Global Polio Eradication

Current Situation and the Impact of Innovations

April 2008
Presentation

Current epidemiology

Impact of the intensified programme and innovations 2006 - 2007

Evolving challenges & risks

Post eradication challenges
### Timeline for Polio Eradication

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Current Situation of WPV transmission globally
WPV type 1

WPV type 3

Data in WHO HQ as of 01 Apr 2008. WPV type 1 includes 3 cases in 2007, 2 cases in 2006, 3 cases in 2005, 2004, 2002 and 4 cases in 2001 with a mixture of W1W3 virus. For 2008, cases with onset in March will be reflected end-April.
Wild Poliovirus infected districts*, 02 Oct 2007 – 01 Apr 2008

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data in WHO HQ as of 01 Apr 2008

<table>
<thead>
<tr>
<th>Status</th>
<th>Country</th>
<th>Date of most recent type 1</th>
<th>Date of most recent type 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>endemic</td>
<td>India</td>
<td>20-02-2008</td>
<td>13-03-2008</td>
</tr>
<tr>
<td></td>
<td>Nigeria</td>
<td>27-02-2008</td>
<td>17-02-2008</td>
</tr>
<tr>
<td></td>
<td>Pakistan</td>
<td>25-02-2008</td>
<td>31-12-2007</td>
</tr>
<tr>
<td></td>
<td>Afghanistan</td>
<td>10-02-2008</td>
<td>09-02-2008</td>
</tr>
<tr>
<td>active outbreak</td>
<td>Nepal</td>
<td>NA</td>
<td>16-02-2008</td>
</tr>
<tr>
<td></td>
<td>DR Congo</td>
<td>14-02-2008</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Chad</td>
<td>17-11-2007</td>
<td>03-02-2008</td>
</tr>
<tr>
<td></td>
<td>Niger</td>
<td>23-01-2008</td>
<td>31-12-2007</td>
</tr>
<tr>
<td></td>
<td>Angola</td>
<td>10-01-2008</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Cameroon</td>
<td>18-11-2007</td>
<td>NA</td>
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NA. Date of onset is prior to rolling 6-month period.

*Excludes vaccine derived polio virus and virus detected from environmental surveillance.
Intensified programme and innovations 2006 - 2007
Monovalent OPVs: mOPV1 efficacy

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<tr>
<th>Country</th>
<th>tOPV</th>
<th>mOPV1</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>10%</td>
<td>31%</td>
</tr>
<tr>
<td>Nigeria</td>
<td>16%</td>
<td>66%</td>
</tr>
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</table>
Expanded use of New Tools 06-07

Monovalent OPV1 & 3

New laboratory procedures (50% faster confirmation)

2.4 B doses since Apr '05

75 m doses since Apr '07
Expansion of New Tactics: Immunization

**Pakistan & Afghanistan**
- Synchronized campaigns, Nov 2006
- Flexible SIAs in access compromised areas 2007

**Nigeria**
- 'Immunization Plus Days' (IPDs), June 2006

**India**
- Accelerated mOPV1 SIAs Jan 2007

**Re-infected Areas**
- OPV for int'l travel (2007)

- Indigenous virus 2006-7
- Imported virus 2006-7

Saudi Arabia requires OPV for visas.
Impact of innovations
Impact of mOPV1 & accelerated rounds on immunity against type 1 polio, India

Direct protection with OPV against type 1 polio among children 0-4 yrs
- type 1 polio case
Impact: Type 1 Polio, UP, India 2007

*data as on 5th January 2008*
Impact of mOPV3: Weekly incidence of P3 cases in western UP, Nov06 – Nov 07

Lower WPV3 transmission in areas with two or more mOPV3 doses

Higher WPV3 incidence in areas where mOPV3 was not used until July

* data as on 14th December 2007
Direct protection by vaccination against type 1 polio among children 0-4 yrs
- type 1 polio case
Impact of New Tools & Tactics, Nigeria*

*data at 14 December 2007
Continued reduction in missed children
northern Nigeria, 2007

Source: Independent Monitoring Data

12% reduction in children missed due to non-compliance (January - September)
WPV transmission, Afghanistan/Pakistan 2007

- Red circles represent WPV1 locations.
- Blue triangles represent WPV3 locations.

The map shows the transmission routes of WPV1 and WPV3 in Afghanistan and Pakistan for the year 2007.
Afghanistan: a sustained increase in access in Southern Region

**August**

Inaccessible children reduced from 110,000 to 20,000

**September**

**October**

Not accessible because of active fight (13878)
Not accessible because AGE refusal area (14413)

- **Completely inaccessible districts**
- **Partially inaccessible districts**
- **Accessible districts**
- **Districts not included in the activity**
203433 children are security compromised out of 377075
7870 children are security compromised out of 111669
135965 children are security compromised out of 135965
101145 children are security compromised out of 101145
13260 children are security compromised out of 157864
41298 children are security compromised out of 117953

Total inaccessible = 502971
Impact on outbreaks
Impact of Outbreak Response Tactics

24 of the 27 countries re-infected 2003-7 have stopped circulation of the imported virus.

* data as of 12 February 2008
Impact of Outbreak Response Tactics

2006

- Circulating imported virus, 2006

2007

- Continuing outbreak
- New importation, 2007
circulating Vaccine-Derived Poliovirus Outbreaks (cVDPVs), 2000-2007*

* as of 4 December 2007
Risks
<table>
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<th>Country</th>
<th>Immediate Epidemiologic &amp; Programmatic Risks</th>
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</thead>
<tbody>
<tr>
<td>India</td>
<td>ongoing WPV1 transmission in Bihar (WPV3 outbreak declining fast)</td>
</tr>
<tr>
<td>Pak/Afgh</td>
<td>detection of new WPV1 cases &amp; poor security in key areas</td>
</tr>
<tr>
<td>Nigeria</td>
<td>missed children in key northern states leading to WPV1 rise</td>
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<td>Chad</td>
<td>continued geographic expansion of outbreak; gaps in SIA &amp; surv quality.</td>
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Summary of current situation and priorities for 2008-2009
Wild Poliovirus type 1 cases
comparison 2006 & 2007 & last 6 months

* 02 October 2007 – 01 April 2008

2006 data as of 03 April 2007 and 2007 data as of 01 April 2008. Does not include W1W3 (3 cases in India in 2007)
Wild Poliovirus type 3 cases
comparison 2006 & 2007 & last 6 months

* 02 October 2007 – 01 April 2008

2006 data as of 03 April 2007 and 2007 data as of 01 April 2008. Does not include W1W3 (3 cases in India in 2007)
ACPE: the impact of the intensified effort in 2007 demonstrates that polio eradication can be completed.
What do we know now?

- mOPVs work well to generate immunity in high risk populations
- BUT to work the vaccine has to be given to enough children enough times……..
- Security, quality, & strategy problems still limit access to children in key areas
- In the meantime we have to keep children protected in non-endemic areas
Immediate programme priorities 2008-9

- intensive mOPV campaign plan with further refined tactics in endemic areas
- restart/extend campaigns in at-risk areas
- rapid, effective outbreak response (mOPV)
- augmented surveillance in all HRAs
Post-eradication challenges
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WPV Containment & Certification Phase

Goal

minimize risk of WPV reintroduction.

Start

1 year after last WPV.

Activities

» identify & destroy unnecessary WPVs.
» replace WPV with Sabin where possible.
» full 1° & 2° safeguards for residual WPVs.
» certify WPV eradication & containment.

Finish

3 years after last WPV.
VAPP/VDPV Elimination & Verification Phase

Goal  
minimize risk of cVDPV emergence.

Start  
at time of cessation of routine OPV (ideally ASAP after WPV certification).

Activities  
» synchronize cessation of routine OPV.
» 1⁰ & modified-2⁰ safeguards for Sabin virus.
» respond to cVDPVs with mOPV.
» verify cVDPV absence & iVDPV control.

Finish  
2-5(?) years after last cVDPV.
Post-OPV Era

Goal  minimize risk of Sabin reintroduction.

Start  at verification of VDPV elimination.

Activities  » full containment of Sabin viruses
            (i.e. ideally full 1<sup>o</sup> & 2<sup>o</sup> safeguards)
            » introduction, if possible, of further attenuated
              IPV seed strains for low income settings.
            » consider replacing mOPV with IPV as first
              line response to a circulating PV.

Finish  indefinite
Extras if necessary
Role of IPV in Post-Eradication Risk Management

Essential:
- 2\textsuperscript{o} safeguard around all poliovirus-retaining sites.

Potential:
- incentive for OPV cessation.
- reduce risk of cVDPV emergence.
- reduce risk associated with iVDPVs.
- adjunct role in cVDPV response.
Weekly epidemiological record
Relevé épidémiologique hebdomadaire

14 APRIL 2001, 8th YEAR / 14 AVRIL 2001, 8e ANNÉE
No. 15, 2001, 89, 137-144
http://www.who.int/wer

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Inactivated poliovirus vaccine following oral poliovirus vaccine cessation
Supplement to the WHO position paper
WHO issues a series of regularly updated position papers on vaccines and vaccine combinations against diseases that have an international public health impact. These papers are concerned primarily with the use of vaccines in large-scale immunization programmes limited vaccination for individual protection, as executed mostly in the private sector, may be a valuable supplement to national programmes but is not emphasized in these policy documents. Rather, the position papers summarize essential background information on the respective diseases and vaccines and conclude with the current WHO position concerning their use in the global context. The papers are reviewed by a number of experts within and outside WHO and are designed for use mainly by national public health officials and immunization programme managers. However, they may also be of interest to international funding agencies, the vaccine manufacturing industry, the medical community and the scientific media.

This document is a supplement to the WHO position paper on introduction of inactivated poliovirus vaccine (IPV) into countries using oral poliovirus vaccine (OPV). It focuses on preparations for policy decisions on vaccination for the OPV cessation era, which is expected to begin approximately 5 years after confirmation of interruption of poliovirus transmission globally and appropriate containment of wild poliovirus material.

1 See No. 20, 2003, pp. 241-253.

Passage au vaccin antipoliomyélite inactif suite à l’abandon du vaccin antipoliomyélite oral
Supplement to the note of information of FOMS
FOMS publie une série de notes d’information régulièrement actualisées sur les vaccins et les associations vaccinales contre les maladies ayant une incidence sur la santé publique internationale. Ces notes d’information portent essentiellement sur l’utilisation des vaccins dans le cadre des programmes de vaccination à grande échelle. Certaines vaccinations destinées à la protection individuelle, généralement effectuées dans le secteur privé, peuvent compétir utiliser les programmes nationaux mais n’occupent pas une place importante dans ces documents d’orientation. Les notes réunissent plutôt les faits essentiels concernant les maladies et les vaccins correspondants et donnent en conclusion la position actuelle de l’OMS concernant leur utilisation dans le monde. Elles ont été revues par un certain nombre d’experts au sein même et en dehors de l’OMS et sont essentiellement destinées aux responsables nationaux de la santé publique et des programmes de vaccination. Toutefois, elles peuvent également être utiles aux organismes internationaux de financement, aux fabricants de vaccins, aux membres des professions médicales et aux médias scientifiques.

Le présent document est un supplément à la note d’information de l’OMS relative à l’adoption du vaccin antipoliomyélite inactif (VPI) par les pays utilisant le vaccin antipoliomyélite oral (VPO). Il s’intègre aux dispositions à prendre concernant les décisions politiques de vaccination pour la période qui suit l’abandon du VPO, qui devrait débuter près de 5 ans après confirmation de l’interruption de la transmission du poliovirus dans le monde et confirmation
Establish 'affordable' IPV options for the low-income, developing country setting in the post-eradication era (ie. cost of IPV immunity = cost of OPV immunity by 12 months of age).

Establish IPV production processes that reduce the risks associated with wild polioviruses handling in low-income, tropical country setting.
Affordable IPV Options*
(*cost of IPV immunity = OPV immunity by 12 months)

Strategies

2-dose schedules (14 wks & 9 mos)
Fractional IPV (1/5 standard dose)
Adjuvants (1/5\textsuperscript{th} - 1/20\textsuperscript{th} dose)
Process optimization (cell density, etc)
Low-cost production sites (Sabin IPV)
Safer IPV Production Processes

Goal: allow safe production of IPV in low-income, tropical settings.

Strategies

• Sabin IPV Technology Transfer (5 year target): NIV-JPRI-WHO-Biofarma

• Alternate seed strains (10 year target): NIBSC, CDC, etc.