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Andean Region: Measles on the Way Out!

The VII Andean EPI Manager Meeting held in Quito, Ecuador, 27-28 August, brought together health officials, EPI managers, epidemiologists, laboratory representatives, UNICEF, Rotary International and SVI/PAHO staff to review the program's progress, especially with regard to measles elimination.

Measles Surveillance

Following SVI/PAHO's strategy for eliminating measles, all countries in the Andean Region have already conducted "catch-up" vaccination campaigns targeting all children between the ages of 9 months and 15 years, achieving coverage above 90%. The impact of these campaigns is evident in the marked reduction of measles incidence, with only 7 laboratory confirmed cases during the first half of 1996 (Table 1). Nonetheless, many municipalities still reported routine coverage rates below 90% in 1995, and 95% (target set in 1995 for measles coverage) in 1996.

Another critical component of the measles elimination strategy to prevent the accumulation of susceptibles are periodic "follow-up" campaigns. These were carried out in 1995 in Colombia, reaching children 1 to 3 years of age, and in Peru, aimed at all children under 5 years of age. During 1996, Chile completed its "follow-up" campaign, reaching children between the ages of 1 and 14 years of age. The coverage rates of these campaigns were 90% or higher

(Chile, 100%; Colombia, 90%; and Peru, 97%). The critical number of susceptible children to measles infection has been estimated as equal to one year's birth cohort for each country. Considering this trend, Ecuador should carry out a "follow-up" campaign in 1997, Bolivia and Peru in 1998, and Venezuela in 1999.

Countries in the Andean Region began to systematically implement a national surveillance system for measles in 1995. Efforts are needed to continue strengthening these

systems to reduce the number of clinically confirmed measles cases reported (refer to *EPI Newsletter* of April 1996 for the measles case classifications).

Recommendations

- Implement the new definition of a suspected measles case.
- Reach and maintain routine vaccination coverage greater than 95% for children 12 to 23 months in each municipality.
- Continue ongoing monitoring of the build-up of susceptibles and carry out "follow-up" campaigns to prevent outbreaks when this number equals one year's birth cohort.

- Change the age for administering measles vaccine from 9 months to 12 months (for countries that have yet to implement this recommendation).
- Continue making efforts to expand the network of health units reporting measles cases.

Table 1
Confirmed measles cases by country
Andean Region and Chile, 1993 - 1996*

Country	1993	1994	1995	Clinically(1)	1996* Laboratory(2)	Total
Bolivia	3,391	1,441	76	6	0	6
Chile	1**	0	0	1	0	1
Colombia	9,851	639	308	10	3	13
Ecuador	3,627	3,668	919	20	0	20
Peru	1,730	670	353	60	1	61
Venezuela	22,231	16,561	172	27	3	30
Total	40,831	22,979	1,828	124	7	131

(1) Without adequate samples (failure of the surveillance system)
 (2) IgM Capture test
 * Data as of 31 July
 ** Imported

Source: Country reports, 1996

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- Make greater use of the resources offered by the Measles Elimination Surveillance System for monitoring the program in the countries.
- Assure the utilization of the key indicators for measles surveillance.
- Maintain a weekly publication of measles cases and areas with outbreaks.

Measles Diagnosis

Representatives of laboratories in Bolivia, Chile, Colombia, Ecuador, Peru, and Venezuela met to exchange experiences and discuss the implementation of uniform criteria for measles diagnosis.

Recommendations

- Only samples from cases that fit the definition of suspected measles case will be processed.
- Only one sample will be taken from each suspected case. To be considered adequate, a sample must be taken within 30 days of rash onset.
- Upon arrival at the laboratory, all samples must include the following information: identification, age, origin, date of rash onset, date sample was taken, vaccination history, and date of last dose.
- National laboratories will send 100% of the positive and indeterminate cases, and a 10% random sample of negative sera to the reference laboratories for confirmation via the IgM Capture test.
- Given the need for reliable laboratory results, a more sensitive and specific indirect IgM test for measles diagnosis was recommended than the one currently used.

Polio Eradication

Five years have passed since the last indigenous wild poliovirus was isolated in the Region of the Americas. The meeting emphasized the importance of continuing the countries' high degree of political commitment to surveillance and vaccination activities to keep the hemisphere polio-free.

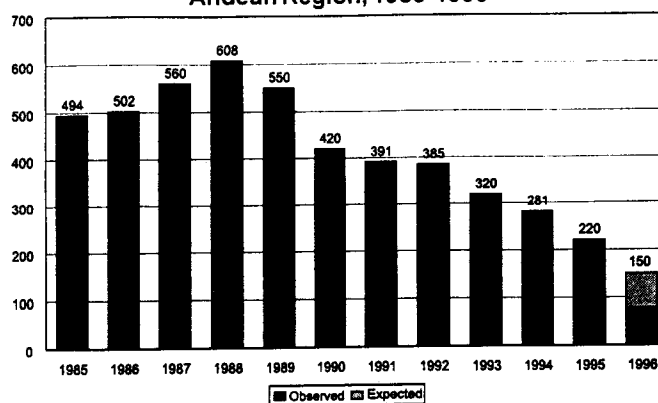
Today, importations represent the largest threat to the Region's polio free status. An updated analysis of four importations of wild poliovirus into the Western Hemisphere in 1978, 1988, 1993 and most recently in March of 1996, was presented and lessons were drawn (for more information about these importations, refer to the *EPI Newsletters* of April 1995, and August 1996.) The child linked to the 1988 importation had received three doses of inactivated polio vaccine (IPV), and the child linked to the 1996 importation had received three doses of an enhanced version of IPV. Two of these incidents occurred among religious communities who refuse immunization. However, it was mentioned that while some of these groups reject injectable vaccination, they are more ready to accept the oral polio vaccine (OPV).

It was recommended that countries present an evaluation of the quality of weekly negative notification.

Neonatal Tetanus

Surveillance of neonatal tetanus (NNT) continues to expand. Even though new areas have been identified, the frequency of neonatal tetanus is diminishing each year in the Andean countries (Figure 1). The greatest impact has been observed in Bolivia and Peru. Emphasis on epidemiological research was considered fundamental for understanding how the disease continues to behave. The most important variables in this regard are the patient's place of origin and the mother's vaccination history.

Figure 1
Neonatal tetanus cases notified by year
Andean Region, 1985-1996



There was a consensus on placing higher priority on the impact of migration on the control of NNT.

As previously agreed, the countries in the Andean region have carried out intensified vaccination activities at the borders to control the disease.

Recommendations

- Continue placing priority on vaccinating women of child-bearing age in identified high-risk areas.
- Search for new high-risk areas.
- Investigate all known cases, especially the variable related to the mother's vaccination status.
- Urge health authorities to allocate the necessary resources to vaccinate women of child-bearing age in high-risk areas.
- Consider migration as an important factor when determining areas and populations at risk.
- Monitor protection from tetanus in mothers when children receive their first dose of DTP.

EPI Indicators

The systematic use and continuous monitoring of EPI indicators was reiterated at the Andean Region meeting. Special mention was made of the successful reduction in the drop-out rates for DPT1-DPT3, particularly in Bolivia and Peru.

- **Vaccination coverage:** All the countries have submitted projections of EPI vaccination coverage in children under 1 year of age for 1996 by municipality. This facilitates the analysis of the situation at the local level and directs efforts and resources to the areas at greatest risk.

- **Surveillance indicators by disease:** Already established for each disease, broken down by political-administrative units.
- **Number and percentage of municipalities with coverage of DTP1 > 90%:** Measures the accessibility of the population to local vaccination services.
- **Drop-out rate between DTP1 - DTP3 and DTP1 and measles:** Indicates the program's effectiveness.
- **Percentage of resources included in the EPI Plan of Action earmarked for high-risk areas:** Measures the definition of priorities and decentralization of the program.
- **Proportion of national resources in relation to external resources included in the Plan of Action:** Measures the sustainability of the program.
- **Number of ICC meetings:** Evaluates the degree of inter-agency coordination and national leadership.
- **Number of NGOs that support the EPI Plan of Action:** Evaluates social mobilization.

Missed Opportunities for Vaccination

Bolivia, Colombia and Ecuador have programmed surveys on missed opportunities for 1996 (for information on the 1995 Peru survey, refer to the *EPI Newsletter*, August, 1996.)

Vaccines

Hepatitis B Vaccination and Surveillance

Following the presentation of a progress report on the control program of hepatitis B in Colombia, Peru, and Venezuela, participants agreed to continue working on the recommendations outlined at the 1995 Andean Meeting.

Recommendations

- Standardize case definitions.
- Establish an information system for the systematic collection and consolidation of data.
- Strengthen the laboratories to identify the prevalent hepatitis viruses.
- Train health personnel to handle cases, carriers, and outbreaks.
- Community education.

Quality Control of Vaccines

Recommendations were issued to ensure that national immunization programs have adequate quantities of quality-assured vaccines. This means a vaccine that is safe, potent and effective, which has been produced under conditions that assure the quality of each batch. The responsibility for this falls on both manufacturers and the government. Manufacturers should produce vaccines in accordance with international standards (Good Manufacturing Practices) and WHO requirements. The governments independently and through National Control Authorities should guarantee that producers follow established standards.

Haemophilus influenzae

The market availability of several effective vaccines for invasive diseases due to *Haemophilus influenzae* type b points strongly to the possibility of including this vaccine in the national immunization programs (refer to article on page 5). There was agreement to initiate epidemiological surveillance studies to develop a set of indicators for measuring the impact of this vaccine in the Region.

Immunization Program Sustainability

Member Countries are demonstrating an overwhelming commitment to the sustainability of national immunization programs in the Region. A key indicator for this is the increased allocation of national resources for regular program costs. While the collaboration of external agencies will continue to be critical, the bulk of resources have to be borne by the countries themselves. Of primary concern is the financing of recurrent program costs, such as the purchase of vaccines, syringes and needles, as well as the financing of program implementation and supervision.

The table below illustrates the efforts of selected countries in achieving program sustainability. This is an excellent indication of the priority accorded to this highly cost-effective and preventive health intervention. In fact, it is estimated that for every U.S. dollar invested in vaccination, approximately US\$ 7 to US\$ 20 are saved as a result of the prevention of disability, death and medical costs otherwise associated with childhood disease.

Another example of national commitment is the recent establishment of a budget line for national immunization activities incorporated into the national budget of Guatemala. Similar initiatives in Member Countries would ensure the permanence of immunization programs Region-wide. SVI/PAHO is actively collaborating with legislators in various countries to facilitate this process.

Percentage of recurrent costs financed by national budgets for selected countries

Country	Proportion of Recurrent Costs	
	1990	1995
Bolivia	54%	85%
Dominican Republic	88%	99%
Ecuador	85%	93%
El Salvador	80%	86%
Guatemala	1%	76%
Honduras	87%	96%
Nicaragua	-	80%
Peru	50%	97%

(-) = Data not available

Source: National Plans of Action

Measles Laboratory Workshop in Central America

The directors of measles diagnostic laboratories of Central America met for the first time July 8-10 in Panama City. Representatives of laboratories in Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama, the director of the Regional Measles Reference Laboratory of Colombia, and SVI/PAHO staff evaluated their experiences during the first half of 1996.

The discussion focused on the role of laboratories in support of the measles elimination initiative in the Americas. Participants reviewed the results of laboratory diagnosis for measles in each of the countries, the measles laboratory diagnostic tests used in Central America, and the shipping and transportation of samples to the Gorgas Commemorative Center's Measles Reference Laboratory in Panama. Also, Panama's experience with measles surveillance was presented.

All the countries except Guatemala have begun the laboratory testing of sera from suspected measles cases using the indirect IgM assay.

The Gorgas Laboratory (CCG) had received and processed 216 samples as of week 26 of 1996, with 14 positives and 202 negatives. The positive cases are distributed as follows: Costa Rica, 4; El Salvador, 5; Guatemala, 1; Nicaragua, 2; and Panama, 2. The Gorgas Laboratory analyzed the samples received using the IgM Capture test, and sent to CDC all the positive samples and a certain percentage of the negatives (31 in all for 1996).

A response has been received for all 31 samples sent, which points to an 88% agreement between the results obtained at the Gorgas Laboratory and those obtained at CDC. The positive cases were distributed as follows: Costa Rica, 4; El Salvador, 4; Guatemala, 1; and Panama, 1. The case from Guatemala had rash onset in 1995.

Of these positive cases, it was determined that 2 cases from Costa Rica, 3 from El Salvador, and 1 from Panama were vaccine-induced IgM.

Recommendations

- There was agreement on standardizing the indirect IgM test for all participating laboratories.
- The test should be performed weekly, except in special situations that justify increasing the frequency.
- Working relations between laboratory directors and directors of immunization programs should be strengthened in each country. Meetings for coordination and classification of cases should be documented.
- Laboratories will process all the samples from suspected measles cases; in special cases tests will be performed on samples that have diagnoses compatible with measles cases.
- The countries' laboratories will send to the Gorgas Laboratory samples of positive and indeterminate cases weekly, and a 10% random sample of negative sera, monthly.

- Samples will be sent to the Gorgas Laboratory Mondays and Tuesdays, with prior notice and confirmation that they are accompanied by the following information: Identification number, case name, age, date of rash onset, date sample was taken, date of last measles vaccination, and result obtained.
- The Gorgas Laboratory will provide instructions for sending samples and a sheet with the minimum data required with each sample.
- The Gorgas Laboratory will send the results to the countries one week after receiving the samples. They will be sent directly to the laboratories, and through the PAHO Country Office in Panama to the national chiefs of EPI.
- In order to analyze the sensitivity and specificity of the indirect IgM test, all the countries will send to the Gorgas Laboratory the results of the indirect IgM tests obtained from January to June 1996. These findings may indicate a need for additional, more reliable tests.
- On a monthly basis the reference laboratory of the Gorgas Laboratory will send the countries a summary of the conditions samples are received (quantity, labeling, cold chain, minimal data, timeliness of reception).
- All the laboratories of the network should have a computer and modem capability.
- Efforts should be made to improve surveillance, so that all suspected cases enter the surveillance systems, not only suspected cases with serum samples.

Table 1
Samples and results of suspected measles cases sent by the countries to the Reference Laboratories, Central America, weeks 1 to 26, 1996

Criterion	COR	ELS	GUT	HON	NIC	PAN	
Cases with blood sample	198	237	100	8	162	73	
Positives from national laboratories	33	13	...	0	8	2	
CCG	Specimens sent	55	52	44	8	28	29
	"+" for measles	5	5	1	0	2	2
	"-" for measles	50	47	43	8	26	27
CDC	Specimens sent	8	8	3	2	2	3
	"+" for measles	5	4	1	0	0	1
	"-" for measles	3	4	2	2	2	2

Visit the homepage of the Special Program for Vaccines and Immunization (SVI) on the World Wide Web:

<http://www.paho.org/english/svihome.htm>

Access up-to-date information on measles, polio, and neonatal tetanus, including our Weekly Polio Bulletin, Weekly Measles Bulletin and more!

Haemophilus influenzae Surveillance in Argentina

Since January of 1993 until 4 October 1996, there have been 14,238 cases of meningoen­cephalitis due to all causes reported to the National Surveillance System - Epidemiology Unit of the Argentine Ministry of Health and Social Action. Of these 68% (9,774) have been diagnosed as bacterial.

Table 1
Meningoencephalitis (ME) in Argentina
1993-1996*

Year	Total ME	Bacterial ME	<i>H. influenzae</i>	NI ²
1993	3,816	2,615	322	807
1994	3,898	2,710	400	902
1995	3,758	2,523	364	761
1996*	2,766	1,926	242	625
Total	14,238	9,774	1,328	3,095

* data as of 4 October 1996

² NI = no isolation

During this period *H. influenzae* was reported as the etiological agent in 14% of the cases (1,328), with a range between 12% in 1993 and 15% in 1994. Within that same period, there was no isolation of the etiological agent in almost 32% of cases of bacterial meningoen­cephalitis.

Table 2
Meningoencephalitis with
isolation of etiological agent (ME/WI) and
caused by *H. influenzae*, according to age group
Argentina, 1996*

Age Group	Total ME Bac. WI and Age***	Total Hi**	% Hi**/Total ME Bac. WI and Age***
< 1 years	392	152	39
1-4 years	292	43	15
5+ years	500	13	3
Total	1,184	208	18

* Data as of 4 October 1996

** Complete record with age (cases with isolation but no age = 34)

*** Complete record with age (cases with isolation but no age = 117)

An analysis of the reporting records from 1996 (through 4 October) determined 1,184 cases of bacterial meningoen­cephalitis for whom the age group was known. *H. influenzae* accounted for 208 cases. Of these, 195 (94%) were among children less than 5 years of age and 152 (73%) were children under 1 year of age (Table 2).

Source: I. Miceli, C. Riva Posse, R. Chuit. Epidemiology Unit, Ministry of Health and Social Action, Argentina.

Editorial Note: The study presented above by the Argentine Ministry of Health is a useful tool for determining that country's need to integrate the vaccine against *H. influenzae* type b into their national immunization schedule. Recognizing that the numbers presented above are underestimated due to failures in notification and/or isolation, and that this pathogen is also responsible for respiratory dis­eases, one can estimate that the introduction of a vaccine against *H. influenzae* would prevent a significant number of meningoen­cephalitis cases, and their well-known sequelae and financial consequences. Currently, several effective

vaccines are available on the market against invasive dis­eases caused by *H. influenzae* type b, which have had a considerable impact on the incidence of meningitis in the countries implementing them. This success has raised the question as to whether to include these vaccines in the countries' national immunization programs. In Uruguay, vaccination against *H. influenzae* was introduced in the regular immunization schedule in 1994, achieving a marked reduction of meningitis cases. Similarly, since July of 1996, Chile has been administering three doses of this vaccine to children under 1 year of age, together with the DPT vaccine starting at two months of age. At this point in time, it is imperative for countries in the Region to strengthen their surveillance systems for *H. influenzae* to accurately deter­mine the potential impact of its introduction. As mentioned in the article on page 8, the production of a new vaccine and its integration into the regular immunization program require that countries pay increasing attention to cost-effectiveness.

Polio Vaccination in the United States

The Centers for Disease Control and Prevention (CDC) accepted the recommendations of its Advisory Committee on Immunization Practices (ACIP) to change the routine childhood polio vaccination schedule, beginning early 1997. CDC recommends that children in the United States receive two doses of inactivated polio (IPV) followed by two doses of oral polio vaccine (OPV). The recommended sequential series consists of two doses of IPV (at 2 and 4 months of age), and two doses of OPV (at 12-18 months and 4-6 years). This new schedule is aimed at preventing the eight to nine cases of paralytic polio caused by OPV which are reported in the United States each year.

Poliomyelitis was a common disease in the United States in the 1940s and 1950s. In 1952, there were over 57,000 reported polio cases, and over 21,000 of those were paralytic cases. Because of the wide use of OPV, no case of paralytic polio caused by naturally occurring polio virus has been reported in the United States since 1979.

Prior to this recommendation, the United States relied almost exclusively on the use of OPV which is made with a live weakened virus. OPV protects vaccinated persons directly; OPV indirectly protects other susceptible persons through the spread of the vaccine virus within the commu­nity, which then stops the spread of the wild virus if it is re-introduced in the United States. IPV gives comparable levels of protection to vaccinated persons as OPV, but it is not believed to be as effective as OPV in preventing the spread of wild polio virus among other susceptible persons. The newly-added two doses of IPV, followed by two doses of OPV are expected to reduce the frequency of vaccine-associated paralytic polio by 50 to 75% or more.

Polio Surveillance

The CDC statement emphasizes that this change is possible because progress in global polio eradication has substantially reduced, though not eliminated, the risk of importation of polio into the United States. "This new recommendation for a greater role of IPV applies only to the United States because it has sustained interruption of polio for more than 16 years. CDC remains firmly committed to global polio eradication by the year 2000, **which relies on the exclusive use of OPV in countries that have or have recently had circulating wild polio virus.** Aggressive immunization efforts and surveillance programs must continue until polio is eliminated worldwide," the CDC statement says.

Source: Statement from Centers for Disease Control and Prevention and from CDC's National Immunization Program, Atlanta, Georgia.

Editorial Note: Following the initial recommendations of the Advisory Committee on Immunization Practices (ACIP) to change the poliomyelitis immunization schedule by adding two doses of inactivated polio vaccine (IPV), the Centers for Disease Control, Rotary International and UNICEF issued a joint statement in November of 1995, endorsing WHO's position of maintaining the current global immunization policy for polio eradication, that is of using the oral polio vaccine (OPV) **alone.**

The joint statement affirmed that OPV is the vaccine of choice because it provides superior direct and indirect immunity against polio to children living in polio endemic countries, it is affordable at US\$ 0.08 per dose, and it is easily and safely administered by mouth without the use of needles and syringes. In the past 10 years, approximately one billion children have received OPV and are successfully protected from polio. Polio was eradicated from the Western Hemisphere in 1994, and is projected to be eradicated worldwide by the year 2000.

Importations remain the greatest threat to the polio free status in the Americas. The latest importation into Canada from India in March of 1996, a 15-month old child who had received three doses of an enhanced version of IPV, emphasizes the importance of using OPV in all countries until global polio eradication is achieved.

This year marks the 5th anniversary of the last polio case in the Americas. Since then, we have had four importations of wild poliovirus into the Western Hemisphere, two from India and two from The Netherlands. The latest importation was reported as recently as March 1996. As reported in the previous article, importations represent now the greatest threat to our polio-free status! Therefore, SVI/PAHO is using every forum possible to alert health officials in the Region to make sure their AFP surveillance systems are functioning adequately.

To prevent possible breakdowns in the surveillance systems, countries can provide refresher courses for health workers which emphasize record keeping and networking, update the surveillance manual and guidelines for AFP, and focus on those municipalities that require more attention. Countries in the Region which face obstacles in their AFP surveillance should continue looking at measures that can support the effective implementation of their national surveillance system.

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 \geq 1:100,000 in children <15 years
Chile				
Colombia				
El Salvador				
Honduras				
Mexico				
Nicaragua				
Paraguay				
Peru				
Venezuela				
Bolivia				
Costa Rica				
Cuba				
Dominican Republic				
Ecuador				
Guatemala				
Panama				
Brazil				
Haiti				
Uruguay				
Argentina				

Meet criteria

* Data as of 12 September 1996

Source: SVI/PAHO (PESS)

Update

The Island of Montserrat carried out its scheduled measles "follow-up" campaign during the month of September in spite of severe volcanic activity affecting the island since last year. Vaccination was aimed at children between the ages of 6 to 10 years of age. Seven of the twelve health centers on the island have been closed, and nine of the 16 reporting sites are presently functioning. The health staff are doing an excellent job. There have been no outbreaks despite the fact that half the population has been relocated to shelters.

The Soufriere Hills volcano began erupting on July 18, 1995, forcing the evacuation of more than 6,000

people to the northern end of the island. Scientists at the Montserrat Volcano Observatory expect much larger eruptions to occur. PAHO and the Red Cross have stepped up mass casualty management and first aid training for health workers.

The commitment shown by Montserrat's health workers and community is to be commended! As in Montserrat, health workers throughout the Region of the Americas have on repeated occasions overcome difficult situations to reach agreed health goals.

Source: Trip report of Dr. Abdelmalik M. Hashim SVI/PAHO adviser and PAHO's Program on Emergency Preparedness and Disaster Relief.

Reported Cases of Selected Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1996 to date of last report, and the same epidemiological period in 1995, by country.

Country/Territory	Date of last report	Measles			Confirmed* 1995	Polio		Tetanus				Diphtheria		Whooping Cough	
		Confirmed 1996				1996	1995	Non Neonatal		Neonatal		1996	1995	1996	1995
		Laboratory	Clinically	Total				1996	1995	1996	1995				
Anguilla	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Antigua & Barbuda	07 Sep	0	0	0	1	0	0	0	0	1	0	0	0	0	0
Argentina	07 Sep	0	38	38	114	0	0	36	25	3	3	0	4	315	930
Bahamas	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Barbados	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Belize	07 Sep	0	0	0	0	0	0	3	0	1	0	0	0	1	0
Bermuda	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bolivia	07 Sep	0	3	3	0	0	0	5	5	6	14	1	5	9	36
Brazil	10 Aug	2	128	130	163	0	0	97	291	10	37	24	71	318	1,280
British Virgin Islands	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada	07 Sep	295	—	295	2,018	0	0	1	1	...	...	...	2	1,333	4,663
Cayman Islands	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chile	07 Sep	0	1	1	2	0	0	4	4	0	0	0	0	245	56
Colombia	07 Sep	2	18	20	271	0	0	...	50	15	19	3	3	40	567
Costa Rica	20 Jul	3	2	5	64	0	0	...	5	...	0	...	0	...	5
Cuba	07 Sep	0	0	0	1	0	0	...	...	...	...	...	...	...	...
Dominica	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dominican Republic	07 Sep	0	0	0	0	0	0	17	22	0	0	2	3	1	0
Ecuador	07 Sep	0	19	19	779	0	0	0	70	26	36	13	123	62	157
El Salvador	07 Sep	1	0	1	0	0	0	7	3	4	3	0	0	1	4
French Guiana	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Grenada	07 Sep	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Guadeloupe	07 Sep	0	1	1	...	0	0	...	...	...	...	...	...	...	...
Guatemala	07 Sep	0	0	0	26	0	0	7	...	5	4	0	0	4	20
Guyana	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haiti	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Honduras	07 Sep	0	1	1	1	0	0	15	0	4	0	0	0	67	0
Jamaica	07 Sep	0	0	0	7	0	0	6	4	0	0	0	0	21	6
Martinique	...	...	...	...	...	0	0	...	0	...	0	...	0	...	0
Mexico	07 Sep	0	19	19	9	0	0	96	50	38	27	0	0	1	0
Montserrat	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Netherlands Antilles	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Nicaragua	07 Sep	1	0	1	5	0	0	7	2	0	3	0	0	3	4
Panama	07 Sep	0	0	0	8	0	0	0	1	0	0	0	0	0	3
Paraguay	07 Sep	0	4	4	18	0	0	13	23	8	12	0	1	10	10
Peru	07 Sep	1	62	63	199	0	0	43	57	35	70	4	4	179	786
Puerto Rico	07 Sep	6	—	6	11	0	0	...	...	...	...	...	...	...	...
St. Vincent/Grenadines	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Kitts/Nevis	07 Sep	0	0	0	1	0	0	1	0	0	0	0	0	0	0
St. Lucia	07 Sep	0	0	0	2	0	0	0	0	0	4	0	0	0	0
Suriname	07 Sep	0	0	0	0	0	0	0	3	1	0	0	0	1	0
Trinidad & Tobago	07 Sep	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Turks & Caicos	07 Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0
United States	07 Sep	422	—	422	261	0	0	...	4	...	...	...	0	775	807
Uruguay	10 Aug	0	0	0	...	0	0	1	1	0	0	0	0	12	32
Venezuela	07 Sep	1	6	7	64	0	0	...	28	8	8	0	0	230	207
Total		734	302	1036	4,025	0	0	359	649	165	242	47	216	3,628	9,575

... Data not available.

— Clinically confirmed cases are not reported.

* Laboratory and clinically confirmed cases.

The Vaccine Challenge

Two hundred years after the discovery of the first vaccine—against smallpox—the world is on the threshold of a series of major scientific developments that will change the face of preventive health care for children. Over the next 5-15 years a new generation of vaccines will come on line which could save the lives of up to eight million children each year. Dramatic advances in molecular biology and the use of genetic engineering techniques have produced a raft of candidate vaccines that will simplify immunizations, improve the performance of existing vaccines, and protect children against diseases for which no vaccines currently exist. In addition, some of these vaccines will increasingly become the first line of defense against a range of diseases that are fast becoming untreatable due to rapidly increasing microbial resistance to antibiotics.

However, the report *State of the World's Vaccines and Immunization* warns that despite dramatic advances in molecular biology and genetic engineering, the promise that science holds for development of new and improved vaccines and immunization services may be squandered tragically unless the international community continues to back scientific research and global immunization with adequate resources for new vaccines.

The new generation of vaccines is expected to be many times more expensive than those in use today. Vaccines are likely to cost not cents but dollars per dose from now on. Research and development costs today for a single vaccine can range from US\$ 50 million to US\$ 200 million. On top of that new vaccines will be constrained by a web of intellectual property rights, each adding a fixed percentage to the price of a single dose as well as potentially restricting its manufacture elsewhere.

Over 12 million children under five die every year—three million of them before they are even a week old. As many as two million of those deaths are from diseases that could be prevented by the vaccines already offered through the Expanded Program on Immunization. They occur for

two main reasons: because not all existing vaccines are 100% effective and because each year about 20% of the world's children are not fully immunized during their first year of life with the six original EPI vaccines against diphtheria, tetanus, whooping cough, polio, tuberculosis, and measles. Work is now under way to boost immunization coverage rates and cut delivery costs through simplifying immunization, cutting down on the number of contacts needed and developing new vaccines that can be given at an earlier age. This would help protect children against diseases such as some acute respiratory infections which can strike before they are old enough to be immunized, as well as reaching more children with vaccines before they lose contact with the health care system.

The two-pronged approach to transform immunization—boosting coverage through improving existing vaccines and immunization and adding a range of new vaccines against diseases that are not yet vaccine-preventable—will be a severe test on immunization finance and delivery systems. But, perhaps more importantly, the new approach will require a fundamental rethinking of the value of disease prevention through immunization. What is a vaccine really worth?

The availability of new, more expensive vaccines will focus attention increasingly on the relative value of alternative disease-prevention measures. The cost-effectiveness of each possible intervention—whether immunization, efforts to improve sanitation and hygiene, environmental protection, or the adoption of a healthier lifestyle—will need to be carefully weighed to ensure that the choice is based on the most effective and efficient use of resources available from individuals, governments, and donors. But even at a higher price, vaccines will remain one of the most cost-effective means of preventing disease and avoiding treatment costs.

Source: *State of the World's Vaccines and Immunization*, WHO and UNICEF, Geneva, 1996.

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