the altemative

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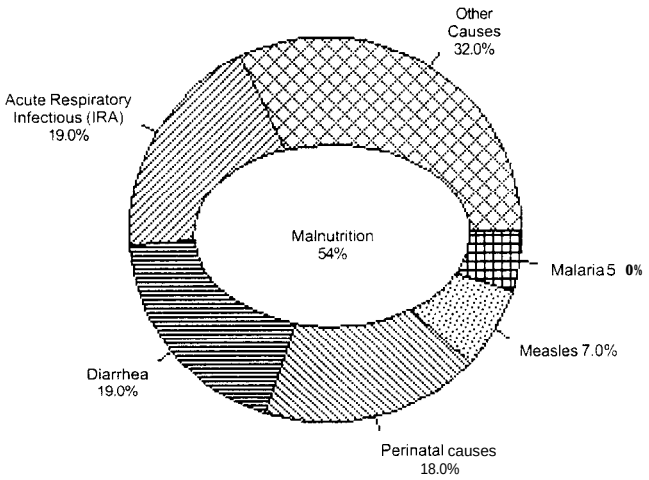
**Figure 1: Distribution of deaths of children under 5 years of age of age in al1 developing countries of the world. 1995**




Source: Based on data from The Global Burden of Desease 1996. Edited by Murray C J.L. y López A.D and Epidemiological Evidence for a Potentiating Effect of Malnutrition on Child Mortality. Pelletier D L., Frongillo D.A and Habicht AMJ Public Health 1993, 83 1130-1133

selected to support the application of specific ongoing control measures, strengthen their integration, and systematically incorporate disease prevention and health promotion components to improve the general health status of children.

**General Characteristics of the IMCI Strategy**

The IMCI strategy is a practica1 tool for health workers, since it provides standardized criteria for:

- Evaluating signs of disease and the general condition of the child.
- Classifying the child according to these signs, taking into account the possible overlapping of certain symptoms of illness.
- Determining the appropriate treatment for each category.
- Providing the family with instructions for treating the child and caring for it in the home both during the illness and once it has been cured.
- Providing follow-up to monitor the child's progress as a result of the treatment prescribed.

In emphasizing the most frequent illnesses and health problems found in children in the developing countries. the IMCI strategy takes into account components for the control of ARI and diarrhea, as well as malaria, measles, and malnutrition.

In view of the various epidemiological realities of the developing countries, in which the frequency of some of these illnesses is high while that of others is low or practically nonexistent, the IMCI strategy geared its contents to the realities of each country so that in can be adapted to the needs of health personnel, the health services, and the community.

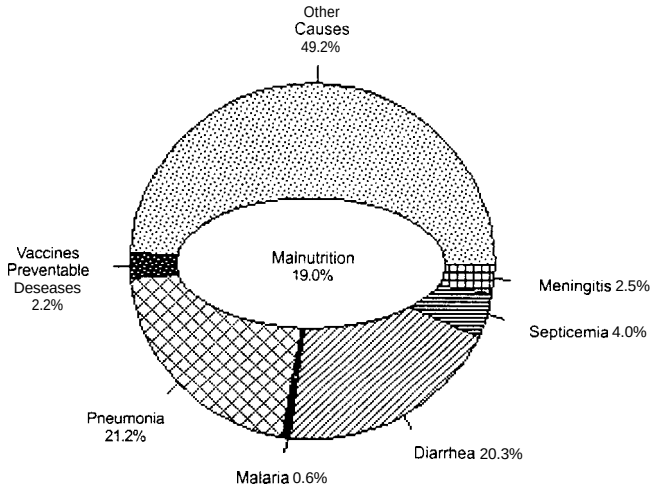
**The Profile of Child Mortality in the Region of the Americas**

Although the epidemiological profile of mortality in the Region of the Americas is generally similar to the global profile, it. nevertheless, presents certain variations (Figure 2).

The illnesses responsible for 7 out of 10 deaths worldwide account for roughly 5 out of 10 deaths in children under 5 in the hemisphere. Malnutrition, in tum, is the underlying cause of approximately 19% of the deaths in this age group, less than half of that observed worldwide.

Although pneumonia and diarrhea account for 4 out

**Figure 2: Distribution of deaths of children under 5 years of age. Region of the Americas, 1995**




Source Program of Health Situation Analysis. Division of Health and Human Development. PAHO/WHO. 1997

of 10 deaths in children under 5, the remaining causes not included within the five illnesses mentioned worldwide are responsible for 5 out of 10 deaths in this group, with disorders originating in the perinatal period, birth defects, and accidents constituting the leading causes of mortality in many countries.

**Country Variations in Infant Mortality**

The above profile, in tum, varies from one group of countries to another (Figure 3).

In the developing countries in the Americas with an infant mortality rate (IMR) of between 20 and 40 deaths per 1,000 live births, the five illnesses mentioned account for 4 out of 10 deaths in infants under 1 year of age and children 1 to 4, with perinatal disorders and accidents responsible for the remaining 6 deaths.

Nevertheless, in countries with an IMR of less than **20** deaths per 1,000 live births, these illnesses represent less than **20%** of the deaths in children under 5. Although this group of countries includes the developed countries in the Region, such as Canada and the United States, some developing countries, such as Chile, Costa Rica, Cuba, and Uruguay, have already reduced their IMR even further.

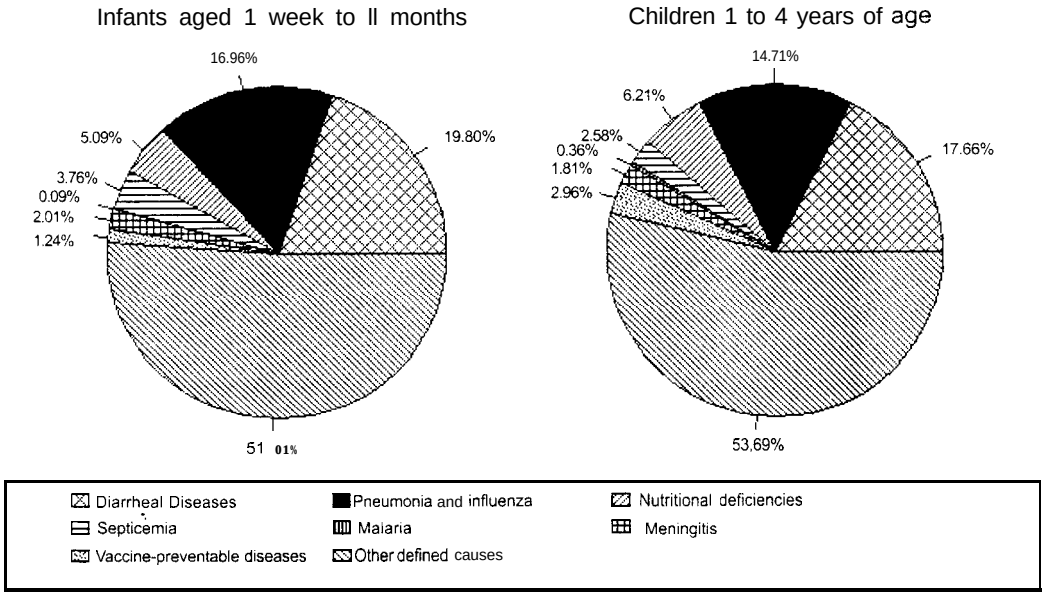
For the particular situation of the Region of the Americas, it is important to visualize the IMCI strategy not only as a tool for reducing mortality from a specific group of prevalent health problems in the developing countries, but also as an opportunity for gradually improving the health status of children.

In this regard, it should also be pointed out that, in addition to the anticipated impact of the IMCI strategy on child mortality, the health status of children is also expected to improve as a result of changes in the quality of the care provided by the health services and in the guidelines for the care of children in the home.

**The IMCI Strategy and Its Implementation in the Region of the Americas**

In view of the above, the Regional Plan for the Implementation of the IMCI strategy envisages two phases of work. which will be carried out simultaneously:

**Figure 3: Proportional distribution of deaths of children under 5 years of age in the Region of the Americas. Circa 1994**




Source Program of Health Situation Analysis. Division of Health and Human Development PAHO/WHO. 1996

- The first, geared toward rapid implementation of the IMCI strategy in al1 countries where an IMR higher than 40 per 1,000 live births is still observed. Rapid results in terms of deaths prevented are anticipated in these countries, with a corresponding reduction in existing inequities, since many such deaths no longer occur in other developing countries or in the developed countries of the Region of the Americas.
- The second, geared toward the gradual adaptation and implementation of the IMCI strategy in countries with epidemiological situations characterized by lower IMRs. Here, the emphasis is not only on assessing the impact of the strategy on child mortality, but also on its potential contribution to improved the health status of children.

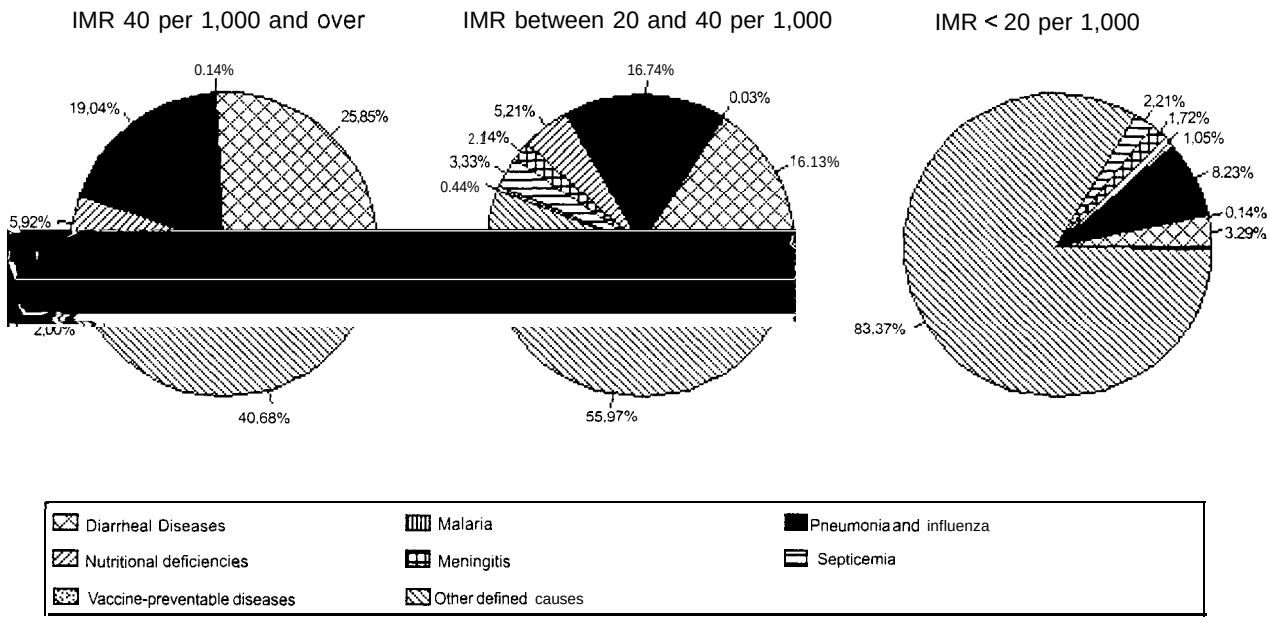
**Components of the Process for Implementing the Strategy in the Region of the Americas**

The IMCI strategy in the Region of the Americas has been supported by several bilateral cooperation agencies. In this regard, it is worth mentioning the U.S. Agency for Intemational Development (USAID), the Cooperación Española, and the govemment of the Netherlands, whose commitment made it possible to accelerate the implementation timetable and actively disseminate information about this intervention in priority countries of the Americas.

In addition to the Regional level, support for the implementation of the strategy can also be found at the country level, where multilateral, bilateral and non-governmental organization joined forces. In some countries, the strategy has been included in loan projects with the World Bank, and a large number of NGOs have incorporated it in their specific projects to be used by health workers.

The Regional Program has made initial headway on the basic component of the process for implementing the strategy-that is, improved the clinical management of the children seen at the health services; nevertheless, in its design and within the implementation process, other

**Figure 4: Proportional distribution of deaths of infants aged 1 week to 11 months in the Region of the Americas. Circa 1994**




Source: Program of Health Situation Analysis. Division of Health and Human Development. PAHO/WHO. 1997

components to strengthen and expand this component have also been taken into account.

The logistical and operational aspects of the health services and the community activities, are two of the most important of these components.

The first ultimately determines the possibility of implementing the IMCI strategy, any other interventions aimed at controlling disease and solving health problems, such as the lack of interna1 coordination in the services, the management of records and information, the organization of the provision of supplies, and referral system between levels of care.

Community activities are also considered a basic component for improving the health of children. Community practices in child health care in the home are of critica1 importance in ensuring the application of disease prevention and health promotion measures, early consultation, and compliance with treatment recommendations.

Since the IMCI strategy will to become the main instrument for improving health care for children, **human resources for health** should be prepared to collaborate in this effort. The training provided as part of the implementation of the IMCI strategy affords immediate benefits, since it rapidly multiplies the application of the strategy. However, over the medium and long term. the guarantee that health workers will continue to apply the IMCI strategy cannot rest solely with alternative mechanisms for training personnel. Inclusion of the IMCI strategy in the basic and continuing education of health workers is imperative for the countries in order to sustain its use in the health services.

University education will play a key role in this process. Not only should the IMCI strategy be incorporated in professional training, it should also become the working tool of physicians and nurses in outpatient practice and the various modalities of rural or community service. Incorporating the IMCI strategy should also stimulate research and studies on the topic of child health care that can be applied for the improvement of current practices.

The Training Units organized during the implementation of the strategies for standard case

management of acute respiratory infections and diarrheal diseases should also be integrated into the ongoing training process, as well as activities involving monitoring, evaluation. and research. Linking many of these Training Units with pediatrics departments and health sciences schools will result in a greater exchange of experiences and in a stronger relationship between the training of undergraduate and graduate students.

The work of scientific societies. which were active during the adaptation processes in the countries, could be multiplied to augment the continuous information provided to health workers on the scientific basis for the IMCI strategy's criteria for evaluation. classification, and treatment. The preliminary results of the implementation of the strategy could be disseminated within the medical and scientific communities, thereby increasing their knowledge of practica1 pùblic health experiences in the country and the Region of the Americas.

Al1 these efforts can help to initiate the dissemination of a new and different vision of health care, one that is not grounded solely in theoretic knowledge but one that introduces the realities of each particular place and the impacts that can be obtained by the application of simple. appropriate technologies that can improve the health of the population.

The concept of information, education, and communication for health as an activity is part of the implementation of the IMCI strategy and it should be expanded to encompass a global process whereby the community acquires the knowledge that will empower it to improve its present and future health conditions.

The IMCI strategy can also become an appropriate vehicle for promoting an exchange between health personnel and the population, beginning with an analysis of the problems that cause concem in each community. leading people to consult health workers or the health services.

The specific contents of the IMCI strategy should be incorporated into the school cuniculum so that children. throughout their educational process. may apply them and thereby act as agents of change in their families and communities.

**Interventions Currently Included in the IMCI Strategy.**

| | **Promotion of Growth and Disease Prevention** | **Response to Illness (curative care)** |
|---|---|---|
| Home | • Community and home intewentions to improve nutrition.<br>• Mosquito netting impregnated with insecticide. | • Early case management.<br>• Appropriate search for assistance.<br>• Compliance with treatment. |
| Health Services | . Vaccinations.<br>• Counseling for supplementary feeding and breast-feeding.<br>• Micronutrient supplements. | • Case management of: ARI, diarrhea, measles, malaria, malnutrition, other severe infections.<br>• Counseling for supplementary feeding and breast-feeding.<br>• Treatment with iron.<br>• Anthelmintic treatment. |

It is necessary t'or **research** to accelerate its role of questioning customary practices and scrutinizing them in light of the concrete results obtained in solving current health problems.

The incorporation of case studies and small-scale epidemiological and operational research will help to improve implementation of the IMCI strategy. convince health workers of the value of applying it. and produce rapid results that will demonstrate its relevance for improving the health status of children.

**Contribution of the IMCI Strategy to Development**

The IMCI strategy is also a primary tool for assisting the countries in their development. since during its preparation emphasis was placed on providing the health services and health workers at the primary care leve1 with the greatest possible capacity to solve the most frequent problems that affect the health of children.

This in itself is one of the most important foundations of the health care decentralization policy currently under way in many developing countries. By increasing the response capability of the services at the local level, implementation of the IMCI strategy helps to support decentralization. Furthermore, by permitting its adaptation in al1 the countries and even for their most remote areas, the IMCI strategy encourages the participation of the health system's decentralized levels in the identifícation their health situations and the targeting of priorities for action.

The IMCI strategy provides a concrete to establish or strengthen intersectoral health care service networks, both within single establishments (hospitals) and between different health facilities (hospitals, health centers, health posts, and community health workers). Effective application of the IMCI strategy depends on the proper operation of the different levels of the health services in an integrated manner.

Both in its initial conception and in the ongoing adaptation process, the IMCI strategy encourages coordination among programs. Implementation of the IMCI strategy in the countries, which was initially viewed as a threat to existing individual programs, eventually resulted in their strengthening. The strategy can expand coverage by offering new services, and the necessary health personnel, including the control of health problems in their routine work. as opposed to being restricted to special services.

The IMCI strategy also provided a common work objective for international organizations. bilateral cooperation agencies. and nongovernmental organizations. which, directing their attention toward improving the health status of children. made it possible to unite in a single effort projects. plans, and activities that were previously carried out separately.

Application of the IMCI strategy has also made it possible to increase the coverage of a variety of disease prevention and health promotion measures. as well as measures related to early diagnosis and treatment, thus reducing the risk of disease and death. By guaranteeing children access to a basic package of interventions of this nature, application of the IMCI strategy helps to improve equity in the health conditions of children in the countries and in the Region of the Americas as a whole.

Strengthening the relationship between the health services and the universities can also become a significant effect of the implementation of the IMCI strategy, in terms of the training of health workers and of study and research on adapting and evaluating the performance of the strategy in solving child health problems.

The IMCI strategy is also part of the reform of the health sector under way in the countries of the Region of the Americas. Since the majority of the countries envisage bolstering the response capability of the health services and ensuring the quality of the care provided, the IMCI strategy is very useful as a basic standard for the proper health care of children who are seen in the health services.

**Progress in the Region of the Americas**

Since the introduction of IMCI in the Region of the Americas, progress has been made in adapting this strategy to the epidemiological realities of the countries for implementation it in the health services. If these achievements are borne in mind, it becomes easier to understand the need to take into account immediately the future prospects for its implementation.

Nearly 20 countries in the Region of the Americas have participated in regional and subregional meetings and

workshops devoted to analyzing the adaptation of the IMCI strategy and presenting the "clinical course" for health workers to train them in the application of the strategy to outpatient care for children under 5 who visit the health service.

In 10 of these countries. essentially those with an IMR of 40 deaths per 1.000 live births or more, the IMCI strategy has been adopted as the national standard through ministerial resolutions. and in some of them, the strategy has been endorsed by the highest levels of govemment.

The 10 countries have already held national workshops on adaptation. and in nine of them the adapted materials have been printed for use in national implementation.

In eight of the 12 countries prioritized on the basis of their IMR levels, national plans of action have been prepared and initial areas for implementation identified. Local to conduct training, provide supplies. and carry out monitoring and supervision have been effected. Training has been extended to the local levels, and there are now numerous health services with at least one person trained in the application of the IMCI strategy among those responsible for the health care of children. Post-training follow-up visits are being conducted in three countries to support health workers in the effective application of the IMCI strategy.

**New Materials and Lines of Action for 1998**

Addition to progress already made, a process is under way at the regional leve1 to obtain support materials required for planning the implementation of the IMCI strategy as the gateway to achieving a continuous improvement in children's health status.

The Region's extensive group of specially formed personnel makes available high-leve1 scientific and technical facilitators to assist countries in the initial adaptation and training phase. This will be supported by the dissemination of bibliographic materials that will be used to make decisions on the evaluation, classification, and treatment components of the current IMCI strategy. These decisions will gradually enrich the strategy as progress is made to incorporate new components on the basis of epidemiological profiles of child morbidity and mortality.

Strengthening the community component in the implementation of the IMCI strategy will become an important line of work in the future. Materials designed to increase the capacity of health workers to communicate and exchange information with mothers and families at the various levels of the health services structure are being prepared for use in the Region. The course for Community Health Workers, and the course "Talking with Mothers" will help to improve community knowledge, attitudes, and practices in child care both in the health service and in the home, contributing to increased awareness of danger signs and early consultation.

Finally, the dissemination and application of protocols for epidemiological and operational research on the IMCI strategy will permit coordinated progress to be made in obtaining knowledge about the problems at hand, the results of implementing the strategy, and its ongoing adaptation to the health problems of the various countries.

These and other materials are currently in the discussion and analysis stage and will be applied through the regional network in support of the countries, especially the national consultants. These consultants have helped to speed up implementation of the IMCI strategy and to increase collective knowledge about the problems that affect the health of children and the difficulties facing the national and local level to ensure that the population has real and effective access to the available technologies for improving the health status of children.

**Source:** Division of Disease Prevention and Control, Integrated Management of Childhood Illness (IMCI), Communicable Diseases Program, HCP/HCT, PAHO.

# Summer Epidemiology Institute, 1998

The New **England Epidemiology Institute** announces its eighteenth **Annual Summer Program.** "Premier in Methods", to be conducted from 8 to 26 June, 1998 at Tufts University's Medford/Boston campus. Seventeen five-day courses will be offered. This program is intended for those seeking an introduction to modern epidemiologic concepts as well as those desiring a review of recent developments in epidemiologic thinking. The courses include: introduction to epidemiology, the design of epidemiologic studies, biostatistics for epidemiologists, causal inference, pharmacoepidemiology, epidemiological data analysis, epidemiology in developing countries, clinical trials, novel epidemiologic designs for sudden-onset events, use of biomarkers in epidemiologic research, decision & cost-effectiveness analysis in health care, logistic regression modeling, survival analysis. meta-analysis, health care utilization & outcomes research, and biology & epidemiology of cancer.

Further information is available from: The New England Epidemiology Institute. Dept. PA-PAN, One Newton Executive Park, Newton Lower Falls, MA 02162-1450, EUA. Tel.: (617) 244-1200, Fax: (617) 244-9669. Correo electrónico: epidemiol@aol.com; Internet: http://www.epidemiology.com.

# Chagas disease interruption of transmission in Uruguay

Chagas disease exists only on the American continent. It is estimated that 16-18 million people are infected by *Trypanosoma cruzi*, the parasite that causes Chagas disease and that 100 million, i.e. 25% of the population of Latin America, are at risk of acquiring the infection.

There are 2 stages of the human disease: the acute stage which appears shortly after the infection and the chronic stage which may last severa1 years and irreversibly affects interna1 organs, namely the heart, esophagus and colon as well as the peripheral nervous system.

Chagas disease is an endemic parasitic disease in Uruguay where vectorial domiciliary transmission is effected through the triatomine insect *Triatoma infestans*. *The* other mode of transmission is through infected blood transfusions.

Entomological and sero-epidemiological data for 1997 confirm that Chagas disease transmission has been interrupted. An independent Commission was appointed to certify the interruption of transmission.

In 1983, *T. infestans.* the main vector of the disease, infested human dwellings and their peridomestic annexes in the Departments of Artigas, Rivera, Tacuarembo, Salto, Rio Negro. Soriano, Colonia, Durazno and Cerro Largo, i.e. 80% of the territory of Uruguay.

The National Chagas Disease Control Programme, which was reorganized in 1983, carried out a spraying programme of human domiciles and peridomiciles with residual activity insecticides. The sustained spraying eliminated the infestation of dwellings by *T. infestans* in all departments except in Tacuarembo where the house infestation rate has been reduced by 90%.

**Table 1**
**Triatoma infestans house infestation t-ates, by department, Uruguay, 1983-1997**

| Department | House infestation rate (%) | | |
|---|---|---|---|
| | 1983 | 1992 | 1997 |
| Artigas | 2.9 | **0.0** | 0.0 |
| Rivera | 15.3 | 1.9 | 0.1 |
| Tacuarembo | 22.2 | 2.3 | 2.3 a |
| Salto | 8.8 | 2.0 | 0.0 |
| Cerro Largo | 2.6 | 0.23 | 0.0 |
| Paysandu | 0.0 | 0.0 | 0.0 |
| Rio Negro | 1.4 | 0.06 | 0.0 |
| Colonia | 0.9 | 0.0 | 0.0 |
| Durazno | 1.7 | 0.0 | 0.0 |
| Soriano | 0.7 | 0.0 | 0.0 |
| Total | 5.6 | 0.6 | 0.3 |

[a] Peridomiciliary infestation with no significance for vectorial transmission

Data for 1997 show that in al1 departments of the country, except in Tacuarembo, the house infestation rates by *T. infestans* have fallen below 0.1% which is equivalent to a reduction of 95% when compared with 1983 data (Table 1). The house infestation rate of 2.3% for Tacuarembo is an average for the whole department, but the wide dispersion of the infestation and the fact that al1 the triatomines captured were peridomiciliary insects indicate that no vectorial transmission is taking place in that area. The above is confirmed by the very low infection rate of 0. 1% observed in this department **(Table 2).**

In 1994, a serological survey to detect human *T. cruzi* infection in the highly endemic Departments of Rivera and Tacuarembo in schoolchildren aged 6-12 years showed a prevalence rate of 0.7% which is equivalent to a reduction of 88% compared with 1985 data. Data from another serological survey carried out in 1997, in the hyperendemic municipalities of the Department of Rivera, showed fully negative results in children O-5 years old. The infection rate was 0.1% in the age group 6-12 years in Tacuarembo, which represents a reduction of 98% as compared with 1985

figures (Table 2).

Two eco-epidemiological areas of Chagas disease can be defined in the country taking into consideration entomological data on house infestation by *T. infestans* and seroprevalence of human *T. cruzi* infection (Figure 1).

The designations employed and the presentation of material on the maps do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Area A: Rivera and Tacuarembo show in 1997 human seroprevalence rates ranging from 0.0% to 0.1% (compared with 6.0%-8.4% in 1992), and house infestation rates from 0.1% to 2.3% (compared with 2.0%-2.3% in 1992).

Area B: includes the rest of the country where the seroprevalence rates are 0.0% with no infestation of dwellings by *T. Infestans*.

In addition, transmission through blood transfusion is also interrupted because of the very low numbers of infected donors and of the 100% coverage provided by compulsory blood screening in the country.

These data rank Uruguay as the first Member State of the Southern Cone Countries Initiative to have accomplished the goals set by the Ministries of Health of Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay for the elimination of vectorial and transfusional transmission of Chagas disease since the multicountry programme was launched in June 1991. An independent multinational Commission met in Uruguay in September 1997 under the auspices of the Pan American Health Organization/WHO and certified the interruption of vectorial and transfusional transmission of Chagas disease in the country.

**Figure 1**
**Ecoepidemiological areas for Chagas disease in Uruguay, 1992 and 1997**

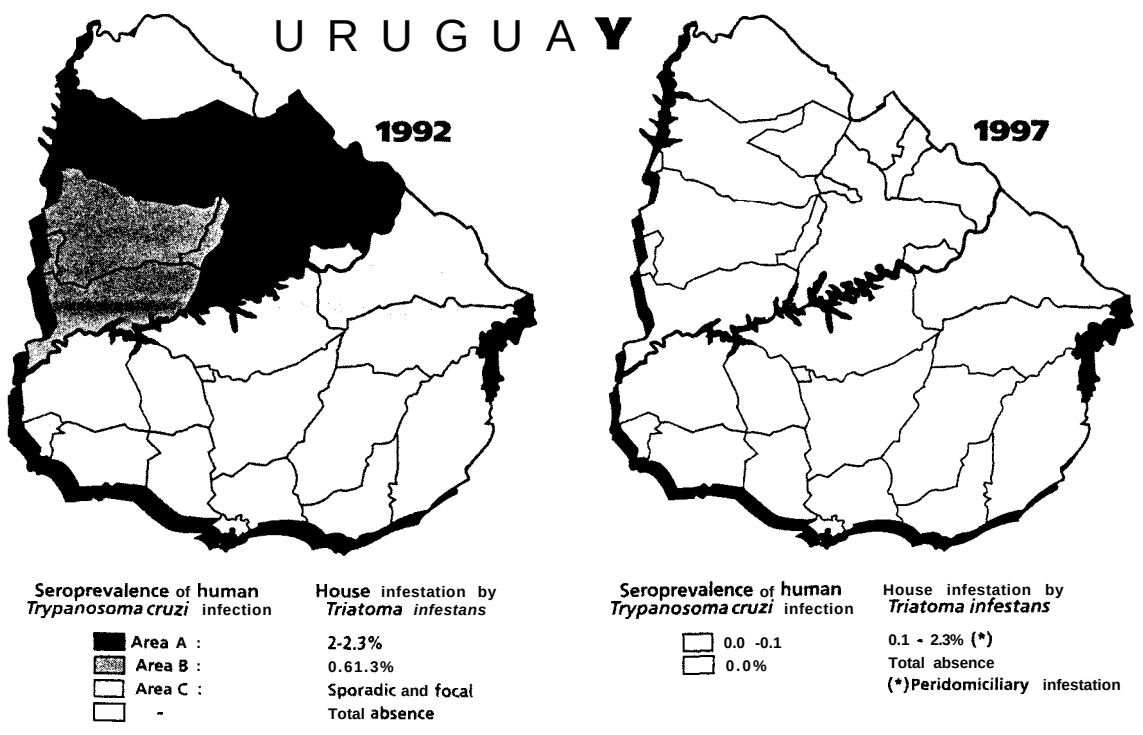


**Table 2**
**Chagas disease: seroprevalence rates in children 6-12 years old, Rivera and Tacuarembo Departments. Uruguay, 1985-1997**

| Drpurtament | Tasa de seroprevalencia (%) | | | Reducción 1985-1997 (%) |
|---|---|---|---|---|
| | 1985 | 1994 | 1997 | |
| Rivera | 3.4 | 1.2 | 0.0[a] | 100.0 |
| Tacuarembó | 4.3 | 0.5 | 0.1 | 98.0 |
| **Total** | **5.6** | 0.7 | 0.06 | 99.0 |

[a] Seroprevalence in age group 0-5 years.

(Based on: A report from the *Programa Nacional de Control de la Enfermedad de Chagas*, Ministry of Health, Montevideo in *Informe Técnico,* September *1997* and in Chagas disease – Interruption of transmission in WER/WHO. No. 1-2, 1998, pp l-4.)

**III International Workshop on Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases**
**Rio de Janeiro, Brazil, June 7-10, 1998**

It is being organized under the auspices of the Instituto Oswaldo Cruz-FIOCRUZ, ORSTOM (the National French Agency for scientific research in developing countries), CNRS (the National French agency for basic research) and the Centers for Disease Control and Prevention (CDC).

The goal of the workshop is the integration of laboratory science and epidemiology, which will foster the use of genetic information for studying evolution, emergence, reemergence, and dispersa1 of microorganisms. The objectives of the workshop are to: 1) integrate epidemiologic, molecular biologic, and evolutionary genetics approaches in areas of diagnosis. strain typing, species identification, pathogenesis. antigenic variation, drug and vaccines resistance, and host and vector specificity; 2) foster interaction between epidemiologists and laboratory scientists working on parasites, yeast and fungi, bacteria, and viruses; 3) favor integrated approaches of the genetic variability of the host, the pathogen and in the case of vector-borne diseases, the vector, in relation with the transmission and disease manifestations of infectious diseases, and 4) provide health care providers, public health professionals, epidemiologists and laboratory scientists an opportunity to discus the use of genetic tools and methodologies needed to meet the challenges of diagnosis and management of emerging, re-emerging, and endemic infectious diseases.

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# Growth retardation indicators in children under 5 years old

The purpose of this article is to contribute to knowledge about the use of anthropometric indicators to measure growth retardation in children under the age of 5 through a discussion of the advantages and disadvantages of these indicators and a presentation of estimates on the prevalence of growth retardation in selected countries of the Region.

The indicators most commonly used to measure growth retardation are height and weight. These indicators form the basis for constructing compound indicators, such as weight in relation to age (weight-for-age), length or height in relation to age (height-for-age), and weight in relation to length or height (weight-for-height).

**Advantages and Disadvantages of the Indicators**

Low weight-for-height is an indicator of wasting, low height-for-age is an indicator of linear growth retardation or stunting, and low weight-for-age is a mixed indicator that does not distinguish between stunting and wasting. Most Latin American countries have a very high prevalence of stunting and low levels of wasting (1). Consequently, if only one indicator is used, low height-for-age is the most appropriate for establishing the degree of malnutrition in the majority of the countries of the Region.

The weight-for-age indicator can mask acute or emerging problems related to low weight-for-height; therefore, it is not recommended that this first indicator be used in isolation. In Mexico, for example, where the prevalence of wasting is high compared to other Latin American countries. the weight-for-age indicator would not detect this problem. Weight-for-height changes more quickly than weight-for-age or height-for-age and thus is a useful indicator for monitoring programs and impact assessment in nutrition. Similarly, since weight-for-age is related to weight-for-height and height-for-age, the same prevalence of malnutrition, as measured by weight-for-age, can indicate completely different prevalences of wasting and stunting (2). For this reason, it is important to collect data on these two kinds of indicators.

The World Health Organization (WHO) has recommended using an intemational standard of growth ( 1983) that was developed with the data from a longitudinal study (the FELS Study) and cross-sectional surveys (HANES) that were conducted in the United States. WHO has recommended that the above indicators be expressed in units of standard deviation from a mean or median intemational reference standard (Z scores). The use of Z scores has statistical and practica1 advantages: their values have a normal distribution, which makes it possible to use parametric tests for comparing groups (t, or regression, tests). In addition, Z scores can be clearly interpreted in terms of their location in the reference distribution, and the percentage of the population below -2 DE is constant.

The disadvantage of expressing malnutrition in terms of percentages of the median, as was done in the past, is that the percentages for each age and for each indicator are not directly related to the distribution of the reference population. As a result, the interpretation of a given percentage of the median changes with the age and the indicator (i.e., weight-for-height, weight-for-age, or height-for-age). There are inconstant differences between the proportion of children who fall below a given percentage of the median and the proportion of those that fall below a given Z value.

The cut-off point generally recommended for expressing the prevalence of malnuttition is -2 DE with respect to the median reference values recommended by WHO (2). The percentage of healthy, well-nourished children that fall below this cut-off point is expected to be very low (less than 3%).

When problems related to malnutrition are present in a population, it is not just the extremes of the distribution that are affected. In general, the curve shifts to the left. Consequently, estimates of malnutrition based on the use of Z scores as cut-off points are imprecise due to false positives (children who are classified as malnourished but who in fact are small, but healthy, children) and false negatives (children who exceed cut-off point values but who grow less than their potential). Severa1 proposals for correcting these classification errors have been made. For

example. basing his argument on the assumption that the indicator values have a normal distribution function, Mora (3) proposes an algorithm for correcting estimated prevalences. Another innovative proposal for determining the prevalence of malnutrition present in a population is to use the mean Z score instead of the Z score cut-off points. This proposal is based on the observation mentioned above that. in countries with problems related to nutrition, the entire distribution of the selected indicator shifts leftward. not just in the lower values, which makes it possible to assume that virtually the entire population is growing at less than its potential. According to this line of reasoning, a measurement of central tendency like the mean is more appropriate for quantifying growth retardation than identifying percentages that fall below a certain cut-off point (4).

The discussion above has been concerned with indicators for determining the magnitude of the problem and not with indicators for determining who should benefit from programs aimed at increasing growth. It has been observed that not al1 the children who have been identified as malnourished benefit equally from nutritional interventions. For example. Ruel et al.(5) found that the thinnest children benefit the most from food supplement programs. For this reason, it is important to keep in mind that the same indicators are not equally indicative of the risk of malnutrition and the potential for benefit.

**Discussion**

It is estimated that 34% of the world's children under the age of 5 (around 184 million) are severely underweight (weight-for-age below -2 standard deviations (DD) of the reference standard recommended by WHO), due to the interaction between malnutrition and infectious diseases (6).

Growth retardation during the first years of life is associated with severa1 adverse functional effects over the short-term (during infancy and the preschool years). the most important among which are the following: diminished immunological response (7), greater risk of death (8 and 9), decreased motor development (10), and diminished mental development (ll).

A controlled longitudinal test of food supplementation conducted by the Institute of Nutrition of Central America and Panama (INCAP) (13) succeeded in substantially improving the quality and quantity of the diets of children receiving food supplements and, as a result. had a positive impact on the participants' growth and development. The principal findings of the test showed that these effects persisted through adolescence and adulthood. Subjects who received dietary supplements during early childhood were heavier. taller. and leaner (13), and had greater physical capacity (14) and better intellectual performance (15) than subjects who did not receive supplements.

In general. it has been observed that the fundamental growth problem of preschool children in the Region is stunting: wasting is much least frequent. As shown in Table 1. nutritional problems are not usually of an acute nature; they indicate a long-term process of moderate malnutrition associated with slower growth rates. as demonstrated by the high prevalence (10%) of reduced height or stunting in most countries. The situation is more serious in rural areas and for particular population groups, such as indigenous populations. However. since the data ordinarily gathered in these countries are not broken down by age, it is impossible to determine at what age the problem begins. This fact is important because it is suspected that height is affected very early on (even before the age of 6 months), which leaves a narrow window of opportunity for interventions intended to prevent stunting and the harm associated with it. Children under 2 years of age respond best to nutritional interventions.

The data available do not permit comparisons between countries due to differences in the methodologies used to classify population groups according to age, or because either different or unrepresentative indicators have been used. In addition, the interna1 validity of the data in each country is variable, and the majority of the studies do not report what methodologies were used in conducting the surveys.

Nevertheless, the available data suggest that malnutrition, as shown by anthropometric indicators, remains a serious problem in the Region, and notwithstanding the slight improvement in the situation over the past two decades, these reductions have not

been sufficient to achieve the goals of the World Summit for Children. Table 1.

Source: Based on *Crecimiento en las Américas: la magnitud de la desnutrición al final del siglo,* Division of Health Promotion and Protection. Food and Nutrition Program, HPP/HPN, PAHO/WHO, 1997

**Table 1.**

**Percentage of preschool population falling below the -2SD cut-off point, by country and year of survey. Region of the Americas, c. 1993.**

| Country | Region | Year | Sample size | Weight-for height | Height-for age | Weight-for age |
|---|---|---|---|---|---|---|
| Argentina [a] | National | 1994 | 5,296 | 1.1 | 4.7 | 1.9 |
| Bolivia [b] | National | 1992 | ND | ... | ... | 11.7 |
| Chile [a] | National' | 1994 | ND | 0.3 | 2.6 | 0.9 |
| Costa Rica [a] | National[d] | 1992 | 176,935 | . . | ... | 2.3 |
| Cuba [e] | Havana | 1993 | 1.300 | 0.4 | 2.6 | 1.4 |
| El Salvador [a] | National | 1993 | 3,483 | 1.3 | 22.8 | 11.2 |
| | Metropolitan | 1993 | 734 | 0.3 | 13.6 | 7.2 |
| | Rural | 1993 | 1,824 | 1.8 | 28.1 | 14.0 |
| Guyana [a] | National | 1993 | 581 | | ... | 18.3 |
| Haiti [a] | National | 94-95 | 2,794 | | | 27.5 |
| | Urban | | | | | 22.1 |
| | Rural | | | | | 29.8 |
| Honduras [a] | National | 91-92 | 6.166 | 1.5 | 39.4 | 19.3 |
| | Urban | | | 1.3 | 26.3 | 12.4 |
| | Rural | | | 1.6 | 47.2 | 23.2 |
| | Indigenous | 1992 | 147 | 0.7 | 70.5 | 34.0 |
| Jamaica [a] | National | 1993 | 663 | 3.5 | 9.6 | 10.2 |
| Nicaragua [e] | National | 1993 | 3.301 | 1.9 | 23.7 | 11.9 |
| | Urban | | | 1.6 | 15.6 | 8.6 |
| | Rural | | | 2.2 | 32.7 | 15.5 |
| Panama [a] | National | 1992 | 853 | 2.7 | 9.9 | 6.1 |
| Peru [f,g] | National | 91-92 | 7,035 | 1.4 | 36.5 | 10.8 |
| Dominican | National | 1991 | 2.884 | M1.2 | M20.9 | M11.2 |
| Republic [h] | | | | FO.9 | F17.8 | F9.6 |
| Venezuela" | National' | 1993 | 244,142 | 3.1 | 12.8 | 4.6 |

a Reference 16
b Reference 17
c National Surveillance System <5 years of age
d National Surveillance System <6 years of age
e Reference 18
f Reference 20
g Reference 21
h Reference 19
ND = No data

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