Field Guide

Surveillance of Acute Flaccid Paralysis

Third Edition
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Child Health Division
Department of Family Welfare
Ministry of Health & Family Welfare
New Delhi

(Prepared with assistance from National Polio Surveillance Project - India)
FOREWORD

Government of India launched the immunization and surveillance activities a decade back, which aimed at achieving the eradication of polio from the country, much has been accomplished. Numerous intensive immunization campaigns have been conducted throughout the country, during which millions of children have been immunized and protected from polio. The number of cases of paralytic polio in the country has steadily fallen, so that fewer and fewer of India's children have had to face a lifetime of disability and hardship that this disease brings. The focus on protecting children from this crippling disease has awakened public interest in putting equal effort into strengthening immunization programs that target all the vaccine-preventable diseases of childhood. In 2005, India is very close to achieving the goal of eradication of wild poliovirus from the country, thanks to the unifying efforts of all in the public health community, the clinical community of practicing physicians and other providers of health care, the laboratories, millions of volunteers and civic groups, government workers at all levels and the generous support of the international donor partners.

The work of polio eradication, specifically of surveillance, must continue for several years after the last case of paralytic polio is reported, in order to provide assurance that polio is truly and finally gone. It is with this need in mind that the third edition of this field guide is presented. As with the previous two editions, (1997, 2000), the primary aim of this document is to provide personnel involved in the polio eradication initiative in India with a step-by-step guide for maintaining highly sensitive surveillance and for preparing and providing convincing evidence of the absence of wild poliovirus for certification of eradication.

(Prasanna Hota)
Secretary to the Government of India
### ACRONYMS

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<td>Acute Flaccid Paralysis</td>
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<tr>
<td>CDC</td>
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<tr>
<td>CFR</td>
<td>Case-fatality Ratio (or rate)</td>
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<td>CPE</td>
<td>Cytopathic Effect</td>
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<td>CSF</td>
<td>Cerebrospinal Fluid</td>
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<td>DIO</td>
<td>District Immunization Officer</td>
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<td>DTR</td>
<td>Deep Tendon Reflexes</td>
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<td>EMG</td>
<td>Electromyography</td>
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<td>EPI</td>
<td>Expanded Program Of Immunization</td>
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<td>EPID</td>
<td>“Epidemiological” number (AFP case identification number)</td>
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<td>ERC</td>
<td>Enterovirus Research Centre (Mumbai)</td>
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<td>ERC</td>
<td>Expert Review Committee (for case classification)</td>
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<td>GBS</td>
<td>Guillain Barré Syndrome</td>
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<td>ICC</td>
<td>Interagency Coordinating Committee</td>
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<td>IEAG</td>
<td>India Expert Advisory Group</td>
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<td>IPV</td>
<td>Inactivated Polio Vaccine</td>
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<td>IPPI</td>
<td>Intensified Pulse Polio Immunization</td>
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<td>ITD</td>
<td>Intratypic Differentiation</td>
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<td>MOH &amp; FW</td>
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<td>National Polio Surveillance Unit</td>
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<td>OPV</td>
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<td>Outbreak Response Immunization</td>
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<td>PCR</td>
<td>Polymerase Chain Reaction</td>
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<td>PEI</td>
<td>Polio Eradication Initiative</td>
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<td>PPI</td>
<td>Pulse Polio Immunization</td>
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<td>RC</td>
<td>Regional Coordinator (NPSP)</td>
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<td>Reproductive And Child Health</td>
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<td>Universal Immunization Program</td>
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<td>United Nations Children’s Fund</td>
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<td>VAPP</td>
<td>Vaccine Associated Paralytic Polio</td>
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<td>VPD</td>
<td>Vaccine Preventable Disease</td>
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<td>VVM</td>
<td>Vaccine Vial Monitor</td>
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<td>WHO</td>
<td>World Health Organization</td>
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INTRODUCTION

1.1 Background
India introduced the Expanded Program on Immunization (EPI) in 1978 with the objective of reducing morbidity and mortality from diphtheria, pertussis, tetanus, polio and childhood forms of tuberculosis. 1985 saw the introduction of measles vaccine and in the same year the Universal Immunization Program (UIP) was established, aimed at rapidly raising coverage, with a target of reaching nationwide coverage of 80% by 1990. During the 1990s, following the introduction of the Universal Childhood Immunization (UCI) goals, reported coverage levels for all antigens reached more than 90% of eligible children in India.

Since 1990 routine immunization coverage has declined, probably in all areas, but most markedly in some populous northern states, where no more than 50% of the eligible infants are estimated to receive all scheduled immunizations. In spite of declining coverage in routine immunisation, the outcome of the supplementary immunization activities for polio has been impressive, with polio incidence declining from 24,000 reported cases in 1988 to 134 cases in 2004. From 1995 onwards, the routine UIP was supplemented by intensive pulse polio immunization (IPPI) campaigns aimed at national polio eradication.

Childhood immunization is one of the most cost-effective health interventions. GoI is committed to the reduction of morbidity and mortality due to vaccine preventable diseases (VPDs) and to the establishment of reliable surveillance for VPDs. The goal to eradicate poliomyelitis adopted under the UIP has retained its position of high priority under the newly launched RCH Program.

1.2 The Global Polio Eradication Initiative
In May 1988, members of the 41st World Health Assembly (WHA) passed a resolution calling for the global eradication of poliomyelitis by the year 2000 (WHA41.28). As referenced in the resolution, the decision was based upon the progress made toward achieving the Expanded Program on Immunization (EPI) goals and objectives, as well as the existence of regional goals to eradicate polio by the year 2000. In May 1999, the 52nd WHA reaffirmed the commitment for global polio eradication by the end of 2000 (WHA52.22). At that time, three of the six WHO regions – the Americas, Europe, and Western Pacific – had successfully interrupted transmission of poliovirus. Although the world had been expected to be polio-free by the year 2000, official certification was not expected to occur until 2005 at the earliest, and is now delayed further due to ongoing wild poliovirus transmission in a very small number of countries in Africa, Asia and the Eastern Mediterranean Region.

1.3 Polio Eradication in India
The oral polio vaccine (OPV) was one of the scheduled antigens under the EPI programme (which was launched in 1978), to be administered in early infancy as three doses.

In 1988, India was a signatory to the World Health Assembly resolution calling for the global eradication of the wild poliovirus by the year 2000 and adopted the same target for its National Program. Administration of OPV in mass campaigns was piloted in 1994 with two “Pulse Polio” immunization rounds in the state of Delhi in October and December,
and led to a decision by the GoI to conduct two national rounds of Pulse Polio Immunization (PPI) each year.

The first national PPI rounds in India were held on 9th December 1995 and 20th January 1996 and reached more than 87 million children aged 0-3 years with two doses of OPV. In subsequent years, the target age group was expanded to include children aged 0-5 years, and based on analysis of Acute Flaccid Paralysis (AFP) surveillance data Pulse Polio Immunisation(PPI) rounds were conducted as NIDs (whole country), SNIDs (High Risk Areas only) and Mop-up rounds in areas with localized virus transmission.

In 1997 the National Polio Surveillance Project (NPSP) was established as a joint collaboration between the World Health Organization and the Ministry of Health and Family Welfare, GoI, with the primary objective to intensify surveillance for polio eradication through detection and investigation of childhood Acute Flaccid Paralysis (AFP). NPSP comprises of a central unit for providing guidance, support, coordination, monitoring and data analysis of various activities related to surveillance of polio and NPSP field units headed by Surveillance Medical Officers (SMOs) who are deployed in all States and Union Territories, with primary responsibility for facilitating surveillance and immunization activities aimed at polio eradication.
2. EPIDEMIOLOGY OF POLIOMYELITIS

2.1 Infectious Agent
The polioviruses belong to the genus Enterovirus in the family Picornaviridae and comprise three related serotypes: types 1, 2, and 3, all of which can cause paralysis. The poliovirus is rapidly inactivated by heat, chlorine and ultraviolet light. The most frequent cause of epidemic polio is poliovirus type 1, type 3 less frequently, and type 2 rarely.

2.2 Occurrence
In 1988, the year of the WHA resolution calling for global polio eradication, wild poliovirus was endemic in more than 125 countries on five continents, paralyzing more than 1000 children every day. As of May 2005, poliomyelitis occurs primarily in Africa and South Asia.

It is seasonal, occurring more commonly in summer and early autumn in temperate climates. In tropical countries seasonality is less clearly defined; however, some areas experience increase during the rainy season. In developing countries with low immunization coverage, poliomyelitis produces a significant amount of illness, death and disability. Where poliomyelitis is common, 5 to 10 of every 1000 children infected with poliovirus will develop paralytic disease.

Experience in several of the world’s WHO Regions where polio has been eliminated has demonstrated that the recommended strategies are effective and that global eradication of polio is feasible. As of early 2005, the WHO Regions that have been certified as polio-free are the Americas (last case in 1991, Peru; Region certified polio-free in 1994), the Western Pacific Region (last case in 1997, Cambodia; Region certified 2000), and the European Region (last case in 1998, Turkey; Region certified 2001).

2.3 Transmission
Transmission is primarily person-to-person via the faecal-oral route. Poliovirus multiplies in the intestines and is spread through the feces. The virus is intermittently excreted for up to 2 months or more after infection, with maximum excretion occurring just before paralysis and during the first two weeks (14 days) after onset of paralysis. On average, the incubation period from exposure to the virus to the onset of first symptoms is 7-10 days (range, 4-35 days). The virus spreads rapidly to non-immune persons; transmission is usually widespread in the community by the time of paralysis onset in a child.

2.4 Reservoir
Poliovirus is found only in human beings; there is no animal reservoir. Although some studies have documented small amounts of wild poliovirus persisting for several months in very cold water, in tropical climates the virus does not survive in the environment outside the human body for more than a few days. There is no long-term carrier state in immuno-competent hosts.

2.5 Communicability
Poliovirus is highly communicable. The cases are most infectious one week before and 2 weeks after onset of paralysis. An infected individual will probably infect all other persons in a household and close contacts, especially where sanitation is poor.
2.6 Immunity
All unimmunized persons are susceptible to poliomyelitis. Epidemiologic evidence shows that infants born to mothers with antibodies are protected naturally against paralytic polio for a few weeks. However, any immunity conferred during the early neonatal period is short lived highlighting the importance of OPV immunization as early as possible in the newborn.

Immunity is obtained through infection with the wild virus and/or through immunization. Immunity following natural infection (including inapparent and mild infections) or a completed series of immunizations with live oral polio vaccine (OPV) results in both humoral and local intestinal cellular responses. Such immunity persists for many years and can serve to block infection with subsequent wild viruses. Vaccination with the inactivated poliovirus vaccine (IPV) confers humoral immunity, but relatively less intestinal immunity; thus, vaccination with IPV does not provide resistance to carriage and spread of wild polio virus in the community. There is no cross-immunity between poliovirus types – immunity is type specific.
3. CLINICAL ASPECTS OF POLIO

3.1 Clinical Course

In 90-95% of infected individuals, poliovirus infection is inapparent. In the remaining 5-10% of individuals infected by poliovirus, one of three syndromes may occur.

1. **Abortive polio** occurs in 4-8% of infections and is characterized by a minor illness with low grade fever, sore throat, vomiting, abdominal pain, loss of appetite, and malaise. Recovery is rapid and complete; there is no paralysis. It cannot be distinguished from other viral infections causing mild respiratory tract or gastrointestinal diseases.

2. **Nonparalytic aseptic meningitis** occurs in 1-2% of infections and is typified by headache, neck, back, and leg stiffness several days after a prodrome similar to abortive polio. Cases recover within 2-10 days. It cannot be distinguished from other causes of aseptic meningitis. Illness may reach imminent paralysis but soon reverts back.

3. **Paralytic poliomyelitis** occurs in 0.5-1% of infections (i.e., one case of paralysis in every 100-200 infected children). Symptoms often occur in two phases, minor and major, and are often separated by several days without symptoms (figure 1). The minor phase consists of symptoms similar to those of abortive poliomyelitis. The major phase of illness begins with muscle pain, spasms and the return of fever. This is followed by rapid onset of flaccid paralysis that is usually complete within 72 hours.

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**Figure 1: Interval between Exposure to Poliovirus and Symptom Onset**

![Diagram showing the interval between exposure to poliovirus and symptom onset.](image)
There are 3 types of paralytic poliomyelitis:

a. **Spinal paralytic poliomyelitis** is the most common form of paralytic poliomyelitis, accounting for approximately 80% of paralytic cases. It results from a lower motor neuron lesion of the anterior horn of the spinal cord and affects the muscles of the legs, arms and/or trunk. Severe cases may develop quadriplegia and paralysis of the trunk, abdominal and thoracic muscles. The affected muscles are floppy and reflexes are diminished. The sense of pain and touch are normal. Paralysis is often asymmetrical, affecting legs more often than arms. Paralytic manifestation in extremities begin proximally and progress to involve distal muscle groups (i.e. descending paralysis). Residual flaccid paralysis is usually present after 60 days.

b. **Bulbar polio** accounts up to 2% of paralytic cases and results from a cranial nerve lesion, resulting in respiratory insufficiency and difficulty in swallowing, eating or speaking.

c. **Bulbo-spinal polio** accounts for approximately up to 20% of paralytic cases and is a combination of spinal paralytic and bulbar polio.

The Case Fatality Rate (CFR - the percentage of deaths among cases) though difficult to estimate is 2–5% for spinal paralytic polio. Bulbar involvement increases CFR to 25–75%.

**Residual Paralysis:** As the acute phase of illness (0-4 weeks) subsides, the recovery begins in paralyzed muscles. The extent of recovery is variable ranging from mild to severe residual paresis at 60 days, depending upon the extent of damage caused to the neurons by the virus. Maximum neurological recovery of the paralyzed muscle takes place in the first six months of the illness but slow recovery continues up to two years. After two years, no more recovery is expected and the child is said to have “Post Polio residual paralysis”, which remains as such through out life. However, the child can learn to use muscles which were not paralyzed to compensate for lost muscle power.

### 3.2 Differential Diagnosis

The differential diagnosis of acute flaccid paralysis includes - *but is not limited to* - paralytic poliomyelitis, Guillain-Barré syndrome, traumatic neuritis and transverse myelitis. These four conditions represent the most common causes of AFP, but the complete differential diagnosis includes numerous etiologies (encephalitis, meningitis, other enterovirus infections, toxins, transient and periodic paralysis caused by metabolic imbalances, tumors and other causes). Distinguishing characteristics of paralytic polio are asymmetric, flaccid paralysis, mostly involving proximal muscles with fever and muscular pain at onset, rapid progression from onset to maximum paralysis (usually <4 days), intact sensory nerve function, and most often, residual paralysis or weakness after 60 days. However any disease that presents as AFP, even if diagnosed as a disease other than polio by the physician, must be reported and investigated.

### 3.3 Diagnostic Tests

The following are the available diagnostic tests.

**Stool:** Recommended in every case of AFP. Virus usually can be found in the feces from onset to up to 8 or more weeks after paralysis, with the highest probability of detection during the first 2 weeks after paralysis onset.

**Cerebrospinal Fluid (CSF):** Not recommended for purposes of surveillance. Not
likely to yield virus, and therefore, its collection is not recommended for culture. However, the CSF cell count, gram stain, protein, and glucose may be very useful in eliminating other conditions that cause AFP.

**Throat:** Not recommended for purposes of surveillance. Not as likely as stool to yield virus and therefore specimen collection from this site is not recommended.

**Blood:** Not recommended for purposes of surveillance. Not likely to yield virus, and current serologic tests cannot differentiate between wild and vaccine virus strains. Interpretation of the serologic data can often be misleading. Collection of blood specimens for culture or serology is therefore not recommended.

| Isolation of wild poliovirus from stool is the recommended method for laboratory confirmation of paralytic poliomyelitis |

### 3.4 Treatment/ Rehabilitation Of Children With Paralytic Poliomyelitis

Specific therapeutic techniques should be used from the earliest stage of poliomyelitis to promote recovery, to minimize residual muscle paralysis and disability. Treatment should not wait for laboratory confirmation of diagnosis. Treatment of the child with paralytic poliomyelitis varies with stage of illness and the severity of paralysis. Children with bulbo-spinal polio and respiratory paralysis would require hospitalization. In acute stage children with isolated limb/limbs paralysis can be managed at home. They should be advised complete rest, proper positioning of the affected limb and passive range of movement at the joints. Massage and intramuscular injection should be avoided during acute phase of illness.

Complete bed rest is essential during acute phase to avoid stress on the paralyzed muscles. The person caring for the child should frequently change the posture of the patient. The child should be made to lie on firm bed and maintain limbs in neutral position. The child should lie with trunk and hip straight with slight flexion (5° - 10°) at knees and feet at right angle at ankle joint. This position can be maintained with pillows, rolled towels or sand bags. The support should also be given on lateral sides of limb/limbs to prevent external rotation. Warm moist fomentations can be given with soft towels, dipped in warm water & squeezed 2 -3 times/ day for 10-15 minutes each time to relieve pain and spasms. Analgesics can also be given to relieve pain and fever. Passive range of movements of all the joints of affected limb/limbs should be given 2 - 3 times / day for 10 times at each joint to prevent joint stiffness. This also helps to stimulate proprioceptive impulses from muscles and tendons thus helping improvement in muscle power.

As the acute phase of illness subsides, recovery in muscle power is helped by giving physiotherapy in form of active exercises aimed at strengthening weak muscle groups, improvement of functional skills of the child, helping ambulation and prevention of deformities. Depending upon the degree of paralysis and age of the child, some children would require orthosis at some stage for ambulation. Physiotherapy plays an important role in management of children during recovery and post polio residual paralysis stage. Some children with fixed deformities and contractures may require orthopedic surgery.

Medical officer can play an important role in advising simple supportive measures in acute stage of illness, which would go a long way to help in prevention of deformities. Except for physical handicap, these children are otherwise normal, they should be encouraged to participate in normal childhood activities with other children and attend normal school.
4. STRATEGIES FOR POLIO ERADICATION

In May 1988, the World Health Assembly committed the member nations of the World Health Organization (WHO) to achieving the goal of global eradication of poliomyelitis. This goal is defined as:

- no cases of clinical poliomyelitis associated with wild poliovirus, and
- no wild polioviruses found worldwide despite intensive efforts to do so.

The following strategies to achieve polio eradication were adopted by the WHO for worldwide implementation in all polio-endemic countries:

- **Achieving and maintaining high routine coverage in infants younger than 1 year with at least 3 doses of oral polio vaccine (OPV3):** Paralytic polio can be caused by any of 3 closely-related strains (serotypes) of poliovirus. Trivalent OPV (tOPV) provides immunity against all 3 types. Three routine trivalent OPV doses should be received by infants at ages 6, 10 and 14 weeks. WHO and UNICEF also recommend that all newborns receive a dose of trivalent OPV at birth (“birth dose” of OPV).

- **Administering supplemental doses of OPV to all children aged <5 years during national immunization days to rapidly interrupt transmission:** National immunization days (NIDs) are conducted at intervals for a short period (a few days) in which a dose of OPV is administered to all children in the target age group, regardless of previous vaccination history. Subsequent doses are administered in the same way after an interval of 4-6 weeks from the previous round. In India, the term for NID is “Pulse Polio Immunization” (PPI). PPI rounds are often planned during the low transmission season when conditions are optimal to interrupt the remaining chains of poliovirus transmission. In addition to protecting vaccinated children, massive use of OPV probably also results in the secondary spread of shed virus, further amplifying the effect of mass OPV administration and facilitating interruption of wild polio virus transmission.

- **Surveillance of Acute Flaccid Paralysis cases:** This is done to identify all reservoirs of wild poliovirus transmission. This includes reporting of ALL AFP cases, investigating them and laboratory testing of all stool specimens collected from such cases for polioviruses in specialized laboratories.

- **Conducting “mop-up” vaccination campaigns:** When poliovirus transmission has been reduced to well-defined and focal geographic areas, intensive house-to-house, child-to-child immunization campaigns are conducted over a period of days to break the final chains of virus transmission.
5. POLIO VACCINES

There are currently two effective polio vaccines, the inactivated poliovirus vaccine (IPV), which was the first vaccine to become available in 1955, and the live attenuated oral polio vaccine (OPV), which was used in mass campaigns in 1959. In developing countries OPV is the vaccine of choice, not only because of ease of administration but also because it simulates natural infection, induces both circulating antibody and intestinal immunity, and by secondary spread, probably protects susceptible contacts.

**OPV is the vaccine recommended for polio eradication**

It has been well documented that the use of OPV can successfully interrupt wild poliovirus transmission in both industrialized and developing countries. IPV protects against clinical disease and suppresses pharyngeal excretion of the virus, but has less of an effect on intestinal excretion. In addition, logistic considerations such as the higher cost of IPV, requirement for injection supplies and equipment and waste disposal, and the need for highly trained personnel make IPV less practical for mass campaigns.

The experience in three of the world’s six WHO Regions (the Americas, the European and the Western Pacific Regions) shows that OPV is the right choice for stopping wild polio virus transmission. Polio can be eradicated by carrying out mass campaigns to supplement routine vaccine delivery and by placing added emphasis on reducing missed opportunities to a minimum.

5.1 Immunity

Under ideal conditions in temperate countries a primary series of three doses of OPV produces seroconversion to all three virus types in more than 95% of vaccine recipients. Recent review of data from developing countries has shown that after 3 doses of trivalent OPV, there is a wide variation in the percentage of children seroconverting with rates of 73% for type 1, 90% for type 2 and 70% for type 3. This decrease may be due to recurrent diarrhoeal infections and malnutrition and other factors. To ensure that all children develop immunity to all three poliovirus serotypes, children in India aged <5 years should receive all doses of OPV that are offered through the routine EPI and through all Pulse Polio Immunization rounds.

5.2 Recommended Schedule

Infants in India should receive routine OPV doses at the ages of 6, 10 and 14 weeks. A dose at birth (the “birth dose”) is recommended by WHO and UNICEF in conditions where the vaccine can be provided at the time of birth. Polio vaccine may be given simultaneously with any other childhood vaccines.

5.3 Dosage, Administration And Formulation

OPV should be administered orally, that is, directly into the mouth. Each single dose consists of two drops of live oral poliovirus vaccine.

OPV is most often formulated as a trivalent vaccine, containing antigens for all three poliovirus serotypes (1, 2, and 3); this preparation is called trivalent OPV, or tOPV, and is the vaccine generally in use in India, both for routine immunization of infants as well as during PPI rounds.
OPV has also been formulated as a monovalent vaccine (mOPV), and was used extensively during mass campaigns in the United States and Europe during the 1960s to 1980s. The mOPV type 1 vaccine has been used in India for the first time in specific areas where surveillance showed P1 wild virus transmission in 2005.

OPV is one of the most heat-sensitive vaccines in common use. The vaccine should be stored below 8°C at all times. Unopened vials of OPV may be stored for up to 6 months at minus 20 degrees Celsius. With the development of the vaccine vial monitor (VVM) in 1996, health workers can evaluate whether cumulative heat exposure of a vial of vaccine has exceeded a pre-set limit, beyond which the vaccine should not be used.

Detailed information on VVMs and the management and distribution of OPV can be found in the Pulse Polio Immunization Operational Guidelines, which is available at NPSU on request, and can also be downloaded from www.npspindia.org.
6. SURVEILLANCE

Surveillance is “collection and analysis of data for action”

**Definition:** Surveillance is defined as the *ongoing* and *systematic* collection, analysis, interpretation, and dissemination of data about cases of a disease and is used as a basis for planning, implementing, and evaluating disease prevention and control activities.

**Types Of Surveillance:**
- Passive Surveillance
- Active Surveillance

Surveillance is *passive* when data/reports are sent by designated health facilities or individuals on their own, periodically as a routine.

Surveillance is *active* when a designated official, usually external to the health facility visits periodically and seeks to collect data from individuals or registers, log books, medical records at a facility to ensure that no reports/data are incomplete or missing.

Surveillance can be carried out as
- Institutional surveillance or
- Community based surveillance

*Institutional* surveillance refers to the collection of data (actively or passively) from pre-identified and designated fixed facilities regardless of size.

*Community-based surveillance* refers to the collection of data from individuals and households at the village/locality level rather than from institutions or facilities.

Analysis of surveillance data helps us to know the following:
- Where the disease is occurring (place)
- When the disease is occurring (time)
- In whom the disease is occurring (person).
7. ACUTE FLACCID PARALYSIS SURVEILLANCE

Under the Global Polio Eradication Initiative, surveillance for polio is conducted through investigation of acute flaccid paralysis cases. The following case definition is used for selection of cases to be investigated.

7.1 Definition:
Acute flaccid paralysis is defined as sudden onset of weakness and floppiness in any part of the body in a child < 15 years of age or paralysis in a person of any age in whom polio is suspected.

In other parts of the world at least one case of AFP (excluding polio) occurs annually for every 100,000 children less than 15 years of age. This is referred to as the “background” rate of AFP among children. The non-polio causes of AFP including (but not limited to) Guillain-Barré Syndrome (GBS), Transverse Myelitis and Traumatic Neuritis account for this background rate, regardless of whether Acute Poliomyelitis exists in the community. Sensitive surveillance for AFP must be able to detect a minimum of 1 case per 100,000 children less than 15 years of age.

Most of the studies that documented the minimum expected non-polio AFP rate of 1 case per 100,000 children less than 15 years of age were conducted in industrialized countries, where sanitary conditions and health care are quite different from those prevalent in a developing country. In a country such as India, where the incidence of conditions such as traumatic neuritis and AFP caused by other non-polio enteroviruses is very high, the background non-polio AFP rate is undoubtedly much higher than 1/100,000.

7.2 The Purpose Of AFP Surveillance
AFP surveillance helps to detect reliably areas where poliovirus transmission is occurring. Thus AFP surveillance helps us to identify areas of priority for focusing immunisation activities. It is the most reliable tool to measure the quality and impact of polio immunisation activities. For polio free certification, it is essential to provide evidence to the certification committee of the absence of wild polio virus transmission through a functioning and sensitive surveillance system for three years after attaining zero polio case status.

7.3 Reasons For AFP Surveillance Instead Of Polio Surveillance
Polio surveillance for a case of disease in a child that “looks like polio” alone is not sufficient because it is impossible to precisely identify all cases of paralytic polio clinically due to confusing and ambiguous clinical signs and variable clinical knowledge and skills of doctors. To ensure that no cases of polio are missed, all cases of AFP are reported and investigated. The rate at which Non Polio AFP cases are detected over time in each geographic area also helps to assess the sensitivity of the surveillance system. If sufficient AFP cases of the Non Polio type are being detected for investigation, it implies that the surveillance is sensitive enough to pick up polio transmission in that area if it was occurring. This rate at which non polio AFP cases occur is called the Non Polio AFP rate.
7.4 Selection Of AFP Cases For Investigation

The principle of AFP surveillance is to identify children below 15 years with the syndrome of Acute Flaccid Paralysis

- **Acute**-Rapid progression or short, brief duration
- **Flaccid**-Floppy or soft and yielding to passive stretching at any time during illness
- **Paralysis**-Loss of motor strength
  - Severe loss of motor strength is called paralysis or plegia
  - Paresis-indicates slight loss of motor strength

The case definition indicates the criteria used to decide whether a case should undergo epidemiologic and laboratory investigation. It is not meant to replace the various other diagnostic processes that clinicians use to decide on a therapeutic plan. The case definition is intentionally broad in order to maximize sensitivity so that each and every case of polio is detected. All cases of acute flaccid paralysis should be reported, **irrespective of diagnosis**, within 6 months of onset. The consequences of missing a case of polio are more serious than occasionally including an “ambiguous” case, especially during the final stages of polio eradication. All cases with flaccid paralysis should be reported and their stools must be collected within 14 days of onset. If it is not possible to collect stool specimens within 14 days, the specimens should still be collected up to 60 days after onset of paralysis.

Include every case with
- Current flaccid paralysis
- History of flaccid paralysis in the current illness
- Borderline or ambiguous clinical signs.

A case should not be included as AFP if there is no evidence of acute flaccid paralysis at the time of examination or anytime during the course of illness or if the onset of paralysis is more than 6 months prior to notification.
8. THE AFP SURVEILLANCE NETWORK

Along with immunization, AFP surveillance is vital for the achievement of polio eradication. In India, the AFP surveillance system depends for its success upon the “eyes and ears” of all the individuals and facilities throughout the country who provide health care to the community. It is the interaction between the providers of clinical care and surveillance officers that provides the foundation for successful AFP surveillance. DIOs/SMOs are responsible for training and orienting providers of all types of health care, so that any AFP case coming to their attention is immediately notified to the DIO/SMO to ensure that prompt case investigation takes place.

8.1 AFP Surveillance In India

The surveillance system being currently practiced in India for detection of polio virus transmission is based on AFP case reporting, investigation, stool collection and laboratory investigation. Surveillance activities take place at the local level, District level, State level and the National Level.

8.1.1 Surveillance Activities At The Local Level

AFP surveillance at the local level is institution based through a comprehensive network of reporting sites which includes health facility reporting units and informers. As of 2005, approximately 9500 reporting units and approximately 12,300 informer units have been enrolled under the AFP surveillance network throughout the country. By ensuring reporting of all AFP cases from the above sources, the DIO/SMO aims to capture all AFP cases occurring in his area.

Establishment of a new reporting site for AFP surveillance

The SMO should first identify a potential reporting site that is likely to treat a child with acute flaccid paralysis. This can be done by discussing with his/ her district or block counterparts, pediatricians and other health care providers. He/she should also study the Case Investigation Forms and do a health facility contact analysis on the sites which were visited by AFP cases in his district prior to notification. The details are mentioned in the section Data Analysis and Monitoring (Section16.4.1).

He/she should then visit the site and meet the head of the institution, private practitioner or health care provider at their convenience. The program should be explained and a nodal person identified in consultation with the head of the institution. All aspects of the surveillance system should be explained to the nodal person, including the weekly routine activities as well as the actions that need to be taken when an AFP case is identified by the site. The relevant forms and the systems that are in place for weekly routine reporting and when an AFP case is identified should be discussed. The SMO should also finalize a time when he could orient all the staff of the reporting site and sensitize them about the importance of reporting and the procedures for the same after discussion with the nodal person and the head of the institution.

The SMO should complete the H001 form and assign a RU code to the reporting site. He should inform the SRC, RC and NPSU when a new reporting site is identified. The specific guidelines for enrolling a reporting unit in the AFP surveillance network is given in appendix J part 2.
**Reporting Units:** These include government or private health facilities which are engaged in treating a large number of patients below 15 years. Most of them are usually larger facilities with both outpatient and inpatient departments. The RUs should be geographically well distributed with at least one RU in every block in rural areas and every ward in urban areas. Examples would be medical colleges, district hospitals, private hospitals, community health centers, primary health centers and private pediatric hospitals.

The identified RUs usually maintain documentation of the patients being treated by various doctors of the unit and in various specialty departments, wards etc. They report a case of AFP immediately on identification to the surveillance system and also send weekly reports to the district even when there are no AFP cases. Each RU should have a designated AFP surveillance nodal officer.

The activities at the Reporting Units are both active and passive. Active component include the visits made by designated officials periodically for searching AFP cases, and sensitizing the staff of the RUs. The passive component is the routine weekly reporting.

**A. Activities when AFP cases are identified**

RU Medical Officers (MOs), pediatricians, and other physicians, nurses who see patients with AFP should inform the designated Nodal Officer, immediately upon presentation of the AFP case. The nodal officer of an RU should immediately inform the district (SMO/DIO/CMO). Notification of an AFP case should be immediate and should be done over telephone, special messenger or fax. It is mandatory that the district surveillance system is immediately made aware of the AFP case.

**B. Routine Activities**

The Nodal Officer at each RU reports to the district level by Monday of each week. The Nodal Officer for AFP surveillance should visit all the wards/contacts who are likely to see AFP cases, ensure that AFP cases have been reported to the DIO/SMO and compile the report forms (AFP-H003, AFP-H003A). He/she should also ensure that the information on the report forms is transcribed to the Weekly Report Form (AFP-H002) on Monday of every week, and sent to the DIO.

**Informer Units:** These are smaller health facilities or clinicians who are visited by patients below 15 years but in relatively smaller numbers than reporting units and they inform the district whenever they come across an AFP case. They do not send a weekly zero report but contact the district (DIO/SMO) only on seeing an AFP case. They usually do not maintain detailed documentation of the patients visiting them. These can be individual child specialists, private practitioners, popular “quacks or Polio doctors” or religious places such as temples that are visited by AFP cases.

**8.1.2 Surveillance Activities At The District Level**

**A. Activities when AFP cases are reported**

The DIO/SMO is notified of an AFP case by a reporting unit, medical officer, pediatrician, and other physician or nurse who sees a patient with AFP. He may also receive information of AFP through informers or other sources such as health workers when active case searches are conducted in the community.
B. Routine Activities
The DIO reports to the State level on the Tuesday of each week. The DIO of each district collects the H002 forms from all the reporting units collates them in the AFP D002 form and compiles and transmits this information in the AFP-D001 form to the State EPI officer, RC or State SMO. The linelist of all AFP cases reported in the week and also updates on the earlier reported AFP cases are sent to the state at the same time in the prescribed linelist format.

The DIO/SMO also analyse the available district data periodically using and linking case information, epidemiological information, laboratory information and initiates action based on the findings as mentioned in the later sections.

8.1.3 Surveillance Activities At The State Level
On Wednesday, the SEPIO/ RC/State SMO collects the information received in the AFP - D001 forms and the linelists from all the districts in the state. He collates the district reports received in the AFP S002 form and prepares the state report in the S001 form. The SEPIO transmits same to the Assistant Commissioner (Immunisation), Ministry of Health and Family Welfare, Government of India, New Delhi.

The SEPIO/ RC/ State SMO also analyse the available state data periodically using and linking information received from the districts and other states - cross notification of AFP cases, their classification, relevant epidemiological information, laboratory information and initiate action based on the findings as mentioned in the later sections.

8.1.4 Surveillance Activities At The National Level
At the national level, on Thursday at NPSU, the data from the states received in the weekly state linelist is collected, collated and compiled to prepare the national report. This is sent by the Assistant Commissioner (Immunisation), Ministry of Health and Family Welfare, Government of India, New Delhi to the WHO’s South East Asian Regional Office (SEARO) at New Delhi.

NPSU analyses the available state data on a real time basis using and linking information received from the states and other countries on AFP cases, their classification, relevant epidemiological information, laboratory information and initiates action based on the findings as mentioned in the later sections.

A Summary of AFP Surveillance reporting flow is given in Appendix J Part 3.

8.2 Other Surveillance Related Routine Reporting
At the district level
The AFP-D002 form that provides a summary of the completeness and timeliness of reporting from the reporting units is sent on a quarterly basis from the office of the DIO to the state level.

The AFP-D003 form that provides information on the frequency and the result of Active Case Searches is sent to the SEPIO at the end of every year.
At the state level

The AFP-S002 form that provides a summary of the completeness and timeliness of reporting from the district to the state is sent on a quarterly basis from the office of the SEPIO to the national level.

8.3 Roles And Responsibilities Of Key Persons

At the Reporting Unit

To facilitate and coordinate surveillance reporting of cases of AFP in health facilities, a Nodal Officer or nodal person for surveillance should be designated by the hospital or health facility director/superintendent. The nodal officer visits all the relevant departments (e.g., pediatrics, medicine, orthopedics, neurology, emergency, physiotherapy and rehabilitation, and medical records section) and doctors in that reporting unit for seeking any AFP case and then compiles the weekly report. All records at the RU are maintained by the nodal officer.

At the district

The local manager of AFP surveillance activities is usually the District Immunisation Officer (DIO), although the designation may vary in certain states of India. If the DIO position is vacant, responsibility for AFP surveillance should be assigned to another Medical Officer of the District. With respect to AFP the disease surveillance activities include:

- Monitoring weekly surveillance for AFP (weekly reports including zero case reports submitted by Reporting Units)
- Ensuring timely investigation of AFP cases including timely stool collection and transportation
- Ensuring that all data from cases are properly collected, analyzed and interpreted for local action
- Ensuring that surveillance reports and case investigation data are forwarded to the national EPI/NPSU through proper channels.

To support the DIO and other concerned EPI staff in the field, the National Polio Surveillance Project (NPSP) of the WHO in collaboration with the Government of India has recruited Surveillance Medical Officers (SMOs) to assist with AFP case investigations, and in the collection and analysis of surveillance data. SMOs work in designated offices in all states of India; in highly polio-endemic areas of the country (Bihar, Uttar Pradesh), SMOs are deployed in every district. In states other than Uttar Pradesh and Bihar, each SMO works closely with Government staff in several districts (usually 5-7 districts). The SMOs receive support and cross-district coordination from Regional Coordinators and Sub-Regional Coordinators.

SMOs work hand-in-hand with DIOs to ensure that weekly reports including zero reports are received in a timely fashion from all Reporting Units, active surveillance visits are conducted as required to reporting sites, AFP cases are promptly investigated, stool specimens collected and transported and feedback and appropriate action is undertaken in response to the surveillance findings. SMOs also assist health personnel at block, district and state level in the planning and implementation of Supplementary Immunization Activities (SIAs) for polio eradication. These activities are described in detail in the Operational Guidelines for Pulse Polio Immunization (available from NPSP upon request, and can also be downloaded from www.npspindia.org).
8.4 Maintenance Of The AFP Surveillance System
The AFP surveillance system is maintained through active surveillance (Active Case Searches), which is an ongoing activity and is done by prioritization of reporting units and informer units and active surveillance visits to selected reporting sites.

8.4.1 Prioritization Of Reporting Units And Informer Units
The reporting sites are prioritized into 3 categories in India:

a. Very High Priority (VHP) reporting units/informer units:
   - Medical College hospitals
   - Specialized pediatric hospitals (pediatric department, specialists)
   - District hospitals
   - Popular Child specialists
   - Popular quack or “Polio doctors”

b. High Priority (HP) RU
   - Reporting sites (RU / IU) in the network which see AFP cases and have missed reporting or have delayed reporting AFP cases
   - Hospitals / doctors who habitually report AFP cases late
   - Reporting units which have stopped sending weekly AFP zero reports

c. Low Priority (LP) RUs
   - All other RUs enrolled in the AFP surveillance reporting network, who see fewer AFP cases.

Active surveillance visits should be made to RUs/IUs designated as Active Surveillance Sites according to the following schedule. This is the minimum recommended frequency of visits; more frequent visits can and should be made whenever possible. The DIO/SMO in a district should make:

- Active surveillance visits to at least 3 VHP RUs / IUs every week
- Active surveillance visits to at least 3 HP RUs/ IUs every fortnight (i.e., every 2 weeks)
- Active surveillance visits to at least 3 LP RUs/IUs every month. These should be LP RUs not visited during the previous 2 months.

Telephonic contact should be made with the remaining RUs/IUs in the network every week if active surveillance visits are not planned for the week.

8.4.2 Active Surveillance Visits To Reporting Sites
Based on the prioritization, selected reporting units and informers are visited regularly on a planned basis for the specific purpose of searching for AFP cases and to sensitise Reporting Site staff.

Activities during active surveillance to reporting units
During a visit to a reporting unit the DIO/SMO should meet the head of the reporting unit and the nodal officer, visit all relevant departments and check their inpatient and outpatient registers for any missed or unreported cases since the time of the last visit. This helps to verify the activity of the nodal officer and identify the training needs of the staff of the health facility or hospital. Active case searches followed by training sessions can greatly improve the reporting of AFP cases by the health facilities. The visit should be documented by signing the registers/ records checked. The Active Case Search D003 form should be completed by documenting the visit.
Other activities during active surveillance visits to reporting unit

The DIO/SMO should ensure the availability of:

a. Blank weekly report formats - H002 form & copies of reports sent to district
b. Plastic stool containers with screw caps for stool collection
c. Stool shipment carriers or distinctly marked and separated vaccine carriers which function as stool shipment carrier
d. Ice packs separate or distinctly marked for use in stool carriers and capacity to freeze them without mixing with other ice packs used in vaccine carriers
e. Posters for reporting AFP cases, well displayed in the OPD and wards with the name and telephone numbers of the district officials.

The DIO/SMO should also look at the H003 forms maintained at the RU and verify that all the feedback given by him is available.

Activities during active surveillance visits to informers

By meeting the informer in person the DIO/SMO could update him on the polio eradication situation, check his records/registers to scan for any missed or unreported cases since last visit. It is also essential to identify the informers training needs, place AFP surveillance posters and NPSP calendars in his premises and ensure that there is a system in place to respond rapidly in case he/she reports an AFP case. The DIO/SMO should document the visit by signing the registers/records checked. The visit should also be documented in the Active Case Search D003 form separately maintained for informers.

8.5 What To Do If An Unreported Case Is Found On Active Case Search

If the child is still admitted in the hospital, the case is investigated immediately and stool sample collection is initiated. If the child is not admitted, the address of the child is noted and the case is investigated at the residence of the child. The nodal officer and other medical officers/staff at the RU should be sensitized on the adverse impact on the program of not reporting an AFP case.

8.6 Regular Review Of Reporting Network

Map of Surveillance Network in District “A”
THE AFP SURVEILLANCE NETWORK

The DIO/SMO should prepare a map of all AFP Surveillance Reporting Sites in the district to assist in assessing the geographic completeness of the reporting network. Plotting of AFP cases on this map may provide additional information about “silent” reporting blocks/areas and highlight the need for additional RUs or informers in blocks/areas that have not reported cases. The reporting network map should be reviewed and updated regularly throughout the year, with addition of any newly enrolled reporting sites and removal of those no longer included in the network.

Prioritization of reporting sites should be checked regularly and sites reporting the highest number of AFP cases identified. Silent reporting units that have potential for reporting AFP cases must be revisited and resensitised.

The second page of the case investigation forms should be reviewed to look for visits made by AFP cases to health facilities or healthcare providers not included in the reporting network, and these should be visited by DIO/SMO and added to expand the network. This would also ensure timely reporting (notification) of AFP cases and timely collection of stools. This health facility contact analysis of AFP cases is crucial to ensure the appropriateness of the reporting sites in the network and helps to prioritise the DIO/SMO’s surveillance related work. This is described in section 16.4.1.

8.7 AFP Surveillance After Attaining Zero Polio Status

After attaining zero polio cases, it is still critical to continue active surveillance in all areas in the country to detect any WPV case either indigenous or importation for at least three years after the last confirmed case. This is also a requirement for certification.
9. AFP CASE INVESTIGATION

9.1 Case Notification
The date of notification is the date the information of the AFP case reaches the district level (DIO/SMO). The Ministry of Health & Family Welfare, Government of India issued an official instruction in 1997 that all health facilities, clinicians and other practitioners are required to notify AFP cases immediately to the District Immunization Officer (DIO), by the fastest available means. Immediate notification of AFP cases is essential because important activities including immediate case investigation and stool sample collection, outbreak response immunization and active searches for additional cases in the community should be ensured without delay.

9.2 Case Investigation
All cases should be verified and investigated by a specially trained surveillance officer or epidemiologist within 48 hours of notification.

Verification: Once a case of acute flaccid paralysis (AFP) is reported by a physician, health unit or any other source, the DIO /SMO or any other designated official must personally see the case to ascertain if the case meets the AFP case definition. If the case does not meet the case definition of AFP, the DIO/SMO should discuss the findings with the RC/ SRC/ reporting physician/health worker and record the case as not AFP on the case investigation form. The SMO should maintain a separate file of all notified cases that he/she determined not to be AFP.

Investigation: Upon verification that the case meets the AFP case definition, the DIO/SMO initiates the case investigation. Attempt should be made to ensure a case investigation, with in 48 hours of notification, for all AFP cases. Any case that has had onset within 6 months of notification should be investigated.

The necessary steps in the AFP case investigation are as follows:
- Using the case investigation form (CIF) as a guide, obtain the history and conduct a physical examination of the affected child.
- Fill out the CIF and assign the EPID (unique case identification) number.
- Determine carefully the travel history of the child and family 35 days prior to the onset of paralysis and details of visitors from outside during this period to pinpoint the place of infection, in case AFP is due to polio. The details of travel should be incorporated into the CIF. Cross notify the SMO of the concerned district where the child was probably infected to enable him to take necessary follow-up actions (this is the resident district). Also inform state SMO/ SRC/ RC/ NPSU.
- Collect two stool samples from the child at a minimum interval of 24 hours; this is done to improve the chances for the detection of poliovirus, which may be shed intermittently. Stool cultures have the maximum probability of yielding a positive result if collected within 14 days (2 weeks) of paralysis onset, so every effort must be made to collect specimens within this interval. The excretion of poliovirus diminishes rapidly after 14 days, but because a small proportion of cases can still excrete virus for several weeks following paralysis onset, stool specimens should be collected from late-reported cases for up to 60 days (2 months) after paralysis onset. DIO/SMO should ensure that all reporting sites initiate stool collection for
every AFP case without waiting for the case to be examined by DIO/SMO
- Each specimen should be 8 grams (approximately the size of an adult thumb) and stored and transported under proper cold chain conditions (see Section 10, Collection, Transport and Reporting Results of Stool Specimens)
- If stool specimens cannot be collected within 14 days of paralysis onset, the DIO/SMO should collect detailed epidemiological and clinical information to be presented to the Expert Review Committee for classification (see section 15.1 and 15.2, Preparation of AFP Cases for Expert Review, and Appendix M, Expert Review Committee Documentation Forms)
- Collect detailed information on where the patient will be located at 60 days from the time of paralysis onset as cases with inadequate stool specimens or with vaccine virus or wild virus isolations from stool specimens will require follow-up examination between 60 to 90 days following paralysis onset, for the determination of the presence or absence of residual weakness.

9.3 Outbreak Response Immunization (ORI)
After the AFP case investigation and stool specimen collection, ORI is organized in the community and performed as soon as possible. Children aged 0-59 months are given one dose of trivalent oral poliovirus vaccine (tOPV) regardless of the number of doses received previously. The number of houses to be covered in ORI and house to house search would depend on the epidemiologic factors of the case. Usually 500 children below 5 years of age from the locality / village of the AFP case are covered under ORI.

The travel history of the child with AFP may suggest additional places of stay where ORI should also be conducted. If SIA round is either due or has happened in the 4 weeks preceding or following onset of paralysis there is no need for ORI but active case search should still be done in the community.

9.4 Active Case Search In The Community
The investigation team searches for additional AFP cases in the community, which if present could signal the possibility of a polio outbreak. If ORI is being done, active case search can be performed when conducting the house-to-house immunization,

House-to-house active case search is conducted to find additional AFP cases in the community where an AFP case resides or where an AFP case has visited during the incubation period of polio (4-35 days before paralysis onset). A search is conducted for any children below 15 years who have had the onset of flaccid paralysis within the preceding 6 months. All cases found are investigated immediately and two stool specimens are collected from cases with paralysis onset with in last two months.

In addition, the search teams could randomly ask community leaders, chemists, local private practitioners, village heads and some mothers / families in the neighborhood of the case whether they are aware of any AFP case occurring in the last six months.

9.5 Identification Of “Hot” Cases
During the final stages of polio eradication it becomes increasingly important to identify AFP cases that appear likely to be polio, so that immediate follow-up action can be taken. All such cases, which in the opinion of DIO/SMO, after examination, look
like Polio are labeled as ‘Hot Cases’. Characteristics, signs and symptoms, which are most commonly observed in polio case are as Under:-

- Age less than 5 years +history of fever at onset of paralysis +asymmetrical proximal paralysis or patchy paralysis.
- Age less than 5 years with rapidly progressive paralysis leading to bulbar involvement and death.

All “hot cases” must be notified immediately to NPSU by e-mail or fax. For all Hot cases with inadequate specimens, contact stool samples should be collected. Stools can be collected from contacts of the hot index case up to six months following the onset of paralysis in an index case. This procedure is explained in the section collection of specimens from contacts of AFP cases (Section 11.2 and 11.3).

9.6 Cross Notification And Tracking Of Cases
A child who presents with acute flaccid paralysis may first come to the attention of a health official in a district other than that where he/she resides, and may even come from a neighboring country. Following are procedures to follow to ensure that cases appearing in districts other than the district of residence are properly evaluated, and that health staff in the concerned districts are immediately notified about the case.

9.6.1 Actions By The Reporting District
- The reporting district is the district in which the case is reported and investigated (may not be the district where child normally resides)
- Case identification (EPID) number is assigned by the SMO in the reporting district
- Address where the case will be at the time of 60 day follow-up should be documented
- The most likely site of poliovirus infection would be the district where the child resided during the incubation period (range 4-35 days; 7-10 days most common)
- The SMO in the reporting district should inform the SMO of the district where the child was likely to have been infected. The SMO should inform the DIO of that district
- The reporting district DIO/SMO should send CIF with complete address to the SMO in the presumed district of infection/residence
- The fastest means of communication should be used (telephone, fax or courier)
- Active case search, ORI and 60-day follow-up (if required) should be done both in the district where infection most likely occurred and in the district where the child was present at the time of reporting
- In case the child resided in several districts before onset, the SMO should discuss with the SRC/RC/NPSU before finalising the district of residence
- The reporting district DIO/SMO should inform the DIO/SMO of the district of Infection/residence the actions have been taken so far, and inform them what follow-up actions are required (e.g. active case search in the community, ORI, 60-day follow-up). The personnel of the concerned district should give feedback to the reporting district as and when actions are taken
- If the case meets the criteria for collection of contact specimens (“hot” case with inadequate specimen collection), the contact specimens should be collected in the district/community where infection most likely occurred
- Feedback should flow in both directions, both concerned DIO/SMOs should
exchange data of the case, regarding the outcome of investigation and actions taken. Information at all levels should be identical with
- DIO and SMO of concerned districts
- RC/SRC/State SMO
- NPSU
- RU/informant
- SMOs and RCs/SRCs/ State SMOs should monitor and document that necessary actions are taking place for cross-notified cases. A separate file for cross-notified cases should be available and SMOs in both districts should provide updated line-list information to NPSU.

9.6.2 Actions By District Of Residence/ Infection (where case has been cross notified)
- Locate residence of the child
- Inform the reporting SMO if address seems to be incomplete or incorrect
- If the child has returned from the reporting district to the district of residence, but is not found, inform the reporting SMO and the RC
- If the child has returned from the reporting district and has not yet had collection of two adequate stool specimens, obtain stool specimens
- If the case meets the criteria for collection of contact specimens (“hot” case with inadequate specimen collection), the contact specimens should be collected in the district/community where infection most likely occurred
- Organize ORI and active case search
- If applicable, conduct 60-day follow-up at 60+ days (but not more than 90 days) following paralysis onset. If required, arrange for supplemental evaluation and special testing for review by Expert Review Committee
- Provide feedback to the reporting SMO when the action points are completed.

9.6.3 Levels Of Cross-Notification
- National: investigating SMO should perform the following
  - Send CIF to SMO of concerned district
    - State to State (with copy to RC/SRC/ State SMO)
    - Within State (with copy to RC/SRC/ State SMOs)
    - Within SMO’s area: send CIF to DIO of concerned district (with copy to RC /SRC/ State SMO)
  - Direct notification in all cases: SMO to SMO
  - District SMO to concerned district DIO.
- International (e.g. cases from Nepal, Bangladesh or any other country): send CIF to NPSU, New Delhi. NPSU would inform SEARO. SEARO notifies the concerned country if it is in the region, or else informs WHO, HQ Geneva, which in turn would inform the concerned country through the relevant WHO Regional office.
10. COLLECTION, TRANSPORT AND REPORTING RESULTS OF STOOL SPECIMENS

10.1 When To Collect Stool Specimen From A Case Of AFP
Two stool specimens must be collected from every AFP case. Stool specimens must be collected within 14 days of onset of paralysis to maximise the chances of isolating poliovirus. In case samples cannot be collected within 14 days, the specimens should still be collected up to 60 days of paralysis onset. The first specimen should be collected at the time of the case investigation. If the child is not able to pass stool, leave the stool collection kit and stool shipment carrier with frozen ice packs with the family so that they can collect sample from the child later. The second sample should be collected at least 24 hours after the first specimen collection, because virus shedding may be intermittent.

Explain the process of stool collection to the parents/ caretaker of the child

10.2 How To Collect A Stool Specimen
Preferred method
- Use a clean plastic screw-cap container (It is not essential to have a sterilized container).
- A label with the name, identification number of the case (the EPID number), the specimen number and the date of collection should be pasted on the side of the container. Use a water-resistant, indelible pen to label the specimen containers.
- If possible, collect fresh stool from the child’s diapers, or get the child to defecate onto a clean paper.
- Collect a volume of stool about the size of one adult thumb size (8 grams). This amount of stool will allow additional testing, if necessary.
- Use the spoon attached to the cap to place the specimen in the sample bottle
- Avoid using laxatives

Do not fill the container up to the brim. Do not soil the rim of the container
After collection, immediately place the container in the stool shipment carrier/ fridge. Enema is not a preferred method for stool collection.

Adequate stool: Two specimens collected within 14 days of paralysis onset and at least 24 hours apart; each specimen must be of adequate volume (8-10 grams) and arrive at a WHO-accredited laboratory in good condition (i.e., no desiccation, no leakage, with adequate documentation and evidence that the cold chain was maintained.

Less preferred method
In critically ill children where stool is not passed, sample should be collected with the help of rectal tubes. This method is less preferred because the volume of stools collected is inadequate to save a portion for additional testing; also the virus isolation rate may be low.

A rectal tube should be used as follows:
- Open the screw-top container and check the tube. The rounded end with the small side holes is the end that should be inserted into the rectum
- Gently lay the child on his/her back and raise the legs to expose the anus
Remove the tube from the container, apply a small quantity of lubricant (paraffin, glycerin) and without squeezing the walls of the tube, insert it gently into the rectum.

Insert more than half the tube’s length.

Squeeze the rear end of the plastic tube to close the lumen so that the stool in the tube is not sucked back into the rectum. Withdraw the tube.

When the tube is withdrawn and if there is no stool inside it, insert the tube gently once more. Do not try more than twice.

Place the tube back in its container and replace the cap.

If the use of the rectal tube stimulates defecation, also collect this stool in addition to the stool already collected in the rectal tube.

Wash your hands.

### 10.3 Transportation Of Specimens

The specimens should be sent to the laboratory in “cold chain”. The process of keeping the specimen in the desired temperature of 2 to 8°C after collection from the child to the time of reaching the laboratory is called the “cold chain. If there is likely to be a delay in shipment, after collection, the specimens must be placed immediately in a deep freezer or a freezer compartment of a refrigerator. As soon as both samples are collected, make arrangements to ship the specimens immediately. Plan for the specimens to arrive at the laboratory within 72 hours of dispatch. If this is not possible, the specimens must be frozen (at minus 20°C) and then shipped frozen, preferably with dry ice or with cold packs that have also been frozen at minus 20°C.” If a cold chain is not properly maintained at all times during transport, poliovirus will not survive in the stool specimen.

Do not mix stool shipment carriers with vaccine carriers. Avoid storing specimens in refrigerators, cold boxes or vaccine carriers that are used for vaccines or other medicines. If this is unavoidable, be sure to seal the specimens in 2-3 layers of plastic bags and carefully separate them from the vaccines or other medicines. For transporting specimens, a separate stool shipment carrier should be used and labeled “For Stool Specimen Shipment”. Also if vaccine carrier is used for stool shipment, mark it so that it is distinguished from others. Do not use vaccine carriers that are used for vaccines to transport stool specimens. If contamination is suspected, refrigerators, cold boxes, vaccine carriers and ice packs can be disinfected with a solution of 1 part bleaching powder to 10 parts water or 1 % sodium hypochlorite solution for a contact period of at least half an hour.

Complete the laboratory request form (LRF) for each case. EPID number of the case should be recorded on the label of the specimen collection container and the LRF. Data entry should be done carefully ensuring that the data entered in the CIF, LRF and the specimen container match.

When arrangements have been made for shipment, wipe the specimen containers with absorbent material (such as cotton wool) to clean leaked stool if any, seal them in a plastic bag and place them in a cold box designated for shipping specimens with frozen ice packs. Place the laboratory forms in an envelope, enclose them in a separate plastic bag, and place them in the cold box for shipment. Do not wrap the forms around the specimens.

Send the specimens by the fastest, most reliable means of transport available.
10.4 Matching Of Stool Specimens At The Laboratory
The receiving laboratory must maintain correct records for each sample, using the EPID number to identify each specimen. The epidemiological data from the surveillance system and the laboratory data for each case will be linked by this number.

10.5 Reporting Laboratory Results
Laboratories set a “turn-around time” of 28 days or less as a goal for processing specimens, i.e. the primary isolation result is reported to the surveillance program no more than 28 days from the time the specimen is received at the laboratory. In India Poliovirus Laboratory Network, specimens from which a poliovirus is isolated are sent for intratypic differentiation (as described in chapter 12- India Poliovirus Laboratory Network) and for genetic sequencing if wild virus is isolated. Results of these tests are sent to NPSU, who in turn send these results to the field.

Specimen Collection and Handling

<table>
<thead>
<tr>
<th>Item</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specimen</td>
<td>8 grams of stools (approximately one adult “thumb-size” amount for each specimen)</td>
</tr>
<tr>
<td>Number</td>
<td>Two specimens, taken at least 24 hours apart</td>
</tr>
<tr>
<td>When</td>
<td>Within 14 days of paralysis onset, and no later than 60 days following paralysis onset</td>
</tr>
<tr>
<td>Method</td>
<td>Preferably voided stools; by rectal tube if necessary</td>
</tr>
<tr>
<td>Temporary storage</td>
<td>Less than +8°C</td>
</tr>
<tr>
<td>Transportation</td>
<td>Less than +8°C</td>
</tr>
<tr>
<td>Label</td>
<td>Case Identification (“EPID“) number, date of specimen collection, child’s name and sample number.</td>
</tr>
<tr>
<td>Collection Responsibility</td>
<td>DIO and SMO</td>
</tr>
<tr>
<td>Storage Responsibility</td>
<td>DIO and SMO</td>
</tr>
<tr>
<td>Transportation Responsibility</td>
<td>DIO, SEPIO and SMO</td>
</tr>
<tr>
<td>Responsibility for provision of specimen containers and specimen carriers</td>
<td>DIO, SEPIO, SMO and laboratory</td>
</tr>
</tbody>
</table>
11. COLLECTION OF SPECIMENS FROM CONTACTS OF AFP CASES

11.1 Purpose Of Contact Stool Collection
To increase the sensitivity of detection of wild poliovirus in cases when adequate stool specimens cannot be collected from hot AFP case.

11.2 Procedure For Contact Stool Collection
Selection of AFP Cases for contact stool sample collection
Contact stool specimens should be collected from all “Hot” AFP cases (As described under section 9.5) with inadequate specimen. This should be done in consultation with RC/SRC.

Selection of contacts:
Select five children aged less than 5 years living in and around the residence of the index case. Try to locate those children who have the closest contact with the index case, e.g. siblings, playing together, living in same household, etc.

Timing of collection of contact specimens:
Contact specimens should be collected as quickly as possible, as soon as the SMO realizes that specimen collection from the index case will not be possible within 14 days. Virus excretion diminishes after 14 days from paralysis onset, therefore the sooner the contact specimens are collected, higher the probability of virus isolation. Stools can be collected from contacts of the index case up to six months following the onset of paralysis in an index case.

11.3 Stool Collection Procedure And Documentation
Obtain one stool specimen from each contact child. The guidelines for quantity of stool to be collected, packing, labeling and transportation are identical to that for AFP cases.

The contact stool line list form (see Appendix K, form AFP-LL-contact) should accompany the stool specimens and should also be faxed to SRC, RC and NPSU. Each contact specimen should be identified by a unique identification number, linked to the EPID number of the index case. Using the EPID number of the index case, assign identification numbers to each of the five contact specimens as follows:

- EPID-C1 through C5, for example:
  - Index case is IND-UP-LNO-05-002
  - Contacts:
    - IND-UP-LNO-05-002-C1
    - IND-UP-LNO-05-002-C2
    - IND-UP-LNO-05-002-C3
    - IND-UP-LNO-05-002-C4
    - IND-UP-LNO-05-002-C5

11.4 Interpretation Of Results
Laboratory results are received at NPSU. Presence of wild poliovirus in any one of the five contact specimens is highly suggestive that the index case was also infected with wild poliovirus. Any index AFP case with one or more contacts testing positive for wild poliovirus will be classified as “confirmed polio”.

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12. INDIA POLIOVIRUS LABORATORY NETWORK

Eight national laboratories constitute the India Poliovirus Laboratory Network. All laboratories do primary isolation of poliovirus from stool specimens received from their defined geographic areas. Enterovirus Research Centre, Mumbai is one of the seven global specialized laboratories. ERC performs Intratypic Differentiation (ITD) of poliovirus isolates and sequencing of all wild polioviruses to guide the program. In 2004 two national polio laboratories (Chennai and Lucknow) were upgraded to perform ITD of their own isolates.

All the laboratories are accredited by WHO. WHO accreditation requires 80% proficiency score in test panels and a yearly on-site review by trained WHO virologists. The program monitors the turn around time between specimen receipt in the laboratories and report of primary isolation and ITD for all laboratories in the network.

12.1 Laboratory Methods
12.1.1 Primary Isolation Of Poliovirus In Cell Culture
Stool specimens in cold chain with properly filled laboratory request forms are received in the laboratory and are assigned a laboratory number. About 1gm of stool is homogenized and disinfected with a 10% suspension of chloroform and phosphate buffer saline. The supernatant is collected and inoculated in cell lines.

Two types of cell lines are used for poliovirus isolation from the stools. The RD cell lines which favor growth of all enteroviruses and L20B cell lines which favor the growth of only polioviruses. The use of these two cell lines gives this system a very high sensitivity and specificity.

Growth of any virus in these cell lines is revealed by the development of specific cytopathic effect (CPE) observed under the inverted microscope. Normally CPE appears within 7 days of inoculation but if any culture is negative after 7 days, a blind passage is done on fresh cell lines and watched for another 7 days before declaring the sample negative. If the CPE is evident only in the RD cell lines, it is passaged into L20B cell lines for confirmation of poliovirus. If no CPE appears in L20B, the sample is declared as positive for non-polio enteroviruses (NPEV).

If CPE appears in L20B cell line the isolate goes for serology (neutralisation test). The neutralization test will determine the serotype (type 1, 2, or 3) of the poliovirus by using poliovirus antiserum. These steps are performed in all the laboratories of poliovirus network.

12.1.2 Intratypic Differentiation Test (ITD)
All poliovirus isolates from primary isolation are further tested to determine whether the particular isolate is wild poliovirus or vaccine poliovirus. This is done by an intratypic differentiation test. For ITD two tests are conducted which are ELISA and probe hybridization. Currently three of the laboratories are equipped with this facility. Both tests must be positive before the result is confirmed.
12.1.3 Genetic Sequencing

The poliovirus genome evolves at a continuous rate. By comparing the genome of various polioviruses, we can determine the genetic relationship and temporal origin among the viruses. This information can be used to identify chains of transmission, geographic spread of various wild polioviruses and the genetic changes between them.

In India, all wild poliovirus isolates undergo genetic sequencing at ERC, Mumbai. Molecular characterizations of the wild poliovirus isolates have become a powerful tool to determine the reservoir areas of transmission and sources of outbreaks. This information is also used to target SIA activities and to determine whether a case that appears in a previously polio free area represents re-establishment of indigenous circulation or an importation of virus from elsewhere.

### India Poliovirus Laboratory Network - Locations and tests performed

<table>
<thead>
<tr>
<th>Laboratory &amp; Tests Performed*</th>
<th>Address</th>
<th>Primary Culture of Specimens from:(States, Districts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmedabad(1)</td>
<td>Polio Laboratory, Dept. of Microbiology, B J Medical College, Ahmedabad (Gujarat) - 16</td>
<td>Daman &amp; Diu, D&amp;N Haveli, Gujarat and Rajasthan</td>
</tr>
<tr>
<td>Bangalore(1)</td>
<td>National Institute of Virology, Field Station (ICMR), c/o Dept. of Microbiology, Victoria Hospital Campus, Bangalore (Karnataka) - 560 002</td>
<td>Karnataka</td>
</tr>
<tr>
<td>Chennai(2)</td>
<td>King Institute of Preventive Medicine, Guindy, Chennai (Tamil Nadu - 600 032)</td>
<td>Andhra Pradesh, Pondicherry, and Tamil Nadu</td>
</tr>
<tr>
<td>Coonoor(1)</td>
<td>Pasteur Institute of India, Coonoor, Nilgiris (Tamil Nadu) - 643 103</td>
<td>Kerala</td>
</tr>
<tr>
<td>Kasauli(1)</td>
<td>Central Research Institute, Kasauli, District Solan (Himachal Pradesh) - 173 204</td>
<td>Chandigarh, Haryana, Himachal Pradesh, Jammu &amp; Kashmir and Punjab</td>
</tr>
<tr>
<td>Kolkata(1)</td>
<td>Serologist &amp; Chemical Examiner, Institute of Serology, 3 Kyd Street, Kolkata (West Bengal) 700 016</td>
<td>A&amp; N Islands, Arunachal Pradesh, Assam, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Sikkim, Tripura and West Bengal</td>
</tr>
<tr>
<td>Lucknow(2)</td>
<td>Department of Microbiology, Sanjay Gandhi Post-Graduate Institute, Rae Bareilly Road, Lucknow (Uttar Pradesh) - 226 014</td>
<td>All districts of Central and Eastern Uttar Pradesh, Bihar and Uttarakhand.</td>
</tr>
<tr>
<td>Mumbai(3)</td>
<td>Enterovirus Research Centre, Haffkin Institute, Acharya Dondde Marg, Parel, Mumbai (Maharashtra) - 400 012</td>
<td>All districts of Western Uttar Pradesh; Chattisgarh, Goa, Madhya Pradesh and Maharashtra</td>
</tr>
</tbody>
</table>

Tests performed:
1 = National Laboratories doing primary isolation (cell culture)
2 = Upgraded National labs doing primary isolation and ITD
3 = Reference labs doing primary isolation, ITD and Genetic Sequencing
(See Appendix F: Map, India Poliovirus Laboratory Network).
13. SIXTY DAY FOLLOW-UP EXAMINATION

60-day Follow-Up Examination
Sixty day follow-up is done between the 60th and 90th day in certain categories of AFP cases to determine the presence/absence of residual paralysis. The presence of residual paralysis at this time is further evidence that the cause of paralysis is likely to be due to poliovirus. The 60th day follow-up should not be done before the 60th day of onset of paralysis.

In India, the following categories should undergo 60-day follow-up:

- AFP cases with inadequate stool specimen collection
- AFP cases with isolation of wild poliovirus
- AFP cases with isolation of vaccine-type (Sabin-type) poliovirus.

During the 60 day follow-up examination, the investigator must:

- Verify with the family that all the information on the CIF is correct
- Ask if the paralysis has improved, progressed or is static i.e same as before
- Observe how the child moves limbs or areas of the body that were paralyzed (look for areas of muscle atrophy, mid thigh skin folds in children and, if possible, watch the child walk)
- Compare present (e.g. mid arm/mid thigh) circumference measurements with the measurements taken at initial case investigation to detect any wasting
- Examine the tone, power and reflexes
- Verify sensation
- Even mild residual weakness is considered as residual paralysis
- Complete the 60 day follow-up format and send the form to NPSU, according to established procedures.
14. AFP CASE CLASSIFICATION

From 1997 through 1999, India followed the WHO clinical classification system. In January 2000, upon reaching standard global criteria for moving from clinical to virological classification (non-polio AFP rate ≥1 case/100,000 children aged <15 years; adequate* stool collection from ≥60% of AFP cases; all stools tested in a WHO-accredited polio laboratory), India shifted to the virological system of case classification.

Virological Case Classification
Within 90 days of paralysis onset, all cases should undergo final classification as confirmed polio, non-polio AFP or compatible with poliomyelitis.

An AFP case is “confirmed” as polio only by the isolation of wild poliovirus from any stool specimen.

An AFP case is classified as “non-polio AFP” if wild poliovirus is not isolated from adequate stool specimens.

If stool specimens are inadequate, final classification of the AFP case as either non-polio AFP or compatible with polio will depend on the results of 60 day follow-up examination. If the 60 day follow-up examination shows no residual weakness, the case is classified as non-polio AFP.

* Adequate stool: two specimens collected within 14 days of paralysis onset and at least 24 hours apart; each specimen must be of adequate volume (8-10 grams) and arrive at a WHO-accredited laboratory in good condition (i.e., no desiccation, no leakage, with adequate documentation and evidence that the cold chain was maintained.)
If, however, in cases with inadequate samples and negative stool results, 60 day follow-up examination reveals persistent weakness or paralysis, or the child has died or is lost to follow-up, the final classification of the case as “compatible” or discarded as “non-polio AFP” will be determined by the National Expert Review Committee (ERC). This is done on the basis of additional data including a detailed history, physical and neurological examination, laboratory data, and results from diagnostic procedures. Investigating medical officers should take a detailed history of present illness from such AFP cases and ensure that copies of all relevant records are procured and available for review at a later date.

The Expert Review Committee meets every month in New Delhi to review all cases with inadequate stool specimens that were found to have residual weakness at 60-day follow-up, and to classify such cases. Medical officers should ensure availability of all records and documents as described in the section “Preparation of AFP cases for Expert review” for presentation to the national Expert Review Committee.

The mandate of the ERC is to discard cases as non-polio AFP only if they can be confident that the case is not compatible with polio; if any doubt exists, then the case is classified as *compatible with polio*. Polio-compatible cases are indicative of a failure of surveillance, and serve as a reminder that all efforts must be made to ensure that cases are reported early enough to enable collection of adequate stool specimens from every AFP case.
15. PREPARATION OF AFP CASES FOR EXPERT REVIEW

All AFP cases with inadequate stool specimens and residual weakness at 60 day follow-up or those who have died or are lost to follow-up are evaluated by the Expert Review committee. For all such cases, SMO should collect additional clinical and laboratory information, described below. When the National Certification Committee collects data in preparation for certification procedures, the cases evaluated by the Expert Review Committee undergo special scrutiny, as it is these cases that are most likely to be misclassified. The SMO should therefore ensure that information obtained on these cases is complete and accurate.

15.1 Selection Of Cases

The SMO will identify cases with inadequate specimens and collect detailed supplementary information:

- As soon as the SMO realizes that an AFP case has inadequate stool specimens, he should initiate processing of the case for expert review.
- The SMO should send the following technical documents to NPSU:
  - Completed CIF
  - Clinical Record of AFP cases for expert review completed by SMO (Appendix M AFP ERC-001 Clinical Record Format)
  - Case Summary (Appendix M AFP-ERC 002 Format for AFP Case Summary for Expert Review)
  - Copy of Hospital case sheets
  - Interview/ Opinion of attending physician/ pediatrician in a separate sheet/ letter pad
  - Photograph of the child showing involved parts
  - 60 day follow-up Report (Appendix M, form AFP ERC-003):
    a. If done already – The report should be sent in the standard format
    b. If pending – All other documents should be sent to NPSU.
    The 60 day follow-up should be done when due and the report sent in the standard format. (The case will be classified only on the receipt of the 60 day follow-up report).
  - Approval Request for NCV/EMG in the approved format (Appendix M, form AFP ERC-004) along with budget required.
NCV/EMG will be conducted only in those cases where it is likely to give a lead towards the
diagnosis. Tests other than NCV/EMG in some cases depending on the clinical picture may
also be done. If the tests are requested for and approved by NPSU, the SMO should get the
tests done in the NPSP recommended special test centres and a neurologist/ specialist
assessment of the case in the neurological assessment format (Appendix M, form AFP
ERC-005).

- If 60-day follow-up examination shows no residual weakness, then EMG and NCV
  are not required and the result should be communicated to NPSU in the 60-day follow-
  up section of the line list and on the 60 day follow-up format (AFP ERC-003)
- All AFP cases with inadequate stool collection must be seen by the DIO/SMO at least
  once definitely, in the acute phase (initial case investigation) and again if indicated at
  the time of 60 day follow-up examination
- NPSU monitors progress in the work up of all such cases and gives feedback to the
  SMO.

15.2 Documentation

Case Investigation Form (CIF) (Appendix K, form AFP-CIF)

- Fill in accurately with no missing data
- Ensure that pages 1 and 2 (front and back) of CIF are completed. Probe to obtain
  accurate details on age, caste (for both Hindu and Muslim), block, setting- urban
  or rural, dates of stool collection and shipment, date of 60-day follow-up with
  results
- Obtain accurate travel history and record neurological examination findings carefully
  on page 2 (back) of CIF.

Standard clinical record (Appendix M, form AFP ERC-001)

It should be filled up as soon as the SMO feels that the samples would be inadequate.

- Elicit detailed history from mother or father, with emphasis on the following points:
  - Progress of symptoms from onset to the date of examination— is the
    weakness static, improving or progressive; number of days from paralysis
    onset to maximum paralysis
  - Age of developmental milestones, including sitting, standing with or without
    support, walking, running; comment if there were any delays in milestones.
- Perform careful physical examination, including a basic neurological examination
  with emphasis on the following:
  - Loss of power, decrease in tone and whether the paralysis/weakness is
    asymmetrical
  - Proximal vs. distal weakness in upper and lower limbs
  - Elicit reflexes and note any loss of muscle bulk
  - Involvement of cranial nerves (difficulty in swallowing, closure of the eyes,
    deviation of angle of mouth, etc.)
  - Examination of spine for any deformity, tufts of hair, etc.
- Include results of any laboratory, radiological or other tests that were done.

Case summary (Appendix M, form AFP ERC-002)

The SMO should prepare a concise written summary of the case, including key information
for the Expert Review Committee. The summary should include the EPID number of the
case, age and sex of the child, date of paralysis onset, stool collection dates and results,
contact specimen dates and results (if any), history of present illness, progression of illness from paralysis onset to the date of examination, functional status of the child (milestones such as ability to sit, stand, walk), findings on physical examination (general and neurological examination), 60 day follow-up date and findings, date of neurological evaluation and findings of neurologist.

60 day follow-up in the standard format (Appendix M, form AFP ERC-003)
The 60 day follow-up examination should be done and the details noted in the standard format as mentioned earlier.

Hospital and other clinical records
Photocopies of all hospital and clinical records, including laboratory reports, should be obtained by the SMO and sent with the other documents.

Interview of attending doctors
The opinion of the treating physician should be obtained. In the case of death of the child, a careful interview of any available family members and attending doctors should be conducted by the SMO, to ascertain clinical features, progress of events and probable diagnosis.

Photograph
Obtain a photograph showing the affected parts of the body. If possible, photograph the child without clothing (within acceptable social limits) and in a standing position. Write the name and EPID number on the back of the photograph.

Maps
Prepare spot maps of AFP cases, confirmed polio and polio-compatible cases in the district and adjoining districts, indicating date of onset of the wild poliovirus confirmed cases and compatible cases. Include major roadways, block boundaries, railway lines, rivers and major landmarks.

Collection and forwarding documents to NPSU
This should be done as soon as possible. When all of the information and supporting documents have been obtained as described above, the SMO shall compile all and forward all documents to the Surveillance Coordinator retaining a copy of the same in his office. The SMO should also complete a checklist (Appendix M) to ensure that all documents have been included, place it on top of the collected documents and send them to NPSU in a strong envelope marked with the EPID number of the case and “For Expert Review.”

Neurological assessment (Appendix M, form AFP ERC-005)
Neurological assessment should be done after NPSU recommends and approves the same. Preferably a pre identified neurologist (or pediatrician if neurologist is not available) on the approved panel of NPSU should examine the case and record examination findings/comments on the prescribed neurological assessment form. This should be submitted by the SMO to NPSU Surveillance Coordinator along with all other documents.

15.3 Presentation Of Case To The Expert Review Committee
- A folder is prepared for each case at NPSU, where all documents are compiled for future reference.
The National Expert Review Committee (ERC) meets once a month at NPSU to review and classify cases. The ERC may ask for additional clinical or laboratory information if they are unable to classify the case with the available information. Based on available clinical records the ERC either discards the case as non-polio AFP or classifies it as compatible with polio. If the case is discarded as non-polio AFP, the ERC provides the likely final diagnosis.

Following each meeting of the ERC, NPSU sends the case classifications to SMOs, RCs and SRCs. The SMOs should inform the DIO, the case reporting sites and the family of the child about the final classifications in the prescribed format.
16. DATA ANALYSIS AND MONITORING

16.1 Overview
An important aspect of a successful polio eradication program is a well-developed information system that provides program managers and health workers with the necessary information to take appropriate actions. The surveillance data should be reviewed on a weekly basis at the national, state and district levels to detect and quantify disease occurrence, assess changing disease patterns over time, determine risks for disease, monitor the progress of the polio eradication program and evaluate the performance of the AFP surveillance system itself.

Analysis of AFP surveillance data is required for measuring the sensitivity and consistency of the surveillance system to ensure that it is functioning at the desired level. Surveillance data is useful in the decision making process in the following ways:

- Monitor performance of surveillance using standard indicators and focus efforts in low performing areas
- Monitor seasonality to determine low season of poliovirus transmission for planning NIDs
- Monitor routine coverage in all geographical areas and focus efforts in low performing geographical areas
- Identify high risk areas for focusing greater attention to such areas during SIAs
- Track wild poliovirus circulation
- Provide evidence for polio-free certification.

Main Sources of data:

- Case Investigation Form
- AFP line list
- Completeness and timeliness of reporting units (Form D002)
- Active case search form (Form D003).

16.2 Epidemiologic Analysis
The data needs to be analysed by time, person, and place.

Time: Number of AFP/WPV/compatible/non-polio AFP cases by month and year should be analysed for state, district and block.

Person: The characteristics of AFP/WPV/compatible/non-polio AFP should be analysed by state, district, and block. Key characteristics include age, sex, religion, caste, and OPV status.

Place: Distribution of AFP/WPV/compatible/non-polio AFP cases by state/ district and block. This is best analysed by a spot map.

16.3 Surveillance System Performance Indicators
Following are basic indicators of surveillance quality that should be carried out by DIO/SMO on a regular basis.

1. Non Polio AFP rate per 100,000 <15 years children (target >1/100,000, operational target for India >2/100,000)
2. Reported AFP cases with 2 stool specimens collected within 14 days of onset of paralysis (target >80%)
3. Notification of AFP cases within 10 days of onset of paralysis (target >80%)
4. Reported AFP cases investigated within 48 hours of notification (target >80%)
5. Timeliness of weekly reporting (target >80%)
6. Completeness of weekly reporting (target >90%)
7. Stool specimens reaching a WHO accredited laboratory within 72 hours of being sent (target >80%)
8. Stool specimens reaching laboratory in good condition (target >80%)
9. Stool specimens with a turn around time <28 days (target >80%)
10. Stool specimens from which non-polio enteroviruses were isolated (target >10%).

The WHO Indicators of AFP Surveillance and Laboratory Performance are given in Appendix A.

**Method of calculating major indicators**

**A. Calculation of Non-polio AFP rate**

\[
\text{Non-Polio AFP Rate} = \frac{\text{Number of reported non-polio AFP cases < 15 years of age} \times 100,000}{\text{Total number of children < 15 years of age}}
\]

Non-polio AFP cases are the discarded cases (non-polio AFP cases = Total AFP cases minus WPV cases, compatible cases, pending classification)

*Example 1:* Calculate non-polio AFP rate for a district with a population of 2,000,000 of <15 year children. The district has reported 45 non-polio AFP cases for the year.

\[
\text{Non-polio AFP rate} = \frac{45}{2,000,000} \times 100,000 = 2.25
\]

*Example 2:* Calculate non-polio AFP rate for a district with a population of 2,000,000 of <15 year children. The district has reported 15 non-polio AFP cases by week 31.

\[
\text{Non-polio AFP rate} = \frac{15}{2,000,000 \times 31} \times 100,000 = 1.26
\]

This is called annualised Non Polio AFP rate and is calculated for a certain time period

**B. Calculation of percent stool collected within 14 days from onset**

*Example:* A district reported an AFP case with date of onset of paralysis on June 15, 2005. Two stool specimens were collected. First specimen was collected on June 27, and the second on June 29.

Date onset of paralysis = June 15 (taken as day zero)
2\textsuperscript{nd} stool collected on = June 29
Number of Days between onset and 2\textsuperscript{nd} stool collection = June 29 – June 15 = 14 days
16.4 Other Recommended Analyses

Following are some basic analyses of surveillance data that should be carried out on a regular basis by the SMO/DIO.

16.4.1 AFP Reporting Network Based Information

The AFP surveillance network includes the reporting units and the informers. It is essential to analyse information for surveillance actions by the DIO/SMO. Periodic analysis of this information will enable the DIO/SMO to rationalize the reporting units thereby including only the RUs that are relevant to the system and deleting the ones that have become redundant as described in section “AFP Surveillance Network”. Analysis also helps the DIO/SMO to develop work plans and prioritize their work. The suggested analysis include the following:

- Map of districts/blocks depicting roadways, important landmarks, health facilities etc.
- Spot map showing location of RUs and informers, by block
- Timeliness and completeness of weekly reporting by reporting sites by analysing data in the AFP-D002 forms
- Prioritization of reporting sites for visits by SMO/DIO to provide feedback and conduct active case searches by looking at the AFP-D002 and the AFP-D003 forms.

**Health facility contact analysis**

It is important to look at the information gathered in page 2 of the CIF and identify health care providers who have been visited by AFP cases. By analyzing this information, the DIO/SMO can determine which facilities/individuals are either not reporting AFP cases or reporting them late, and accordingly prioritize the visits to these reporting sites. Also sites frequently visited by children less than 15 years not already included in the reporting network should be added (expansion of reporting network).

These visits should also be used to explain the importance of timely reporting to the nodal person. If the DIO/SMO determine that some of the already enrolled reporting sites have not reported a case, they can be targeted for revisits and retraining.

The table given below can be used to do the health facility contact analysis. Write the names of the health facilities which the child visited before getting reported for each AFP case. This will help in picking up the health facility that has seen the maximum number of AFP cases.
16.4.2 AFP Case Based Information

**Mapping of AFP Cases**: Mapping of AFP cases helps the SMO/ DIO to pinpoint areas that require attention. Mapping should be done taking into account the time and space in which cases have occurred.

- Spot map of AFP cases and hot cases
- Spot map of wild poliovirus cases
- Spot map of compatible cases together with wild poliovirus cases.

**Analyze the timeliness of case investigation and stool collection**

This analysis helps the DIO/ SMO to identify exactly where the delays are occurring and take remedial measures. Using the table given below, the DIO/ SMO can calculate:

- Interval from paralysis onset to notification
- Interval from notification of case to investigation
- Interval from investigation to collection of 2 adequate stool specimens.

<table>
<thead>
<tr>
<th>Epid Number of AFP cases</th>
<th>Health Facility 1</th>
<th>Health Facility 2</th>
<th>Health Facility 3</th>
<th>Case Reported From</th>
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**Analyze the reason(s) for delayed notification of case**

When cases are reported late to the public health system (DIO/SMO), the chances of collecting stool specimens within 14 days of paralysis onset diminish. Every effort should be made to determine why cases are being reported late, and then to take corrective action based on the analysis.
Analyze the reason for delayed case investigation
If a case is notified in time but investigation is delayed, the SMO/DIO should try to find the reason for the same and take appropriate action. The following are some of the common reasons and suggested actions that need to be taken in such instances.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information not flowing up</td>
<td>Identify the reasons</td>
</tr>
<tr>
<td></td>
<td>Improve the system of information flow</td>
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<tr>
<td>DIO position vacant</td>
<td>Have another competent medical officer of the district nominated for case investigation designated as “Nodal Officer” for Polio</td>
</tr>
<tr>
<td>DIO not motivated to investigate cases quickly</td>
<td>SMO should discuss the importance and procedures for early investigation.</td>
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Analyze the reason for delayed stool collection
Once the reasons for delayed stool collection are identified, it is necessary to initiate action. The following are some of the common reasons and actions suggested for delayed stool specimen collection.
Analyze 60-day follow-up data  
The DIO/SMO should keep a track of cases that require 60-day follow-up. Ensure timely follow-up, so that cases can be classified or if necessary, be evaluated for classification by the Expert Review Committee.

Analyze reasons for delayed classification of cases  
If a case has inadequate stool specimens DIO/SMO should ensure work up of case for Expert Review Committee and complete 60-day follow-up. In such cases the SMO should

<table>
<thead>
<tr>
<th>Reason</th>
<th>Action</th>
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</thead>
<tbody>
<tr>
<td>No proper system of stool specimen collection / lack of awareness of the system to all concerned</td>
<td>The DIO/SMO should discuss with the nodal officer and establish a system with participation of all concerned</td>
</tr>
<tr>
<td>No one designated to perform this function.</td>
<td>Identify a person locally who can be trained and is willing to do the job</td>
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<tr>
<td>Designated person not involved, performing poorly or not aware of procedures</td>
<td>On the job training with demonstration on how the activities should be done</td>
</tr>
<tr>
<td>Supplies and equipment not available for specimen collection at the requisite place and with the designated person?</td>
<td>DIO/SMO should ensure that all supplies related to stool collection, temporary storage and shipment are available.</td>
</tr>
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</table>

**Track the movement of specimens from the field to the laboratory**  
The DIO/SMO should analyze all steps of specimen collection and transportation to identify any delays or obstacles in getting the specimens to the laboratory in a timely manner. This is done by analyzing the time taken from AFP case investigation to the time the stool is received in the laboratory. This table can be prepared to look at the number of days spent in shipment and transit of specimens from patient to lab.

<table>
<thead>
<tr>
<th>EPID number of AFP cases</th>
<th>Number of days from</th>
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<tr>
<td></td>
<td>Investigation to 1st stool collection</td>
<td>1st stool collection to 2nd stool collection</td>
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**Analyze 60-day follow-up data**  
The DIO/SMO should keep a track of cases that require 60-day follow-up. Ensure timely follow-up, so that cases can be classified or if necessary, be evaluated for classification by the Expert Review Committee.

**Analyze reasons for delayed classification of cases**  
If a case has inadequate stool specimens DIO/SMO should ensure work up of case for Expert Review Committee and complete 60-day follow-up. In such cases the SMO should
find whether the 60-day follow-up examination is pending or whether the case has been worked up for special investigation.

16.5 Analysis Of Compatible Cases

Clustering of Compatible cases

Compatible cases should be analyzed in time and space as they represent AFP surveillance failure and should be analyzed by the SMO for ways to identify the cause of surveillance failure and to determine if there is evidence of missed poliovirus transmission.

- Evaluate surveillance quality and completeness
- Take steps to improve timely reporting of cases and specimen collection/transportation
- Compatible cases occurring in areas without known wild poliovirus transmission should be carefully evaluated by obtaining additional epidemiologic information
- Clustering of compatibles should be considered if two or more compatible cases with onset in the same district or adjacent districts occur within a 2-months period.

Investigation of clustering of compatible cases:
The SMO should analyze cases identified as part of a cluster to identify possible links. Data gathered during the initial case investigation should be compared with other cases to search for possible links and clues to identify undetected wild poliovirus circulation. Clusters should be analyzed by time, place and person. Immunization status of the child and the community, clinical findings, date of paralysis onset, ethnicity (social, occupational, and/or sub-caste group) and other factors should be explored in more detail. In addition to the standard information gathered during the initial case investigation, the following data should be collected when evaluating a cluster.

Travel history

- Has the child/family had any contact with known polio cases? Have any polio cases visited the community, or has anyone visited the vicinity from a community having polio cases?
- Has the child/family traveled to any endemic area during the previous month?
- Has the child/family traveled to any common public gathering or facility recently where the child could have come into contact with wild poliovirus?
- If a case appears strongly suggestive of polio, where is the most likely place where the infection occurred (taking into account travel history of the child during the incubation period)?

Geographic factors

- Are there major travel routes including roads, railway lines etc, linking the cases?
- Are the cases bordering endemic areas?
- How far apart are the cases?
- What is the topography between the cases, e.g. rivers, mountains, etc.?

Other

- Environmental/sanitation conditions

If the DIO/SMO suspect that there is an epidemiologic link among cases which would suggest an outbreak, he/she should immediately notify the concerned State Government/RC/SRC/State SMO.
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<th>Description</th>
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AFPD003 Active Surveillance of RUs  
AFPS001 Weekly State Report  
AFPS002 Summary Timeliness/Completeness of Weekly District Reports  
AFPCIF Case Investigation Form (CIF)  
AFPLRF Laboratory Request Form (LRF)  
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Checklist  
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APPENDIX A
WHO INDICATORS OF AFP SURVEILLANCE AND LABORATORY PERFORMANCE*

1. Non-polio AFP rate in children < 15 years of age. (Target ≥ 1/100,000; In India the operational target for each district > 2/100,000)

Non-Polio AFP Rate = \( \frac{\text{Number of reported non-polio AFP cases < 15 years of age}}{\text{Total number of children < 15 years of age}} \times 100,000 \)

→ The non-polio AFP rate is an indicator of surveillance sensitivity. If the NPAFP rate is < 1/100,000 then the surveillance system is probably missing cases of AFP. Note that 1/100,000 is the minimum expected number of cases.

2. Reported AFP cases with 2 stool specimens collected < 14 days since paralysis onset (Target ≥ 80%)

3. Completeness of weekly “zero” reporting. (Target > 90%)

   % Complete = \( \frac{\text{Number of Weekly reports received}}{\text{Number of Weekly reports expected}} \times 100 \)

4. Timeliness of weekly “zero” reporting. (Target ≥ 80%)

   % Timely = \( \frac{\text{Number of weekly reports received before a specified deadline}}{\text{Number of weekly reports expected}} \times 100 \)

5. Reported cases investigated ≤ 48 hours of report. (Target ≥ 80%)

   → Every reported case of AFP is a public health emergency to be investigated by a trained, designated case investigator within 48 hours of receiving the report.

6. Reported AFP cases with a follow-up exam at least 60 days after paralysis onset to verify the presence of residual paralysis or weakness (Target ≥ 80%).

   → AFP cases that should undergo 60-day follow-up include a) cases with inadequate or no stool specimens; b) cases with isolation of vaccine virus from the stool; and c) cases with isolation of wild poliovirus from the stool.

7. Specimens arriving at the national laboratory ≤ 3 days of being sent (Target ≥ 80%)

8. Specimens arriving at the laboratory in “good condition” (Target ≥ 80%)

   → “Good condition” means that upon arrival: there are frozen ice packs or ice, or a temperature indicator (showing < 8° C) in the container; the specimen volume is adequate (> 8 grams); there is no evidence of leakage or desiccation; and appropriate documentation (laboratory request/reporting form) is completed.

9. Specimens with a turn-around time < 28 days (Target ≥ 80%)

   → The turn-around time is the time between specimen receipt and reporting of results

10. Stool specimens from which a non-polio enterovirus is isolated (Target ≥ 10%)

    → This is an indicator of the quality of the “cold chain” (i.e. that the specimen has been continuously maintained at temperatures <8° C during transportation from the field to the laboratory) and how well the laboratory is able to perform routine isolation of enteroviruses.

APPENDIX B. Flow Diagram of AFP Case Investigation

onset of paralysis

Immediate notification of case to DIO/SMO

case investigation
(within 48 hrs of notification)

collection of 2 adequate stool specimens
(at interval of at least 24 hours, within 14 days of paralysis onset)

transported to lab in ≤ 72 hours

viral culture at polio lab;
Results reported from lab to
national programme within 28 days

if any poliovirus isolated, ITD conducted
(wild vs vaccine virus)

if wild poliovirus,
genetic sequencing performed
(ERC Mumbai)

outbreak response immunization
(+ additional case search)

60-day follow-up exam
(conducted in cases with inadequate specimens,
cases with isolation of wild or vaccine virus;
conducted at least 60 days
but not more than 90 days following paralysis onset)

within 90 days of paralysis onset

final classification of case:
non-polio AFP, polio or compatible with polio
(by Expert Review Committee if necessary)
APPENDIX C
NATIONAL TECHNICAL AND ADVISORY GROUPS
FOR POLIO ERADICATION IN INDIA

The following groups meet regularly to provide technical guidance and advice for the polio eradication initiative in India. For details of current chairmanship and membership, contact information and to download meeting reports and Plans of Action, see www.npspindia.org.

NATIONAL CERTIFICATION COMMITTEE FOR POLIO ERADICATION (NCCPE)

Background

The National Certification Committee for Polio Eradication (NCCPE) was established by the Government of India vide order No. T 13013/1/98 dated 7th August 1998 with its secretariat located at the All India Institute of Medical Sciences, New Delhi. The order stated as follows:

"The Government has further decided to set up a National Certification Committee for Polio Eradication for the purpose of monitoring the country wide progress of the eradication activities. This committee will examine and assess the data on the polio incidence in the country and will make necessary suggestions and recommendations for improving the systems of gathering evidence for documentation of work on data collection and analysis. This committee will also interact with the original Certification Commission of the South-East Asia Region, WHO. As and when necessary the committee may undertake field trips for assessing the situation on the spot. The committee will also prepare the country report for certification and when the country becomes fully polio free."

The Process of Certification of Polio Eradication

The Global Certification Commission (GCC), established by the Director-General of WHO in 1995, is responsible for setting the process and criteria for certification and ultimately deciding whether to certify global polio eradication. This requires at least 3 years of zero polio cases due to wild poliovirus in the presence of certification-standard surveillance in all six WHO regions. The GCC also requires all six regions to provide data demonstrating full implementation of the pre- and post-eradication containment activities outlined in the WHO global action plan for the containment of wild polioviruses prior to global certification.

In contrast to individual countries being certified free of smallpox, an entire WHO region must be certified polio-free. For this to happen, every country and area in a region must provide evidence consistent with there being no indigenous wild poliovirus cases for at least 3 years, under conditions of certification-standard surveillance for the virus. Surveillance for acute flaccid paralysis (AFP) is the gold standard for certification, though other surveillance strategies have been accepted for some countries that have long been polio-free and have high levels of sanitation and strong health systems. The capacity of a country to detect and investigate sufficient AFP cases in the absence of polio demonstrates that the poliovirus would be found if it were present.

This certification documentation is collected and verified by national certification committees (NCCs) and provided to a regional certification commission (RCC), which then decides on the basis of the data whether the region can be certified.

The RCCs are independent panels of 8 to 10 internationally recognized experts in public health, epidemiology, virology and/or clinical medicine. The finalisation of documentation is a multi-year, iterative process involving dialogue between the NCCs and the RCC. The documentation must also illustrate the capacity to detect, report and respond to imported polio cases.

Once a region is certified polio-free, and before global certification can be considered, all countries within the region must maintain certification-standard surveillance and implement post-eradication containment measures.
Role of NCCPE
The role of the National Certification Committee for Polio Eradication (NCCPE) is to collect, review and analyze information to its satisfaction and prepare a country report for presentation to the International Commission on Certification of Polio Eradication. These data must contain convincing evidence of interruption of poliovirus transmission in the country. When not convinced, the NCCPE should take the responsibility of asking the national program to provide convincing data to the satisfaction of the Committee.

INDIA EXPERT ADVISORY GROUP (IEAG)
The India Expert Advisory Group was established in May 1999 as a group of national and international experts on polio eradication, who would:

° Monitor progress toward polio eradication in India
° Provide technical advice to the Ministry of Health & Family Welfare, Government of India, on immunization and surveillance activities for polio eradication and
° Monitor the quality of immunization activities, AFP surveillance and laboratory performance.

The IEAG meets on a periodic basis, the frequency being determined by the status of polio eradication in India. Meetings occur more frequently when urgent decisions must be made regarding matters such as acceleration of supplementary immunization activities, modifications in surveillance policies, or changing approaches to programme communications and social mobilization.

NATIONAL EXPERT REVIEW COMMITTEE
India’s National Expert Review Committee (ERC) for polio eradication was established in 2000 in preparation for the transition in January of that year from clinical classification to virologic classification of acute flaccid paralysis (AFP) cases. The role of the ERC is to provide expert advice on the final classification of AFP cases from which adequate stool specimens could not be obtained, resulting in a lack of virologic evidence to classify a case as polio or non-polio AFP.

The ERC meets monthly at NPSU to review case records for all cases with inadequate stool specimens, to classify these cases as compatible with polio or discarded as non-polio AFP.

NATIONAL TASK FORCE ON LABORATORY CONTAINMENT OF POLIOVIRUS

Background
All countries are committed to eradicate polio from the world. Once transmission of wild poliovirus has ceased, the only source of infection will be laboratories storing clinical material, apparent or potentially infectious, containing wild polioviruses. To prevent laboratory associated spread of wild polioviruses it is obligatory that all potentially polio infected clinical material is either destroyed or handled under appropriate bio-safety conditions.

The Global Commission for Certification of Polio Eradication has requested the Regional and the National Commissions to ensure that each country has a plan of action for this purpose, and that the plan is vigorously implemented. In February 2004, the Department of Family Welfare, Ministry of Health & Family Welfare constituted a National Task Force on Laboratory Containment of Poliovirus under the chairmanship of the
Director-General, Indian Council of Medical Research. Task Force members have been drawn from related ministries, departments and organizations, and include independent experts. The secretariat for the Task Force has been established at the headquarters of the Indian Council of Medical Research.

**Terms of Reference**

1. To write a National Plan of Action for Laboratory Containment of Poliovirus.

2. To conduct a national search for laboratories in order to create a list of all biomedical laboratories in the country that could potentially be storing wild poliovirus infectious materials.

3. To contact each agency and laboratory on the national search list and request them to search storage areas for wild poliovirus infectious of potentially infectious materials, complete documentation attesting to what was found and report back to the National Task Force.

4. To monitor and follow up with agencies and laboratories to ensure that the activities are done in a timely and effective manner.

5. To visit all agencies, institutions or laboratories of concern [for example, non-responders, large laboratories, those reporting large amounts of infectious or potentially infectious material].

6. To review all completed forms submitted by different agencies and laboratories.

7. To prepare the final National Inventory for Containment that will be submitted, along with supporting documentation, to the National Certification Committee on Polio Eradication. This will be included as part of the national documentation for certification that will be submitted to the Regional Certification Commission and copied to the WHO Regional Office for South-East Asia.
APPENDIX D

Response to a polio outbreak due to wild poliovirus importation/ circulating vaccine derived poliovirus (cVDPV) after zero polio status is reached

As long as virus transmission continues in any part of the world, the possibility of virus importation to polio free regions remains. This importation could be detected by the AFP surveillance system through isolation of wild polio virus in an AFP case (with or without history of travel to a polio endemic area) or through isolation of wild polio virus in sewage or environmental samples. The recent polio outbreaks in Indonesia, Yemen and other African/ Middle East countries are examples of this. Also, due to down scaling of SIAs, both in terms of size & numbers, coupled with low OPV coverage levels under routine immunization, the possibility of declining community immunity levels against polio virus will be there. Such a situation can facilitate circulation of vaccine virus in the community for prolonged periods with a danger of mutation of vaccine virus to VDPV which in addition to virulence also acquires transmissibility and a possibility of occurrence of clusters of polio cases. In the recent past, such outbreaks were seen in Hispaniola Island, Philippines, Madagascar and very recent in Indonesia.

It is therefore appropriate to keep ready a ‘Preparedness Plan On Polio Outbreak’ for such situations. The plan needs to clearly outline a policy on how to respond and what to do in the event of an outbreak due to either wild Polio virus importation or detection of cVDPV after zero polio status is reached. The plan should consist of the following four components:

1. **Investigation and communication**: A full and rapid investigation should be conducted in response to all possible or confirmed polio outbreaks. This should include a clinical, epidemiological, virological and surveillance investigation. Areas detecting suspected polio outbreaks should notify WHO, CDC, UNICEF and neighbouring ‘at risk’ states/ countries.

2. **Enhanced surveillance**: There needs to be a plan to enhance the surveillance by immediate notification to all surveillance units and staff and conducting active searches in the concerned district and neighbouring districts for unreported AFP cases. The enhanced surveillance must be maintained for a period of six months after the last polio case is detected.

3. **Immunization response**: Detection of an imported wild poliovirus or cVDPV should be treated as a public health emergency. An aggressive mop up immunization response including at least two house-to-house oral polio vaccine (OPV) rounds covering a large geographical area should be conducted at the earliest. It is essential that there should be an Emergency Response Committee for polio virus importation and cVDPV. The Committee should have a contingency plan, budget, and operational guide to conduct the mop up immunization in an emergency situation.

4. **Documentation**: Detailed and comprehensive documentation is required to describe the epidemiologic background, findings of the case investigation and surveys including laboratory results, description of immunization response and results of enhanced surveillance.
NPSP Regions

APPENDIX E
APPENDIX F

India Poliovirus Laboratory Network
APPENDIX G
ASSIGNMENT OF
CASE IDENTIFICATION (EPID) NUMBERS FOR AFP CASES

Every AFP case must have a unique case investigation number that is used to track the case and to link laboratory data to the case. The format for the EPID number is used universally in all countries conducting AFP surveillance for polio eradication. The EPID number is the basis for the case-based surveillance database of all AFP cases investigated and tracked as part of the global Polio Eradication Initiative. The DIO/SMO is responsible for assigning the case identification numbers.

The case investigation number (also called the “EPID” number) comprises 13 alphabetic characters and digits.

Example: IND-AA-BBB-##-###

<table>
<thead>
<tr>
<th>Characters / Digits</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 3 (IND)</td>
<td>3-letter country code (1st administrative level)</td>
<td>IND</td>
</tr>
<tr>
<td>Next 2 (AA)</td>
<td>2-letter state code (2nd administrative level); state where case was detected and investigated.</td>
<td>UP</td>
</tr>
<tr>
<td>Next 3 (BBB)</td>
<td>3-letter district code (3rd administrative level); district where case was detected and investigated.</td>
<td>LNO</td>
</tr>
<tr>
<td>Next 2 (##)</td>
<td>2 digit identification of the year of paralysis onset (according to the Gregorian calendar). Note: If a case with disease onset on 28 December 2005 is reported on 5 January 2006, it is coded 05.</td>
<td>05</td>
</tr>
<tr>
<td>Next 3 (###)</td>
<td>Number of the case detected in that district in that calendar year.</td>
<td>From 001 onwards</td>
</tr>
</tbody>
</table>

The EPID number is intended only to serve as a unique identifier for each individual AFP case and its associated laboratory specimens and results. The district- and state-code components of the EPID number do not always correlate with the actual district where poliovirus infection occurred, as cases are occasionally detected and investigated in districts other than where infection occurred. Special efforts must be made by the SMO, through careful questioning during the epidemiologic investigation, to determine where poliovirus infection might have occurred, taking into account incubation period, travel history and community movement.

Example of case identification number: IND-TN-CNI-05-001
This is a case identification number for the first case in 2005 from the district of Chennai in the state of Tamil Nadu in India.

The two-letter codes for States/Union Territories and the three-letter codes for Districts are listed in Appendix H.
### APPENDIX H. STATE AND DISTRICT CODES

#### INDIA STATE / UNION TERRITORY CODES

to be used in assigning case investigation (EPID) numbers to AFP cases and specimens

<table>
<thead>
<tr>
<th>Name of State/Union Territory</th>
<th>Code</th>
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<tbody>
<tr>
<td>1 A&amp;N Islands</td>
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<tr>
<td>2 Andhra Pradesh</td>
<td>AP</td>
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<tr>
<td>3 Arunachal Pradesh</td>
<td>AC</td>
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<td>4 Assam</td>
<td>AS</td>
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<td>5 Bihar</td>
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<td>6 Chandigarh</td>
<td>CH</td>
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<td>CG</td>
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<td>8 D&amp;N Haveli</td>
<td>DN</td>
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<td>9 Daman &amp; Diu</td>
<td>DD</td>
</tr>
<tr>
<td>10 Delhi</td>
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<td>15 Jammu &amp; Kashmir</td>
<td>JK</td>
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<td>17 Karnataka</td>
<td>KA</td>
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<td>KE</td>
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<td>OR</td>
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<td>UA</td>
</tr>
<tr>
<td>35 West Bengal</td>
<td>WB</td>
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