

PROGRESS OF POLIO ERADICATION IN NEPAL

1996



2014



Child Health Division/ Department of Health Services (DoHS)
Ministry of Health and Population (MoHP)
Kathmandu, Nepal

October, 2015

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Preface

This report documents the polio eradication progress and efforts in Nepal from 1996 to 2014. It aims to compile and consolidate the relevant information for results and lessons learnt to date. It serves as a reference material as well as a document of Nepal polio free country.

Nepal has made tremendous effort for polio eradication. The efforts are based on the global polio eradication strategies. Nepal endorsed the decisions of World Health Assembly held in 1988 and was the signatory of the Polio Eradication Initiative (PEI). For this purpose, Nepal adopted four strategies for polio eradication such as high routine immunization coverage, supplementary immunization days, high quality AFP surveillance and mopping up. These four strategies have been considered as the pillars of the polio eradication program. The countries of South East Asia Region were declared **polio** free by the WHO Regional Certification Commission for Polio Eradication (RCCPE) on 27 March 2014 in Delhi India. Ministry of health and population, Nepal celebrated polio free Nepal on 7th May 2014 in Pokhara. The last polio case was detected in Nepal on 30 August 2010. It has been made possible by strong commitment of the government, and local resource mobilization along with an intensive involvement of the female community health volunteers, partners, community and civil societies at national, regional, district and community levels.

I would like to extend my sincere thanks to all female community health volunteers, partners, communities and civil societies who involved in the systems strengthening, service delivery and partnership approach in order to reach every child with polio vaccine to make Nepal polio free.

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Preface

This document is the product of activities and efforts of polio eradication carried out by all actors especially FCHVs and health institutions across the country from 1996 to 2014. The efforts have also strengthened the health systems, community structure and partnership. It is a reference document for Polio free Nepal.

In 1985 World Health Organization (WHO) estimated that every year some 350,000 cases of Poliomyelitis occurred in the world. As the known reservoir of the poliovirus are human beings, and the mode of transmission is person-to person through faecal-oral route, and an effective vaccine is available, technically, it was considered a eradicable disease and so lots of effort has been put into it by various partners with a goal to eradicate polio by 2000 initially and postponed till 2005 later on. But it was not possible by the time.

Nepal as a signatory for global polio eradication initiative executed its strategies and followed the guidelines developed by WHO. On basis of them, Comprehensive Multi-Year Plan of Action-cMYPA (2002-2007; 2008-2011, 2011-16) has been developed and implemented to eradicate the polio from Nepal.

The WHO Regional Certification Commission for Polio Eradication (RCCPE) declared polio free Nepal on 27 March 2014 in Delhi India. The Minister of Health and population announced the Nepal polio free in an official ceremony on 7th May 2014 in Pokhara Nepal. It is noted that the polio eradication initiative is an immense public health intervention which is made possible by joint venture and partnership approach where the government, community and civil societies planned and worked together for the results.

My sincere thank goes to all FCHVs, health institutions, communities and civil societies who involved in the planning, execution and follow up to ensure every child immunized with polio vaccine and Nepal polio free for future generation.

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Abbreviations

AES	Acute Encephalitis Syndrome
AFP	Acute Flaccid Paralysis
AHW	Auxiliary Health Worker
ANM	Auxiliary Nurse Midwife
BCG	Bacillus Calmette-Guerin
CDC	Centres for Disease Control and Prevention
cMYP	Comprehensive Multi-Year Plans
cMYPA	Comprehensive Multi-Year Plan of Action
cVDPV	Circulating Vaccine-Derived Polio Virus
DHO	District Health Office
DoHS	Department of Health Services
DPT	Diphtheria, Pertussis and Tetanus Vaccine
DQSA	Data Quality Self-assessment
EDCD	Epidemiology and Disease Control Division
EHCS	Essential Health Care Services
EPI	Extended Program Immunization
ERC	Expert Review Committee
EWARS	Early Warning and Reporting System
FCHV	Female Community Health Volunteers
GAPS	Geographic Assessment of Planning and Services
GAVI	Global Alliance for Vaccines and Immunization
GDP	Gross Domestic Product
GIVS	Global Immunization Vision and Strategy
GPEI	Global Polio Eradication Initiative
Hib	Haemophilus Influenza B vaccine
HMIS	Health Management Information System
IEC	Information, Education and Communication
INGO	International Non-Governmental Organisation
IPD	Immunization Preventable Diseases
IPV	Inactivated Polio Vaccine
JE	Japanese Encephalitis
MCHW	Maternal and Child Health Worker
MDG	Millennium Development Goals
MNT	Maternal/Neonatal Tetanus
MoHP	Ministry of Health and Population
MR	Measles and Rubella
NCC	National Certification Committee
NGO	Non-Governmental Organisation
NHSP	National Health Sector Program
NID	National Immunization Day
NIP	National Immunization Program

NPHL	National Public Health Laboratory
OPV	Oral Polio Vaccine
ORI	Outbreak Response Immunization
PEI	Polio Eradication Initiative
PEN	Polio Eradication Nepal
RCCPE	Regional Certification Commission for Polio Eradication
RCS	Rapid Convenience Survey
RED	Reaching Every District
RHD	Regional Health Director
RI	Routine Immunization
SEAR	South-East Asia Region
SIA	Supplementary Immunization Activities
SMO	Surveillance Medical Officer
SNID	Sub-National Immunization Day
UN	United Nations
UNFIP	United Nations Fund for International Partnership
USAID	United States Agency for International Development
VDC	Village Development Committee
VHW	Village Health Worker
VPD	Vaccine Preventable Diseases
WHO	World Health Organization
WPR	Western Pacific Region
WPV	Wild Polio Virus

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Progress of Polio Eradication in Nepal

The Government of Nepal as a signatory country of World Health Assembly, had expressed the commitment for this initiative at various Global forums and took ownership for the efforts of polio eradication that have been focused on partnership and community based approach. The Polio Eradication Initiative's goal is to reach every child with polio vaccine and to ensure a polio-free Nepal for future generations. This report documents the history of polio eradication efforts in Nepal from 1996 to 2014. It aims to compile and consolidate the results to date, lessons learnt and relevant information to give a full picture of polio eradication efforts made in Nepal and this document will serve as a reference material as well as other such initiatives for polio eradication of Nepal. The South East Asia Region countries were declared polio -free by the WHO Regional Certification Commission for Polio Eradication (RCCPE) on 27 March 2014 in Delhi, India. The Ministry of Health and Population announced Nepal Polio Free in an official ceremony on 7th May 2014 in Pokhara. The last polio case was detected in Nepal on 30 August 2010 and the zero polio case status is maintained since then.

The Expanded Program on Immunization (EPI) in Nepal started in 1979; it was piloted in three districts (Rupandehi, Dhanusa and Sindhupalchowk) with BCG & DPT. By 1988, six primary series of antigens (BCG, DPT, Measles and OPV) were introduced in all 75 districts. The current, Programme for Immunization Preventable Disease (IPD), then Polio Eradication Nepal (PEN) was established in June 1998 in collaboration between Ministry of Health & Population and WHO. Built on this network additional vaccine preventable disease surveillance of Neonatal Tetanus, Measles, and Acute Encephalitis Syndrome were added by 2003 onward.

The Comprehensive Multi-Year Plan of Actions¹ which is prepared incorporating GIVS (Global Immunization Vision and Strategy), NHSP (Nepal Health Support Program I and II) and other global documents are the guiding documents for the National Immunization Program in which the activities related with child mortality and morbidity reduction associated with VPDs have been identified. It provides a road map to achieve the goal set in GIVS, Millennium Development Goals (MDGs4) and the milestones stated in NHSP-II (90 per cent coverage of measles). NIP is the only public health program which has access to the marginalised and hard-to-reach population and addresses the issues of gender equity. Access to routine immunization has improved in both villages and municipalities due to the appropriate immunization service delivery strategy of the fixed, outreach sessions and mobile clinics allocated in each VDC and municipality. The supplementary immunization strategy (high risk approach of immunization) targeted for the control, elimination and eradication of the VPDs were also designed accordingly.

Advocacy, social mobilization and IEC materials were strongly placed at the community to the central level. Steering and Co-ordination Committees have been formed at 5 levels (National-2, Regional, District, and VDC/ Municipality). In addition, there are four committees for polio eradication e.g. National Polio Certification Committee, National Expert Review Committee, Task Force for Laboratory Containment of wild Polio Virus and Task Force for Responding to

¹ . Comprehensive Multi-Year Plan of Action- cMYPA (2002-2007; 2008-2011, 2011-16)

Outbreak of Wild Polio Virus and Circulating Vaccine Derived Polio Virus which provide technical support to the polio eradication initiatives.

Key Strategies for polio eradication

Routine immunization- Routine immunization is the cornerstone of polio eradication. Uniform and 95% OPV3 routine coverage increases the immunity level in community and thus interrupts the circulation of WPV transmission. Hence, the access of routine immunization services should be expanded at grass-root level.

Supplementary Immunization Activity (SIA) - National Immunization Days aiming to improve universal coverage should be conducted on regular basis. It is an additional national or sub-national mass vaccination campaign designed to vaccinate all children under five which helps in interruption of transmission of wild poliovirus. It aims to vaccinate everyone under five, regardless of their previous immunization status.

Surveillance of acute flaccid paralysis (AFP) - All AFP cases (suspected polio) are detected, reported and investigated. This allows for the identification of any remaining reservoirs of wild polio virus and helps in the decision making for the SIAs need.

Mop-up campaigns - These are intensive, house to house campaigns that are conducted during the final stage of polio eradication. Mop up is conducted when the polio virus is confined in a limited geographical area, where all children are tracked and vaccinated reaching each house hold, even after successful implementation of NIDs and routine immunization.

Historical aspects of Polio Eradication² initiative have been included in the document. Total of 32 polio cases have been detected from 1999. Among them 30 were from Terai districts. No polio cases have been reported in Nepal since the last polio case with onset 30 August 2010³.

The last nation-wide national immunization days (campaign) was held in December 2013 and January 2014 (in 68 districts) and the remaining 7 Himali districts observed NID in March and June 2014.

Process and Objective Learning

The Polio Eradication Initiative in Nepal (PEI) is the greatest public health intervention in the partnership of government with the community and civic societies where in each steps of planning and implementation, this partnership became more robust. The Polio Eradication initiative is a system support intervention where the existing government immunization delivery system strengthened and played a vital role to achieve the results through engaging the local community. The professionals, political and non-political actors of the community as well as national level heavily engaged in formulating and aligning with global policy, and delivering the polio eradication initiatives. Government commitment and ownership set a high

² AFP Surveillance Report- Nepal- 1998-2013

³ . Annual Report of DoHS/MoHP -2010/11 to 2012/13

motivation among stakeholders, communities and individual and further fostered local, national and International partnership.

The process and objective for learning from the initiatives of Polio Eradication are:

- Integration of other VPD surveillance on AFP surveillance platform,
- Synergy to VPD surveillance and routine immunization,
- Social mobilization and bringing tranquillity during insurgency,
- Innovation in planning and service delivery,
- Enhancement of Program ownership and performance,
- Enhancement in monitoring and strengthening of supervision system,
- Strategy formulation to reach un-reached population

Context

1.1. Introduction

This report documents the history of polio eradication efforts in Nepal from its inception in 1996 to 2014. It aims to compile and consolidate all its relevant information to present a clear picture of polio eradication efforts, results and learning. It serves as a reference material and documents learning of the strategies, interventions and also to use this learning in other immunization preventable diseases (IPDs). The polio documentation is conceptualised in the three steps as follows.

Polio Documentation- Conceptual Framework (1996-2014)

Table-1

See	→	Study	→	Share
<ul style="list-style-type: none"> • Program--EPI, NIP , IPDs- • Partnership- state and non-state • Participation-health and non-health actors • Progress -past and present • Performance of actors- state and non-state • People- perception 	→	Process and results- Fact and figure Steering structure and Network Strategies <ul style="list-style-type: none"> • Routine Immunization - Trend analysis • Supplementary Immunization Activities (SIA)- NID, SNID, • AFP Surveillance - (1998-2014) • Mop-up Campaign- Issues and Challenges, Initiatives and interventions	→	<ul style="list-style-type: none"> • Learning -process and objective • Partnership- state and non-state actors • Innovative approaches- reaching to un-reach • Social mobilization- - during Insurgency • Ownership–local & government

Currently, country witnessing zero polio cases for almost 5 years, Nepal is at the juncture of eradicating the disease.

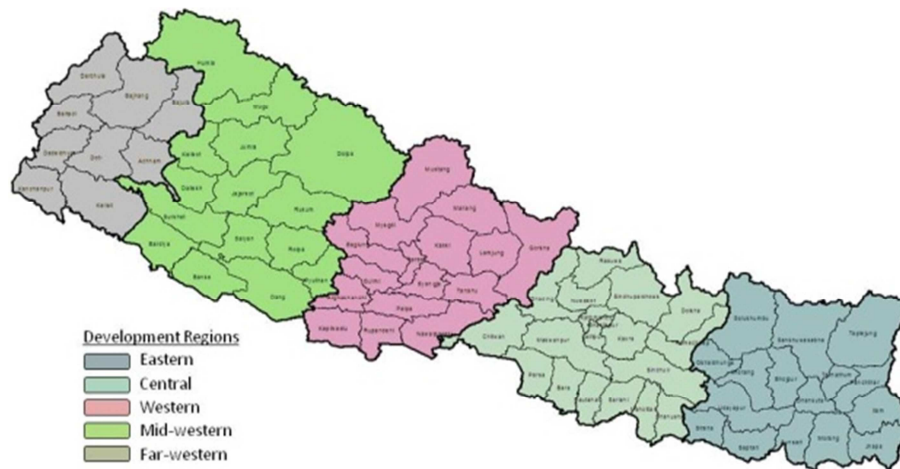
1.2 Nepal Country Profile

Nepal is one of the least developing countries in the world. It is a small landlocked country with a total area of 147,181 square kilo-meters, bordered by China to the North and India to the South, East and West. The Terai (flatland) stretches the entire southern border with India.

Temporary and permanent migration between India and Nepal is common in this area⁴. Nepal is a federal republic nation and concentrating on the process of drafting a new onstitution⁵. Administratively, Nepal has 75 District Development Committees, 58 Municipalities, and 3,914 Village Development Committees. There are five development regions. Health data is generally presented by district and region rather than ecological zone.

Development Region of Nepal

Fig-1



1.2.1 Demography and ecology

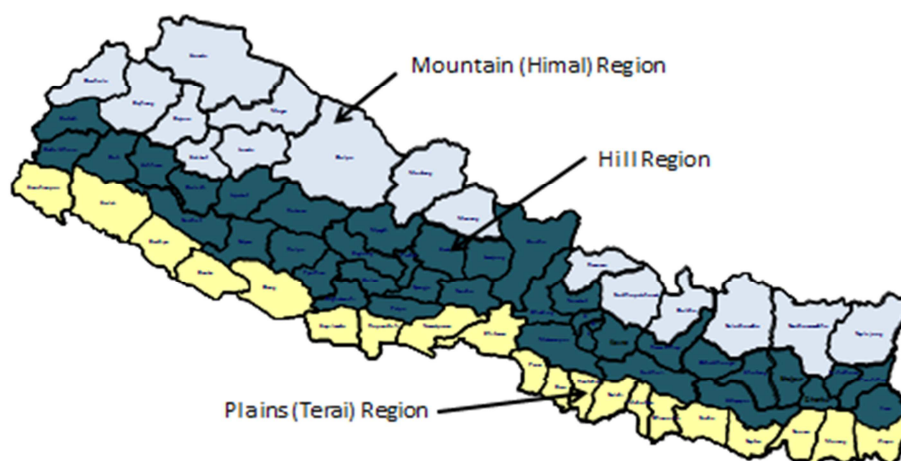
Nepal is of roughly trapezoidal shape, 800 kilo-meters (497 mi) long and 200 kilo-meters (124 mi) wide, with an area of 147,181 km² (56,827 sq mi). Nepal is divided into three ecological Regions Mountain, Hill and Terai. The mountain zone ranges in altitude from 4,877 to 8,848 meters above the sea level. While it covers 35% of Nepal's land area, only 7% of the population resides there. The hill zone ranges in altitude from 610 to 4,876 meters and contains fertile valleys. It comprises about 41% of Nepal's land area and 44% of its population. The southern plains (Terai) is the most fertile part of the country. Although this zone covers just 23% of the total land area, it is home to 49% of the population. Temporary and permanent migration between India and Nepal is common in this area.

⁴ Country Profile: Nepal - 2012

⁵ Interim Constitution- 2007

Ecological zones in Nepal

Fig.2



According to the 2011 census, Nepal's population grew from 9 million people in 1950 to 26.5 million in 2011. The annual population growth rate at present is estimated at 1.35%.

1.2.2 Socio- economic information

Total population (2012)	27,474,000
Gross national income per capita (PPP international \$, 2012)	1,470
Life expectancy at birth m/f (years, 2011)	67/69
Probability of dying under five (per 1 000 live births, 2012)	42
Probability of dying between 15 and 60 years m/f (per 1 000 population, 2011)	183/157
Total expenditure on health per capita (Intl \$, 2011)	68
Total expenditure on health as % of GDP (2011)	5.4
Literacy Rate (Male)	75.1%
Literacy Rate (Female)	57.4%

Economic growth of the country is adversely affected by the political uncertainty. Nepal's gross domestic product (GDP) for 2012 was estimated at over \$17.921 billion (adjusted to Nominal GDP). In 2010, agriculture accounted 36.1%, services 48.5%, and industry 15.4% of Nepal's GDP. Agriculture employs 76% of the workforce, services 18% and manufacturing/craft-based industry 6%. The rate of unemployment and underemployment approaches half of the working-age population. Thus many Nepali moves to other countries in search of work. As of 2010, the total remittance value is worth around \$3.5 billion. In 2009 alone, the remittance contributed to 22.9% of the nation's GDP.

Nepal has made significant progress in achieving its MDGs and has received international praise for efforts made for it in spite of a decade-long armed conflict and political instability. The health-related MDGs have already been achieved, or are on track.

In 1990s, Nepal had a great socio-political change. Private sectors and civic societies became major players in resource mobilising at the grassroots level. The participation of local people in the development process was increased drastically and democracy deepened. The economy grew by over six per cent per year, the number of NGOs increased in resources at community level thus poverty decreased, inequality narrowed, and exemplary achievements were made in the social sector which were possible due to the active collaborative partnering of the community and private sector.

Health System and Immunization service

2.1. National Health Policy and Plan

The National Health Policy⁶ aimed to upgrade health status of the rural population by extending basic primary health services, and to provide the service and opportunity to the people together with the benefits of modern medical facilities. The 9th and 10th five-year plan of Government of Nepal set the targets for the reduction of child, infant and maternal mortality by improving their health status and thus to increase over all life expectancy of the people of Nepal. Immunization program emerged as one of the most important programs in contributing the child mortality and provided an excellent foundation for the launching of polio eradication efforts in 1996.

The Second Long-Term Health Plan (1997-2017) of the MoHP, developed in 1997 reaffirmed the government's commitment to improve the maternal and child health of the rural populations. The plan identified Essential Health Care Services (EHCS), which addresses the most imperative health needs of the population and are highly cost-effective. Childhood immunization for diphtheria, pertussis, TB, measles, polio and hepatitis B were outlined as EHCS.

Nepal Health Sector Program-Implementation Plans (NHSP-IP I & II)⁷ reiterate Nepal's commitment to eradicate polio. According to the plan, this efforts to be supported by the following measures:

- Ensuring the maintenance and replacement of the cold chain at the peripheral level;
- Developing a policy on immunization in municipalities to ensure access to immunization for all municipal population
- Developing and implementing a comprehensive social mobilization and communication plan to create awareness/demand for immunization services among stakeholders in the community
- Continued use of micro-planning in low-performing districts and municipalities in order to focus on hard-to-reach children who are not fully immunized or who have been missed entirely.

The National Health Policy-1991 aims to provide universal coverage of primary health care services including immunization to rural community across the country. It guides and organises the management and structure of health sector. The organogram of MoHP envisages that the department of health services (DoHS) is one of three departments. The Child Health Division (CHD) is one of seven divisions of DoHS. It oversees the immunization in the country (See annex-1 for details).

⁶ National Health Policy- 1991, MoHP Nepal

⁷Nepal Health Sector Program-Implementation Plans - I & II (2004- 2010 & 2010-2015)

2.2. Child Health Division (CHD)

The Expanded Programme of immunization (EPI) remained as a project of Ministry of Health and Population of Nepal until Child health division was established in 1994 (2051 B.S) which was a section of family health division till then. Child health division, one of the seven divisions in DoHS, is responsible for national immunization program. In Child health division, there is a separate EPI section which monitors the implementation of the activities. It also coordinates the partners of immunization including WHO, UNICEF and Rotary international etc.

The polio eradication is a global call. Government of Nepal included it as a priority in its policy documents. Intra-ministerial coordination and commitment was crucial to make it happened and thus, CHD bridges by advocating adopting, formulating the strategy aligning with the global policies into a local context. It further took lead in planning, delivering and managing the National Immunization Program throughout the country. To carry out a successful polio eradication program and reduction of morbidity, mortality occurring from other vaccine preventable diseases, national immunization program has been supported by different Divisions and Centres of DoHS/ MoHP, including the National Public Health Laboratory, the National Health Training Centre and the Epidemiology and Disease Control Division.

2.3. Immunization Program in Nepal

The NIP is a priority programme (P1) of Government of Nepal. Immunization is one of the most cost-effective health interventions to save lives, improve health and ensure long-term prosperity. It has significantly reduced the burden of vaccine preventable diseases (VPDs) and child mortality and has contributed in achieving the Millennium Development Goal (MDG4) on child mortality reduction.

The routine immunization service is delivered throughout the country adopting mainly fixed, outreach and mobile strategies. Thus, all the targeted population of the districts (municipalities and Village Development Committees -VDCs) receives immunization service free of cost. NIP section of CHD leads in identifying, planning, implementing and monitoring the immunization activities at the National level. The Regional Health Directorate (RHD) acts as a facilitator between the Centre and the Districts and has a principal role of monitoring the health related activities in the districts.. NIP is focusing in municipalities to D(P)HO implements, analyse and response with the health structures (PHC,HP and SHP) at VDC level and coordinate, facilitate with municipalities to implement the national activities happened. Immunization service outlets are established through RED strategy based micro planning to increase the accessibility of parents for their children to get vaccination done

Smallpox eradication opened the window for the control, eliminate and eradicate the vaccine preventable disease from the world. World Health Organization (WHO) in 1974 envisioned to add traditional vaccine on existing network of small pox project and was named Expanded Program on Immunization (EPI). Soon after this, countries included traditional vaccine in their Immunization programmes. In Nepal, EPI program came in existence in the fiscal year 1977/78. To start with BCG and DPT were the only vaccine in the schedule and a year later injection TT was included. Measles and polio were added in program in 1979/80. EPI grew to a national scale in 1989 through the universal childhood immunization approach with six antigens.

Until 2002/03 only six antigens-BCG, DPT, OPV and Measles were in national immunization schedule. Underused and new vaccines were introduced later and thus currently there are 10 antigens in RI schedule. Thus Hep B as mono valent was introduced in 2002, Hepatitis mixed with DPT (tetra as DPTHepB) in 2004, Japanese encephalitis vaccine in 2008, Haemophilus influenza vaccine mixed with DPTHepB (as Penta DPTHepBHib) in 2009 and Rubella mixed with measles vaccine (as MR Vaccine) in 2013. NIP has also planned to introduce Pneumococcus conjugated vaccine in 2014. Inactivated polio vaccine (IPV) will also be introduced as a part of Polio End-Game Strategy 2013-2018. With the inclusion of underused and new vaccine in national immunization schedule CHD, DoHS decided to change the existing name of "Expanded program on immunization" (EPI) to "National Immunization Program" (NIP) in 2005.

All the vaccines of NIP schedule are provided free of cost. About 70% vaccines are borne by the government. Periodically many interventions were introduced in NIP to strengthen RI so that the desired achievements can be obtained. Supplementary immunizations against polio (NID) and measles (Measles catch up and follow up campaign) and Japanese encephalitis were carried out to reduce the burden of diseases and to meet the objectives of national immunization program. Further, expansion of VPD surveillance such as NT, AES and Measles to create the evidences of the burden of diseases and respond in time were also included accordingly with the support of WHO.

National Immunization program goals and objectives:

Goal: To reduce child, mortality, morbidity and disability associated with vaccine preventable diseases

Objectives⁸

- Achieve and sustain 90% coverage for DPT₃ by 2008 and of all antigens by 2010.
- Maintain Polio free status.
- Sustain MNT elimination status.
- Initiate Measles elimination.
- Expand Vaccine Preventable Diseases (VPDs) surveillance.
- Accelerate control of other vaccine preventable diseases through introduction of new vaccines.
- Improve and sustain immunization quality.
- Expand immunization services beyond infancy

Immunization Service Delivery Strategies:

NIP delivers the immunization services through Routine and Supplementation of additional doses of the vaccines. VHW, MCHW ANM, Staff nurse, AHW, Health assistants and other health workers carries immunization through the health facilities and outreach sessions based at VDC and municipalities to increase the access to all eligible for immunization including marginalised and hard-to-reach population. The frequency of immunization services delivered

⁸Multi-Year Plan of Action 2007 – 2011, DoHS/MoHP

through health facilities or fixed immunization sessions may vary depending upon session size and so is at VDC level which usually carryout 3 to 5 outreach sessions allocated in each VDC in consensus of local community. The supplementary immunization strategy is in place for the catch up, follow up and high risk approach of immunization for the VPDs targeted for the control, eliminate and eradicate. Following strategies are practiced throughout the country.

- **Health facilities (Fixed session):** Immunization services are provided at hospitals, primary Health care centers, health posts and sub-health posts. Some health facilities equipped with refrigerators provide immunizations daily, weekly, every fifteen days or monthly.
- **Outreach services (Session):** Immunization services are provided through outreach session to the people who have difficulty in reaching health facilities due to long distance to travel. At least three to five immunization sessions in a month are conducted at several locations in each VDC.
- **Mobile teams:** Geographical conditions such as lack of roads and bridges hamper immunization in remote areas. Retention of health worker is identified hurdle in remote areas for routine immunization services. To address these issues, a common strategy together with community is developed mostly as four visits in a year to complete all antigens within the 1st birth day of a child.
- **Private and NGOs INGO clinic:** Though immunization services are provided mainly through government facilities, the private sectors and NGOs clinics are also providing the service

Private sector provides immunization services mainly in urban areas: through clinics of hospitals, nursing homes and through NGOs. Government supplies vaccines and related logistics and provides technical assistance including monitoring and supervision to ensure uniformity and quality service.

Evolution of Polio Eradication

3.1 Global initiative in Polio Eradication

In the early 20th century, polio was one of the most dreadful diseases and was a public health problem in industrialized countries. It was paralysing thousands of children every year. Soon after, there was an introduction of effective vaccines in the 1950 and 1960. Lameness surveys during the 1970 revealed that the disease was also prevalent in developing countries. As a result, during the 1970 routine immunization was introduced worldwide as part of national immunization programmes, to control the disease in many developing countries. In 1988 the Global Polio Eradication Initiative began, polio paralysed more than 1000 children worldwide every day. Today, polio has been free from most of the world. WHO has defined disease eradication as the “permanent reduction to zero of the world wide incidence of infection caused by a specific agent as a result of deliberate efforts; intervention measures [including vaccination] are no longer needed.” Therefore, the global eradication of polio involves both halting the incidence of the disease and eradicating the virus that causes it.

In May 1988, the World Health Assembly committed the member states of the World Health Organization (WHO) to the global eradication of poliomyelitis by the year 2000 (Resolution WHA41.28). At this time, an estimated 350,000 paralytic cases occurred from 125 countries on five continents. Since that time, polio cases have declined by over 99%.

One reason that polio was chosen as the second disease for worldwide eradication was that it was one of only a limited number of diseases which can be eradicated. (Measles, rubella and guinea worm disease are additional examples.) It was considered possible to eradicate polio due to the following reasons:

- the disease only affects humans, and there is no animal reservoir;
- an effective, inexpensive vaccine exists;
- immunity is life-long;
- The virus does not survive for a long time in the environment.

The decision to target polio for eradication was also supported by the experience in the Americas: Countries such as Brazil and Cuba had eliminated the disease largely through mass vaccination campaigns, known as National Immunization Days. In fact, when the U.N. declared its intention to eradicate polio worldwide (1988), the Americas Region was already close to eradication after the Pan American Health Organization declared its commitment in 1985 to eliminate polio within 5 years.

Recent Developments (1989-2014)

In 1989, the 42nd World Health Assembly approved a general Plan of Action for Global Polio Eradication⁹. The worldwide strategy would be based on what was being done in the Americas and was similar to that used for smallpox eradication in the 1970s. The commitment of external partners such as Rotary International, UNICEF and the Centers for Disease Control and Prevention (CDC) helped push to the initiative forward. These partners provided funding, staff, scientific expertise, laboratory capacity and volunteers that were each critical to the effort.

The number of cases declined rapidly in the first several years after the resolution was passed. Although the target of eliminating of polio by 2000 proved elusive, important milestones were reached during the first two decades. These include China having its last case of endemic polio in 1994 and WHO's Western Pacific Region and its European Region being certified as polio-free in 2000 and 2002, respectively.

In 2010, the *GPEI Strategic Plan 2010-12* was launched to chart a course to polio eradication by the end of 2012. While significant progress was made in the first two years, including the reporting of the last polio case from India, the strategic plan's milestones for the end of 2010 and 2011 were missed. In 2011 there was an upsurge of cases in Nigeria, Pakistan and Afghanistan, accompanied by international spread. Advancement in the science and technology to decades of investment in vaccination programs, polio cases have been reduced by 99% - from more than 350,000 to 223 in 2012. But the disease continues to threaten children in some of our world's poorest countries and their communities.

As a result of these developments," The *Global Polio Emergency Action Plan 2012-13* was developed in early 2012, based on a resolution by WHO. Its objectives were to intensify support to Nigeria, Pakistan and Afghanistan in order to stop transmission of all polioviruses by the end of 2012, sustain on-going efforts in the Democratic Republic of Congo, Chad and Angola, and to close the funding gap.

Unfortunately, the objectives of the emergency action plan were not achieved. Moreover, after reaching a record low of 223 cases worldwide in 2012, the number of cases surged in 2013 as the disease resurfaced in five countries which had been polio-free.

In spite of setbacks in other parts of the world, the South-East Asia Region (SEAR) was certified polio free on 27 March 2014. This region encompasses a large geographic area, from India in the west to Indonesia in the east. To the far northeast, the Democratic People's Republic of Korea (North Korea) of this region, 11 countries of SEAR Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste are polio free.

The eradication of polio from the Western Pacific Region (WPR) was a significant development for the abdication efforts of countries in SEAR since many of them share borders with highly-populated countries of the WPR. For instance, Nepal, India, Myanmar, Bhutan, and North Korea each has a border with China. Therefore, when China was certified as polio free in 2000, it became highly unlikely that any of these countries would have polio

⁹ Plan of Action for Global Polio Eradication -WHO - 1989

importation for China. As the table below shows, all countries in SEAR have been polio free for more than five years except Nepal and India.

SEAR Countries, by Year of Last Wild Polio Case reported

Table-2

<u>Country</u>	<u>Year of Last Polio Case</u>
Bhutan	1986
Sri Lanka	1993
Maldives	1994
Democratic People's Republic of Korea (North Korea)	1996
Timor-Leste	1996
Thailand	1997
Bangladesh	2006
Malaysia	2007
Nepal	2010
India	2011

3.2 Polio Eradication Initiative in Nepal

The Comprehensive Multi-Year Plans (cMYP) issued by the National Immunization Program (NIP) provides a road map for five-year periods to achieve the Millennium Development Goals (MDGs), the milestones stated in NHSP-II and the resolutions of the World Health Assembly. These plans (2002-2007; 2008-2011; and 2011-2016) are the guiding documents for the NIP in which the activities have been identified with their incurred and secured cost so that hindrances in reducing child mortality and morbidity associated with VPDs are sorted out in time.

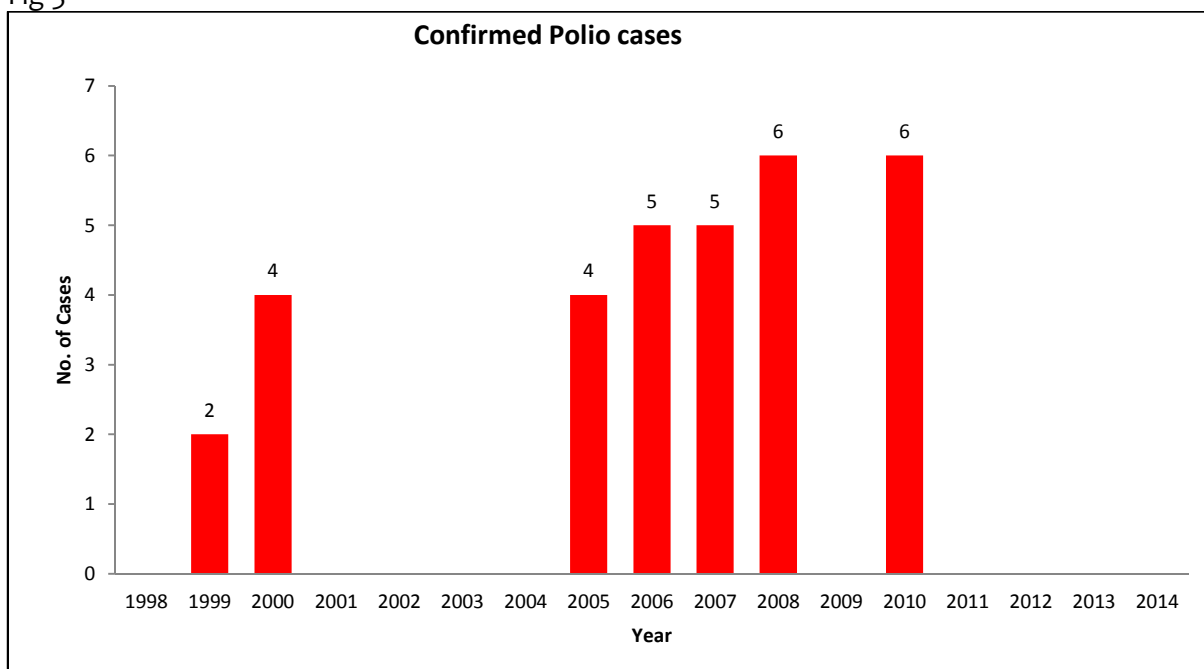
The first plan articulated an objective to achieve certification for polio eradication by the year 2005. Although this objective has not been reached, the most recent plan (2011-2016) reaffirmed the government's commitment to eradicate polio. In addition to strengthening immunization services overall, the document outlined the following polio-specific strategies:

- Achieving and maintaining population immunity levels adequate to stop transmission of polio
- Responding adequately to any outbreak of polio with appropriate vaccine
- Achieving and maintaining the certification standards for AFP surveillance at the national and sub-national levels.

3.2.1 Status of Polio cases in Nepal

Nepal reported 32 confirmed cases of polio since 1998. The table below shows the number of confirmed WPV cases by year, serotype and district from 1998-2014.

Fig-3



Polio Cases in Nepal, 1998-2014

Fig-4



The last indigenous case in the country was reported in 2000 (4 cases), and Nepal remained polio free for the ensuing four years from 2001 to 2005. However, 4-6 cases of polio imported from neighbouring country were detected yearly in 2006-2010 with the exception of 2009. Nepal and India have an open boarder with strong socio-economic relationship and high mobility for employment.

3.2.2. Strategies for Polio Eradication

3.2.2.1 Routine Immunization¹⁰

OPV was incorporated into routine vaccination in 1980. It is one of ten antigens administered to children. OPV is given at six, ten and fourteen weeks of age through various static, outreaches, mobile and private/NGO run clinics. Every month around 16,000 outreach clinics are run all over the country to provide routine vaccination which are run by village health workers and maternal and child health workers. Female Community Health Volunteers (FCHVs) play a crucial role in mobilizing the residents for services and in following up on children who are overdue for a vaccine(s). Vaccines are supplied to the public and private sectors free of charge. Each VDC /Municipality has a minimum of one health facility called primary healthcare center, health post or sub health post, which is run by the government as following.

- **Health facilities (Fixed session):** Immunization services are provided at hospitals, primary Health care centers, health posts and sub-health posts. Some health facilities equipped with refrigerators provide immunizations daily, weekly, every fifteen days or monthly.
- **Outreach services (Session):** Immunization services are provided through outreach session to the people who have difficulty in reaching health facilities due to long distance to travel. At least three to five immunization sessions in a month are conducted at several locations in each VDC.
- **Mobile teams:** Geographical conditions such as lack of roads and bridges hamper immunization in remote areas. Retention of health worker is identified hurdle in remote areas for routine immunization services. To address these issues, a common strategy together with community is developed mostly as four visits in a year to complete all antigens within the 1st birth day of a child.
- **Private and NGOs INGO clinic:** Though immunization services are provided mainly through government facilities, the private sectors and NGOs clinics are also providing the service
- **Private sector** provides immunization services mainly in urban areas: through clinics of hospitals, nursing homes and through NGOs. Government supplies vaccines and related logistics and provides technical assistance including monitoring and supervision to ensure uniformity and quality service.

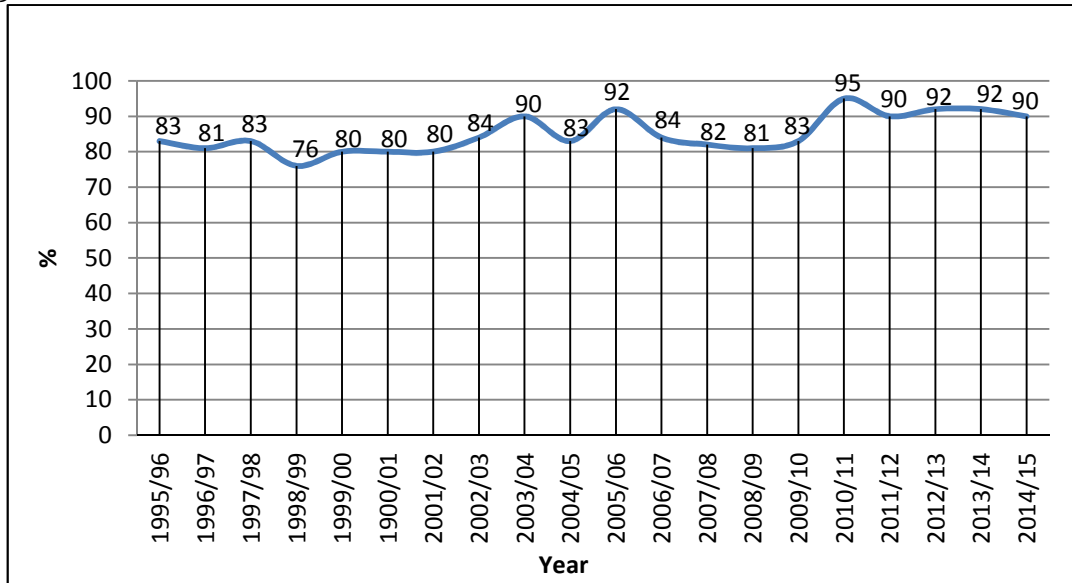
Since the three doses of OPV are scheduled to be administered within eight weeks, the percentage of children who start the series but do not finish (i.e. drop out), should be quite low. From 2006 to 2012 dropout averaged 2.3%, ranging from a low of -1.9% in 2011 to a high of 7.9% in 2010. Coverage for the full series of OPV (“OPV3”) has ranged from 76-95% over the past 17 years, with an average of 84%.

¹⁰ National Immunization Plan-DoHS/MoHP-2005 and cMYP

OPV3 Coverage by Fiscal Year (~August 1 through ~July 31), 1995/96 – 2014/15

Coverage rounded to nearest whole number

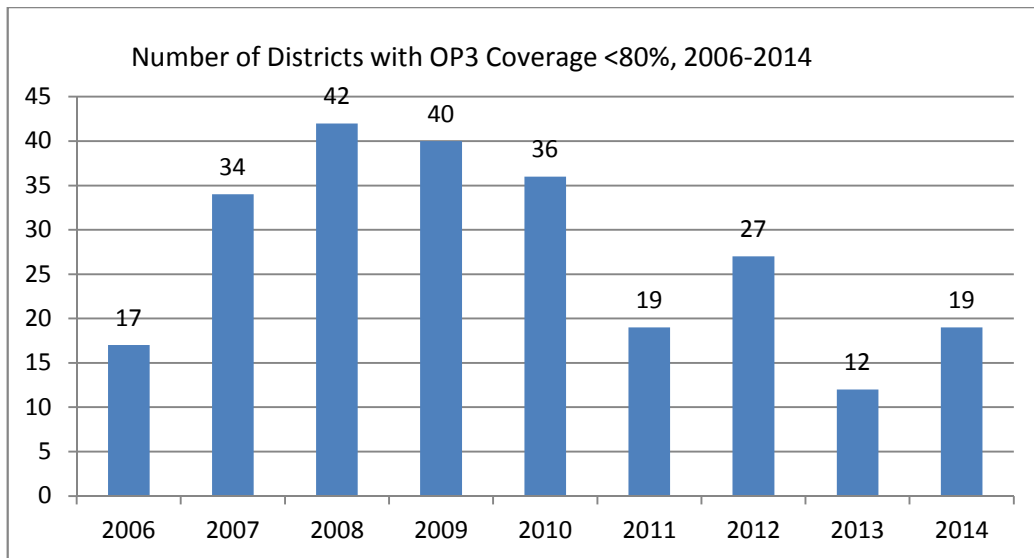
Fig-5



Source: HMIS Annual Report, 2014/15

While the average OPV3 coverage nationwide is about equal to what is generally considered necessary for herd immunity, problems persist at the local and district levels which leave the population in certain areas vulnerable if the virus were reintroduced. Historically, coverage has tended to be lower outside the Central Development Region, which encompasses Kathmandu Valley. The graph below shows the number of districts by year which have failed to achieve OPV3 coverage of at least 80%:

Fig-6



Other significant problems exist in the administration of the immunization sessions. For example, sessions are sometimes not held per the VDC's session schedule. This could be due to lack of supervision, unavailability of vaccines or the vaccinator position being vacant. Long-term vacancies of vaccinator positions are a major issue in some areas.

3.2.2.2. Supplementary Immunization Activities (SIA)

National Immunization Days (NIDs) have targeted children less than five years and have been conducted two days throughout the country. Winter season is usually chosen because this is typically a time of low transmission of polio. However, climate dictates that campaigns in certain Himal Districts must be held in another season (usually spring). While the second round of a campaign is ideally held 4-6 weeks after the first, some adjustments to this schedule have been necessary in Nepal due to unavailability of vaccines, political problems, lack of funding and the desire to synchronize the polio campaign with the measles/rubella campaign. SIA does not replace routine immunization.

SIA requires substantial planning and resources. The success of the campaign is strongly linked to the adequacy of the planning and the provision of required resources. Female community health volunteers are the key vaccinators for polio in the campaigns. The first day, polio is given in the assigned booths while on second day, vaccination teams make house-to-house visit to administer polio to the left out children.

Prior to 2000, vaccine was given to children at the booth on both days; no house-to-house search was undertaken. However, experience showed that the vaccination team needed to be more proactive in reaching children who did not come to the booth on the first day, since some of the them didn't come on the second day either. As a result, all SIAs since 2000 have employed house-to-house searching instead of booth vaccination on the second day.

The first of the NIDs that have occurred in Nepal was held in 1996, when the government committed to eradicate the disease. Additionally, 3 Sub national Immunization Days (SNIDs) have taken place, beginning in the year 2000. SNIDs employ nearly the same methods as NIDs. A brief summary of SNIDs follows the description of NIDs.

Case study of social mobilization- In DHO Gulmi- (1997 /1998), DHO organized a meeting with stakeholders (government, officials, local bodies , political leader, business persons, health institute and civil societies etc) and briefed the concept and importance of NID. After extensive discussion, the NIDs were planned, organized and implemented where different task forces (advocacy, monitoring & supervision, rally, volunteer, resource mobilization etc.) were formed for social and resource mobilization and their roles and tasks were defined .In order to follow up, a number of regular meetings was organised to discuss and update. In case of social mobilization, there was an exciting and typical example of banner support for NID where each business person provided clothes for 2- 5 banners and DHO managed to write NID's slogan on the banner. (The name of shopkeeper was mentioned in a corner for his/her support). In this way, each VDC (79) received 5 banners for NID.

In 2003 - 2007 (pick insurgency period), the civil societies particularly Human Rights Organizations were mobilized to inform and communicate the message of polio eradication to Maoists at central, regional and district levels. The Maoists communicated the message to their cadres at the community level. They were become more proactive to support in vaccine transportation and session conduction due to channel wise well communication from centre to local level, active participation of local people and direct benefit to the community. More-over the process and practices of polio initiatives are simple, clear and transparent to everyone.

Sub National Immunization Days

The decision to conduct an SNID versus an NID is based on factors such as nationwide coverage data, the status of surveillance and OPV coverage in high-risk districts, and the circulation of WPV (including across international borders). Additionally, the practicalities of funding and vaccine availability at national and international levels sometimes dictate that a campaign must be limited to a subsection of the country. The methods used to conduct the SNIDs are virtually the same as those used for NIDs.

The thirteen rounds of SNIDs have been conducted in Nepal between 2000 and 2008. Historically, the Terai and areas immediately north (known as the “Inner Terai”) have been targeted in response to WPV circulating in northern India and/or the high-risk nature of the districts in these areas (e.g. below-average health services and immunization coverage levels; high degree of migration to and from India; ethnic minorities). Kathmandu Valley has been included in the SNIDs due to the propensity of migration and travel to and from the Terai, as well as the fact that some slum areas in the valley have been difficult to reach during routine vaccination.

3.2.2.3. Mop-up Campaigns

Mop-up campaigns have been conducted in response to new polio cases identified in a focal area. First mop up was in April and May 2001 in 23 districts. Since then, 33 rounds of additional mop-ups have occurred in 2001, 2005, 2006, 2007, 2008 and 2010.

The target area for the campaign depends on factors such as migration patterns, travel history of the case(s) and the virus type in circulation. Mop-up campaigns generally start a minimum of two weeks after the polio case is first reported. This time lapse is necessary for laboratory confirmation of the case and for planning the campaign. The plan stipulates that if the polio case travelled or resided in more than one district during the period of incubation or infectiousness (35 days before until the 35 days after onset of paralysis), then it is advised to conduct mop-up.

There are some important distinctions in the way mop-up campaigns are carried out as compared to SIAs. They are summarized as follows:

- Vaccination is done house to house. Booths are not used.
- Mop-up may require at least three rounds of immunization while SIAs are normally done in two.
- Campaign planning and scheduling are based on the number of houses to be targeted. The entire district in which the case was identified has been included in the mop-up, and all adjoining districts have generally been included.

- Interpersonal communication and social mobilization are heavily used.
- Supervision is more comprehensive than during SIAs.

Outbreak Response Immunization (ORI) in response to AFP cases

Prior to 2012, outbreak response immunization (ORI) was conducted in response to every AFP case. Children under five who lived in close proximity to the AFP patient's home were administered one dose of OPV. Generally, about 200 to 500 children had been vaccinated through house-to-house activity. While conducting the ORI, the investigation team would also search for new AFP cases in the community, which could signal the possibility of a polio outbreak. The rationale for conducting an ORI was threefold: 1) If the AFP was ultimately determined to be caused by poliovirus, transmission to unvaccinated or under vaccinated children living near the patient's home could easily be infected prior to the start of SIAs; 2) The house-to-house search allowed for rapid identification of any other children under age 15 with AFP. 3) It was an effective tool in raising awareness on the importance and use of vaccination.

The number of reported AFP cases had grown substantially due to increased sensitivity of the surveillance system. Because only a minute fraction of these cases turned out to be caused by poliovirus and the cost of conducting ORIs was high, they were discontinued.

3.2.2.4. Surveillance of Acute Flaccid Paralysis

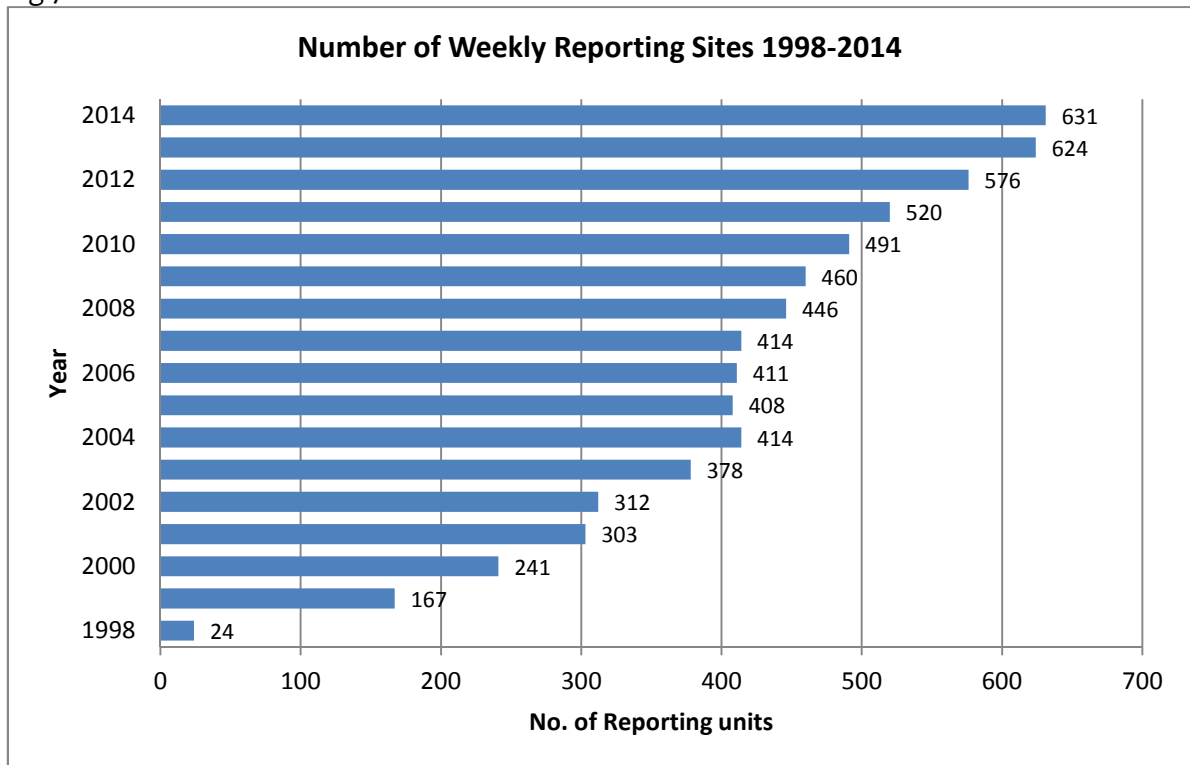
The growth of the RC/ SMO network has allowed the number and diversity of reporting sites to increase exponentially over the years. Table-3- Surveillance of AFP

Table-3

Year	AFP Surveillance Sites (Weekly Reporting)	Active Surveillance Sites	No of Surveillance Officers
1998	24	-	4
1999	167	47	5
2000	241	47	6
2001	303	81	15
2002	312	76	11
2003	378	79	13
2004	414	81	13
2005	408	82	10
2006	411	73	10
2007	414	73	11
2008	446	91	14
2009	460	91	15
2010	491	89	15
2011	520	89	15
2012	576	89	15
2013	624	89	15
2014	496	96	15

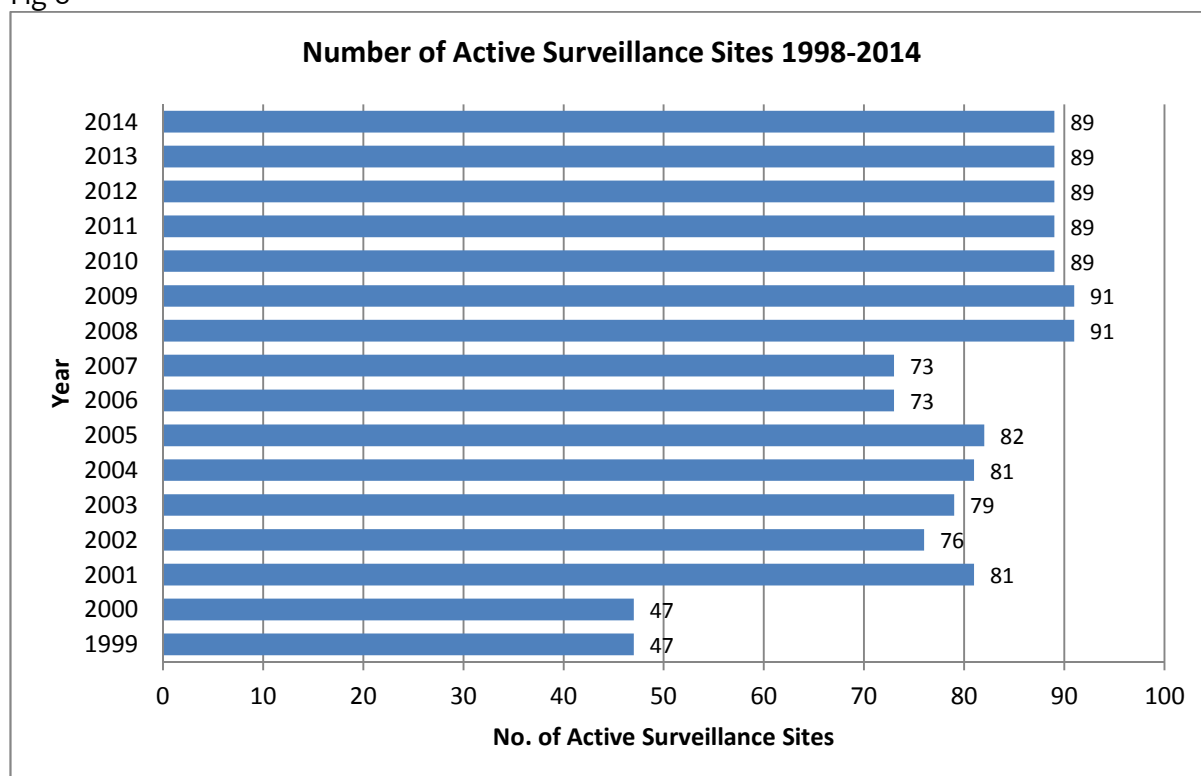
Case study of surveillance set-up -In June 1998, one of the 4 Surveillance Medical Officers (SMOs) was posted in the East Development Region (Biratnagar) to look after 16 districts. He went there and made frequent visits to the RHD, DHOs and development partners to set-up the office and strategic surveillance sites AFP and others. The UNICEF provided the office place with necessary equipment (computer, phone, etc). A single person managed the office set- up, established surveillance sites and communication systems, conducted training to the government officials and made regular frequent visits to RHD, DHOs and surveillance sites by public buses/ vehicles in the beginning. As a result, the second positive AFP case from Saptari was detected in 1999.

The graph below illustrates the growth of weekly reporting sites over the past 15 years:
Fig-7



The reporting sites have been drastically increased from 24 in 1998 to 631 in 2014 based on country ecological and open border risks.

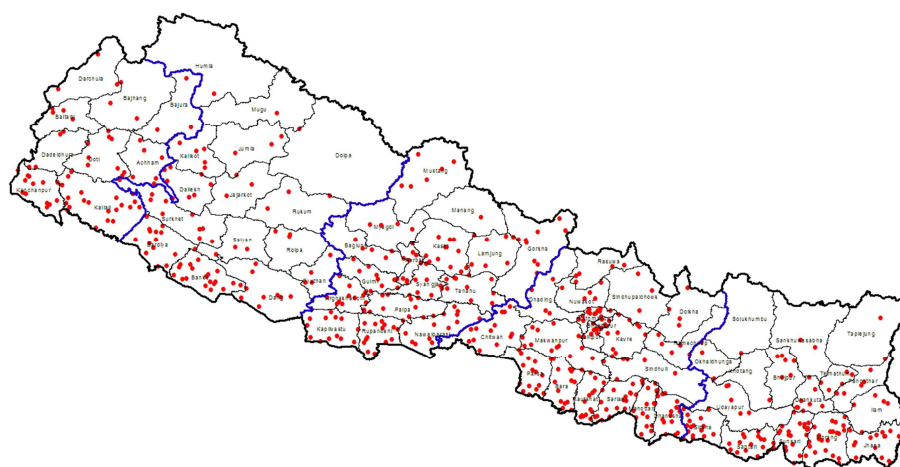
Fig-8



Active surveillance has varied as per no. of field offices/SMO

Weekly zero reporting sites, 2014 (n=631)

Fig 9



The table below illustrates the tremendous increase in the sensitivity of AFP surveillance since the creation of the surveillance network. Nepal has exceeded the WHO minimum of 1 case annually per 100,000 children under 15 each year since 1999. It has also exceeded SEAR's target of 2 AFP cases per 100,000 each year since that target was established in 2006. The table also demonstrates that Nepal has met the WHO worldwide standard of 80% for stool specimen adequacy every year since 2001.

Non-polio AFP Rate per 100,000 under 15 Years Old and Adequacy of Stool Collection, 1998-2014

Table-4- Status of AFP cases

Year	AFP Cases	Confirmed Polio cases	Non-Polio AFP rate	Adequacy of Stool Collection (%)
1998	69	0	0.41	35
1999	234	2	2.00	76
2000	211	4	1.96	79
2001	186	0	1.95	83
2002	197	0	2.00	87
2003	192	0	1.90	86
2004	214	0	2.16	84
2005	230	4	2.25	84
2006	364	5	3.50	86
2007	343	5	3.24	83
2008	426	6	3.94	88
2009	451	0	4.14	88
2010	598	6	5.15	89
2011	568	0	6.41	96
2012	646	0	6.18	96
2013	579	0	5.78	95
2014	496	0	4.95	96

Fig-9

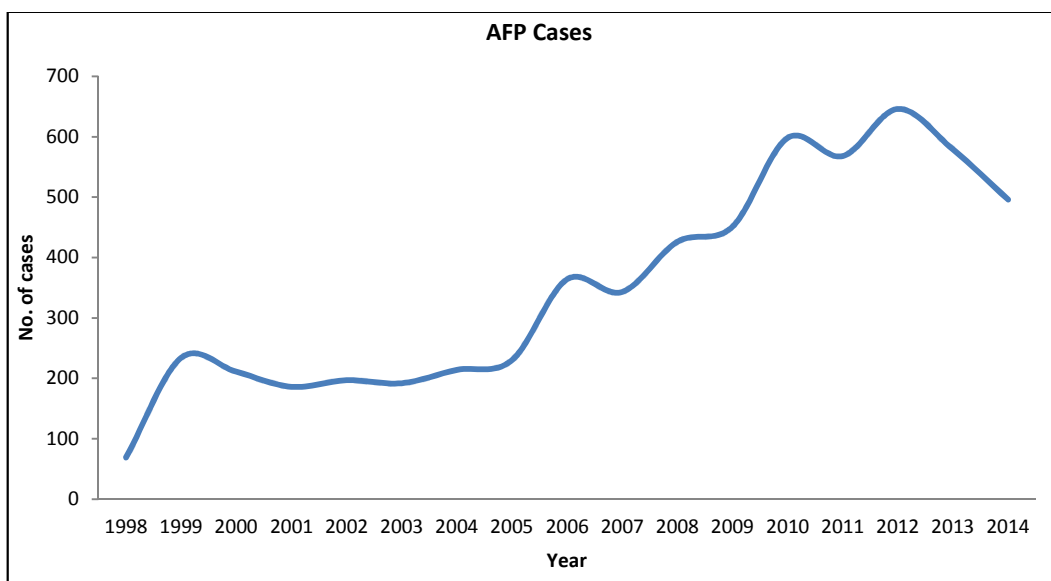
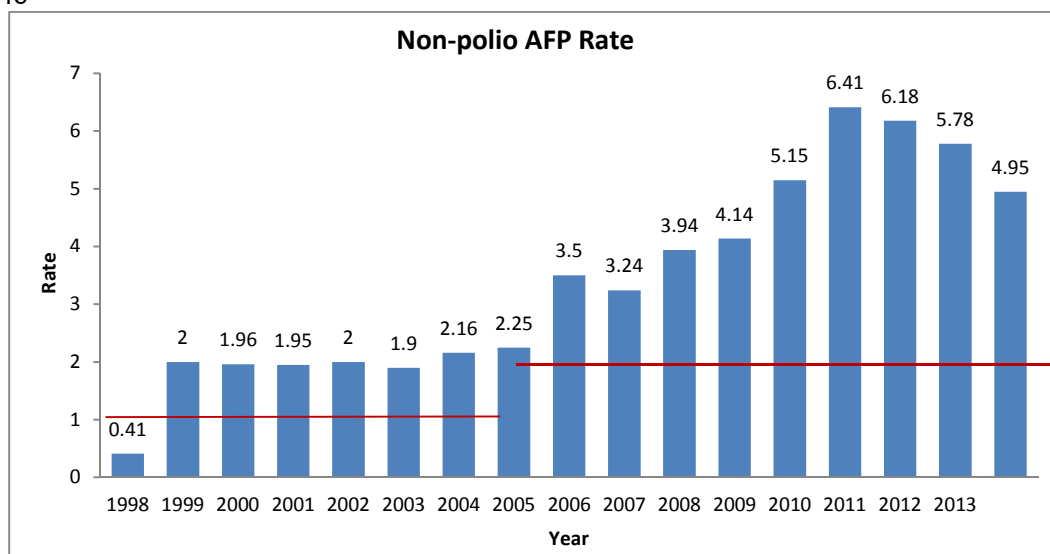
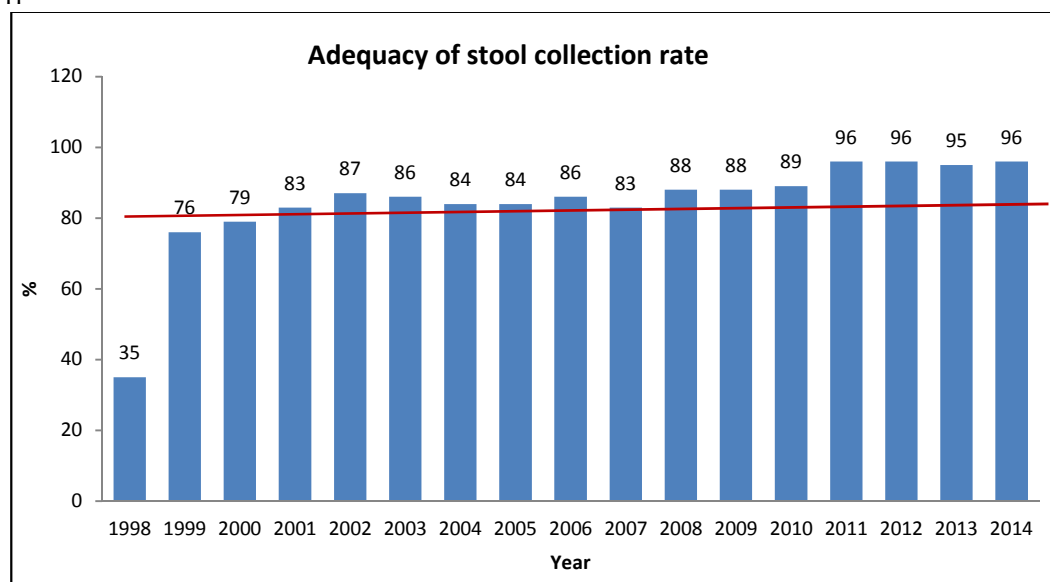


Fig-10



Since 2005, the target for non-polio AFP rate was 2/100,000 of population under 15 years but before 2005 it was 1.

Fig-11



Since 2001, there has been always > 80% with consistency in adequacy of stool collection rate. It indicates majority of AFP cases have been reported timely.

3.2.3 Steering Structure for NIP and Polio Eradication

3.2.3.1 Steering and Co-ordination Committees

In Nepal, the committees are formed at 5 levels under leadership of the government structure for the management and steer the immunization programs. They are responsible to provide the policy guidance, co-ordination, technical support, planning, monitoring and evaluation for effective and efficient implementation as following.

- 1) Steering Committee- (Central Directive Committee) Chaired by the Prime Minister, this committee is charged with coordinating the ministries (Interior, Defence, Women's

and Children's Welfare, etc.) and other government entities (e.g. Police) whose involvement is needed to make the campaign successful. This committee directs the work of other committees.

- 2) National Coordination Committee- Chaired by the Minister of Health and Population, this committee is responsible to develop policy and to establish cooperation among International Nongovernmental Organizations (iNGOs), national Nongovernmental Organizations (NGOs), WHO and UNICEF. Its tasks include identifying and mobilizing physical and financial resources needed for the campaign. This committee also develops the training strategies as well as the communication strategies for promoting the campaign. Additionally, it is responsible for the campaign's budget.
- 3) Regional Immunization Coordination Committees- the Regional Health Director chairs this committee in each of the five development regions. The principal task of this committee is to disseminate manpower throughout the region for vaccination, supervision and monitoring.
- 4) District Immunization Coordination Committees- This committee exists in each of the 75 districts and is headed by the chairperson of the District Development Committee. Its responsibilities are to estimate the number of vaccines and supplies needed and to arrange for their transportation within the district. It also has extensive training responsibilities in the VDCs.
- 5) Municipality/VDC Immunization Coordination Committees- This committee exists in each VDC or settlement and is headed by the chairperson of the VDC or municipality. It is responsible to ensure a successful campaign in each ward. It identifies one volunteer per ward to serve on the vaccination team with the FCHV. Furthermore, it assigns the areas in which supervisors and monitors will work, based on the map(s) that have been developed. It also identifies the booth locations and plans advocacy and social mobilization activities.

3.2.3.2 National Committees and Task Force for Polio Eradication-

These committees play the technical, monitoring and co-ordination roles that help in decision making for planning, organizing and implementing polio related events/ activities. The current committees are as follows.

- National Certification Committee (NCC)-1998, five members
- National Expert Review Committee (ERC)- 2001, six members
- National Task Force for Laboratory Containment of WPV-2002, 13 members
- National Task Force for polio outbreak response- 2007, nine members

3.2.4 Programme for Immunization Preventable Diseases (IPDs)

IPD formerly known as "Polio Eradication Nepal" (PEN) provides technical support to the Ministry of Health and Population (MoHP) for vaccine preventable diseases (VPDs) surveillance and immunization. Since its establishment in 1998, IPD has been supporting the Government of

Nepal's endeavour to strengthen the surveillance of acute flaccid paralysis (AFP for polio), measles rubella, neonatal tetanus (NT), acute encephalitis syndrome (AES for Japanese encephalitis), were added in VPD surveillance afterwards in 2003/04. Additionally IPD also

assist in strengthen the routine immunization programme. IPD supports these activities in close collaboration with the Child Health Division (CHD), Epidemiology and Diseases Control Division (EDCD), and National Public Health Laboratory (NPHL) under the Department of Health Services of MoHP. It also plays a role for cross border collaboration. As polio eradication became a higher global health priority, it was decided that WHO would assume AFP surveillance responsibilities. Prior to 1996, polio cases in Nepal were reported through the Health Management Information System (HMIS), but this system did not capture AFP cases as because it's a passive surveillance system.

Advancement- Surveillance for Vaccine Preventable Diseases (VPDs) started in 1996 through the Early Warning Reporting System (EWARS) under the Ministry of Health and Population (MoHP). In 1998 through the collaboration between the MoHP and WHO, Polio Eradication Nepal (PEN) was established to increase the sensitivity of the existing AFP surveillance system. In 2003, measles and neonatal tetanus was integrated into AFP surveillance system. Similarly, surveillance for Japanese encephalitis (JE) was integrated in 2004. In 2005, PEN changed its name to the Programme for Immunization Preventable Diseases (IPD) to reflect its expanded activities

By 1996, it became evident that, as a system designed for routine reporting, HMIS was not suited to provide timely information or facilitate early response to possible polio cases (i.e. AFP cases), which was necessary to control transmission and accelerate progress toward eradication. In recognition of these limitations, the Early Warning and Reporting System (EWARS) were established for AFP surveillance in 1996. At the time, EWARS was purely a hospital-based sentinel surveillance system, with just 6 reporting sites in 1996 and 24 by 1998. All sites reported weekly even if no cases were found.

IPD currently has 11 field offices with three regional coordinators and 12 surveillance medical officers where only Biratnagar and Nepalgunj filed offices are in UNICEF premises and rest remain in the government building. All of the IPD field offices operate in close coordination with the Regional Health Directorates (RHD) and the District (Public) Health Offices (DHO) to carry out the surveillance and immunization related activities. WHO has established eleven performance indicators for AFP surveillance. These indicators fall into five categories as follows.

- Thoroughness of AFP reporting
- Timeliness of reporting
- Timely and adequate follow up on AFP cases
- Outbreak response immunization
- Timeliness of laboratory results

The rate of AFP cases due to causes other than polio (“non-polio AFP rate”) is the major indicator of the thoroughness of AFP reporting. Arguably, it is the most important performance indicator. Experienced across the world shows that at least 2 case of non-polio AFP occurs annually for every 100,000 children aged <15 years. This is referred to as the non-polio AFP rate. Reported non-polio AFP rates less than 2/100,000 in this age group would suggest that surveillance is not sensitive enough to detect all cases of paralytic polio.

The second most important performance indicator for surveillance is the adequacy of stool collection. This refers to the percentage of AFP cases from whom two stool specimens are collected at least 24 hours apart and within 14 days of onset of paralysis. If stool collection does not meet these criteria, the presence or absence of wild poliovirus may not be detected. These sites now also report three additional vaccine-preventable diseases for which WHO has assumed surveillance responsibility: measles rubella; neonatal tetanus; and acute encephalitis syndrome. In recognition of its expanded scope of responsibilities, PEN changed its name to Program for Immunization Preventable Diseases (IPD) in 2005 due to program extension.

In addition to weekly zero reporting sites, there are now 89 active surveillance sites. These are major hospitals, which would more likely see AFP cases (as compared to smaller health facilities). SMOs and RCs are required to visit these sites weekly or biweekly or monthly depends on priority. During the visit, the SMOs and RCs review the patient registries, interview medical personnel about AFP and other VPD cases and continuously sensitize the staff about the vaccine preventable diseases for which WHO has surveillance responsibility¹¹. The polio-related responsibilities of the RC/SMOs are as follows:

- Carry out active case search, surveillance and epidemiological investigations for AFP.
- Provide technical and logistical assistance as well as training for surveillance and outbreak investigation to their government counterparts.
- Assist their government counterparts in training, planning and monitoring for routine and supplemental immunization activities.
- Coordinate with counterparts across international borders to achieve polio eradication.

3.2.4.1 IPD's Roles and Partners

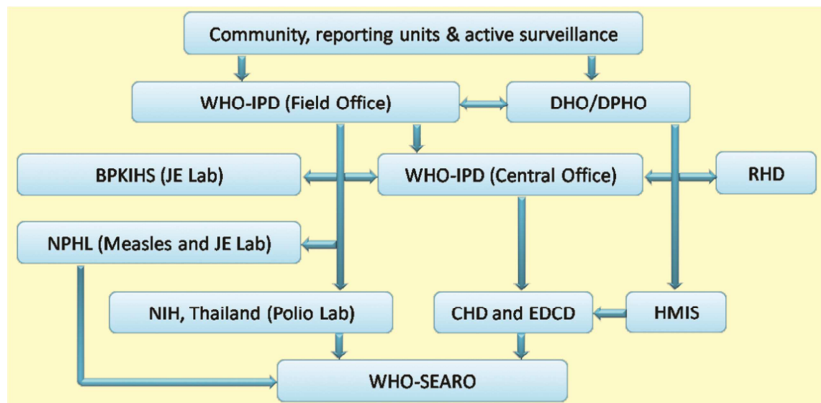
IPD's Core Activities	IPD's Partners
<ul style="list-style-type: none"> • Surveillance of VPDs • Surveillance support for other infectious diseases • Support for routine and supplementary immunization activities • Support in policy formulation and strategy development for the National Immunization Programme (NIP) • Research, publication and dissemination of surveillance information and guidelines • Social mobilization • Coordination with partners • Technical support to MOHP for laboratory diagnosis of VPDs 	<ul style="list-style-type: none"> • United States Agency for International Development (USAID) • Centers for Disease Control and Prevention (CDC), Atlanta • Bill and Melinda Gates Foundation • Global Alliance for Vaccines and Immunisation (GAVI) • Rotary International • United Nations Fund for International Partnerships (UNFIP) • United Nations Children's Fund (UNICEF) • World Bank

¹¹ Programme for Immunization Preventable Diseases Nepal/WHO

3.2.4.2 Information Management Flow

It facilitates inter-relationship and communication and establishes functional monitoring and active surveillance system from the community to central level and beyond AFP case detection and management.

Fig-13

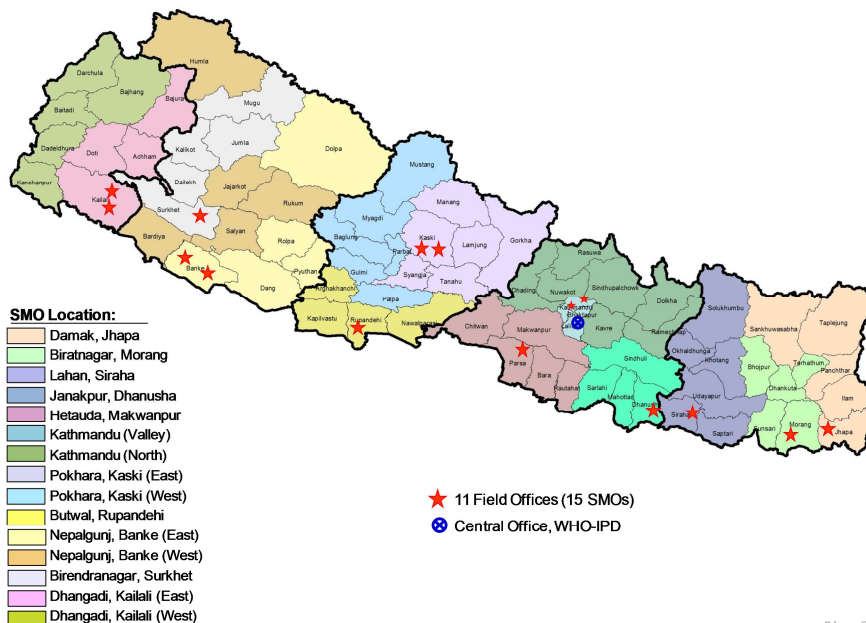


3.2.4.3 Monitoring and Surveillance System

Data generated at the service level are reported to the district, region and the central level on monthly basis. On the basis of HMIS data, NIP monitors the coverage, drop out and vaccine wastage at all levels and sends quarterly feedback to the area of concern. In addition to HMIS, surveillance information on vaccine preventable diseases (AFP, Measles like illnesses, MNT and AES) is reported through integrated Acute Flaccid Paralysis (AFP) surveillance system supported by WHO/IPD as well. In AFP surveillance, data are collected through the weekly zero reporting sites. Similarly any outbreak of vaccine preventable diseases is reported through both the HMIS and integrated AFP Network.

Fig-14

Location and Districts Covered by WHO-IPD Field Offices, 2014



3.2.5. Historical Development in Polio Eradication

Polio Eradication Initiative in Nepal was begun in 1996 through EWARS and it was part of global efforts of the World Health Organization to achieve the world free of polio. With vigorous attempts backed by appropriate and effective policy measures, Nepal has been able to make the country free from this crippling disease as no new polio cases have been reported in the country for more than three years. The national polio immunization campaign has been carried out so effectively that every child up to five years is successfully administered polio drops. As a result, the country is now proudly able to stand as a polio-free country, which is a matter of satisfaction to all of us. The efforts of the government and support of the donors as well organizations like WHO, UNICEF and the Rotary International have yielded positive results.

- In 1980, the government of Nepal included polio vaccination in regular immunization programme
- In 1996, Nepal initiated polio eradication efforts by holding the first National Immunization Days in all 75 districts. The first NID had been started from Kathmandu.
- In July 1998, the government established an expanded nationwide Acute Flaccid Paralysis Surveillance. Since then, 32 polio infection cases have been detected. Among them 30 were from Terai region
- Two cases were reported from hill districts (Bajura and Dailekh) Nepal borders with the endemic states of India has always been a threat for imported polio virus. Nepal has been continuously observing national immunization days every year in two rounds to stop indigenous or importation of WPV.
- Nepal set the target of becoming polio free by 2000. No polio virus was detected in 2001, 2002, 2003 and 2004.
- The virus resurfaced in 2005, 2006, 2007 and 2008 (average 4- 6 cases). 20 cases were reported due to cross-border transmission.
- No polio case was reported in 2009 but six cases were detected in 2010 (one WPV1 reported from Mahottari district followed by five WPV1 in Rautahat district).The detail investigation revealed that first case of Mahottari was importation from Bihar.
- No new polio case has been reported since then (30 August 2010).

The last nation-wide polio drop campaign in December 2013 was able to achieve over 90 per cent coverage. Door-to-door polio drop was administered to ensure that no child under five years of age was left out from the drive against polio.

3.2.6 Key issues/challenges and interventions/Initiatives

In order to polio eradication, it must be ensured that the coverage must exceed 90 percent in every ecological and development region, and every population group across the country. Major issues /challenges have been analysed based on systems blocks (policy and planning, human resources, supply chain, monitoring and supervision, and management and leadership) as following Table- 5 Major Issues/challenges and their interventions/initiatives

Major Challenges and Issues	Key Interventions/Initiatives
Policy and Planning <ul style="list-style-type: none"> Achieving and sustaining high coverage (> 90%) in every district or every village of the country Disparities in coverage among ethnic groups, geography and gender. Open border of Nepal with Uttar Pradesh and Bihar of India which are off and on Polio endemic areas 	<ul style="list-style-type: none"> Action plan for EPI was developed and implemented High level technical committee was formed Reviewed and revised EPI policy and strategies and planning to comply current and future needs
Human Resources <ul style="list-style-type: none"> Shortage of trained local level human resources (VHW) due to retirement, disable and others Limited FCHVs in municipal areas resulted inadequate access to the urban poor 	<ul style="list-style-type: none"> Provided bi-cycle to all VHW and umbrella to all FCHVs Provision of multiyear contract for HR Provision of training for needed person and field allowance
Supply Chain Management <ul style="list-style-type: none"> Massive power cuts (more than 16 hours a day) in the country, Cold chain system-, poor repair and maintenance of EPI equipment, supply to outlets (hilly and mountain) 	<ul style="list-style-type: none"> Introduced solar power in some places as option Reviewed and set vaccine delivery mechanisms Vaccine supply as per target population Replacement of ageing equipment
Monitoring and Supervision <ul style="list-style-type: none"> Inconsistency immunization report (variation at central, region, district and community) Coverage was not uniform or trend-negative and at district and VDC/Municipality level 	<ul style="list-style-type: none"> Technical and financial assistance from development partners for NID, AFP surveillance Provision of data quality self-assessment (DQSA) Established reporting sites for AFP surveillance- strategic reporting sites
Management and leadership <ul style="list-style-type: none"> Poor community involvement in EPI High vaccine wastage and dropped out Frequent bands and blockages by political activists/others Budget - not released on time and inadequate budget for supply and transportation 	<ul style="list-style-type: none"> Partnership-with DDC, VDC /municipality in EPI for resource mobilization Local community mobilized during high insurgency Advocacy based on information and evidence- rallies, banner, logistics, multi-media approach, Used National celebrities (Mr.Hari Bansha and Madan Krishna)

Source-Annual Report of DoHS/MoHP- 1995- 2013 and AFP Surveillance Report- 1998- 2013

Future Direction and strategies: Strengthen and maintain RI; Continue to maintain high standard AFP surveillance; Keep awareness and high priority on polio eradication with Involvement of community, CVOs, NGOs, political parties.

Learning and Conclusion

4.1 Process and Objective Learning

The polio eradication initiative in Nepal (PEI) is an immense public health intervention. It is a joint initiative and partnership approach at national, regional or district and community level where the government, community, civic societies, and formal & informal leaders have been planning and implementing together. The initiatives of Polio Eradication are systems support focused and results oriented through health facility and community based approaches. The objectives and procedures have been jointly defined based on information and evidence. The participation of professional and political actors (health and non-health sectors/ actors) from community to policy makers is made in designing, delivering and managing the interventions. The initiatives have resulted in the developing capacity and ownership of the government, mobilizing people, personnel and partners for polio coverage and utilization and strengthening systems for resources mobilization. It is noted that the government commitment and ownership at different levels has set a high motivation among stakeholders, communities and individual and that further fosters local, national and International partnership. Key learning is as following.

1. Integrating other VPD on AFP surveillance platform

Nepal committed to achieve the goal of global eradication of Poliomyelitis by 2000 but unfortunately, it was not happened. Then after, efforts have been more concentrated in the ways which have strengthened national immunization programme and health systems. The successful use of Polio national immunization days (NIDs) to deliver Measles Campaign 2004 to 2006 is an example of how polio eradication can serve as a platform to address other problems of child health. Significantly, this integration was helping to achieve elimination of Measles outbreaks in Nepal. The supplements during NIDs help raise awareness, enhance technical capacity, improve monitoring and establish a reporting system. Moreover, polio NIDs can provide an entry point for the sustainable provision of Vitamin-A and de-worming and demonstrate how immunization campaign can be used for the delivery of other preventive health activities.

2. Synergy effects to VPD surveillance and routine immunization

In polio eradication efforts, an advanced co-operation management has been practised where objectives/results are agreed jointly, and activities are planned, executed and monitored in a partnership approach. The CHD/DoHS has taken led in organizing and managing all interventions/ activities. Here are a few examples -

- National and district level plan supported in collaboration with the WHO, USAID, Rotary International and UNICEF.
- Local theatre groups volunteered to perform “street dramas” in the VDCs about AFP, polio, as well as supplemental and routine immunization. These dramas were performed in the weeks preceding the campaign
- Football tournaments were organized for local football clubs. At the tournaments, messages about the campaign were given, as well as campaign-themed prizes.

Synergy effects towards health systems due to polio eradication:

The initiative of polio has improved health systems nationwide by improving cooperation among partners at central and local level, and facilitating linkages between health workers and their communities. It has enhanced vertical and horizontal co-ordination and networking for resource mobilization and utilization. As a result, the eliminating polio did not cause a diminution of funding for immunization against other illnesses. Relatively little is known about the opportunity costs of polio eradication. Improved planning in disease eradication initiatives can minimize disruptions in the delivery of other services. Future initiatives should include indicators and baseline data for monitoring effects on health systems development.

3. Evidence based social mobilization during the insurgency

Multi-sectoral and multifarious actors such as professional organizations, associations, elected bodies- parliamentarians, journalists and teachers, medical societies, local government officials, formal and informal community leaders, the army, schools and local NGOs and the public at large were/are oriented and mobilized at central, regional, district and community levels. They publicize and endorse the messages for the NIDs/campaigns at all levels of their respective organizations. It is not only creating more publicity for it, but also encouraging participation and removing obstacles to effective implementation.

The government also directly promotes the campaigns to the public. At the central level, it is advertised and promoted on television and radio during the three days preceding the campaign. The central government is responsible to prepare messages, posters, caps, and street and booth banners in the partnership. The district should also leverage other local resources for advocacy such as, loud speakers, rallies, cinemas and sporting events. The VDC Immunization Coordination Committee is responsible for advocacy and social mobilization within its jurisdiction. The Maoists during the insurgency from 2002 to 2006 supported and took active role to administer the polio drop even though there were frequent bands and blockades. They should ensure that banners/posters are in place at the immunization booth and at other important locations such as schools and border crossings. The FCHV plays a key role in mobilization, just as she does for routine immunization services.

4. Innovation in Planning and Service Delivery

The pockets of under-vaccinated persons have allowed outbreaks of polio disease in a country that has even achieved high levels of vaccination coverage. A field-based methodology-GAP (Geographic Assessment of Planning and Services) was developed and applied to predict in advance of an immunization campaign, the sites of which are most likely to have a pocket of unvaccinated persons and then use this information to improve planning, supervision, and evaluation of the campaign. GAPS were also applied in Nepal. GAPS appeared to have promise as a practical method to help improve the quality of mass immunization campaigns. Even if no pockets of unvaccinated persons were found, the method could serve as a rapid quality-check of administrative estimates of coverage. GAPS may also be considered for improving other types of health campaigns, such as distribution of insecticide-treated bed nets, vitamin A capsules, and de-worming.

5. Counting every child by monitoring and supervision

The most significant monitoring activity occurs the day after the campaign, when the Rapid Convenience Survey (RCS) is conducted. In every district, at least one high-risk VDC is selected for an RCS. During the survey, 20 houses were chosen for revisiting. During the revisit, the vaccination status of each child in the target group is verified. If an unvaccinated child is found, OPV is administered. If the monitors discover that fewer than 90% of children were reached during the campaign, the FCHV is required to revisit every house in the ward to account for the vaccination status of each child under five- essentially repeating the process which took place on the second day of the campaign.

At the VDC level, approximately three permanent staff from the local health facilities are assigned to work as supervisors in the wards. On the first day, they work at the booths alongside the FCHVs and the campaign volunteers. Supervisors are charged with making sure that all the steps for vaccinating a child and record keeping are done correctly. They are also responsible to assure the quantity and quality of the vaccine supply. This includes verifying that ice packs are adequately cold and that each vial remains usable as per the “vaccine vial monitor.” It is their obligation to retrieve any needed supplies from the health facility.

On the second day, instead of working directly with the vaccination team, supervisors canvas the ward independently to verify that the vaccination team has accounted for every child. They go from house to house to confirm that all houses have been marked. They also “spot check” that houses and children are marked and vaccinate missed children, if found.

6. Enhancement of Program ownership and performance

The capacity development takes place at individual, organization, networking and policy level through mobilizing and managing information, skill, resources and partnership. Since 1998 in Nepal, an estimated 100,000 health workers and volunteers have been engaged in implementing the necessary polio supplementary immunization activities (SIAs) on a recurring basis, and at least 15 well-trained SMO have been conducting polio surveillance. A combination of task simplification, technological innovations and adaptation of strategies to fit local circumstances has allowed the polio eradication initiative to use a wide range of workers and volunteers, from both inside and outside the health sector. They deliver the polio vaccine during SIAs and monitor progress in virtually every area of every country, regardless of the health infrastructure, conflict, geography and/or culture. This approach has required sustained political advocacy and mass community mobilization, together with strong management and supervisory processes. Non-monetary incentives, reimbursement of costs and substantial technical assistance have been essential. The implications of this approach for the broader health system must be replicated for the delivery and monitoring of other interventions. As an example: At the district level, health facility in-charges, NGOs and community stakeholders typically participate in a two-day workshop. The first day is dedicated to training for the NID, while the second involves planning at the VDC level (e.g. booth locations; supervision).

Finally, training at the municipal and VDC levels involves instructing the health post staff and FCHVs about the NID implementation plan, including advocacy, social mobilization, and supervision and monitoring.



FCHVs receiving training at the VDC

7. Reaching the Un-reached through mobile approach

The annual performance review pointed out that the coverage for OPV-3 was below 70 % in some districts (particularly in rural VDCs and urban slum setting from 2005 to 2009). In those rural areas that have been hard to reach, mobile teams might be used to vaccinate children, rather than depending on children to come to the booth. In hard-to-reach urban areas, standard methods are used, but more resources are typically needed to achieve the desired results. It involves assigning more volunteers, intensifying supervision and/or increasing the number of booths. At the border

crossings with India, children entering and leaving the country are vaccinated. The last nation-wide polio drop campaign in December 2013 was able to achieve over 90 per cent coverage. Door-to-door polio drop was administered to ensure that no child under five years of age is left out from the drive against polio.



Vaccination booth at the border crossing to India

4.2. Conclusion

Nepal has been maintaining certificate standard AFP surveillance since 2001. The surveillance system is sensitive enough to detect polio cases and circulating derived poliovirus. Nepal was declared polio -free by the Regional Certification Commission on 27 March 2014. Nepal adopted the strategies developed by the WHO such as active AFP surveillance, Routine Immunization, SIAs and Mop-up to achieve the goal of Polio eradication. The CHD took lead in planning, delivering and managing the National Immunization Program including polio throughout the country. The community based interventions together with the national and international learning have been accounted for this success in the functional partnership and community based approaches.

Nepal started immunising children with oral polio vaccine in 1979 through routine immunization. Polio got particular focus in 1996 when the government started the first National Immunisation Day. The routine vaccine programmes together with frequent campaigns have helped the country combat the polio virus. After two cases were reported in 1999 and four in 2000, Nepal was polio -free for the next four years from 2001 to 2004. Nepal reported 32 confirmed cases of polio since 1998 with last polio case on 30 August 2010.

The last nation-wide polio drop campaign in December 2013 was able to achieve over 90 per cent coverage. Door-to-door polio drop was administered to ensure that no child under five years of age was left out from the drive against polio.

Annexes

Annex- 1- Organogram and Structure of MoHP

Organizational Structure of the Department of Health Services

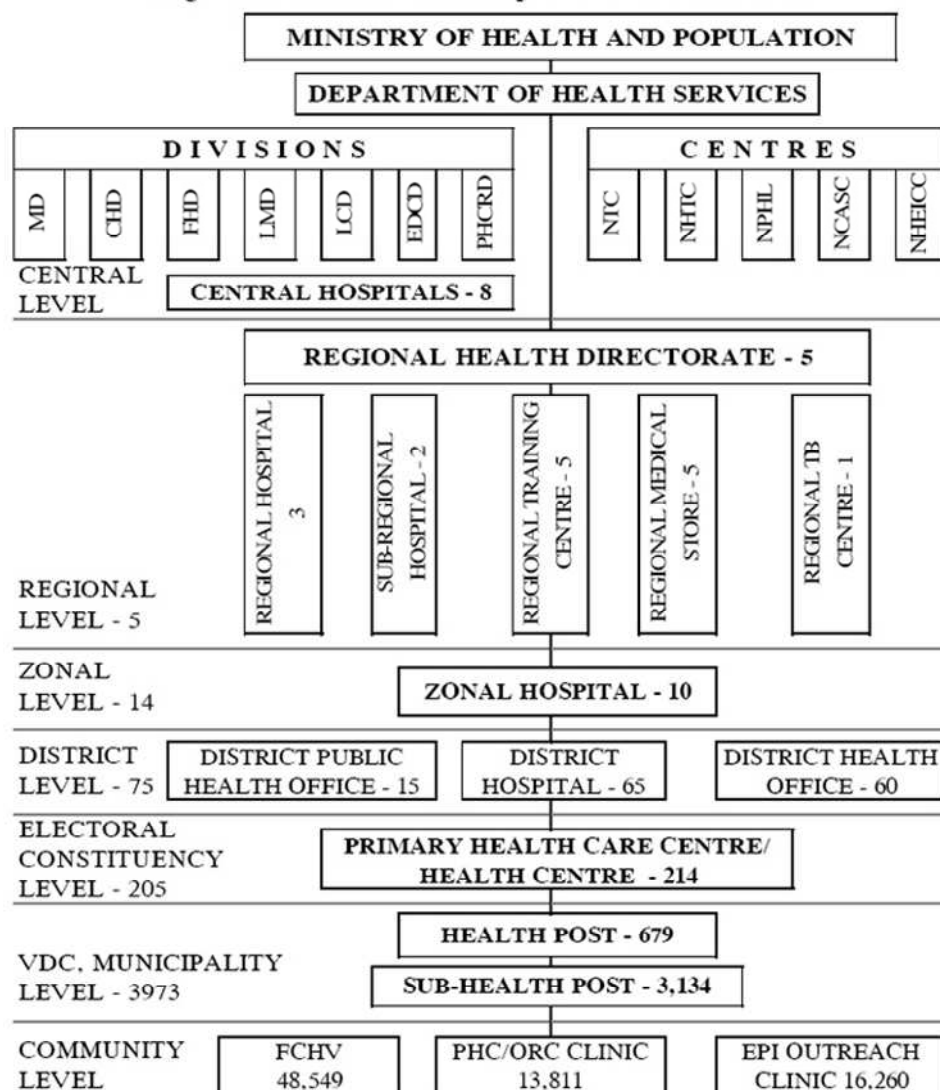


Figure 1b.1

Source: Administration Section, HMIS/MD, DoHS

Acronyms

MD Management Division

FHD Family Health Division

CHD Child Health Division

EDCD Epidemiology and Disease Control Division

LMD Logistics Management Division

LCD Leprosy Control Division

PHCRD Primary Health Care Revitalization Division

NHEICC National Health Education, Information and Communication Centre

NHTC National Health Training Centre

NTC National Tuberculosis Centre

NCASC National Centre for AIDS and STD Control

NPHL National Public Health Laboratory

FCHV Female Community Health Volunteer

PHC/ORC Primary Health Care Outreach Clinic

EPI Expanded Programme on Immunisation

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The following tables contain the data available from the campaigns held from 1996-2014. All of the NID data is provided first, followed by data from SNIDs and mop-ups. For each type of activity, the reader will note that the data elements are not the same over the course of time. Data collection and analysis have become more extensive over the years

National Immunization Days, Nepal

1996 to 2014

Program	Date	Target Population	Achievements	% Coverage	Districts Covered
NID I-Round		32,32,235	37,73,160	116.74	AllNepal
NID II-Round	17-Jan-97	32,32,235	39,09,229	120.95	AllNepal
NID I-Round	07-Dec-97	39,09,229	38,60,983	98.77	AllNepal
NID II-Round	18-Jan-98	39,09,229	39,17,449	100.21	AllNepal
NID I-Round	07-Dec-98	38,60,983	36,46,294	94.44	AllNepal
NID II-Round	18-Jan-99	38,60,983	37,44,672	96.99	AllNepal
NID I-Round	21-Nov-99	38,49,325	36,24,331	94.15	AllNepal
NID II-Round	19-Dec-99	38,49,325	38,08,202	98.93	AllNepal
SNID I-Round	23-Jan-00	22,77,583	23,26,925	102.17	33 Districts
SNID II-Round	27-Feb-00	22,77,583	23,82,254	104.60	33 Districts
SNID III-Round	26-Mar-00	22,77,583	23,79,848	104.49	33 Districts
INID I-Round	09-Dec-00	39,62,358	39,44,544	99.55	AllNepal
INID II-Round	20-Jan-01	39,62,358	40,11,593	101.24	AllNepal
Mop-up I-Round	7-Apr-01	23,03,850	24,12,698	104.72	23 Districts
Mop-Up II-Round	12-May-01	23,03,850	24,50,077	106.35	23 Districts
Mop-up I-Round	15-Sep-01	3,51,213	3,51,888	100.19	4 Districts
Mop-Up II-Round	13-Oct-01	3,51,213	3,56,781	101.59	4 Districts
INID I-Round	1-Dec-01	41,16,889	41,16,507	99.99	AllNepal
INID II-Round	19-Jan-02	41,16,889	41,21,729	100.12	AllNepal
Mop-up I-Round	23-Feb-02	25,84,464	25,26,445	97.76	27 Districts
Mop-Up II-Round	23-Mar-02	25,84,464	25,72,072	99.52	27 Districts
Mop-up I-Round	05-Oct-02	22,35,528	22,42,822	100.33	20 Districts
Mop-Up II-Round	16-Nov-02	22,35,528	22,59,275	101.06	20 Districts
INID I-Round	04-Jan-03	41,44,464	42,14,141	101.68	AllNepal
INID II-Round	08-Feb-03	41,44,464	42,52,959	102.62	AllNepal
INID I-Round	03-Jan-04	42,52,959	42,20,395	99.23	AllNepal
INID II-Round	21-Feb-04	42,52,959	42,12,812	99.06	AllNepal
Single Dose Polio-I phase	21-Sep-04	24,38,582	23,32,276	95.64	35 Districts
Single Dose Polio-II phase	04-Jan-05	17,07,594	16,68,683	97.72	33 Districts
Single Dose Polio-III Phase	21-Apr-05	66,636	67,330	101.04	7 Districts
Mop-up I-Round	07-Feb-05	4,44,728	4,40,801	99.12	4 Districts®
Mop-Up II-Round	12-Mar-05	4,44,728	4,37,999	98.49	4 Districts®
SNID I-Round	12-Mar-05	19,44,816	18,84,403	96.89	17 Districts
SNID II-Round	17-Apr-05	11,44,738	11,05,470	96.57	9 Districts
Mop-up I-Round	07-Oct-05	4,75,617	4,71,460	99.13	5 Districts®
Mop-Up II-Round	11-Nov-05	4,75,617	4,76,586	100.20	5 Districts®
Mop-up III-Round	09-Dec-05	4,75,617	4,82,922	101.54	5 Districts®
Program	Date	Target	Achievements	% Coverage	Districts

		Population			Covered
SNID I-Round	21-Jan-06	17,96,760	17,56,422	97.75	15 Districts
SNID II-Round	21-Feb-06	17,96,760	17,70,453	98.54	15 Districts
SNID I-Round	01-Apr-06	5,97,683	5,54,452	92.77	6 Districts
SNID II-Round	06-May-06	5,97,683	5,46,951	91.51	6 Districts
Mop-up I-Round	24-Jun-06	2,12,112	2,03,059	95.73	5 Districts
Mop-Up II-Round	29-Jul-06	2,12,112	2,06,315	97.27	5 Districts
NID I-Round	14-Oct-06	44,35,202	41,89,875	94.47	75 Districts
NID II-Round	18-Nov-06	44,35,202	42,20,120	95.15	75 Districts
NID III-Round	23-Dec-06	44,35,202	42,75,877	96.41	75 Districts
Mop-up I-Round	07-Apr-07	6,71,549	6,37,610	94.95	6 Districts
Mop-Up II-Round	26-May-07	6,71,549	6,39,069	95.16	6 Districts
SNID I-Round	26-May-07	17,76,251	16,73,652	94.22	17 Districts
SNID II-Round	30-Jun-07	17,76,251	16,81,465	94.66	17 Districts
NID I-Round	29-Dec-07	44,05,410	41,50,091	94.20	68 Districts
NID II-Round	02-Feb-08	44,05,410	41,76,402	94.80	68 Districts
SNID I-Round	15-Mar-08	23,86,263	22,88,103	95.89	20 Districts
SNID II-Round	26-Apr-08	23,86,263	22,42,389	93.97	20 Districts
Mop-up I-Round	06-Aug-08	1,99,751	1,95,067	97.66	7 Districts
Mop-up II-Round	10-Sep-08	1,99,751	1,85,065	92.65	7 Districts
Mop-up III-Round	22-Oct-08	1,99,751	1,92,842	96.54	7 Districts
Mop-up I-Round	10-Sep-08	3,40,364	3,02,863	88.98	4 Districts
Mop-up II-Round	22-Oct-08	3,40,364	3,07,331	90.29	4 Districts
Mop-up III Round	22-Nov-08	3,40,364	3,13,848	92.21	4 Districts
Single dose Polio with Msl campaign	10-Sep-08	11,30,258	10,20,852	90.32	29 Districts
Single dose Polio with Msl campaign	06-Dec-08	33,36,702	29,92,172	89.67	46 Districts
NID I-Round	28-Feb-09	44,66,960	41,47,817	92.86	75 Districts
NID II-Round	04-Apr-09	44,66,960	41,27,314	92.40	75 Districts
NID I-Round	10-Apr-10	44,66,960	39,24,282	87.85	75 Districts
NID II-Round	22-May-10	44,66,960	39,94,496	89.42	75 Districts
Mop-up I-Round	19-Jun-10	28,73,388	26,45,192	92.06	27 Districts
Mop-up I-Round	17-Jul-10	10,96,948	10,73,315	97.85	8 Districts
Mop-up II-Round	31-Jul-10	10,96,948	10,78,402	98.31	8 Districts
Mop-up I-Round	14-Aug-10	20,15,085	19,39,249	96.24	18 Districts
Mop-up I-Round	18-Sep-10	10,96,948	11,01,668	100.43	8 Districts
Mop-up I-Round	02-Oct-10	4,36,617	4,43,198	101.51	3 Districts
Mop-up II-Round	30-Oct-10	4,36,617	4,52,106	103.55	3 Districts
Mop-up III-Round	20-Nov-10	4,36,617	4,42,995	101.46	3 Districts
NID I-Round	12-Feb-11	44,66,960	40,72,270	91.16	75 Districts
NID II-Round	12-Mar-11	44,66,960	40,94,912	91.67	75 Districts
Mop-up I-Round	12-Nov-11	11,10,222	10,92,617	98.41	8 districts
Mop-up II-Round	10-Dec-11	11,10,222	11,02,244	99.28	8 districts
NID I-Round	28-Apr-12	42,26,966	39,55,266	93.57	75 Districts
Single dose OPV with MR vaccination 2012	Feb - Dec 2012	4,189,044	3,613,036	86.25	75 Districts
15th NID- 1st Round	21-Dec-13	4,226,966	3,760,622	88.97	75 Districts
15th NID- 2nd Round	25-Jan-14	4,226,966	3,783,879	89.52	75 Districts

**PROGRESS OF
POLIO ERADICATION
IN NEPAL**

Child Health Division/ Department of Health Services (DoHS)
Ministry of Health and Population (MoHP)
Kathmandu, Nepal