21st Meeting of the India Expert Advisory Group
for Polio Eradication
Delhi, India, 5-6 November 2009

Conclusions and Recommendations

The Twenty-first Meeting of the India Expert Advisory Group (IEAG) was convened on 5-6 November 2009 in Delhi, with the following objectives:

1. To review progress on polio eradication since the Twentieth Meeting of the IEAG in June 2009;
2. To make recommendations on strategies to ensure the interruption of wild poliovirus transmission in India.

Dr. T. Jacob John served as Chairperson, Dr Steve Cochi, Dr R.N. Basu, Dr. R. N. Srivastava, Dr. Panna Chowdhary (President IAP), Dr. Lalit Kant, Mr Deepak Kapur , Dr. Bruce Aylward, Dr. Olen Kew, Dr. Jagadish Deshpande, and Mr. Chris Maher participated in the meeting. Mr Carl Tinstman and Dr. Maritel D. Costales were unable to participate in the meeting. The IEAG was pleased to have the participation of Union Secretary for Health and Family Welfare Ms Sujatha Rao, Additional Secretary and Mission Director, Mr P.K. Pradhan and Joint Secretary Mr Amit Mohan Prasad along with other representatives from Government of India (including Dr S Khaparde, Deputy Commissioner for Immunization and Dr Anil Kumar Assistant Commissioner for Immunization), representatives from the States of Bihar, Uttar Pradesh (UP), Delhi, Haryana, Punjab, West Bengal, Maharashtra, and Uttarakhand. In addition core partner agencies (Rotary International, UNICEF, WHO, and CDC) were represented as were the Bill and Melinda Gates Foundation, USAID, DFID, CORE and KFW.

Introduction

The IEAG met in the context of 2009 polio case numbers being very similar to the same period in 2008, and was posed questions by the Government of India and State Governments of UP and Bihar:

- Why isn't the epidemiology for type 1 and type 3, in terms of cases, fully meeting IEAG projections despite the intensity of activities?
- Given the very highly focal nature of polio now in India, can the scope of national & sub-national activities be reduced to better target efforts to those remaining areas of highest risk?
- Recognizing the importance of improving routine immunization, can the work of the 'B teams', be merged with the 'Village Health and Nutrition Days' (VHNDs) to optimize health impact?

The IEAG also considered questions raised by the Independent Review of Barriers to Polio Eradication in India conducted in August 2009:

- What are the implications of the conclusion that the major barrier now in India is the incomplete nature of gut mucosal immunity coupled with the uniquely high force of infection seen in west UP and central Bihar?

- How should the findings of the Evaluation be translated into specific actions on research and operations?

The conclusions and recommendations below respond to these questions.

Findings and conclusions

Overall conclusions:

After careful review of the epidemiologic, virologic, genetic, operational & technical evidence, the IEAG concludes that India is still on the right path to finish eradication.

Although the number of polio cases in India has not fallen as expected at the June 2009 meeting of the IEAG, the geographic scope of both type 1 and type 3 poliovirus circulation has continued to reduce during 2009 compared to 2008. Most cases in 2009 are due to outbreaks of WPV3 in key districts in western Uttar Pradesh and in central Bihar, on account of two factors, namely inadequate UIP coverage of infants with the recommended number of tOPV doses and the increased use of mOPV1 which offers no immunity to type 3. Low levels of WPV1 transmission have also continued in the same high risk zones, but with continuing restriction of geographic prevalence. Despite this, the IEAG believes the evidence continues to point to progress.

No WPV1 outbreak has occurred outside of UP and Bihar in 2009 even though there have been a few importations and sporadic cases. WPV1 has not been detected by environmental surveillance in Mumbai since January 2009. Only one genetic lineage of WPV 1 has been detected in 2009 compared to 3 in 2008 and 7 in 2007. **Transmission of WPV1 has been stopped in the vast majority of communities in India, including large parts of the endemic states, surviving only at a very focal level in limited key districts and blocks of the high risk zones of western UP and central Bihar.** The current outbreaks of WPV3 are concentrated in the same areas, and have occurred in districts that have not used type 3 containing vaccines in the first half of 2009. **Given prior experience and the results of recent vaccine trials, use of mOPV3 in the second half of 2009 and bOPV from early 2010 in these areas should lead to rapid increase of population immunity and control of type 3 outbreaks.**

The IEAG considers that there is continuous innovation in programme implementation, in particular the efforts to focus attention to the highest risk areas and groups. Analysis of epidemiological and other data has identified just over 100 high risk blocks in western Uttar Pradesh and central Bihar that hold the key to eradication in India. The IEAG identified the possible reasons for persistence of wild poliovirus in these blocks as persistent gaps in OPV coverage, sub-optimal seroconversion to tOPV, incomplete gut mucosal immunity and herd effect, and a very high force of WPV infection. There are ongoing efforts to address the issue of the highest risk groups, namely the under-immunized migrant and mobile populations, and to reach all communities in the Kosi river area of Bihar. Social mobilization and

communication initiatives have raised community engagement and reduced resistance to very low levels. Laboratories have maintained the mean turn-around time from onset of paralysis to laboratory confirmation of a polio case at 22 days throughout 2009 despite an extremely high workload. Research conducted in 2009 has led to the rapid commercial development of bivalent OPV, which will be available for wide scale programme use from early 2010.

Polio seroprevalence studies conducted in Moradabad in 2007 and in AFP cases of western UP in 2009 have clearly demonstrated that type 1 immunity in very young children (i.e. 6-9 months of age) has improved by over 15% since 2007, reaching a high level (>95%) across all of western UP in 2009.

Taken together these evidences indicate that India is entering the low transmission season with very high levels of immunity to WPV1 in key endemic areas, and that appropriate use of bOPV, mOPVs and tOPV in 2010 will maintain such high levels for type 1 and simultaneously raise immunity for type 3, while offering immunological deterrent to the development/spread of VDPV type 2.

In this context, the IEAG considers that there are three over-riding priorities for the programme in the coming months:

- To sustain intense efforts to close coverage gaps in highest risk groups (young children & migrants) everywhere, particularly the highest risk blocks in the high risk zones of western Uttar Pradesh and central Bihar.
- To introduce bOPV in sequence with mOPV1 to close type 3 humoral & mucosal immunity gaps while maintaining pressure on WPV1.
- To immediately assess the importance of mucosal immunity to continued poliovirus transmission and the impact of different strategies to boost mucosal immunity in different age groups.

The current epidemiological situation:

As at 5 November 2009, 568 cases of polio due to WPV have been reported with onset in 2009. Of these, 68 are due to WPV1, and 499 due to WPV3, and 1 due to a mixture of WPV1+3.

Six states have reported WPV in 2009 to date (Uttar Pradesh-454, Bihar-103, Delhi-4, Punjab-3, Uttarakhand-3, and Rajasthan-1) with the endemic states of UP and Bihar accounting for 98% of all cases reported. Within the endemic states, transmission of WPV is geographically very restricted. In UP, virtually all cases have been reported from the western districts, and 80% of all cases have been reported from just 10 districts. In Bihar, transmission is concentrated in central districts, particularly in and around the Kosi River floodplain, with 85% of cases reported from only 6 districts.

Wild poliovirus type 1: While only 67 cases due to WPV1 have been reported in India to date in 2009, different transmission patterns exist. First, there is persistent transmission of WPV1 (i.e. for longer than 12 months, from the previous high transmission season of 2008, through the low season in

early 2009, into the high transmission season of 2009) in key high risk blocks in central Bihar and western Uttar Pradesh. This type of transmission constitutes the bulk of cases reported in 2009. Second, following importation of WPV1 into some areas, there has been limited secondary spread, causing additional cases. Third, there have been sporadic importations into non-endemic or non-high risk areas that have resulted in single cases with no secondary spread.

Migrant populations originating from UP and Bihar continue to carry WPV1 to non-endemic areas of India. Cases reported from Delhi, Punjab, and Rajasthan represent multiple recent importations of wild poliovirus from either central Bihar or western UP, as confirmed by analysis of genetic sequencing data. Rapid, large scale mop-ups in response to these importations have prevented multi-case outbreaks.

Genetic sequencing analysis of WPV1 from polio cases demonstrates the continuing trend towards elimination of WPV1 clusters, with reduction in the number of clusters from 9 in 2006 to a single remaining cluster in 2009. Environmental surveillance in Mumbai confirms that WPV1 circulation is at very low levels in 2009, as only one sample from January 2009 has been found positive for WPV1, in contrast with more frequent detection in previous years.

Wild poliovirus type 3: 500 WPV3 cases have been reported to date in 2009, almost entirely from UP and Bihar (426 and 63 respectively, with only 3 cases reported from Uttarakhand and one each from Delhi and Punjab). Both Bihar and UP have successfully restricted the geographic scope of the majority of WPV3 circulation to the Kosi river area and western Uttar Pradesh. In the areas of continued WPV3 transmission, outbreaks have occurred, particularly in districts that did not conduct a type 3 immunization activity in the first half of the year, and already had inadequate UIP coverage of infants with the recommended doses of tOPV. By October 2009 all the above areas were covered with 1-2 mOPV3 SIAs, with plans for additional mOPV3 usage in the December 2009 SIA for districts that have received only one mOPV3 SIA to date. The impact of these activities on controlling the type 3 outbreak in these areas is expected to be apparent by the end of the year.

Vaccine-derived polioviruses: The Indian polio laboratory network has identified a total of 5 vaccine-derived polioviruses (VDPVs) from the stool specimens of AFP cases, and 2 in sewage samples from Mumbai. One of the 5 VDPVs (type 1) was isolated from an immunodeficient child. Of the remaining 4 VDPVs detected in AFP cases, 3 are of type 2 (all in UP and Bihar) and 1 of type 1 (in Assam). To date, extensive investigation and sampling around these isolations has not identified evidence of circulation in the wider community. Western UP and central Bihar pose the greatest risk for further VDPVs due to low rates of routine immunization and infrequent use of type 2 containing vaccines in recent years.

SIA quality and reaching underserved groups

The IEAG commends the government of Bihar and the partnership for the significant progress made in improving operations in the Kosi river area during the last 6 months. The increased number of satellite stay points and the increased presence and involvement of government medical officers, NPSP SMOs and field monitors, and UNICEF social mobilizers in this area has resulted in improved micro planning, implementation and monitoring of the activity. The IEAG noted the particular importance of the impressive achievement in which nearly 150,000 additional clusters of field huts have been identified and covered during the September 2009 SIA over and above the 50,000 clusters that were being covered until March 2009. The percent missed children detected by monitors in the Kosi area reduced to less than 4% in September from over 12% in March 2009.

The IEAG notes that while the overall quality of the SIA operations in UP has been maintained during the recent months, operational gaps remain in the identified high risk blocks that require urgent action. The high number of vacant medical officer positions in UP, particularly in the identified high risk blocks, was noted with concern by the IEAG.

The IEAG was satisfied with the intensive efforts being made by the programme to cover the migrant/ mobile communities in UP and other identified states that have high in-migration from UP and Bihar. In UP more than 30,000 sites had been identified and 700,000 migratory/ mobile children vaccinated through these sites during the September 09 campaign. While the percentage of missed children detected by monitors at these sites in UP has shown a decline during the recent months (from 8% in late 2008 to 4% in the most recent round), monitoring data has shown that the percentage of missed children in these communities was still relatively higher than in the general population (2%). More than 2 million migratory/ mobile children are vaccinated in Punjab, Gujarat and West Bengal during each SNID round.

Communications and Social Mobilization

The IEAG commends the Social Mobilization Network for its efforts to address the June 2009 recommendations. The expansion of the underserved strategy in Western UP as well as the doubling of SMNet mobilizers in Bihar has demonstrated significant commitment to the epidemiologically identified priorities in migrant communities and the Kosi river area. The IEAG also notes the development of a media management protocol to facilitate an increase in positive reporting for the polio programme.

The IEAG further notes the implementation of previous recommendations to complete a Communications Review, and to conduct research on community attitudes towards IPV.

Research and Programme Evaluation

The persistence of poliovirus transmission in northern India has catalyzed an ambitious program of research. A tremendous amount of new information is

now available on the immunogenicity of various polio vaccines and levels of population immunity in western UP.

The monovalent polio vaccine studies demonstrate superior immunogenicity of mOPV1 and mOPV3 to tOPV and equivalent immunogenicity of mOPV2 to tOPV. The bivalent OPV (bOPV) study demonstrates that it is "non-inferior" to mOPV1 and mOPV3, and as a result, will offer an important additional tool for the India polio program to address the challenge of alternating type 1 & 3 outbreaks while maintaining pressure on WPV1 elimination.

An important and logistically challenging study conducted in Moradabad district, Uttar Pradesh, provided insight into a number of key areas for the program. It shows that multiple doses of mOPV1 successfully generate very high levels of population immunity (99%) in one of the most challenging areas for polio eradication in India. The study also demonstrates that one dose of IPV effectively closes the immunity gaps to types 2 and 3 and that the fractional intra-dermal IPV dose was less effective than the full dose by intramuscular injection.

Polio seroprevelance studies conducted in Moradabad in 2007 and in AFP cases of western UP in 2009 provide data that reinforces the results from the Moradabad IPV study. They show that type 1 immunity in very young children (i.e. 6-9 months of age) has improved by over 15% since 2007, reaching a high level (>95%) across all of western UP in 2009. The results also highlight the substantial gaps in type 2 and 3 immunity.

Analysis of AFP surveillance data on mucosal immunity to polioviruses (i.e., preventing fecal shedding after oral inoculation of vaccine) in the remaining endemic areas of India found that for similar numbers of tOPV doses, the type-specific mucosal immunity in West UP and Bihar was half that seen in the rest of India. Encouragingly, however, the same analysis demonstrated that the use of mOPV had enhanced the impact of vaccination on mucosal immunity to type 1 poliovirus in these areas to levels similar to that seen with tOPV in the rest of the country.

Surveillance for Wild Poliovirus

The AFP and laboratory surveillance system in India continue to function at ever increasing levels of sensitivity and speed. The IEAG commends the recent efforts to increase surveillance sensitivity in the Kosi river area and among the migratory populations and was satisfied with the steps being taken to initiate sewage surveillance in Delhi.

Enhanced surveillance around polio cases has been undertaken to better define patterns of community poliovirus transmission. Preliminary data from these assessments of poliovirus transmission in western UP and the Kosi districts of Bihar has shown the presence of wild poliovirus in older children in known areas of transmission, but the significance of this in contributing to the survival of transmission in these areas is not known, nor is the extent to which this is related to waning mucosal immunity, and what measures could most

effectively close any mucosal immunity gaps. This is an obvious area for further evaluation.

The IEAG noted the improved timelines for reporting of laboratory results. Despite their extremely high workload, the Indian network laboratories have continued to improve the timeliness of primary isolation results and over the last 12 months have met the international standard of 80% results within 14 days of sample receipt. The timeliness of final intratypic differentiation (ITD) results continued to exceed the international standard of 80% results within 21 days of stool sample receipt. The improvement in timeliness of results has reduced the mean number of days from case onset to final confirmation from 58 days in first quarter of 2007 to 21 days during 2009. All polio laboratories had sustained high standards of performance by achieving an annual proficiency score of 100% for virus isolation and ITD. The IEAG was informed that steps had been taken to include the National Centre for Disease Control (NCDC, earlier NICD), Delhi as a part of the polio laboratory network and that the NCDC laboratory had scored 100% in the proficiency test panel and was scheduled for an onsite accreditation in March 2010.

Routine Immunization

The IEAG commends the efforts taking place at the state and local levels to strengthen routine immunization in priority polio states. Bihar demonstrates that it is possible to improve routine immunization coverage rates while maintaining a high intensity of polio SIAs. To illustrate, the proportion of fully immunized children 12-23 months nearly doubled from 21% to 41% from DLHS 2 (2002-04) to DLHS 3 (2007-08). The IEAG believes that Bihar's experience offers valuable lessons for both polio endemic and non-endemic states.

Substantial time and resources have been invested to create detailed polio SIA micro plans and the IEAG encourages their use to revise and update routine immunization micro plans in polio endemic and non-endemic states.

The IEAG notes with appreciation the early results of RI session and house-to-house monitoring in Bihar, UP and Jharkhand as a means of providing useful programmatic data to district and block level decision makers and encourages further scale-up of this strategy to all districts of polio priority states.

IEAG Recommendations

The IEAG reaffirms that the principal objective in the coming low transmission season (November 2009 to June 2010) should be to ensure the final interruption of WPV1 transmission, while maintaining control of WPV3. Following interruption of WPV1 transmission, emphasis should be shifted to

interrupting WPV3 transmission. The availability of bOPV will ensure that this strategy can be pursued with greater efficiency and effectiveness.

OPV Supplementary Immunization Schedule

The IEAG considers the objectives of the SIA strategy are:

- Stop WPV1 transmission through continued aggressive use of mOPV1 and bOPV in high risk areas and rapid, large scale mop-ups in any polio-free areas where the virus may be reintroduced
- Control and ultimately stop WPV3 transmission in 2010 or early 2011 (i.e. in the low transmission season) through use of bOPV and mOPV3
- Maintain or achieve high levels of general population immunity to all three serotypes in polio-free areas through NID and SNID rounds (in conjunction with routine immunization)

The IEAG has carefully considered the questions posed by the Government of India on the scope and intensity of SIA activities to stop WPV transmission, while continuing to protect the whole population of India. In formulating recommendations, the IEAG is attempting to achieve the above objectives while following a rational schedule which does not overburden the system.

The following principles have guided recommendations:

- In the coming low season (the period to June 2010) the intensity of SIA activities in endemic zones must be maintained at a very high level to optimize the current opportunity to stop type 1 polio and ensure the full impact of bOPV before any scaling-back in the scope of activities.
- Full national immunization rounds should be continued in 2010 given the continuing risk of wild poliovirus introduction into polio-free areas from the endemic zones, particularly given the ongoing type 3 outbreak in west UP.
- The high risk zones of UP and Bihar identified in the previous IEAG remain operationally valid, and should form the minimum basis for SIA activities.
- For the reasons stated above, there remains a significant risk of importation of WPV through migrant and mobile communities; the identified high risk areas/communities in Delhi, Haryana, Uttarakhand, greater Mumbai, Punjab, Gujarat, and West Bengal should continue to be covered in conjunction with full SNIDs in UP and Bihar.
- The introduction of bivalent OPV offers tremendous opportunities to the programme and will help rationalize the SIA schedule and potentially the scope of these activities if used in combination with tOPV and appropriate mOPVs.

With reference to above principles and objectives, the recommendations of the 20th IEAG meeting, the current epidemiology, and the likely availability of bOPV only in early 2010, the IEAG recommends the following SIA schedule:

1. Polio SIAs 2009: The IEAG endorses the current programme plans as follows:

- November: SNIDs with mOPV1 in high and moderate risk zones of UP and high risk zone of Bihar, and associated areas.
- December: SNIDs with mOPV1/mOPV3 (mOPV3 in those districts of West UP which have had only one round with type 3 containing vaccine in the preceding 6 months) in the high risk zone of UP, and mOPV1 in the high risk zone of Bihar.

2. Polio SIAs 2010:

- January: NID round with tOPV in all areas except the high risk zone of Bihar where bOPV should be used; if bOPV is not available in January, mOPV1 should be used in this zone.
- February: NID round with tOPV in all areas except the high risk zones of UP and Bihar where bOPV should be used; if bOPV is not available in February, mOPV1 should be used in these zones.
- March: SNID with mOPV1 in high risk zones of UP and Bihar.
- April: SNID with bOPV state wide in UP, Bihar, and associated areas including Delhi, neighbouring districts of Haryana and Uttarakhand, greater Mumbai, and migrant areas in Punjab, Gujarat, West Bengal.
- May: SNID with mOPV1 in high risk zones of UP and Bihar
- June/July: SNID in high risk zones of UP and Bihar using mOPV, bOPV, or tOPV (depending on the epidemiology).

The IEAG should review SIA plans for the second half of 2010 in May/June 2010 based on the epidemiology but in principle the programme should plan for:

- September: SNID with bOPV state wide in UP, Bihar, and associated areas (as described for the April 2010 activity)
- October/November: SNIDs with bOPV, mOPV1, or mOPV3 (depending on epidemiology) state wide in UP and Bihar and associated areas

3. Mop ups: *The objective of mop-ups is to interrupt any remaining WPV transmission.* Mop-ups should be carried out as recommended in the 18th IEAG report (3 SIAs covering a minimum of 2-5 million children with type specific mOPV. The first SIA should be initiated within 30 days of case confirmation with the subsequent conducted at 4-6 week intervals. Previously planned SIA rounds can be included as part of the response activities where timing and scale is appropriate). Mop-ups should be conducted:
   - Up to May 2010:
     i. In response to any WPV1 anywhere in the country
     ii. In response to any WPV3 outside high risk zones of UP and Bihar
   - From June 2010 onwards:
     i. In response to any WPV1 or WPV3 anywhere in the country

4. Polio SIAs in 2011-2012. The scope of SIAs in 2011 and beyond should be reviewed in mid 2010 on the basis of epidemiological developments, to determine to what extent these activities can be scaled back. An analysis of risk factors state by state should be presented to the next meeting of the IEAG to facilitate decisions on recommended scale in 2011. Such an analysis should include: whether routine OPV3 coverage is >85%; history of importations; history of outbreaks following importations. At this stage, for planning purposes, the government should plan for two NID rounds using tOPV during the first quarter of the year and 2 full SNIDs in UP and Bihar and associated areas, each year until global certification.

OPV supply

In order to ensure an adequate vaccine supply in 2010, and taking into consideration that a 6 month lead time is needed for manufacturers to produce additional vaccines, the IEAG recommends the following:

5. The Government of India and partners should:
    - Prioritize the licensing of bivalent OPV from all prequalified manufacturers to maximize the potential sources of supply
    - Confirm OPV requirements for the period to July 2010 with reference to the number and timing of SIAs, and the types and amounts of vaccine required for each SIA
    - Maintain adequate quantities of emergency stock of mOPV1 and mOPV3 as recommended during the recent IEAG meetings to allow rapid mop-up response
    - Ensure stability of OPV supply through the establishment of long term MOUs and associated funding

SIA Operations and quality

The IEAG notes the detailed work being done to maintain high levels of SIA quality and to identify and address quality gaps, and believes this work is increasing pressure on WPV circulation in India.

6. Efforts to improve SIA quality and ensure that no children are missed should be prioritized as follows:
    - Specific efforts should be concentrated on the designated highest risk blocks (~ 100 blocks) of the high risk zones of western UP and central Bihar; particular attention should be paid to all aspects of SIA quality in these areas but in particular to ensuring adequate Government and partner agency staffing and close monitoring of performance.
    - Urgent steps should be taken by the UP and Bihar governments to fill the vacant medical officer positions in all high risk blocks.

- In all areas, but in particular in the highest risk blocks, continued emphasis should be placed on identifying transit areas and mobile groups to ensure they are included in operational plans for each SIA round; specific monitoring of coverage in mobile communities should continue to be expanded.
- States that are destinations for a large number of migrants from UP or Bihar (Punjab, Gujarat, Delhi, greater Mumbai, West Bengal, Haryana), should continue to systematically identify migrant populations and ensure they are fully immunized with OPV during planned SIAs and through routine immunization activities.
- The IEAG concurs with Government proposals to integrate the B-Team activity in Uttar Pradesh and Bihar with the broader range of interventions through Village Health and Nutrition Days, but recommends that this be introduced in a phased manner to fully understand the operational issues and impact, if any, on SIA coverage

Communications and social mobilization

7. The IEAG welcomes the proposal for a new forward looking Communications and Social Mobilization Plan for 2010-2013 and recommends:

    - The full report of the Communication Review and the findings of the community study on attitudes towards IPV conducted in 2009 should be submitted to the IEAG members.
    - The findings of the 2009 Communication review should be fully implemented.
    - The IEAG endorses the proposed principles for the Communications and Social Mobilization Plan for 2010-2013, including the roll out of a broader approach including routine immunization, zinc supplementation, breastfeeding, and hygiene and sanitation; the development of the final version of the strategy and plan should be informed by the Communications Review findings.
    - Continued focus of the SM Net on migrants and nomads must be maintained, including intensification of transit mobilization.
    - IEAG welcomes the new district/block *communications profiles* and urges rapid analysis and dissemination of block level communication data in order to inform action, particularly to rapidly deal with pockets of resistance in high risk areas.

Research and Programme Evaluation

Noting the valuable information provided by research studies in 2009, the IEAG recommends that:

8. Specific studies on mucosal immunity should be initiated as quickly as possible, and should include assessment of the best mechanisms (mOPV, bOPV, IPV) to close any mucosal immunity gaps, if identified. A specific

challenge study should be initiated as rapidly as possible to (a) compare mucosal immunity against polioviruses in children who have been recently vaccinated (e.g. 5 years of age) vs. those who have not (e.g. 10 or 15 years of age) and (b) determine the most efficient strategy (i.e. bOPV vs bOPV+IPV) to close any mucosal immunity gaps that are identified.

9. Regular serosurveillance using seroprevalence surveys should be carried out in the key transmission areas of western UP and central Bihar, ideally at the commencement and the end of the low transmission season, to provide information on immunity status and inform activities. At a minimum, the programme must conduct and rapidly complete a serosurvey among very young children in April/May to assess the impact of the mOPV3, bOPV, tOPV and mOPV1 rounds conducted between Oct 2009 and March 2010, so as to guide vaccine decisions in advance of the high season.

   A full report of the current state of knowledge should be presented to the next meeting of the IEAG.

AFP and Laboratory Surveillance

10. The potential role of older children in sustaining WPV transmission in key areas of UP and Bihar should continue to be evaluated through detailed analysis of data generated by enhanced surveillance of poliovirus transmission conducted around polio cases in western UP and in the Kosi area of Bihar. The analysis should be used to inform the need for additional assessments in this area and to evaluate the most appropriate methodology to obtain the data required for decision-making.

    Recognizing the important role of migrant populations in poliovirus transmission in India, and the historically low OPV coverage in this high risk group, particular consideration should be given to targeting future stool surveys among contacts of hot AFP/confirmed cases in migrant populations so as to assess the potential importance of mucosal immunity gaps in older children in this population.

The quality of AFP and laboratory surveillance will be increasingly important in the remainder of 2009-10 in order to rapidly identify and target remaining areas of circulation. Therefore, the IEAG recommends:

11. Sewage sampling processes should be initiated in Delhi by the end of 2009, and environmental sampling sites expanded to include Patna in 2010.
12. Given the very high laboratory and field surveillance workloads, an analysis should be conducted of the comparative sensitivity of 1 versus 2 stool samples from AFP cases, to determine if any gains in the sensitivity of WPV detection continue to warrant collection of a 2nd specimen.
13. State-level and targeted surveillance reviews, guided by epidemiologic and genetic data, should continue to be a priority for the NPSP.

Routine immunization

The IEAG again noted the achievement of the Government of Bihar to increase routine coverage while at the same time conducting an aggressive schedule of high quality SIAs. The IEAG recommends:

14. Polio endemic states of UP and Bihar should continue efforts to urgently strengthen routine immunization through the following activities:
    - The successful increase in routine immunization coverage in Bihar in conjunction with high number of polio SIAs should be documented and other states, including UP, should identify transferrable lessons
    - The SM Net should continue to focus on the strengthening of mobilization and monitoring of routine immunization sessions, particularly for newborns, in their areas.

Water and sanitation issues

The IEAG considers that contaminated water and poor sanitation are important factors in the continuation of wild poliovirus transmission in the remaining endemic areas. However the Group lacks the immediate knowledge of the actual situation as well as potential interventions and their feasibility. Accordingly:

15. The IEAG requests that at its next meeting the appropriate Ministry of the Union Government presents a summary of existing knowledge on the water and sanitation situation in the highest risk blocks for polio in west UP and central Bihar, and potentially feasible water and sanitation interventions that could be introduced in the short to medium term. This information will in turn inform IEAG recommendations on actions that could be taken on this important issue in the highest risk blocks.