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## *Abstracts and Reports*

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### **Measles Elimination in the Americas**

The 44th World Health Assembly (1989) set forth a target for 1995 of reducing measles cases by 90% compared to pre-immunization levels. The World Summit for Children in September 1990 expanded this goal to include reducing measles deaths by 95%. Such an achievement would represent an important step toward the global eradication of measles in the longer term. After examining the measles elimination initiatives under way in several countries and areas of the Americas, the XXXV Meeting of PAHO's Directing Council (September 1991) requested that the feasibility of measles elimination in the Western Hemisphere be evaluated. As the first step in this analysis, PAHO convened an Informal Consultation on Measles Elimination in the Americas, held in Washington, D.C., on 28 February 1992. It was chaired by Dr. D.A. Henderson of the U.S. Office of Science and Technology Policy, who is also the chairman of the PAHO Expanded Program on Immunization (EPI) Technical Advisory Group.

The objectives of this consultation were threefold: to review the various control/elimination initiatives that have been or are being undertaken; to consider the scientific and technical feasibility of measles

elimination in the Americas; and to recommend an appropriate role for PAHO in support of the measles program.

In his opening statement, Dr. Carlyle Guerra de Macedo, PAHO's Director, noted that the Region of the Americas had pioneered a number of initiatives on disease control and elimination, such as the polio eradication effort. These activities, besides having a major impact on the burden of disease, had led to the strengthening of both the overall health infrastructure and local health services and had increased the health sector's prestige and leadership.

#### **MEASLES ELIMINATION EFFORTS**

The introduction of measles vaccine in the early 1960s had a tremendous impact on the incidence of the disease throughout the Western Hemisphere. As overall coverage increased, the epidemiology of the disease changed, resulting in lengthened interepidemic periods and diminished epidemic peaks.

In recent years, periodic epidemics have occurred among the susceptible population that accumulates during interepidemic periods, prompting more aggressive disease control measures to be taken in some areas of the Americas. The results in these countries, together with the experience of the Gambia (Africa) in the late 1960s, were reviewed by the Consultation Group.

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*Source:* Pan American Health Organization (Maternal and Child Health Program, Expanded Program on Immunization), Informal Consultation on Measles Elimination in the Americas, Washington, D.C., 28 February 1992 (unpublished document).

**The Gambia.** Periodic national measles campaigns began in the Gambia in 1967. Initially, all children under five years old received a dose of measles vaccine. Subsequent rounds of vaccination were aimed at all children not immunized in previous campaigns. Interruption of transmission was documented between 1968 and 1970, but as the vaccination strategy was discontinued measles was reintroduced from neighboring countries and transmission reestablished. This was the first demonstration of the feasibility of interrupting measles transmission throughout a country, albeit a small one.

**United States of America.** In 1978, as part of its Childhood Immunization Initiative, the United States set the goal of eliminating the indigenous transmission of measles from the country by 1982. The strategy called for high vaccination coverage with a single dose of measles vaccine, careful surveillance, and aggressive outbreak control. Coverage of over 95% of children entering school was achieved, and measles incidence dropped 99% compared to the prevaccine era. However, the goal of elimination was not accomplished, illustrating the practical difficulties involved in this theoretically possible undertaking. The large number of importations, shifting epidemiology of the disease to susceptibles in the 10- to 19-year age group, missed vaccination opportunities, and the highly contagious nature of the disease proved formidable challenges. In spite of these difficulties, the United States still maintains the goal of eliminating indigenous measles transmission.

**Cuba.** In 1988 Cuba launched an initiative to eliminate indigenous measles transmission by 1995. It now appears that transmission may have been interrupted by 1989 and that the few cases reported in the last three years were imported.

However, no data are available to substantiate this assumption. The successful Cuban program was based on a massive measles immunization campaign that achieved over 95% coverage of children 1–14 years old.

**English-speaking Caribbean.** An initiative to eliminate indigenous transmission of measles by 1995 was begun in this subregion in 1988. The strategy was to reinforce the routine delivery of measles vaccine in all health facilities and to conduct a campaign to vaccinate all children 1–14 years old, regardless of previous vaccination status. The mass campaign, which took place in May 1991, immunized over 90% of the children in the target group. Measures to strengthen the surveillance system have followed. Since September 1991, only four measles cases have been detected in the countries that implemented the strategy outlined above, and all were imported cases. It now appears that transmission has been interrupted in most countries.

**São Paulo, Brazil.** Following a major measles epidemic in 1985–1986, the São Paulo State Health Secretariat began a program to control and eventually eliminate measles in that state. The measures taken included mass vaccination of the population 1–14 years of age regardless of previous vaccination status; maintenance of high coverage levels through vaccination in the existing health services; and implementation of a more responsive and active surveillance system, employing outbreak investigation and control measures. From 1979 to 1987 an average of 3,666 hospitalized cases had been reported each year; from 1987 to 1990 the average number of cases declined to 208 and deaths were reduced by 98%. The experience of São Paulo State led the Ministry of Health of Brazil to begin a national vaccination campaign in

April 1992 targeting children 1–14 years of age. In May of this year, Brazil vaccinated 47 million children in this age group, or about 95% of the total.

**Other initiatives.** In November 1991, the Council of Ministers of Health of the Central American countries resolved to eliminate the indigenous transmission of measles in Central America by 1997. Activities toward this goal are set to begin in 1992. In April of this year, Chile began its own measles elimination campaign, vaccinating 3.9 million children 1–14 years of age—99% of the population in this age group.

## CONCLUSIONS AND RECOMMENDATIONS

The Group recognized that PAHO has historically played a leading role in the control of vaccine-preventable diseases. This Region was the first to be free of smallpox and developed several strategies that led to greatly improved immunization programs, such as a revolving fund for vaccine purchases and the prioritizing of surveillance within national immunization programs. It was also the first to decide on poliomyelitis eradication, and the strategies now being applied worldwide to that end were developed in the Americas. In this context, PAHO's effort to enhance measles control, possibly leading to global eradication, would be yet another "first."

The Group emphasized that the measles virus results in more deaths than any other known microorganism. Therefore, measles vaccination programs command the highest priority. The health burden of measles affects both developing and developed countries. Data from recent studies of the cost effectiveness of health interventions show that measles vaccination is the most cost-effective medical procedure in terms of adding discounted

healthy life years (International Bank for Reconstruction and Development, unpublished list).

Given that humans are the only host for the measles virus, that the illness is short-term and followed by permanent immunity, and that a highly protective (over 90% efficacious) vaccine is available, the Group agreed that interruption of measles transmission is theoretically possible. It has been achieved in some places for limited periods, but never over a wide geographic area. Thus, determining the practicability of this objective in selected areas and countries—as is being done in the ongoing initiatives—is useful and will help address several important questions:

- What are the best approaches for measles surveillance, in terms of clinical case definition, follow-up, and laboratory diagnosis using a single blood specimen?
- What levels of immunity are necessary to achieve interruption of transmission in different urban and rural environments?
- What is the best vaccine, vaccination schedule, and vaccine delivery strategy to stop transmission in view of the changing epidemiology of the disease?
- Given the highly contagious nature of measles, how can a "transmission-free" status be sustained once the disease is reintroduced into a given population, and what is the best strategy to control outbreaks?
- What are the managerial constraints, both financial and operational, including those related to vaccine supply?

The Group considered that PAHO should support measles-control efforts designed to lead to the disease's elimination. It therefore recommended that

PAHO give support to the initiatives in Brazil, Chile, Cuba, the Central American countries, and the English-speaking Caribbean, as they represent valuable steps toward assessing the feasibility of measles elimination throughout the Western Hemisphere. These initiatives should be pursued within the context of

the overall PAHO policies on strengthening the health infrastructure and decentralizing services.

As lessons are learned and barriers are further identified and removed, PAHO should continuously reassess the feasibility and timing of a measles elimination goal for the Western Hemisphere.



## Control of Acute Respiratory Infections in the Americas

### MAGNITUDE OF THE PROBLEM

Acute respiratory infections (ARI) are now recognized as one of the principal health problems in children under five years old in developing countries. It is estimated that worldwide each year some 4 million children die from ARI, 80% to 90% from pneumonia. In the Region of the Americas, pneumonia mortality constitutes an important problem in children under five. Annually, more than 100,000 children under one and more than 40,000 children one to four years old die from this cause. Most of these deaths take place in the developing countries of the Region, with only 1% occurring in the industrialized countries of North America.

Pneumonia is responsible for 10% to 25% of all deaths among children under five in the developing countries of the Americas, while the proportion is only 1% to 3% in industrialized countries (Figure 1). It is among the three leading causes of death in children under one year in 18 countries, the fourth cause of death in five countries, and the fifth in three. Only in one country is pneumonia not one of

the five leading causes of infant death. Among children one to four years of age, pneumonia is the leading cause of death in one country, the second or third cause in 17 countries, and the fifth cause in two countries. There are only two countries where pneumonia is not among the leading causes of death in this age group.

The contrast in the magnitude of this problem between the developed and developing countries of the Region deepened in the 1980s. In 1987, some subregions of the Americas had pneumonia mortality rates similar to those in the United States and Canada almost 50 years ago (Figure 2). While the developed countries continued to reduce mortality by 13% to 16% in the 1980s, the reductions in the developing countries were much less: only seven countries achieved decreases of 10%, nine between 5% and 10%, and six less than 5%; in four countries the rates remained stable.

In addition to being one of the principal causes of death in children under five, ARI are the main cause of consultation at health services, representing 30% to 60% of total visits and 20% to 40% of