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## **Progress report on Eradication of poliomyelitis**

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## 1. Introduction

In 1988, the Regional Committee for the Eastern Mediterranean issued resolution EM/RC35/R.14 adopting the goal of poliomyelitis eradication. Since then, the implementation of eradication strategies has reduced the number of countries endemic for polio in the Eastern Mediterranean Region from 22 countries to only two (Afghanistan and Pakistan) at the end of 2007. In both countries the intensity of transmission has decreased to historically low levels as a result of enhanced eradication efforts.

The large-scale epidemics experienced in Sudan, Yemen and Somalia during 2004–2007 due to virus importation from Nigeria have come to an end, with the last case reported from Somalia in March 2007.

## 2. Current situation in the Eastern Mediterranean Region

### 2.1 Regional progress

The year 2007 witnessed intensification of polio eradication efforts and considerable progress towards the eradication goal, with the total number of poliomyelitis cases reported the lowest ever recorded in the Region (58). The majority (49 cases) were from the two endemic countries; 8 were from Somalia, representing the tail of the outbreak that followed importation of poliovirus, and a single importation was reported from Sudan with no secondary cases. The total regional cases in 2007 represent a 46% reduction as compared to 2006 cases (107) and represent less than 5% of the global cases for the year 2007.

In the remaining endemic countries, in addition to the reduction in case numbers the geographic extent of virus transmission is also being restricted, with the majority of the population living in polio-free areas.

### 2.2 Highlights on endemic and re-infected countries

#### *Afghanistan and Pakistan*

Of the four remaining endemic countries for poliomyelitis worldwide, Afghanistan and Pakistan represent a single epidemiological block, as evidenced by the epidemiological and genetic patterns of the viruses isolated from each country. They share ethnic and cultural traditions and very strong social and commercial links, with considerable population movement between both countries.

The number of confirmed cases of polio in Pakistan decreased from 40 cases (20 P1 and 20 P3 virus) in 2006 reported from 22 districts to 32 cases (19 P1 and 13 P3) from 18 districts in 2007.

Similarly in Afghanistan the total confirmed cases in 2007 were 17 (6 P1 and 11 P3) from 13 districts while in 2006, 31 cases were reported (29 P1 and 2 P3) from 17 districts.

Transmission in Afghanistan and Pakistan occurs mainly in 2 zones:

- The northern transmission zone, which comprises most of North West Frontier Province including the tribal agencies along the border with Afghanistan and sometimes extends into the eastern region of Afghanistan (2 P1 cases in 2007). Cases are mostly due to WPV1 (10 P1 and 1 P3 cases in 2007).
- The southern transmission zone, which represented the principal endemic zone in 2007 and includes the corridor from the southern region of Afghanistan and continues through Balochistan and southern Punjab into northern and southern Sindh including Karachi. Pakistan reported 9 P1 and 12 P3 cases from this zone in 2007 and the southern region of Afghanistan reported 11 P3 and 4 P1 cases.

Surveillance activities remained at certification standard and the polio laboratory in the National Institutes of Health, Pakistan, which serves as a regional reference laboratory in the Global Polio Laboratory Network, continued to perform at exceptionally high standard, serving both Afghanistan and Pakistan. Genomic sequencing of isolated viruses from both countries is also done in the laboratory and is showing an evident decrease in genetic diversity of polioviruses, from 10 sub-clusters in 2005 to 7 in 2006 to 4 in 2007.

Both Afghanistan and Pakistan conducted large-scale house-to-house supplementary immunization activities in 2007 that targeted children aged less than 5 years. Pakistan implemented 4 national immunization days (NIDs) and seven subnational immunization days (SNIDs) covering reservoir and high-risk areas. Afghanistan also conducted 4 NIDs and 7 SNIDs in the southern region and adjacent regions along the border with Pakistan. These supplementary immunization activities were largely synchronized between the two countries in order to optimize simultaneous comprehensive coverage of the border areas and of children on the move. Both countries were increasingly using monovalent vaccine (mOPV1 and mOPV3) in addition to trivalent OPV (tOPV). Decisions on type of vaccine were dictated by the epidemiology of the disease as both types of wild polioviruses are still circulating in both countries. The reported aggregate coverage rates of supplementary immunization activities were in general very high. However, analysis of post-campaign monitoring data at the sub-district level shows poor coverage of some Union Councils in high risk areas. As well, coverage remains suboptimal in security-compromised and difficult-to-access areas in southern Afghanistan and along the border in both countries.

The continued circulation of poliovirus despite the implementation of large number of supplementary immunization activities is mainly the result of difficulty in accessing children living in insecure areas with active conflict and fighting, especially in southern Afghanistan and tribal areas in Pakistan. In addition, the quality of supplementary immunization activities remains poor in some endemic areas in Pakistan, especially in Balochistan and Sindh provinces. This is mainly attributed to managerial issues and inadequate engagement of some of the authorities at provincial and district levels.

In Afghanistan, windows of opportunity for improved access were used to immunize children, and efforts continued to reach agreement with all partners to cease hostilities during supplementary immunization activities to allow vaccinators to move safely and reach children. Through indirect contact, it was possible to reach agreement with anti-government elements to issue a statement of support for supplementary immunization activities in their areas of influence. This breakthrough, combined with efforts by the Government of Afghanistan to limit hostilities during immunization rounds, allowed improved access to children in the southern region who had consistently been missed. However, this access needs to be sustained in order to have an impact on the immunity profile and hence cessation of cases.

In Pakistan, efforts are focused on ensuring full engagement of the national leadership at all levels, as well as civil administration and local communities including tribal and religious leaders, and intensifying support to high risk areas.

### *Somalia*

The outbreak that started in Somalia after the first imported wild poliovirus (P1) was detected in Mogadishu in July 2005 came to an end with the last case on 25 March 2007. Somalia has since regained its polio-free status.

This was achieved despite significant challenges including prevailing conflict and insecurity, limited infrastructure, poor routine immunization, porous borders with intense population movement, difficulty in reaching nomadic populations and high numbers of refusals in large towns. Several rounds of supplementary immunization activities were conducted prior to and following the outbreak using mOPV1. Activities have continued in 2007, with 4 NIDs and 6 SNIDs implemented using mOPV1. Post-campaign evaluation over the past three years has been very helpful in identifying and addressing gaps in campaign quality. Also, several innovative approaches were used in conflict affected areas including full involvement of the community elders, using windows of opportunities to access children and implementing repeated rounds within short periods using mOPV. In recognition of the continued risk of importation and poor routine coverage and in order to prevent accumulation of a pool of susceptible individuals, supplementary immunization activities are continuing, with 2 rounds of NIDs conducted in the first half of 2008 using tOPV.

The AFP surveillance system is well established based on a large number of national staff and reporting sites and a strong community component. All major surveillance indicators were achieved at national level during 2007.

Efforts are also ongoing to coordinate activities in the Horn of Africa, where communication and exchange of information is ensured and most of the immunization campaigns are synchronized between Somalia, the Somali region of Ethiopia, northeast Kenya and Djibouti.

### *Sudan*

Sudan is a country at high risk of wild poliovirus importation, with two of its nine bordering countries, namely Chad and Democratic Republic of Congo, still reporting polio cases due to wild polioviruses. There is continuous population movement between Sudan and Chad that includes families living on both sides of the country, nomadic populations, pilgrims on their way to Saudi Arabia, and refugees moving due to insecurity.

Many lessons were derived from the explosive outbreak that followed virus importation in May 2004 and continued until June 2005. Based on this experience, Sudan continued conducting NIDs during 2006 and 2007 in order to maintain high levels of immunity among children. The threat of wild poliovirus importation became a reality in 2007. A polio case due to imported wild poliovirus (P1) was reported in September 2007 from South Darfur. The case was detected just two months before the pilgrimage season. Genetically this virus was linked to a case reported from Chad. In October 2007, another imported poliovirus (P1) was also isolated from a healthy child in West Darfur. Factors that prevented the spread of virus or occurrence of secondary cases included the high immunity level of children and the large-scale high quality immunization response using mOPV1.

The AFP surveillance system in Sudan has achieved certification standard performance indicators since 2003. The experience of detection of the imported poliovirus in a very remote and insecure area of Darfur in 2004 and recently in 2007 has proved that the system is sensitive enough to timely detect polioviruses. However, the suboptimal routine immunization level in the southern and Darfur states, inaccessibility to some areas due to insecurity and the need to sustain national political commitment until global poliomyelitis eradication is achieved remain as major challenges.

## **3. Implementation of polio eradication strategies**

### **3.1 Routine immunization**

High routine immunization coverage of infants is one of the basic strategies of polio eradication. The crucial role of high routine coverage is highlighted by the importation experiences, where imported poliovirus resulted in large outbreaks in countries with low coverage compared with sporadic cases without secondary spread in countries with high routine coverage.

Polio eradication activities continue to support and strengthen routine immunization. The polio eradication workforce helps to strengthen routine immunization. The significant investment made by the polio eradication programme in training various levels of national health workers in micro-planning, campaign implementation, monitoring and evaluation has increased their capacity to support immunization programmes.

The surveillance structure developed for AFP surveillance has proved to be capable of supporting other EPI initiatives such as measles elimination. The established laboratory network for polio eradication is now extending laboratory services for EPI diseases and other diseases of public health importance.

### **3.2 Supplementary immunization activities**

Priority attention continued to be given to implementing supplementary immunization activities, with the aim of ensuring that all children under 5 years are immunized against polio, especially in countries with low routine coverage.

In 2007, more than 412 million doses of OPV were given in national and subnational immunization campaigns in the Region. Afghanistan, Pakistan and Somalia carried out supplementary immunization activities throughout the year at 4–6 week intervals. Mop-up activities were also implemented in response to wild poliovirus isolation in Afghanistan, Pakistan and Sudan using the appropriate monovalent OPV. To guard against spread after importation, some polio-free countries conducted campaigns addressing mainly high-risk areas and areas with low routine coverage (Djibouti, Egypt, Iraq, Lebanon, Jordan, Libyan Arab Jamahiriya, Sudan, Syrian Arab Republic and Yemen).

Campaigns were conducted from house to house targeting all children less than 5 years of age. Extensive efforts were made to ensure high quality. Commitment was secured from politicians and community leaders, and multisectoral approaches were implemented to involve governmental and nongovernmental sectors and included intensified social mobilization and supervision activities. Detailed microplans with maps were developed and used to reach every child, with special focus on risky areas and difficult-to-reach groups. Monovalent vaccine was used to maximize type-specific immune response. Finger-marking was used to guarantee that no child was missed. Independent monitors observed campaigns, and their remarks helped to pinpoint problems that were resolved by the responsible authorities. NIDs were coordinated between neighbouring countries and supplementary immunization activities were also used to provide other services, such as delivering life-saving vitamin A.

### **3.3 Surveillance for acute flaccid paralysis**

The AFP surveillance system in the Region continues to perform at the accepted international standard and even exceed the required indicators in many priority countries. All endemic, infected or recently polio-free countries have maintained a non-polio AFP rate of at least 2 cases per 100 000 children under the age of 15 years. Many other countries, particularly those at high risk of importation, also exceeded the required level. Overall, the Region achieved a rate of 4.11 in 2007. The minimum required level of 1 case per 100 000 children under 15 was reached by all individual countries except Palestine (0.93), which has a difficult security situation.

The second key quality indicator for surveillance is percentage of AFP cases with adequate stool collection. In 2007 this indicator was maintained above the target of 80% at the regional level (90.9%) and in all countries except Bahrain (60.0%) and Lebanon (65.2%), which had only a small number of cases.

The quality of AFP surveillance is assessed through in depth-review missions with actual field evaluation. By the end of 2007, with AFP surveillance reviews conducted in Kuwait, Oman, Qatar, Bahrain and United Arab Emirates in the later part of the year, almost all countries of the Region had been reviewed by international staff at least once since 2004. The only exceptions are the security-compromised countries. In Iraq, reviews were conducted by national staff. In Afghanistan, Pakistan and Somalia, reviews have not yet taken place. The Regional Office is following closely the implementation of the recommendations of these reviews.

To maintain a high standard of surveillance in the Region, the Regional Office has developed regional guidelines for many of the procedures implemented in AFP surveillance. These guidelines have been communicated to the national programmes and are used to update their national guidelines and maintain surveillance performance. A surveillance workshop was conducted in March 2007 with participation from all countries. It was an excellent chance to share the findings of the surveillance reviews, share the experience of more evolved systems and train the national staff. The workshop also included one day on measles surveillance, reflecting the pivotal role played by polio eradication staff in other EPI activities.

The Regional Office is working on updating the Information for Action (IFA) database system. During early 2008, three workshops were conducted to train data management staff in all countries of the region on the new system. This also represented a chance to build the capacities of staff to analyse the surveillance data. The new system will incorporate a component for collection of data for the contacts of AFP cases.

As the target of eradication nears, it is critical to sustain the quality and sensitivity of the AFP surveillance in all the countries of the Region and hence provide necessary information to guide programme activities for interruption of viral circulation in endemic countries and for timely detection and response to any wild poliovirus importation in polio-free countries. Continued national commitment, close monitoring and support to these programmes will ensure this goal is achieved.

### **3.4 Regional poliovirus laboratory network**

The performance of the regional poliovirus laboratory network is being sustained at certification standard. All network laboratories were fully accredited, and have passed the WHO proficiency testing panel for both primary virus culture and intratypic differentiation testing.

There was a general increase in laboratory workload due to improvement in AFP surveillance and collection of stool samples from contacts of AFP cases. In 2007, the regional poliovirus laboratory network tested 18 138 stool samples from AFP cases, 4751 from contacts, and 866 from other sources. All laboratory performance indicators were well above the set targets: cell culture report within 28 days (100%), NPEV rate (18%), ITD within 14 days (99%), and final report within 60 days of onset of paralysis (99%).

A remarkable achievement is implementation of the new testing algorithm in all regional network laboratories, which has shortened the time of reporting of virological investigation results to less than two weeks. The speed of sequencing results for wild polioviruses has also increased; most WPV positive cases have been confirmed within one week of isolation, which in turn has decreased the response time in the field for immunization activities. After implementation of the new test algorithm, the mean time from onset of paralysis to ITD result decreased from 31 days in 2006 to 25 days in 2007. The period from receiving the sample in the laboratory to ITD results has decreased from 17 days in 2006 to 12 days in 2007.

In Egypt, both AFP and environmental surveillance are continuing at good sensitivity, and one more site (Red Sea) was added to the 33 already-existing sewage collection sites for environmental surveillance.

Two more laboratories (Morocco and Syrian Arab Republic) were given the facilities for ITD testing, and are in the process of establishing ITD testing. New LABIFA software, version 4.0, was designed in light of the needs of the new algorithm for use in network laboratories in March 2008.

Maintaining the polio laboratory network is of vital importance at least until global certification including the post-eradication phase. It should be used for the provision of laboratory support to other programmes, particularly measles elimination. Therefore efforts are needed to address and solve challenges that may face the network.

## **4. End-game issues**

### **4.1 Laboratory containment of wild poliovirus and potential infectious material**

All countries, except the two endemic countries and Somalia and Yemen, have reported completion of Phase 1 containment activities (laboratory survey and inventory). The national plans of action for Afghanistan and Yemen were developed and submitted for approval by their health authorities. A national containment coordinator has been nominated by Pakistan and the national plan of action has been prepared.

As of December 2007, other than Pakistan, 19 383 laboratories have been surveyed and only seven laboratories have been identified as storing WPV material. Three of these laboratories belong to the regional network of national polio laboratories (Egypt, Pakistan and Tunisia) and the remaining four are research or quality control laboratories in three countries (Egypt, Islamic Republic of Iran and Tunisia).

As of December 2007, 12 countries (Bahrain, Islamic Republic of Iran, Iraq, Jordan, Libyan Arab Jamahiriya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Tunisia and the United Arab Emirates) had submitted their revised reports to WHO based on the comments of the reviewer.

## 4.2 Certification of poliomyelitis eradication

In 2007 the Regional Commission for Certification of Poliomyelitis Eradication (RCC) reviewed various national documents submitted by the national certification committees (NCCs) of 19 countries in the Region. Final national documents for regional certification were accepted from five more countries (Lebanon, Libyan Arab Jamahiriya, Morocco, Syrian Arab Republic and Tunisia) that had all been polio-free for 5 or more years and had completed phase 1 of the laboratory containment in addition to the seven country reports accepted in 2006 (Bahrain, Islamic Republic of Iran, Jordan, Oman, Qatar, Saudi Arabia and United Arab Emirates). Similar reports from Iraq and Kuwait are expected to be reviewed by the RCC in April 2008. All these countries and others whose basic national documents have been accepted (Djibouti, Egypt, Sudan and Palestine), will, however, continue to submit annual updates until regional certification has taken place.

Yemen re-submitted its national document while Somalia submitted a provisional report in 2007. The remaining polio endemic countries of the Region, Afghanistan and Pakistan, have also submitted provisional national certification documents that were reviewed by the RCC in 2007. The preparation of these reports has helped the NCCs and the national programme managers in compiling and validating a large amount of data on national polio eradication activities and in becoming familiar with the RCC's critical review of such reports.

## 5. Technical and financial support to countries

Technical support to the regional polio eradication programme is continuing, using about 70 international and over 1000 national polio staff in addition to teams of experts constituting both regional and country technical advisory groups (TAGs), which are advising the national programmes on strategic directions. At the same time, all polio staff are extending support to EPI as well as helping to address other priority health programmes at country level.

Significant resources for eradication efforts are being provided by the Member States, particularly with respect to routine immunization. In addition, considerable external financial resources were secured to support activities necessary to achieve the target, particularly with respect to the provision of vaccines, operational expenses and technical support needed to intensify supplementary immunization and continue surveillance activities. The external resources provided to support the planned activities through WHO for 2006–2007 were in the order of US\$ 117 million; these included US\$ 72 million for operational expenses, US\$ 16 million for surveillance and laboratory and US\$ 29 million for national and international staff.

The main contributors to these funds were the UK Department for International Development (DFID), Rotary International, World Bank, GAVI, Government of the United States of America, Bill & Melinda Gates Foundation, Government of Canada, the European Community, Governments of Kuwait, Russia, France, Germany and Saudi Arabia, and the United Nations Foundation. Recent resource mobilization efforts were successful in Pakistan and secured the contribution of the Government of Pakistan to OPV costs for planned supplementary immunization in 2008.

## 6. Coordination with other Regions

Coordination is being extended to neighbouring countries in other WHO regions. Several coordination meetings for the Horn of Africa took place in 2007; the Horn of Africa bulletin is being issued regularly with input from all relevant countries. As well, the Horn of Africa Technical Advisory Group met in April 2007. Synchronization of activities and exchange of information between countries has improved greatly. However, there is still room for improving direct coordination at local levels. Operation MECACAR is continuing between neighbouring countries of the Eastern Mediterranean and European regions; the two regions agreed to continue joint efforts to fight polio in a signed declaration in 2007, and the scope of the operation was extended to include measles elimination and routine immunization as well.

Given the continued threat of poliovirus importation from Nigeria, the Regional Office continued to assist in providing technical support to the polio eradication efforts in Nigeria to help in the planning



and implementation of polio eradication activities in northern Nigeria. As well, the Regional Office continued to support efforts to fight rumours about the vaccine and vaccination through seeking statements from leading religious scholars that call on parents and communities to vaccinate their children and that counter the unfounded rumours about the vaccine and vaccination.

## **7. Regional commitment for polio eradication**

With the goal of stopping transmission in the Region closer than ever, regional commitment for poliomyelitis eradication is now at its highest level, with national authorities in both endemic and polio-free countries showing great commitment.

The continued interest and regular review of the situation by the Regional Committee, along with the progressive guidance reflected in Regional Committee resolutions, are the driving force towards achieving this goal at regional level. The Regional Office has continued its advocacy efforts through disseminating information, providing regular updates and alerting national authorities to developments. The Regional Director continued to pay visits to priority countries and met with Heads of State, Prime Ministers, Ministers of Health and other senior national officials, who assured him of their continuing commitment to eradication efforts.

The commitment of the two endemic countries of the Region, Pakistan and Afghanistan, was reaffirmed during a stakeholder's consultation in Geneva in February 2007, as well as during the visit of the WHO Director-General and Regional Director to both countries and in subsequent meetings held with high-level officials including President Hamid Karazi of Afghanistan and the Prime Minister of Pakistan.

## **8. Challenges and future directions**

The primary challenge facing the programme is the continuation of endemic wild poliovirus transmission in the shared transmission zones of Pakistan and Afghanistan, where access to children is compromised in some areas due to insecurity, especially in the conflict affected areas of southern Afghanistan, and to cultural factors and refusals in other areas. As well, the interest and commitment of national authorities must be maintained at all levels in both polio-endemic and polio-free countries. Importation of wild poliovirus to the Region from remaining endemic countries remains a threat, especially for countries in the extended Horn of Africa. Securing the necessary resources, both from national funds and external resources, is also an ongoing challenge. To address these challenges, the regional priorities for polio eradication during 2008 are to:

- Interrupt transmission in Pakistan and Afghanistan through intensification of supplementary immunization activities, ensuring high quality performance, making appropriate use of available monovalent vaccines and ensuring access to children in the security compromised areas;
- Avoid large immunity gaps in polio-free countries through improvement of routine immunization and implementation of supplementary immunization activities, especially in foci of low population immunity;
- Maintain certification-standard surveillance in all countries, both at national and subnational levels and particularly among high-risk areas and populations;
- Maintain and further strengthen coordination activities between neighbouring countries, especially between Afghanistan and Pakistan and in the Horn of Africa, including synchronization, exchange of information and local level planning and coordination;
- Continue with containment and certification activities;
- Secure the financial resources required to implement the regional plan for eradication;
- Optimize collaboration between the poliomyelitis eradication initiative and the Expanded Programme on Immunization.