



# EPI Newsletter

## Expanded Program on Immunization in the Americas

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IMMUNIZE AND PROTECT YOUR CHILDREN

October 2002

### Six weeks without reported indigenous measles transmission in the Americas

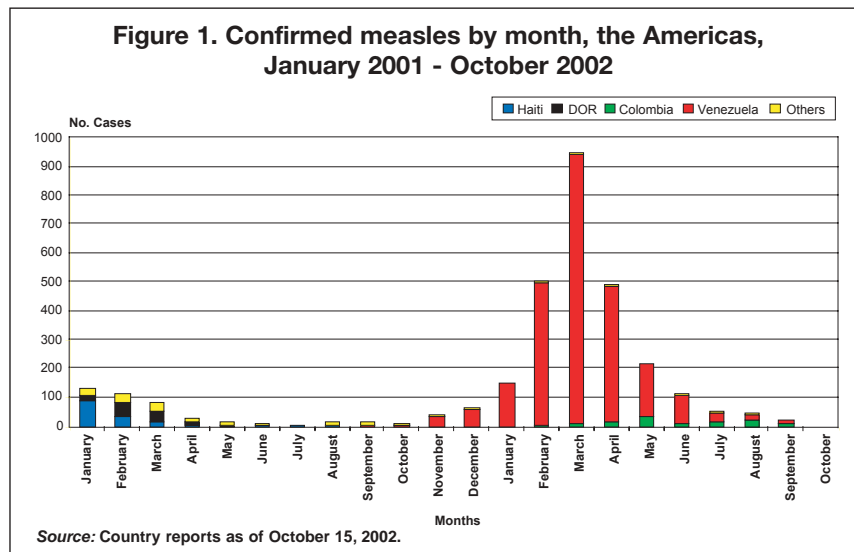
#### Background

Measles is one of the most infectious diseases known to man and remains the leading cause of vaccine-preventable deaths worldwide. Prior to the introduction of the vaccine, practically all children became infected. In 1994, during the Pan American Sanitary Conference, the Americas embarked on the goal of interruption of indigenous measles transmission.

PAHO's recommended strategy for the interruption of measles transmission includes: (a) an initial mass vaccination campaign (*catch-up*) for children aged 9 months to 14 years, (b) vaccination of children aged >1 year old in routine vaccination services (*keep-up*), and (c) complementary mass vaccination campaigns every four years (*follow-up*), for all children ages 1 to 4 years. PAHO has recommended reaching a 95% vaccination coverage in every municipality of the countries. This strategy is complemented by (a) a sensitive surveillance system capable of timely detecting suspected measles circulation, (b) the confirmation and thorough investigation of all cases, (c) an effective virologic surveillance system, and (d) strong supervision of vaccination activities, including rapid house-to-house monitoring of vaccination coverage.

In the Americas, from 1990 to 1996, measles cases declined from approximately 250,000 to 2,109. In 1997 there was a resurgence of measles virus circulation, with 52,284 confirmed

cases reported from Brazil, which started with a large urban outbreak in São Paulo. The virus strain that caused the outbreak was D6, which had been circulating since at least 1995 in Brazil and possibly other countries of the Region. The D6 outbreak spread to Argentina and Bolivia, where the largest number of measles cases occurred during 1998 and 1999, respectively, and then



to the Dominican Republic and Haiti, which had the largest number of cases in 2000 and 2001 (Figure 1). Sustained vaccination efforts by these countries led to the progressive decrease of cases region-wide to 3,209 in 1999, and 1,754 in 2000. In 2001, the total number of confirmed measles cases had dropped to 541, the lowest yearly number since the beginning of the hemispheric measles initiative. Since September, 2001, no other viruses of the D6 strain have been identified in the Americas. Moreover, numerous countries with high measles vaccination coverage, including Brazil, Canada, Chile, Costa Rica, El Salvador, Chile, Mexico, Peru, United States and Uruguay, had measles importations during 1999-2002 with

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limited or no secondary transmission. In August, 2001, after an importation from Europe, a new measles outbreak began in Venezuela and spread to neighboring Colombia (Figure 1). The virus responsible was a new measles strain, d9, never before identified in the Americas. Following important vaccination efforts in both countries, these outbreaks are being controlled. As of October 15, 2002 and since the beginning of these outbreaks, a total of 2,495 cases in Venezuela, and 128 in Colombia have been confirmed. The last confirmed case occurred in Venezuela in September 20, 2002. Since then, no other indigenous measles cases have been reported. This represents the longest period without reports of indigenous measles transmission since the Regional Plan of Action for Measles Eradication was implemented in 1996.

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**Editorial Note:** By interrupting regionwide the indigenous transmission of at least one measles strain (D6) for over a year,

by experiencing an unprecedented six weeks without reports of any indigenous measles, and by experiencing repeated measles importations with limited or no secondary transmission, countries of the Americas have shown that global measles eradication, following PAHO's recommended strategies, is possible. Nonetheless, intensive active search for cases in areas of civil unrest in Colombia, and areas of Colombia and Venezuela that still maintain either low measles coverage or insufficient surveillance will be needed to confirm that indigenous measles transmission has effectively been interrupted.

To maintain the Region free of indigenous measles transmission in the absence of global measles eradication, all countries in the Americas will need to: (1) achieve and maintain high (>95%) vaccination coverage by municipality during both routine and *follow-up* measles vaccination, and (2) maintain strong surveillance and case investigation efforts.

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## Accelerated rubella control and prevention of CRS evolving strategies

In response to ongoing rubella virus circulation and the potential for major rubella epidemics in the Region, PAHO's 1997 Technical Advisory Group on Vaccine Preventable Diseases (TAG) addressed the issue and recommended the implementation of a regional initiative to strengthen rubella control and congenital rubella syndrome (CRS) prevention efforts. At the time, the initiative included the introduction of a rubella-containing vaccine into routine childhood immunization programs; vaccination of women of childbearing age; the development of specific vaccination strategies for the accelerated rubella control and CRS prevention; the development of integrated surveillance systems for measles and rubella; the implementation of a CRS surveillance system; and support for enhanced laboratory capabilities in rubella virus isolation.

In 1986, sixteen years after licensure of the rubella vaccine, six countries (the United States, Canada, Cuba, Panama, Costa Rica and Uruguay) had introduced MMR vaccine into their childhood programs. It was only in 2002, that 41 of the 44 countries and territories in the Americas had finally introduced a rubella-containing vaccine (MR or MMR) in their national childhood immunization program. The remaining three countries, Peru, Haiti and the Dominican Republic will follow suit between 2003 and 2004.

Using a combined strategy that targeted adult women and children with a rubella-containing vaccine, Cuba was the first country to eliminate rubella and CRS, with the last CRS case reported in 1989, and the last rubella case in 1995. This goal was largely achieved through the implementation of two mass vaccination campaigns in 1985 and 1986, initially targeting women aged 18 to 30 years, and subsequently children aged 1 to 14 years.

At the 1999 TAG held in Canada, an accelerated rubella control and CRS prevention strategy was developed for the Americas, which followed the experience of the English-speaking Caribbean countries and Cuba in adult mass vaccination campaigns against rubella. The strategy rests on the combined vaccination of adult men and women, coupled with rubella vaccine introduction into national childhood immunization programs. This combined vaccination strategy seeks to achieve rapid reduction of rubella virus circulation, while preventing the shift of disease burden to susceptible young adults, particularly women of childbearing age, thus, avoiding the incidence of CRS. The principal rationale of an accelerated vaccination strategy is to reduce the time it takes to interrupt rubella virus circulation and prevent CRS occurrence. Most countries in the Region have already implemented routine childhood rubella vaccination, and this strategy is protecting children as they reach their first year of life. Nevertheless, this vaccination strategy is likely take over 20 years to control CRS, as several cohorts of childbearing women will remain susceptible to rubella virus.

Cuba's experience and that of the English-speaking Caribbean countries have helped shape the initiatives of accelerated control in Chile, Costa Rica, Brazil and Honduras (Figure 1). These four countries have conducted adult mass vaccination campaigns for accelerated rubella control and CRS prevention: Brazil (refer to *EPI Newsletter*, April 2002) and Chile (*EPI Newsletter*, December 1999) have targeted these campaigns to women only, while Costa Rica (*EPI Newsletter*, February and June 2001) and Honduras (to be published in the February 2003 issue of the *EPI Newsletter*) have carried out rubella campaigns that included men and women. Critical knowledge is being developed

for the continuous development of successful and sustainable vaccination strategies of adults that reach coverage levels of at least 90%.

Lessons have been gained in the mass vaccination of heterogeneous population groups that have included men, women and adolescents. In Costa Rica for example, 42% of the population (1.6 million), which included men and women were vaccinated within the timeframe of one month. The mass vaccination of 28 million women in Brazil against rubella has further provided important lessons on the vaccination of large population groups. All of these countries have used the MR vaccines with the exception of Chile, which used the rubella vaccine in its single presentation.

The experience of the English-speaking Caribbean countries has also provided useful insights on the cost-benefits of immunizing against rubella infection. These studies show that the benefits of accelerated control vaccination far outweighs the costs associated with the treatment and rehabilitation of

CRS. The cost-benefit ratio was estimated at 13.3:1 for the interruption of rubella and CRS prevention in the entire English-speaking Caribbean. The cost-effectiveness of mass campaigns has been estimated to average US\$ 2,900 per case of CRS prevented. The countries of Barbados and Guyana estimated their own costs for interruption of transmission, with a cost benefit ratio of 4.7:1 for Barbados, and of 38.8:1, for Guyana, and a cost-effectiveness of US\$ 1,633 per CRS case prevented.

The impact of accelerated rubella vaccination strategies on rapid reduction of CRS morbidity in Cuba, the English-speaking Caribbean and in Chile is being reported, as well as the rapid interruption of rubella virus transmission in Costa Rica. CRS is now recognized as a serious public health problem, but limited surveillance data remains a source of concern, providing only a partial view of real disease burden and success of initiatives. In response, additional tools that can enhance the identification of suspected CRS cases are being implemented. These include the collaboration with regional systems such the Perinatal Information System (SIP 2000) from the Latin American Center for Perinatology and Human Development (CLAP) and the Congenital Malformation Latin-American Collaborative Study (ECLAMC). Information collected includes: history of exposure to rubella, clinical illness during the mother's preg-

nancy, vaccination status of the mother, as well as laboratory confirmation of maternal rubella and any congenital malformations, hepato-splenomegaly and purpura in the newborns.

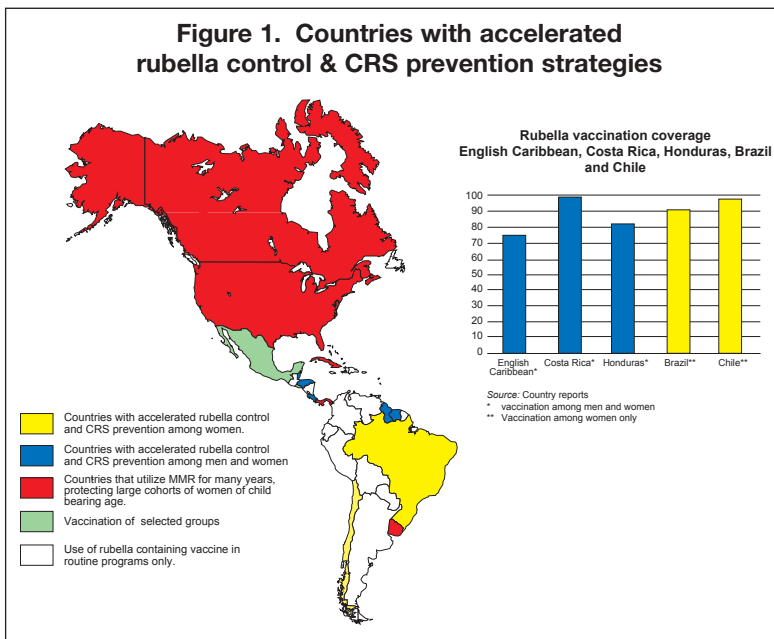
As countries in the Americas embark on the accelerated control of rubella, documenting the endemic strain in each country will become critical in determining whether the case is imported or not. As with measles, even though a country has eliminated rubella, importations of the virus may occur and can only be avoided when other regions worldwide carry out

similar efforts. Laboratory confirmation of the diagnosis is therefore recommended. Rubella IgM is readily detected in the first six months of life. Rubella virus may be isolated from naso-pharyngeal swab 6 to 12 months following birth. Currently, however, few clinical cases of rubella are being confirmed by laboratory testing, and few virologic specimens are being submitted for molecular typing. As countries establish accelerated rubella control and CRS programs, these areas will need to be strengthened.

Testing viral isolates for molecular typing will allow for understanding of the source and the propagation of rubella outbreaks and CRS cases, as well as determination of the variations of rubella strains.

Countries with the strategy of accelerated rubella control already underway will need to maintain effective surveillance systems. The surveillance of rash and fever is currently the most effective tool. Surveillance systems and adequate laboratory diagnosis should be able to detect rubella activity, document the impact of the rubella vaccination strategy being implemented, as well as closely investigate and obtain knowledge of each confirmed case, rather than simply tracking the location where the virus is circulating. Emphasis should be placed on laboratory confirmation of all suspected rubella cases.

Countries are reporting great progress in their efforts to control rubella and prevent CRS. Health authorities in the Region have embraced the challenge by providing key political support at the country level. At the 26th Pan American Sanitary Conference celebrated in September, 2002, PAHO's Governing Bodies approved a resolution calling for Member States to undertake accelerated control of rubella and congenital rubella syndrome prevention initiatives, and to continue improving epidemiological surveillance of rubella and CRS, as well as laboratory diagnosis and investigation procedures.



## Supervision: an under-utilized management tool to identify risk areas

Supervision is not being used systematically by all countries of the Region as an effective management tool. This lack of regular supervision has contributed to failures in identifying areas at risk for low vaccination coverage, resulting in inadequate and/or insufficient resources and management attention in these areas. Country data on vaccination coverage at the municipal level, results of measles outbreak investigations, on house-to-house monitoring of vaccination campaigns, and surveys show insufficient vaccination coverage, particularly in poor and under-served rural population groups, as well as among rural migrants residing in the outskirts of large cities. To improve routine immunization services, PAHO has proposed strengthening regular supervision at all health establishments, as both an educational tool, and as a means to enhance accountability at the local level.

### Key components of an effective supervision strategy

- *Standardized supervision protocols that include the following activities*

At health establishments supervisors should review: (a) vaccination practices, including injection practices, and disposal of used syringes; (b) administrative data on vaccination, local population estimates, evaluation of DTP1 (or BCG)/DTP3 (or measles) drop-out rates; (c) cold chain equipment, including maintenance of adequate refrigerator temperature; (d) weekly reporting of vaccine-preventable diseases; and (e) programming and implementation of outreach vaccination activities.

At the community level supervisors should: (a) perform house-to-house monitoring of vaccination of children ages 0-4 years, to determine first-hand the completion

of their vaccination schedule, feedback on problems encountered by parents when children were vaccinated, and reasons for non-vaccination; (b) seek cooperation and feedback from local authorities, community leaders, organizations and private health care providers; (c) utilize information obtained to provide educational feedback to health staff managing health establishments on ways to improve program performance.

Written feedback: Prepare a short report of the visit (with a copy for the health establishment) that includes: (1) main findings; (2) areas in need of improvement and remedial steps needed; (3) feedback from the local manager; and (4) expected date of next supervisory visit.

- *Existing indicators to be used to select high-risk areas that require frequent visits*

Selection criteria could include: (1) populations with insufficient health services; (2) areas with low vaccination coverage or high drop-out rates; (3) areas with silent surveillance; and (4) areas with rural-to-rural migration.

- *Sufficient resources should be made available for the implementation of regular supervision*

Ensure that National Plans of Action for immunization include adequate resources to support regular supervision at both the national and local levels, and take into account resources for training supervisors.

The sustained implementation of a well-managed supervision strategy will aid in improving program performance and accountability at all health establishments, particularly at those in high-risk. These efforts should also help countries in attaining uniform, quality immunization in all municipalities.

## Achieving equitable immunization coverage: The Bolivia Project

### Background

Vaccines are considered one of the most cost-effective practices in the field of public health. Accordingly, they are generally offered free of charge in health services and the Expanded Program of Immunization (EPI) is considered a key component within basic health care strategies for the general population. EPI's goal is to guarantee and ensure universal access to immunization services for all children with special emphasis given to the population at increased risk of contracting vaccine-preventable diseases. The search for equity in the delivery of vaccination services is a key priority for national immunization programs. Thus, the existence of municipalities with coverage levels under 80% demonstrates that coverage is not equally distributed throughout a country. Such municipalities constitute high-

risk areas for both increased disease transmission, as well as for epidemics. Therefore, the causes of low coverage levels in such municipalities should be clearly identified and investigated, and actions should be taken to overcome any barriers to achieving high coverage. Within this framework, a Project was developed in 1999 (see *EPI Newsletter*, August 1999 and 2001), between the government of Bolivia, the World Bank, and PAHO which focuses on three lines of action: 1) institutional strengthening of EPI to promote the adoption and implementation of immunization policies; 2) strengthening of health services in general to improve vaccination coverage and to facilitate the introduction of new vaccines; and 3) strengthening of information and surveillance systems. In order to measure compliance with the Project's goals, indicators of vaccination activities and financing were



developed. Municipalities at risk were defined as those reporting DTP3 or pentavalent 3 coverage levels under 80%.

## Methods

As a part of the strategic plan to reduce the number of municipalities at risk, those reporting low coverage for various years were analyzed for years 1997 to 2001. Data prepared by the EPI program using the National Health Information System (SNIS) database utilized to determine the number of doses of vaccine administered, and data from the National Institute of Statistics (INE) were used to determine the population for the denominator in coverage calculations. The information of the study corresponds to years 1997 through 2001 for DTP3/ pentavalent 3. Pentavalent vaccine was introduced in Bolivia in July 2000.

### Definition of chronic low-coverage municipality

A chronic low-coverage municipality was defined as any municipality with coverage levels below 80% during two or more or years during the last five years. Municipalities were grouped into high priority, medium priority, and low priority. This classification aided in the prioritization of municipalities for vaccination activities.

- \* **High priority:** Municipalities that reported DTP3 or pentavalent 3 vaccination coverage under 80% for all of the last five years.
- \* **Medium priority:** Municipalities that reported DTP3 or pentavalent 3 vaccination coverage under 80% during three to four years of the last five years.
- \* **Lower priority:** Municipalities that reported DTP3 or pentavalent 3 vaccination coverage under 80% in two years of the last five years.

Among the municipalities selected for interventions, a working group will be organized with the participation of municipal mayors, health workers, and grass-roots organizations. This group will be responsible for developing local medium and long-term plans, which will be signed as agreements between all members of the group. The central level of the Ministry of Health will assign staff for direct technical support and monitoring of the project.

## Classification of Municipalities

Bolivia has 314 municipalities and a total population of 8,328,772 (for year 2001), of which 251,363 are children under 1 year of age. There are 27 municipalities classified as high priority with a combined population of 8,077 children under 1 year of age (Table 1). The majority of municipalities in this category are rural and indigenous. The average population per municipality of children less than 1 year old in these high-priority municipalities is 300. There are 94 municipalities classified as medium priority with a total popu-

lation of 93,363 children under the age of 1. Thirty three (35%) of these municipalities are located in La Paz . There are 53 municipalities classified as low priority with a total population of 45,458 children under 1 year of age. The greatest proportion of the population in this priority group are located in Cochabamba (52%) and in Santa Cruz (12%). Finally, there are 140 municipalities that were not classified as being at risk, with a population of 106,178 children less than 1 year of age. The area with greatest percentage of municipalities is this category is Potosi with 20%.

**Table 1. Number of municipalities at risk by Department and priority classification, Bolivia, 1997-2001**

Area	Total municipalities per department	High priority	Medium priority	Low priority
Beni	19	3	9	2
Cochabamba	44	1	16	11
La Paz	75	14	33	9
Pando	15	3	8	3
Potosi	38	0	6	5
Santa Cruz	50	3	13	10
Tarija	11	3	1	3
Oruro	34	0	3	3
Chquisaca	28	0	5	7
<b>Total</b>	<b>314</b>	<b>27</b>	<b>94</b>	<b>53</b>

## Immunization Equity Plan

The national immunization program is developing and implementing a strategy that seeks, through dialogue with local community leaders, local level commitment for the support of the national program. This strategy will include the use of mobile vaccination brigades (BEARs), which are widely used in Bolivia to work on municipalities considered at high-risk. As usual, the brigades will work closely with local community members in developing a diagnosis of the problem and for implementing an agreed upon plan. Technical assessments will evaluate the causes of low coverage and undertake comprehensive reviews of problems encountered. Part of the analysis of problems associated with coverage estimates will be based on the reliability of official denominators, that is populations, for each municipality, combined with the use of PAHO's rapid monitoring tools as a part of supervision and situation analysis activities. Challenges for the analysis include how to best assess coverage levels in municipalities with intense migration that can result in erroneous populations figures.

A critical component of the Project is the permanent link and communication between municipalities and the Departmental and the Central level of the Ministry. It is important that the Ministry give staff the responsibility to monitor these municipalities and provide technical support for the timely implementation of plans. In the medium-term, an

evaluation of the participation of community and municipal authorities will be carried out to improve the functioning of the plan, and to give recognition to municipalities who have effectively eliminated or lowered a risk classification. This immunization equity plan is currently included in the national government's Health Plan that addresses the reduction of social exclusion from national health services. Community participation is a key aspect of the immunization equity plan which will ensure access for those who are currently not benefiting from health services.

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**Editorial Note:** Achievement of high vaccination coverage levels at the local level is a key mission goal for PAHO and for national immunization programs. Although regional and national coverage levels by vaccine are quite high, variation exists in many, if not most, countries at the local level.

## Quality control system for the surveillance of bacterial meningitis and pneumonia

A key task at hand following the implementation of the regional surveillance system for *S. pneumoniae*, that was later expanded to include *H. influenzae* and *N. meningitidis*, has been the standardization of laboratory methodologies and the commitment of laboratories to Quality Assurance at all levels. These efforts seek to ensure that regional and country technically valid data are produced.

The standardization has been achieved through effective training programs that began at the main reference center, the National Streptococcus Centre in Albert, Canada, to every public health laboratory in the Region, and from there to laboratories at participating hospitals. Close collaboration has been established among public health laboratories of the different countries that joined the system, which also involved research collaborations and knowledge sharing and expertise. The training involved primary isolation, identification, susceptibility testing, characterization of pneumococci, as well as serotyping, antibiotic susceptibility testing, and in some instances, molecular analyses.

The Quality Control-Quality Assurance system has included: proficiency testing (panel of unknowns sent from the main reference center to sub-regional centers in Mexico, Colombia and Brazil, and then to public health laboratories in the rest of the Americas), and verification of submitted isolates (10% of all typable *S. pneumoniae*, all 'non-typable' *S. pneumoniae*, and 25% of antibiotic resistant strains). The quality system is active, as it involves continuous communication between the centers and countries, discussions and preparation of summary report of results. The panels used are designed based on appropriate level of challenge, and as an educational and improvement tool. These need to be evaluated as part of routine laboratory processes, to monitor all components of the testing system (media, reagents, antis-

Currently, PAHO has adopted equity in the provision of health services as a key organizational goal. Accordingly, it is placing renewed emphasis on accelerating activities at the local level to improve local coverage. As part of this effort, all countries should monitor local coverage. Municipalities with low coverage should be targeted for assessments to determine the reasons for low coverage and to assist in developing micro-local level action plans to address and correct any problem detected. Key to such assessments will be educational supervisory visits that place emphasis on the review of data management, the vaccination registry, current health center vaccination practices and policies and attitudes and beliefs of the community, as determined from rapid monitoring activities in the community. Such activities will not only assist in preventing and controlling vaccine-preventable diseases, but will also be essential in achieving equity in the provision of immunization services.

era), technical precision and test interpretation, as well as data entry and reporting.

In 2001, contacts were made with the Haemophilus Reference Center of the United Kingdom's Public Health Laboratory System, a WHO Collaborating Center, to act as the external QC-QA reference center for *H. influenzae* in the Americas. At the end of 2001, a workshop was conducted to standardize laboratory techniques for *Neisseria meningitidis*, and the decision was taken to request the services of the Instituto Adolfo Lutz in Sao Paulo, Brazil as the reference center for meningococci. Thus, by the year 2002, the surveillance of bacterial meningitis and pneumonia is being supported by a QC-QA system that addresses the quality of data referring to *S. pneumoniae*, *H. influenzae* and *N. meningitidis*.

In September 2002, a meeting was held in Cuernavaca, Morelos, Mexico to discuss the status of the QC-QA system with representatives from the Regional (Canada and the United Kingdom) and sub-regional reference centers (Brazil, Colombia and Mexico). The purpose of the meeting was to provide updates of results, as well as share lessons learned. In general, results on the panels from three sub-regional centers sent from the NCS correlate over 90% of the time for serotyping and antimicrobial susceptibility of *S. pneumoniae*. When errors occur, they are deemed minor. Some discrepancies were observed on submitted isolates (15% for serotyping and 10% for antimicrobial susceptibility), but they were almost always resolved on repeat testing by the submitting laboratory. Overall, for panels sent by the *Haemophilus* laboratory results have been of good standards, with some problems in the interpretation of slide agglutinations, but PCR would provide a type for strains that give inconclusive results on slide agglutination. Almost all *H. influenzae* type b were identified correctly.

The QC-QA system from the sub-regional centers to the countries has also obtained good results in the correlation of serotyping and antimicrobial susceptibility. Among major problems identified is international transportation. Shipping of isolates is more difficult getting every day: import permits are required, costs are high, and there are limited courier options. This is reflected on the sporadic reception and submission of isolates. QC-QA programs require financial resources, which are unfortunately becoming more reduced at regional public health laboratories.

In conclusion, the QA-QC system has strengthened public health laboratories in the Region through inter-country and inter-laboratory technical and scientific collaborations, as well as by supporting the validity of information being generated from the surveillance system of bacterial pneumonia and meningitis. It is important that National Authorities recognize the value of QA and QC, and provide the necessary support to strengthen these activities and extend them to the whole public health laboratory system in their respective countries.

## Diphtheria outbreak in Paraguay – an update

### Background

During epidemiological week 7 of 2002 (week ending February 2) a diphtheria case in a 4 year old child was reported from the district of Capiata in the Central region of Paraguay (see *EPI Newsletter*, June 2002). During epidemiological week 13 (March 30), a second case from the same region was reported in the district of J. Augusto Saldivar. Subsequently, two additional cases were reported in week 15 (April 13) and were later laboratory-confirmed.

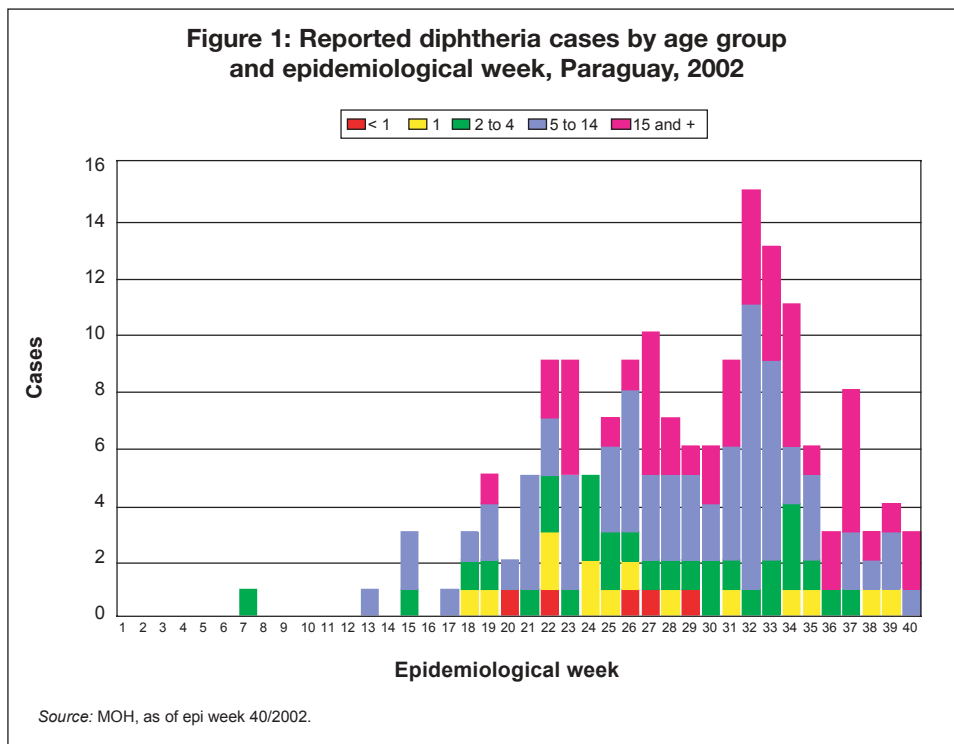
As of epidemiological week 40 (October 5), 164 cases had been reported (Figure 1). Of the 164 reported cases, 47 were confirmed, 31 by laboratory, 12 clinically, and 4 by epidemiological link (Figure 2). One hundred and three cases were discarded and 14 remained under investigation. Seven deaths have been reported, with a case fatality rate of 15%.

Diphtheria had shown a decreasing trend in Paraguay for the past 22 years, with the exception of a reported increase from 1985 to 1987. In 1985, Paraguay reported the highest rate ever per 100,000 persons, i.e., 0.75. From 1996 to 2000 no cases were reported. In 2001, an isolated case, reported from the Department of Alto Parana, was later confirmed as diphtheria. No additional cases were reported from that area even after a thorough investigation. Between 1995 and

2001, national coverage for DPT3 ranged between 79% and 89%. Reported vaccination coverage in 2001 for DPT3 in the affected areas of the diphtheria outbreak ranged between 86% and 99%.

The outbreak affected five districts in the Central region (Aregua, Capiata, Nemby, San Lorenzo, and J.A. Saldivar), one district in the Pte. Hayes region (Benjamin Aceval) and 2 peri-urban areas from Asuncion. Of the total confirmed cases, 78% belong to the Central region, with the district of Capiata reporting the majority of cases (37 cases/23%). High-est attack rates were reported in children 1 year of age (3.2 per 100,000), followed by the 2-4 years age group (2.07 per 100,000). Of the confirmed cases the majority (28 cases) were reported in persons 5 to 14 years of age, with an average age of 7 years.

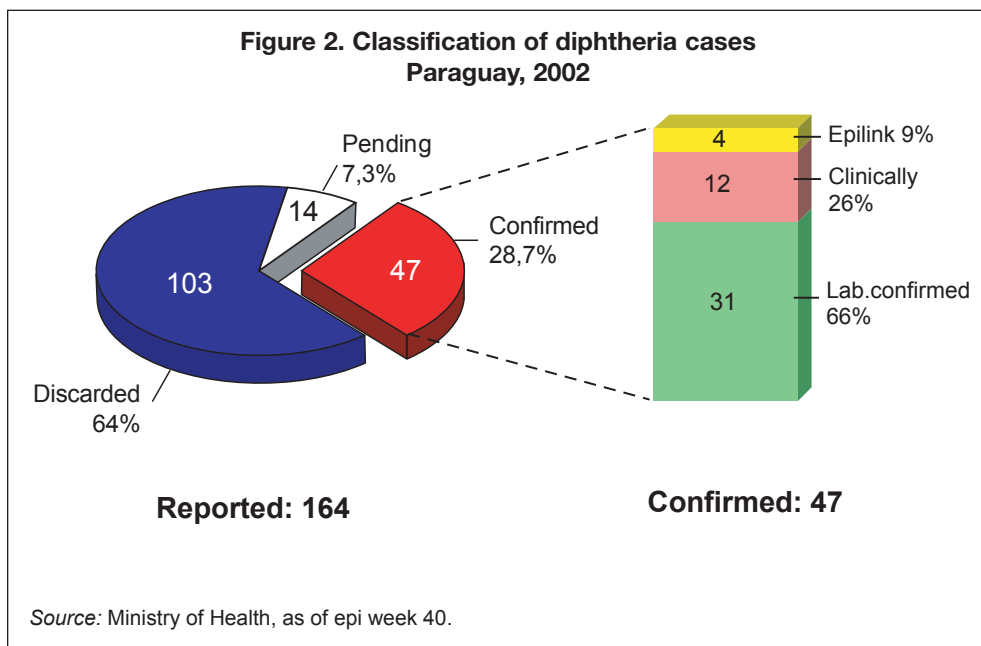
An evaluation of the vaccination history of the 47 confirmed cases revealed that 74% (35 cases) lacked proof of vaccination, be it through a vaccination card or through the register in a health service, 13% (6 cases) showed an incomplete vaccination schedule, and only 13% (6 cases) had full proof of vaccination. Cases predominantly affected children living in extreme poverty in poor, peri-urban areas.



Vaccination was intensified in the entire country, particularly in the affected areas and in high-risk areas (defined as those with low vaccination coverage levels). Children under 14 years of age were targeted. In districts with cases, vaccination activities have been expanded to include adults at high risk, among others, merchants in the informal sector working in public markets. Various vaccination strategies were employed and included house-to-house vaccination, and vaccination in health services and educational institutions. Priority was given to vaccination in poor peri-urban areas, as well as in newly-settled areas with migrants.

outbreaks. This was the case in the 2000 diphtheria outbreak in Cali, Colombia, which reported 8 confirmed cases and affected persons between the ages of 5 and 19 years. Highest attack rate was in the 5-9 age group (31.2 x 100,000). Overall coverage levels in Cali had began a downward trend in 1997 until 1999, year when they reached around 60%. A decline in coverage levels was also reported as the cause of the diphtheria outbreak in the Republics of the former Soviet Union which notified 50,319 cases. Over 70% of the cases reported were among persons 15 years and above.

A great majority of cases are occurring among persons lacking access



**Editorial Note:** The incidence of diphtheria had shown a significant reduction in the Americas as a result of increased vaccination coverage. In 1978, there were 6,857 reported cases, the highest number of cases recorded in the Region. Since then, a gradual decline in cases is evident, with 113 cases in 2000, and 68 cases reported in 2001. In 2002, as of epidemiological week 40, Paraguay has reported 164 cases.

Failure in maintaining uniform and high level DPT3 vaccination coverage is the most probable cause for these

to vaccination services or who have an incomplete vaccination schedule. In Colombia, 5 (62%) of the cases had an incomplete vaccination schedule and were under the poverty line. In Paraguay, 35 (74%) of the confirmed cases, mostly poor, lacked proof of vaccination. This points to the need of improving access to health services in the under 5 years of age population group. The occurrence of cases among adults also indicates the need to prioritize vaccination services among adults at high-risk, particularly population groups with poor access to health services, as is the case in Paraguay.

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