EPI Newsletter

Expanded Program on Immunization in the Americas

Volume XIX, Number 3 | IMMUNIZE AND PROTECT YOUR CHILDREN | June 1997

Update: São Paulo Measles Outbreak

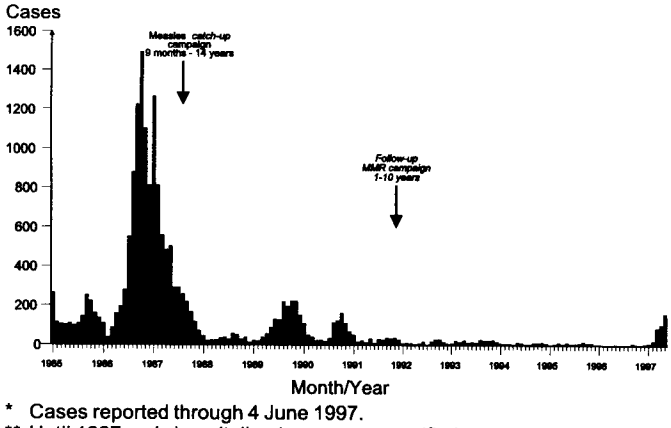
The last major measles outbreak in São Paulo state occurred in 1990. Since then, there has been relatively little measles activity in the state (see Figure 1). During 1996, a total of 22 confirmed measles cases were reported. To date in 1997, there has been a re-emergence of measles in São Paulo state with nearly 400 confirmed cases reported. The purpose of this report is to review the epidemiologic situation of measles in São Paulo.

In 1987, a mass vaccination campaign targeting all children 9 months through 14 years of age in the state was conducted using single-antigen measles vaccine. Reported coverage was over 90%. In 1992, a second mass vaccination campaign targeting children 1-10 years of age was conducted using MMR vaccine and coverage was over 90%.

Following the second campaign, São Paulo state adopted a routine two-dose measles vaccination policy. Children are vaccinated at 9 months with single-antigen measles vaccine and are revaccinated with MMR vaccine at 15 months of age. A *follow-up* campaign has not been conducted.

Routine measles vaccination coverage in the Greater São Paulo area has been officially reported to be over 90% in 9 of the last 10 years. In the last five years, reported coverage with measles vaccine has been 98% or more. Since 1992, routine MMR coverage has been reported to be greater than 100% every year.

Figure 1
Confirmed measles cases by month*
São Paulo, Brazil 1985-97**



* Cases reported through 4 June 1997.
** Until 1987, only hospitalized cases were notified.
Source: Center for Epidemiological Surveillance, São Paulo, Brazil.

Preliminary outbreak investigation

Between 1 January 1997 and 30 May 1997, a total of 846 suspected measles cases were reported to the São Paulo Secretariat of Health. Of the reported cases, 383 (45.3%) cases have been laboratory confirmed, 127 (15.0%) have been discarded after laboratory testing, and 336 (39.7%) remain under investigation.

There has been a major increase in reported suspected measles cases during the months since March, 1997. In May, nearly 400 suspected measles cases were reported. The Greater São Paulo metropolitan area has been primarily affected by this outbreak. The highest measles incidence rates have been reported in the municipality of São Paulo and the surrounding areas of Greater São Paulo. Few cases have been reported from other parts of the state.

Confirmed measles cases have ranged in age from 2 months to 44 years of age. Over half of the reported cases have been among persons 20-29 years of age (born between the years 1966 and 1978) and 18% have been in children under 1 year of age. Highest age-specific attack rates are in infants < 1 year of age, followed by adults 20-29 years of age and children 1-4 years of age. The majority of the young adults were born between the years of 1964 and 1978. Unvaccinated infants and young adults appear to be at highest risk for measles infection.

In this issue:

Transmission has been documented in medical settings. Several young adult health care workers have been confirmed with measles. Transmission has occurred from health care workers to patients and from patients to health care workers.

Measles virus has been isolated from clinical specimens collected from several measles cases by the Instituto Adolfo Lutz. Genetic analysis of these isolates will be performed at the measles laboratory of the Centers for Disease Control and Prevention in Atlanta, Georgia, USA. This information may provide important clues as to the source of the virus which is causing the São Paulo outbreak.

After reviewing available data, an advisory panel organized by the Secretariat of Health has recommended that a "selective" measles vaccination campaign be conducted among children 9 months through 4 years of age to stop the outbreak. This campaign was scheduled to begin on 21 June 1997.

Source: São Paulo State Secretariat of Health, Division of Epidemiology; Instituto Adolfo Lutz, Department of Virology.

Editorial Note: After a virtual absence of about 6 years, measles virus is again circulating in São Paulo. This is among the largest outbreaks in recent years in the Americas. Although difficult to predict, this outbreak may approach or surpass the 1989 measles outbreak, when nearly 2,000 cases were reported in São Paulo state.

Contributing factors for this outbreak include: insufficient population immunity in children 1-4 years of age due to an inappropriate vaccination schedule, the presence of large numbers of susceptible young adults, high population density and introduction of measles virus.

As discussed previously, a two-dose vaccination strategy is not sufficient to eradicate measles, especially when the vaccination coverage is less than 100% for both doses and population density is high. Moreover, the reported vaccination coverage data in São Paulo appear to have grossly overestimated true coverage, due to an underestimation of the population size.

There are approximately 400,000 measles susceptible children 1-4 years of age in Greater São Paulo. Transmission in this age-group may be fueling measles transmission among infants < 1 year of age and susceptible young adults.

According to the PAHO measles eradication strategy, a *follow-up* measles vaccination campaign should be conducted when the number of susceptible preschool-aged children approaches one birth cohort. Therefore, a *follow-up* campaign should have been conducted among children 9 months through 4 years of age in 1995. This was not done in São Paulo.

Such a campaign could have prevented this outbreak, or at the least, would have greatly reduced the number of susceptible preschool-aged children and would likely have reduced the probability of experiencing so large an outbreak.

In addition to susceptible, preschool-aged children, there is apparently a large number of susceptible young adults living in São Paulo. These are persons who are both unvaccinated and have never experienced measles infection. Many of these persons are in the age-group which was targeted for vaccination during the 1987 mass vaccination campaign. A working hypothesis is that the outbreak is occurring primarily among unvaccinated young adults who have recently migrated to São Paulo from other parts of the country. This hypothesis is currently being investigated.

Outbreak prevention is always preferable to outbreak response. Measles outbreak control is very difficult, if not impossible, especially when measles virus is circulating widely. Measles virus spreads far faster than outbreak response vaccination activities. Therefore, the planned selective vaccination campaign is unlikely to have any major impact on measles virus circulation in São Paulo. A *follow-up* campaign targeting all children 6 months to 15 years of age would seem more appropriate under the present circumstances. Further updates of this important outbreak will be included in future issues of the *EPI Newsletter*.

Rubella and Congenital Rubella Syndrome in the USA

Indigenous rubella and congenital rubella syndrome (CRS) have been targeted for elimination in the United States by the year 2000. From 1969 through 1989, the numbers of annual reported cases decreased 99.6% for rubella and 97.4% for CRS. Following a slight resurgence during 1990-1991, the number of reported rubella cases reached record lows during 1992-1996 (annual average: 183 reported cases). Findings indicate sustained low incidence of rubella and CRS since 1992 and possible interruption of transmission of rubella virus in late 1996.

Rubella: During 1994-1996, a total of 32 states, the District of Columbia and New York City reported 567 rubella cases. Based on provisional data as of 18 April 1997, symptom onset for the last case in 1996 was 6 November and for the first case in 1997 was 5 January, representing approximately three incubation periods with no reported rubella cases. Of the 561 (98.9%) patients for whom age was known, 171 (30.5%) were women of childbearing age (15-44 years); of these, five were pregnant at the time of rash onset.

Of the 505 (89.1%) cases with known importation status, 471 (93.3%) were indigenously acquired, 32 (6.3%) were internationally imported, and two (0.4%) were imported from another state. Of the internationally imported cases, country of exposure was reported for 15 (46.9%): Mexico (five cases); Japan (three); Kenya (two); and Colombia, England, Germany, Korea and Switzerland (one each).

Congenital Rubella Syndrome: A total of 12 infants with laboratory-confirmed CRS were born during 1994-1996. Nine states reported seven indigenously acquired cases, four imported cases, and one case with unknown importation status. The maternal exposures for the four imported cases occurred in Mexico (two cases), Sri Lanka (one) and Dominican Republic (one)—countries that do not routinely provide rubella vaccination. Of the seven infants with indigenously acquired cases, four were born to women of Hispanic ethnicity. Of the 10 mothers for whom vaccination status was available, seven had one or more missed opportunities for vaccination.

In recent years, outbreaks of rubella have occurred primarily in settings where young adults congregate, and the risk has been the highest among persons who often are unvaccinated and who may be exposed to persons traveling from areas where rubella vaccination is not routine.

The increasing proportion of cases accounted for by persons of Hispanic ethnicity suggests a potentially susceptible group to whom vaccination efforts should be directed. Hispanics and those who are native of countries without rubella vaccination programs should be considered susceptible to rubella unless they have documentation of vaccination or serologic evidence of immunity.

The changing epidemiologic pattern of rubella underscores the importance of ongoing collection and analysis of information on reported rubella and CRS cases, including demographics, vaccination history, source of exposure (i.e., indigenous or imported), relation to outbreaks, and mode of transmission. Such analysis is important for effectively targeting vaccination activities, evaluating the effectiveness of rubella and CRS prevention programs, and designing more efficient prevention strategies.

The effectiveness of efforts to control and prevent rubella in the United States is reflected by the possible interruption of transmission of rubella during November-December 1996, the dramatic decline in reported cases when compared with the prevaccine era, and the low annual average number of cases since 1991. Elimination of rubella will further require:

- maintenance of high vaccination levels in preschool and school-aged children and young adults,
- intensification of diagnosis of and surveillance for rubella and CRS,
- prompt control of outbreaks.

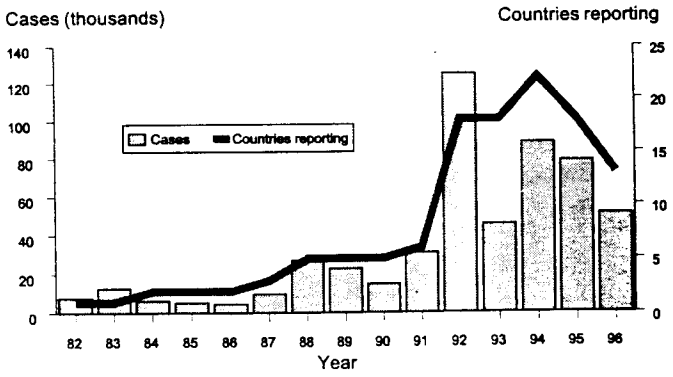
The shift in the increasing proportion of cases accounted for by persons aged 15-44 years indicates that vaccination programs targeting school-aged children have been successful in preventing rubella in that age group, but that vaccination activities also should include adolescents and adults. Because more than half of CRS cases in recent years have resulted from missed opportunities for vaccination, health care providers should screen reproductive-aged women for rubella immunity (e.g. during prenatal screenings and premarital health care visits) and vaccinate when appropriate (e.g., postpartum). Elimination of indigenous transmission of rubella in the United States also will require collaboration with other countries to develop and implement national rubella vaccination policies.

Reported by: State and territorial epidemiologists. Child Vaccine Preventable Diseases Br, Epidemiology and Surveillance Div, National Immunization Program, CDC.

Source: MMWR 46(16); 350-354; April 25, 1997.

Editorial Note: *Situation in the Americas* - The United States' surveillance system for rubella suggests that the virus is circulating in Latin America and the Caribbean (see Figure 1). Moreover, the cases detected in the United States may only be the tip of the iceberg. Unfortunately, relatively little data are available concerning the epidemiology of rubella in the Americas.

Figure 1
Reported cases of rubella
Latin American and Caribbean Countries
1982-1996



Source: PAHO/EPI Information Systems

In 1995 and 1996, the Caribbean Epidemiological Center (CAREC) confirmed the circulation of rubella virus in seven countries, including among pregnant women. Regarding CRS, most of the available experience in surveillance comes from the Caribbean, where countries have started notification and follow-up of cases. Four countries in that region selected as pilots for CRS surveillance in 1996, have found eight confirmed cases (6 in Jamaica and 1 in Barbados and Trinidad).

In Barbados, 20 suspected cases of CRS were identified through an active search in 1996, and eight additional cases were being investigated. In the same country, 17 of 52 pregnant women (33%) with fever and rash illnesses tested positive for rubella. In Guyana, six suspected cases of CRS have been identified in children born between 1992 and 1996.

The Regional Measles Surveillance System has highlighted rubella as a health problem. Of the total suspected measles cases investigated by laboratory in 1996, 17% had rubella as a final diagnosis. The countries presenting the highest percentage of positive cases for rubella through the surveillance system include: Nicaragua with 38%, El Salvador with 33%, Costa Rica with 32% and Peru with 20%.

CAREC has proposed a set of case definitions for CRS, a CRS case reporting form, and guidelines for CRS surveillance. The guidelines include the creation of a registry of pregnant women with laboratory-confirmed rubella whose infants need to be followed through the neonatal and post-

natal periods. Countries in the English-speaking Caribbean have been encouraged to strengthen their measles surveillance system, in order to improve rubella surveillance.

In Mexico, there were 26,286 cases of rubella reported in 1996 and 51,157 cases during 1995. However, the Mexican Ministry of Health has estimated that there may be as many as two million cases annually in children under the age of 15. In Colombia, an average of 7,000 rubella cases have been reported annually since 1985. The most affected populations are children under the age of five, followed by those between the ages of 5 and 14 years of age. In Colombia congenital malformations are among the leading five causes of deaths in the 0-4 age range; and within these, the congenital cardiopathies compatible with CRS represent between 59 and 62% of all the congenital anomalies which occurred during those three years. In Canada, in 1996 there were five clinically-confirmed cases of CRS, two of these were from children born in Central America and subsequently adopted by Canadian parents.

Current Control Strategies - Several countries in the Americas are developing strategies for the control of rubella aimed at groups identified as a priority and based on the availability of financial resources. In the Andean region, only Colombia has introduced the measles, mumps and rubella vaccine in the national vaccination schedule for children between the ages of 1 and 3. Ecuador is planning to include this vaccine in 1998, as part of its regular schedule. In Central America, Costa Rica, El Salvador and Honduras are using MMR. In the English-speaking Caribbean and Suriname, MMR vaccine is part of the routine vaccination schedule.

Future Activities - Taken together, rubella and CRS surveillance data from the United States and the limited data from other countries of the Region strongly suggest that rubella is a significant public health problem in the most of the Hemisphere.

The first step to developing appropriate interventions against rubella in Latin America and the Caribbean is to better define the burden of disease in these countries. Once the magnitude of the rubella and CRS problem is known and persons at risk of disease are identified, targeted vaccination strategies can be developed. Therefore, the immediate PAHO goal is to develop CRS surveillance throughout the Region.

Many countries are adopting MMR vaccine for routine infant immunization and for use in the measles *follow-up* campaigns. While this will surely reduce the circulation of rubella virus, it will not prevent CRS. In order to prevent CRS, we must assure that women of childbearing age are protected against rubella infection. Infant and childhood immunization are necessary, but not sufficient to eliminate CRS. New vaccination strategies are needed to effectively eliminate rubella and CRS. The availability of quality surveillance data will help greatly in developing targeted and effective rubella vaccination strategies.

Viral Hepatitis

*This is the third article dealing with the subject of viral hepatitis. The previous two articles described general diagnostic aspects of viral hepatitis (February 1997 issue of the **EPI Newsletter**) and details of hepatitis B and D (April 1997 issue of the **EPI Newsletter**). This final segment covers hepatitis A, C and E.*

Hepatitis A

Anti-HAV antibodies appear early, together with biochemical changes and symptoms of infections (Table 1). Although there are four genotypes of HAV, these comprise only 1 serotype and thus do not interfere in the serological diagnosis.

Serological Markers of Hepatitis A

1. **Anti-HAV IgM:** An acute phase marker, its titer rises rapidly, reaching maximum serum levels in 1 to 3 weeks after the appearance of symptoms. Their average duration is 3 months.[1]
2. **Anti-HAV IgG:** Detected soon after IgM, it is an antibody with a long life, whose presence is indicative of previous infection and immunity.[1] A decrease in the levels of these antibodies is possible, making them undetectable using conventional tests, although the individual retains his immunity to this viral infection.[2]
3. **HAVAg:** Although viremia in HAV infection is quite transient, the viral antigen can be detected in the blood and feces of infected individuals at the end of the incubation period and later after the appearance of the first symptoms.[1]

Table 1
Serological profile of HAV infections

Interpretation of serological profile	Anti-HAV IgM	Anti-HAV IgG
Susceptible	-	-
Recent infection	+	+ -
Past infection, immunity	-	+

Hepatitis C

Anti-HCV tests are currently grouped based on their antigenic composition, in the first, second and third generation. The first generation tests were made up of recombinant proteins corresponding to the NS4 region and part of the NS3 region of the viral genome. Recombinant proteins or synthetic peptides were added to subsequent tests, corresponding to the structural (core) and non-structural (NS3) regions (second generation) and the NS5 region (third generation).[4-5]

Serological diagnosis of Hepatitis C is based on ELISA screening. However, specimens that are reactive in this first stage are later subjected to confirmation or supplementary

tests—immunoblots—which also use recombinant proteins or synthetic peptides separately fixed on nitrocellulose strands. Like the ELISA, they are also grouped in generations based on their antigenic composition.[5]

The addition of core proteins greatly enhanced the sensitivity of reagents for detection of anti-HCV, since this is a region of greater conservation of the viral genome among the different types of HCV. For this reason, second and third generation tests are more appropriate for serological diagnosis of Hepatitis C[5-6], and most of them detect IgG antibodies.[8]

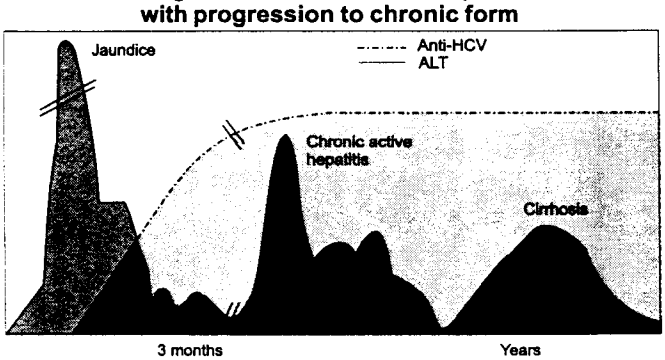
The proteins of the viral envelope, although responsible for inducing formation of neutralizing antibodies, are not adequate for diagnostic purposes since they present high variability in their amino acid sequence.[6,7]

Serological Markers of Hepatitis C (Fig. 1)

Anti-HCV generally arises from 4 to 24 weeks after the onset of Hepatitis C symptoms. However, it is estimated that 10% to 20% of those infected do not show seropositivity for this marker.[2]

1. **Anti-HCV IgM:** Anti-HCV IgM is not a good marker for acute infection. Although these antibodies can be detected up to one month after infection (78%), they may appear late or not at all. It is impossible to differentiate between acute and chronic hepatitis based on their presence alone, since Anti-HCV IgM continues to be detected throughout the chronic phase.[2,8]
2. **Anti-HCV IgG:** These antibodies are usually detected after 3 months of infection although 50% of cases show reactivity for IgG in the initial acute phase. These antibodies are of long duration, lasting throughout the lifetime of chronic patients. They may not be related to the course of the infection and are thus not useful in determining the prognosis.[8]

Figure 1
Serological markers of acute hepatitis C with progression to chronic form



Pasteur[3]

Therefore, the diagnosis of acute Hepatitis C becomes very complicated. However, through quantitative tests for detection of IgG, it is possible to differentiate between acute and chronic infections. During the initial stage of acute Hepatitis C, IgM is positive and IgG is negative or detectable at low levels, whereas in the chronic infection, IgG is present at high levels, regardless of the presence or absence of IgM.

Genetic Variability of HCV and Diagnosis

The high variability of certain regions of the HCV genome lead to the classification of the virus under at least six genotypes and 11 subtypes, based on the nucleotide homology of the NS5 region. The different genotypes have been associated with different responses to treatment and clinical evolution.[6,7] Thirty percent of the variation found among the different variants of HVC may potentially interfere in the detection of antibodies. The effect of this variation in screening for anti-HCV has not yet been completely established.[7]

Current tests utilize antigens derived from HCV type 1, and for the diagnosis to be conducted effectively, it is necessary that the antibodies induced by other types be capable of cross-reacting with the antigens employed in the test systems.[7] As a result, tests utilizing antigens corresponding to the core region demonstrate lower sensitivity, since this region presents a lower level of variability.[9]

Hepatitis E

The selection of a molecular clone made it possible to identify the HEV genome and was extremely useful in the development of tests for detection of anti-HEV antibodies.[1] Different antigens have been used in diagnostic tests. Lok et al. (1993) demonstrated that multiple antigens from different HEV isolates should be included in the EIA for the detection of Anti-HEV. The antigens corresponding to the ORF3 region show greater capacity for detecting IgM or IgG antibodies, when compared with products coded by ORF2, which detect IgM antibodies better.[10]

Serological Markers of Hepatitis E (Table 2)

1. **Anti-HEV IgM:** A marker of acute infection which generally shows peak detection from 3 to 4 weeks after jaundice, losing its titer rapidly. Only 50% of cases remain positive after 6-12 months.[11,12]
2. **Anti-HEV IgG:** Disappears and declines rapidly 1 year after the acute phase and confers immunity. However, in some patients it remains for many years.[13,14] It characterizes convalescence.

Table 2
Serological profile of HEV infection

Interpretation	Anti-HEV IgM	Anti-HEV IgG
Susceptible	-	-
Acute infection	+ +	- +
Past infection, immunity	-	+

Source: Oliveira, M.L.A., Yoshida, C.F.T., Schatzmayr, H.G. "Diagnóstico Laboratorial das Hepatites Virais" Virology Department, Oswaldo Cruz Foundation, Rio de Janeiro, December 1995.

References

1 Vitral, C.L.; Oliveira, L.H.S.; Oliveira S.A. Hepatites Virais. Virus da Hepatite A, B, C, D e E. In: Oliveira, L.H.S. **Virologia Humana**. Editora Cultura Médica (1994), pp. 283-301.

2 Dantas, U.; Dantas, E.B. Os virus da hepatite e seus marcadores: a ótica do clínico. In: Mendes, F.; Pitella, A.M. **Recentes Avanços em Hepatites**. Editora BYK (1993), pp. 11-18.

3 Pasteur Vaccines. **L'Hepatite B en question**. 1994 Edition.

4 Corouce, A.M.; Janot, C. Development of screening and confirmation tests for antibodies to Hepatitis C Virus. In: Reesink, H.W. (ed): **Hepatitis C Virus. Current Stud Hematol Blood Tranf.** Basel, Karger (1994), 61, 36-38.

5 Yoshida, C.F.T. O Virus da Hepatite C e seus marcadores. **Hepatologia Moderna**. Boletim do Serviço de Hepatologia, Santa Casa do Rio de Janeiro, Brazil (1995), 1:8-10.

6 Cuthbert, J.A. Hepatitis C: progress and problems. **Clinical Microbiological Reviews** (1994), 7(4):505-532.

7 Simmonds, P. Variability of Hepatitis C Virus genome. In: Ressink, H.W.; Leiloka, J.; Jansen, P.L. **Hepatitis C Virus**. Current Studies in Hematology and Blood Transfusion. Karger (1994), pp. 12-35.

8 Hino, K. Diagnosis of Hepatitis C **Intervirology** (1994), 37:77-86.

9 Houghton, M.; Weiner, H.; Choo, Q.L. et al. Potential implications of host pathogenicity, diagosis and control of disease. **The 1983 International Symposium on Viral Hepatitis and Liver Disease**. Tokyo.

10 Lok. A.S.F.; Varbough, P.D.; Kwar, W.K. Comparison of reactivity to ORF2 and ORF3 antigens in IgG and Anti-HEV IgM assays. **International Symposium on Viral Hepatitis and Liver Disease**. Tokyo, 1993.

11 Coursaget, P., Depril, N.; Buisson, Y. Peptide based ELISA for detection of anti-HEV infections in France and Africa. **International Symposium on Viral Hepatitis and Liver Disease**. Tokyo, 1993.

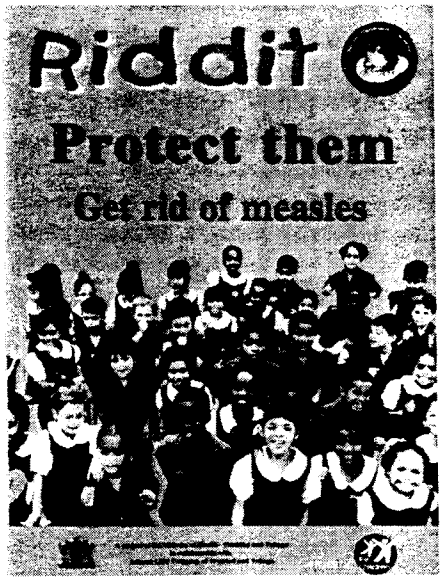
12 Ticehurst, J.; Varbohgu, P.D.; Bryan, J.P. et al. Antibodies to Hepatitis E Virus (Anti-HEV) in serial sera from an outbreak: detection by enzyme immunoassay (EIA). **International Symposium on Viral Hepatitis and Liver Disease**. Tokyo, 1993.

13 Balayan, M.S.; Zamyatina, N.A.; Mikhailov, M.I. et al. Serological Survey on hepatitis E virus infection in an endemic area: diagnostic potential of enzyme immunoassay for detection of IgG antibody. **Clinical and Diagnostic Virology** (1994), 2:297-304.

14 Sjogren, M.H.; Inni, B.; Redfield, R. et al. Assessment of serological responses during acute and convalescent states of Hepatitis E Virus infection using a new immunoassay. **International Symposium on Viral Hepatitis and Liver Disease**. Tokyo, 1993.

Natural Gas Company Supports Measles Elimination

Trinidad and Tobago received financial and logistical support during the month of May for their *follow-up* measles vaccination campaign from the Atlantic Liquid Natural Gas Corporation (Atlantic LNG). Atlantic LNG launched the program "Atlantic for Children" to help promote the well-being of children in the country. The financial contribution in the amount of TT$ 450,000 (approximately US$ 72,000) will be used to carry out a media campaign, to sponsor medical teams in the delivery of vaccines in hard-to-reach areas, and to support record-keeping activities. Atlantic LNG has also committed a vehicle equipped with a public address system and driver to transport the medical teams.



Source: Ministry of Health, Trinidad and Tobago.

Editorial Note: The support provided by Atlantic LNG represents the kind of partnerships between the public and private sectors that should be emulated or strengthened throughout the Americas. Today and future disease elimination goals and their maintenance will require the collaboration of all sectors of society.

Polio Surveillance

The Pan American Health Organization, through its *EPI Newsletter* has been alerting health officials of the countries of the Americas on repeated occasions about the apparent trend of declining attention to the polio surveillance indicators. This pattern has been consistent throughout the past year and there does not seem to be any indication of improvement. Furthermore, countries who were traditionally complying with all these key indicators, are no longer doing so on a regular basis. Especially alarming and worrisome is the countries' response to the indicators of 80% of cases with one adequate stool sample taken, and the AFP rate ≥ 1:100,000 in children under 15 years of age. These two indicators demonstrate our capacity for the timely identification of the circulation of wild poliovirus so that containment measures can be rapidly implemented if necessary.

The lack of cases in the Western Hemisphere has lead to a false sense of security, as often happens when a disease is rare. It is imperative that health officials in all countries of the Region mobilize health workers immediately to actively search for and investigate every case of AFP.

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
Chile				
Colombia				
Cuba				
El Salvador				
Nicaragua				
Peru				
Bolivia				
Dominican Republic				
Ecuador				
Guatemala				
Honduras				
Mexico				
Paraguay				
Venezuela				
Brazil				
Panama				
Uruguay				
Argentina				
Costa Rica				
Haiti				

Meet criteria

* Data as of 22 March, 1997

Source: SVI/PAHO (PESS)

Reported Cases of Selected Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1997 to date of last report, and the same epidemiological period in 1996, by country.

Country/Territory	Date of last report	Measles				Polio		Tetanus				Diphtheria		Whooping Cough	
		Confirmed 1997			Confirmed*			Non Neonatal		Neonatal					
		Laboratory	Clinically	Total	1996	1997	1996	1997	1996	1997	1996	1997	1996	1997	1996
Anguilla	17 May	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Antigua & Barbuda	17 May	0	0	0	0	0	0	0	...	0	...	0	...	0	...
Argentina	10 May	0	1	1	32	0	0	...	7	...	0	...	0	...	29
Bahamas	17 May	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Barbados	17 May	0	0	0	0	0	0	0	..	0	0	0	...	0	...
Belize	17 May	0	0	0	0	0	0	0	...	0	...	0	...	0	...
Bermuda	17 May	0	0	0	0	0	0	0	...	0	...	0	...	0	...
Bolivia	17 May	0	0	0	0	0	0	...	...	...	0	...	1	...	1
Brazil	17 May	235	30	265	32	0	0	58	97	13	10	32	24	101	318
British Virgin Islands	17 May	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada	17 May	523	—	523	222	0	0	...	1	...	...	...	...	...	1,333
Cayman Islands	22 Mar	0	0	0	0	0	0	0	...	0	...	0	...	0	...
Chile	17 May	0	0	0	0	0	0	3	7	0	0	0	0	224	322
Colombia	17 May	10	4	14	10	0	0	...	...	9	11	1	...	173	...
Costa Rica	17 May	0	0	0	1	0	0	1	1	0	0	...	...	8	6
Cuba	17 May	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dominica	17 May	0	0	0	0	0	0	0	...	0	...	0	...	0	...
Dominican Republic	17 May	0	0	0	0	0	0	1	...	0	0	0	1	0	0
Ecuador	17 May	0	0	0	19	0	0	...	...	...	8	...	1	...	15
El Salvador	17 May	0	0	0	1	0	0	0	4	1	0	0	0	0	1
French Guiana	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Grenada	17 May	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Guadeloupe	22 Mar	72	0	72	1	0	0	...	...	...	...	...	...	...	...
Guatemala	17 May	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Guyana	17 May	0	0	0	0	0	0	...	0	...	0	...	0	...	0
Haiti	17 May	0	0	0	...	0	0	...	...	1	...	...	...	...	...
Honduras	17 May	0	4	4	0	0	0	0	3	0	1	0	0	3	11
Jamaica	17 May	0	0	0	0	0	0	0	6	0	0	0	0	1	8
Martinique	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Mexico	17 May	0	4	4	0	0	0	45	49	10	22	0	0	4	0
Montserrat	22 Mar	0	0	0	0	0	0	0	...	0	...	0	...	0	...
Netherlands Antilles	22 Mar	0	0	0	...	0	0	...	...	...	...	...	...	...	...
Nicaragua	17 May	0	0	0	0	0	0	1	4	0	0	0	0	14	0
Panama	17 May	0	0	0	0	0	0	1	0	0	0	0	0	12	0
Paraguay	17 May	0	1	1	4	0	0	9	9	9	5	0	0	9	3
Peru	17 May	0	1	1	0	0	0	14	22	8	24	1	4	183	118
Puerto Rico	17 May	0	—	0	1	0	0	...	...	...	...	...	...	...	...
St Vincent/Grenadines	17 May	0	0	0	0	0	0	0	...	0	...	0	...	0	...
St. Kitts/Nevis	17 May	0	0	0	0	0	0	0	0	0	1	0	0	0	0
St. Lucia	17 May	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Suriname	17 May	0	0	0	0	0	0	0	6	0	0	0	0	1	1
Trinidad & Tobago	17 May	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turks & Caicos	17 May	0	0	0	0	0	0	1	0	0	...	0	0	0	0
United States	17 May	45	—	45	123	0	0	...	...	...	...	...	...	...	775
Uruguay	15 Mar	0	0	0	0	0	0	0	0	0	0	0	0	4	10
Venezuela	17 May	0	1	1	9	0	0	...	...	...	5	...	0	...	135
TOTAL		**885**	**47**	**932**	**455**	**0**	**0**	**134**	**216**	**51**	**87**	**34**	**31**	**737**	**3,086**

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

Surveillance for Bacterial Meningitis

The incidence of severe illness caused by *Haemophilus influenzae* type b (Hib) has dramatically diminished in those countries which have introduced the conjugated vaccine against this disease. Despite the fact that this pathogen has been fundamentally associated with meningitis, recent results obtained about the use of the vaccine have demonstrated that the incidence of *H. influenzae* may be ten times higher in acute respiratory diseases. Several countries in the Americas are in the process of incorporating Hib vaccine in their immunization programs, but the high costs associated with this vaccine is slowing down universal vaccination. Efforts are now underway to find alternative vaccination strategies according to each country's situation. This underscores the need to have sufficient data, which will support countries in their decision. The Special Program for Vaccines and Immunization is promoting the introduction of the Hib vaccine in the Region, highlighting the importance of implementing an adequate surveillance system which would help in evaluating its impact. In response to this, several countries have taken the following steps:

Dominican Republic: A population-based surveillance system for bacterial meningitis has been initiated in Santo Domingo with the financial support from the Global Program for Vaccines and Immunization of the World Health Organization. The system will assess the local burden of meningitis due to *H. influenzae* type b among children less than 5 years of age. All children in this age group living in the National District will be under surveillance (an estimated 3,330,000 children). Eight hospitals, four public and four private, will participate in the intensive surveillance network. A second surveillance network including the eight local Ministry of Health epidemiology services, will contact weekly every health center in their local areas for possible cases of bacterial meningitis. The Robert Reid Cabral Hospital (the main children's hospital in the country) and the National Department of Epidemiology of the Ministry will head this project.

El Salvador: A national commission was formed to investigate the incidence of infectious neurological syndrome in children under five years of age. With the technical support of PAHO, the commission is made up of the immunization program manager, the national director of epidemiology, the director of the national reference laboratory and the president of the society for infectious diseases. This group will study the incidence of *H. influenzae, S. pneumoniae, N. meningitidis* and beta hemolytic *Streptococcus* in cases of meningitis, using the latex agglutination test, as well as the traditional blood and cerebrospinal fluid (CSF) cultures. The investigation will take place at the largest pediatric hospitals of the country: San Salvador, Santa Ana and San Miguel, and the reference center will be the National Laboratory. This study is expected to begin in June 1997.

Nicaragua: An analysis of the situation of bacterial meningitis in the country was performed in Managua, in order to design and implement a surveillance system for this disease. The results of the analysis indicate that the population under 1 year of age is most affected, with more than 50% of cases occurring in this particular age group. The mortality rate is between 10 and 20%, with a high percentage of sequelae in the survivors. The pathogens responsible for this disease have not been characterized due to basic laboratory problems. Since the majority of bacterial meningitis cases in Managua are seen in two of the city's hospitals —Manuel de Jesus Rivera "La Mascota" Hospital and the Hospital Infantil Fernando Velez Paiz—the surveillance system has been set up in these two centers to estimate the disease burden as well as the responsible pathogens.

It will be critical for the validity of these studies to utilize a standard methodology. Likewise, the laboratory aspects of surveillance will require trained personnel and adequate materials.

The *EPI Newsletter* is published every two months, in Spanish and English by the Special Program for Vaccines and Immunization (SVI) of the Pan American Health Organization (PAHO), Regional Office for the Americas of the World Health Organization (WHO). Its purpose is to facilitate the exchange of ideas and information concerning immunization programs in the Region, in order to promote greater knowledge of the problems faced and their possible solutions.

Editor: Ciro de Quadros
Associate Editor: Monica Brana
ISSN 0251-4729

Pan American Health Organization
Pan American Sanitary Bureau
Regional Office of the
World Health Organization

Special Program for Vaccines and Immunization
525 Twenty-third Street, N.W.
Washington, D.C. 20037
U.S.A.
http://www.paho.org/english/svihome.htm