

# **RESPONSE TO IMPORTATION OF WILD POLIOVIRUS IN THE PACIFIC ISLANDS**

## **Generic Plan of Action – Final Draft**

### **BACKGROUND**

Pacific island countries and territories (PIC) have been free of indigenous polio for many years, some even decades. However, importations into non-endemic countries (eg. USA, Canada, Finland and the Netherlands) have been documented frequently, and may occur more often than reported.

In most cases, an importation into non-endemic countries does not result in further spread or re-established local transmission because of high levels of herd immunity and adequate sanitation standards. However, if wild poliovirus importations occur into polio-free areas with low immunization coverage and/or sub-optimal surveillance, large polio outbreaks can result like those recently in Yemen and Indonesia. Since 2003, wild poliovirus importations and subsequent outbreaks took place into almost 20 countries which were previously polio-free.

The Subregional Committee for Certification of Poliomyelitis Eradication in Pacific Island Countries and Areas (SCC - the oversight body for achieving certification and maintaining polio-free status) recommends that the best protection the Pacific can provide its children from the reintroduction of polio is through sustaining high polio vaccine immunization coverage combined with high quality AFP surveillance. Furthermore, it is critical that immunization coverage be uniformly high across all district and communities within a country.

While having noted the global increase in poliovirus importations, the SCC during its last meeting in September 2004 continued to consider the Pacific at relatively low risk of importation. The SCC concluded that geographic distances and generally high immunization coverage still provide barriers against introduction and re-establishment of wild poliovirus circulation. Still, the SCC encourages all national governments and the Pacific Public Health Surveillance Network (PPHSN) to continue to strengthen mechanisms for outbreak preparedness, detection and response, also in terms of poliomyelitis.

### **POLIO SURVEILLANCE IN THE PACIFIC**

A Pacific region wide Hospital Based Active Surveillance (HBAS) system was established in 1997 by the WHO under the PPHSN framework as part of the Global Polio Eradication Initiative. The objectives of the system were to prove that the Pacific was free of poliovirus and serve as the basis of certification as such; and to monitor the maintenance of polio-free status. The HBAS system has since grown to incorporate 58 hospitals in 20 Pacific island countries and areas and over 200 paediatric clinicians and is considered comprehensive for detecting all AFP cases in the Pacific

The standard strategy for surveillance for paralytic poliomyelitis is acute flaccid paralysis (AFP) surveillance, which comprises notification and investigation of all AFP cases including timely and adequate collection of two stool specimens, and adequate clinical follow-up 60 days after paralysis onset. Under the HBAS system, the laboratory support for AFP sample analysis is provided by the Victorian Infectious Diseases Reference Laboratory (VIDRL), in Melbourne (Australia), which is a WHO accredited polio laboratory.

Further information on the HBAS system can be found at:

<http://www.spc.int/phs/PPHSN/Surveillance/HBAS.htm>

## INITIAL DETECTION OF POLIOVIRUS

The detection of any wild poliovirus should be considered a **national public health emergency**. According to current standard definitions of the Global Polio Eradication Programme, in a polio-free country one single wild poliovirus-associated case represents an outbreak.

All decisions on response to importation must be made at the national level. The responses to importation of wild poliovirus must be composed of

- 1) **Case Investigation**
- 2) **Enhanced Surveillance** (to detect the extent of wild poliovirus circulation)
- 3) **Immunisation Response** (to interrupt wild poliovirus transmission through an appropriate OPV intervention)
- 4) **Documentation of the interruption of transmission of wild poliovirus**

When a case of wild poliovirus is confirmed, the **National EpiNet Team** should meet urgently, and ensure that it has appropriate leadership and representation to develop and implement the response (e.g. the chief medical officer in public health, chief of paediatrics, EPI manager, laboratory director, epidemiologist or person responsible for outbreak investigations, nursing director, administrator). In addition, inclusion of WHO would be appropriate to assist and coordinate external support.

It is important that importation of wild poliovirus is included in EpiNet team guidelines that deal with disease outbreak responses and delineation of responsibilities and activities, and that they are reviewed now and updated as required (with future re-examination; at least annually).

Key responsibilities of the **EpiNet Team** to address the detection of poliovirus would be to:

- conduct regular meetings to coordinate and assess the implementation of all activities;
- analyse epidemiological data coming through enhanced surveillance;
- estimate and identify additional resources for the appropriate response;
- communicate with the general public and the media;
- evaluate the impact of the response;
- produce and disseminate a timely and detailed report documenting all response activities.
- alert international authorities (e.g. WHO) and other Pacific nations through PacNet Restricted, and providing regular updates once a response is initiated through PacNet.

It is important that the **EpiNet Team** members understand that isolation of a single wild poliovirus may in fact represent several hundred non apparent infections in the larger community. The four main scenarios that the detection of poliovirus could occur, in ascending order of extent of poliovirus circulation they may represent are:

- 1) Single imported case of poliomyelitis: wild poliovirus is isolated from stools samples of a single AFP with a history of recent travel to a polio-endemic area. This may represent a single infection obtained outside the country.
- 2) Wild poliovirus is isolated from sewage or any other environmental sample that has no link to an individual person. In a large town or city, this may represent many infections.
- 3) Wild poliovirus is isolated from stool samples of an individual person with or without neurological symptoms and no history of recent travel to a polio-endemic area. This may represent widespread infections.

- 4) Secondary polio cases associated with an imported case. In this situation the wild poliovirus has already started to spread in the community.

An area is considered to have re-established transmission if wild poliovirus circulation following an importation continues for more than 6 months.

## **RESPONSE TO POLIOVIRUS DETECTION**

### **1. Case investigation [both initial and subsequent suspected cases]**

Any wild poliovirus isolation will lead to an immediate investigation, coordinated by the **EpiNet Team** to commence within 24 hours and expert risk assessment to identify the scope of the response based on such factors as the known extent of transmission, surveillance quality, major transit routes, international borders and origin of the virus. A full clinical, epidemiological and virological investigation of the case(s) will be part of this.

Since the last case of paralytic polio due to indigenously acquired wild poliovirus infection in PIC was many years ago, it is likely that poliovirus is either due to exposure in a polio endemic country/polio outbreak area directly or indirectly via asymptomatic contacts within the country. Therefore, a detailed travel history of the cases and of other household and non-household contacts should be obtained. Any contact with visitors, especially those recently returned from areas with polio must be clearly elucidated; this can also be residents of developed countries transiting through endemic areas as well as those born or living in endemic areas. Specimens should be collected from contacts (before any doses of OPV are given) and all samples are to be submitted to VIDRL for testing including determination of the geographic origin of the virus through genetic sequencing.

House-to-house searches should be conducted in the area for AFP cases with onset in the last 12 months; such searches can be carried out during response immunization activities. Previously unreported AFP cases should be investigated using a standard cases investigation form (e.g. HBAS Manual 2005 – Annex B1) and stool specimens collected if onset of paralysis occurred less than 3 months ago. These cases should be examined by a paediatrician or paediatric neurologist and findings immediately be presented to the PIC SCC through WHO.

The case investigation team should also provide health education for members of the patient's family and surrounding community and advise them on good food and personal hygiene. Regular contacts will be placed under surveillance for 2 weeks and observe for weakness of the limbs or signs of paralysis. If the patient is schooling, the school is to be visited and the School Principal informed and health education to students provided. All school contacts are to be placed under surveillance.

Prompt case investigation should occur for any subsequent AFP cases that present after the initial case(s). Isolation of poliovirus (one of three serotypes) from the stool or pharynx early in the course of the disease is presumptive evidence of polio. Isolation of virus from the cerebrospinal fluid (CSF) is diagnostic but is rarely accomplished. The likelihood of poliovirus isolation is highest from stool specimens, intermediate from pharyngeal swabs, and very low from blood or spinal fluid. To increase the probability of poliovirus isolation, at least two stool specimens should be obtained 24 hours apart from patients with suspected polio as early in the course of the disease as possible (i.e., immediately after polio is considered as a possible differential diagnosis), ideally within the first 14 days after onset of paralytic disease.

Patients should receive appropriate medical care, however, health staff and family member are to be educated on procedures to follow when handling and disposal of all body fluids that are potentially infectious, especially stool.

## **2. Enhanced surveillance**

On notification of wild poliovirus identification, the **EpiNet Team** will immediately contact all surveillance units and major hospitals nationally to inform staff that an imported wild poliovirus has been detected, and to alert them of the possibility of further cases. This is to include both hospitals that are part of the HBAS system in addition to other health sites within the country. Surveillance staff and clinicians nationwide will be provided with full information on reporting and investigating AFP cases, including the following:

- names, addresses, telephone, fax and E-mail numbers of the responsible persons in the Ministry/Department of Health
- case investigation forms
- details on how to collect and transport stool specimens

The **EpiNet Team** will ensure that sufficient stool collection and shipping containers are easily available for all surveillance sites and staff are provided with and can follow guidelines for stool collection, storage and shipment (the HBAS Manual 2005 - Section 3 – AFP case investigation provides guidance here).

The National Laboratory Director (or equivalent) will act as the focal point for the coordination of transport of all specimens internally within the country, and their subsequent shipment to the VIDRL, Australia. It is important that stool sample be shipped to VIDRL as soon as practical after collection, as primary isolation, identification and intra-typic characterisation to determine whether the poliovirus isolate is wild or vaccine-related takes between 4-10 days.

Sub-national and national staffs will immediately begin enhanced active surveillance by visiting all districts surrounding the case. Active searches by reviewing records and interviewing staff for unreported AFP cases at health facilities, beginning at (paediatric) hospitals will be conducted. Hospital record reviews should be conducted in all major hospitals and include review of outpatient and inpatient records from paediatric, neurology and infectious diseases department for the last 12 months.

A protocol for conducting a retrospective record review is provided in the HBAS Manual 2005 – Annex G. It should be reminded that for purposes of regular AFP surveillance only children under 15 years are included. If a polio outbreak is suspected, also older patients may need to be investigated.

Other surveillance activities may be required, e.g. extended stool surveys, to determine the extent of virus circulation beyond the community where case(s) have been detected and will be advised by the national **EpiNet Team**.

Monitoring of reports by the national **EpiNet Team** will require:

- Daily telephone reports from surveillance sites in districts/areas surrounding the initial case
- Weekly telephone and written reports from all sub-national units (provinces or districts as appropriate – province reports must include all - 100% - districts).
- Weekly review of situation by experts using mapping and other means of actively documenting the extent of the surveillance response.

After the initial notification of wild poliovirus importation, regular (i.e. weekly) updates should be provided to other PIC through standard communication channels (e.g. PacNet) and enhanced case finding in neighbouring states, or those with known links with the affected areas, should be encouraged. Enhanced surveillance will be maintained for a period of at least 3 months after the last wild poliovirus associated case or clinical case of polio is detected.

**[Note: Implementation of the above measures should also be considered when polio is strongly suspected, and while laboratory results are still pending].**

### **3. Immunization response**

On confirmation of a case of wild poliovirus a limited outbreak response immunisation (ORI) must start immediately (ideally within 72 hours), but only *after* collection of stool specimens from immediate contacts. Conducting ORI before collecting stool specimens may cause contamination of stools with vaccine virus, making it more difficult to determine the cause of the paralysis.

The ORI consists of one round of OPV administered to contacts of the case. The extent of ORI will be determined by the rapid epidemiological investigation and risk assessment around each case. Routine childhood vaccination programs should be conducted without interruption during the campaign. If more than three months have elapsed since the onset of paralysis in a case, ORI should not be conducted. Nevertheless, the case must still be investigated.

Further immunisation responses following the initial ORI will be determined by the epidemiological evidence, location of the case, contact tracing and where the infection seems to have been acquired. Contact tracing would inform the age groups that would be targeted for an outbreak response vaccination. An immunization response can never be too large; too small a response could result in a national disaster. Micro planning for immunization response is essential, and should, besides technical staff and political decision makers, involve local civic, religious and other leaders, particularly for adequate social mobilization.

The ORI would be followed by at least two large scale rounds of OPV immunisation 4 weeks apart for children (usually aged 0-59 months) regardless of their immunisation status at least in the area of one provinces or two provinces when the case(s) occur near the border. This must be conducted on a house-to-house basis to optimize coverage among very young children. A minimum of 90% coverage should be achieved as verified by independent monitors in each administrative area.

The extent of any third OPV immunization round would be determined by an analysis of local OPV coverage and by further analysis of the local epidemiological situation. If an extended chain of infection were established, the response would be upgraded to include a wider vaccination campaign for children (and adults) depending on the epidemiology. In some cases a National Immunizations Days (NIDs) may have to be conducted targeting all children of the age group identified.

A type-specific polio immunization response (i.e. monovalent/mOPV1 or mOPV3) should be conducted unless there is a particularly high risk of circulation of a second serotype. Consideration of using mOPV (if technically recommended) would require licensing by the responsible National Regulatory Authority (NRA) and close coordination with the Division of Pharmaceutical Services would be necessary.

For the immunization response to be successful, a timely and proactive communication strategy with the community is essential, especially as Pacific countries have not experienced polio for several years, and community awareness/understanding will probably be low. It should start once the first wild poliovirus (and thus an outbreak) is confirmed and before the ORI and further response immunization take place. To ensure public confidence in the immunization response, the communications strategy should also address community concerns about adverse events following immunizations (AEFI). AEFI surveillance should be enhanced as part of any immunization response, and reported events investigated promptly and openly. All public information activities should include coordination with the WHO to meet reporting and information responsibilities at Regional and Global levels.

At the national level, the **EpiNet Team** should work closely with the country or regional Interagency Coordinating Committee (e.g. Pacific Immunization Programme Strengthening - PIPS) to coordinate

external support requirement (e.g. vaccine supply, technical assistance, financial assistance, communications).

#### **4. Documentation of the interruption of transmission of wild poliovirus**

An equally important part of the response to imported wild poliovirus is the documentation of the interruption of transmission of wild poliovirus. Detailed and comprehensive documentation is required to describe the epidemiological background, findings of case investigation and surveys including laboratory results, description of immunization response and results of enhanced surveillance.

Final documentation should be completed in close coordination of all national and international experts involved and submitted to the PIC SCC for review, endorsement and submission to the Regional Certification Commission (RCC).

### **VACCINE DERIVED POLIOVIRUS (VDPV) ISOLATION**

Besides wild poliovirus importation, another risk to maintaining polio-free status is the emergence of circulating vaccine derived polioviruses (cVDPV). In certain circumstances, vaccine-related polioviruses are able to persist for extended periods by person-to-person transmission as observed in recent cVDPV associated polio outbreaks in Hispaniola (2000-2001), the Philippines (2001), Madagascar (2002) and China (2004) where VDPVs had been circulating for up to 3 years. The common feature in all these outbreaks was low coverage with poliovirus vaccine.

Under current definitions of the Global Polio Eradication Programme, the following applies:

- VDPV: VP1 nucleotide sequence >1% divergence from the Sabin serotype strain
- cVDPV: two or more AFP cases with isolation of related but non-identical VDPVs

In case of VDPV isolation it should be verified if it is indeed circulating or related to an immuno-compromised individual (iVDPV). In immuno-competent individuals given oral poliovirus vaccine (OPV), about 50% excrete poliovirus for 2 weeks, but none still excrete at 3 months. The exception occurs in individuals with primary antibody deficiencies. Chronic poliovirus infection (over 6 months) in this group is difficult to treat and may persist for years. However, only 19 cases have ever been described and only three continue to excrete poliovirus.

Episodes of cVDPV should be considered and treated similarly to a wild poliovirus importation. In areas of good coverage an iVDPV would not represent a national emergency (while a single wild poliovirus associated case would!). Even in areas with low coverage, not the iVDPV is the primary public health problem (though for the individual), but the poor coverage.

Besides enhanced surveillance (highest priority) and thorough review of polio immunization coverage the following investigations need to be conducted before a decision on immunization response is made:

1. Collect and process specimens monthly thereafter from case(s) with VDPV isolation until such time as two consecutive monthly specimens are negative for VDPV.
2. Conduct a thorough clinical investigation to record any clinical features or history that would suggest an immuno-deficiency (including quantitative immunoglobulin test).
3. Investigate household/close contacts for possibly being immuno-compromised.

Based on findings of these various investigations, the decision on (and magnitude) of immunization response should be made. Detailed documentation of any VDPV episode, whether iVDPV or cVDPV, is also required

## **Annex 1 – WHO Pacific Offices and VIDRL Contact Information**

### **WHO South Pacific Office**

Level 4 Provident Plaza One  
Downtown Boulevard  
33 Ellery Street, Suva  
P O Box 113, Suva, Fiji

Telephone: (679) 3304-600 or 3304-631

Fax: (679) 3300-462 or 3311530

Email: [who@sp.wpro.who.int](mailto:who@sp.wpro.who.int)

### **WHO Samoa Office**

Ioane Viliamu Building  
P O Box 77  
Beach Road, Apia, Samoa

Telephone: (685) 24-976 (direct)

(685) 23-756

(685) 23-765

Fax: (685) 23-765

Email: [who@sma.wpro.who.int](mailto:who@sma.wpro.who.int)

### **Victorian Infectious Disease Reference Laboratory**

#### Poliovirus Reference Laboratory

Poliovirus Reference Laboratory  
Victorian Infectious Diseases Reference Laboratory (VIDRL)  
10 Wreckyn St  
North Melbourne, Victoria, 3051  
Australia

Telephone: +61 3 9342 2607 (lab)

+61 3 9342 2600 (24 hour)

Fax: +61 3 9342 2665

Email: [polio@mh.org.au](mailto:polio@mh.org.au)

Contact: *Dr Bruce Thorley* ([Bruce.Thorley@mh.org.au](mailto:Bruce.Thorley@mh.org.au))

## **Annex 2 - Fact Sheet on Poliomyelitis**

Poliomyelitis (polio) is a highly infectious disease caused by a virus. It invades the nervous system, and can cause crippling paralysis, sometimes in a matter of hours. Polio generally affects children under the age of three, but adults can contract it as well.

The virus enters the body through the mouth and multiplies in the intestine. Initial symptoms include fever, weakness, headache, vomiting and pain in the limbs. A lifelong paralysis can set in quickly. Among those paralyzed, 5%-10% die when their breathing muscles become immobilized. Many of those infected with the virus will show no symptoms at all but can pass the virus on to others.

Polio is incurable but it can easily be prevented through immunization. Polio vaccine, given multiple times, almost always protects a child for life. Through quality vaccination and disease-reporting (surveillance) systems, the Western Pacific Region has been polio-free since 19 March 1997 when the Region's last case caused by an indigenous (locally circulating) poliovirus was reported in Cambodia. Polio continues to occur in other parts of the world.

Once established in the intestines, poliovirus can enter the blood stream and invade the central nervous system—spreading along nerve fibres. As it multiplies, the virus destroys nerve cells (motor neurons), which activate muscles. These nerve cells cannot be regenerated and the affected muscles no longer function. The muscles of the legs are affected more often than the arm muscles. The limb becomes floppy and lifeless - a condition known as acute flaccid paralysis (AFP).

Surveillance for polio is based on surveillance for AFP in children under age 15. Stool specimens have to be tested for poliovirus at a quality laboratory, accredited under WHO standards. AFP surveillance results are regularly reported to WHO and quality standards are applied to ensure that almost all AFP cases are investigated and polio would not be missed.

Two types of vaccine against polio are available. The first is a live attenuated (weakened) oral polio vaccine (OPV), which was developed by Dr Albert Sabin in 1961. OPV is given orally and its action is two-pronged: OPV produces antibodies in the blood ('humoral' or serum immunity) to all three types of poliovirus. In the event of infection, this will protect the individual against polio paralysis by preventing the spread of poliovirus to the nervous system. OPV also produces a local immune response in the lining ('mucous membrane') of the intestines—the primary site for poliovirus multiplication. The antibodies limit the multiplication of 'wild' (naturally occurring) virus inside the gut, preventing effective infection.

The unique ability of OPV to induce this intestinal, local immunity is probably responsible for the extraordinary effect of OPV mass campaigns in interrupting wild poliovirus transmission. Due to these advantages, OPV remains the vaccine of choice for the eradication of polio.

The second type, the inactivated polio vaccine (IPV), was developed in 1955 by Dr Jonas Salk. IPV is used primarily in countries where the wild poliovirus has already been eliminated. It has to be injected by a trained health worker.

WHO recommends that polio vaccine be given at birth (in areas where polio is still endemic), at six weeks, 10 weeks and 14 weeks.

The Global Polio Eradication Initiative, spearheaded by national governments, Rotary International, the United States Centers for Disease Control and Prevention (CDC), UNICEF and WHO, is the largest public health initiative the world has ever known. In the Western Pacific, the Governments of Australia and Japan provide significant support beyond their own national programmes.