



ORGANISATION OF THE ISLAMIC CONFERENCE
STATISTICAL, ECONOMIC AND SOCIAL RESEARCH
AND TRAINING CENTRE FOR ISLAMIC COUNTRIES



OIC OUTLOOK

April 2011

THE STATE OF POLIO IN OIC MEMBER COUNTRIES

“ENHANCING MULTILATERAL COOPERATION TO ERADICATE POLIO”

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OIC OUTLOOK

GLOBAL FOOD PRICE CRISIS: IMPACT ON FOOD SECURITY AND MALNUTRITION IN THE OIC MEMBER STATES

INTRODUCTION

Polio or Poliomyelitis is a communicable disease caused by a virus that lives in the throat and intestinal tract. Poliovirus attacks the nervous system and in some cases can paralyze the victim instantly. There are three types of poliovirus: Type 1 (PV1) or Mahoney; Type 2 (PV2) or Lansing; and Type 3 (PV3) or Leon. It is usually transmitted through person to person contact with the faeces or oral/nasal secretions of an infected person. Therefore, it spreads rapidly especially in those communities that are living in very poor hygienic and sanitation conditions. People of all ages can get infected by the Polio; however children under five years of age are the most likely to be infected by the virus.



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Therefore, it spreads rapidly communities that are living sanitation conditions. People of all ages can get infected by the Polio; however children under five years of age are the most likely to be infected by the virus.

In majority of the polio cases, the infected person usually does not show any particular symptoms whereas in some cases the victim suffers from fever, fatigue, headache, vomiting, stiffness in the neck, and pain in the limbs. As a result, it is very much likely that an infected person spread the disease to many others before clinical confirmation of the infection. Poliovirus is highly dangerous. It attacks the nervous system and destroys the nerve cells that activate the muscles. In some cases it can paralyze the victim and can cause even an instant death. According to the WHO estimates, approximately one out of every 200 children infected suffers from irreversible paralysis, usually in the legs, and five to ten percent of those who get paralyzed die mainly due to immobilization of their breathing muscles (WHO Fact sheet No: 114 November 2010). On the other hand, around 40% of those who managed to survive paralytic polio suffer from post-polio syndrome (15-40 years after the original infection) which causes a new progressive muscle weakness, severe fatigue and pain in the muscles and joints (Global Polio Eradication Initiative (GPEI), 2011).

Though polio is not curable, it can be prevented especially through childhood vaccination. There are two types of vaccines that are being used widely to protect against polio: Inactivated Polio Vaccine (IPV) and Oral Polio Vaccine (OPV). IPV was first developed in 1952 by Jonas Salk whereas OPV was developed by Albert Bruce Sabin and was licensed for use in 1963.

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In 1988, WHO member countries launched the Global Polio Eradication Initiative (GPEI), the single largest public health project ever undertaken by the global community. This initiative was adopted by the World Health Assembly with an aim to mobilize global efforts to end polio by 2000. GPEI provides a platform for the governments as well as the multilateral health/development agencies like the World Health Organization (WHO), Rotary International, the US Centers for Disease Control and Prevention (CDC) and UNICEF to spearhead their efforts to eradicate the polio by increasing immunization coverage across the world. Since 1988, about US\$ 9 billion has been invested in this initiative. These efforts paid off and globally incidence of polio has declined by over 99%. Today, only four countries are classified as polio endemic compared to 125 in 1988 (GPEI Infected Countries, 2010).

This report examines the current state of prevalence of polio both at world and OIC levels. It also highlights the major issues and challenges facing the endemic and importation countries and the role of multilateral cooperation to eradicate polio, and provides a brief discussion about the major initiatives taken by the OIC and what measures should be taken both at national and intra-OIC level to speed up the eradication of polio in member countries.

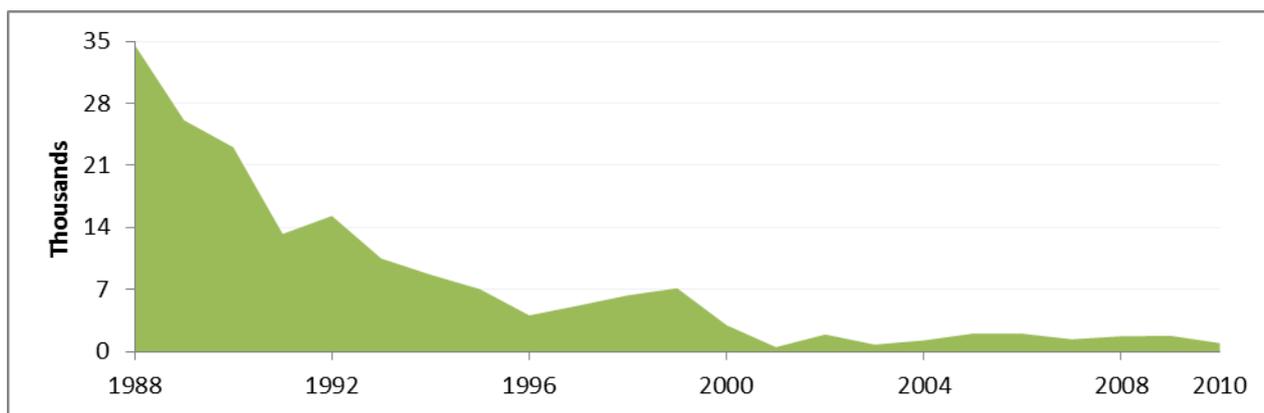
PREVALENCE OF POLIO AT GLOBAL LEVEL

Over the years, global community strived hard to achieve the target of the Global Polio Eradication Initiative (GPEI) to eradicate polio by 2000. Under this initiative, efforts have been made to achieve and maintain high routine immunization coverage for the children under the age of one. To supplement routine immunization activities, governments especially in endemic countries were also encouraged to organize National immunization Days (NIDs). In addition, various door to door campaigns have also been organized to ensure delivery of Oral Polio Vaccine (OPV) in specific areas of those countries which were at the last phase of polio eradication (Levin, 2000).

These strategies have been proved very effective. According to the GPEI estimates (History of Polio, 2010), between 1988 and 2009, about 2.5 billion children worldwide have been immunized with the help and cooperation of more than 200 governments and over 20 million volunteers. Today, around 85% of total infants are immunized against polio across the globe. At the regional level, more than 80% of infants get three doses of polio vaccine in all regions except Africa and South- East Asia where coverage rate remained 72% and 74% respectively (WHO Immunization Coverage, 2010).

The widespread immunization coverage helped to reduce the burden of polio disease across the globe. As shown in the Figure 1, the number of polio cases has declined from around 35 thousands in 1988 to just about 950 in 2010. Meanwhile, number of polio endemic countries has also declined from 125 in 1988 to just four in 2010.

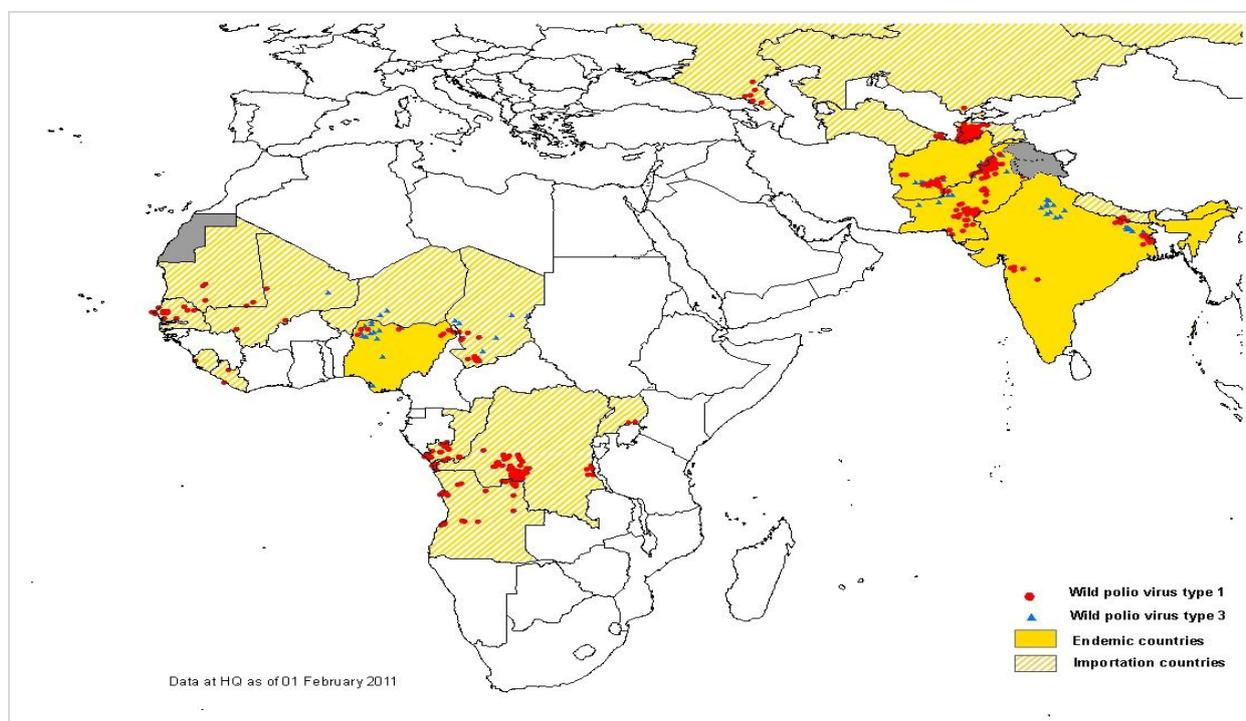
Figure 1: Reported Polio Cases in the World, 1988-2010



Source: WHO Database for Reported Incidence of Diseases

As shown in the Figure 2, there are four countries: Afghanistan, India, Pakistan and Nigeria where polio is endemic¹ whereas 16 countries are experiencing outbreaks of poliovirus following an importation. Three out of these 16 importation countries: Angola, Chad and Democratic Republic of Congo are classified as countries with re-established transmission². In 2010, globally there were 950 cases of polio and about 76% of these cases (718 cases) were reported in non-endemic importation countries. In endemic countries, polio is mainly caused by wild poliovirus type 1 and type 3 whereas in non-endemic importation countries poliovirus type1 is more prevalent compared to the polio virus type 3. For 2010, Tajikistan registered the highest number of cases (458) followed by Pakistan (144) and Democratic Republic of Congo (93).

Figure 2: Prevalence of Polio in the World, 2010



Source: Global Polio Eradication Initiative (GPEI), 2010

¹ According to the WHO, countries where transmission of wild poliovirus has never been stopped are classified as endemic.

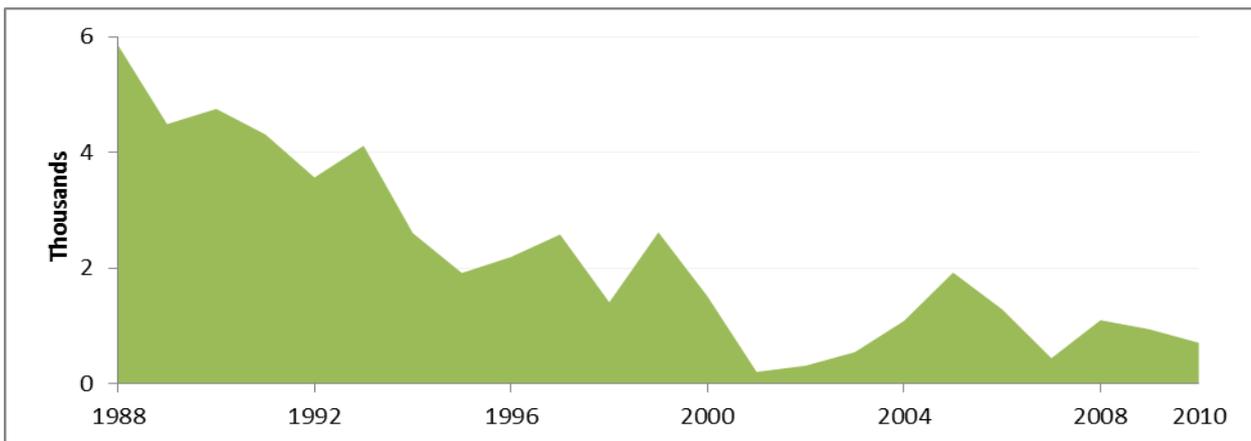
² Countries with an active and persistent poliovirus transmission of more than 12 months following an importation.

PREVALENCE OF POLIO AT OIC LEVEL

Over the years, OIC member countries worked in close cooperation with international community and multilateral agencies to eradicate polio disease. Strong political will and public awareness played a pivotal role to improve the immunization coverage of infants with three drops of polio vaccine. According to the WHO immunization coverage estimates (2010), over 81% of infants were immunized in OIC member countries in 2009. At the OIC regional level, 96% of infants were immunized against polio in Europe & Central Asia followed by Latin America & Caribbean (92%), East Asia & Pacific (90%), Middle East & North Africa (90%) and South Asia (88%) ; whereas the coverage rate remained only 65% in Sub-Saharan Africa.

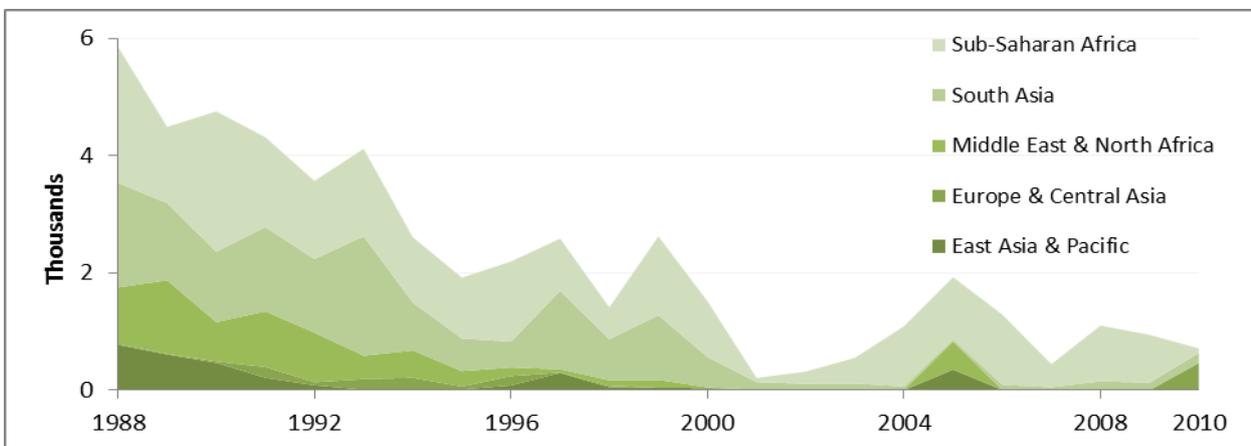
Higher immunization coverage rate helped to eradicate the polio disease in OIC member countries. As shown in the Figure 3, number of reported poliovirus cases has declined from about six thousands in 1988 to only 711 in 2010. At the regional level, all OIC regions managed to contain the polio outbreaks (Figure 4) and with the exception of South Asia and Sub-Saharan Africa, all regions are being declared as non-endemic by the WHO. At the individual country level, only three OIC member countries are classified as endemic countries whereas ten member countries are classified as non-endemic importation countries.

Figure 3: Reported Polio Cases in OIC Member Countries, 1988-2010



Source: WHO Database for Reported Incidence of Diseases and GPEI

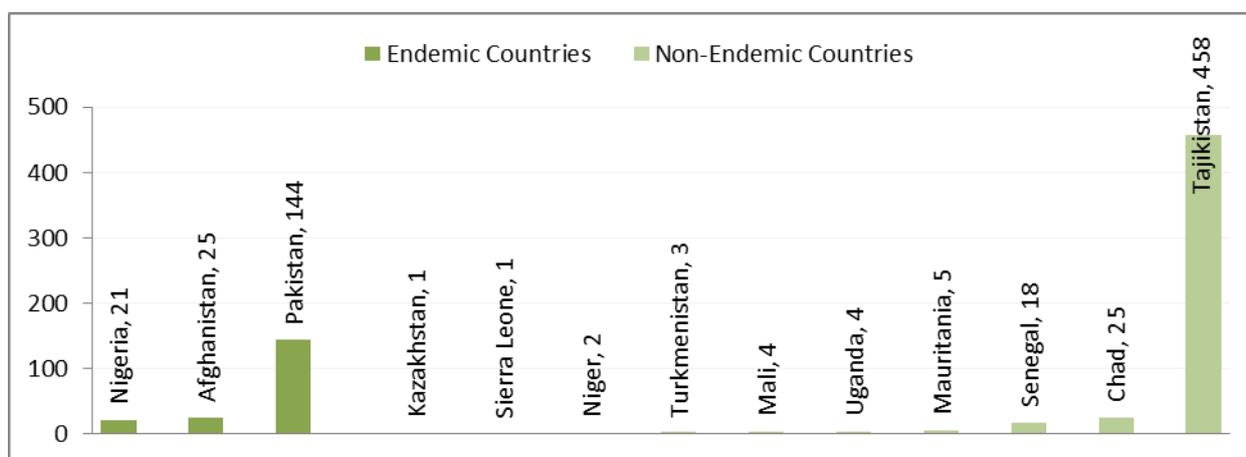
Figure 4: Reported Polio Cases in OIC Regions, 1988-2010



Source: WHO Database for Reported Incidence of Diseases and GPEI

Despite all achievements, poliovirus still exists in some pockets of three member countries: Afghanistan, Pakistan and Nigeria. These countries largely failed to stop the transmission of poliovirus and are classified as endemic countries. On the other hand, ten OIC member countries: Tajikistan, Chad, Senegal, Mauritania, Mali, Uganda, Turkmenistan, Niger, Kazakhstan and Sierra Leone witnessed poliovirus outbreaks following an importation. One out of these ten countries i.e. Chad is being classified among countries with re-established transmission. In 2010, more than 73% of OIC total polio cases were registered in non-endemic importation member countries. In this group, as shown in the Figure 5, Tajikistan registered the highest number of polio cases (458) followed by Chad (25) and Senegal (18); whereas number of poliovirus cases remained equal to or less than five in Mauritania (5), Mali (4), Uganda (4), Turkmenistan (3), Niger (2), Kazakhstan (1) and Sierra Leone (1).

Figure 5: Reported Polio Cases, 2010



Source: Global Polio Eradication Initiative (GPEI), 2010

MAJOR ISSUES AND CHALLENGES OF POLIO ERADICATION IN ENDEMIC AND IMPORTATION COUNTRIES

According to the GPEI, globally around 950 polio cases have been reported in 2010. A bulk of these cases were registered in Europe & Central Asia (476 cases or 50% of world total) followed by Sub-Saharan Africa (257 cases or 27% of world total) and South Asia (217 cases or 23% of world total). In these regions, with the exception of Sub-Saharan Africa, the incidence of polio remained comparatively very high in the OIC member countries. In Europe & Central Asia, OIC member countries accounted for 97% of total polio cases followed by 78% in South Asia and 31% in Sub-Saharan Africa. In general, during 2010, OIC member countries accounted for more than 75% of total poliovirus cases in the world. Within OIC group, the incidence of polio remained highly skewed towards non-endemic importing countries which accounted for about 73% of OIC total polio cases. Currently, OIC member countries are importing the polio virus both from endemic as well as non-endemic countries. In this section, we would like to analyze some major issues and challenges faced both by the endemic and non-endemic member countries to eradicate polio in the OIC region.



I- OIC Polio Endemic Countries

1- Pakistan

In 2010 there were 144 poliovirus cases in Pakistan compared to 89 in 2009, corresponding to an increase of 62%. Wild poliovirus type 1 remained more prevalent compared to type 3. In 2009, about 85% of total infants were immunized against the polio disease (Figure 6). According to the GPEI (Fact Sheet Pakistan, 2010), only ten out of 152 districts of Pakistan are affected by persistent transmission of polio. These districts are located in the provinces of Sindh, Khyber-Pakhtoonkhwa, Baluchistan, and Federally Administered Tribal Areas (FATA). In Karachi, the largest and most densely populated city of Pakistan, polio persists mainly due to the lack of sufficient administrative surveillance and shortage of trained vaccinators. These shortcomings ultimately lead to the poor quality of Supplementary Immunization Activities (SIAs). In Khyber Pakhtoonkhwa and FATA, lack of security is the major impediment to reach the children for vaccination; whereas lack of political ownership and security for vaccination teams are the major reasons for the prevalence of polio disease in Quetta (Baluchistan).

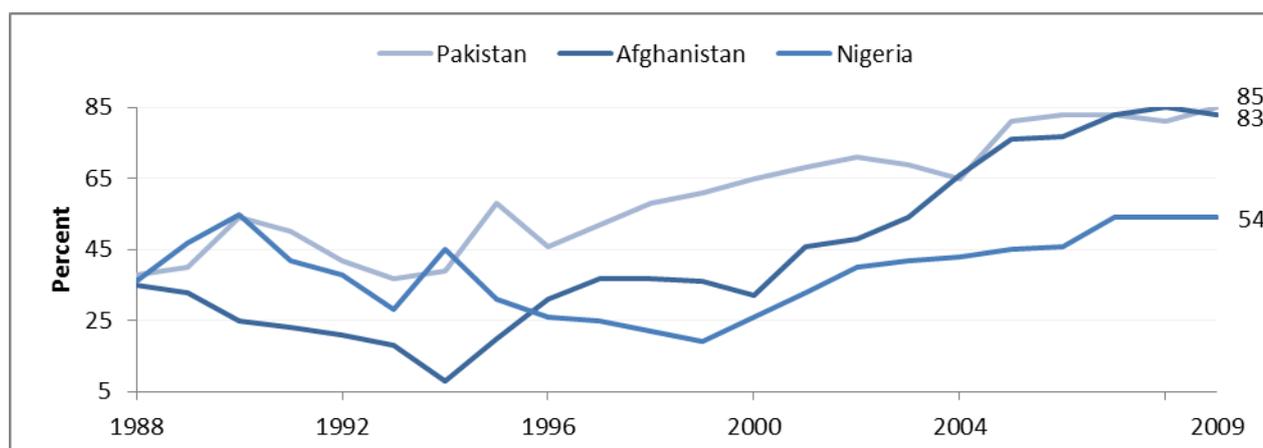
2- Afghanistan

In 2010 there were 25 poliovirus cases in Afghanistan compared to 38 in 2009, corresponding to a decrease of 34%. Majority of polio infections were caused by wild poliovirus type 1. Over the years, international community strived very hard to eradicate polio by increasing the immunization coverage in Afghanistan. These efforts paid off and the proportion of infants immunized against poliovirus has increased to 83% in 2009 (Figure 6). According to the GPEI (Fact Sheet Afghanistan, 2010), today only 13 out of 329 districts of Afghanistan are affected by persistent transmission of polio. These districts are located in the provinces of Helmand, Kandahar and Uruzgan. However, other regions are also vulnerable to get re-infection from these areas or due to importation from Pakistan. The polio persists in these areas mainly due to the ongoing conflict and war which makes it very difficult and even dangerous for the vaccination teams to travel to access target group of children for immunization.

3- Nigeria

In 2010 there were 21 poliovirus cases in Nigeria compared to 541 in 2009, corresponding to an impressive decrease of 96%. Both wild poliovirus type 1 and types 3 remained the major causes of these infections. As shown in the Figure 6, immunization coverage against poliovirus remained comparatively very low in Nigeria and only 54% of infants received three doses of polio vaccine in 2009. According to the GPEI (Fact Sheet Nigeria, 2010), polio transmission remained highly concentrated in 12 states located in the north and about 85 districts of these states are identified as the high risk where more than 20% of children has never been immunized. Among others, lack of political and religious leadership and ownership and lower level of engagement of local leaders and media in supplementary immunization activities remained the major causes of low immunization coverage in Nigeria.

Figure 6: Polio Immunization Coverage in Endemic OIC Countries



Source: WHO Database for Reported Estimates of Immunization Coverage

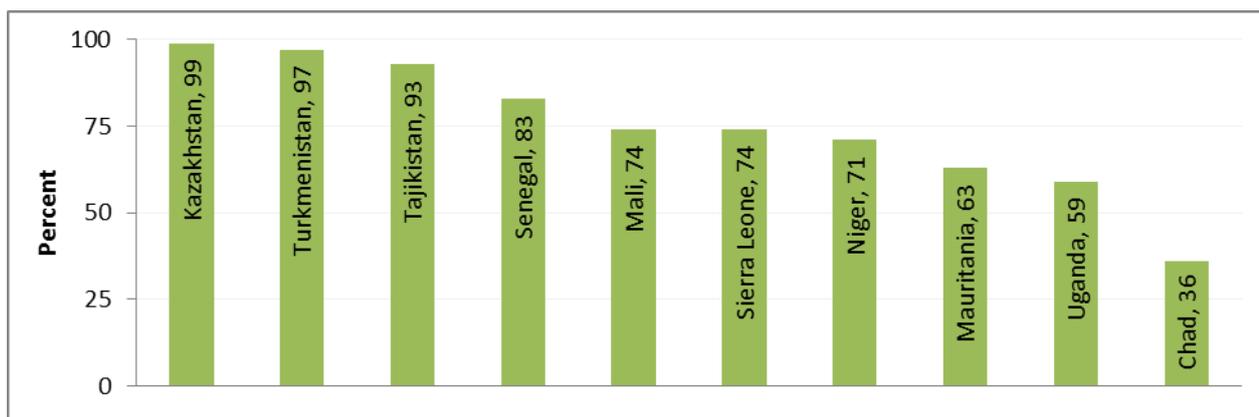
II- OIC Importation and Retransmission Countries

As it has been mentioned earlier, in 2010 about 73% of OIC total poliovirus cases were registered in ten non-endemic member countries. Three member countries from Europe and Central Asian region: Kazakhstan, Tajikistan and Turkmenistan, are also included in this list. Over the years, these countries have registered quite higher level of immunization coverage (Figure 7) and have been largely polio free since late 1990s. According to the CDC report (2010), outbreak of polio in Tajikistan during 2010 was mainly caused by importation from India. On the other hand, Kazakhstan and Turkmenistan imported poliovirus from Tajikistan. To control and stop the outbreaks, Tajikistan and Turkmenistan have planned Supplementary Immunization Activities (SIAs) during the first quarter of 2011.

Transmission and outbreak of imported poliovirus remained quite prevalent in Sub-Saharan Africa in general and Western Africa in particular. In general, immunization coverage remained comparatively low in this region. As shown in the Figure 7, in 2009 immunization coverage varied greatly across the seven importations OIC member countries and it ranges from a low level of 36% and 59% in Chad and Uganda respectively to a high level of 83% and 74% in Senegal and Mali respectively. In this region, some member countries like Nigeria, Chad, and Sudan are part of a very high risk importation belt. Outbreaks in Senegal, Mauritania, Mali, Niger, Sierra Leone, Uganda and Chad are considered as the continuation of the large outbreak in West Africa that started in 2008. Most of these countries have been importing polioviruses from Nigeria, the only endemic country in Africa (CDC, 2010). To overcome the outbreaks, many OIC member countries like Niger, Burkina Faso, and Guinea have planned Supplementary Immunization Activities (SIAs) during the first quarter of 2011.

According to the GPEI Strategic plan 2010-2012, in importation countries emergence of poliovirus is mainly caused by inadequate immunization coverage and geographical proximity with endemic or infected countries/areas. Therefore, these countries should strive hard to increase the immunization coverage. This will help not only to reduce the incidence of importation but also will minimize the impact if importation occurs. There is also need to increase the monitoring and surveillance of immunization requirements for the both inbound and outbound travelers in these countries.

Figure 7: Immunization Coverage in Importation Member Countries, 2009



Source: WHO Database for Reported Estimates of Immunization Coverage

MULTILATERAL COOPERATION TO ERADICATE POLIO

In 1988, World Health Assembly decided to launch a global initiative to eradicate polio. Along with national governments, several multilateral health/development agencies agreed to provide technical, managerial and financial support to achieve the target of Global Polio Eradication Initiative to end polio in 2000. Over the years, this multilateral partnership has been spearheaded by the WHO, Rotary International, the US Centers for Disease Control and Prevention (CDC) and UNICEF. Among these institutions, the WHO has been largely responsible for the coordination of vaccination campaigns and development of strategies to eradicate polio across the globe. Rotary International provided its services for advocacy and fund raising for the GPEI both at global and country levels. CDC has been responsible to provide technical expertise for monitoring/ surveillance of polio disease and investigations of expanded program on immunization (EPI). The UNICEF has provided field based support for polio vaccination through its own EPI.

Since 1988, a wide range of government, public and private donors contributed about US\$ 9 billion for the GPEI. According to the GPEI report (Financial Resource Requirements 2011-2012), between 1988 and 2010, 45 public and private donors donated more than US\$ one million for the global initiative; whereas 18 of these have donated US\$ 25 million or more. Some donors like United States of America, India, United Kingdom, Germany, Japan, Canada, Rotary International, World Bank and Bill and Melinda Gates Foundation provided more than US\$ 250 million to eradicate polio across the globe.

In fact, multilateral cooperation both in terms of technical and financial assistance helped to reduce the incidence of polio disease significantly across the globe. This resulted into prevention of about five million cases of paralysis and more than 250,000 deaths. In addition, experts are of the view that the GPEI could provide financial benefits of up to US\$ 40-50 billion if the transmission of poliovirus is to be stopped in next five years. About 85% of these benefits are expected for the low-income countries (Economic Benefits of GPEI, 2010).

OIC INITIATIVES TO ERADICATE POLIO IN MEMBER COUNTRIES

Health sector is an important constituent of OIC Ten Year Program of Action. In this program OIC General Secretariat has been mandated to collaborate with international health organizations and development agencies to promote the eradication of diseases and epidemics in the member countries.



To control and stop the polio transmission and outbreak in OIC countries, OIC General Secretariat is cooperating with Global Polio Eradication Initiative. Both institutions have formulated a work program to enhance collaboration on polio eradication. To mobilize the high level political support, the OIC General Secretariat contacted Heads of State of Afghanistan, Nigeria and Pakistan, the three remaining polio affected Member States and the Head of State of Chad being one of polio re-affected OIC countries.

Keeping in view the prevalence of misunderstandings about the use of polio vaccine on the religious grounds, OIC General Secretariat secured religious injunction from the Islamic Fiqh Academy which issued a fatwa to encourage the Muslims to participate and support the national polio vaccination campaigns. Based on the principles of the Quran, this fatwa explained the duty of parents/elders to protect children when disease is preventable. This fatwa is being proved very helpful to raise awareness in Muslim communities about the benefits of polio immunization campaigns.

The OIC General Secretariat with the assistance of the Center of Disease Control and Prevention (CDC) of US prepared a project entitled “Reaching Every Mother and Baby in the OIC with Emergency Care”. In December 2008, both parties signed a cooperation framework to implement the project. To expedite the implementation of cooperation framework, the OIC General Secretariat is in close contact with the US State Department and the US Health and Human Services Department (DHHS) and Global Polio Eradication Initiative (GPEI).

In December 2009, the OIC General Secretariat co-sponsored along with US State Department and UNICEF a panel discussion on polio at the UN HQ New York. In August 2010, a delegation of USAID and US State Department visited OIC Headquarters in Jeddah to discuss the implementation of US-OIC project on Mother Child Health. In the same vein, a team of polio eradication experts from the US Office of International Health and Biodefense, USAID and Centres for Disease Control and Prevention (CDC) also visited the Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC) headquarters in Ankara to discuss possible ways and means of cooperation to further facilitate the implementation of the project.

A joint event on combating polio was also organized in September 2010 at the sidelines of the annual session of the UN General Assembly. OIC Secretary General and President Obama's special envoy for OIC attended the event. This event aimed to highlight the challenges and the OIC's efforts in dealing with the polio issues including through cooperation with the US, UN and other partners.

The OIC General Secretariat encouraged the Islamic Development Bank (IDB) to consider providing support to Afghanistan, one of the three OIC endemic countries, to procure polio vaccines to an amount of US \$ 2 million. The IDB expressed readiness to provide US \$ 500 000 for UNICEF to procure polio vaccines on behalf of the Government of Afghanistan. To show solidarity and provide moral support to Pakistan to eradicate polio, the OIC General Secretariat participated during the launching of national polio vaccination campaign in October 2009.

CONCLUDING REMARKS AND POLICY RECOMMENDATIONS

Over the years, OIC member countries have registered significant progress to eradicate the polio disease. Today, polio is endemic in only three OIC member countries whereas ten member countries are facing polio outbreaks due to importation. For the complete eradication of polio in OIC region there is an urgent



need to develop close partnership with international health and donor agencies, including WHO, UNICEF, World Bank, Rotary International, American Red Cross, International Federation of Red Cross and Red Crescent Societies, the UN Foundation and the Bill and Melinda Gates Foundation.

High infant immunization coverage with four doses of Oral Polio Vaccine (OPV) in the first year of life is critical. Therefore, all OIC member countries in general and endemic and importation member countries in particular should work hard to increase the immunization coverage through routine immunization of infants and through achieving the highest possible coverage during Supplementary Immunization Activities (SIA's). To achieve and maintain the highest possible level of population immunity, member countries should collaborate with regional and international health organizations to train the required human resources and ensure sufficient supply of vaccine for their populations.

Lack of political and social ownership is one of the major impediments to increase the vaccination coverage both in endemic and non-endemic importation OIC member countries. Therefore, it is highly recommended both at the national and intra-OIC cooperation level, to speed up efforts to mobilize high level political support for the polio eradication programs and campaigns. In addition, there is also a need to engage the local community leaders and the media outlets to spread awareness about the polio, its major causes, preventive measures and importance of vaccination. In this way immunization programs will become more participatory and the sense of ownership will also increase.

The successful implementation of polio eradication plans needs an effective management and supervision both at national and local government levels. Therefore, governments in member countries should establish specific mechanisms to hold local authorities accountable for the performance of polio eradication campaigns. There is some evidence that frequent polio vaccination campaigns are causing fatigue among the vaccinators especially those working in security compromised areas. Therefore, it should be ensured that local authorities are fully cooperating with the vaccinators and they are compensated well. Supporting and re-energizing the vaccinators is very crucial especially for two endemic member countries: Afghanistan and Pakistan. In these member countries the prevalence of type 1 poliovirus is very low and it is restricted to some clearly defined limited areas. Therefore, these countries should launch the large-scale mop-up activities - door to door vaccination activities - to eradicate the final

chains of poliovirus transmission. Provided the security situation in some polio affected areas, the successful implementation of these mop-up activities largely depends on the level of cooperation and administrative support of local authorities.



In some member countries polio immunization activities have been suspended due to the people's concerns about safety and religious permissibility of the polio vaccine. As a result, there were new outbreaks and many areas were re-infected. To avoid such issues in future, it's highly recommended to translate the fatwa of Islamic Fiqh Academy in national/local languages and distribute it especially in endemic areas. In addition, especially during the national polio immunization campaigns, imams should be provided with necessary information to explain the importance of vaccination during the Friday prayer gatherings and preaching sessions.

Incidence of polio in a country/region/area is closely linked to poverty, level of education, water and sanitation, food safety, and other social and cultural factors. Therefore, in order to increase the effectiveness of polio eradication activities in member countries, there is a strong need for more closer cooperation and coordination between national polio eradication programs and other ministries and agencies like Ministry of Education, Ministry of Information and Broadcasting, Ministry of Women, Ministry of Environment and National Food Security Program.

Until the complete eradication of polio, any polio free country can get infected through importation of virus. The only solution to this problem is achieving and maintaining highest possible level of immunization coverage. Therefore, all polio free member countries should work hard to avoid re-emergence of disease by increasing the immunization coverage. These countries should also pay special attention to the communities that are either living near the border of an affected neighboring country or migrating from that country. In addition, all importation countries should increase surveillance for Acute Flaccid Paralysis (AFP) cases by ensuring examination of all specimens at a WHO-accredited poliovirus laboratory. Current financial and economic crisis has not only caused a significant decline in flow of development assistance and aid to the low income developing countries but also posed pressure on the flow of financial resources to the GPEI. As a result, there is a funding gap of US\$ 720 million for the GPEI Strategic Plan 2010-2012 (GPEI, 2011). High income member countries can play a pivotal role to eradicate polio by contributing more financial resource to the GPEI as well as by helping the polio affected member countries to boost up their health care systems.

REFERENCES

1. CDC (2010), Assessment of Risk: Country Profiles
2. GPEI (2010), Economic Benefits of the Global Polio Eradication Initiative
<http://www.polioeradication.org/tabid/167/iid/82/Default.aspx>
3. GPEI (2010), Fact Sheet: Afghanistan
<http://www.polioeradication.org/Portals/0/Document/Media/FactSheet/Afghanistan.pdf>
4. GPEI (2010), Fact Sheet: Nigeria
<http://www.polioeradication.org/Portals/0/Document/Media/FactSheet/Nigeria.pdf>
5. GPEI (2010), Fact Sheet: Pakistan
<http://www.polioeradication.org/Portals/0/Document/Media/FactSheet/Pakistan.pdf>
6. GPEI (2011), Financial Resource Requirements 2011-2012
7. GPEI (2010), History of Polio
8. <http://www.polioeradication.org/Polioandprevention/Historyofpolio.aspx>
9. GPEI (2010), Infected Countries <http://www.polioeradication.org/Infectedcountries.aspx>
10. GPEI (2010), Strategic Plan 2010-2012, Countries with recurrent importations
11. Levin, Ann, Sujata Ram, Ahmet Afsar, Vito Tanzi, Leanne Dougherty, and Miloud Kaddar (2000), The Cost-effectiveness of Mixes of Operational Approaches to Polio Eradication
12. WHO (2010) Immunization Coverage Estimates, data as of July 2010
http://www.who.int/immunization_monitoring/data/data_subject/en/index.html
13. WHO (2010), Reported Incidence of Diseases ,data as of December 2010
http://www.who.int/immunization_monitoring/data/data_subject/en/index.html
14. WHO (2010), Fact sheet No: 114 Poliomyelitis
<http://www.who.int/mediacentre/factsheets/fs114/en/index.html>



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