Polio Eradication in India – Takeaways for Others
Dr Ranga Reddy Burri, President, IFCAI
A Webber Training Teleclass

POLIO ERADICATION IN INDIA TAKEAWAYS FOR OTHERS

Dr Ranga Reddy Burri, President, IFCAI

IFCAI
INFECTION CONTROL ACADEMY OF INDIA

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Comments on India's Polio eradication success

"India has shown the world that there is no such thing as impossible. This is likely the greatest lesson, and the greatest inspiration for the rest of the world." She attributed this to world-class health surveillance systems in India.

Margaret Chan, Director-General, World Health Organisation

"After this historic victory of humankind where millions of lives have been saved through tireless efforts of many, we have to take care of neighbours also. We should commit ourselves to creating a polio-free world,"

Pranab Mukherjee, President, Republic of India

"success was unmatched in scope and extent anywhere in the world. This had been made possible through teamwork and a highly creative communication strategy, which worked to dispel myths and fears and stimulated communities".

Sonia Gandhi, Chairperson, National Advisory Council

with resolute will at the highest levels, technological innovations like the indigenous bivalent polio vaccine, adequate financial resources and close monitoring leading to99 per cent coverage and India achieved polio eradication. A 2.3-million strong team of polio volunteers and 150,000 supervisors worked day and night to reach every child.

Dr Azad, Minister of Health, GOI, 2014

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Hosted by Paul Webber paul@webbertraining.com
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OBJECTIVES

- Introduction to Polio - Brushing up the basics
- Diagnosis and Treatment for Polio diseases
- Immunization, Opposition to vaccination efforts/ Vaccine confidence
- Polio eradication criteria
- Importance of Surveillance in control and prevention of Polio disease (scenario in India)
- India's Success story in eradication of Poliomyelitis
- Final steps to eradicate polio infection India
- How India rehabilitates polio diseased persons
- Role of Society, Governmental Nongovernmental Organization
- Current scenarios to eradicate Poliomyelitis in the world and learning from India

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Introduction

- The word poliomyelitis, coined in 1878, joins two Greek words. Poliós means "grey." Myelós means "core" or "marrow." Combined, they refer to the grey matter of the spinal cord. The suffix –itis means "inflammation."
- Poliomyelitis can cause inflammation of the spinal cord's grey matter, injuring the body's nervous system and sometimes causing paralysis or death.
- Poliomyelitis is a highly infectious disease caused by three serotypes of poliovirus. Type 1 is the most common, and also the strongest.
- A viral infection most often recognized by acute onset of flaccid paralysis.
- Infection with poliovirus results in a spectrum of clinical manifestations from inapparent infection to non-specific febrile illness, aseptic meningitis, paralytic disease, and death.

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Poliomyelitis Milestones

- First described by Michael Underwood in 1789
- First outbreak described in U.S. in 1843
- 21,000 paralytic cases reported in the U. S. in 1952
- Dr Jonas Salk developed the first vaccine-IPV against polio in 1955
- Dr Albert Sabin developed live OPV in 1961
- In 1974, world health assembly passes resolution to create the Expanded program on immunization (EPI) to bring vaccines to the world children
- In 1988,Global polio eradication initiative launched by world health assembly
- In 1990, global polio lab network established to detect WPV-Wild Polio Virus & VDPV-vaccine derived polio virus

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INDIA POLIO FACT SHEET

- Cases in 2011: 1 (last case 13 January 2011)
- Cases in 2010: 42 Cases in 2009: 741
- Cases in 1991: 6,028 Cases in 1985: 150,000
- Last wild poliovirus type 1 (WPV1) case: 13 January 2011, Howrah, West Bengal
- Last wild poliovirus type 2 (WPV2) case: October 1999, Aligarh, Uttar Pradesh
- Last wild poliovirus type 3 (WPV3) case: 22 October 2010, Pakur, Jharkhand
- Last positive case from monthly environmental sewage sampling (conducted in Delhi, Mumbai and Patna): November 2010, Mumbai
- Number of Supplementary Immunization Activities in 2011: -
  - ✓2 National Immunization Days (NIDs) immunizing 172 million children
  - ✓7 Sub-National Immunization Days (sNIDs) immunizing 50-70 million children each –
  - ✓1 Mop-up Emergency Activity immunizing 2.6 million children
- Number of Oral Polio Vaccine (OPV) doses administered in 2011: 900 million

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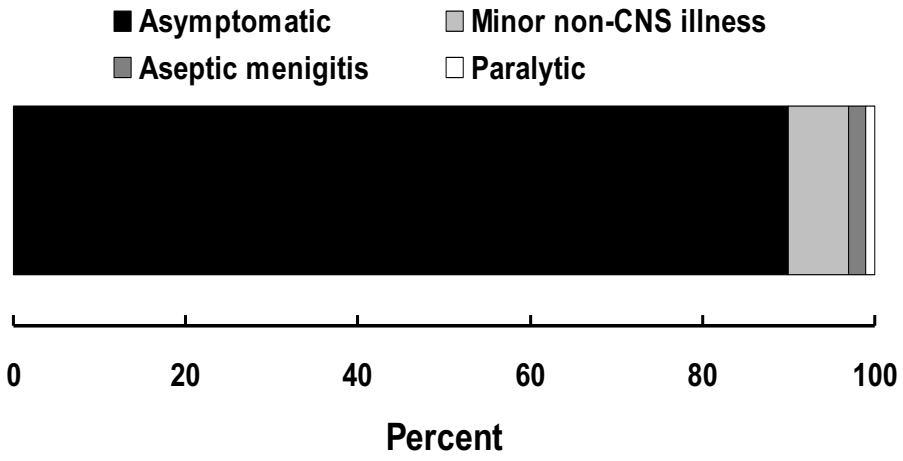
Outcomes of poliovirus infection



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Epidemiological pattern

- The epidemiological pattern of polio depends upon the degree of the socioeconomic development and health care services of a country.
- The pattern of the disease has been considerably modified by widespread immunization.

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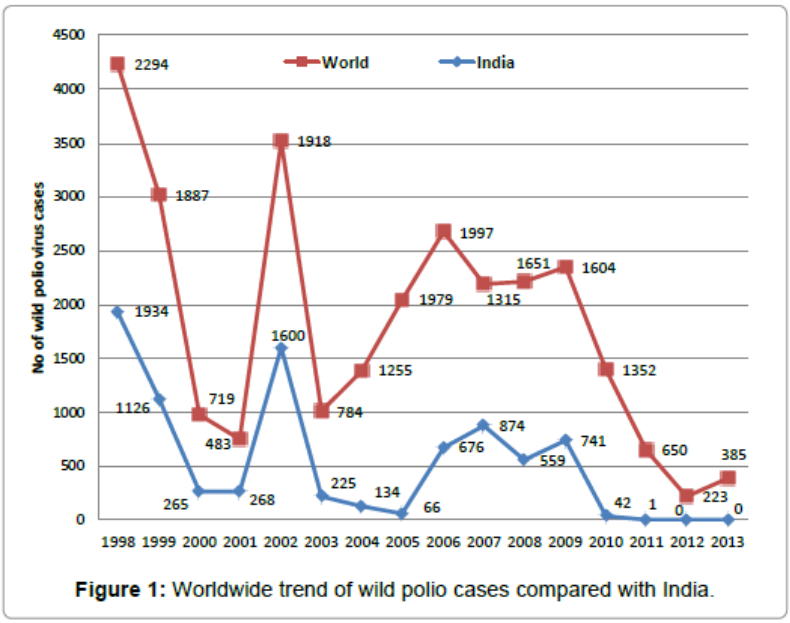

Figure 1: Worldwide trend of wild polio cases compared with India.

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According to the WHO; Three epidemiological patterns have now been delineated:

- Countries with no immunization: the virus infects all children, and by age 5 years almost all children develop antibodies to at least one of the 3 types of polio virus. In that pattern paralytic polio cases are frequent in infants.
- Countries with partial immunization: In these countries, wild polio virus is largely replaced by vaccine virus in the environment.
- Countries with almost total immunization coverage: in these countries polio is becoming rare, however, sporadic cases do occur rarely.

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Causative organism

- Poliovirus: belongs to "Picorna" viruses which are small RNA-containing viruses.
- Polioviruses have three antigenically distinct types, giving no cross immunity:
  - Type I: "Leon"; the commonest in epidemics
  - Type II: "Berlinhide"; the prevailing type in endemic areas.
  - Type III: "Lansing"; occasionally causes epidemics.
- Polioviruses are relatively resistant and survive for a long time under suitable environmental conditions, but are readily destroyed by heat (e.g. pasteurization of milk, and chlorination of water).

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Reservoir of infection

- Man is the only reservoir of infection of poliomyelitis.
- Man: cases and carriers
- Cases: all clinical forms of disease
- Carriers: all types of carriers (e.g. incubatory, convalescent, contact and healthy) except chronic type. In endemic areas, healthy carriers are the most frequent type encountered.

Foci of infection

- **Pharynx: the virus is found in the oropharyngeal secretions.**
- **Small intestine: the virus finds exit in stools.**

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Modes of transmission

Since foci of infection are the throat and small intestines, poliomyelitis spreads by two routes:

- Oral-oral infection: direct droplet infection
- Faeco-oral infection:
  - Food-borne (ingestion) infection through the ingestion of contaminated foods. Vehicles include milk, water, or any others that may be contaminated by handling, flies, dust….
  - Hand to mouth infection.

  (polio virus has the ability to survive in cold environments. Overcrowding and poor sanitation provide opportunities for exposure to infection.)

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Period of infectivity

- Contact and healthy carriers: about 2 weeks
- Cases: the cases are most infectious 7 to 10 days before and after the onset of symptoms. In the feaces, the virus is excreted commonly for 2 to 3 weeks, sometimes as long as 3 to 4 months.
- In polio cases, infectivity in the pharyngeal foci is around one week, and in the intestinal foci 6-8 weeks.
- Incubation Period: 7-14 days

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Susceptibility

- Age: more than 95% reported in infancy and childhood with over 50% of them in infancy.
- Sex: no sex ratio differences, but in some countries, males are infected more frequently than females in a ratio 3:1.
- Risk factors: (provocative factors of paralytic polio in individuals infected with polio virus): fatigue, trauma, intramuscular injections, operative procedures, pregnancy, excessive muscular exercise…
- Immunity: The maternal antibodies gradually disappear during the first 6 months of life. Immunity following infection is fairly solid, although infection with other types of polio virus can still occur.

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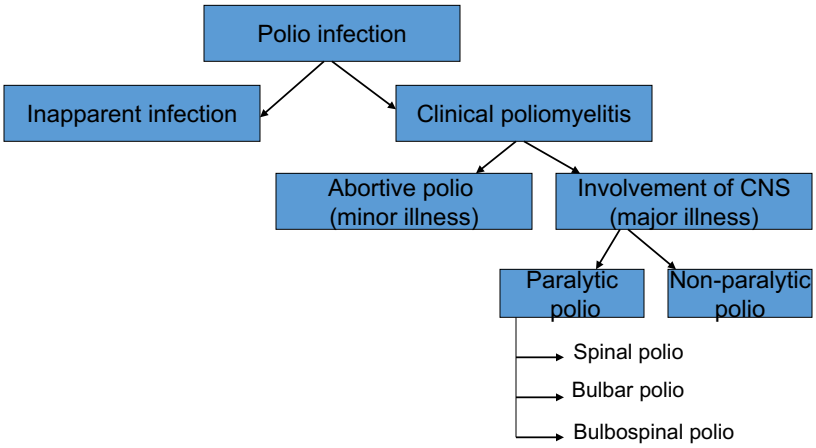
Sequelae of polio infection



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Inapparent infection

- Incidence is more than 100 to 1000 times the clinical cases.
- No clinical manifestations, but infection is associated with acquired immunity, and carrier state.

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Clinical poliomyelitis

I. Abortive polio (minor illness):

- The majority of clinical cases are abortive, with mild systemic manifestations for one or two days only, then clears up giving immunity. Some abortive cases may be so mild to pass unnoticed.
- Manifestations:
  - Moderate fever
  - Upper respiratory manifestations: pharyngitis and sore throat
  - Gastrointestinal manifestations: vomiting, abdominal pain, and diarrhea.

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Clinical poliomyelitis (cont.)

II. Involvement of the CNS (major illness):

- Affects a small proportion of the clinical cases, and appears few days after subsidence of the abortive stage. It takes two forms: nonparalytic and paralytic polio.
- Nonparalytic polio is manifested by fever, headache, nausea, vomiting, and abdominal pain. Signs of meningeal irritation (meningism), and aseptic meningitis (pain and stiffness in the neck back and limbs) may also occur.
- The case either recovers or passes to the paralytic stage, and here the nonpralytic form is considered as a “preparalytic stage”.

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Clinical poliomyelitis (cont.)

III. Paralytic poliomyelitis:

- Paralysis usually appears within 4 days after the preparalytic stage (around 7-10 days from onset of disease).
- The case shows fever, headache, irritability, and different paralytic manifestations according to the part of the CNS involved, with destruction of the motor nerve cells, but not the sensory nerve cells.
- Forms: spinal, bulbar, and bulbospinal.

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Spinal polio

- Different spinal nerves are involved, due to injury of the anterior horn cells of the spinal cord, causing tenderness, weakness, and flaccid paralysis of the corresponding striated muscles.
- The lower limbs are the most commonly affected.

Bulbar polio

- Nuclei of the cranial nerves are involved, causing weakness of the supplied muscles, and maybe encephalitis.
- Bulbar manifestations include dysphagia, nasal voice, fluid regurgitation from the nose, difficult chewing, facial weakness and diplopia
- Paralysis of the muscles of respiration is the most serious life-threatening manifestation.

Bulbospinal polio

- Combination of both spinal and bulbar forms

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Complications and case fatality

- Respiratory complications: pneumonia, pulmonary edema
- Cardiovascular complications: myocarditis, cor pulmonale.
- Late complications: soft tissue and bone deformities, osteoporosis, and chronic distension of the colon.
- Case fatality: varies from 1% to 10% according to the form of disease (higher in bulbar), complications and age (fatality increases with age).

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Case definition & Final Classification

The following case definition for paralytic poliomyelitis has been approved by CDC (1997)

- ***Clinical case definition***

Acute onset of a flaccid paralysis of one or more limbs with decreased or absent tendon reflexes in the affected limbs, without other apparent cause, and without sensory or cognitive loss.

Classification:

- **Probable:** A case that meets the clinical case definition.
- **Confirmed:** A case that meets the clinical case definition and in which the patient has a neurologic deficit 60 days after onset of initial symptoms, has died, or has unknown follow-up status.

  Confirmed cases are then further classified based on epidemiologic and laboratory criteria. Only confirmed cases are included in the *Morbidity and Mortality Weekly Report (MMWR)*.
- **Indigenous case:** Any case which cannot be proved to be imported.
- **Imported case:** A case which has its source outside the country. A

  person with poliomyelitis who has entered the country and had onset of illness within 30 days before or after entry

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Diagnosis and laboratory testing

- Laboratory studies, especially attempted poliovirus isolation, are critical to rule out or confirm the diagnosis of paralytic poliomyelitis.
- ***Virus isolation***

  The likelihood of poliovirus isolation is highest from stool specimens,

  intermediate from pharyngeal swabs, and very low from blood or spinal fluid.
- ***Serologic testing***

  A four-fold titer rise between the acute and convalescent specimens suggests poliovirus infection.
- ***Cerebrospinal fluid (CSF) analysis***

  The cerebrospinal fluid usually contains an increased number of leukocytes—from 10 to 200 cells/mm3 (primarily lymphocytes) and a mildly elevated protein, from 40 to 50 mg/100 ml.

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Prevention

General prevention:

- Health promotion through environmental sanitation.
- Health education (modes of spread, protective value of vaccination).
- Sero-prophylaxis by immunoglobulins:

  Not a practical way of giving protection because it must be given either or before or very shortly after exposure to infection.

  (0.3 ml/kg of body weight).
- Active immunization:
  - Salk vaccine (intramuscular polio trivalent killed vaccine).
  - Sabin vaccine (oral polio trivalent live attenuated vaccine).

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Inactivated Polio Vaccine

- Contains 3 serotypes of vaccine virus
- Grown on monkey kidney (Vero) cells
- Inactivated with formaldehyde
- Contains 2-phenoxyethanol, neomycin, streptomycin, polymyxin B
- Highly effective in producing immunity to poliovirus
- >90% immune after 2 doses
- >99% immune after 3 doses
- Duration of immunity not known with certainty

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Oral Polio Vaccine

- Contains 3 serotypes of vaccine virus
- Grown on monkey kidney (Vero) cells
- Contains neomycin and streptomycin
- Shed in stool for up to 6 weeks following vaccination
- Highly effective in producing immunity to poliovirus
- 50% immune after 1 dose
- >95% immune after 3 doses
- Immunity probably lifelong

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Salk vs Sabin vaccine

IPV (Salk)

- Killer formalised virus
- Given SC or IM
- Induces circulating antibodies, but not local (intestinal immunity)
- Prevents paralysis but does not prevent reinfection
- Not useful in controlling epidemics
- More difficult to manufacture and is relatively costly
- Does not require stringent conditions during storage and transportation. Has a longer shelf life.

OPV (Sabin)

- live attenuated virus
- given orally
- immunity is both humoral and intestinal. induces antibody quickly
- Prevents paralysis and prevents reinfection
- Can be effectively used in controlling epidemics.
- Easy to manufacture and is cheaper
- Requires to be stored and transported at subzero temperatures, and is damaged easily.

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First Standard- Polio Vaccination Schedule

Age	Vaccine	Minimum Interval
2 months	IPV	---
4 months	IPV	4 wks
6-18 months	IPV	4 wks
4-6 years*	IPV	4 wks

*the fourth dose of IPV may be given as early as 18 weeks of age

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Polio Vaccination of Unvaccinated Adults

- IPV
- Use standard IPV schedule if possible (0, 1-2 months, 6-12 months)
- May separate doses by 4 weeks if accelerated schedule needed

Polio Vaccination of previously vaccinated Adults

- Previously complete series → administer one dose of IPV
- Incomplete series→ administer remaining doses in series, no need to restart series

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Polio Vaccine Adverse Reactions

- Rare local reactions (IPV)
- No serious reactions to IPV have been documented
- Paralytic poliomyelitis (OPV)

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Vaccine-Associated Paralytic Polio

- Increased risk in persons ≥18 years
- Increased risk in persons with immunodeficiency
- No procedure available for identifying persons at risk of paralytic disease
- 5-10 cases per year with exclusive use of OPV
- Most cases in healthy children and their household contacts

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Polio Vaccine
Contraindications and Precautions

- Severe allergic reaction to a vaccine component or following a prior dose of vaccine
- Moderate or severe acute illness

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Control of patient, contacts and the immediate environment:

1) Report to local health authority: Obligatory case report of paralytic cases as a Disease under surveillance by WHO, Class 1.

2) Isolation: Enteric precautions in the hospital for wild virus disease; of little value under home conditions because many household contacts are infected before poliomyelitis has been diagnosed.

3) Concurrent disinfection: Throat discharges, feces and articles soiled therewith. Terminal cleaning.

4) Quarantine: Of no community value.

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5) Protection of contacts: Immunization of familial and other close contacts is recommended but may not contribute to immediate control; the virus has often infected susceptible close contacts by the time the initial case is recognized.

6) Investigation of contacts and source of infection: **Occurrence of a single case of poliomyelitis due to wild poliovirus must be recognized as a public health emergency prompting immediate investigation and planning for a large-scale response. A thorough search for additional cases of AFP in the area around the case assures early detection, facilitates control and permits appropriate treatment of unrecognized and unreported cases.**

7) Specific treatment: None; however, Physical therapy is used to attain maximum function after paralytic poliomyelitis.

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Epidemic measures:

- In any country, a single case of poliomyelitis must now be considered a public health emergency, requiring an extensive supplementary immunization response over a large geographic area.

Disaster implications:

- Overcrowding of non-immune groups and collapse of the sanitary infrastructure pose an epidemic threat.

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International measures:

- Poliomyelitis is a Disease under surveillance by WHO and was targeted for eradication by 2005.
- National health administrations are expected to inform WHO immediately of individual cases and to supplement these reports as soon as possible with details of the nature and extent of virus transmission.
- Planning a large-scale immunization response must begin immediately and, if epidemiologically appropriate, in coordination with bordering countries.
- Once a wild poliovirus is isolated, molecular epidemiology can often help trace the source.
- Countries should submit monthly reports on case of poliomyelitis AFP cases and AFP surveillance performance to their respective WHO offices.
- International travelers visiting areas of high prevalence must be adequately immunized.

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Polio Eradication Timeline

- Last case in United States in 1979, However, the virus has been brought into the country by travellers with **polio**. The last time this happened was in 1993.
- In 1988,Global polio eradication initiative launched by world health assembly
- Western Hemisphere certified polio free in 1994
- Last isolate of type 2 poliovirus in India in October 1999
- Last case of wild polio virus reported in india-2011
- India certified as polio free in 2013
- WHO region of South-east Asia was declared polio free in 2014
- Globally synchronized switch from trivalent to bivalent OPV in implemented in 2016
- The only three endemic countries as of 2016 are Afghanistan, Pakistan and Nigeria.
- Global eradication goal to achieve by 2018 (now 2023).

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Importance of surveillance in control & prevention of Polio disease

- **The key challenge now is to ensure any residual or imported poliovirus in the country is rapidly detected and eliminated.**
- **This requires very high levels of vigilance and emergency preparedness to respond to any importation of wild poliovirus.**
- The Government of India and all states are putting together Emergency Preparedness and Response Plans to ensure a rapid and appropriate response to any case of polio in the country.
- The challenge is to ensure all **children up to 5 years of age continue to take OPV at every available opportunity (polio campaigns and routine immunization)** both in and outside the polio-endemic states until global eradication is achieved.
- Ensuring **populations on the move – migrants, nomads and cross-border movements** – both inside and outside polio-endemic, high-risk and re-infected states and entering India from neighbouring Pakistan and Nepal, are protected with OPV in each round.
- Tackling the risk of complacency among the community and within the polio programme in view of zero cases.
- Keeping polio eradication as a key health priority in India until global eradication.

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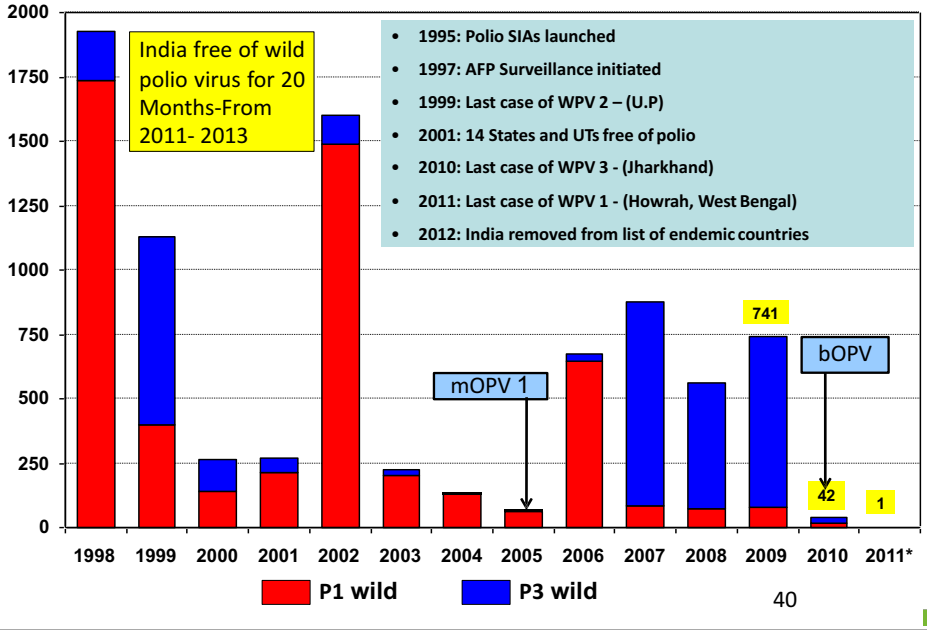
A Snapshot of Polio Eradication in India - 2013



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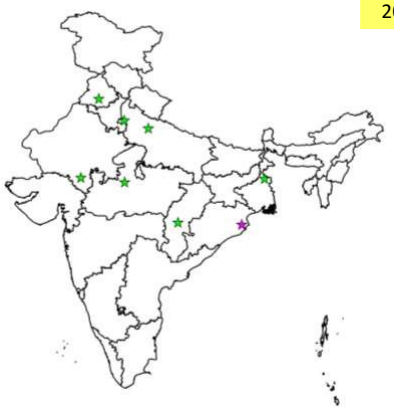
AFP surveillance and polio situation in 2009-12

Year	AFP	WPV	Compatible	VDPV
2009	50,405	741	473	21
2010	55,785	42	190	5
2011	60,751	1	50	7
2012	7,122	0		1

Spot map of VDPVs 2011-12



No circulating VDPVs
No genetic linkage amongst 2011 VDPVs
No genetic linkage with VDPVs of 2009 & 2010

VDPVs (2011-12*)			
State	P2	P3	Total
Chhattisgarh	1		1
Madhya Pradesh	1		1
Orissa		1	1
Punjab	1		1
Rajasthan	1		1
Uttar Pradesh	2		2
West Bengal	1		1
Total	**7**	**1**	**8**

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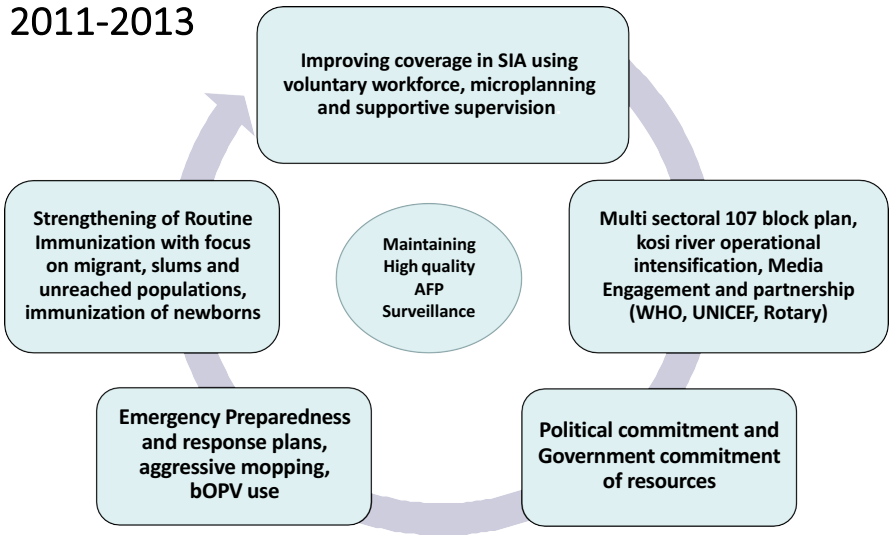
Strategies for Polio Eradication in India During 2011-2013



Research to guide policy decision

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Action No. 1 : Intensive Polio SIAs

National Immunization Days (NID)

- Children immunized: 172 million
- Houses visited: 220 million
- Vaccinators deployed: 2.3 million

Sub-National Immunization Days (SNID)

- Children immunized: 70 million
- Houses visited: 81 million
- Vaccinators deployed: 500,000

902 million doses administered in 2011 and missed Children varied from 0.3% to 7.8%

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Action No. 2: Intensifying Routine Immunization

- Year 2012-13 declared as 'Year of Intensification of Routine Immunization in India'
- 239 high focused districts identified for focused attention
- Immunization Technical Support Unit (ITSU) established
- Reach the unreached through Immunization weeks
- Modernizing AVD mechanism & enhancing human resources to improve access to immunization services
- Branding & demand generation of Routine Immunization services & Media sensitization
- Web enabled mother and child tracking system

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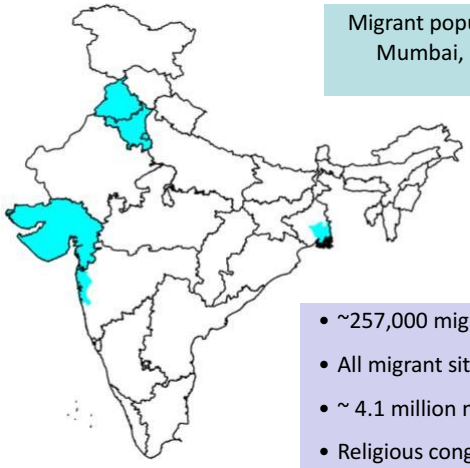
Action No. 3: Focus on Migrants Populations



Migrant populations of states with high migration Delhi, Mumbai, Punjab, Haryana, Gujarat & West Bengal vaccinated during each SIA

- ~257,000 migrant sites identified in India
- All migrant sites included in SIA microplans
- ~ 4.1 million migrant children vaccinated in NID
- Religious congregations also covered

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Polio vaccination of migrants and children in transit

•8 million children in transit immunized in India each round
• 100,000 of these in running trains

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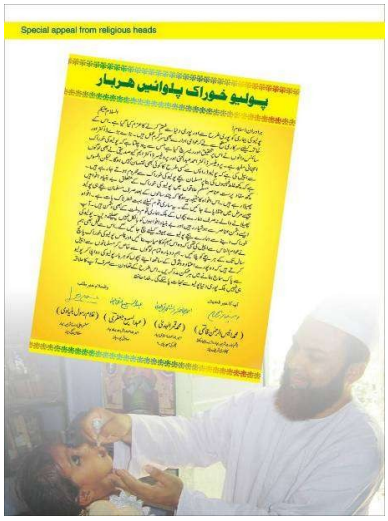
Action No. 4: Tackling vaccine refusal through focused communication



- Muslim female vaccinators & community mobilizers on each team
- Special signed appeals muslim leaders & imams
- Imam meetings
- Mosque announcement & haj advocacy
- Village level influencers, public representatives, local doctors supported vaccination

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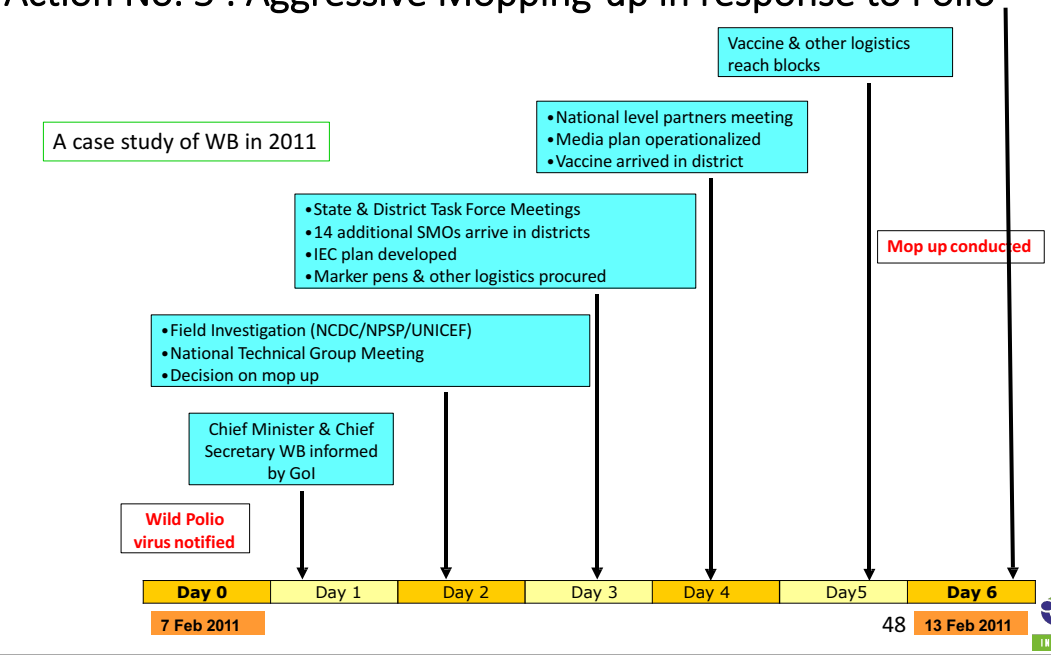
Action No. 5 : Aggressive Mopping-up in response to Polio



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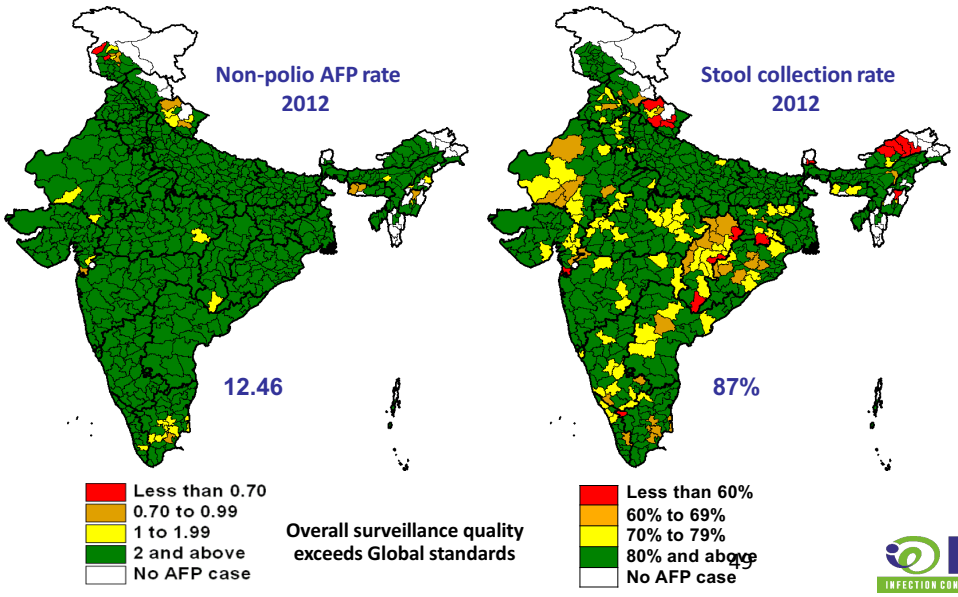
Action No. 6 : Maintaining sensitive AFP and Environmental Surveillance



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Action No. 7 : Research to guide programme activities and measure progress In Hot Spots of India-2010-11

Trends in Seroprevalence Against Poliovirus

	Moradabad Nov 2007 (N=121)	AFP cases UP Nov 08 – mid 09 (169)	Moradabad May 2009 (N=534)	UP & Bihar Aug 2010 (N=1280)	UP & Bihar Aug 2011 (N=1246)
Age	6-7 mo	6-11 mo	6-7 mo	6-7 mo	6-11 mo
Type 1	78%	96.5%	99%	98%	98.5%
Type 2	56%	33.7%	75%	65%	85%
Type 3	69%	42.6%	49%	77%	88.2%

High immunity levels sustained for P1 in 2010-11
Increasing trend in immunity level for P3 in 2010-11

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Risks to Polio Eradication in India

- Complacency
- International importation particularly in areas with low population immunity and high migration.
- Reintroduction of virus into traditional endemic areas of UP and Bihar and survival of poliovirus in the migrant and mobile communities leading to further spread
- Gaps in AFP surveillance or delays in detection of WPV
- Delayed and inadequate response to importation

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2011-2013 priorities: journey to Polio Eradication Certification

- **Intensified surveillance for early detection**
- **Rapid and effective response to any Wild Poliovirus detection**
- **Sustaining quality of coverage in campaigns especially in migrant/mobile populations**
- **Routine immunization intensification with focus on pockets of low coverage**
- **Planning for the end game strategy, incl. research to guide policy**
- **Certification**

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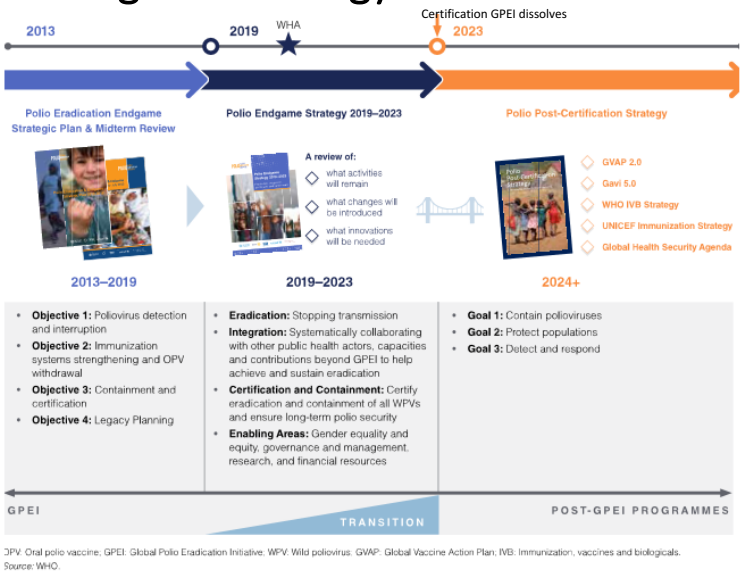
Global Polio Endgame Strategy



OPV: Oral polio vaccine; GPEI: Global Polio Eradication Initiative; WPV: Wild poliovirus; GVAP: Global Vaccine Action Plan; IVB: Immunization, vaccines and biologicals.
Source: WHO.

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Endgame strategy plan 2013-2018

- **Detect and interrupt all poliovirus transmission**
- **Strengthen immunization systems and withdraw oral polio vaccine**
- **Contain poliovirus and certify interruption of transmission**
- **Plan polio's legacy**
- **Strengthening disease surveillance**
- **Improving the quality of immunization campaigns**
- **Building capacity to respond to outbreaks.**

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Polio-Free Certification

- Criteria for certification
  - ✓ presence of certification standard surveillance
  - ✓ access to WHO accredited laboratory
  - ✓ the absence of wild poliovirus transmission for at least three consecutive years
  - ✓ ensure laboratory containment of WPV and VDPVs
- India certified as polio free in 2013
- Certification of South East Asia region in 2014

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Post-Certification Strategy

Strategy has three goals:

- **Contain poliovirus sources:** Ensure potential polioviruses are properly controlled or removed
- **Protect populations:** Withdraw the oral live attenuated polio vaccine (OPV) from use and immunize populations with inactivated polio vaccine (IPV) against possible re-emergence of any poliovirus
- **Detect and respond:** Promptly detect any poliovirus reintroduction and rapidly respond to prevent transmission

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Global Polio Endgame Strategy 2019-23

Table 1. Goals of the *Polio Endgame Strategy 2019–2023*

Goal One: Eradication	• Interrupt transmission of all wild poliovirus (WPV) • Stop all circulating vaccine-derived poliovirus (cVDPV) outbreaks within 120 days of detection and eliminate the risk of emergence of future VDPVs
Goal Two: Integration	• Contribute to strengthening immunization and health systems to help achieve and sustain polio eradication • Ensure sensitive poliovirus surveillance through integration with comprehensive vaccine-preventable disease (VPD) and communicable disease surveillance systems • Prepare for and respond to future outbreaks and emergencies
Goal Three: Certification & Containment	• Certify eradication of WPV • Contain all polioviruses

Source: WHO

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Global Polio Endgame Strategy 2019-23

http://polioeradication.org/wp-content/uploads/2019/06/english-polio-endgame-strategy.pdf

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How INDIA rehabilitates polio diseased persons

- Evidence indicates that with proper education and rehabilitative services, mental status may stabilize or improve even with worsening physical condition
- A scheme District Disability Rehabilitation Centre for persons with disabilities launched by the Hon'ble Minister of Social Justice and Empowerment, Government of India
- Govt bears the expenses incurred for travel and treatment, rehabilitation, callipers and wheel chair *etc*.
- Availability of assistive devices
- Non Governmental Organization (NGO) assisted people with disability and their families to construct accessible toilets
- District Rehabilitation Center (DRC) Project started in 1985.
- Four Regional Rehabilitation Training Centers (RRTC) have been functioning under the DRCs scheme at Mumbai, Chennai, Cuttack, and Lucknow
- National Information Center on Disability and Rehabilitation
- National council for Handicapped Welfare
- National Level Institutes—NIMH, NIHH, NIVH, NIOH, IPH.

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Role of Society, Governmental Nongovernmental organization

- India proved to the world how to conquer this disease: through the strong commitment of the government, seamless partnership comprising the government, Rotary clubs, WHO and Unicef.
- Tireless hard work of millions of front-line workers - vaccinators, social mobilisers and community and health workers.
- Community mobilisers started talking about the need for hand-washing, hygiene and sanitation, exclusive breastfeeding up to the age of six months, diarrhoea management with zinc and oral rehydration therapy, and routine immunisation, necessary to sustain the success of polio eradication.
- India's polio campaign gathered momentum when it focused on marginalised and mobile people, and began working in earnest with religious leaders in Muslim communities to urge parents to immunise their children.
- Government ownership of the initiative at all levels of governance, absolute accountability, meticulous microplanning, and real-time monitoring and review of the ongoing program.
- Building partnerships with the private sector, along with involvement of socio-religious leaders and celebrities, were key interventions needed to tackle social resistance against a mass public health campaign.

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Polio eradication campaigns: Every stakeholder in Action

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Current Scenarios to eradicate Poliomyelitis in the world and learning from India

- India's triumph over polio is replete with lessons to be learned.
- Lessons can be broadly categorized as government ownership, innovations in program delivery, technical advances, building partnerships with private and social sectors, and massive social mobilization.
- Technical advances that included identification of suboptimal efficacy of trivalent OPV in some highly endemic states and subsequent deployment of highly potent monovalent and bivalent OPVs in the program also proved to be real game changers.
- Novel yet simple measures such as finger marking, inclusion of female staff in the vaccinators team, "bindi marking" to denote number of under 5 children in the household, new born tracking, and mapping missed children greatly facilitated OPV delivery.
- Finally, the lessons learned in India's success story against polio have helped GPEI restructure their Polio Eradication and Endgame Strategic Plan
- Limited trivalent OPV efficacy in this region informed the GPEI efforts to bolster OPV campaigns with incorporation of IPV.

- GPEI: Global Polio Eradication Initiative
- OPV: oral polio vaccine
- WPV: wild polio virus

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List of the Initiatives towards POLIO Eradication

- Children's rallies
- Detailed house-level microplanning to reach every child
- Training of vaccinators & community mobilizers
- Mobilizing the community
- Announcing the round
- Vaccine distribution
- **Booth day**
- Bulawa Toli
- **Reaching every house, reaching every child**
- House marking
- Finger marking
- Dealing with resistance
- **Reaching children on the move**
- Border vaccinations
- **Reaching the hardest to reach**
- **Focusing on high-risk groups**
- Newborn tracking
- **Religious engagement**
- **Working with influencers**
- **Celebrities & media engagement**

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Polio as of August 2020

- A cVDPV2 outbreak has been detected in Sudan. WHO and UNICEF are working closely with the Ministry of Health to plan and launch an effective outbreak response to limit virus spread.
- Polio vaccination campaigns continue to resume in countries worldwide in the context of strict COVID-19 infection prevention and control measures. A campaign is in progress in some areas of Pakistan, the second held in the nation since campaigns resumed in July.

Wild poliovirus type 1 and Circulating vaccine-derived poliovirus cases

Total cases	Year-to-date 2020		Year-to-date 2019		Total in 2019	
	WPV	cVDPV	WPV	cVDPV	WPV	cVDPV
Globally	87	211	64	69	174	367
—In Endemic Countries	87	76	64	16	174	40
—In Non-Endemic Countries	0	135	0	53	0	327

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SUMARY

- India removed from the list of polio-endemic countries by WHO in 2013
- Risk of importation from countries with continuing polio circulation remains
- Strategies and plans in place to prevent polio importation and for an emergency response to an importation
- The challenge is to ensure all children up to 5 years of age continue to take OPV at every available opportunity (polio campaigns and routine immunization) both in and outside the polio-endemic states until global eradication is achieved.
- Ensuring populations on the move – migrants, nomads and cross-border movements – both inside and outside polio-endemic, high-risk and re-infected states and entering India from neighbouring Pakistan and Nepal, are protected with OPV in each round.
- Tackling the risk of complacency among the community and within the polio programme in view of zero cases.
- Keeping polio eradication as a key health priority in India until global eradication.

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References and further reading

- **full text of the speech delivered by Prime Minister Manmohan Singh at the Polio Summit, in New Delhi on February 25, 2012.** https://www.thehindu.com/news/resources/pms-speech-at-polio-summit/article2932093.ece
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- Polio Eradication in India: The Lessons Learned Naveen Thacker, MBBS, MD, Vipin M. Vashishtha, MBBS, MD, Deep Thacker, MBBS

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August 26, 2020	*(FREE Teleclass)* **HOSPITAL LAUNDRY AND *C. DIFFICILE* SPORE INACTIVATION** Speaker: **Kevin P. McLaren**, American Reuseable Textile Association
September 10, 2020	**LOOK AT WHAT THE CAT SCRATCHED IN - PET ASSOCIATED ZOONOSES, WHAT'S NEW AND RELEVANT FOR INFECTION PREVENTION AND CONTROL** Speaker: **Prof. Jason Stull**, University of Prince Edward Island, and Ohio State University
September 17, 2020	**REPROCESSING OF CRITICAL FOOT CARE DEVICES** Speaker: **Clare Barry**, Infection Control Consultant, Canada, and **Merlee Steele-Rodway**, Canadian Association of Medical Device Reprocessing
September 24, 2020	**WATERBORNE PATHOGENS: WHY IS THEIR PROFILE CHANGING?** Speaker: **Prof. Syed A Sattar**, Professor Emeritus of Microbiology, University of Ottawa
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