EPI Newsletter

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Measles Update

Follow-up campaign in Venezuela

Venezuela conducted a national *follow-up* measles vaccination campaign in the country's 23 states, aimed at all children between the ages of 1-4 years (target population: 2,223,210). The campaign started on May 19 and lasted through the middle of June. Vaccination using measles-mumps-rubella (MMR) vaccine was carried out at day care centers, orphanages, and all health posts. In rural areas, vaccination was done house-to-house. Overall coordination and procurement of vaccines for the campaign was handled by Venezuela's Ministry of Health. Central and state authorities shared the financing of the delivery of immunization services.

In 1992, Venezuela experienced a large measles epidemic, with 22,321 confirmed cases and 77 deaths. This lasted until early 1994 with 16,561 cases and 47 deaths. In 1994, the country carried out a *catch-up* vaccination campaign targeting the entire population between 9 months-14 years of age, reaching 98% coverage. Between 1994-1996, vaccination coverage through routine immunization services has averaged about 75%. Since the *catch-up* campaign there has been a steady decline in the number of confirmed measles cases, from 172 in 1995, to 89 in 1996, and to 27 in 1997. As of July 18 (epidemiological week 28), Venezuela had reported 452 suspected cases, but none had been reported as confirmed measles cases. Nevertheless, the growing number of susceptible children has prompted the Health Ministry to undertake a measles *follow-up* campaign.

Follow-up vaccination campaigns are critical for the successful completion of the measles eradication goal.

Measles Outbreaks in Argentina and Bolivia

Bolivia is currently experiencing a measles outbreak in the areas bordering Argentina, which started May 21. The outbreak has affected primarily the municipality of Yacuiba, in the department of Tarija. The municipality of Yacuiba, especially its localities of Yacuiba and Pocitos, borders the province of Salta in Argentina. In this area there is a heavy flow of people crossing from Argentina to Bolivia to shop. As of July 24, there were 49 suspected measles cases: 22 in Pocitos, 24 in the area of Yacuiba, and 3 in the area of El Palmar. Of the 49 cases, 28 had serum samples taken, of which 18 tested positive. The population group most affected in the initial stages of this outbreak were those between the ages of 1-4 years. A *follow-up* measles vaccination campaign targeting all children under 6 years of age, regardless of their vaccination history, was held in the localities of Salvador Masa (Argentina) and Pocitos and Yacuiba (Bolivia) between June 1-21. As of August 10, Argentina had reported 1,874 confirmed measles cases, with 11 deaths, six of these under the age of 1. The first cases appeared in August 1997, in the province of Misiones, which borders both Paraguay and Brazil, then spread to the capital city of Buenos Aires and surrounding areas. Detailed information on these outbreaks and final vaccination coverage data from Venezuela will be forthcoming in the next issue of the ***EPI Newsletter***.

In this issue:

Follow-up campaigns are now critical

The successful completion of the measles eradication goal by the year 2000 will require the implementation of PAHO's recommended vaccination strategy in its entirety in all countries of the Region. The objective of the strategy is the prevention of measles outbreaks. It is far more efficient and less costly to prevent an outbreak than to be forced to attempt to control one. In addition to achieving high levels of measles vaccination of children at 12 months of age through routine health services, all countries should conduct *follow-up* campaigns targeting all children 1-4 years of age, regardless of prior vaccination status or disease history, **at least** every four years to assure the highest possible level of measles population immunity. Health authorities in the Region need to ensure that sufficient resources are allocated for *follow-up* measles vaccination campaigns, and that surveillance for the disease is strengthened in order to reach the eradication goal.

As reported previously, there are several countries overdue for a *follow-up* campaign or are due for such a campaign in 1998. Countries **overdue** for a campaign are at an increased risk of a measles outbreak and should conduct *follow-up* campaigns as soon as possible. These countries include: Cuba, Dominican Republic, Ecuador and Haiti. Countries that should conduct a *follow-up* campaign during 1998 include: Bolivia, Guatemala, Paraguay and Uruguay.

Public Health Burden of Rubella and CRS

*This article is the first of a series focusing on the public health importance of rubella and congenital rubella syndrome (CRS) in the Americas and worldwide. In April the Caribbean Community established the goal to eliminate rubella by the year 2000 (**EPI Newsletter**, June, 1998). The following article discusses the public health burden of rubella. A future article will address the characteristics of rubella vaccine and adequate vaccination strategies for rubella and CRS elimination.*

The recorded history of the rubella virus dates back to the mid-18th century when it was first described by German authors as *Rötheln*. Until the early 19th century, rubella was still known as the "third disease", a variant or combination of measles and/or scarlet fever. In 1814, Dr. George Maton further investigated a rash illness diagnosed as "scarlatina". He came to the conclusion that the disease did not fit the description of any known disease. In 1866, English Royal Artillery surgeon, Dr. Henry Veale, coined the name rubella. It was, according to him, short, pleasant sounding, and indicative of the disease.

Although formally recognized as an individual entity in 1881 at the International Congress of Medicine in London, rubella, the plural of Latin *rubellus* "red", was often referred to as "German Measles" until the second half of the 20th century. The term German may have referred to the initial identification made by Germans or it may have taken on the connotation of "closely akin to" because rubella was seen as a disease similar to measles. Acquired rubella, however, is milder than measles. It often causes mild fever, 3-day rash spreading from head to foot, and lymphadenopathy. Arthralgia and arthritis are common in adult women.

Following a severe rubella epidemic that swept across Australia in 1940, came the recognition of Congenital Rubella Syndrome (CRS) by an ophthalmologic surgeon, Dr. Norman McAlister Gregg. In 1941, Dr. Gregg noted an unusually large number of infants with congenital cataracts among his own patients. After inquiry to his colleagues, he found that similar observations had been made throughout Australia. In his report, "Congenital Cataract Following German Measles In The Mother," he described the infants as being "of small size, ill nourished, and difficult to feed", as having congenital heart defects, and developing an eczematous condition or high fever. As has been discovered more recently, CRS clinical manifestations can be grouped into three categories: 1) transient conditions which present themselves at birth (eg. low birth weight), 2) permanent structural manifestations which may be present at birth or may become apparent during the first year of life (eg.cataract), and 3) late emerging conditions (eg. diabetes mellitus).

After extensive investigation, Dr.Gregg concluded that the cataract condition observed throughout the country was "the result of some constitutional condition of toxic or infective nature". He realized that the approximate period of early pregnancy corresponded with the peak of the "German Measles" epidemic.These findings allowed Dr. Gregg to make two correct assumptions: 1) rubella infection had inhibited fetal development, and 2) the earlier the mother is infected, the worse damage is. He also noted that the group primarily affected was young mothers because older women were more likely to have acquired natural immunity.

Dr. Gregg commented in his prognosis, however, that "we cannot at this stage be sure that there are not other defects present which aren't evident now but which may show up as development proceeds". He asked the question which sparked interest and focus on rubella and CRS. "what can we do to prevent a repetition of the tragedy in any future epidemic?" He also made a suggestion that has withheld the test of time and still applies today, "we must recognize and teach the potential dangers of such an epidemic". Unfortunately, Dr. Gregg's observations did not immediately receive the attention it deserved.

It was not until the 1960's, with the rubella pandemic of 1962-1965, that the world became fully aware of the damage that rubella could cause. The morbidity-mortality rates in the United States alone were astonishing. In 1964-1965, there was an estimated 12.5 million acquired rubella cases. As for the consequences of infection during pregnancy, there were over 11,000 reported abortions (spontaneous and surgical) and approximately 20,000 infants born with CRS, of whom 2,100 died in the neonatal period. Of the CRS infants, almost 12,000 reported deafness, 3,580 blindness, and 1,800 were mentally retarded. An example of a city that suffered greatly is New York. The number of children affected by rubella represented 1% of births in the city. This may have been due to high population density and immigration. The epidemic took a financial toll on the country as well. The estimated cost of this epidemic is estimated to have been over US$800 million.

The ultimate outcome was the recognition of the significance of CRS. In 1966, rubella and CRS became reportable on a national basis in the United States. Rubella was found to be a disease primarily of young children with the highest incidence rate among 5-9 year olds. The greatest number of total annual rubella cases, 57,686, was reported in 1969. Throughout the following decades, communities continued to endure the aftermath of the epidemic. In 1980, more than 6,000 students with hearing impairment due to CRS were enrolled in special programs throughout the country.

As for financial costs today, in the English-speaking Caribbean, it was estimated that expenditures for care and rehabilitation of 1,500 CRS cases expected to occur over the next 15 years would be approximately US$60 million. The lifetime cost of treating one patient with CRS in the United States today is estimated to be over US$200,000. Direct annual national cost of care for persons with multiple rubella defects was estimated in 1985 to be US$90 million.

The figures recorded and documented are not highly accurate due to the problem of underreporting. Factors contributing to this underreporting are 1) 30-50% of rubella infections are subclinical, 2) in the case of mild symptoms, no medical care is sought, and 3) symptoms are not highly specific and sporadic cases frequently go unrecognized by physicians.

Susceptibility is an indicator of the likelihood of an outbreak. Epidemiological observations suggest that outbreaks may occur when rates are >10%. In the 1980's some Latin American countries reported relatively high susceptibility rates (30-60%) among women of childbearing age. In Mexico, where rubella is not included in the Health Ministry's Universal Vaccination Program, results of studies testing susceptibility support the assumption that women living in lower socio-economic areas and rural areas are less likely to be immune than those in urban settings. This is due to the fact that those in areas of low population density are less frequently exposed to the virus. These studies suggest that CRS is an under-recognized public health problem and improved CRS surveillance is necessary.

In the Caribbean, rubella epidemics occurred annually between 1989-1991. From 1991 to 1995, there was decreased incidence reported until a resurgence occurred in 1995. In some countries in the sub- region, susceptibility has been found to be as high as 40-50%. Although rubella is a notifiable disease throughout the sub-region, CRS is not. For 1997, 20 CRS cases were found in the Caribbean. Nevertheless, it has been estimated that there may be 20,000 or more infants born with CRS each year in Latin America and the Caribbean. One source of rubella data is through measles surveillance. To increase reporting, the criteria for clinical diagnosis have been simplified. Health care workers should suspect rubella and/or measles in patients exhibiting fever and rash illnesses. In these patients, a single blood specimen should be collected and tested for both rubella and measles IgM antibodies.

From the above information, it is clear that rubella and CRS pose serious public health problems throughout the world. Since Dr. Gregg's discovery in 1941, there has been a great deal of progress towards prevention of these diseases. Since vaccine licensure in 1969, rubella incidence has dropped significantly in the countries where it is used. A tool to eliminate rubella and CRS exists. It is important to continue this effort and improve surveillance and vaccination so as to free the world of the threat of rubella and CRS.

Vaccination against *Haemophilus influenzae* type b

Public health control of meningitis and other infections caused by Hib requires active immunization of infants and children. Routine use of Hib vaccines is recommended and justified due to:

- severe disabling complications of Hib survivors
- increased antibiotic resistance
- availability of safe and effective Hib vaccines.

Initially, a Hib polysaccharide (PRP) vaccine was used, but like other polysaccharide vaccines, the immunological response was age-dependent and immunogenicity was particularly poor in children under the age of two years. A more effective vaccine was developed through the conjugation of the Hib polysaccharide to carrier proteins. This new vaccine is immunogenic in young children and appears to induce immunological memory. Since 1990, several conjugated vaccines have been developed and are available for use.

Safety, immunogenicity and efficacy

The safety of Hib-conjugate vaccines has been proven in extensive field trials in Finland, the United States and the United Kingdom, and through their use in routine immunization programs in most developed countries. Antibody responses to the conjugated vaccines are T-cell dependant. The minimum protective antibody concentration is 0.15 µg/ml, and a level of 1.0 µg/ml is considered for long-term protection. There is, however, no strict correlation between the antibody concentration and protective efficacy. In addition to bactericial antibodies directed against the PRP-antigen, cellular immunity is also important for protective efficacy. Vaccine efficacy exceeds 95% in infants with a complete Hib vaccination schedule who are immunized starting from 2 months of age.

Recommendations

All infants, including those born prematurely, should receive a primary series of Hib-conjugate vaccine beginning at 2 months of age, or as soon as possible thereafter. Immunization can be initiated as early as 6 weeks of age. The minimum interval between doses is 1 month. When data on safety and immunogenicity exist, Hib vaccine can be given simultaneously with other vaccines or in conjunction with DTP.

Characteristics of Hib vaccines

Vaccines	Protein	Composition	Presentation	Preservative	Combination
PRP-D	Diphtheria Toxoid	25µg PRP 18µg DT	Liquid Single dose	Merthiolate	DTP
PRP-CRM197	CRM197*	10µg PRP 25µg CRM197	Liquid Single dose or 10 doses	Merthiolate	DTP
PRP-OMP	OMP** of *N. meningitidis* Group B	15µg PRP 250µg OMP	Lyophilized Single dose	NO	Hep-B
PRP-T	Tetanus Toxoid	10µg PRP 20-40µg TT	Lyophilized Single dose or 10 doses	NO	Reconstitution with DTP, DTP-HepB

* CRM-197- Cross-Reacting Material 197 protein, a non-toxic mutant diphtheria toxin

** OMP= Outer Membrane Proteins

Vaccination schedules

Infants 2-6 months:

- PRP-OMP: 2 doses separated by two-month intervals, followed by a booster at 12-15 months
- Available data indicate that the vaccines are interchangeable, thus any combination of 3 doses of conjugate vaccine constitutes a primary series
- PRP-T or PRP-CRM197: 3 doses separated by at least one-month interval

Non-vaccinated infants 7-11 months:

- 2 doses separated by at least one-month interval

Non-vaccinated children > 12 months:

- 1 dose
- Healthy children > 5 years do not need Hib-vaccination. It is recommended that individuals at high-risk (e.g. immunodeficiency, splenectomy) receive 1 dose of Hib vaccine and if necessary, be re-vaccinated at any time.

Results from the United Kingdom and Chile indicate that the booster dose can be eliminated from the vaccination schedule.

PRP-D is only recommended as a booster.

Simultaneous vaccination

All Hib-conjugate vaccines are manufactured from inactivated Hib organisms and can be administered simultaneously/concurrently (at the same time/visit) with other childhood vaccines at different body sites: DT, DTP (whole cell and acellular), OPV, MMR, Hepatitis B, varicella, pneumococcal, meningococcal and yellow fever.

Combination of Hib-conjugate vaccines

A combination vaccine may contain multiple antigens that are active in the prevention of more than one infectious disease (DTP, MMR), or it may combine active components for the prevention of diseases caused by multiple serotypes or strains of a single pathogenic species (OPV, pneumococcal vaccine). The combination may be formulated during manufacturing or the components may be combined by the health-care provider at the time of immunization.

Since Hib vaccine is recommended to be administered on a similar schedule as DTP, certain vaccine manufacturers have included it in combination with DTP vaccine. One manufacturer has a Hib-DTP combination vaccine where the mixing is done during the manufacturing process, while others recommend the mixing be done prior to injection. It is important to understand that not all combinations are possible. Mixing of Hib vaccine with other childhood vaccines in one syringe is permitted *only* if:

- The compatibility of the different antigens is proven
- Absence of clinically important interference in the immunoresponse to the different antigens is proven in immunogenicity trials
- Safety is proven

Common adverse reactions/side effects

Adverse reactions to Hib-conjugate vaccines are generally rare. Swelling, redness, and/or pain have been reported in 5-30% of recipients and usually resolve within 12-24 hours. Systemic reactions such as fever and irritability are uncommon. Systemic reactions following simultaneous/concurrent administration of Hib-vaccines with other childhood vaccines are similar to those following administration of each individual vaccine.

Contraindications

Vaccination with a specific Hib-conjugate vaccine is contraindicated in an individual known to have experienced anaphylaxis following a prior dose of that vaccine. Vaccination should be delayed in children only if they have a moderately severe or severe illness. Minor illnesses (eg. mild upper respiratory tract infections or mild diarrheal illness) with or without fever are not contraindications to vaccination.

Other conditions that are *not* contraindications for Hib-conjugate vaccines include:

- current antimicrobial therapy or convalescent phase of illness
- prematurity
- pregnancy of mother or household contact
- recent exposure to an infectious disease
- breastfeeding
- a history of non-specific allergies or relatives with allergies
- family history of convulsions
- family history of Sudden Infant Death Syndrome (SIDS)
- malnutrition
- reaction to a previous dose of DPT.

Decentralization of Information Systems

*The **EPI Newsletter** will periodically include articles on country experiences in the use of information systems to implement and manage national surveillance systems for vaccine-preventable diseases. Articles will cover the role of information systems in achieving greater integration between national laboratories and epidemiological units, and in the efforts of countries to successfully expand surveillance systems to the local level.*

Information systems allow for the collection of data in an organized way to facilitate their analysis and subsequent use for decision-making at the technical and policy levels. From the most basic paper form system, to the more hi-tech computerized system, the usefulness and success of information systems depends on how well they are integrated into the day-to-day activities, the degree to which they meet country needs for information, end uses of the information, and built-in feedback mechanisms throughout the whole system. In the area of vaccine-preventable diseases, information systems are a critical component to guide national epidemiological surveillance systems.

Rationale for a Regional System

Regional and national initiatives to control and eradicate vaccine-preventable diseases produce large quantities of epidemiological surveillance data. These data need to be analyzed in a timely and accurate way, from the local level, all the way up to the central and regional levels.

An effective regional information system supporting the control/eradication of a vaccine-preventable disease should:

- operate at all levels: local, state, national and regional
- guarantee the use of established standards throughout all levels and regions
- guarantee the compatibility of collected data and analysis throughout all levels and regions
- maintain a historical record
- serve as a means or reference for the certification of the eradication of a vaccine-preventable disease

When a country embarks on an eradication initiative, the requirements mentioned above are best met by the use of a single system which is adopted as part of the whole effort. At PAHO, the Measles Eradication Surveillance System (MESS), implemented in 1996, was developed to support the measles eradication initiative endorsed by all countries in 1995. MESS assists countries in their efforts to generate reliable and timely information on suspected measles cases. Through MESS, participating countries can collect standardized case information to determine not only the prevalence of measles, but also to evaluate the quality of surveillance and laboratory performance in each country.

Laboratory Integration

Based on experience from the usage of information systems during the successful polio eradication campaign between 1985-1991, greater emphasis is now being placed on the integration of laboratory and epidemiology data through MESS. In this regard, the requirement of one system for all levels is extended to include all laboratories, both diagnostic and reference.

The benefit of integration goes beyond that of data sharing and consolidation. MESS promotes a permanent communication channel between laboratories and immunization programs at the different levels. Coordination and joint analysis of case data (including laboratory data) by immunization and laboratory units result in more streamlined and efficient case handling, from investigation to final classification. As a result of increased communication and coordination, other surveillance activities, such as active case investigation and control measures are carried out promptly and effectively.

Decentralization of Epidemiological Surveillance Systems

As part of the process of decentralization of health services, the responsibility for gathering data, for decision making, and for monitoring national surveillance systems is being transferred to the local level. This trend should allow for the development and/or strengthening of local epidemiological systems. It should also provide information that better reflects and responds to local needs in a timely way.

In this context, MESS can be considered a tool for decentralization: it provides the local level with the same tools available to manage and analyze data as the central level. In doing so, responsibility for all activities pertaining to measles epidemiological surveillance, including case investigations and data collection, is transferred to the local level. The local level can then independently calculate and monitor established indicators to help guide its activities. Health authorities at the central level provide overall supervision, guidance and support. Their responsibilities include evaluating the strategies being used for measles eradication, supporting their implementation at the local level, and providing timely feedback and a global view of measles eradication in the country.

During the past two years, there have been several efforts to decentralize the Measles Eradication Surveillance System. Some have focused on integrating laboratories with MESS, while others have emphasized MESS transfer to the local level. Countries ready to decentralize their surveillance system should consider five major aspects: required computer equipment, applicable software, basic communication infrastructure, training, and follow-ups.

Required computer equipment includes a modern computer capable of running DOS or Windows with a modem and a laser printer. Access to a phone line is very important for data transfers and for providing support services. Training should be given in configuration, data entry, analysis, data transmission, and systems maintenance. Educating staff in the efficient use of the system as an epidemiological tool to provide regular feedback and to identify problems is critical.

Although the financing to fill hardware, software, and communication needs is often scarce in the Region, the greatest challenge remains in the areas of training and human resources. The mechanical aspects of configuring the system, entering data, and printing reports are fairly simple and can be mastered with a hands-on demonstrations and practice sessions. Data transmission is equally straightforward. Nevertheless, the bottlenecks that usually impede the smooth integration of the system into surveillance activities usually lie in the management of the information. This area requires a great deal of support and supervision from the central level. Health authorities at the local level need to be trained to see MESS as a useful instrument that will expedite the collection and analysis of data. Therefore, training sessions need to stress that an information system, such as MESS will assist health staff in identifying areas that require immediate attention and those that need follow-ups. MESS will also provide the means to disseminate easy-to-follow standardized reports on a regular basis to colleagues and health workers at other levels.

Country Experiences

The Caribbean Epidemiology Center (CAREC) in Trinidad & Tobago, was the first to integrate laboratory data with that from the national immunization programs in the region. The physical proximity between CAREC's EPI and laboratory facilitated the whole process. The challenge was to coordinate the work of both groups and deploy the system in a network environment. The results have been outstanding and there are currently no delays in obtaining laboratory results. The data entry load is distributed and participating units share the same database for reporting and analysis.

In Colombia, all states participated in the first MESS decentralization effort. A highly customized installation disk for MESS, along with communications software and installation instructions was mailed to every state. Some states were able to use it immediately, while others were able to start only after a visit from a health officer at the central level. Currently MESS is operational in nine of the 33 departments. These nine departments notified 92% of all measles cases reported in Colombia in 1997. So far in 1998, they have reported 84% of all cases in the country. Future activities will entail strengthening national capabilities to analyze and disseminate data periodically, and ensuring the participation of local laboratories.

In 1998,Venezuela also started to decentralize its measles epidemiological surveillance system, and installed MESS in the state of Zulia. This state contributed 40% of all measles cases reported during 1997, and 33% so far in 1998. The laboratory at the central level, Rafael Rangel National Institute of Hygiene, has also been integrated with the epidemiology unit of the national immunization program, and information is exchanged on a weekly basis. The states of Carabobo and Lara are scheduled for installation in 1998.

The experience in Chile is noteworthy as well. The immunization program and the national laboratory, National Institute of Health (ISP), have established a highly coordinated routine of data exchange and case numbering, which has greatly enhanced Chile's ability to classify cases more expeditiously. Nicaragua has also taken the first step toward decentralizing their surveillance systems. Early this year MESS was installed at the national laboratory and in one local health system (SILAIS) in Managua.

Polio Surveillance

As of epidemiological week 28 of 1998, countries have continued to comply satisfactorily with only two of the four indicators for the certification of poliomyelitis eradication in the Americas. Indicators that show inadequate monitoring are: rate of acute flaccid paralysis in children under 15 years of age - only 5 countries are currently complying with this indicator, and the indicator showing percentage of cases with one adequate sample taken within 15 days of onset of paralysis – only 9 of the 21 countries that are part of surveillance system are complying. If these indicators continue at such low levels, countries in the Region will not be able to ensure that an eventual importation can be promptly detected and appropriately dealt with. Countries that need to make additional efforts for improvements include Argentina, Brazil, Costa Rica, Haiti, Panama and Paraguay.

AFP Surveillance Indicators

Country	80% weekly reporting units	80% of cases investigated within 48 hours	80% of cases with 1 adequate stool sample taken	AFP Rate ≥ 1:100,000 in children < 15 years
Colombia	■	■	■	■
Nicaragua	■	■	■	■
Bolivia	■	■		■
Cuba	■	■	■	
Ecuador	■	■	■	
El Salvador	■	■		■
Honduras	■	■		■
Paraguay	■	■	■	
Peru	■	■	■	
Venezuela	■	■	■	
Chile	■	■		
Dominican Republic		■	■	
Guatemala		■	■	
Haiti	■	■		
Mexico	■	■		
Brazil		■		
Panama	■			
Uruguay		■		
Argentina				

■ Meet criteria

* Data as of week 28, ending 18 July 1998
Source: SVI/PAHO (PESS)

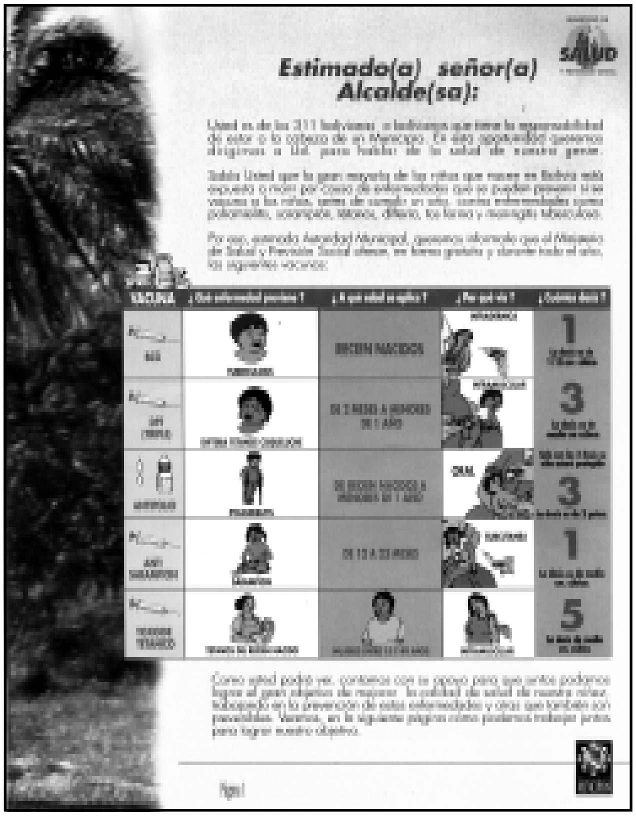
Reported Cases of Selected Diseases

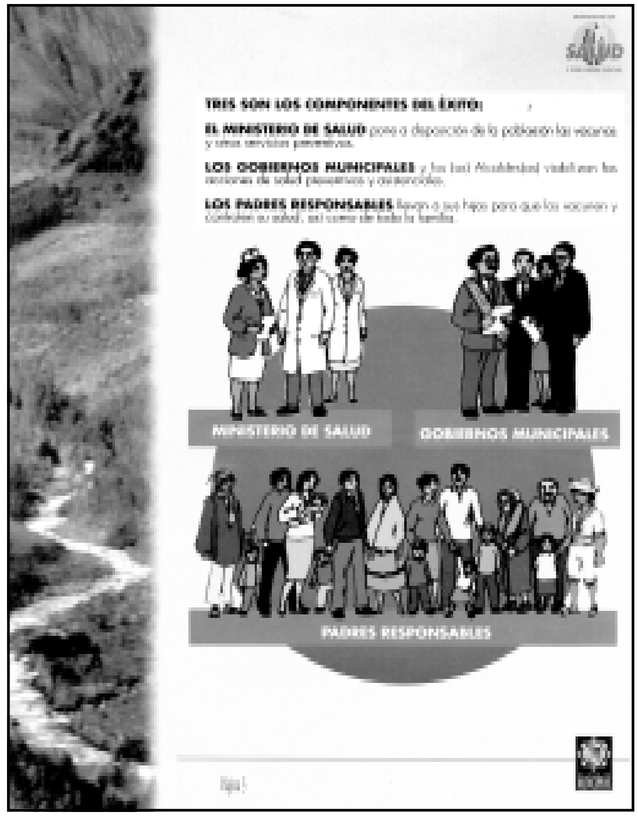
Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1998 to date of last report, and the same epidemiological period in 1997, by country.

Country/Territory	Date of last report	Measles				Polio		Tetanus				Diphtheria		Whooping Cough	
		Confirmed 1998			Confir-med*			Non Neonatal		Neonatal					
		Labo-ratory	Clini-cally	Total	1997	1998	1997	1998	1997	1998	1997	1998	1997	1998	1997
Anguilla	4 July	0	0	0	0	0	0	...	...	0	0	0	0	0	0
Antigua & Barbuda	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Argentina	4 July	577	7	584	11	0	0	9	11	0	2	1	0	29	161
Bahamas	4 July	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Barbados	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Belize	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Bermuda	4 July	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bolivia	4 July	11	0	11	0	0	0	1	0	1	3	5	0	18	22
Brazil	4 July	798	45	843	1352	0	0	...	58	...	13	...	32	...	101
British Virgin Islands	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Canada	4 July	7	__	7	560	0	0	...	...	...	...	...	...	772	1,448
Cayman Islands	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Chile	4 July	0	0	0	0	0	0	5	3	1	0	0	0	561	199
Colombia	4 July	1	4	5	39	0	0	0	1	3	9	2	1	81	173
Costa Rica	4 July	0	0	0	0	0	0	...	2	...	0	...	176	...	8
Cuba	4 July	0	0	0	0	0	0	...	0	...	0	...	0	...	0
Dominica	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Dominican Republic	4 July	0	0	0	0	0	0	5	5	0	0	3	4	7	0
Ecuador	4 July	0	0	0	0	0	0	10	21	9	11	16	12	115	83
El Salvador	4 July	0	0	0	0	0	0	...	3	...	2	...	0	...	2
French Guiana	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Grenada	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Guadeloupe	4 July	1	0	1	72	0	0	...	...	...	...	...	...	...	...
Guatemala	4 July	0	1	1	6	0	0	0	4	1	5	0	0	377	89
Guyana	4 July	0	0	0	0	0	0	...	...	0	0	0	0	0	0
Haiti	4 July	...	...	...	0	0	0	...	0	12	1	0	0	...	0
Honduras	4 July	1	0	1	4	0	0	4	3	2	1	0	0	18	100
Jamaica	4 July	1	0	1	0	0	0	3	0	0	0	0	0	0	1
Martinique	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Mexico	4 July	0	0	0	12	0	0	37	66	8	11	0	0	52	8
Montserrat	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Netherlands Antilles	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Nicaragua	4 July	0	0	0	0	0	0	1	6	0	0	0	0	25	28
Panama	4 July	0	0	0	0	0	0	0	0	0	0	0	0	94	21
Paraguay	4 July	2	0	2	7	0	0	9	9	8	9	0	...	10	9
Peru	4 July	0	0	0	29	0	0	18	33	4	20	1	1	229	559
Puerto Rico	4 July	0	__	0	0	0	0	...	...	...	...	...	...	...	...
St Vincent/Grenadines	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
St. Kitts/Nevis	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
St. Lucia	4 July	0	0	0	0	0	0	...	0	0	0	0	0	0	0
Suriname	4 July	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Trinidad & Tobago	4 July	0	0	0	1	0	0	...	0	0	0	0	0	0	0
Turks & Caicos	4 July	0	0	0	0	0	0	...	1	0	0	0	0	0	0
United States	4 July	37	__	37	70	0	0	14	20	...	...	1	5	2,135	2,645
Uruguay	4 July	0	0	0	2	0	0	...	0	...	0	...	0	...	4
Venezuela	4 July	0	3	3	19	0	0	15	10	2	5	0	0	241	225
TOTAL		**1,436**	**60**	**1,496**	**2,185**	**0**	**0**	**131**	**256**	**51**	**92**	**29**	**231**	**4,764**	**5,887**

... Data not available.
— Clinically confirmed cases are not reported.
* Laboratory and clinically confirmed cases.

Bolivia's Mayors Play Active Role in Immunization





Editorial Note: The fliers produced by the Epidemiology Unit of Bolivia's Health Ministry illustrate the growing role of mayors in decision-making about immunization. As part of the process of decentralization and health reform, mayors have become key figures in ensuring that immunization remains a priority within their municipalities and that established goals are met. The direct channel of communication that is developing between central and local governments, and between local authorities and communities, should serve as a forum to jointly identify pressing public health problems and promote a unified response.

As the flier suggests, a successful immunization program requires three partners: Ministries of Health that ensure the availability of vaccines and other preventive health services for the population; municipal governments that guarantee the implementation of immunization programs and other preventive initiatives; and parents who take their children to be vaccinated and for regular check-ups.

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References to commercial products and the publication of signed articles in this *Newsletter* do not constitute endorsement by PAHO/WHO, nor do they necessarily represent the policy of the Organization.

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