

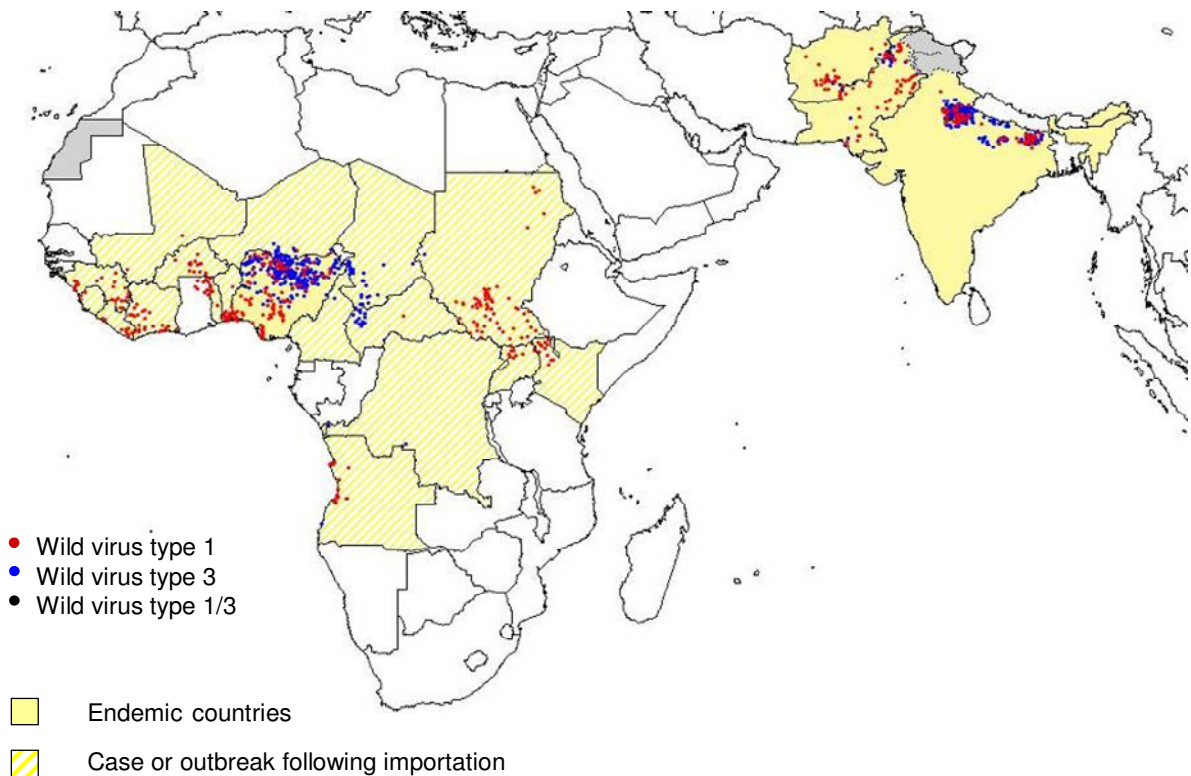
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## Independent evaluation of major barriers to interrupting poliovirus transmission

### EXECUTIVE SUMMARY

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### Wild Poliovirus, 16 Sep 2008 – 15 Sep 2009



## Executive Summary:

**Introduction:** In the spring of 2009, the Director General, Dr. Margaret Chan, requested an independent, external evaluation of the Global Poliomyelitis Eradication Initiative (GPEI). On 28 February 2007, the four polio endemic countries and GPEI stakeholders had launched an *'intensified eradication effort'* to determine their collective capacity to overcome the remaining technical, operational and financial challenges to interrupting all wild poliovirus transmission globally. At present, having passed the 24-month mark in the *intensified effort*, there has been progress on each challenge but risks remain. The scope of the remaining challenges is visualized on the map of wild-type polio cases detected in the last year that appears on the cover of this report.

This evaluation has now been carried out by five teams – one each for the four endemic countries that have never eradicated polio - Pakistan, Afghanistan, India, and Nigeria - plus one to examine international spread which focused on reinfected African countries. The team leaders met first in Geneva in early July and were briefed on the current status of the Eradication Initiative by Dr Asamoah-Baah, Deputy Director-General, and members of the GPEI. Each team leader then assembled a team with representative expertise specific to their country assignment. The in-country visits were accomplished in July and August with the logistic help of the WHO Director General's office. Each team spent approximately 10 days in their assigned country(ies). A detailed trip report, assessment and recommendations were formulated by each team and are attached. **These are the most comprehensive summaries of each team's findings and should be considered in conjunction with this summary.** To facilitate an initial review an overview of approximately 10 pages has been prepared. This was accomplished during a meeting of the team leaders in Geneva on September 15-16<sup>th</sup>. The report has been submitted to and reviewed by an Oversight Committee comprised of a senior representative from the four spearheading partners (WHO, Rotary, CDC, UNICEF), each of whom is not directly involved in GPEI implementation or oversight. At the Oversight Committee's suggestion the report has gone to country programmes for comment. The report will next be submitted to Dr Chan. Subsequently it is understood that the report will be shared within GPEI, with the WHO oversight structure, and with the countries who are working so hard to eradicate polio within their boundaries and thus achieve the goal of global eradication.

The teams are very appreciative of the efforts by Geneva headquarters and particularly in-country personnel to accommodate the teams. Although of necessity we had extensive interactions with the GPEI teams it was stressed throughout that this was to be an independent assessment. All teams believed that this goal was accomplished.

**Objectives:** The objectives of the evaluation as specified by Geneva were:

- To evaluate, for each infected area, the primary challenge(s) to achieving sufficient population immunity to interrupt the remaining poliovirus transmission.
- To determine, by reviewing the management, supervision and implementation of polio campaigns, whether other critical factors are compromising oral poliovirus vaccine (OPV) coverage and population immunity.
- To evaluate risks, consequences and responses to the international spread of wild poliovirus to previously polio-free areas, with particular attention to those with persistent transmission.

- To propose area-specific strategies for addressing the primary challenge(s) and any other major factors that are compromising population immunity
- To outline actions local, state/provincial and federal authorities should take to ensure the area-specific strategies are fully implemented and stop transmission
- To outline actions WHO, UNICEF, and other GPEI stakeholders should take at the sub-national, national and international levels to support implementation of the area-specific strategies, stop any persistent importation-associated outbreaks and reduce the risks of new international spread.

**Structure of report:** The executive summary is designed to present major findings and recommendations. For the purposes of the summary the team reports were condensed into three sections – the first dealing with the dyad of Afghanistan and Pakistan, the second with India, and the third with Nigeria and the surrounding reinfected African countries.

**Summary:** A great deal of thought and commentary has been generated around polio eradication. The teams were not asked to and did not address the broader issues of the likelihood of success of the GPEI or the relative benefits of the choice of polio as an eradication target. The teams uniformly were impressed with the dedication and energy of the PEI and fully recognized this effort as unique in the history of global health.

Our cumulative input certainly represents the most complete review of the GPEI that has been undertaken. Nevertheless, we stress that there were many programmatic considerations to the overall conduct of such a unique undertaking as GPEI, e.g. funding, laboratory capacity, vaccine quality, and global coordination, that we could not adequately assess to comment on authoritatively. Even at a country level we were limited by time (and in some countries security constraints) in the sites we could visit and insights we could gain. We would further comment that the report was put together under time constraints and reflects the frank opinions of the teams. It is evident to all the teams and to the GPEI that although impressive progress has been made in individual sectors the overall number of cases of wild-type polio in the countries reflect that “things have stalled” and much of the teams’ efforts were devoted to developing ideas/recommendations to overcome barriers. Our independence from the GPEI means that many of these ideas are undoubtedly being considered or indeed already being addressed. It was striking to the teams as they reassembled that in spite of the differences between countries there were many similarities in our assessments. In preparing the overview several cross-cutting issues arose that are highlighted here.

- The GPEI has a very complicated administrative structure both globally and within countries. There is little authority or control over poorly performing local implementing entities. In India the strong leadership of the National Polio Surveillance Programme has overcome this. Similar approaches with equal or greater authority may be essential to coordinating country-by-country eradication.
- Disparities in country support by the GPEI were noted that were particularly marked in newly reinfected countries (e.g southern Sudan and Angola) that had more cases than in some of the four endemic countries but far fewer resources than officially endemic countries. This is an essential issue to address.
- The GPEI and a functioning routine immunization programme (EPI) must work closely together both in pre-eradication but especially in the post-eradication era when reliance on injected IPV will make house-to-house supplementary

- immunization activities (SIAs) more difficult to carry out. There are clear lessons, particularly from the Indian polio programme, for strengthening routine immunization.
- It was clear in all countries that programmatic effectiveness is determined by commitment and resources at a local, grass-roots level.
  - With the pressure of achieving eradication too little attention is being paid to post-eradication strategies that may ultimately determine the success of the GPEI.
  - The research done to date on the immunologic basis for the necessity of multiple vaccinations, ages to be vaccinated, and optimal utilization of new OPV and IPV constructs will need to be continued and extended. This may be of particular importance in northern India where there are few operational issues and recent data suggest that vaccine is offering serologic protection while transmission is still occurring.
  - There was confidence on the part of the teams that if the managerial, security, and technical issues can be addressed that polio eradication can be achieved. A message from many sites, however, was for the GPEI not to make too optimistic projections.

## I. BACKGROUND

### I.A Afghanistan and Pakistan

The primary challenges in the remaining polio-infected areas in **Pakistan** are (1) the inability to sustain very high OPV coverage in the heavily-populated accessible areas and (2) difficulties in achieving moderately-high coverage in the security-compromised areas of North West Frontier Provinces and Baluchistan. All of these areas continue to report cases of polio. There is inter-connected polio transmission in **Pakistan** and **Afghanistan** illustrated by genetic identity of polio cases reported in **Afghanistan and Pakistan**. There is regular coordination of PEI work between the two countries.

The polio eradication initiative (PEI) in **Afghanistan** has achieved remarkable success in an increasingly challenging environment. For the majority of the Afghan population (84%), ongoing polio transmission has ceased. Despite the contraction of the area of polio transmission, the annual number of confirmed polio cases is not diminishing and appears to have remained static for the last four years: 18 cases (types 1 and 3) reported during 2009 up until mid-August is consistent with the incidence in 2008. There is a very high level of political commitment, coordination by partners, and technical quality of PEI team work. The high level of planning, review, and analysis of supplementary SIAs is impressive.

**I.B India** The evaluation team focused on Uttar Pradesh (UP) and Bihar, the two states in north central India where poliomyelitis cases continue to be reported and there is documented circulation of polio virus types 1 and 3. The population of these areas illustrates the immensity of the task to conduct what are now close to monthly SIAs. As an example UP has a population of 187 million with 38 million children under 5. Each vaccination round in UP engages 200,000 vaccinators and 22,000 supervisors to reach 33 million households. There are 110,000 booths (fixed sites) and 64,000 house to house teams.

**I.C Nigeria and International Spread** At this point all 3 types of polio, including circulating type 2 vaccine derived polio virus, are present in Nigeria with the epicenter is in the northern provinces visited by the team. The occurrence of circulating Sabin vaccine derived type 2 virus is a problem that must be addressed and points to a weakness in OPV as a post eradication tool.

During their mission of the international team travelled to Angola and Sudan, which both have persistent polio outbreaks following importation of poliovirus from Nigeria and India.

## II. FINDINGS

### II.A Pakistan/ Afghanistan

Insecurity poses the most significant barrier to achieving high polio vaccination coverage in each country. The security situation is unstable, unpredictable, and threatened by a range of armed factions. The contextual environment of poorly funded health systems and PHC results in weak routine services, especially in **Pakistan**. In **Afghanistan**, high-profile endorsement by political, international, and military figures has been useful in the past but may be counter-productive in non-secure areas. Anti-government elements are likely to oppose any programme perceived to be a high priority of the Government of Afghanistan.

Human resource management issues in both countries constrain both routine immunization and polio SIAs. These include low salaries of vaccinators and fatigue associated with the difficulties of trying to deliver quality Expanded Programme of Immunisation (EPI) and SIAs in dangerous environments, the high frequency of SIAs, and the proliferation of so many vertical donor initiatives directly or indirectly impacting on immunization. Political interference in appointing vaccinators and their accountability are major problems in some areas of **Pakistan**. Similarly, in **Afghanistan**, recruitment of cluster supervisors and volunteers for SIAs was variously described as haphazard, inefficient, inappropriate for the prevailing culture and a means for friends to earn money. The selection of vaccinators needs to reflect cultural and political realities, e.g. female vaccinators are acceptable in some areas but not others. There is inability to conduct adequate supervision, monitoring, and data validation. This is due to a combination of inability to access insecure areas and lack of trained supervisory staff.

The movement of large populations both between **Pakistan and Afghanistan** and between provinces within each country has the potential to introduce wild polio virus into areas where it has long been absent.

Health facilities, especially sub-centres in **Afghanistan**, are often inadequately resourced to provide PEI and routine EPI services. Both countries rely too heavily on the designated health worker category of *vaccinators*. There is inconsistent understanding of responsibilities of other health staff; in some provinces, nurses and midwives are not expected to provide vaccinations in the absence of designated vaccinators.

In **Afghanistan**, the degree of engagement in SIAs by NGOs responsible for implementing the Basic Package of Health Services is inconsistent. Some middle level health managers (not directly involved in the PEI) are voicing scepticism about the need

for such a high focus of attention on polio. Private practitioners are not adequately involved in the provision of routine EPI services, especially those who continue to work in insecure areas. Perceived fear by service providers is not always adequately addressed and could benefit from better information on the actual security situation in contested areas.

In **Afghanistan**, there is not a functional referral system for polio and other AFP cases to effective rehabilitation services. We found a lack of evidence to explain the high male:female ratio of reported polio and non-polio AFP cases.

In **Afghanistan** there is a lack of flexibility in accessing children safely in some provinces. There is no one “right way” to engage with communities in security-compromised areas, though the teams heard of a number of examples of negotiation through different local intermediaries, including NGO district staff, hired negotiators, mullahs, and tribal elders. Bridging into non-secure areas could be via a broader range of service providers, eg, private practitioners and veterinary workers.

While there was little evidence of resistance to vaccination and low refusal rates in **Afghanistan**, there are persistent rumors and misconceptions in **Pakistan** linking polio vaccination with sterilization or infertility with minimal efforts to address this issue. In both countries, demand for polio vaccination is relatively low because it is not perceived by communities to be a high priority.

In **Afghanistan**, changing policies of the International Security Assistance Force and the Taliban are focusing on stabilizing populations and enabling the provision of social services. This trend offers both opportunities and threats -- opportunities to provide access to service providers; however, there is a risk of direct service provision by combatants, which is inconsistent with the basic humanitarian principles of neutrality, impartiality, and independence. A number of foreign governments have both military forces and aid programmes, some of which support the PEI. This raises the possibility that in areas controlled or influenced by anti-government elements, immunization activities may be perceived by community leaders to be intertwined with military operations. The **neutrality** of the polio programme must be protected.

The main **technical barriers** to polio eradication include the fact that in both countries some polio cases have occurred in children who have received more than 10 OPV doses. In **Afghanistan**, there is evidence that several recent polio cases occurred in children who had neither travelled to nor been in contact with children from endemic zones. However, they were in contact with older children or young adults who had returned from **Pakistan** raising the question of older individuals participating in the chain of transmission.

## **II.B. India**

The team concluded that the high coverage observed in both UP and Bihar reflected the most thorough, well managed vaccination effort that team members had ever seen. In short, programme implementation was not viewed as a constraint to elimination of polio. However, the team noted that even if OPV performance in Bihar and UP is similar to that elsewhere in the developing world the implications of a type 1 seroconversion rate of, for example 80% after three doses of trivalent OPV, means that even a very high coverage

rate of 98% translates to 79% seroconversion after the initial three doses. In addition, even missing only 1% of the very large under 5 population in UP or Bihar can quickly lead to a substantial unvaccinated newborn cohort.

In remote Kosi river areas in Bihar the evaluation team conducted a polio vaccine coverage survey in over 12 villages examining 561 children for the finger nail markings applied when vaccinated and found four that were unimmunized (all four were in transit during the previous week's campaign and did not pass any transit site stations). This level of 99.2% coverage is consistent with reported 99% found on area-wide post round surveys. In addition to areas that are difficult to access the North India population is extremely migratory, 12% of the vaccine given in an SIA in Bihar is at transit points, e.g. train stations.

In spite of recent improvements, EPI programmes in Uttar Pradesh (UP) and Bihar are still weak and feel threatened by the polio programme. Estimated routine coverage of tOPV is 53% in Bihar and 40% in UP. That the PEI is putting strain on shared personnel with the routine immunization programme is an explanation typically offered for the present low coverage of routine immunization.

The National Polio Surveillance Programme (NPSP), Government of India and their partners are capable of sustained high coverage OPV for the immediate future, though a less intense schedule will ultimately be important to avoid worker fatigue. A decline in cases and WPV isolates will be an important motivating factor as complete elimination comes closer though many cautioned against presenting too "rosy" a picture or giving time lines that were not met. More attention must be paid to the post eradication strategy and the ultimate integration of NPSP into a strengthened routine immunization programme.

The efforts to eradicate polio in India form a highly visible and recognised programme with robust community mobilisation and programme communication components especially in the endemic states of Bihar and Uttar Pradesh. Basic awareness relating to polio symptoms, benefits of OPV, and the target group (children under 5 years) is high, with earlier resistance in minority communities having decreased substantially in recent years, due to the active mobilization of community leaders/ influencers

The environmental conditions in all the areas we visited where circulation of wild type virus persists optimize polio transmission, with indiscriminate defecation, contaminated water supplies, and extreme crowding of population (rural populations of 1000/km<sup>2</sup> in Kosi are crowded into land areas one tenth that area in the floods accompanying the monsoon season). Add to this an extremely high prevalence of malnutrition, unclean supplementary food and extremely high birth rate with interbirth intervals as close as one year, and the vulnerability of the very young to polio and other enterovirus infection becomes very apparent.

A central question is whether vaccine performance (as judged by infectivity and extent of subsequent immunogenicity) is different in UP and Bihar than that experienced in other tropical countries with comparable environmental conditions. The response to trivalent oral polio vaccine (tOPV) has long been recognized as compromised in developing countries with the dominant response after the first dose being to type 2 and gradual immunity developing to types 1 and 3 with subsequent doses. The reasons for limited

immunogenicity in certain tropical settings are not clear; nevertheless, polio has been eradicated from the great majority of India using tOPV. A recent encouraging finding is that 6-9 month olds exposed to routine immunization and supplemental monovalent type 1 in Moradabad had seroprevalence to type 1 of 98-100 percent. Even in UP and Bihar it is important to note that of 9 lineages of type 1 found several years ago only 1 persists and for a recent period of 1 year in UP no type 1 wild type virus was found before reintroduction (from Bihar) in 2006. As is the case throughout the rest of the world wild polio type 2 has not circulated in India for a number of years.

## **II.C Nigeria and International Spread**

The Evaluation Team considered that much work needed to be done to achieve polio eradication in Nigeria. Nevertheless, the Team considered the basic infrastructure in the sites visited was sound, and the Team considered that polio eradication in the near future is feasible.

Management issues are the most critical barriers to the success of the Nigerian programme. These difficulties occur at all levels with varying levels of significance. Current barriers to polio eradication at Federal level include the very broad health development agenda in Nigeria, with very many health issues needing to be addressed simultaneously. Hence, the required importance for polio eradication is lacking at the central level. At the local government level (in the State of Kano there are 44 Local Governments and 14 in Zamfara) where immunization delivery takes place, the importance given to polio eradication differs widely. In some areas the programme was well supported, but in others, interest, support and supervision were weak. Another barrier is the weak routine immunization programme, which cannot be relied upon to achieve high levels of polio vaccine coverage. The PEI is entirely dependent on the quality of its own infrastructure.

Although the Declaration of Abuja signed by Prof Babatunde Oshotimehin, Honorable Minister of Health on behalf of the Federal Government and His Excellency Dr Bukola Saraki , Executive Governor of Kwara State and Chairman of the Governors' Forum on behalf of all the Governors in February 2009 signaled the start of a renewed effort for polio eradication in Nigeria, the oversight to implement the Abuja declaration fully in all States and Local Government Areas is weak. In Zamfara the Evaluation Team observed that 2 of 14 Local Governments had not established their Polio Elimination Task Forces and one task force had not started operations. Some senior officials were not aware of the Abuja Declaration. Though all Local Governments released their counterpart funding these amounts appear inadequate to achieve sustained community participation and social mobilization.

The vaccination teams were equally poorly equipped with knowledge and interpersonal communication skills to respond to even the slightest community challenges met during IPDs. No established training programmes exist for staff to ensure that all teams are adequately prepared.

A large numbers of donors are assisting in the GPEI; however, a coherent strategic plan and mechanisms for developing such a plan are absent.

Inadequacy of operational funds is also a problem in many local governments which are struggling with the priority given to polio eradication, in addition to their other responsibilities. There appeared to be major problems with the management of funds. In some local governments, funds for polio immunization activities were released very late, sometimes only 24 hours before the start of activities, which left inadequate time for preparation and mobilization of resources and the community. This leads to largely ineffective planning and the considerable resource mobilization required for an SIA does not occur. Many respondents raised concerns over funds mismanagement and lack of accountability for funds. If verified, this may constitute a serious barrier to effective implementation of the PEI.

Community perceptions regarding the safety of polio vaccines presented a major barrier, to the extent that OPV was withdrawn from use in the State of Kano in 2003-2004. The issues with the vaccine were couched in religious terms and in this community, as in other areas, depressed community demand for immunization. These religious concerns have created major barriers to implementation of polio eradication which persist today.

Inadequate mobilization of community groups, such as women's groups and others, is a key barrier to community demand. Inadequate community interest, support, and demand have therefore become barriers to polio eradication. Polio has not been the highest priority in terms of child survival and there is a disjunction between immunization and other health care services.

There are significant deficiencies in cold chain maintenance, especially in Zamfara, e.g. non-functioning of solar refrigerators. There is inadequate transportation capacity of vaccines due to non-availability of sufficient funds for fuel etc.

The international spread of polio out of Nigeria and from India has been controlled in countries with strong health systems and high routine vaccine coverage. However the virus has persisted in countries with underdeveloped health systems and low routine vaccine coverage – **South Sudan, Angola and Chad**. Vaccine coverage with OPV3 in **South Sudan** has been around 20% although there is a current acceleration and in **Angola** it is about 40%. In both these countries access to health care is limited. In Sudan only approximately 25% of the population have health care access and only a proportion of these actually make use of the access. In **Angola** the country is re-constructing public services but there is still a considerable amount of work to do.

This lack of health infrastructure not only affects routine vaccination but also AFP surveillance. Whilst this is adequate in Angola it is likely that cases have been and will be missed in South Sudan. Both these countries have a severe shortage of trained health personnel, particularly in South Sudan. Repeated campaigns in both Angola and **South Sudan** have led to fatigue in the health services. The basic guidelines for the conduct of campaigns are no longer being followed. The resources that WHO and UNICEF are committing to **Angola** and **South Sudan** are strikingly limited in comparison to those in Afghanistan, Pakistan and India.

Monitoring of campaigns in **Angola** suggests that there are significant numbers of missed children. Whilst this is not reported in **South Sudan** there is doubt about the effectiveness of monitoring across this very large country with hard to reach populations.

PEI campaigns have similarly led to community fatigue in both **Angola** and **Sudan**. This was particularly apparent in **Angola** where there is a demand for other services beyond polio vaccination. In **Sudan** there have been regular refusals of polio vaccination in one State – western Equatoria.

Social mobilisation has been largely successful in **Angola** where there is a close relationship between WHO and UNICEF. However, in **South Sudan** social mobilisation has suffered from difficulties in release and use of funds. The partnership between UNICEF and WHO for polio eradication was less strong in south Sudan. There was clear political commitment to polio eradication in **Angola** and strongly functioning communication among the PEI partners. However, in **Angola**, the national health ministry has many competing demands in terms of developing health services and the control of malaria, pneumonia and diarrhoea. In **South Sudan** the primary concerns of the government are census results, border demarcation, disarmament, de-mobilization and reintegration. Despite this the government stated that they are committed to polio eradication.

Climatic factors play a crucial role in these countries. Flooding in Luanda and other areas of **Angola** has led to house to house campaigns being modified to fixed point. Access to some areas of Angola requires military assistance because of inaccessibility. However, conflict and security are not major issues currently in **Angola**. In **South Sudan** the rainy season plays an important role in limiting activities. There are virtually no sealed roads outside the capital and many of the airstrips are susceptible to flooding. The presence of live mines in some places in both **Angola** and **South Sudan** limits the travel of international staff.

The current monovalent vaccine used in the NIDs or SIAs according to the epidemiology enhances the occurrences of outbreaks related to other types. Having a good sustained routine EPI system, with high quality NIDs using the appropriate vaccine, t-OPV and b-OPV, as soon as it becomes available, can help overcome these barriers.

### III. RECOMMENDATIONS

#### III.A Pakistan/Afghanistan

*There needs to be an appropriate balance between SIAs and routine EPI. If containment measures through national immunization days (NIDs) in 2009 to mid-2010 are successful, less frequent NIDs should be considered, while focusing on high-quality sub-national immunization days (SNIDs) in high-risk areas. Government and development partners need to improve the demand for and delivery of routine immunization, and improve EPI coverage to achieve 90% by OPV3, through better resourcing of health centres at all levels, accelerated outreach (mini-SIAs), more mobile teams and, in **Pakistan**, a strengthened role of LHWs in provision of EPI services. *The LHW programme is a key entry point for strengthening PHC and there is a need to rapidly scale up nation-wide coverage and funding support of this programme. Compensation levels should be revised to encourage sustained motivation.**

*The current high performing AFP surveillance in both countries must be maintained, with the deteriorating surveillance in Baluchistan in **Pakistan** needing to be addressed immediately. In **Pakistan**, efforts should be made to conduct post-campaign coverage*

assessment using finger marking at the Union Council, not district, level, in order to hold Union Council teams accountable. To avoid conflict of interest in post campaign polio-coverage assessment, independent teams should be employed that are not involved in NID/SNIDs.

*In **Afghanistan**, NIDs should be reduced from mid-2010 after a rigorous technical analysis, which includes modeling of immunity in each province, based on routine EPI coverage, SIA access and coverage, and exposure to migrants from areas where wild polio virus is circulating. Reduction of the number of NIDs should proceed in a carefully phased manner. Conduct detailed district-by-district, cluster-by-cluster planning of SNIDs, with flexible dates and flexible approaches to accessing communities.*

*In **Afghanistan**, harmonise donor initiatives efforts to strengthen **routine** outreach and mobile EPI services such as Sustainable Outreach Services (SOS), Reach Every District (RED), and Quick Impact Projects (QIP). Strengthen coordination of AFP surveillance in **Afghanistan and the border areas of Pakistan**. Maintain intensive cross-border immunization and close coordination of PEI activities. In addition to synchronising the timing of SIAs, synchronise communication strategies.*

*Address human resources constraints, such as low salaries of vaccinators and low incentives of campaign volunteers. In both countries, clarify the roles and responsibilities of all health facilities, health personnel and other stakeholders. All categories of medical/nursing personnel in comprehensive and basic health centres and sub-centres should have vaccination included in their routine duty statements.*

*In **Afghanistan**, clarify referral procedures for polio and non-polio AFP cases that require rehabilitation services. Currently, most provincial hospitals have inadequate physiotherapy capacity to provide effective care. There are provisions to cover the cost of treatment and transport to their six orthotic centres.*

*Recognise the range of potential stakeholders in both facilitating access to high-risk districts and conducting supervision and monitoring and evaluation. There needs to be more management risk-taking through discrete negotiation with a range of intermediaries including NGO district staff, hired negotiators, mullahs, tribal elders, and district veterinarians to gain access to contested areas.*

*Tighten procedures for selecting cluster supervisors, volunteer vaccinator teams, mobilisers, and campaign monitors to strengthen the ability of the programme to assess and validate performance at the community level.*

*Continue to pilot and evaluate innovative methods of community mobilization, such as “women’s courtyards” in **Afghanistan**, while recognising that such strategies may only be acceptable within relatively narrow geographic areas.*

*In **Pakistan**, there is a need to review the goals and objectives of communication strategies for SIAs and routine immunization. Innovative communication approaches, including entertainment-education, are needed generate demand, as well as clear, culturally appropriate messages to counteract rumours, misconceptions, and misinformation in the general population. The recruitment of local language speaking (especially Pashtun) female health staff and LHWs in the immunization team and post-*

*campaign reviews involving zonal supervisors at evening meetings might help ensure their accountability.*

In light of competing demands, *we recommend maintaining the current level of high political and financial commitments, interest and ownership to improve routine EPI and high quality polio vaccination campaigns.* However, in **Afghanistan**, high-profile endorsement by political, international, and military figures may no longer be necessary and may be counter-productive in non-secure areas. *Promote the neutrality of the polio programme.* While political commitment is important to maintain resource allocations to the PEI, *reduce the **visible** involvement of political figures in vaccination campaigns.* *Focus on discrete, local negotiations with anti-government elements through a flexible range of intermediaries. De-link SIAs from associated events that might be used by anti-government elements to politicise the polio eradication initiative.*

As polio case numbers decline with improved immunization coverage, *the quality of the review of 'inadequate' AFP cases may need to be increased.* Although the reasons why cases were 'inadequate' are routinely reviewed within the current system, this practice may also need to be improved. In particular, lessons learned from individual cases about how to improve early detection should be shared with all surveillance system stakeholders.

*Conduct operational research in **Afghanistan** to clarify the following issues: polio infection in children with high number of OPV doses; possible infection of some children by older children or adults returning from Pakistan; high male: female ratio of reported AFP cases.*

### **III.B.India**

Intensified SIAs mark the programmes in UP and Bihar. Enhanced management and administrative support has been provided to support the planning, implementation and monitoring of SIAs to ensure near-complete immunization coverage of target population. Inflation in the number of immunization rounds seems to be an instinctive response to the programme failure to interrupt virus transmission without a critical assessment of their benefit and necessity. The team *recommends for sustainability of the programme a critical review of the timing, vaccine content, coverage areas and frequency of vaccine rounds be carried out.* One approach to avoiding accumulation of susceptible is to put more efforts on the children under 1 year.

Use of inactivated polio vaccine (IPV) was a question that arose wherever the review team engaged with senior medical and non-medical governmental staff. As previously noted there is the perception that OPV has not been as immunogenic as had been anticipated and that the introduction of IPV will serve as a useful adjunct. Introduction of IPV is no small matter because of the cost and the logistic demands. It seemed to the team unlikely that IPV can be given in house to house visits and a fixed center approach that immunizes a large fraction of children under one would have to be developed. DTP3 coverage is about currently 50% and an effective supplemental IPV based strategy will require much higher routine coverage. Translation of this strategy to public health scale will be a major challenge. *Nevertheless, IPV must be examined in the northern India context.* Of particular interest is the demonstration that the combined use of OPV and IPV has induced uniformly high antibody response to all three polio types in

a range of countries (WHO Collaborative Study Group on Oral and Inactivated Poliovirus Vaccines. Combined immunization of infants with oral and inactivated poliovirus vaccines: results of a randomized trial in The Gambia, Oman, and Thailand. Bull World Health Organ. 1996; 74(3): 253–268). *Planned studies of IPV should include a combined OPV/IPV arm.*

While substantial overall improvement in sanitation seems very unlikely in the foreseeable future, attention to clean water and hygienic practices, especially for the under 2s offers an intervention worth exploring. Specifically, all tube wells in Kosi were unprotected with plinth or platform and many were surrounded with filthy stagnant water. We were told that studies of wells in this area showed 80% contained E coli indicating fecal contamination. *Further studies may indeed be indicated to define indicators of the worst affected wells. Simple affordable technologies to protect rural wells should be explored*

The introduction of bivalent type 1 and 3 vaccine should offer a significant operational advantage. The data from southern India suggest that its immunogenicity is close to equivalent to individual monovalent vaccines. *Bivalent OPV needs to be introduced in the programme with validation of effectiveness as soon as possible.*

Surveillance of acute flaccid paralysis (AFP) is a key component of the programme. Global standards are that AFP cases be detected at a rate of 2/100,000. The national non-polio AFP rate was 6.6/100,000 for children under 15 years in 2009 while AFP rates in Bihar and UP were 18/100,000 and 30/100,000, respectively and within the Kosi river embankment it exceeds 100/100,000 largely due to the broadening of the case definition. *The broadening of the case definition has important programmatic implications and therefore, although AFP reporting provides a critical tool for detection of polio circulation, a strict case definition of poliomyelitis needs to be adopted (as has been the case with vaccine-associated poliomyelitis (VAP)) and that a differentiation be made between detection of wild type poliovirus in the stool and a case of poliomyelitis* We believe that the disillusionment of seeing cases described as “polio” after multiple (10-20) vaccine doses is a major deterrent to maintaining the morale of the program and may in many cases reflect incomplete mucosal protection and resultant wild type polio gut infection without implying failure of vaccine protection against poliomyelitis.

The India Expert Advisory Group (IEAG) provides an excellent forum for decisions about vaccine strategy. We are however concerned with the recrudescence of type 3 virus and would *recommend that equal attention be paid to type 3 eradication.*

Continued circulation of wild poliovirus despite many OPV doses is unsettling, suggesting that in the Indian setting, either gut immunity after multiple doses of OPV is incomplete or in the presence of gut immunity the density of wild poliovirus in the Indian environment is sufficient to allow for continued excretion and transmission. The public health implications of these observations are daunting. More complete information on gut immunity in the Indian setting is urgently needed. *We encourage the conduct of studies on gut immunity (challenge studies with Sabin vaccine after OPV and inactivated polio vaccine IPV) in UP and/or Bihar.*

Are the severe environmental issues – floods, filth, sanitation, poor water quality, high density of population, especially in periurban and squatter areas and in tiny isolated river

bed islands sufficient to maintain wild poliovirus circulation despite extremely high OPV coverage rates? *There is a need for more comprehensive environmental sampling to better understand persistence of wild poliovirus in these unusual environments.*

### **III.C Nigeria and International spread**

**The strongest and the weakest links of the polio eradication programme in Nigeria are at the local government level.** Local performance in SIAs is variable and highly-dependent on LGA leadership. *A longer-term funding solution for local governments (i.e., basket account implemented in Zamfara) needs to be identified.* Local performance can be monitored with a checklist that can then be shared with the Governor for feed-back in meetings with LGA chairs. *The quality of monitoring data (through use of additional methods such as Lot Quality Sample (LQS) should be improved. A system of performance-based rewards based on implementation of PEI, should be planned and implemented at all levels, central, state and LGA's. Involvement of donor partners in monitoring and analysis through a strategic framework of programme implementation and accountability to the suggested focal points at the Presidential and Governor and Local government levels could be considered. Planned upgrades should ensure that the vaccine stores at all the places are adequate. State Governments also play a major role in leadership in programme management, and social mobilization. All stakeholders at all levels should embrace good accountability practices. Communities should also be encouraged to demand immunization services. Good operational financial and logistical programme management practices should be followed, especially for SIAs.*

*Increased commitment and oversight needs to be translated into improved quality of key programme activities by enhancing the political stake as well as accountability at various levels by ensuring close monitoring and follow-up of polio activities by HE President and Governors' office (i.e., establishing a small unit within the respective offices). Moreover, including the addition of polio eradication as a regular agenda item in discussions between the President and State Governors and subsequently with the local government, will help to closely monitor the situation at all levels.*

*Also, implementation of all aspects of the Abuja declaration closely monitored including regular PEI progress reports from Governors to HE President. Regular reports need to be provided by local government chairs to Executive Governors (and feed-back meetings).*

The large numbers of children missed by the routine immunization programme and the GPEI were grim reminders of the seriousness of these barriers. The State of Zamfara state recently introduced street teams to find and cover missed children, but this initiative did not yield the desired result. Reasons given were that the scheme was very new and not well understood. *However, a more focused strategy to reach out to missing children and to reach the hard-to-reach should be considered as an important barrier and addressed.*

Community demand for polio and routine immunization has not been strong in Nigeria; however, recently support from the traditional institutions and the level of knowledge of the issues of polio eradication have increased. *A sustained enthusiastic programme of social mobilization involving community women organizations, religious and traditional leaders should help overcome these barriers. Training programmes for developing*

*appropriate interpersonal communication skills should be provided to vaccination teams and staff in order to respond to even the slightest community challenges met during IPDs. A strong communication campaign, fully implemented, is required. A system of performance-based rewards based on implementation of PEI, should be planned and implemented.*

*In Nigeria\_Civil servants from Departments of Local Government and Education, and related agencies will need to play an active and critical role in the achievement of polio eradication. The education sector, in particular, will need to play a prominent role in social mobilization, using the schools as major vehicles for building and reinforcing community demand for polio eradication.*

*In other African countries the emphasis on campaigns with little similar emphasis on routine immunisation is diverting resources from routine vaccination leading to vulnerability to wild virus re-introduction and persistence in countries with existing low levels of routine vaccine vaccination and under-developed health systems. These campaigns need to follow the basic guidelines with more emphasis on social mobilization. A bolstering of routine vaccination in border districts of countries neighbouring previously endemic and newly endemic countries would limit exportation of virus. The separation of GPEI from the EPI programme has led to a reduction in the emphasis on routine vaccination activities, reintegration of these and strengthening of the EPI programmes would be beneficial, particularly to countries where routine vaccination is at a low level. The resources currently committed to countries with persistence of re-introduced wild virus need to be markedly increased if interruption of circulation is to be achieved.*

*Vaccination of travellers against poliomyelitis is appropriate at land crossing points between endemic countries and polio free countries.*

*At a regional level the international team concluded that the emphasis of Regional offices was on campaigns rather than on routine coverage. In particular the team concluded that improvement in routine vaccination specifically targeted on areas at high risk of importation (for example districts bordering areas of persistent infection) would both prevent introduction and persistence of virus whilst strengthening control of VPDs in general. The issue of poor quality of campaigns appeared to relate to fatigue in many countries, particularly those with persistent circulation of virus. The solution to this issue was not apparent at a regional level. Weekly contact and discussion between AFRO and EMRO would facilitate greater cooperation in identifying cross border transmission control. It was unclear to the team what the benefit of the AFRO proposal to carry out 2 NIDS across the continent would be compared to focusing attention on the countries with persistent virus and low routine coverage.*

*In the reinfected countries campaigns there is a need to follow the basic guidelines with more emphasis on social mobilisation. Coordination of WHO, UNICEF, national EPI programmes and other GPEI partners needs to be improved at country level in some countries to ensure that both routine EPI and campaigns are conducted optimally. Coordination between the EPI/polio team and the social mobilisation team must be strengthened at both central and decentralized levels. Additional human resources, technical guidance and financial resources should be devoted to social mobilisation in these countries (if one is to tackle resistance, create demand and involve communities). Coordination of WHO, UNICEF, national EPI programmes and other GPEI partners*

*needs to be improved at country level in some countries to ensure that both routine EPI and campaigns are conducted optimally. Capacity in planning, management and monitoring should be strengthened with a particular emphasis on district level activities.*