IMMUNIZE AND PROTECT YOUR FAMILY

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In this issue:

5th Annual EPI-Managers Meeting of Aruba and the Netherlands Antilles

The 5th annual EPI Managers' Meeting of Aruba and the Netherland Antilles (Bonaire, Curaçao, Saba, St. Eustatious, and St. Maarten) was held in Willemstad, Curaçao, from 5-6 August 2010. This meeting is related to the annual Caribbean EPI Managers' Meeting, following a recommendation by the Pan American Health Organization and the Caribbean Epidemiology Centre (CAREC) after a 2005 EPI review of the 6 Dutch-speaking Caribbean Islands. This "mini-EPI Managers' Meeting" presented an opportunity for representatives from each of the islands to share experiences regarding their respective immunization programs and to strengthen inter-island collaboration. The main objective of the meeting was to discuss the state of each island's immunization program in 2010 and to address plans for 2011. Specific objectives were to discuss basic immunization schedules, status of vaccination coverage, surveillance systems, influenza preparedness, vaccination and inter-island cooperation. The implementation of the documentation and verification process for measles, rubella, and congenital rubella syndrome elimination was also discussed. As well as the potential consequences of the impending constitutional changes in each island's EPI.

The meeting took place at an important time in the history of the islands. As of 10 October 2010, the Netherlands Antilles ceased to exist. Curaçao and St. Maarten have become autonomous entities within the Kingdom of the Netherlands, as is the case with Aruba since 1986. The islands of Bonaire, St. Eustatius, and Saba (BES islands) will become public entities of the Netherlands. The main recommendations of the meeting aim at ensuring that the governments of the autonomous islands and the BES islands maintain the immunization programs in the context of the constitutional changes, that the inter-island collaboration continues to be maintained, and that CAREC and PAHO continue providing support to their immunization programs. ■

Meeting participants, Curaçao, 6 August 2010.

Investigating an Imported Measles Case in the Post-Elimination Era in the Americas: Ecuador 2008

Introduction

The mass measles vaccination campaigns implemented in Ecuador and Latin America followed the guidelines issued by the Pan American Health Organization (PAHO) and have proven successful in interrupting measles and rubella virus circulation. In 1994, a *catch-up* campaign was conducted, in which 3,946,650 children and adolescents aged 9 months to 14 years were vaccinated, with 100% coverage; 1998 saw the first *follow-up* campaign, in which 1,263,645 children aged 9 months to 4 years were vaccinated, with 95.2% coverage. In 2002, as the first stage in the elimination of rubella and congenital rubella syndrome was being launched in the Region, a second *follow-up* campaign was conducted using the measles-rubella vaccine. A total of 4,161,260 children and adolescents aged 6 months to 14 years were vaccinated, with 100% coverage. In 2004, during the second elimination stage, 4,982,607 adolescents and adults aged 16 to 39 were vaccinated, with 100% coverage. In 2008 the third *follow-up* campaign was conducted with a target population of 1,755,411 children aged 1-6 years, with 102% coverage.

Interruption of measles transmission has increasingly been consolidated

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through the gradual expansion of coverage with the measles-mumps-rubella vaccine, introduced in 1999. In 2007, coverage levels reached 100%. The mass campaigns mentioned above and the higher coverage have resulted in the absence of indigenous measles cases since 1996. They also have helped improve the epidemiological surveillance to meet internationally established indicators and confirm the absence of cases during this period, since all suspected cases and cases that meet the operational definition of fever plus nonvesicular rash are investigated until they are either ruled out or confirmed by laboratory or epidemiological link with a laboratory-confirmed case.

Nonetheless, Ecuador is not exempt from the risk of new measles cases due to virus importation by people infected outside the country. Indeed, over 1 billion people around the world travel by air each year, 50 million of them to developing countries. At the same time, many industrialized countries have no systematic vaccination strategy. Thus, low vaccination coverage levels coupled with the global increase in travel are determinants for the reintroduction of measles and other diseases already eliminated in Latin American countries.

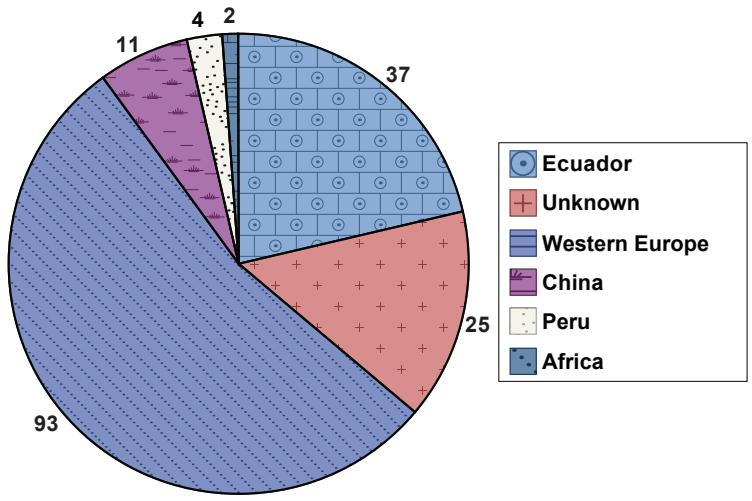
Investigation of the Index Case

On 27 June 2008, the national reference laboratory for measles and rubella surveillance, (INH Quito) notified the Expanded Program on Immunization (EPI), responsible for integrated measles and rubella epidemiological surveillance, about the presence of a confirmed measles case in an Italian tourist, a 33-year old female who had arrived from Florence, Italy, on 24 June 2008 on KLM flight 0153. She started her trip on 23 June, flying from Florence to Amsterdam, where she caught another flight to Quito, with stops on the island of Bonaire (Netherlands Antilles) and in Guayaquil. She had spent five hours in the airport in Amsterdam, an hour on the plane while in Bonaire, and an hour on the plane while in Guayaquil.

The patient had experienced prodromal symptoms on 20 June (3 days prior to her trip), mild malaise, a cough, runny nose, and fever of 38ºC. On 21 and 22 June, the classical maculopapular rash had appeared, initially on her face and later spreading to her torso and limbs.

Between 23 and 25 June, she complained to the staff of the hotel where she was staying to be run-down, with malaise, fever, and a maculopapular rash. Physical examination revealed no presence of swollen lymph nodes, rhinorrhea, or conjunctivitis. She had not been vaccinated against measles and had no history of the disease. She was then transferred to a private clinic, where measles IgM ELISA tests were conducted. The clinic sent a serum sample from the patient to the national reference laboratory, which confirmed the measles diagnosis on 27 June. On 28 June, nasopharyngeal and urine samples were taken from the patient for viral isolation.

Figure 1. Place of Residence of Passengers Arriving in Ecuador on the flight related to the case, July 2008



Source: Ministry of Health, Ecuador.

Outbreak Investigation Activities

On 27 June, as soon as the index case was confirmed, a team of investigators was formed. It was comprised of officials in charge of epidemiological surveillance at the local level and staff from INH Quito and the EPI. After completing the measles notification form, the team requested passenger information from the immigration and customs offices at the airport to compile a list with addresses and phone numbers. The team also visited the patient at her hotel and instructed her to stay in her room until the period of communicability had passed. Meanwhile, the team analyzed the different periods of infection to identify the period of communicability. Simultaneously, notification was sent to PAHO to report the presence of an imported measles case in Ecuador.

Next, the team compiled a list of staff at the private clinic and the hotel who had contact with the case so their vaccination status could be confirmed and they could be vaccinated, if necessary. Later on, the team compiled a contact list based on the immigration and customs data. The list divided the passengers on the flight into two groups: those who disembarked in Quito and those who disembarked in Guayaquil. The list contained phone numbers, information on whether the passenger was bound for a hotel or other provinces, and addresses. Then the team started contacting individuals as follows:

- First, the passengers who had traveled in the rows next to the index case. For that purpose, investigators had requested the seat assignment list from the airline.
- Second, passengers whose final destination was a province other than that of Quito or Guayaquil. Epidemiologists and EPI officials in those provinces were given the passenger names and any available information on them.
- In the following days, investigators interviewed representatives from travel agencies and airlines that connected with KLM flight 0153 in an attempt to contact people whose address and phone number were unknown. At the same time, they reviewed the vaccination status of contacts at the airport, airline personnel, baggage handlers, immigration officers, and the airplane's cleaning crew.

In order to monitor the location of the contacts, the team used a tool with the following variables: name, sex, age, embarkation point, address where they were staying, telephone number, date of notification, date of contact with the health services, vaccination status, and general health status.

In the following days, the international health office was designated as the contact center for passengers who had boarded the flight. Offices under the Provincial Director and Ministry of Health began to make calls to find out about the passengers' vaccination status. This was fol-

lowed by home visits from health area staff, as required.

Through the PAHO/WHO International Health Regulations (IHR) contact point for the Americas, neighboring countries, and the World Health Organization and its Regional Office for the European region were notified.

Active Search for Contacts

KLM flight 0153 had 175 passengers on board: 117 (67%) disembarked in Quito and 57 (33%) in Guayaquil. One passenger disembarked in Bonaire. New crews boarded the aircraft in Bonaire, Guayaquil, and Quito. The Quito crew also made the return trip a few hours later. It should also be noted that cleaning crews boarded the plane both in Bonaire and Guayaquil.

Of the total number of passengers who arrived in Ecuador, 37 (21%) lived in Ecuador, while 137 (78%) lived in other countries. Of these, 22 (13%) lived in Spain, 19 (11%) in France, followed in relatively equal proportions by passengers living in Belgium, China, Germany, Italy, the Netherlands, Peru, Sweden, the United Kingdom, and other countries (Figure 1). For 25 passengers, the place of residence could not be determined. The average age of the passengers who arrived in Ecuador was 36 (range 3-81). Relevant information for international contact tracing was shared with the above mentioned countries through the IHR contact channels.

Sixty-two of the 117 passengers who disembarked in Quito were located: 45 in Quito and 17 in other provinces. A total of 55 passengers could not be located, either because they had left their hotel before they could be contacted or their address and phone numbers were wrong. Eighteen of the 57 passengers who disembarked in Guayaquil were located: 11 Guayaquil and 7 in other provinces. A total of 39 passengers could not be located, for the reasons already stated.

The average time it took to contact the 80 passengers who were located (46% of the passengers on the flight) was 106 hours, with a median time of 96 hours since exposure to the contact (range 2-264 hours).

Ultimately, the imported measles case required the vaccination of 1,028 people who directly or indirectly had come into contact with the passengers. A total of 423 people were vaccinated at the hotel where the index case was staying; 112 people at the airport; 45 at the private clinic where the patient was seen; and 48 contacts from the flight. In all cases, the family structure and vaccination status of each contact was available. The virus could not be detected to be genotyped.

Discussion

The universal vaccination strategy implemented in the Region of the Americas requires countries to increase surveillance to prevent virus reintroduction. The measles importation from Italy clearly demonstrates what effort this surveillance represents. The investigative team had to conduct an exhaustive search for contacts by reviewing hundreds of forms, making phone calls, visiting contacts, and vaccinating people.

Yet, despite the efforts deployed, all the potential contacts could not be traced, mainly because customs and immigration forms had not been properly filled out. There were also some delays in contacting people, primarily due to the fact that the index case was detected a few days after arrival. The strategy used that consisted in locating passengers through established response levels also delayed the detection of contacts, but it led to appropriate mobilization efforts, although epidemiologists and nurses throughout the system had other overlapping activities at the time. In the end, however, everyone rose to the challenge. Operative levels were strengthened and, some months later, were better prepared to conduct similar activities in the search for influenza A(H1N1) cases and their contacts.

The EPI's close coordination with epidemiologists, EPI managers in the provinces, and the surveillance staff at INH Quito produced an immediate response to the epidemiological alert declaration. A search for passenger's contacts and their relatives was immediately launched, so that they could be vaccinated. The search was conducted in all the provinces, but took place mainly in Quito: at the clinic where the patient had been seen, the airport, and the hotel where she stayed. This ensured the interruption of the chain of transmission.

Another critical aspect is that tourists experiencing a health problem do not usually seek medical attention from the public health services network, although it is better prepared to handle disease detection and surveillance. Health authorities learned about the imported measles case because a private health facility sent a sample to INH Quito. Unfortunately, not all private health facilities demonstrate such a level of response. It is therefore imperative that epidemiological surveillance in the private sector be expanded and strengthened.

No set of guidelines exists that can be used for investigating this type of disease importation. Public health authorities in Ecuador had to develop their own methodology as they went along. As a result, health authorities have realized there is a need for a protocol detailing the steps to take should similar cases occur. These steps need to be in agreement with the recommendations from the IHR issued by the World Health Organization.[1]

Editorial note:

While measles is not eliminated from the rest of the world, measles importations to countries of the Americas will continue to occur. In the case described above, a European tourist decided to spend her honeymoon in Ecuador, unaware that she was harboring the measles virus at the time of her travel. This experience highlights the vulnerability of the countries of the Americas to measles importations during the post-elimination era, as well as the significant amount of time and resources required in case investigation and outbreak control activities. It also emphasizes the relevance of the recommendations made by PAHO's Technical Advisory Group on Vaccine-preventable Disease (TAG). The following recommendations deserve special mentioning:

- Countries should routinely maintain high, homogenous coverage (>95%) by municipality through the administration of the 1st routine dose, monitor the accumulation of those most susceptible, and continue the implementation of high quality nationwide follow-up campaigns to ensure the vaccination of the entire cohort as a second opportunity to give the first dose to those children that were missed by the routine program.
- Countries should achieve an adequate level of preparedness by developing national plans for preparation and rapid response to an importation and potential outbreaks.
- Countries should actively involve the private sector in measles, rubella, and CRS surveillance to support the rapid detection of importations and response to outbreaks and to strengthen immunization activities.
- Countries should guarantee the full integration of measles and rubella surveillance systems and ensure the completion and continuous monitoring of the recommended standardized measles/rubella surveillance indicators to attain high-quality surveillance, emphasizing high-risk and "silent" areas.
- Countries should establish priorities for obtaining viral samples with emphasis on, for example, border areas, industrial areas, areas with frequent foreign travel, and contacts with a high likelihood of exposure. ■

1 To learn more about International Health Regulations, please visit http://www.who.int/features/qa/39/en/index.html.

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Importing eliminated diseases

The rapid growth of communications, trade, and international travel is an important risk factor for the spread of infectious diseases. Furthermore, the migration of people from resource-poor countries to developed ones poses new challenges for international health and human rights. This is why, in 2005, the World Health Organization revised the International Health Regulations (IHR), a set of global rules to enhance national, regional, and global public health security. As part of the IHR (2005), countries are asked to develop early warning systems to allow detecting acute events, such as the occurrence of measles or rubella in the Americas, to ensure the timely implementation of control measures to prevent the spread of the disease.

Resource-poor countries have implemented very rigorous strategies for the control and elimination of vaccine-preventable diseases. After a tremendous effort in the Region of the Americas, some vaccine-preventable diseases are practically eliminated. In contrast, in developed countries with more abundant resources, immunization has almost become an optional intervention. This contradiction could lead to the reintroduction of certain viruses that have already been eliminated in our Region, as in the case of the measles virus.

The only tactic resource-poor countries can use against disease importation is to maintain high vaccination coverage ensuring at least 95% immunity in the population, together with an active epidemiological surveillance system ensuring that cases are detected and immediately investigated and that control measures are implemented.

Until very recently, the issue of imported diseases had not been viewed from the perspective of resource-poor countries. The wealthiest countries were the ones that had increasingly set up centers for travel medicine. Yet, the example of the imported measles case to Ecuador is a reminder that travel medicine no longer applies uniquely to the tourist returning to his or her country with a tropical disease. The same tourist could just as well be responsible for the reintroduction of a virus already eliminated in a developing country.

Historical Piece, The Principles of Disease Elimination and Eradication

The Dahlem Workshop discussed the hierarchy of possible public health interventions in dealing with infectious diseases, which were defined as control, elimination of disease, elimination of infections, eradication, and extinction. The indicators of eradicability were the availability of effective interventions and practical diagnostic tools and the essential need for humans in the lifecycle of the agent. Since health resources are limited, decisions have to be made as to whether their use for an elimination or eradication program is preferable to their use elsewhere. The costs and benefits of global eradication programs concern direct effects on morbidity and mortality and consequent effects on the health care system. The success of any disease eradication initiative depends strongly on the level of societal and political commitment, with a key role for the World Health Assembly. Eradication and ongoing programs constitute potentially complementary approaches to public health. Elimination and eradication are the ultimate goals of public health, evolving naturally from disease control. The basic question is whether these goals are to be achieved in the present or some future generation.

Introduction

Elimination and eradication of human disease have been the subject of numerous conferences, symposia, workshops, planning sessions, and public health initiatives for more than a century. Although the malaria, yellow fever, and yaws eradication programs of earlier years were unsuccessful, they contributed greatly to a better understanding of the biological, social, political, and economic complexities of achieving the ultimate goal in disease control. Smallpox has now been eradicated and programs are currently under way to eradicate poliomyelitis and guinea-worm disease. In 1993, the International Task Force for Disease Eradication evaluated over 80 potential infectious disease candidates and concluded that six were eradicable (1). In 1997, the World Health Assembly passed a resolution calling for the "elimination of lymphatic filariasis as a public health problem". With this background, the Dahlem Workshop on the Eradication of Infectious Diseases was held in March 1997 (2). The Workshop addressed four questions: 1) How is eradication to be defined and what are the biological criteria? 2) What are the criteria for estimating the cost and benefits of disease eradication? 3) What are the societal and political criteria for eradication? and 4) When and how should eradication programs be implemented?

Principal Indicators of Eradicability

In theory if the right tools were available, all infectious diseases would be eradicable. In reality there are distinct biological features of the organisms and technical factors of dealing with them that make their potential eradicability more or less likely. Today's categorization of a disease as not eradicable can change completely tomorrow, either because research efforts are successful in developing new and effective intervention tools or because those presumed obstructions to eradicability that seemed important in theory prove capable of being overcome in practice. Three indicators were considered to be of primary importance:

1 **An effective intervention is available to interrupt transmission of the agent.** The effectiveness of an intervention tool has both biological and operational dimensions. Elimination validates the effectiveness of an intervention tool, but it does not necessarily make the agent a candidate for eradication. Highly developed levels of sanitation and health systems development may make elimination possible in one geographical area but not in another.

2 **Practical diagnostic tools with sufficient sensitivity and specificity are available to detect levels of infection that can lead to transmission.** Diagnostic tools also have both biological and operational dimensions. The tools must be sufficiently sensitive and specific to detect infection that can lead to transmission, and also sufficiently simple to be applied globally by laboratories with a wide range of capabilities and resources.

3 **Humans are essential for the life-cycle of the agent, which has no other vertebrate reservoir and does not amplify in the environment.** Eradication is a much more feasible target of deliberate intervention when humans form an essential component of the agent's life-cycle. An independent reservoir is not an absolute barrier to eradication if it can be targeted with effective intervention tools.

Economic Considerations

Decisions have to be made as to whether the use of resources for an elimination or eradication program is preferable to their use in non-health projects, in alternative health interventions, in continued control of the condition, or even in the eradication of other eradicable conditions. All of these decisions necessitate an evaluation of the cost and benefit of eradication and the alternative use of resources. There is no easy answer.

Formal economic analytical techniques are not ideally suited to eradication programs. It is not clear, for example, how to handle future benefits and cost, particularly long-term effects. Equally unclear is whether and how to discount future effects. Of the available techniques, the Workshop concluded that cost-effectiveness analysis appeared to be most useful when the outcome is expressed in health terms. This technique allows evaluation of disease eradication in comparisons with other health sector projects.

The costs and benefits of global eradication programs can be grouped into two categories -- direct effects and consequent effects. The direct effects of eradication are that no morbidity or mortality due to that disease will ever again occur. Control programs can cease. The consequent effects are those that impact positively and negatively on the entire health care system. Because of the close interrelationships between eradication programs and other health programs, the Workshop concluded that eradication goals and activities should be expressed in the context of overall health services. Explicit efforts should be taken to maximize the effectiveness of both eradication and comprehensive health programs.

Social and Political Criteria

A set of social and political criteria was identified by Workshop participants. These and other related factors are summarized as follows:

- The success of a disease eradication initiative, like any public health programme, is largely dependent on the level of societal and political commitment to it from the beginning to the end. Considering the potentially enormous cost of failure, any proposal for eradication should be given intense scrutiny.
- The disease under consideration for eradication must be of recognized public health importance, with broad international appeal, and be perceived as a worthy goal by all levels of society. There must be specific reasons for eradication. The demands for sustained support, high quality performance, and perseverance in an eradication program increase the risks of failure, with a consequent significant loss of credibility, resources, and health workers' self-confidence.
- A technically feasible intervention and eradication strategy must be identified, field-tested in a defined geographical area, and found effective. The accumulation of success in individual countries or within a region generates the momentum needed for international support.
- Consensus on the priority and justification for the disease must be developed by technical experts, the decision-makers, and the scientific community.
- Political commitment must be gained at the highest levels, following informed discussion at regional and local levels. A clear commitment of resources from international sources is essential from the start. A resolution by the World Health Assembly is a vital booster to the success of any eradication program.
- An advocacy plan must be prepared and ready for full implementation at global, regional, and national levels. Eradication requires an effective alliance with all potential collaborators and partners. Finally -- a recurring theme -- the eradication program must address the issues of equity and be supportive of broader goals that have a positive impact on the health infrastructure to provide a legacy in addition to eradication of the disease.
- Disease eradication programs are conceptually simple, focusing on one clear and unequivocal outcome. At the same time, however, their implementation is extraordinarily difficult because of the unique global and time-driven operational challenges. The limitations, potential risks, and points of caution for eradication programs include higher short-term costs, increased risk of failure and the consequences of failure, an inescapable sense of urgency, and diversion of attention and resources from equally or more important health problems that are not eradicable, or even others that may be eradicable. Care must be taken that eradication efforts do not detract or undermine the development of the general health infrastructure. Other limitations are the high vulnerability of eradication programs to interruption by war and other civil disturbances; the potential that programs

Definitions

Eradication has been defined in various ways -- as extinction of the disease pathogen (3), as elimination of the occurrence of a given disease, even in the absence of all preventive measures (4), as control of an infection to the point at which transmission ceased within a specified area (5), and as reduction of the worldwide incidence of a disease to zero as a result of deliberate efforts, obviating the necessity for further control measures (1). Although definitions outlined below were developed for infectious diseases, those for control and elimination apply to noninfectious diseases as well.

- **Control:** The reduction of disease incidence, prevalence, morbidity or mortality to a locally acceptable level as a result of deliberate efforts; continued intervention measures are required to maintain the reduction. Example: diarrheal diseases.
- **Elimination of disease:** Reduction to zero of the incidence of a specified disease in a defined geographical area as a result of deliberate efforts; continued intervention measures are required. Example: neonatal tetanus.
- **Elimination of infections:** Reduction to zero of the incidence of infection caused by a specific agent in a defined geographical area as a result of deliberate efforts; continued measures to prevent re-establishment of transmission are required. Example: measles, poliomyelitis.
- **Eradication:** Permanent reduction to zero of the worldwide incidence of infection caused by a specific agent as a result of deliberate efforts; intervention measures are no longer needed. Example: smallpox.
- **Extinction:** The specific infectious agent no longer exists in nature or in the laboratory. Example: none.

will not address national priorities in all countries, and that some countries will not follow the eradication strategy; the perception of programs as "donor driven"; placement of excessive, counterproductive pressures and demands upon health workers and others; and the requirement of special attention for countries with inadequate resources and or weak health infrastructure (including hit-and-run strategies).

- The favorable attributes and potential benefits of eradication programs are a well-defined scope with a clear objective and endpoint, and the duration is limited. Successful eradication programs produce sustainable improvement in health and provide a high benefit-cost ratio. Eradication programs are attractive to potential funding sources because they establish high standards of performance for surveillance, logistics, and administrative support; develop well-trained and highly motivated health staff; assist in the development of health services infrastructure including, for example, mobilization of endemic communities; and provide equity in coverage for all affected areas, including urban, rural, and even remote rural areas. They also offer opportunities for other health benefits (e.g. for dracunculiasis eradication: health education and improved water supply), improved coordination among partners and countries, and dialogue across frontiers during war.
- Decisions on initiating a global disease eradication campaign should also take into consideration the ideal sequencing of potentially concurrent campaigns. Eradication programs consume major human and financial resources. Careful consideration must be given to whether two or more eradication programs are to be conducted simultaneously or sequentially, or if the target disease is confined to a limited geographical area.

Conclusion

In summary, elimination and eradication programs are laudable goals, but they carry with them an awesome responsibility. There is no room for failure. Careful and deliberate evaluation is a prerequisite before embarking on any program. Elimination and eradication are the ultimate goals of public health. The only question is whether these goals are to be achieved in the present or some future generation. ■

Adapted from: Walter R. Dowdle. Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Repor (MMWR). 1999/48(SU01);23-7. Full article available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/su48a7.htm.

Disease elimination and eradication programs can be distinguished from ongoing health or disease control programs by the urgency of the elimination and eradication programs and the requirement for targeted surveillance, rapid response capability, high standards of performance, and a dedicated focal point at the national level. Eradication and ongoing programs constitute potentially complementary approaches to public health. There are areas of potential overlap, conflict and synergy that must be recognized and addressed. In many cases the problem is not that eradication activities function too well but that primary health care activities do not function well enough. Efforts are needed to identify and characterize those factors responsible for improved functioning of eradication campaigns, and then apply them to primary health.

Global experts affirm that "measles can and should be eradicated by 2020."

A global *ad-hoc* advisory committee concluded that measles can and should be eradicated and that it is feasible to accomplish global eradication by 2020. This conclusion was presented during the global technical consultation to assess the feasibility of measles eradication that was organized by the World Health Organization (WHO) and hosted by the Pan American Health Organization (PAHO) from 28 to 30 July 2010.

The *ad-hoc* committee based their conclusions on the following: 1) a comprehensive review of available evidence, which established the biological and technical feasibility of measles eradication; 2) the experience of the Americas that demonstrates an effective operational model that is also cost-effective; and 3) the significant progress towards measles elimination achieved by other WHO Regions. The committee also concluded that, where appropriate, measles eradication activities should be used to accelerate rubella control and the prevention of congenital rubella syndrome (CRS).

The main objectives of the meeting were: 1) to review the outcome of work done to assess the feasibility of measles eradication; 2) to provide recommendations on the timing and nature of the next global measles goal (for consideration by the Strategic Advisory Group of Experts [SAGE] on Immunization); and 3) to provide recommendations on research/work needed to facilitate measles eradication. The specific objective of the global ad-hoc advisory group was to summarize the findings from the scope of work presented and provide recommendations regarding the feasibility of measles eradication.

The experience from the Region of the Americas was of particular importance considering that it is the only WHO Region that has eliminated measles, and it has recently celebrated the anniversary of the interruption of endemic rubella virus.

The discussion following the presentation was focused on the following points:

- The economic benefits of eliminating measles in the Americas should be made more widely known.
- Private sector participation has been critical to achieving and sustaining elimination. Alliances with scientific societies have also been fundamental in rapidly responding to crises related to vaccination and to preserve the integrity of immunization programs.
- The vaccination of men and women up to 39 years of age has played a key role in maintaining measles elimination in the Americas; this strategy should be evaluated in detail prior to a decision on global measles eradication.
- Country ownership played a decisive role in the success of measles and rubella elimination efforts in the Americas, intense advocacy efforts are required to ensure political commitment and the mobilization of resources at all levels. ■

For more information visit: "Measles, Rubella and CRS, Rubella Watch", June-July 2010. Available at: http://new.paho.org/hq/index.php?option=com_content&task=view&id=782&Itemid=2180&lang=en.

Reported Cases of Selected Diseases, 2008-2009

Number of reported cases of pertussis, diphtheria, tetanus, neonatal tetanus (NNT), and mumps

Country	Pertussis		Diphtheria		Tetanus (Non-NNT)		Neonatal Tetanus		Mumps	
	2008	2009	2008	2009	2008	2009	2008	2009	2008	2009
Anguilla	0	0	0	0	0	0	0	0	0	0
Antigua & Barbuda	0	0	0	0	0	0	0	0	0	0
Argentina	3085	1743	0	0	0	15	0	0	12198	5913
Aruba	…	0	…	0	…	0	…	0	…	0
Bahamas	0	0	0	0	0	0	0	0	0	3
Barbados	0	0	0	0	2	2	0	0	0	0
Belize	2	0	0	0	1	0	0	0	0	0
Bermuda	0	0	0	0	0	0	0	0	0	2
Bolivia	0	…	0	0	13	8	0	1	10566	3696
Brazil	1275	1037	85	4	333	275	6	3	…	…
Canada	1961	1667	4	2	1	2	0	0	748	214
Cayman Islands	0	0	0	0	0	0	0	0	0	0
Chile	969	692	0	0	8	10	0	0	1243	825
Colombia	408	407	0	0	45	36	3	4	5930	9457
Costa Rica	2024	664	0	0	1	1	0	0	0	25
Cuba	0	0	0	0	3	3	0	0	11	4
Dominica	0	0	0	0	0	1	0	0	0	0
Dominican Republic	11	18	3	5	66	58	2	1	0	…
Ecuador	125	41	0	0	0	4	2	5	626	837
El Salvador	5	2	0	0	1	10	0	0	313	126
French Guiana	…	…	…	…	…	…	…	…	…	…
Grenada	0	0	0	0	2	0	0	0	0	0
Guadeloupe	…	…	…	…	…	…	…	…	…	…
Guatemala	60	…	0	0	2	3	1	1	627	1
Guyana	0	0	0	0	0	0	0	0	0	0
Haiti	696	4	10	37	16	3	16	…	38	0
Honduras	224	127	0	0	12	20	1	1	219	187
Jamaica	0	0	0	0	1	6	0	0	0	0
Martinique	…	…	…	…	…	…	…	…	…	…
Mexico	99	559	0	0	26	39	1	0	7296	…
Montserrat	0	0	0	0	0	0	0	0	1	0
Netherland Antilles	0	0	0	0	0	0	0	0	0	0
Nicaragua	25	11	0	0	2	0	0	0	108	103
Panama	108	101	0	0	5	1	0	1	0	154
Paraguay	7	1	0	0	14	11	1	1	70	83
Peru	59	254	0	0	42	18	2	1	…	…
Puerto Rico	…	…	…	…	…	…	…	…	…	…
Saint-Kitts & Nevis	0	0	0	0	0	0	0	0	0	0
Saint-Lucia	0	0	0	0	0	0	0	0	73	0
Saint-Vincent & the Grenadines	0	0	0	0	0	0	0	0	0	0
Suriname	0	1	0	0	1	1	0	0	0	0
Trinidad & Tobago	0	0	0	0	0	0	0	0	0	0
Turks & Caicos Islands	0	0	0	0	0	0	0	0	0	0
United States*	6022	9910	0	0	19	18	0	0	454	1991
Uruguay	128	9	0	0	2	1	0	0	641	256
Venezuela	0	…	0	0	0	16	0	1	1007	7509
Virgin Islands (UK)	0	0	0	0	0	0	0	0	0	0
Virgin Islands (US)	…	…	…	…	…	…	…	…	…	…
Total	**17293**	**17248**	**102**	**48**	**618**	**562**	**35**	**20**	**42169**	**31386**

… Not available

Updated: 31 October 2010

(*) Mobidity and Mortality Weekly Report (MMWR), Vol. 59/No. 33, 2010.

Source: 2009/10 PAHO-WHO/UNICEF Joint Reporting Forms (JRF) and country reports to FCH-IM/PAHO.

Immunization in the Americas: 2010 Summary Now Available

The *Immunization in the Americas* brochure is published every year by the Comprehensive Family Immunization Project. Its objective is to highlight the key data on vaccine-preventable disease surveillance and the provision of immunization services by the countries of the Americas. The publication serves as a benchmark for monitoring the progress of national immunization programs of the Region.

Following the interruption of indigenous measles virus circulation in 2002 in the Americas, and in light of the achievements in the implementation of immunization strategies and the accelerated reduction in the number of rubella cases, during the 44th meeting of the Directing Council in 2003, PAHO Member States approved a Resolution establishing the goal of rubella and congenital rubella syndrome (CRS) elimination from the Americas by 2010. Following the Resolution, countries have made enormous efforts to implement the PAHO-recommended vaccination and surveillance strategies. Over 250 million people have been vaccinated in mass vaccination campaigns targeting adolescents and adults of both sexes—campaigns that became known as "speed-up"—and routine coverage with measles/rubella-containing vaccines continues to be above 90% since 1998. As a result, the last endemic rubella cases in the Region were reported in Argentina in February 2009. In addition to interrupting rubella transmission, the "speed-up" campaigns have greatly contributed to consolidating measles elimination.

In 2007, the 27th Pan American Sanitary Conference adopted a Resolution calling for national commissions to be formed to verify and document measles, rubella, and CRS elimination, under the guidance of an independent International Expert Committee appointed by the PAHO Director. This year, *Immunization in the Americas* highlights some of rubella elimination achievements, along with the next steps in the process of verification and documentation of the interruption of endemic measles and rubella virus transmission in the Region of the Americas. ■

Copies of the brochure, available in English, Spanish, and French, can be obtained by sending a request to fch-im@paho.org. Electronic versions since 2004 are available on the Immunization Project's web page at www.paho.org/immunization.

The *Immunization Newsletter* is published every two months, in English, Spanish, and French by the Comprehensive Family Immunization Project of the Pan American Health Organization (PAHO), Regional Office for the Americas of the World Health Organization (WHO). The purpose of the *Immunization Newsletter* 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 possible solutions to those problems.

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