

**The Seventeenth Meeting of the India Expert Advisory Group
for Polio Eradication
Delhi, India, 29-30 May 2007**

Conclusions and Recommendations

The seventeenth meeting of the India Expert Advisory Group (IEAG) was convened on 29-30 May 2007 in Delhi, with the following objectives:

1. To review progress on polio eradication since the last full meeting of the IEAG in December 2006, and the special interim meeting held in March 2007;
2. To make recommendations on accelerated strategies to ensure the interruption of wild poliovirus transmission in India.

Dr. T. Jacob John served as Chairperson, and Dr Steve Cochi as Rapporteur. Dr R.N. Basu, Dr. Lalit Kant, Dr. R. N. Srivastava, Dr. Naveen Thacker, Dr. Maritel Costales, Dr Olen Kew, Dr. Bruce Aylward, and Mr Chris Maher were the other members of the IEAG. Dr Jagadish Deshpande and Prof. N.K. Ganguly were unable to attend. Union Secretary for Health and Family Welfare Shri Naresh Dayal, and Joint Secretary Ms. Aradhana Johri, also participated. Other attendees included representatives from Government of India (including Dr P. Biswal and Dr N. Goel, Assistant Commissioners for Immunization), the States of Bihar, Uttar Pradesh (UP), Delhi, Haryana, Uttarakhand, Maharashtra, Mr. Santanu Lahiri, a sanitation expert, CORE, donor agencies, and from partner agencies, i.e. Rotary International, UNICEF, WHO, CDC and USAID. The IEAG particularly noted the specific contributions to the proceedings by delegations from Bihar and Uttar Pradesh, and their reports of progress and future plans.

Findings and conclusions:

Overall conclusions:

General population immunity in India is high following the national rounds and large scale sub-national rounds conducted since mid -2006. In endemic parts of northern India, population immunity against WPV1 is expected to remain high through mid-2007 due to improvements in SIA quality, the use of mOPV, and the recent outbreak. **The approach taken in the second half of the year should be to concentrate on taking advantage of this high immunity to finally stop WPV1 transmission, while taking measures to suppress WPV3 transmission in western UP.**

The process of eradicating polio in India has been long and difficult with lessons learned specific to India. The IEAG recognizes that the effort has placed tremendous burdens on all involved, and is conscious that it may be tedious for the Government and partners to regularly receive similar statements of feasibility and similar recommendations on the need to sustain activities. However, any great undertaking is uncertain, and requires the determination to carry strategies through, even when immediate results may be slim. The steadfast resolve of the Union Government and the State Governments in India to carry the strategies through is highly commendable, and must be sustained with adequate financial and human resources dedicated to achieving the goal. It is in that spirit that the IEAG offers its conclusions and recommendations to the Government.

The IEAG reaffirms their confidence that wild poliovirus will be eradicated from India. Every effort should be made to interrupt transmission of WPV1 in 2007 through implementation of the appropriate strategies. The IEAG again calls on

the Union Government, State Governments (particularly Bihar and UP), and their international and national partners to maintain focus and momentum.

The current epidemiological situation and major risks to finishing polio eradication in India in the second half of 2007:

As at 29 May, 54 cases of poliomyelitis due to wild poliovirus have been reported with onset in 2007. As expected in the low season, reported cases have shown a declining trend, with 23 confirmed in January, 14 in February, 13 in March, and 4 to date in April with 85% of case specimens processed. Of the confirmed cases, 30 are due to wild poliovirus type 1 (WPV1) and 24 due to wild poliovirus type 3 (WPV3). WPV1 cases have occurred in 23 districts in 7 states. All WPV3 cases have occurred in a restricted geographic area, in 9 districts in western UP and 2 neighbouring districts in Uttarakhand.

The national programme presented a comprehensive summary of the current epidemiology of wild poliovirus in 2007 and comparison with previous years, and an analysis of risks. Following review of these risks for continuation of wild poliovirus transmission in the second half of 2007 they can be summarized, in order of priority:

1. Wild poliovirus type 1 transmission in western Uttar Pradesh: To date in 2007 only one WPV1 has been reported in the 24 districts of western UP, and that case had onset on 10 January. The core of endemic districts around Moradabad has now reported no case of WPV1 for almost 6 months. This is due to the number of rounds of immunization held in western UP in the last 8 - 10 months, improvements in quality following the lapses of late 2005 and early 2006, the extensive use of mOPV1, and the effects of the recent outbreak on population immunity. While the IEAG is greatly encouraged by this historically lowest level of WPV1 in what is considered the most endemic area in India and in the world, it **continues to regard western UP as the highest risk for sustaining transmission of WPV1 in India in the second half of 2007**, both because of the possibility of ongoing WPV1 transmission, and of re-introduction of virus from other infected areas.

2. Wild poliovirus type 1 transmission in Bihar: To date 13 cases of WPV1 have been reported in Bihar, in 9 districts. Although case numbers are decreasing each month so far (7 in January, 4 in February, 2 in March, 0 in April to date) the persistence of transmission following multiple rounds of immunization is concerning. The pattern of transmission in Bihar has in recent history been different to Uttar Pradesh; there is little genetic evidence for sustained transmission of viral clusters in the same location, instead shorter periods of circulation, often of different genetic clusters, in seemingly more dispersed locations. However, the IEAG noted that a recent re-assessment of transmission from 2001 to 2007 identified clusters of blocks where WPV was detected much more frequently and more consistently, with 15% of blocks accounting for 70% of cases during this period. Many of these blocks appear to be in flood prone areas, or surrounding the major population centre of Patna. Major factors allowing continuing transmission in Bihar may include the very high level of population movement to and from Bihar, with migrants moving to multiple sites for extended periods, and the inaccessibility of certain areas particularly during the flooding season. **Together with western UP, Bihar is very high risk for sustaining wild poliovirus transmission in the second half of 2007.** This is a particularly important risk as Bihar has been a source of multiple exportations to other parts of India in 2006.

3. Wild poliovirus type 3 transmission expanding: Of the 24 WPV3 cases reported to date, 21 are from western districts of UP, and 3 from immediately neighbouring districts of Uttarakhand. Most cases are from Rampur, Moradabad, and the core of districts surrounding them, more recently cases have been reported from as far west as Baghpat and Ghaziabad. While transmission is still geographically restricted, the virus is clearly moving more widely. This development is not unexpected as the programme has taken a conscious decision to concentrate on the far more dangerous WPV1, and consequently less type 3 containing vaccine has been used in the past 24 months in northern India. Periodic use of mOPV3 has worked remarkably well to date in controlling WPV3 transmission and allowing the programme to maintain focus on WPV1. **The risk of WPV3 moving from western UP to cause problems in other areas is considered as moderate.** Some areas, particularly Bihar and parts of UP, are more vulnerable because little type 3 containing vaccine has been used in the past 24 months and because of known population movements; however, in most of India it is unlikely that introduction of WPV3 would cause substantial outbreaks.

4. Continuation of wild poliovirus type 1 transmission in non-endemic areas of Uttar Pradesh (central and eastern UP): To date in 2007 11 cases of WPV1 have been reported from 7 districts in central and eastern UP, primarily central/northern districts. Despite a deterioration in immunization status in central and eastern UP in 2006, children are better immunized than in 2002/3, the previous major outbreak period; additionally, recent data shows significant improvement in immunization status in early 2007 compared to 2006, following the extensive immunization activities carried out in the last 8 months. Provided that planned SIAs in the second half of 2007 in UP are carried out, with appropriate attention paid to quality especially in infected districts, **transmission in central and eastern UP, while an ongoing risk in the second half of 2007, is of low probability.**

5. Continuation of wild poliovirus type 1 transmission in non-endemic states: 2006 was an outbreak year in India, with wild virus moving out of endemic areas in western UP and Bihar to infect states and areas that were previously polio free for varying periods of time. As noted in previous IEAG reports, genetic evidence clearly demonstrates that all wild poliovirus detected outside the endemic areas originated recently from these areas. Comparison with the last period of extensive spread of WPV1 outside endemic states (the outbreak year of 2002 and 2003) indicates much lower case numbers in non-endemic states in 2006 and early 2007, and a significantly higher immunization status in children less than 5 years of age in virtually every state in the country. The IEAG noted additionally that the speed of detection and response to cases outside endemic states has improved in this period. Accordingly, the IEAG considers that **transmission of WPV1 in non-endemic states is a low risk in the second half of 2007**, provided that all planned activities in response to current cases are carried out, and that any newly detected cases or outbreaks are responded to in line with previous recommendations.

6. Missing wild poliovirus transmission: Surveillance quality is very high overall, with sensitivity improving further in 2007. Despite the very high workload, laboratory performance remains generally very good. Timeliness of genetic data has suffered due to the disruption of the laboratory network following the fire in the Global reference Laboratory in Mumbai in 2006, but that laboratory is now back on line. The IEAG is expectant that genetic data will be available in a much more timely fashion in 2007. It is likely that all chains of transmission are being detected, **and the risk of missing transmission for any appreciable period of time is low.**

7. Other risks: Some of the further risks affecting the programme are:

- Vaccine security; currently only one mOPV1 is licensed in India, and despite the solid reliability of the manufacturer of the vaccine since mOPV1 was introduced, this makes the programme extremely vulnerable in the event of rapid supply and demand changes
- Timely availability of funds for vaccines; the programme runs on a very tight timeline for release of Government funds to UNICEF to enable procurement of vaccines for activities
- Timely availability of sequencing data; for 2007 it will be critical to rapidly understand the genetic relationships between detected viruses, to inform appropriate programme decisions.

Progress in improving immunity in young children

At their previous meeting the IEAG emphasized that in endemic areas polio is now a disease of very young children, and that WPV transmission is surviving largely in children under the age of 3 years in endemic areas. The objective of the December 2006 IEAG recommendations on additional rounds in endemic areas was to try to improve the immunization status of children, particularly the youngest age group, in a shorter period of time. Preliminary data from the AFP surveillance system, which does not yet reflect the impact of all activities conducted between January and May, indicates that an improvement is taking place in the younger age groups. This is a gratifying endorsement of the strategy adopted by the national programme and the states of UP and Bihar. This should continue to be monitored to inform strategy in coming months.

Other progress

The IEAG acknowledges progress in a number of areas in the last 6 months:

- The Government and its partners have conducted a peer-review of the communication strategy and held a communication Technical Advisory Group meeting in Delhi in March 2007; this review strongly endorsed the current communications programme direction and made useful recommendations for enhancing the impact of strategies.
- Routine immunization coverage continues to slowly improve in Uttar Pradesh and Bihar, and a range of enabling activities including training are being carried out across the country. This progress is welcome although it remains too slow. Both UP and Bihar have extensive plans for improving routine coverage, including coverage targets which can be evaluated.
- The Governments of UP and Bihar are moving to recruit health workers to fill vacancies at district and block level and improve general health service delivery.
- Further efforts are being made to improve SIA quality through various interventions including the engagement of ASHA workers in UP and Bihar, the improvement of incentives, and indicators of performance have generally been sustained at good levels for several rounds.
- Tracking newborns during SIAs has been established in both Bihar and UP; this has not only enhanced capacity to reach very young children consistently in subsequent rounds, it has also enabled closer monitoring of newborn coverage.
- Research protocols for serosurveys have been developed to assess immunity levels in western UP; the results of these surveys will be valuable in informing programme decisions.

Additional options for enhancing the impact of SIAs

Recognizing that further gains in the already high SIA coverage in western Uttar Pradesh will be marginal, and that the monthly frequency of campaigns cannot be further intensified, the IEAG discussed potential options for enhancing the impact of each SIA contact in this area of particularly efficient poliovirus transmission.

After extensive discussion, the IEAG identified 2 options that could *potentially* enhance the impact of each SIA contact in western UP:

- further increasing the titre of mOPV1, and
- adding a dose of IPV for young children in addition to current strategies.

The IEAG noted although there was limited data to demonstrate definitively that either of these options would substantially boost mucosal immunity, there were potential merits for considering their use at this point in the programme.

The easiest option operationally is using higher titre mOPV. In terms of the rationale for using a higher titre of mOPV1 in highly endemic areas, it was noted that it was mOPV1 with a titre of $10^{6.7}$ that in 2005-6 rapidly interrupted the final wild poliovirus type 1 reservoir in Egypt, the only other country with poliovirus transmission dynamics that approximate those of western UP. Furthermore, although there is very limited data comparing seroconversion rates and mOPV1 titres, the IEAG noted that in various studies in developing country settings seroconversion rates ranged from 50%-90% for 3 mOPV1s with a titre of approximately 10^6 , and 90% in the one study done with an mOPV1 with a titre of 10^7 . From a programmatic perspective, the use of higher titre mOPV1 for the 24 districts of western UP would be straightforward. The IEAG noted that some WHO approved manufacturers produce mOPV1 at a titre of $10^{6.7}$, and that in principle any manufacturer could potentially produce that titre.

In terms of the rationale for considering the addition of a dose of IPV in a very limited geographical area of western UP, the IEAG noted that a small number of districts have historically been the key reservoir for both type 1 and type 3 polioviruses in that area. The continued circulation of both serotypes there clearly indicates the persistence of a small but sufficient immunity gap among very young children to sustain poliovirus transmission. The IEAG noted that two studies have demonstrated that a single dose of IPV can in such settings rapidly close a gap in humoral immunity to types 1 and 3 polioviruses in children who had previously received multiple doses of OPV. The IEAG was also aware that while the global supply of stand alone IPV is extremely limited, 1 million doses of the product was available to the Government of India should it deem it to have a role in the final stages of polio eradication in the country. The IEAG highlighted that there are substantial limitations to the potential impact of this strategy, however, given the operational challenges to achieving even 50-75% coverage and recognizing that IPV will have very limited impact on mucosal immunity, which is of special importance given that the fecal-oral route is the primary mode of poliovirus transmission in western UP. The IEAG did note, however, that at a minimum this strategy could reduce cases, and facilitate the continued focus on interrupting type 1 poliovirus in this area.

IEAG Recommendations

The principal objective of activities in India in the second half of 2007 should be the interruption of WPV1 transmission by the end of the high season.

OPV Supplementary Immunization Schedule

1. The vaccine of choice in the planned June 2007 SNID should be as follows:
 - mOPV3 in selected districts of western UP encompassing the area where WPV3 is circulating, and selected neighbouring districts of bordering states
 - mOPV1 in the remainder of UP and Bihar.
2. Four rounds of SNIDs should be conducted in the second half of 2007. In principle these rounds should cover Uttar Pradesh, Bihar, and appropriate parts of other states, but the precise geographic extent can be guided by the epidemiology of polio disease (areas with no disease for several months may be excluded). The vaccine of choice for these rounds is mOPV1. Recognizing the constraints imposed by Ramadan and the Diwali festival season, at least two of these rounds should be completed by early September.
3. In western UP, following the first 2 SNID rounds, an immediate rapid response should be carried out to any detection of WPV1, covering multiple blocks according to geographic and epidemiologic criteria, using mOPV1. The use of mOPV1 gives the advantage that spacing between rounds is not a constraint; these responses can therefore be carried out before, after, or between subsequent planned SNID rounds.
4. In polio-free areas, SIAs should be carried out in response to any detection of wild poliovirus as per the recommendations of the Global Advisory Committee on Polio Eradication. This includes WPV3 detected anywhere other than western UP.
5. The Union Government should ensure a rolling reserve supply of both mOPV1 and mOPV3 (minimum 30 million doses of each) to allow for rapid mop-up response if wild poliovirus is detected in any free area.
6. As recommended by the Interim IEAG meeting in March 2007, in order to improve vaccine security and strategic flexibility, additional monovalent OPVs should be licensed in India as soon as possible. Manufacturers of WHO recommended vaccines are urged to submit dossiers to the Drugs Controller General of India, and the Government and concerned partners to follow up.
7. The IEAG has previously recommended at least 2 NIDs and 2 SNIDs in both 2008 and 2009. However the IEAG now considers that this would be the minimum level of activity, and that in order to facilitate financial and operational planning, a higher level of activity should be assumed as follows:
 - In 2008, 2 rounds of NIDs and 6 SNIDs, and
 - In 2009, 2 rounds of NIDs and 4 SNIDs.

The Government and partners should plan for the higher level of activity on the understanding that plans may be modified according to epidemiology:

Enhancing the Quality of Supplementary Immunisation Activities including reaching mobile populations

8. In early 2007 the quality of SIAs has generally been very high. The IEAG reaffirms that it is critical to maintain this high quality of SIAs in UP and Bihar. The improved quality being achieved will only have a longer term impact if it is sustained throughout 2007. This requires the independent monitoring process to continue with the same intensity throughout 2007 to inform actions on quality.
9. In states and particular districts with a history of wild poliovirus importation from UP and Bihar, particularly Punjab, Haryana, Gujarat, Delhi, and Mumbai, as far

as is possible mobile populations from Bihar and Uttar Pradesh should be identified, quantified, and mapped. These populations/areas should be covered along with UP and Bihar during planned SNIDs rounds in the second half of 2007.

10. In each round in Bihar, special focus and attention (including allocation of staff and monitors) should be directed to the clusters of blocks which analysis has identified as regularly infected.
11. The great success being achieved in involving ASHA workers in immunization teams should be pursued to ensure that wherever ASHA workers exist, 100% of teams have ASHA participation.
12. Noting the active role of medical practitioners in the first half of 2007 in convincing the public of the importance of polio eradication and dispelling rumours, the IEAG requests the IAP and IMA to continue to work systematically in endemic states to involve medical practitioners in polio eradication, and to publicly support the polio eradication campaign in India.

Communications and social mobilization

13. The IEAG endorses the general approach of the current communication strategy for polio eradication in India and considers it to be evidence-based and appropriate for reaching out to underserved communities in endemic states at risk of continued WPV transmission.
14. The next communication strategy review should be closely linked to an analysis of high season virus transmission at the end of 2007. This will allow programme planners to adopt communication contingency plans as necessary, based on a clear understanding of epidemiological trends.
15. The IEAG recognizes the value of maintaining a high degree of visibility for the polio programme, and encourages all endemic and infected states to take corrective steps to ensure that IEC materials for the polio programme are produced, distributed and used as per GOI operational guidelines.
16. To capitalize on the currently favourable media environment, the IEAG recommends that the Government and partners work urgently to develop, implement and monitor a pro-active editorial media strategy to ensure continued positive positioning of the polio eradication initiative in India.

Routine immunization

17. Special attention should continue to be paid to improving routine immunization in UP and Bihar.
18. Monitoring of immunization sessions remains a crucial tool in guiding management of routine immunization in Uttar Pradesh and Bihar. Following the expansion of health manpower in both UP and Bihar, monitoring of sessions should include monitoring expansion in areas covered by new staff.
19. All efforts should be made to involve ASHA workers in supporting routine immunization activities, and the involvement of ASHA workers in scheduled routine sessions should be monitored.
20. All polio-free states should ensure that routine immunization coverage is maintained at the highest possible levels to reduce the risk of wild poliovirus spread should there be an importation.

Surveillance and laboratory

21. Because it is now critically important to identify the remaining reservoirs and monitor the remaining chains of transmission, genetic sequencing data on wild should be available within 15 days of confirmation of the case by intratypic differentiation.
22. Recognizing that information provided by the ERC Mumbai from environmental sampling in Mumbai has proven to be of great value to the programme, environmental sampling in that city should recommence now that the Global Reference Laboratory at ERC is operational again.

Additional options for enhancing the impact of SIAs

23. The Government of India should consider procuring a high titre mOPV1 ($10^{6.7}$), for use in SIAs during the remainder of 2007 initially in the 24 districts of western Uttar Pradesh, and as soon as possible in Bihar. The potential impact of this higher titre product can be documented and assessed as it is used, focusing on the impact on wild poliovirus transmission and, if possible, population immunity.
24. The Union Government of India should consider a technical consultation by August to inform a decision on the potential role and feasibility of IPV in eradicating polio from the highly endemic area of western UP.

Programme research

25. The IEAG urges ICMR, the Union Government, and the Government of UP to move as rapidly as possible to finalize approvals for the planned serosurveys in Uttar Pradesh. These studies are vital to informing decisions on immunization strategies in the remaining endemic areas, including potential use of IPV as a supplement to current activities.