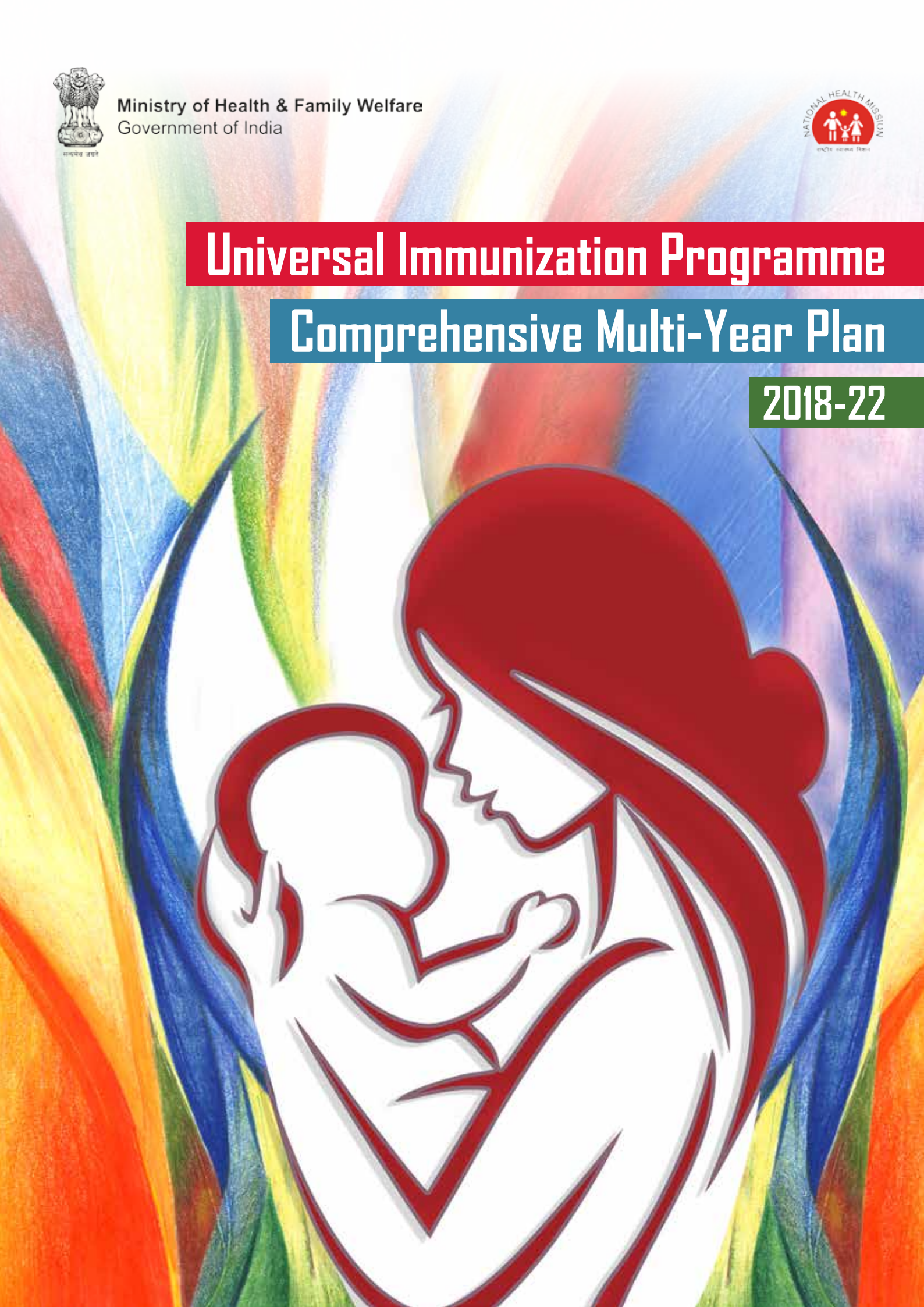
Ministry of Health & Family Welfare
Government of India

Universal Immunization Programme

Comprehensive Multi-Year Plan

2018-22



Ministry of Health & Family Welfare
Government of India

Comprehensive Multi-Year Plan (cMYP) 2018--22

Universal Immunization Programme

REACHING EVERY CHILD

Immunization Division

Ministry of Health & Family Welfare

Government of India

प्रीति सूदन
सचिव
PREETI SUDAN
Secretary

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण विभाग
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
Government of India
Department of Health and Family Welfare
Ministry of Health & Family Welfare

Message

The Government of India (GOI) is determined to strengthen the Universal Immunization Program (UIP) through system strengthening and initiatives like Mission Indradhanush for maintaining equity and rapidly improving immunization coverage especially in the most hard to reach and underserved areas of the country. Government of India is committed in our efforts to achieve full immunization coverage of 90% by 2018, which will also help to attain Sustainable Development Goal to reduce neonatal and under five child mortality.

Ministry of Health and Family Welfare has introduced several new vaccines - Inactivated Polio Vaccine (IPV), Rotavirus Vaccine (RVV), Measles-Rubella (MR) Vaccine, Japanese Encephalitis (JE) Vaccine for adults and Pneumococcal Conjugate Vaccine (PCV) under UIP after recommendation from NTAGI, thus expanding the breadth and depth of the world's largest public health programme.

I am delighted to present the comprehensive Multi Year Plan (cMYP) 2018-22 for immunization. This vision document for UIP has been developed with the goal of achieving 90% full immunization coverage, thereby reducing mortality and morbidity due to vaccine preventable diseases. cMYP 2018-22 provides a holistic approach with objectives and strategies related to core program areas.

I take this opportunity to applaud for all contributors involved in development of cMYP 2018-22. I am sure the document will be used by all stakeholders as an effective aid to strengthen the program and achieve the goal of protecting each child and pregnant woman from vaccine preventable diseases.

(Preeti Sudan)

Tele : (O) 011-23061863, Fax : 011-23061252, E-mail : secyhfw@nic.in
Room No. 156, A-Wing, Nirman Bhavan, New Delhi-110011

मनोज झालानी
Manoj Jhalani
अपर सचिव एवं मिशन निदेशक (रा.स्वा.मि.)
Additional Secretary & Mission Director (NHM)

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
निर्माण भवन, नई दिल्ली - 110011
GOVERNMENT OF INDIA
MINISTRY OF HEALTH & FAMILY WELFARE
NIRMAN BHAVAN, NEW DELHI - 110011

FOREWORD

It gives me immense pleasure to present the five-year comprehensive Multi Year Plan (cMYP) for immunization 2018-22.

India is committed to achieve Sustainable Developmental Goal number 3 that focuses on implementing strategies on maternal and child survival. Immunization services are an integral component of the reproductive, maternal, newborn, child and adolescent health (RMNCH+A) approach in India, underpinned by the government's strong commitment to protect every eligible child from vaccine preventable diseases (VPDs).

The National Health Policy, 2017, also focuses to build upon the success of Mission Indradhanush and in strengthening its implementation. National Health Policy of Government of India, also emphasizes to improve immunization coverage with quality and safety, improve vaccine security and introduce newer vaccines based on epidemiological considerations.

The Universal Immunization Programme of India is one of the largest public health programme across the globe and India has made significant progress in improving the immunization coverage and expanding the protection against various VPDs. The country has expanded the ambit of new vaccines by introducing Inactivated Polio Vaccine (IPV), rotavirus vaccine (RVV), measles-rubella vaccine (MR), Japanese Encephalitis (JE) vaccine for adults and pneumococcal conjugate vaccine (PCV).

The cMYP 2018-22 provides a framework of nine interlinked objectives covering various aspects of UIP with strategies and activities to achieve them. Government of India is committed to provide financial and technical resources to the States to strengthen their program management, improve vaccine logistics and cold chain system; introduce new vaccines; bring in greater efficiency and accountability in service delivery. The global and regional priorities are also aligned to develop this cMYP in order to achieve and sustain the target of 90% full immunization coverage.

The Government of India, through a strong political will, is devoted to reach every child in the country and reduce inequity in coverage. We continue to strengthen the existing partnerships and develop newer ones with national and international organizations building on our respective synergies. This document provides an overall vision to Ministry of Health and Family Welfare in developing the plan to reduce burden of vaccine preventable diseases.

I convey my best wishes to each and every person associated with Universal Immunization Programme and look forward to its future success.

(Manoj Jhalani)

Telefax : 23063687, 23063693 E-mail : manoj.jhalani@nic.in

वन्दना गुरनानी, भा.प्र.से.
संयुक्त सचिव
VANDANA GURNANI, I.A.S.
JOINT SECRETARY
Tel. : 011-23061706
Telefax : 011-23061398
E-mail. : vandana.g@ias.nic.in

सत्यमेव जयते

भारत सरकार
स्वास्थ्य एवं परिवार कल्याण मंत्रालय
निर्माण भवन, नई दिल्ली - 110011
Government of India
Ministry of Health & Family Welfare
Nirman Bhavan, New Delhi - 110011

Preface

India being a signatory of Sustainable Development Goals (SDG) is committed to reducing neonatal and under five child mortality, achieving universal health coverage and supporting the research and development of vaccines and medicines for the communicable and non-communicable diseases through its various health programs. Universal Immunization Program (UIP) of India is one such programme which is also the largest public health programme of the world.

In recent years, Government of India has been strengthening its commitment towards Universal Immunization Program (UIP) of India through determined efforts like Mission Indradhanush and Intensified Mission Indradhanush in rapidly improving immunization coverage especially in the most hard to reach and underserved areas of the county. Government of India is committed to achieve full immunization coverage of 90% by 2018.

Over the past years, India has witnessed many achievements in immunization viz. elimination of polio and maternal and neonatal tetanus and introduction of new vaccines in the program. - Inactivated Polio Vaccine (IPV), rotavirus vaccine (RVV), measles-rubella vaccine (MR), Japanese Encephalitis (JE) vaccine for adults and pneumococcal conjugate vaccine (PCV) under UIP after recommendation from NTAGI.

The comprehensive Multi Year Plan for immunization provides a universal framework to lay down the goal and objectives for UIP and is based on Global and Regional Vaccine Action Plans. cMYP 2018-22 is structured to provide future direction for UIP with emphasis on essential areas of system strengthening for service delivery, increasing confidence and demand for vaccines in community and sustaining the gains achieved under UIP. The plan also includes details of financial pattern of the Indian immunization program including baseline and projected expenditure for immunization activities.

Immunization Technical Support Unit (ITSU), Ministry of Health and Family Welfare assisted in preparation of this document. A core team comprising representatives from ITSU, NCCVMRC, WHO, UNICEF, UNDP, and JSI, developed the draft plan taking inputs from other technical experts and MoHFW representatives at the Immunization division. The document is intended for all administrators and program managers working on UIP under the umbrella of RMNCH+A.

I congratulate every person associated in drafting the document as we realize that each life saved through immunization is a step towards further progress and a better future for the children of our country.

(Vandana Gurnani)

Contents

Acknowledgements

Compiled and edited by:

Dr. M.K. Aggarwal, MoHFW

Dr. Prem Singh, ITSU

Dr. Mayank Shersiya, ITSU

Advisors:

Ms. Vandana Gurnani (IAS), MoHFW

Dr. Pradeep Haldar, MoHFW

Dr. Veena Dhawan, MoHFW

Dr. Pritu Dhalaria, ITSU

We are thankful for your contribution and inputs:

WHO:	Dr. Balwinder Singh, Dr. Danish Ahmed
UNICEF:	Dr. Satish Gupta, Dr. Bhrigu Kapuria, Dr. Bhawani Shankar, Dr. Priti Chaudhary
UNDP:	Dr. Manish Pant, Dr. Akash Malik, Ms. Shalini Verma, Mr. Abhimanyu Saxena
JSI:	Dr. Saumendra Bagchi, Dr. Arup Debroy
BMGF:	Dr. Raj Shankar Ghosh, Dr. Arindam Ray, Dr. Bhupendra Tripathi
ICMR:	Dr. Nivedita Gupta
NCCVMRC:	Dr. Snehil, Mr. Paritosh Panigrahi
MoHFW:	Dr. Kapil Singh (Gavi Secretariat), Ms. Swati Sharma (Gavi Secretariat), Dr. Sheenu Bhadana
ITSU:	Dr. Deepak Polpakara, Dr. Sachin Rewaria, Ms. Jhimly Baruah, Dr. Kiran Agrahari, Dr. Ruma Bhargava, Mr. Varun Singh, Mr. Jasmeet Singh Gujral, Mr. Sanjeev Das, Mr. Sushant Gupta

We acknowledge the sincere efforts by Dr. Susmita Chatterjee, for compiling and writing the chapter on Costing and Financing of Immunization in India.

We would like to thank Ms. Shubhneet Kaur Gujral for illustrating the cover page of this document.

Abbreviations

AEFI	Adverse Events Following Immunization
AES	Acute Encephalitis Syndrome
ANM	Auxiliary Nurse Midwife
ANMOL	ANM Online
ASHA	Accredited Social Health Activist
ASHA	Accredited Social Health Activist
AWW	Aaganwadi worker
AYUSH	Ayurveda Yoga Unani Siddha Homoeopathy
BCC	Behaviour change communication
BMGF	Bill and Melinda Gates Foundation
CBHI	Central Bureaus of Health Intelligence
CBO	Community Based Organization
CCO	Cold Chain Officer
CDSCO	Central Drug Standard Control Organization
CES	Coverage Evaluation Survey
CHC	Community Health Centre
CIF	Case Investigation Form
cMYP	Comprehensive Multi Year Plan
CRS	Congenital Rubella Syndrome
CSO	Civil Society Organization
CSSM	Child Survival and Safe Motherhood
CTFU (I)	City Task Force Urban (Immunization)
CVT	Continuous Vaccination Team
DIO	District Immunization Officer
DLHS	District Level Household Survey
DPT	Diphtheria Pertussis Tetanus
DTFU (I)	District Task Force Urban (Immunization)
EPI	Expanded Program on Immunization

ERC	Expert Review Committee
FIC	Full Immunization Coverage
FHW	Frontline Health Worker
GIS	Geographic Information System
GMRLN	Global Measles Rubella Laboratory Network
GoI	Government of India
GVAP	Global Vaccine Action Plan
Hib	Haemophilus influenzae type b
HMIS	Health Information Management System
HP	High Priority
IAP	Indian Academy of Pediatrics
ICMR	Indian Council of Medical Research
IDSP	Integrated Disease Surveillance Project
IEAG	India Expert Advisory Group
IMA	Indian Medical Association
IMI	Intensified Mission Indradhanush
INCHIS	Integrated Child Health and Immunization Survey
IPC	Inter-Personal Coordination
IPV	Inactivated Polio Virus
ISQUA	International Society for Quality in Healthcare
JE	Japanese Encephalitis
LP	Low Priority
MI	Mission Indradhanush
MNTE	Maternal & Neonatal Tetanus Elimination
MO	Medical Officer
MoHFW	Ministry of Health and Family Welfare
MR	Measles Rubella
MRCV	Measles Rubella Containing Vaccine
NFHS	National Family Health Survey
NGO	Non-Government Organization

NHM	National Health Mission
NHP	National Health Policy
NHSRC	National Health System Resource Centre
NID	National Immunization Day
NML	National Measles-Rubella Laboratory
NRHM	National Rural Health Mission
NRSN	National Rotavirus Surveillance Network
NTAGI	National Technical Advisory Group on Immunization
NTFI	National Task Force for Immunization
NUHM	National Urban Health Mission
ORI	Outbreak Response Immunization
PCV	Pneumococcal Conjugate Vaccine
PHC	Primary Health Centre
PRAGATI	Pro-Active Governance And Timely Implementation
PvPI	Pharmacovigilance Programme of India
QMS	Quality Management System
RCH	Reproductive and Child Health
RCV	Rubella Containing Vaccine
RI	Routine Immunization
RMNCH+A	Reproductive Maternal Neonatal Child Health Adolescent
RNTCP	Revised National Tuberculosis Control Programme
RRL	Regional Reference Laboratories
RSOC	Rapid Survey on Children
RVAP	Regional Vaccine Action Plan
RVV	Rotavirus vaccine
SBCC	Social Behaviour Change Communication
SC	Sub Centre
SDG	Sustainable Development Goal
SEPIO	State EPI officer
SHG	Self-Help Group

SIMS	Surveillance Information Management System
SMNet	Social Mobilization Network
SNID	Sub-National Immunization Day
SOP	Standard Operating Procedure
TNAI	Trained Nurses' Association of India
UIP	Universal Immunization Programme
UNICEF	United Nations Children's Fund
VAEIMS	Vaccine Adverse Events Information Management System
VAI	Vaccine Availability Index
VDPV	Vaccine Derived Polio Virus
VHP	Very High Priority
VPD	Vaccine Preventable Disease
VRDL	Viral Research Diagnostic Laboratory
WHO-NPSP	World Health Organization- National Polio Surveillance Project
WPV	Wild Polio Virus

Chapter 1
Introduction

Introduction

Immunization is considered as one of the key interventions for protection of children against life threatening conditions that are preventable. At the community and national levels, the benefits of immunization go beyond the improvements in health and life expectancy to an impact on social and economic indicators. An effective, evenly targeted immunization programme and its ability to reduce the burden of Vaccine Preventable Diseases (VPDs) will greatly contribute in achieving the Sustainable Development Goal (SDG) No. 3 target of reducing IMR to 25 per 1000 live births by 2030. India is a signatory of SDG and is committed to achieve the desired goals through its various health programs. Universal Immunization Program (UIP) is one such program catering to ~26 million birth cohort and 30 million pregnant women, through 9 million sessions planned every year, making it one of the largest public health program in the world.

The current comprehensive multi-year strategic plan (cMYP) 2013-17 was drafted with an overarching goal of reducing mortality and morbidity due to vaccine preventable diseases through high quality immunization services. It aims to improve implementation of the program by addressing the gaps identified in cold chain and vaccine logistics management, social mobilization, evidence generation, human resource capacity and accountability mechanism.

cMYP 2013-17 comprises of six key objectives with a focus on different core areas:

1. Improve program service delivery for equitable and efficient immunization services by all districts.
2. Increase demand and reduce barriers for people to access immunization services through improved social mobilization.
3. Strengthen and maintain robust surveillance system for Vaccine Preventable Diseases (VPDs) and Adverse Events Following Immunization (AEFI).
4. Introduce and expand the use of new and underutilized vaccines and technology in UIP.
5. Strengthen health system for immunization program.
6. Contribute to the global eradication of polio and measles, elimination of maternal and neonatal tetanus, and control and prevention of rubella.

cMYP provides a universal framework to lay down the goals and objectives for UIP, based on Global Vaccine Action Plan (GVAP) and Regional Vaccine Action Plan (RVAP). It gives common targets for improving the efficiency of immunization program so that the work of MoHFW, immunization partners and other immunization stakeholders are aligned to the achievement of the same goals. The common action plan also helps in the gap assessment of existing program, which eventually forms the basis of the objectives and strategies included in the cMYP.

A mid-term review of cMYP 2013-17 was undertaken in 2015 on a proposed framework and costing projections. It facilitated to identify areas where the progress is sub optimal and suggested mid-course correction; and helped to map the new developments in the health sector relevant to UIP and to realign future plans based on these developments. The review provided a detailed analysis of the progress, key objectives wise, along with pertinent qualitative inputs from various national and state level stakeholders.

The cMYP 2013-17 provided the roadmap for the immunization programme and the country has made tremendous progress during this period. New vaccines like Measles & Rubella (MR), Pneumococcal Conjugate Vaccine (PCV), Inactivated Polio Vaccine (IPV), Rotavirus vaccine and new technology like electronic vaccine intelligence network (eVIN) were introduced in the country. The surveillance systems like Adverse Event Following Immunization (AEFI) and VPD has been improved and strengthened. The importance of communication and IEC activities was acknowledged

and the improved strategy helped in successful implementation of various campaigns like Mission Indradhanush, Measles and Rubella Campaign.

The cMYP 2018-22 is built on the success of immunization program in recent years and will provide the roadmap based on the learning's, successes and challenges faced during 2013-17 period.

The aim of cMYP 2018-22 is to eventually reduce mortality and morbidity due to vaccine preventable diseases, with the goal to achieve and sustain full immunization coverage of 90 percent.

About Universal Immunization Program

Immunization has been one of India's greatest public health success stories. Immunization has helped reduce the annual mortality of children under five, from 3.3 million in 1990, to 1.2 million deaths in 2015; that is 17,000 deaths each day.[1] However, to ensure that all children of India benefit equitably from this intervention, a strategic, i.e., long term approach to planning and implementation is essential.

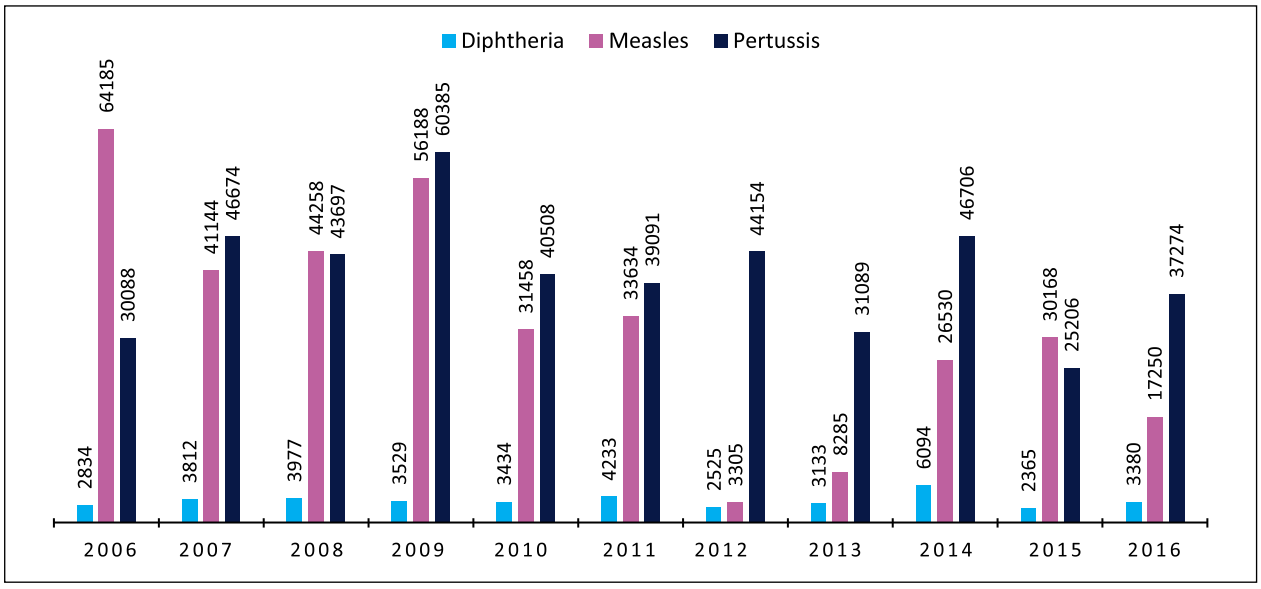
The Immunization Program in India started in 1978 as Expanded Program on Immunization (EPI) with DPT, BCG, OPV, and typhoid paratyphoid fever vaccines. Since its inception, the national program on immunization has undergone various changes, which reflects in its current status; the key transition being the revamping of the program as the Universal Immunization Program (UIP) in 1985, with the incorporation into the Child Survival and Safe Motherhood (CSSM) program in 1992, the Reproductive and Child Health Program (RCH-I) in 1997 and RCH II under the National Rural Health Mission (NRHM) in 2005.

The objectives of the UIP are to:

1. Rapidly increase immunization coverage
2. Improve the quality of services
3. Establish a reliable cold chain system to the health facility level
4. Introduce a district-wise system for monitoring of performance
5. Achieve self-sufficiency in vaccine production

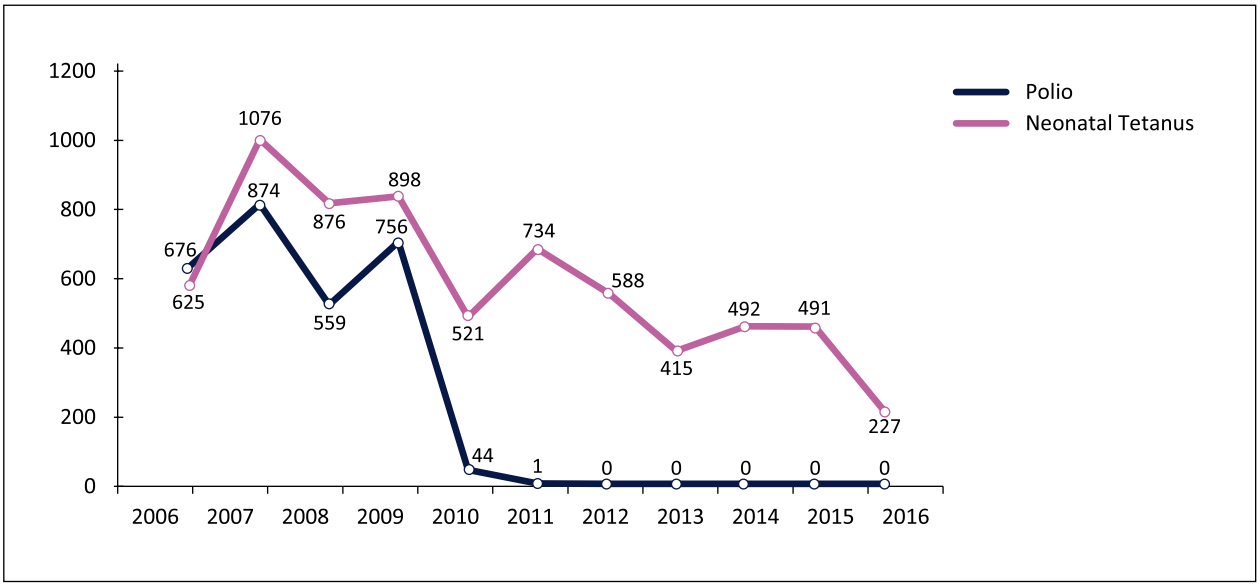
The two major milestones of the Immunization programme has been the elimination of polio in 2014 and maternal and neonatal tetanus elimination in 2015. The programme has helped in bringing down the burden of VPD cases and thus saving lives of millions of children as depicted in the figures below.

Figure 1.1: Trend of burden of diphtheria, measles and pertussis



[1] *Child mortality estimates, UNICEF Global Data Base, 2015*

Figure 1.2: Trend of burden of polio and neonatal tetanus



TheUIP is an integral component of the government's flagship Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A) approach, and underpinning this approach is an unprecedented commitment to protect every child from vaccine-preventable diseases. Full Immunization Coverage (FIC) is also a major contributor to the SDG 3, which focuses on maternal and child survival. As a key element of the national child survival strategy, UIP has contributed significantly in reducing mortality and morbidity rate and the infant and under5 mortality rate over the last decade i.e. IMR from 60/1000 live births in 2005 to 34/1000 live births in 2016 and U5MR from 77/1000 live births in 2005 to 39/1000 live births in 2016.[2]

Under UIP, the Government of India is providing vaccination free of cost against **twelve vaccine preventable diseases,** of which:

- **8 are provided across the country** against Diphtheria, Pertussis, Tetanus, Polio, Measles, severe form of Childhood Tuberculosis, Hepatitis B and Meningitis & Pneumonia caused by Haemophilus Influenzae type B
- **4 are provided in selected states/endemic districts** against Rotavirus diarrhoea, Rubella, Pneumococcal Pneumonia and Japanese Encephalitis; of which Rotavirus vaccine, Measles-Rubella vaccine and Pneumococcal Conjugate vaccine are in process of expansion while Japanese Encephalitis (JE) vaccine is provided only in endemic districts.

[2]*Sample Registration Survey*

UIP Schedule

Vaccine	Due Age	Maximum Age
For Infants		
BCG	At birth till one year	At birth till one year
Hepatitis B – Birth dose	At birth within 24 hours	At birth within 24 hours
OPV- 0	At birth	within the first 15 days
OPV 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks	till 5 years of age
Pentavalent 1, 2 & 3	At 6 weeks, 10 weeks & 14 weeks	1 year of age
fIPV 1 & 2	At 6 weeks & 14 weeks	1 year of age
RVV 1,2 & 3	At 6 weeks, 10 weeks & 14 weeks	1 year of age
PCV 1, 2 & PCV-Booster	At 6 weeks, 14 weeks & 9 months	1 year of age
MCV 1/ MR 1	At 9 completed Months - 12 months	5 years of age
Japanese Encephalitis-1	At 9 months-12 months	15 years of age
Vitamin A (1st dose)	At 9 months	5 years of age
For Children and Adolescent		
DPT Booster- 1	16-24 months	7 years of age
MCV 2/ MR 2	16-24 months	5 years of age
OPV Booster	16-24 months	5 Years
Japanese Encephalitis-2	16-24 months	till 15 years of age
Vitamin A (2nd to 9th dose)	At 16 months. Then, one dose every 6 months.	up to the age of 5 years
DPT Booster-2	5-6 years	7 Years of age
TT	10 years & 16 years	16 Years
For Pregnant Women		
TT-1	Early in pregnancy	
TT-2	4 weeks afterTT-1	
TT- Booster	If pregnancy occur within three years of last pregnancy and two TT doses were received	

BCG: Bacillus Calmette-Guerin; DPT: diphtheria-pertussis-tetanus; fIPV: fractional-dose IPV; JE: Japanese Encephalitis; OPV: oral polio vaccine; PCV: Pneumococcal conjugate vaccine; RVV: Rotavirus vaccine,TT: tetanus toxoid

RVV introduced in 10 states; PCV introduced in 5 states; MR introduced in 13 states

2nd to 9th doses of Vitamin A can be administered to children 1-5 years old during biannual rounds, in collaboration with ICDS

RVV introduced in Andhra Pradesh, Haryana, Himachal Pradesh, Odisha, Assam, Madhya Pradesh, Rajasthan, Tamil Nadu, Tripura and Jharkhand
PCV introduced in Bihar, Himachal Pradesh, Madhya Pradesh, Rajasthan and Uttar Pradesh
MR campaign going on in phased manner with simultaneous introduction into UIP


Fruits

Chapter 2
Situational Analysis (2013-17)

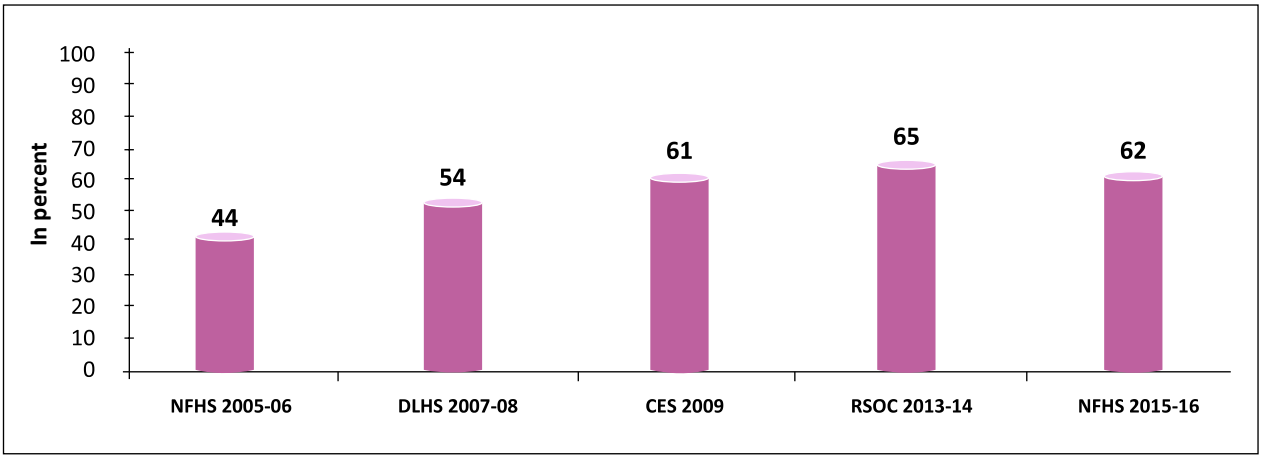
1. Coverage and Equity

The full immunization coverage[3] is an important measure to ascertain the progress made in the direction of universal child health. The evaluated data indicate that the coverage has increased from 44% in NFHS-3, 2005-06 to 62% in NFHS-4, 2015-16 with 2% increase each year among children aged 12-23 months.

The slow progress in full immunization coverage in India during 2005-06 to 2015-16 needs attention, particularly when new vaccines are being introduced in immunization programme, and lessons learned should inform our way forward.

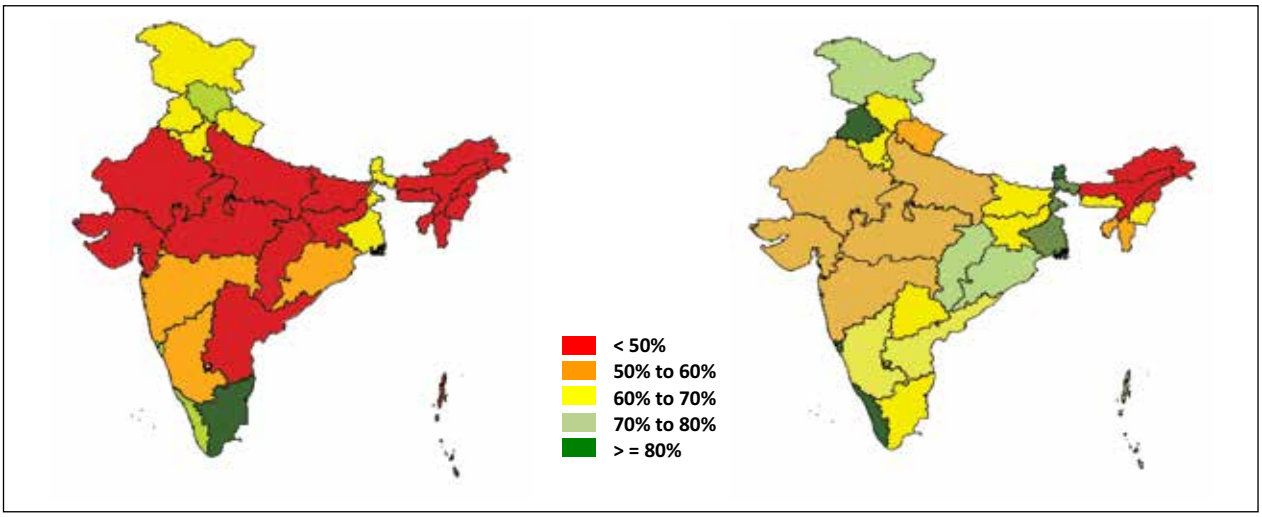
A comparison of national level full immunization coverage across various nationwide surveys in last 10 years are mentioned in Figure 2.1.

Figure 2.1: Trends in Full Immunization Coverage over the last 10 years as shown in different surveys



On assessing the state of inequality in immunization as an important step in identifying where the gaps exist and to plan strategies to increase coverage in unvaccinated or under-vaccinated population subgroups, it was found that the full immunization coverage varies across the states and UTs with Puducherry having 91%coverage and Nagaland having as low as 35% coverage.

Figure 2.2: Immunization coverage geographical variation in country



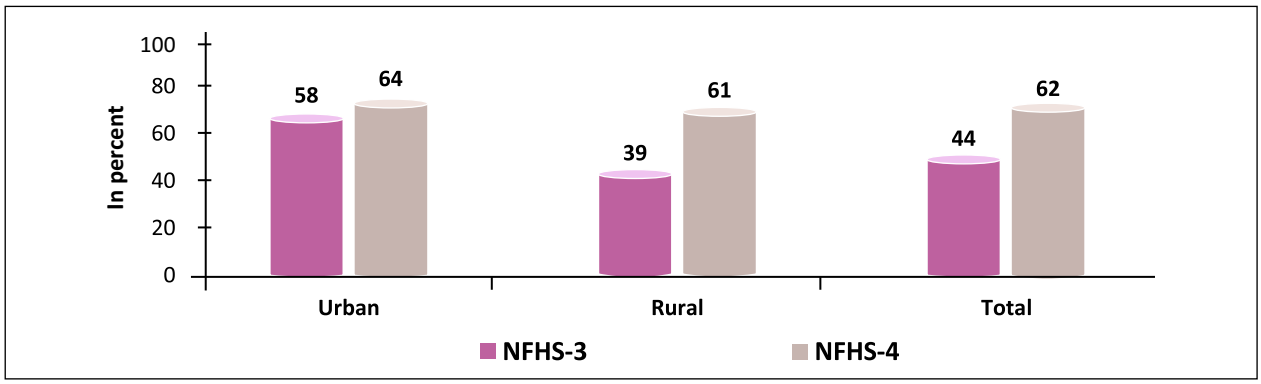
FIC: 43.5% ranging from 21% to 81%, NFHS-3

FIC: 62% ranging from 36% to 91%, NFHS-4

[3]*Fully Immunized child mean that child received one BCG, 3 doses of Penta or DPT, 3 doses of OPV and one Measles containing vaccine by 12 months age*

A more comprehensive review of recent round of NFHS-4 data specifies that much of the progress comes from rural areas (from 39% to 61%) whereas urban areas witness low improvements (from 58% to 64%)(Figure 2.3).

Figure 2.3: Urban-Rural Differentials in Full Immunization Coverage

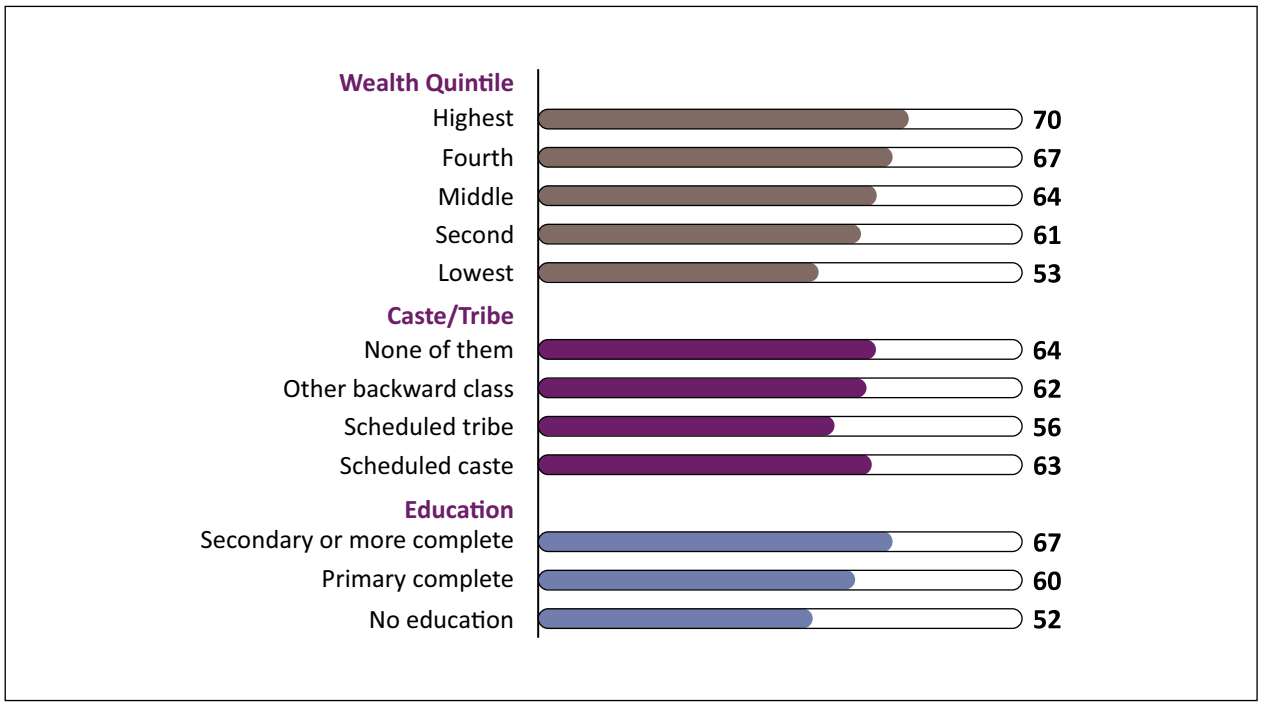


Inequities by economic status, Caste/Tribe and mother's education level are seen prominent. Full immunization coverage is lowest among scheduled tribe population (56%). The level of coverage increased in a step-wise manner across economic quintiles, from 53% in quintile 1 (lowest wealth quintile) to 64% in quintile 3 (middle wealth quintile) to 70% in quintile 5 (highest wealth quintile).

Notwithstanding the progress dynamics, it is discernible that the rural-urban hierarchies as well as the socioeconomic gradients in terms of wealth and social group affiliations are fully intact.

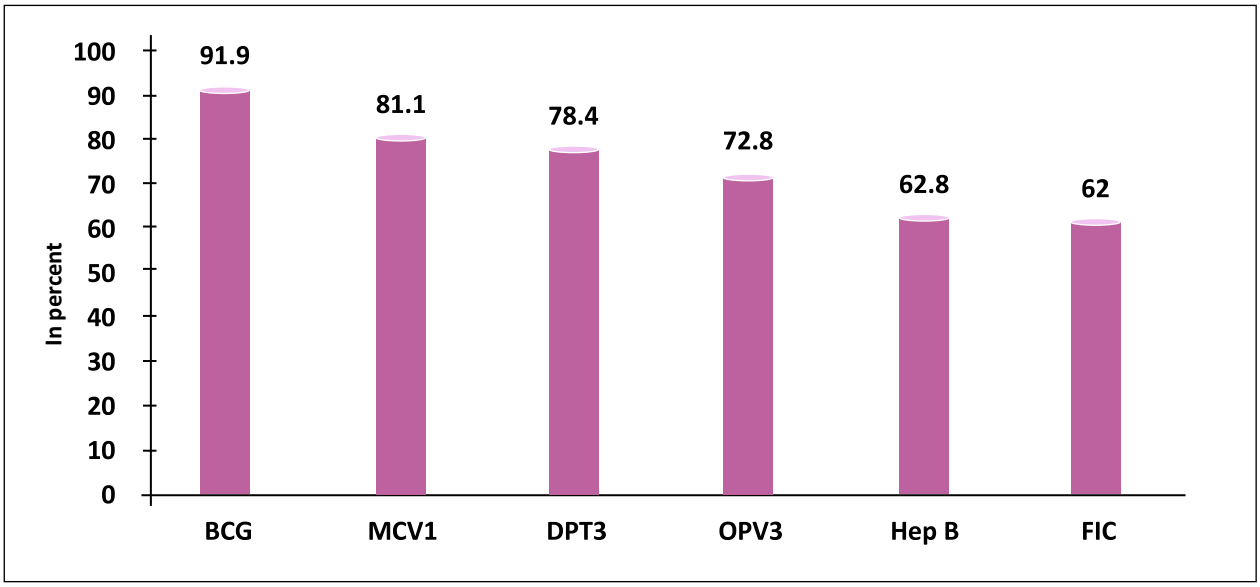
In addition to the socioeconomic status, maternal education is an important factor in determining full immunization coverage. As per NFHS 4 (2015-16) data, the children belonging to mothers with secondary or higher education have high coverage (67%) than those without formal education (52%).

Figure 2.4: Differencials in full immunization coverage among socio-economic groups (NFHS-4)



The variation in coverage is not only geographic or socio-economic wise but a huge variation is seen in the coverage of various vaccines. As per NFHS-4 data, coverage of BCG vaccine is 91.9% and that of DPT3 is 78.4% and MCV1 is 81.1% and the drop-out rate from BCG to DPT3 is 14.6%. The SDG commitment warrants universal immunization coverage by 2030 and India currently has a gap of 38% from achieving the universal coverage that can only be reduced by decreasing the drop-out rate.

Figure 2.5: Antigen-wise coverage, NFHS-4

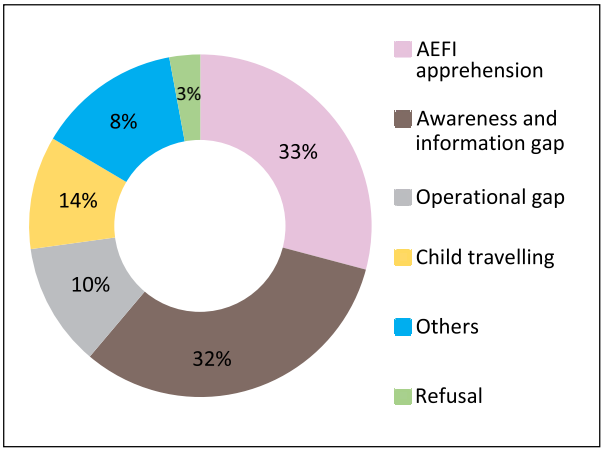


Many vaccines like DPT require a booster shot after the initial dose of vaccine to continue preventing the disease; however the coverage of booster doses is substantially low in the country. As per Coverage Evaluation Survey (CES 2009), DPT first booster dose coverage was 41% among children which declined further to 35% in 2013-14 (RSOC 2013-14). However, efforts have been made to increase the immunization coverage of measles vaccine, but a gap of about 52% continues to be present in the vaccination coverage of two doses of measles vaccine. (RSOC 2013-14: MCV1= 79% and MCV2=27%). This is a cause of concern for the Government of India at a time when the country is moving towards the elimination goal of measles.

Reasons for low immunization Coverage

The top three reasons identified in the National Coverage Evaluation Survey of 2009, as the major causes for low demand for vaccines included: 1) Not feeling the need for vaccines; 2) Lack of awareness about immunization, when and where; and 3) Adverse events following immunization (AEFI). The 2017 Concurrent monitoring data from WHO on routine immunization reveal that 74% of reasons for missing immunization were associated with demand side issues: parents are not aware of vaccine benefits; the fear of side effects or adverse events following immunization (AEFI) leading to dropouts, and unavailability of children or children at home to receive services.[4] Formative research

Figure 2.6:Reasons for missed vaccination, 2016-17



[4] *Immunization status of monitored children, 12 – 23 months, India 2014.*

carried out in 2015 in Uttar Pradesh, Bihar and Tamil Nadu showed that parents lacked awareness and did not understand the role of immunization in preventing diseases, the perceived threat of vaccine-preventable diseases was overall low, and poor knowledge levels related to the immunization schedule (the what, when and why) along with lack of urgency and prioritization of these as related to the uptake of services.

Dropouts indicate a deeper behavioural barrier both at the caregiver/parents level and the immunization service provider's level. Lack of awareness about immunization or the benefits of vaccines, low perception of threat from VPDs in unimmunized children, and incidents of adverse events following immunization has directly impacted confidence in vaccines impacting demand generation for vaccines and thus slowing progress in FIC.

Special immunization drives

To improve the immunization coverage, special immunization drives like Mission Indradhanush and Intensified Mission Indradhanush were launched in the country. These drives aimed at increasing awareness about vaccination and decreasing fear of side effects of vaccination, thus increasing demand generation, and strengthening of immunization programme leading to increased or full immunization coverage.

Mission Indradhanush

With the objective to reach out to the left-out children, Mission Indradhanush was launched in 2014 in the country with an aim to achieve full immunization coverage (FIC) of more than 90% by 2020In addition to the routine immunization days, intensified immunization rounds were held in mission mode. The districts were identified across the country based on the immunization coverage and number of left out children in the district. Within the districts, the Mission focused on high risk settlements identified as pockets with low coverage due to geographic, demographic, ethnic and other operational challenges. These include nomads and migrant labour working on roads, construction sites, riverbed mining areas, brick kilns, and those living in remote and inaccessible geographical areas and urban slums, and the underserved and hard to reach populations dwelling in forested and tribal areas. Till date, four phases of Mission Indradhanush have been conducted in 528 districts of the country and details are given in table 2.1.

Table 2.1: Mission Indradhanush coverage

S. No	Indicators (*in Lakh*)	Phase 1	Phase 2	Phase 3	Phase 4	Total
1	Total Number of session held	9.61	11.55	7.45	6.15	**34.75**
2	Total Number of Antigen administered	190.09	172.84	151.56	117.86	**632.35**
3	Total Number of Pregnant Women Immunized	20.95	16.83	17.83	13.10	**68.70**
4	Total Number of pregnant women completely immunized	11.13	8.94	9.56	7.09	**36.71**
5	Total Number of children immunized	75.75	70.30	62.08	46.43	**254.56**
6	Total Number of children fully immunized	19.81	18.17	16.34	12.19	**66.51**
7	Number of children vaccinated for the first time in life	NA	9.31	12.06	6.84	**28.21**
8	Total Number of Vit. A Doses administered	19.85	20.53	17.98	15.10	**73.45**
9	Total Number of ORS Packets Distributed	16.93	13.62	21.38	16.64	**68.57**
10	Total Number of Zinc Tablets Distributed	57.03	44.85	80.70	52.09	**234.68**

The preparation and learning's during the implementation of the Mission Indradhanush have led to health systems strengthening in terms of drawing up detailed micro plans; designing sturdy framework for stringent monitoring and evaluation of the immunization rounds in the states (more than 3600 state and central level monitors have been deputed); training of frontline workers; identification and analysis of limiting factors in different states leading to creating effective structures to mitigate them and creating awareness about the benefits of vaccination.

As per the report of Integrated Child Health and Immunization Survey (INCHIS), the first two phases of Mission Indradhanush have led to an increase of 6.7% in full immunization coverage in one year as compared to 1% increase/year in the past. This increase was seen more in rural areas (7.9%) as compared to urban areas (3.1%) thus shifting the focus of the programme towards urban areas. This increase, however, would not have been sufficient to achieve full immunization coverage of more than 90% by 2020, as aimed under Mission Indradhanush. Additionally, there are selected districts or cities that have shown slow progress in spite of repeated phases of Mission Indradhanush.

While acknowledging the impact of Mission Indradhanush in improving immunization coverage across the districts over the four phases, Hon'ble Prime Minister, through PRAGATI (Pro-Active Governance And Timely Implementation) platform, emphasized the need for a supplemental action plan to cover all left outs and drop outs in select districts and urban areas with low routine immunization coverage and achieve 90% FIC, in a specific time-frame (by December 2018).

Intensified Mission Indradhanush

Government of India has introduced 'Intensified Mission Indradhanush (IMI)' in 2017 in select districts and urban areas of the country to achieve the target of more than 90% coverage by December 2018 and sustainability thereafter through Routine Immunization.

Intensified Mission Indradhanush involved intensive preparation, implementation and integration of IMI sessions into RI microplans. Special focus was placed on urban slum areas and districts with slowest progress, completion of due-list of beneficiaries on the basis of head-count surveys and greater convergence with other ministries/ departments with defined roles. For the first-time different ministries and departments came forward to work in convergence for the common aim of saving the lives of children by increasing full immunization coverage in the country.

The gains thus achieved need to be sustained through strengthening health systems and microplanning by incorporating IMI sessions into routine immunization sessions.

2. Demand Generation

In the last few years, strategic communication for RI in India has evolved gradually, building on the strong approach of creating mass awareness through robust IEC, which an increased and sustained FIC being more strategic, innovative, and system strengthening-oriented. Some of the significant contributions to RI communication during the five years of cMYP 2012-17 are listed below:

Leveraging Lessons from Polio eradication

The tremendous volume of strategic communication work carried out for Polio eradication, especially the innovations in community outreach through the Social Mobilization Network (SMNet) provided rich lessons on community engagement processes and generating demand for vaccines. SMNet showed the path to engaging people beyond parents, structural strengthening for communication, and strategic engagement, lessons which are now being applied for generating demand for RI.

Branding and Logo for RI, 2012

To give a brand face to RI and for improved visibility, the Government of India developed a special logo for RI, with a tag line that contained a very important ask: "Be wise, get your child fully immunized." The logo had an instant connect with parents and communities, showing good recall value.

Communication and Operational Guideline for Generating Demand for Routine Immunization, 2012

The first ever comprehensive communication guideline produced by Immunization Division, Ministry of Health and Family Welfare (MoHFW) laid out the process for strategic communication planning for RI, based on evidence and barrier analysis and stressing on the importance of monitoring of communication interventions. State capacities were enhanced for improved understanding of the importance of evidence-based communication planning.

Communication Plan – A Model Approach, 2013

Standardizing the process of planning across the country, budgeting for communications, responding to media queries, crisis prevention and media engagement were the core areas in the strategy and the need of the hour. Routine immunization mandates communication planning at every block, district and state level which revolves around 5 strategic approaches – demand generation, capacity building, coordination and convergence, advocacy and social mobilization, and media engagement. This comprehensive guideline included standard operating procedures (SoPs), sample plans, and budgeting norms for various levels of operation.

AEFI Communication

The fear of AEFI further amplifies vaccine hesitancy and, in extreme cases (albeit in about 5%),[5] vaccine resistance. To ensure regular proactive communication with community and media along with timely response during crisis, two tools were developed on AEFI and crisis communication:

1. Communication guidelines for building vaccine confidence around AEFI (2013)
2. AEFI media communication protocol (2014).

AEFI spokespersons mechanism was introduced across states. Capacity building of Programme Managers and AEFI committee members on media management on AEFI were undertaken.

GAVI Health Systems Strengthening Support, 2014:

Among many others, two major strengthening initiatives taken under the GAVI HSSS-1 support included human resource capacity development in Social and Behaviour Change Communication (SBCC) for immunization and institutional setups for SBCC as detailed below:

- *TARANG Capacity building in SBCC for Immunization programme managers:* A 5-day SBCC course was developed for and endorsed by the MoHFW for rollout. TARANG had Quality Assurance mechanisms at every step, not only to measure training performance but also to measure field performance of trainees post learning. Its implementation led to 12 states (Assam, Bihar, Chhattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh, Arunachal Pradesh, Manipur, Nagaland) having a good mix of SBCC skilled personnel from Health and other related sectors, with over 400 Master Trainers; 2,000 District-based Trainers; and over 2,000 CBO members including faith-based organizations (FBOs), self-help groups (SHGs), Panchayati Raj Members (PRIs), Mahila Samakhya members (from Department of Education). TARANG training package was further customized as Incremental Learning and Training Module (ILTM) and enabled 3,000 frontline workers across various states to get trained in SBCC principles and planning.
- *SBCC Cells:* Set up within or by strengthening existing institutions for communication in Health, SBCC Cells had specialized or trained human resources and budgets that directly supported the State Immunization Division and played an immensely significant role in planning and operationalization of communications interventions for flagship interventions such as Mission Indradhanush and new vaccine introduction. Five GAVI-supported states (Assam, Jharkhand, Madhya Pradesh, Odisha and Uttar Pradesh) set up SBCC Cells at the state level, each based in a different institution.

Dashboard on demand generation interventions:

Among the number of communication innovations introduced during Mission Indradhanush, the special focus on Monitoring and Evaluation of

[5] *WHO House-to-House Monitoring, 2017*

communication activities at all administrative levels was one of the most significant contributors to system strengthening for demand generation. Specially designed monitoring tools and analyzed monitoring findings provided easy to understand dashboard information on gaps and strengths of communication interventions.

All these interventions mentioned above led to increased availability of communication plan in the states and districts.

Creating an enabling environment in the news media, 2015-17

Engagement with news media increased proactively, and daily news media was monitored closely, not only to bring in additional support and coverage for routine immunization programme as a whole, but to initiate a shift in tonality of news stories, with more than 85% stories being either favourable or neutral even when there were severe incidences of AEFI or unfortunate deaths during a vaccination campaign. FM radio was similarly used to reach out to a large radio listener base, mainly in media rich urban areas and rural settings.

Increasing RI visibility on Social Media

In 2014, the social media platform was used to further increase visibility of routine immunization, leverage the Mission Indradhanush and build an enabling environment for the introduction of newer vaccines. To increase the overall reach of the programme, a social media campaign Vaccinate4Life was launched across social media platforms – Twitter, Facebook and YouTube, which reached out to a wide range of audiences.

Using Mid-media to engage communities on immunization, linking it with RMNCH+A, 2015-17

Using mobile media vans and trained folk theatre artistes, RI messages were taken directly to communities in media dark and unreached populations, engaging parents, community leaders and caregivers, and help position immunization as a necessary child health intervention under the umbrella of Reproductive, Maternal, Newborn, Child Health and Adolescent (RMNCH+A) programme. Directly increasing awareness on routine immunization, it also helped address concerns through interpersonal communication.

Paanch saal, saat bar: New 360 degree communication message around early child development

Taking the cue from Early Child Development programme which is targeting 0 to 5 years as the most critical period in a child's life during which time all children must receive a comprehensive package of health interventions, a new key campaign for RI was designed and developed around the mandatory seven visits in five years (Paanch Saal, Saat Bar). In the complete immunization schedule, a child must visit the Immunization Centre at least seven times in five years. Popular celebrity Amitabh Bacchhan was the face and brand ambassador for the new media campaign, who was also the face of the Polio Programme and is the most important celebrity ambassador for RI.

3. Service Delivery

India conducts one of the largest Universal Immunization Programs (UIP) in the worldand targets ~26 million newborns and ~30 million pregnant women each year translating into >300 million doses of vaccines each year. The vast scale of India's UIP is supported by more than 27,000 functional cold chain points of which 750 (3%) are located at district level and above; and remaining 95% are located below the district level (PHC, CHC, Urban Health Facility, Sub-centers)), including ~76,000 cold chain equipment, ~2.5 million health workers, and ~55,000 cold chain staff (cold chain technician and vaccine and cold chain handler). Approximately 390 million doses are administered annually at 9 million sessions held across the country to immunize 26 million children and 30 million pregnant women.

3.1 Cold chain and vaccine logistics management

Cold chain and vaccine logistics management is a key driver of the immunization program of India. It has a significant impact on the vaccine availability, safety and potency that are key in ensuring that beneficiaries have confidence in UIP, thereby encouraging the uptake of immunization and enhancing the coverage of fully immunized children.Immunization supply chain management plays the most important role by providing necessary equipment, materials, and adequate supply of quality vaccines at all levels of the system. An efficient supply chain management system has

direct implications on financial cost by reducing vaccine wastage rate, stock-outs and increasing the utilization of resources.

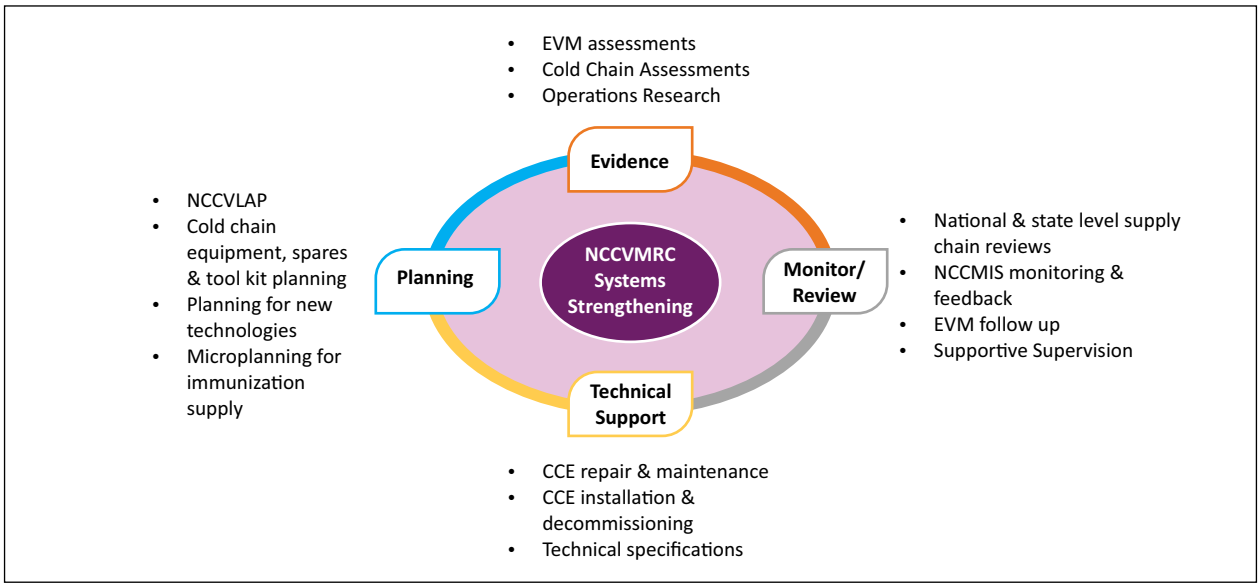
The vaccine delivery network in India operates through 4 GMSDs, 53 SVS (State vaccine Stores), 110 RVS (Regional Vaccine Stores), 666 DVS (District Vaccine Stores) and 25,555 sub-district stores involving 8,187,544 session sites through 259,283 health workers. The government is continuously working towards the aim of strengthening of immunization supply chain and in lieu of this in year 2016-17, a total of 16 WICs were procured additionally, making the total number of functional WICs in states as 263.Furthermore, with additional procurement of 6 WIFs the total number of WIFs increased to 57 in the country.

To ensure that each and every child is reached with vaccine, an Alternate Vaccine Delivery (AVD) system has been implemented by the Government of India. The AVD helps to ensure that the immunization session starts on time, vaccines are collected on the same day and unused/opened vials and immunization waste are brought back to the PHC on the same days. Also, AVD has reduced vaccine shortage; improved vaccine quality, timeliness of reporting and immunization waste management; and ensured regularization of immunization in hard to reach areas.

In recent years, cold chain system has been strengthened further and two apex institutes i.e. National Cold Chain & Vaccine Management Resource Centre (NCCVMRC) at Delhi and the National Cold Chain Resource Centre (NCCRC) at Pune have been established to manage all activities related to immunization supply chain-cold chain, especially for training of various cadres of cold chain & logistics staff.

The NCCVMRC (National Cold Chain and Vaccine Management Resource Centre) was established in 2013 as a joint initiative of the Ministry of Health & Family Welfare (MoHFW), NIHFW and UNICEF for the effective management of cold chain and vaccine logistics and capacity building of the managerial and technical staff working at various level of the health system.

Figure 2.7: NCCVMRC functions and support



NCCVMRC provides - technical support for all cold chain and vaccine management initiatives as per the directive of MoHFW; capacity building of program managers and policy makers; develop integrated monitoring system across all levels; function as the nodal resource centre for all immunization supply chain related research, training, planning and policy initiatives in India. The NCCVMRC has also been designated by the immunization division as the secretariat for comprehensive effective vaccine management (cEVM) assessment, and secretariat for cold chain equipment specification.

To manage and monitor the cold chain equipment and to take management decisions related to cold chain, a real time information system called National Cold Chain MIS (NCCMIS) was developed. This system serves as a platform to make corrective

decision, monitor the sickness rate of cold chain equipment, planning and allocation of new equipment and alignment of the new vaccine introduction with cold chain availability. NIHFW, through the NCCVMRC, is responsible for the overall maintenance and implementation monitoring of the NCCMIS across the country including providing helpline support to end users.

National Cold Chain Training Centre (NCCTC) has been established in Pune, a. This center was subsequently re-titled as the National Cold Chain Resource Centre (NCCRC), conducts training courses for cold chain technicians; and on the installment, repair and maintenance of cold chain equipment. Besides the above, the NCCRC is also in the process of establishing the cold chain equipment testing lab for the testing and calibration of the cold chain equipment.Details of activities done by NCCVMRC and NCCRC during period of 2013-17 is given below in table.

Table 2.2: Activities undertaken by NCCVMRC and NCCRC

S. No.	Activities	Done by NCCVMRC / NCCRC from 2013-17
1	**Assessments / Training Module / Reference Books**	
1.1		National Cold Chain Assessment
1.2		Identification of spare parts
1.3		Identification of cold chain equipment
1.4		Video showing the repair of ILR/DF
1.5		Solar Hybrid Assessment
1.6		National Performance Assessment of CCT
1.7		Vaccine and Cold Chain Handler Module
1.8		NCCVLAP vision document
1.9		Compendium of guideline based on NCCVLAP
2	**Training and Capacity Building**	
2.1	Training on ILR / DF	494
2.2	Training on WIC / WIF	380
2.3	Installation and maintenance of solar CCE	43
2.4	NCCMIS training for state and district level users	2410
2.5	ToT for VCCH	295
2.6	T-VaCC / ECCVMC	133
3	**International activities**	
3.1	**International activities**	ILR/DF training for Afghanistan CCT
3.2		ILR/DF training for Bangladesh CCT
3.3		ILR/DF training for Bhutan CCT
3.4		WHO fellowship program of ISC for Myanmar
4	**Support to other partners**	
4.1	**Support to other partners**	Android tool for Cold chain monitoring in MI
4.2		Android tool for RVV monitoring
4.3		Android tool for Communication monitoring
4.4		Android tool for supportive supervision
5	**Other Activities**	
5.1	cEVM assessments	18 states

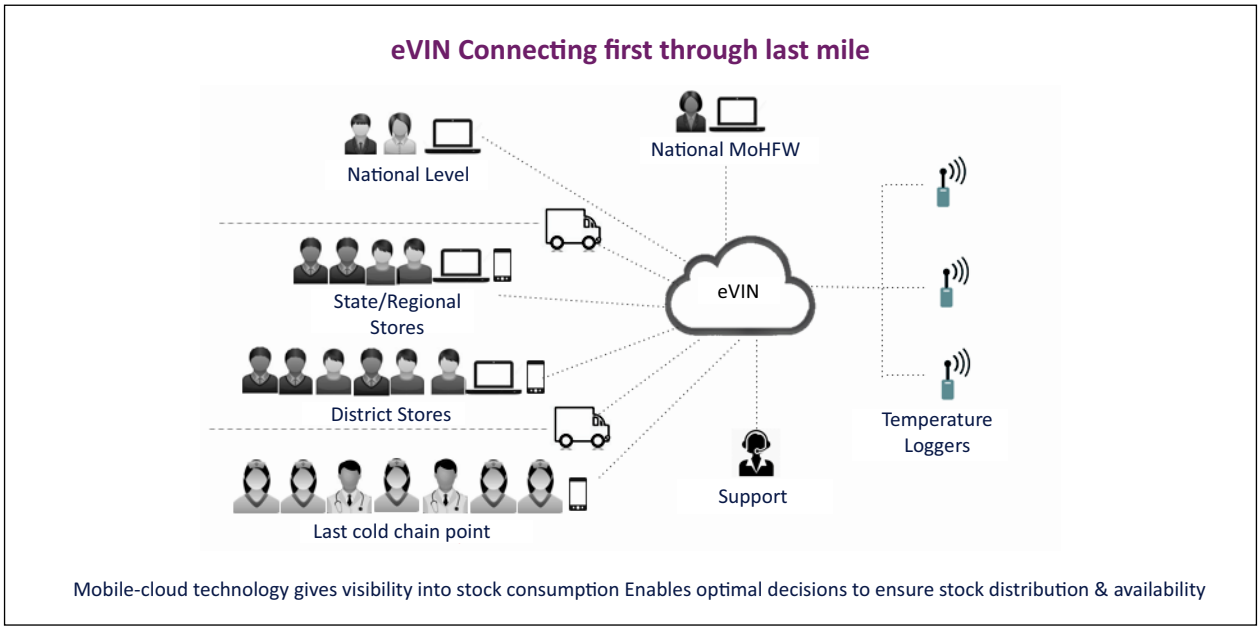
Systematic efforts to identify gaps and address issues in cold chain and vaccine logistics management have been conducted in recent years, which have identified some key challenges in this area. A national EVM assessment was conducted in 2013, in 11 states to understand the strengths and weaknesses in the existing cold chain and vaccine logistics management system. The criterions measured by EVM assessment were below recommended score of 80% or above performance for each criterion such as vaccine arrival process: 43%, vaccine storage temperature: 54%, storage capacity: 63%, building and cold chain equipment and transport: 69%, stock management: 51%, distribution: 45%, and vaccine management practices: 46% etc.

Subsequently, state EVM assessments have been conducted in 11 states and all the states were required to develop the improvement plans based on the EVM assessment findings and the plans are implemented to strengthen the cold chain system in the states.

Government of India (GoI) has prepared NCCVLAP as a vision document to guide the programme for strengthening vaccine logistics and cold chain management.The NCCVLAP clearly enunciates the road map the country needs to traverse in order to deliver on high quality immunization services. The document provides a vision and path for policy-makers and planners to design, implement and monitor their immunization supply chain initiatives at the national, state and district levels.

In order to strengthen vaccine and logistics management, MoHFW successfully piloted the use of indigenously developed IT systems/ applications for real time tracking of the vaccine stock, in 2015. This pilot was successfully scaled up with the name of eVIN (Electronic Vaccine Intelligence Network) in 12 states (Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Manipur, Nagaland, Odisha, Rajasthan and Uttar Pradesh) through Gavi HSS funds. After the successful scale up, eVIN is now being transitioned to be funded from National Heath Mission and included in annual Program Implementation Plan of the states.UNDP will continue to be the technical assistance support agency to the states for smooth transition, implementation, monitoring and evaluation.

Figure 2.8: eVIN functions and connectivity



eVIN aimed to streamline and regularize vaccine flow network by ensuring data-driven and efficient management of immunization supply chain and systemizing vaccine recordkeeping, digitalizing vaccine inventory and provide capacity building to cold chain handlers. eVIN also introduced the tracking of real-time temperature information of the cold chain equipment across all the vaccine storage cold chain points. eVIN enabled digitization of the cold chain temperatures, vaccine

stocks and flows, and has ensured real-time data availability at nearly 10,500 vaccine stores and cold chain points in all 371 districts of the 12 states. Nearly 700 training programmes on eVIN have been implemented for more than 17000 cold chain handlers and vaccine store managers. Over 2 million transactions are being made on eVIN every month capturing essential information such as vaccine issues, receipts discards and transfers. More than 14,000 data loggers have been installed for real time remote temperature monitoring of cold chain equipment.

As of July 2017, eVIN implementation in 12 states has led to 80% reduction in Stock-out events. Moreover, Temperature Excursions have been reduced by 50% after the installation of eVIN Temperature Loggers. eVIN has progressively evolved from real time inventory to a 'Comprehensive Immunization Supply Chain Management Tool' with features like online indentation, dedicated managerial application for District and State Immunization officers. To allow for inclusion of session site and vaccine supply management, a pilot study was conducted by UNDP using a device- VALUE (Vaccine and Logistics Utilization Evaluator) which allowed the ANMs to punch vaccine utilization data at the session site. Currently, VALUE pilot is being expanded to the PCV, introducing districts in Uttar Pradesh as a last mile level monitoring of vaccine wastage.

Figure 2.9: Reduction in stock out events as depicted by eVIN

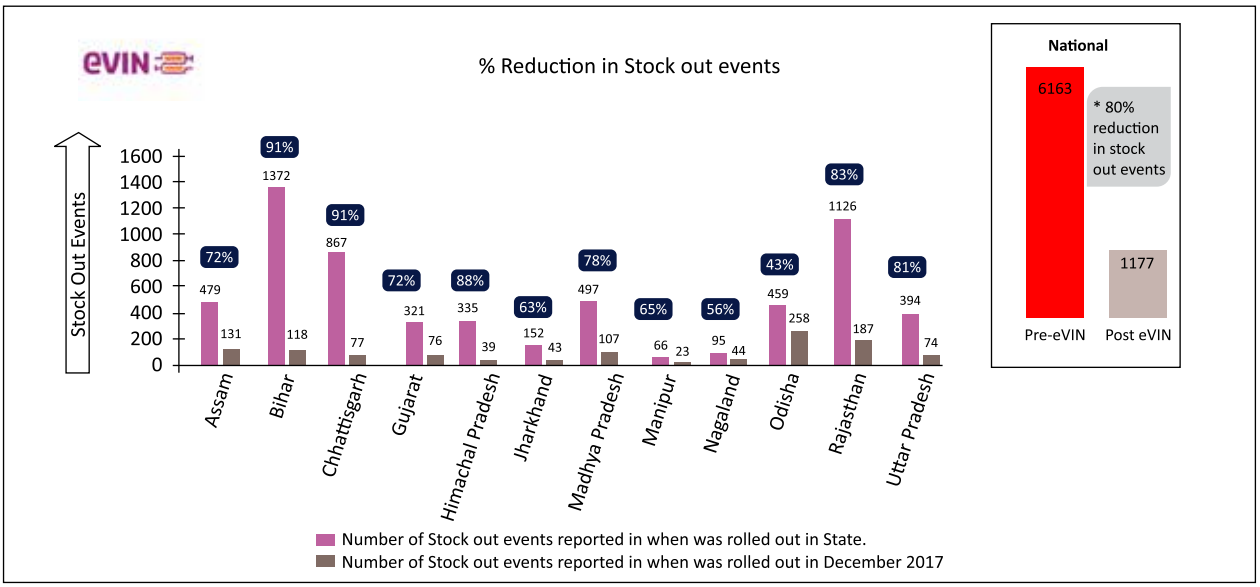
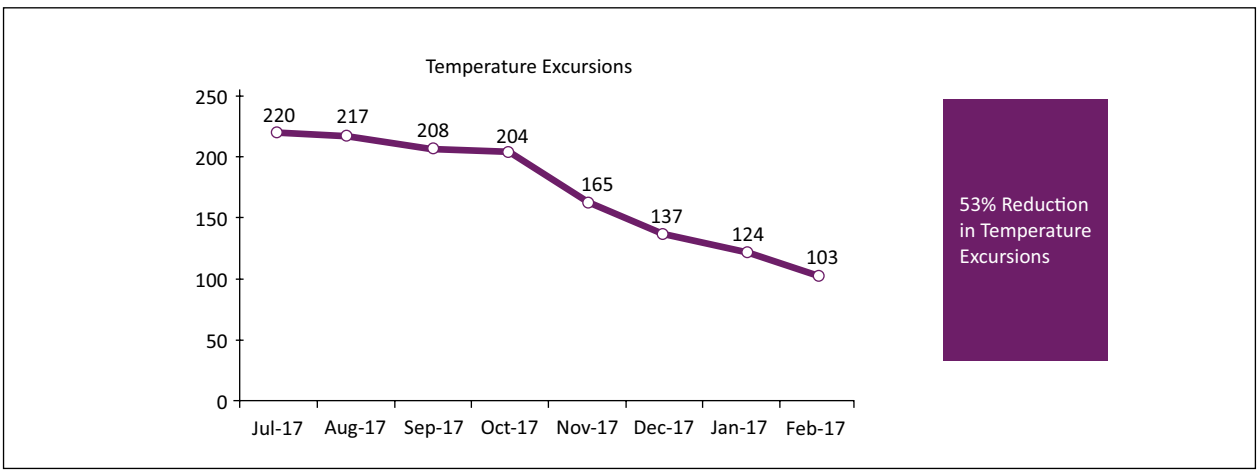


Figure 2.10: Reduction in temperature excursions reflected by eVIN



High vaccine wastage translates into inflated vaccine demand and increases the unnecessary vaccine procurement and supply chain costs. Thus, vaccine wastage is an important factor in forecasting vaccine requirements. Effective vaccine utilization is an integral component of vaccine security. The GoI introduced new vaccine management policy in 2013 (*Open Vial Policy, 2013*) which has been helpful in reducing vaccine wastage and increasing the cost-benefit ratio of immunization (Vaccine wastage assessment after introduction of open vial policy in Surat municipal corporation area of India, 2016 Apr). Among all vaccinators, the average BCG wastage rate was highest (56 percent), followed by measles (37 percent), OPV (36 percent), DPT (32 percent), hepatitis B (30 percent), and pentavalent (27 percent)[6].

3.2 VPD surveillance

A robust surveillance system is essential to detect the burden of diseases which are preventable by vaccines and thereby help generate evidence to inform the decision on introducing the vaccine as well as to measure its impact on the disease burden after its introduction.

Different surveillance systems in India provide information of various diseases, including VPDs. These include:

Integrated Disease Surveillance Project (IDSP)

This is a nationwide system that captures information on outbreaks of diseases including vaccine preventable diseases addressed under UIP, namely, AES, AFP, diphtheria, measles and rubella. It is an outbreak based surveillance system and all disease outbreaks reported from the States/UTs are compiled in the form of a Weekly Outbreak Report. The information provided through IDSP is not specific to any age group and includes outbreak of diseases in all age categories.

Central and State Bureaus of Health Intelligence (CBHI and SBHI)

CBHI provides demographic, socio-economic, health status, health financing, health infrastructure and human resources data annually as National Health Profile (NHP). The data compiled under National Health Profile is collected from central ministries/ department, States and UTs health authorities and autonomous organizations and agencies. The morbidity and mortality data across all age groups from all States/UTs for VPDs under UIP is provided under NHP, namely, Acute Encephalitis Syndrome (AES), JE, neonatal tetanus, diphtheria, pertussis, measles, pneumonia and meningococcal meningitis. It also provides number of TB notifications from public and private facilities in all states/UTs.

Health Information Management System (HIMS)

Within the NRHM framework, HMIS is an electronic data reporting system that captures data for health service delivery at health facility level every month to assist health departments, at all levels, in managing and planning health programs. HMIS also captures information on VPD disease burden from sub- block level on a monthly basis.

WHO supported laboratory based VPD surveillance

WHO has initiated VPD surveillance system, which includes diphtheria, pertussis and neonatal tetanus surveillance over and above AFP and Measles rubella surveillance, in 2015 in Kerala and Haryana. Five more states, namely, Bihar, Himachal Pradesh, Madhya Pradesh, Punjab, and Uttar Pradesh have initiated VPD surveillance till 2017. This will be expanded in a phased manner in all states/UTs with 3-4 states/UTs each year.

WHO supported AFP and Measles outbreak surveillance through NPSP network

AFP surveillance is a laboratory-based system for poliovirus detection in all states. Reported AFP cases having two adequate stool specimens collected within 14 days of onset of paralysis in ≥80% of cases have stood over 80% for the past years. The laboratory-based MR surveillance covers all 36 states/UTs generating data on measles and rubella outbreaks. There is weekly MR surveillance reporting. Based on the serological confirmation, it classifies outbreaks and cases as 'measles', 'rubella', 'mixed' and 'non-measles, non-rubella. India is currently maintaining surveillance sensitivity reporting rate of measles and rubella at <=1.As a part of the elimination requirement, revised case-based MR surveillance, has been transitioned to 18 state/UTs, with a plan to expand to the entire country by end of 2018.

[6] *Cost of delivering routine immunization services in India, 2016*

Acute Encephalitis Syndrome (AES/JE) surveillance

This is a facility-based surveillance system providing information on AES as per the guidelines under the National Vector-Borne Disease Control Program with laboratory support provided by ICMR.

Sentinel surveillance for Congenital Rubella Syndrome (CRS)

India initiated outbreak based and laboratory supported measles rubella surveillance in 2005 and covered the whole country by 2015. In view of the introduction of rubella vaccine in the country, ICMR has established a facility based surveillance for CRS (in age group 0 to 11 months) in the country. Sentinel surveillance sites for CRS has been established at six sites (AIIMS Jodhpur, CMC Vellore, IGICH Bengaluru, KEM Pune, PGIMER Chandigarh and TMH Jamshedpur) in India with an aim to establish baseline trends of CRS and also assess the impact of Measles Rubella vaccination in the country.

Rotavirus Surveillance Network in India

The Indian National Rotavirus Surveillance Network (NRSN) was established in December 2005 to generate data on the clinical, epidemiological, and virological features of severe rotavirus disease in Indian children, using standardized protocols for enrollment and diagnostic evaluation. From 8 hospitals in 2012, the NRSN was expanded to include 28 hospital sites across India in 2014.

Hospital Based Sentinel Surveillance of S. pneumoniae and other Invasive Bacterial diseases

Bacterial meningitis surveillance (in age group 1 to 59 months) in India was initiated by the Ministry of Health and Family Welfare in December, 2011 with the key objective of establishment of 11 Hospital Based Sentinel Surveillance Sites. The network of these sentinel surveillance sites generated data on disease burden of meningitis among children below 5 years of age attributable to *S. pneumoniae*, *N. meningitidis*, and *H. influenzae* type b [S pn, N me and Hib] and also their trends over a three year surveillance period. The network study has built the capacity to carry out multi-site surveillance among young children and established standard operating procedures for similar surveillance activities. It has provided the required platform to set up pneumonia surveillance network across India with a view to generate data and information to assess the impact of initiation of pneumococcal conjugate vaccine in India.

WHO established surveillance system receives over 90% of reports on time. The number of reports received at the national level form the districts compared to that expected is 99% in 2016-17. However, despite the presence of multiple platforms, the VPD reporting system suffers from certain challenges like existence of multiple reporting systems. More than one surveillance system exists to report for a particular diseases, yet there is disparity in the disease burden reported from different data sources. There is a need to integrate the various VPD surveillance systems like IDSP and WHO.

3.3 Adverse events following immunization (AEFI)

AEFI surveillance system is a preliminary step to ensure vaccine safety monitoring, which involves ability to detect, report, receive, log and analyze data as well as to undertake any remedial action (WHO-GVSI, 2013-14). AEFI surveillance systems are specific to monitoring adverse events associated with vaccine use. An efficient AEFI system requires spontaneous reporting of AEFI and capacity for vaccine pharmacovigilance (WHO-GVSI 2013-14).

India's AEFI surveillance program was established in 1986 and National AEFI Committee in 2008, but the system suffered severe under-reporting and poor investigation of reported cases, sporadic causality assessments and poor communications regarding reported AEFI cases. Vigorous strengthening of AEFI surveillance has resulted in manifold rise in absolute number of AEFI reports across several reporting units in the country in the last decade. Constitution of National AEFI Committee in 2008, establishment of National AEFI Secretariat in 2012 and development of risk communication strategy as well as quality management certification are some of the unique aspects of this public health program. The four subcommittees of the National AEFI Committee i.e. Investigation, Causality Assessment, Laboratory and Media have been activated with well-defined work plans. Each committee, chaired by a subject matter expert is leading the strengthening of the AEFI Surveillance program in their respective areas.

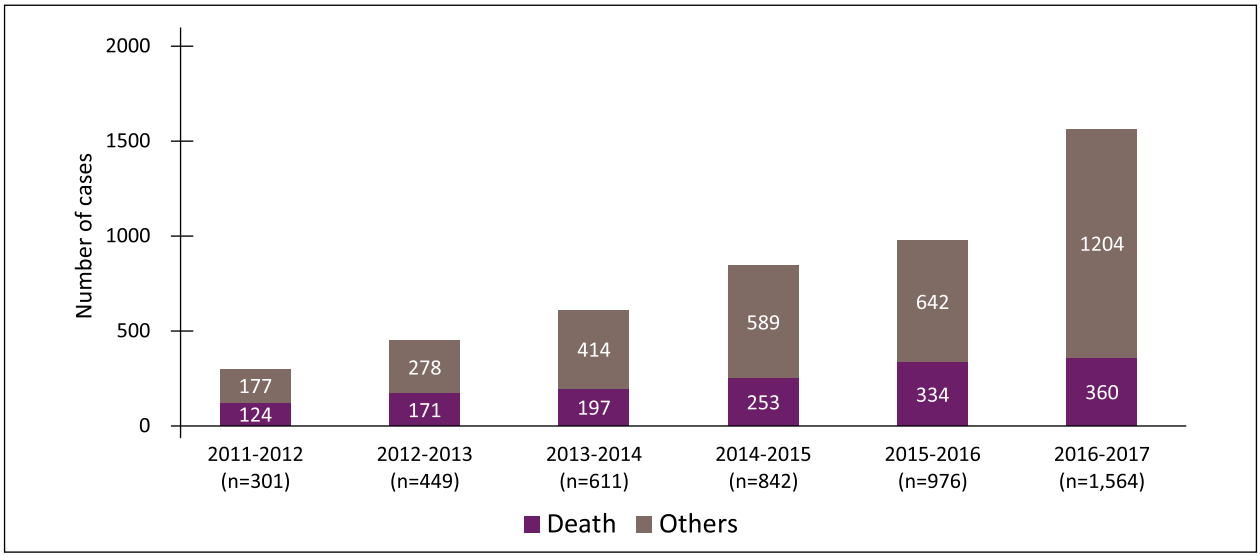
In 2013, National AEFI Technical Collaborating Centre at Lady Hardinge Medical College was

set-up to provide specialist guidance on a regular basis to the AEFI secretariat. Causality assessment meetings are regularly held to assess causality of cases reported and investigated at the National Technical Centre. Causality of more than 40% of all cases reported in past five years have been completed and made public on the MoHFW website. At present every state has established AEFI committees both at the state and the district levels.

To provide direct support to the states for focused efforts to improve AEFI surveillance, four Senior Consultants have been hired by the MOHFW through the National Health Systems Resource Centre, New Delhi. These consultants work with the AEFI Secretariat and are assigned 6-12 states as per zones allocated to them. They provide support in monitoring of AEFI surveillance programs in states and are also involved in trainings.

The AEFI secretariat has been a cornerstone in streamlining the National AEFI Surveillance program. The reporting of serious and severe AEFI cases has steadily been increasing from 301 cases in 2011-12 to 1,564 cases reported cases in 2016-17. However, a huge variation exists across states in reporting of AEFI. In 2016-17, bigger states like Tamil Nadu (101), Himachal Pradesh (104), Karnataka (104), Uttar Pradesh (146), Madhya Pradesh (156), Kerala (165) and West Bengal (256) reported over a hundred cases; however, small states like Manipur, Nagaland and Union territory of Daman & Diu did not report any case. AEFIs following all vaccines are expected to be reported to national AEFI surveillance program. An unpublished study on factors affecting reporting of AEFI in health system of India by ITSU (2017)[7]revealed and highlighted issues such as absence of demand for reporting from seniors, lack of motivation and incentives for reporting of AEFIs, no clear understanding of terms 'AEFI', 'reporting' and reportable AEFIs, no follow up by field health workers and no feedback for reported AEFIs, lack of time and knowledge of reporting process in AEFI surveillance program (private pediatricians), disconnect between medical education system and public health system and lack of desired communication between private sector and public health sector on concerned topic of vaccine safety and reporting of AEFIs.

Figure 2.11: Reporting of serious/severe AEFI (2011-2017)



Source: AEFI secretariat

A National Quality Assurance Committee was formed in 2014 to guide the development of the Quality Management System (QMS). National Quality Assurance Standards for AEFI surveillance processes have been developed. National level processes have been quality certified as per standards. Efforts are on to develop and implement QMS in states and districts. AEFI

[7] *A Qualitative Study to Explore Factors Affecting Reporting of Adverse Events Following Immunization (AEFI) in Health System of India. Unpublished manuscript.*

surveillance is the first public health program unit to be certified for quality management systems by the global International Society for Quality in Healthcare (ISQua) in December 2016. The AEFI secretariat is certified from the National Quality Assurance Standards for national level processes related to AEFI surveillance, Pharmacovigilance (PV) coordination, National Regulatory Authority Institutional Development Plan (NRA IDP) and work for quality certification.

Reporting of AEFI is important to understand safety issues around vaccine. In India, 26% of serious/severe AEFI cases in 2016-17 were notified within 48 hours of the identification/notification by a health staff. Investigation of AEFI is necessary to identify the cause of an AEFI and to implement follow-up action in order to maintain public confidence in immunization programme. Of the total cases reported in 2016-17, 15% were investigated within 60 days of notification of serious/severe AEFI. Causality assessment is required to help determine the likelihood of the event been caused by the vaccine received. In 2016-17, 7% of the total cases were classified within 100 days of notification/ identification.

Table 2.3: Key achievements of AEFI surveillance

Indicator	Status			
	2013-14	2014-15	2015-16	2016-17*
National AEFI system is active with a designated national committee	Yes	Yes	Yes	Yes
Number of reported serious/severe AEFI cases reported during the financial year	611	842	976	1,564
% of serious/severe AEFI cases notified in a timely manner*	27%	24%	24%	26%
% of serious/severe AEFI cases investigated (PIR/PCIF received at national level) in a timely manneras per national guidelines*	31%	35%	30%	15%
% of serious/severe AEFI cases classified within time as per national guidelines*	3.1%	12.1%	1.7%	7.0%
NRA AEFI Program assessment held				Yes
Spokesperson training on AEFI			Yes (15 states)	

Source: AEFI secretariat

Note: Data as of 21-October-2017; Cases are included in a financial year based on date of vaccination.
*For FY 2016-17 timeliness of cases investigated and classified calculated as per AEFI operational guidelines 2015.
All denominators taken as number of reported AEFI cases with the date of vaccination in a financial year; cases with missing date of notification, date of receipt of FIR/PIR/DIR received at national level are excluded from the numerator.

Several initiatives have been taken up for information sharing on AEFI detected by the private sector and Pharmacovigilance Program of India. Efforts have been made to collaborate with the private sector such as IDsurv.org platform of IAP, ADR monitoring centres of the PvPI as well as IMA. The secretariat has initiated the process of developing Quality Management System (QMS) for AEFI surveillance at district, state and national level. Information on reported AEFIs to the immunization division is shared through online file sharing sites with weekly summary reports. The Pharmacovigilance Programme of Indiareports serious AEFIs reported by ADR monitoring centres immediately and also provides monthly line lists for all vaccine related AEFIs (serious and non-serious). The National Regulatory Authority (NRA) body approves procedures to ensure that medicines, including vaccines, are of adequate safety and potency. The NRA assessment by WHO in 2016-17, rated highest possible maturity rating of 4.

A communication guideline for building vaccine confidence around AEFIs was developed in

2013.An AEFI Media Communication Protocol (2015) was prepared as part of the national AEFI guidelines which include ready – to- use media response templates for districts and states. A series of spokespersons' trainings have been conducted since 2015 and is on-going in which 15 state level programme managers and AEFI committee members have already been trained.

In 2015, national AEFI guidelines (reporting, investigation, causality assessment) were revised through a consultative process based on globally accepted guidelines. These regulations included specific guidelines to report severe AEFIs in addition to serious AEFIs, conduct quality post mortems, verbal autopsies and effectively communicating with the community and media when an AEFI occurs. To further increase the footprint of the AEFI surveillance system, the GoI in 2017 issued a direction to all states to create an AEFI register at block PHC level. This register is to be used to record all AEFIs identified in the field including minor events. The ANMs are required to ensure monthly entry of these events during the block level monthly meetings.

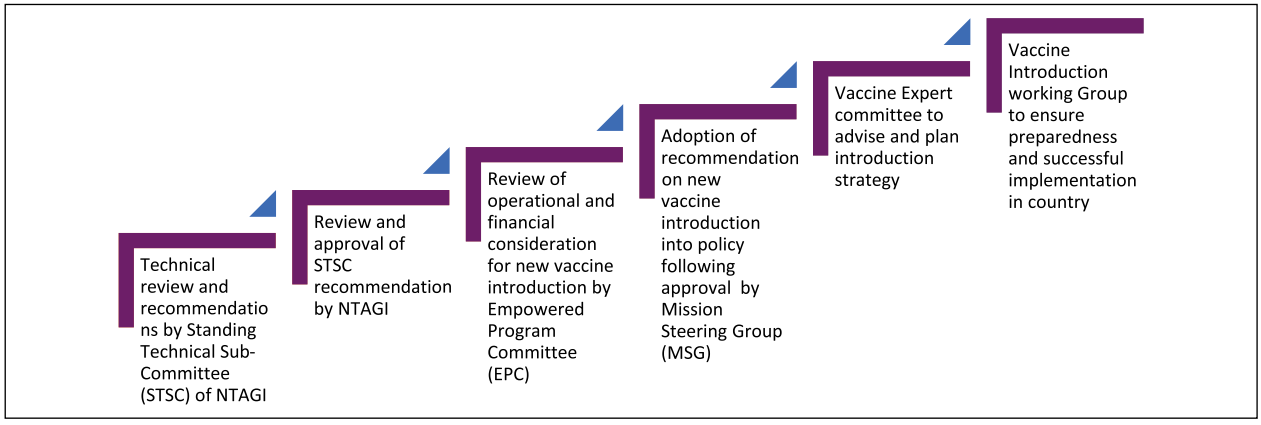
A Vaccine Adverse Event Information Management System (VAEIMS) software for real-time recording of information related to AEFI surveillance (reporting, investigation and causality assessment processes and data) for each serious /severe AEFI case has been developed by the WHO-India Country Office in close coordination of the AEFI Secretariat. Data will be captured at the district level based on information in the Case Reporting Format, Preliminary and Final Case Investigation Formats. The State Causality Assessment Format will be entered at the state level. Reports and analysis in the form of line-lists, dashboards, graphs, charts and maps for presentations will be generated for better visualization of data for action taking. The software, in addition to data capturing, will also generate alerts and reminders to improve timeliness and completeness. The districts can also upload scanned copies of the formats and other records such as hospital records, post mortem reports, etc.

After the successful piloting in all districts of Madhya Pradesh and West Bengal in October 2016, an improved version of the software will be rolled out in all the states by end 2018. Further improvements are planned based on feedback and changes to the AEFI surveillance programme. The software will be hosted on a government server to ensure sustainability and adherence to standards of data security and privacy concerns.

3.4 New Vaccines Introduction

New vaccine introduction in UIP is a multi-step process involving technical and financial considerations. The National Technical Advisory Group on Immunization (NTAGI) was established in August 2001 to strengthen the decision making of the new vaccine introduction. It is the apex advisory body to the MoHFW that makes technical recommendations related to immunization, which include introduction and expansion of the use of new and underutilized vaccines. As part of the NTAGI proceedings, the group of independent and multi-disciplinary health experts as well as ex-officio members systematically review data on disease burden, vaccine safety, equity, financial sustainability, and logistical implications of the decision to introduce new vaccines in the program and give recommendations with regard to introduction of new vaccines.

Figure 2.12: New vaccine introduction process

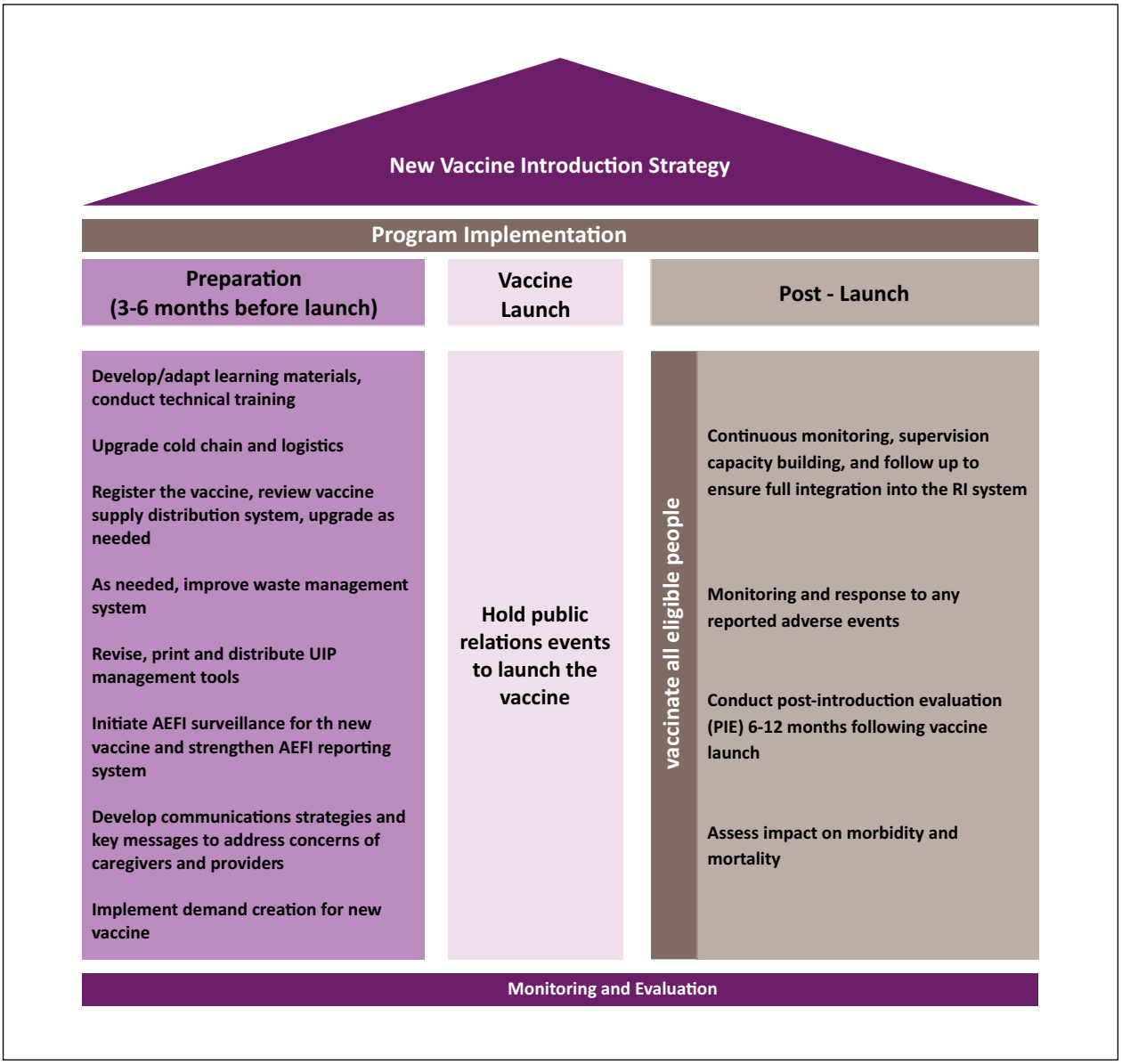


In June 2013, the NTAGI was reconstituted with a Standing Technical Sub-Committee (STSC) of independent experts, as well as a Secretariat was established for NTAGI. The secretariat is situated at NIHFW under the aegis of MoHFW. STSC undertake detailed deliberations on technical issues and provide recommendations to the NTAGI for further review. The Secretariat liaise with partners and independent experts. It undertakes evidence-based reviews by collating and analysing evidence on disease burden and efficacy, safety and cost-effectiveness of available vaccines, to enable timely and informed decision-making. NTAGI meetings have been conducted once every year since 2013. A total of 13 STSC meetings has been conducted from the year 2013 to 2017.

Introducing New vaccine

There is an established mechanism for introducing new vaccine comprising of preparedness assessment prior to introduction, launch of new vaccine and post introduction assessment.

Figure 2.13: New vaccine introduction strategy



The preparedness assessment checklists are developed to support the state and district programme managers in assessing critical information prior to the introduction of a new vaccine. The essential components of state and district preparedness checklists includes- human resource vitals; background information; microplanning planning status; training status; recording and reporting practices; vaccine coverage and wastage, vaccine management, transport and logistics; waste management and injection safety; monitoring and evaluation; AEFI; mobilization; advocacy and communication; surveillance; and cold chain maintenance.

From 2013-17, five new vaccines have been introduced under UIP.

Pentavalent vaccine

In 2011-12, pentavalent vaccine was introduced under UIP in two states – Tamil Nadu and Kerala. Subsequently, in early 2013, this vaccine was extended to six more states. In September 2013, the NTAGI endorsed full scale-up of the pentavalent vaccine under the UIP to rest of the country and the vaccine was introduced in all the States/UTs of the country with Uttar Pradesh being the last state to be introduced to Pentavalent vaccine in December 2015.

Rotavirus vaccine (RVV)

In March 2016, India became the first country in Asia to introduce RVV in the UIP. The vaccine was indigenously manufactured and was initially introduced in four states- Haryana, Andhra Pradesh, Odisha and Himachal Pradesh with expansion to five more states in 2017 (Madhya Pradesh, Rajasthan, Tripura, Assam and Tamil Nadu). In accordance to the plan of expansion of vaccine introduction, a lyophilized RVV was introduced in Jharkhand in 2017. There is a plan to introduce the vaccine in Uttar Pradesh in 2018 with further plan to scale up in remaining states/UTs.

Inactivated polio virus vaccine (IPV)

As a part of Global Polio Endgame Strategy, IPV was introduced in six states in December 2015 and was expanded to all states by June 2016. As a risk mitigation strategy for tOPV to bOPV switch which took place on 25th April 2016 in the country. As per Indian Expert IEAG meeting held in February 2016 fractional dose schedule of IPV was introduced in the country starting from 8 states in April 2016. By April 2017, all states implemented fIPV schedule.

Measles rubella vaccine (MR)

India is committed to the goal of measles elimination and rubella control and to achieve the goal MR vaccine was introduced in the country in the country through a campaign mode in a phased manner in 2017.As a part of MR campaign, 400 million children of age 9 months to below 15 years are targeted and after the completion of the campaign, MR vaccine replaces the measles vaccine as two dose schedule in UIP.This is the largest campaign in world and till April 2018, the campaign has successfully completed in 15 states/ UTs and more than 7 crore children have been reached and vaccinated. It is expected that by 2019, the vaccine would have been introduced in all the states/UTs

Pneumococcal conjugate vaccine (PCV)

Write PCV was also introduced in 2017, in a phased manner starting with three states- Bihar (7 districts), Uttar Pradesh (6 districts) and Himachal Pradesh (all 12 districts). In 2018, there is a plan to introduce PCV in Madhya Pradesh (all 51 districts) and Rajasthan (9 districts) with scale up in all 38 districts of Bihar and 12 districts of Uttar Pradesh. In 2019, additional 19 districts of Uttar Pradesh will be included along with all districts of other four states. India has introduced PCV-13 in its immunization programme.

3.5 Monitoring & Evaluation and Data Quality

Immunization coverage data informs the management, performance and evaluation of immunization programmes. Therefore, it is important that quality of data is maintained. To monitor the programme across the country, the programme managers rely on survey and administrative coverage data. While both data sources are complementary, administrative data systems are of highly variable quality across different states. In 2009, Mother and Child Tracking System (MCTS) was launched which help front-line workers in tracking of the beneficiaries. MCTS is a web enabled name-based system for MCH services delivered through the Indian public health system and is designed to capture and track all pregnant

women (from conception up to 42 days post-partum) and all new-born children (up to 5 years of age).

In 2012, an initiative was taken to develop monthly immunization dashboards. This acted as a common platform to analyse administrative (HMIS, MCTS/ RCH,) evaluated and concurrent monitoring data for program review and monitoring and providing feedback to State/UTs for initiating corrective measures. This has led to the improvement in timeliness and completeness of reporting immunization data. The dashboards have become a ready reckoner for central and state governments for all data related to routine immunization.

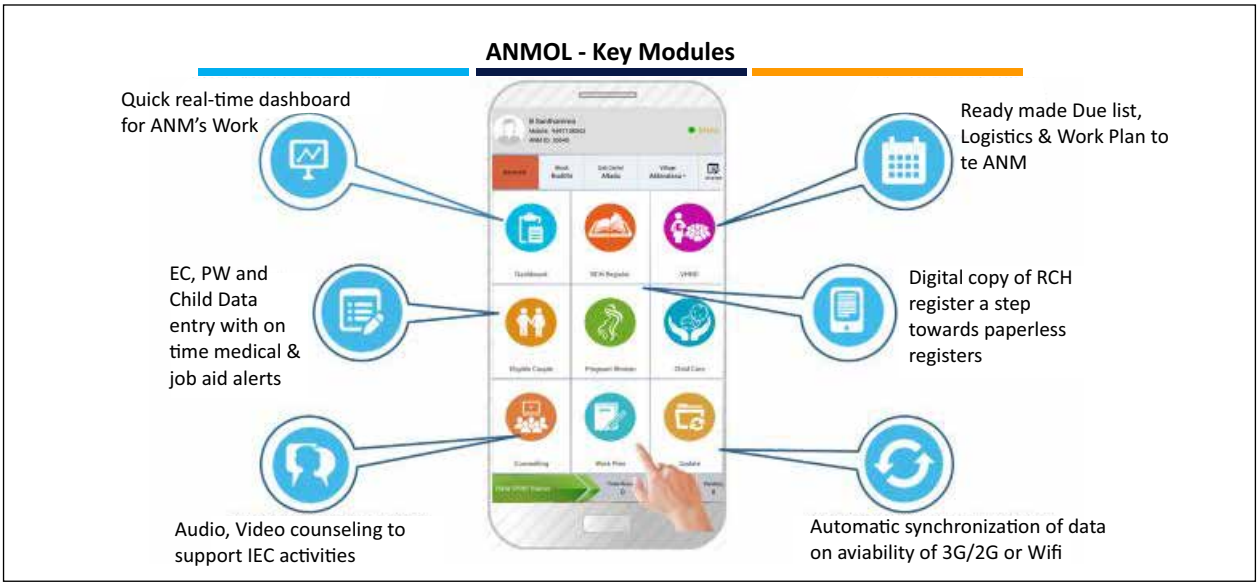
In addition, data quality assessment (DQA) exercises were conducted in three states — Haryana (2014), Uttar Pradesh (2015) and Rajasthan (2016) to further help in improvement of data quality. Similar DQA studies are being planned in other high priority states for the future.

Improvement of immunization requires the regular and continuous monitoring of the programme. The various partners work together with the central and state governments to improve the immunization coverage in the country. With various campaigns like Mission Indradhanush and Measles & Rubella Vaccination campaign the coordination among partners and with the government has improved and monitoring has been strengthened. Over the years monitoring has increased from 89,944 sessions in 18 states in 2013-14 to 1, 83, 983 sessions in 30 states in 2016-17.

Most of the surveys carried out in the country like NFHS, DLHS and AHS collect information about various health related indicators which also includes immunization. These surveys give information about the coverage indicators only and do not collect data on booster doses, birth doses, and other information like demand issues, awareness among parents about immunization, AEFI and distance and time taken to reach the session site etc. The only survey which is focused on immunization and collects all these data is CES and the last CES was conducted in country in the year 2009. In addition to immunization data the CES also collects information about maternal health indicators, breastfeeding and child nutrition indicators. This survey is planned in 2018 and will include maternal and child health indicators in additional to qualitative and vaccine supply chain issues.

The government has recently launched a Tab with custom-made software ANMOL (ANM Online) that will facilitate Auxiliary Nurse Midwives (ANMs) to maintain patient data in digital format and have it automatically backed-up in a central server. This will ensure more prompt entry and updation of data as well as improving the data quality asthe data will be entered “at source” by providers of health services themselves.

Figure 2.14: ANMOL key modules



3.6 Human Resource and Capacity Building

The Universal Immunization Programme (UIP) of India has under-achieved the goal of rapidly increasing immunization coverage with almost stagnating growth[8] in the past few years. Studies suggest that the lack of human resource management is one the most crucial factors in under-achievement of projects[9]. In the last five years, UIP has undergone several structural changes and have demonstrated steady progress in areas of human resource and their training. A brief account of the status of key human resources and their capacity building are described below.

Sub-centres are the most peripheral, grass root level of primary health care system and serves as the first contact between the community and the health care system. Each sub-centre needs to have one Auxiliary Nurse Midwife (ANM) and one male health worker (MPW/M). However, the percentage of sub-centres functional without an ANM has increased from 3.4% in 2013-14 to 5.8% in 2016-17 in the country. As per UIP guidelines there is one cold chain officer placed in every state and 573 cold chain technicians placed in every district of the country.

The effectiveness of immunization program depends upon the efficiency of the immunization supply chain (ISC). NCCVMRC has facilitated in the capacity building of senior and mid-level managers, working at the state and district level in the country through the Training on Vaccine and Cold Chain (T-VaCC)/Effective Cold Chain Vaccine Management Course (ECCVMC). Since 2013-14, 494 cold chain technicians received training on installation of ILR/DF. Moreover, 380 technicians were trained on WIC/WIF during the same period. By March 2017, there were 2410 district level users were trained on NCCMIS. During 2013-17, 295 training of trainers (ToT) were conducted for Vaccine and Cold Chain Handlers (VCCH).

Table 2.4: Human resource training status

System components	Indicators	Status			
		2013-14	2014-15	2015-16	2016-17
HR numbers	% of Sub-centres functional without an ANM	3.4%	4.8%	5.5%	5.8%
	Number of States/UTs with CCO in place	22	23	24	25
	Number of districts with CCT in place	473	505	547	573
Capacity building	Number of states where 80% of ASHA are trained in Behaviour Change Communication	8	9		
	Number of states where all MOs are trained on RI MO handbook	7	DNA		
	Number of states/UTs with all DIOs trained in national AEFI guidelines	DNA	11		
	Number of states/UTs where all cold chain staff are trained in cold chain and vaccine management	16	19		
	Number of DIOs trained on T-VaCC/ ECCVMC	-	71	17	45
	Number of CCTs trained on ILR/DF	81	159	111	143
	Number of CCTs received training on WIC/WIF	19	160	143	58

Source: Rural Health Statistics; NCCVMRC

[8] *NFHS-4, RSOC-2013-14, CES-2009*

[9] *Streefland, P.H. 1995. Enhancing coverage and sustainability of vaccination programs: An explanatory framework with special reference to India. Social Science & Medicine, 41: 647-656.*

Training of health functionaries is essential to deliver quality immunization services. The UIP has regular trainings for health functionaries at several levels as given below:

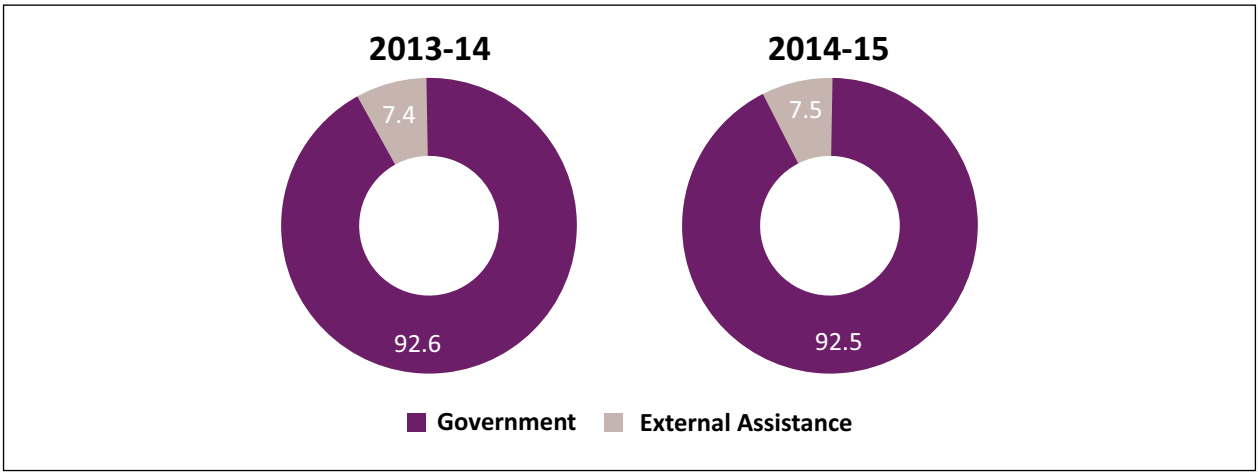
- A three days training of medical officers-immunization are organized at district/ regional/state training to train on 'Immunization handbook for MOs', facilitator's guide and training kit (2016).
- Two days training of health workers are conducted on 'Immunization handbook for HWs' and facilitators' guide (2016) at district training centre/ANMTC.
- A half day training of frontline workers-immunization are held on Info-kits for HWs and ASHAs/AWWs, facilitators' guide for intensified immunization training of frontline workers (2013) at block/PHC level.
- Similarly, two days training of cold chain handlers on 'Handbook for vaccine and cold-chain handlers (2016)' is organized at district training centre/ANM training centre.
- Two days training of Medical Officers –RI on microplanning is conducted on material shared during state-level workshops at state level TOT followed by cascade training at district and sub-district level.

Different mechanisms to train the health functionaries include Half day training of front-line workers at PHC/block level once every 6 months, review meeting at the block/PHC held every fortnight/month/quarter; supervisory visits to the health centres, session sites and the community. Under the GAVI Health System Strengthening Phase 2 Grant for India, a training program called RISE (Rapid Immunization Skill Enhancement) is being developed for health workers, cold chain handlers, program managers and mobilizers working on India's Universal Immunization Program. The training package is expected to deliver effective and efficient routine immunization capacity building system with a built-in mechanism of self-assessment and refresher training.

3.7 Immunization Costing and financing

As per the costing and financing of the comprehensive multi-year plan for immunization (cMYP) 2013-17, shared personnel (those who spent less than 100 per cent of their time on immunization) is the major cost component (38% of the total) followed by routine recurrent expenses including vaccines and syringes (36%) and supplemental immunization activities (25%). India's immunization programme is mostly funded by the government with some support from the partners such as Gavi, BMGF, WHO, UNICEF. During two mid-term review years, 2013-14 and 2014-15, the government paid 93% of total expenditure on the programme which is similar to the baseline year of the cMYP (2012). The rest seven percent was through external assistance.

Figure 2.15: Financing, Indian Immunization Programme (cMYP Mid-term review)



Although the government is the major source of funding for UIP, Gavi also provided substantial support for health system strengthening for immunization and vaccines. Gavi financing for India's immunization programme during 2013-2017 is given as below

Table 2.5: Gavi financing for immunization (US$)

Programme	2013	2014	2015	2016	2017	
HSS	27,286,000		41,094,000	38,620,000	26,465,953	**133,465,953**
MR vaccine				28,980,000	44,345,655	**73,325,655**
Pentavalent vaccine	10,218,312	94,461,548	73,428,060	41,934,261	-3,857,863	**216,184,318**
PCV				27,839,600	82,764,163	**110,603,763**
IPV			18,820,000	-2,288,455	-212,376	**16,319,169**
Total	**37,504,312**	**94,461,548**	**133,342,060**	**135,085,406**	**149,505,531**	**549,898,857**

In the midterm review of cMYP, an attempt was made to examine the projected and actual expenditure on immunization programme for two financial years, 2013-14 and 2014-15. Figure 2.16 presents the results.

Figure 2.16 (a) : Projected and actual expenditure on immunization, 2013-14 and 2014-15, INR crore

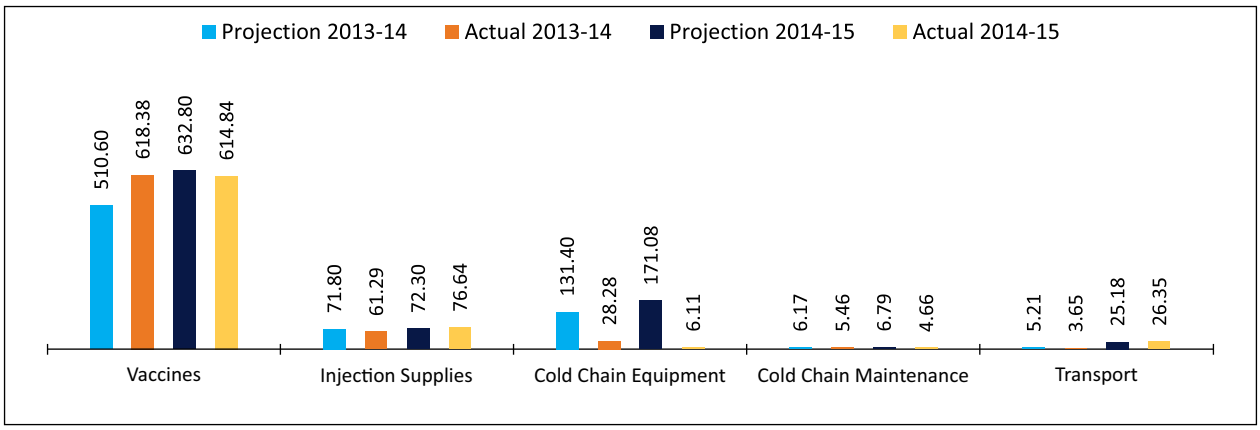
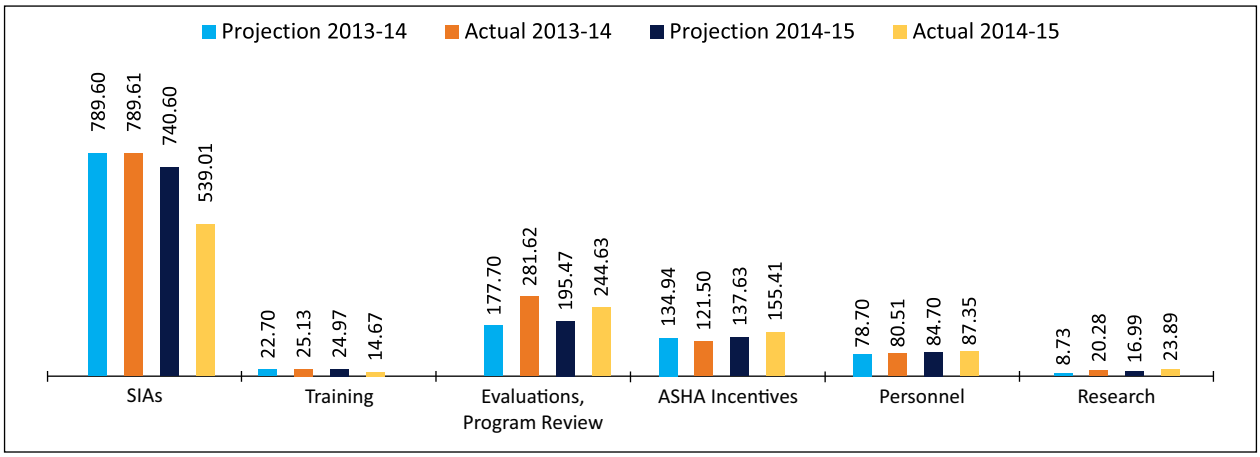


Figure 2.16 (b) : Projected and actual expenditure on immunization, 2013-14 and 2014-15, INR crore

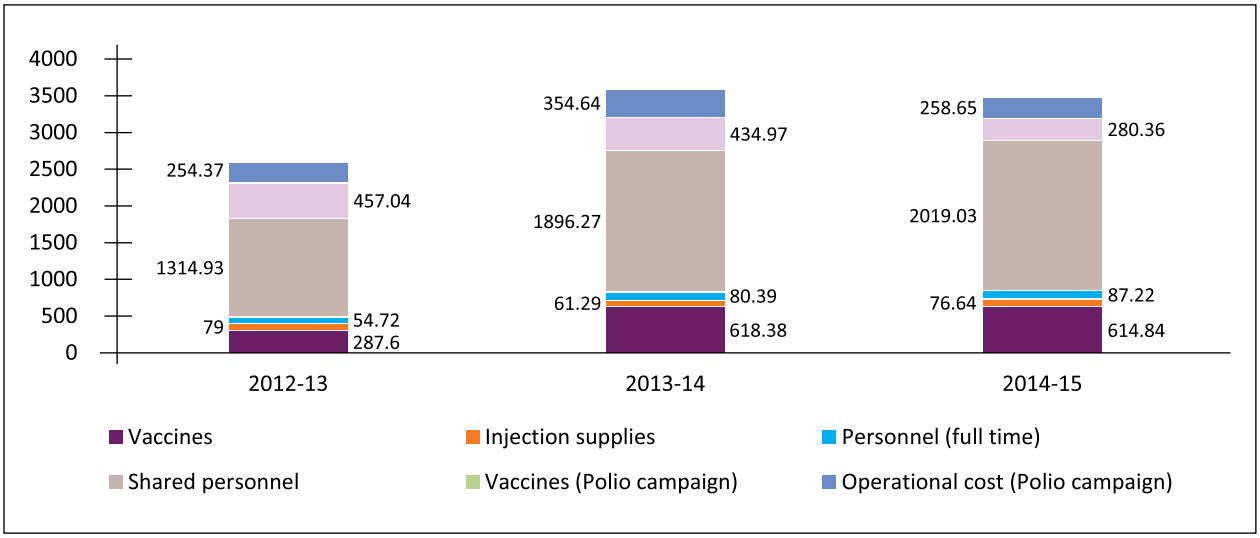


The actual expenditure on vaccines was higher than projection in 2013-14, however, the expenditure was less than projection for injection supplies. More funds were spent on surveillance operations including meetings and trainings, operational cost of polio and other VPDs, research studies and consumables for laboratory than projected in 2013-14. However, in 2014-15, more funds were spent than projected on surveillance operations, but for all other components, actual expenditure was less than projected. The actual expenditures on personnel were close to the projection, however, during the year 2013-14, the actual expenditure for cold chain equipment was much lower than

projected expenditure. Similar trend was observed during the year 2014-15 In addition, the projection for expenditure on cold chain maintenance for the year 2014-15 was 31 percent higher than the actual expenditure. Further, there was a significant difference in the projection by NCCRC and the actual expenditure.

If we compare actual government expenditure over three years, the total expenditure on immunization increased over the years (Table 2.6 and figure 2.15). The amount spent on vaccines increased significantly from INR 288 crore in 2012-13 to INR 618 crore in the next year because of introduction pentavalent vaccine in several states.

Figure 2.17: Actual government expenditure on immunization (INR crore)



The costing and financing analysis of cMYP (2013-17) was based on secondary data collected from the ministry and other immunization partners. Several assumptions were made during the cost analysis of cMYP. In order to improve the assumptions for next cMYP (2018-2022) and understand the actual cost of delivering the programme at different levels, a study was carried out covering 255 public health facilities of different types across seven states in India. Data were collected for the fiscal year 2013-14.

According to the study on cost of delivering routine immunization services in India, the cost per target child which can be used for calculating the budget of the programme both at the state and national level varied widely across states[10]. Table 2.6 shows the variations of unit costs across the study states and the national level estimate. While the cost per child with vaccine cost was INR 1,005 in Bihar, the same was INR 2,198 in Kerala (both at 2017 prices).

Table 2.6: Weighted average state and national level unit costs, including vaccine cost (2017 INR)

	Bihar	Gujarat	Kerala	Meghalaya	Punjab	Uttar Pradesh	West Bengal	National estimate
Cost per target child	1,005	1,574	2,198	1,923	1,779	1,040	1,531	1,728
Cost per dose	84	150	182	125	124	92	106	141
Cost per DPT3/ pentavalent 3 child	1,232	1,746	2,163	1,779	1,871	1,226	1,437	1,956
Cost per fully immunized child	1,347	1,795	2,205	1,996	1,933	1,158	1,715	2,003

[10] *Chatterjee et. al (2018). Routine Immunization Service Delivery in India: Variation in Cost and Performance. BMJ Global Health (under revision).*

Using the national level estimate of cost per target child, INR 1,728, this study estimated total cost of delivering routine immunization services at the national level during 2013-2014 at INR 4,550 crore, while the actual government expenditure reported in cMYP mid-term review during that period was INR 4,070 crore (both adjusted at 2017 prices). The lower costs reported in cMYP probably stem from an underestimation of the shared costs of buildings, vehicles —components that the present study took into account. The shared personnel cost was the major cost component in the cMYP costing (2013-17) and the time spent for the shared personnel was based on expert opinion. The UIP costing study will give a better understanding of the percentage of time spent by different categories of staff. The study also took into account the shared vehicles, building space for immunization. The study, therefore, will help revising the assumption for the current cMYP costing (2018-2022).

Challenges identified under key areas

Key area	Identified challenges
Coverage and Equity	• Issues specific to urban poor and tribal population • Inadequate and infrequent programmatic review at various levels of implementation • Inadequate inter-sectoral convergence for program delivery
Demand generation	• Awareness and information gap • AEFI apprehension • Lack of strategic linkage between communication plan and routine immunization microplan. • Lack of supervision and monitoring for effective communication • Sub optimal Institutional capacity in the states and districts on communication planning and implementation • Absence of mechanism for measuring impact of communication interventions • Absence of trained officials at state and district level in IEC/ SBCC activities
Service delivery	• Lack of availability of the updated microplans for operational and communication activities • Lack of timely availability of quality data • Non-availability of a comprehensive plan for repair and maintenance of CCE in many states • Last mile connectivity- AVD system not yet streamlined in many parts of the country
New vaccine introduction	• Increasing cold chain space demand for new vaccine being introduced within UIP • Sustenance of training of trainers (ToT) by GoI funds • Lack of interchangeability studies for same antigens • Fund availability for new vaccines and associated logistics
VPD surveillance	• Existence of multiple data sources with poor coordination amongst them • Lack of presence of case based surveillance system • Weak capacity of frontline health workers to identify cases • Poor reporting from private sectors and large institutions
Adverse events following immunization	• Under-reporting of AEFI cases (~5000-6000 cases are expected to be reported annually) • Poor programme indicators of AEFI surveillance in states and districts (timeliness and completeness of reporting and investigations and causality assessments) • No system for identifying potential signals, studying the validity of signals (active AEFI surveillance) and advising regulatory action

Human resources	• Shortage of human resources • Irrational deployment-concentration of HR in urban/peri-urban areas • Capacity building needs-sub optimal use of technology for imparting training • Availability and accountability of HR • Lack of human resource capacity at state and district level for AEFI and vaccine safety
Costing and financing	• Transitioning from National five-year plan to Developmental plan • Fund utilization at sub-national level • Lack of budget with the government to sustain the surveillance initiated by the surveillance studies

Chapter 3
UIP Strategic Plan

UIP Strategic Plan

The aim of cMYP 2018-22 is to eventually reduce mortality and morbidity due to vaccine preventable diseases. Achieving full immunization coverage of 90% will act as one of the key steps in reducing mortality and morbidity due to vaccine preventable diseases.

A Monitoring and Evaluation (M&E) Framework has been developed (Annexure 1). 49 Indicators under M&E Framework have been developed to track the progress, and agency responsible is also assigned. The framework provides baseline value and frequency of reporting the data for each indicator.

Objective 1:
Improving Service Delivery and Increasing Coverage

To improve the immunization coverage in the country, it is important that each and every child is reached out and is vaccinated with all the vaccines. This would require robust micro-plans with a special focus on low immunization coverage areas like urban slums and tribal areas. Capacity building of HR would also help in strengthening of immunization program and increased immunization coverage.

Strategy 1.1: Ensuring equitable access to immunization

Activity 1.1.1: Strengthen Routine Immunization microplanning

Microplanning is to be based on head count survey with comprehensive and efficient tracking of HRA population, minorities, and poorest section of society with line listing. Tracking inclusion of vulnerable populations through special need based micro plans including developing and tracking micro plans for areas with HR constraints.

Activity 1.1.2: Integrating immunization in school and adolescent health programme

Integration of Department of Health &Family Welfare with Department of School Education & Literacy to link vaccine delivery with other health interventions for school age children like WIFS, Deworming can increase coverage of these interventions and reduce cost of delivery.

Activity 1.1.3: Implementation of tribal immunization strategies to reach all tribal population

Review of bottlenecks and challenges related to immunization programme in tribal population followed by development of a tribal immunization strategy through multi-stakeholder consultation and integration into the strategic framework of immunization program under NHM. An assessment study will be conducted in the select tribal areas and findings will be used to develop various tribal strategies which will be piloted and best strategies would be recommended for implementation.

Activity 1.1.4: Special immunization drives for left out/ drop out

MoHFW has been active in promoting special drives for immunization, in order to capture all left outs and drop outs. Mission Indradhanush and Intensified Mission Indradhanush has helped in enhancing the immunization coverage. Similar need based drives to boost immunization coverage may be proposed in areas with low coverage and assisting them to convert the session planned for special drives into routine immunization sessions.

Activity 1.1.5: Support state in identifying essential activities and their inclusion in state project implementation plans (PIPs)

MoHFW conducts state orientation workshop on PIPs to ensure that crucial activities for RI strengthening (like mobility support for health workers for vacant SCs or mobile health team) are identified and included in state PIP. MoHFW handholds states for capacity building of program managers to develop PIP. To achieve 90% FIC by December 2018, the states are asked to develop action plans and present during PIP review meetings. Any additional funds required for innovations or interventions to achieve 90% FIC, will be supported by GoI under PIP and approved as per NHM norms.

Strategy 1.2: Regular RI review

Activity 1.2.1: Regular routine immunization review meetings at all levels

Routine immunization review meetings should be conducted to track the progress in immunization program, identify issues/ bottlenecks and address them.

Level	Participants	Chair	Frequency
National	All national immunization stakeholders	Joint Secretary (RCH)	Annual
State	Program managers	Secretary/ Mission Director, NHM	Twice a year
District	Medical officers	CMO	Quarterly
Block	Health workers	BCMO	Monthly

Accountability mechanism like State Task Force for Immunization (STFI) and District Task Force for Immunization (DTFI) to be strengthened through regular meetings. STFI to be conducted once every quarter and DTFI to be held monthly.

Activity 1.2.2: Concurrent RI monitoring

Concurrent RI monitoring to be continued to generate data at session and in the community through government and independent monitors with a common monitoring format.

Activity 1.2.3: Conduct state immunization reviews

A comprehensive review of the states to be done by MoHFW with at least 2 states in a year. The comprehensive reviews will identify the gaps in program implementation, vaccine and cold chain logistics and demand generation. Based on review findings Immunization coverage Improvement Plans (iCIP) will be developed in consultation with state government and partners.

Strategy 1.3: Strengthening the capacity of human resources

Activity 1.3.1:Constitute RI cell at state level

RI cell to be constituted in each state for planning, operations, surveillance and monitoring. It should comprise of State Monitoring and Evaluation Officer, State Vaccine Logistics Officer and State Training cum Surveillance Officer.

Activity 1.3.2: Implementing Rapid Immunization Skill Enhancement (RISE) – a continuous knowledge building system strengthening approach in India

With the introduction of new vaccines and other developments in immunization, there is a need to upgrade the knowledge base of the health cadres. RISE is a platform for e-learning and m-learning and includes other non-electronic learning mechanisms. It will be used across all cadres of health workers including program managers and the content will be designed based on capacity building need assessment at state/ district level.

Activity 1.3.3: Capacity building of master trainers for microplanning and RI strengthening

Revise microplanning training package and capacity building of master trainers for microplanning and RI strengthening

Weak microplans have repeatedly been identified as contributing to a sub-optimal coverage in routine immunization. Towards addressing this issue, the GoI has recommended standardized formats for use across the country. This is a milestone in RI microplanning and for the first-time, formats have been designed for the Primary Health Center in order to have collated information ready at hand.

Two days training programme is designed and developed, which takes the participants through a step by step exercise-based on these formats. The uniqueness of the training is the cascaded approach of the 9 exercises at the state level workshop that reduces in number as the training cascades down to the PHC and the frontline health worker.

Activity 1.3.4: Training of MOs on Immunization Hand book

The training program based on the revised Medical Officer Routine Immunization handbook is a unique two and a half day training which uses a customized kit and facilitator guide containing role play games, puzzles and exercises to impart training. This revised edition also include a new innovative approach to microplanning in routine immunization and also standardizes all the RI microplanning formats across the country.

The trainings will be funded through NHM funds and this demonstrates the governments continued commitment to strengthening routine immunization.

As the number of doctors guiding immunization in the public health system is almost 60,000 officers, the cycle for roll out of the trainings will need to be planned at state level in coordination with partner agencies.

Activity 1.3.5: Training of health workers on immunization

This handbook is the immunization training and operation manual for Routine Immunization in India. The manual incorporates a 2 day health worker training programme and also lays down operational guidelines on RI.

With the introduction of new vaccines, and the enhanced focus on Routine Immunization by the government, the handbook will be instrumental in strengthening capacities of health workers and the system.

The health workers immunization handbook has been revised to incorporate policy and implementation changes in the immunization delivery mechanism of the country.

Activity 1.3.6: Incentives for performance

State government will identify villages achieving 100 percent full immunization coverage. The planning units at district and block and village team (Panchayat, ANM and ASHA) to be awarded a certificate of appreciation and prize money by the Department of Health and Family Welfare, by respective State Government for achieving 100 percent full immunization.

Strategy 1.4 Strengthening urban immunization

Activity 1.4.1: Establish urban immunization cell and urban/ city task force

In efforts to strengthen the reach and services of immunization programme under NUHM, District Task Force Urban Immunization [DTFU (I)] and City Task Force Urban Immunization [CTFU (I)] will be established. For metro cities and cities where urban local bodies (ULB) are the implementing authority for NUHM, CTFU (I) will be the acting body.

These DTFU and CTFU to be established in identified 1067 cities/ towns covered under NUHM for implementation. These urban task forces will comprise of officials from health and non-health departments under the chairpersonship of Mayor and should meet once in two months.

Urban immunization cell will be established with one nodal officer for every 2 lakh population in urban areas of all states.

Activity 1.4.2: Implementation of urban strategies to reach all the children in urban areas

Review of challenges will be conducted related to reaching out to children in urban slums and peri-urban areas. The use of technology for tracking/tagging of urban slum and migrant population and to address coverage and equity using polio and MI experiences.

The Development of urban immunization strategy in consultation with multi-stakeholders and on lines of NUHM

Activity 1.4.3: Conduct situational analysis for strengthening urban immunization

Each district/ city to review the current status of routine immunization, identify gaps and decide strategic actions to improve immunization coverage. A gap assessment in urban areas will help to guide development of improvement plans for urban areas. This will include, mapping infrastructure and human resources (both government and immunization partners), assessment of training needs of human resources and assessment of immunization micro plans with identification of high risk areas.

DTFU/ CTFU (I) will review the processes leading to planning and implementation of immunization in urban area. This includes area demarcation, review of immunization programme performance, identification of operational constraints, and ensure corrective operational steps to improve routine immunization coverage in urban settings with a focus on urban poor.

Activity 1.4.4: Support state and district in identifying need based activities in cities/ corporations identified as part of NUHM and their inclusion in state NUHM project implementation plans (PIPs)

The urban task forces will ensure preparation of program implementation plans (PIPs) based on urban needs of the districts and cities. This will be developed as part of the PIP under NHM. The urban task forces will provide oversight in terms of goal setting, planning, budgeting and measuring progress. The urban task forces will review optimal utilization of funds available for urban areas in PIPs (training of staff, AVD, hiring of vaccinators for urban slum/ poor, incentives for ASHA and mobilization.

Indicators for Objective 1

No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency
1.1	Percent of districts with more than 90% Pentavalent 3 coverage	(Number of districts with more than 90% Pentavalent 3 coverage/ Total number of districts)*100	WUNIEC methodology	21%	2016-2017	80% of districts (RVAP)	Midterm and end term
1.2	Number of States/UTs where >95% sessions were held as planned	No. of sessions held/ Total number of sessions planned	Monitoring data	23	2017	36	Annual
1.3	Number of States/ UTs having less than 10% dropout from Pentavalent1-Pentavalent3	(Penta1 - Penta3 coverage)/Penta1 coverage * 100	Survey/HMIS	27	2016-17	36	Annual
1.4	Difference in FIC between the highest and lowest wealth quintiles (%)	Highest wealth quintile FIC - lowest wealth quintile FIC	Survey	17 (NFHS4)	2015-16	16%	Midterm and End term
1.5	Number of states that developed tribal immunization strategy (Only for high tribal population states)	Number of states that developed tribal immunization strategy in high tribal focus states	State PIP reports	0	2017	16	Annual
1.6	Number of states where 80% districts conducted at least 6 DTFI meetings during the reporting year	Number of states where 80% districts conducted at least 6 DTFI meetings during the reporting year	Monitoring data	0	2017 (Gavi states)	36	Annual
1.7	Percent Medical Officers trained on RI handbook in each state	(Number of MO trained in RI handbook/ Total number of MO in the state)*100	Training report	0	2017	80%	Annual
1.8	Percent health workers trained on Health worker RI handbook in each state	(Number of health worker trained on health worker RI handbook/ Total number of health workers in the state)*100	Training report	0	2017	70%	Annual

Objective 2:
Strengthen vaccine logistics and cold chain management

Vaccine logistics management is one of the critical elements in the immunization program to ensure that all vaccines are available at the last cold chain point for immunization sessions. Similarly, a reliable and cold chain network is essential to ensure that vaccines are stored within the recommended temperature ranges, and safe and potent vaccines are delivered to children. With introduction of new vaccines, it has become even more important to strengthen the cold chain and vaccine logistics in the country and to regularly assess the program.

Strategy 2.1: Implement EVM in all states/UTs

Activity 2.1.1: Effective Vaccine Management (EVM) assessment in states and national level and development of Improvement Plan

EVMs will be conducted in states after every 3-5 years. Technical support will be provided for conducting EVM assessments and development of improvement plans based on the assessment findings for national as well as state assessments.

Activity 2.1.2: Creation of National Resource Pool & local capacity building

For conducting national EVM as well as state EVMs, there would be requirement of large number of assessors. A pool of assessors will be created taking interested and competent program managers from states / districts / medical colleges / partners, who have programmatic experience / prior experience of EVM / attended ECCVMC or T-VaCC course.

Activity 2.1.3: Implementation of improvement plan in states and national level

The improvement plan will be implemented with planned activities incorporated into PIPs. Technical support, supportive supervision as well as monitoring of the activities will be done in order to support the state for implementing the improvement plan. Status of EVM IP implementation will be reviewed annually at national level along with regular monitoring through online EVM Dashboard.

Strategy 2.2: Enhancement of the capacity of human resource and institutes involved in immunization supply chain

Activity 2.2.1: Development of updated VCCH training module & training of VCCH

The currently used VCCH module was updated in 2016. Considering the rapid changes in the Immunization supply chain system, introduction of newer vaccines, newer cold chain technologies and field level issues and challenges, the Vaccine & Cold Chain Handlers module will be updated in coming years. Based on the updated module Vaccine & Cold Chain Handlers will be trained in the entire country.

Activity 2.2.2: Training of Cold Chain Technicians at National centres for repair and maintenance of cold chain equipment

Cold Chain Technicians will be trained on the repair & maintenance of cold chain equipment at NCCVMRC and NCCRC. As part of the capacity building initiatives, various types of job aids (audio-visuals, display material, distance learning etc.) will be developed to standardize and ensure delivery of uniform messages to the participants during the trainings.

Activity 2.2.3: Training on Vaccine and Cold Chain (T-VaCC) for Program managers at National centres

A managerial course has been developed addressing key program challenges faced by the program managers and to build their capacity to take decisions locally to address the challenges. The target audience will be state & district level program managers.

Activity 2.2.4: Institutional strengthening

In order to provide technical support to Immunization division, MoHFW on Cold Chain

& Vaccine Logistics Management related issues two national level institutes (NCCVMRC, New Delhi and NCCRC, Pune) have been developed. These institutes will need to be strengthened wit technically competent human resource, equipment and financial assistance to be able to meet the desired expectations.

The laboratory available in NCCRC, Pune is currently undertaking development of certain tools required by the program. Necessary support needs to be provided to the laboratory to make it NABL accredited as well as PQS certified in order to test the cold chain equipment to be used in the program.

Improvisation of Training MIS: The currently available Immunization Training MIS (iTMIS) is limited to capturing the details about the trainings of Cold Chain Technicians. The scope and features of the MIS will be expanded to capture all the trainings being imparted under the program irrespective of the levels, cadres of service providers and program managers.

Strategy 2.3: Strengthen vaccine logistics management through eVIN

Activity 2.3.1: Scale up eVIN in remaining 24 states and UTs

eVIN to be expanded to remaining 24 States and Union Territories to optimize and strengthen the vaccine supply chain management practices at all levels through real-time stock visibility. By the end of year 2018, a total of 18 states will complete the eVIN rollout, by end of 2019, 28 states and by end of 2020, eVIN will go pan-India.

As part of eVIN scale up, placement of a dedicated Vaccine Cold Chain Manager at each district, capacity building of CCH on eVIN mobile app and installation temperature loggers on cold chain equipment, will be achieved.

Additional modules will be developed to optimize vaccine logistics pipeline and reduce financial burden for enhanced eVIN system functionality across the country.

Activity 2.3.2: Integration of NCCMIS and eVIN

The cold chain management system (NCCMIS) and vaccine logistics management system (eVIN) will be integrated to provide a holistic picture of entire Immunization Supply Chain. Appropriate modalities will be developed for technology, HR, capacity building, documentation etc. to support integration.

Strategy 2.4: Expansion and strengthening of cold chain system for better vaccine management, reduce travel / transit time site

Activity 2.4.1: Expansion of cold chain points with an objective to reduce travel time to less than 1 hour

From various studies like National Cold Chain Assessment, National EVM assessment and the supportive supervision data, it has been observed that quite a significant proportion of session sites linked to the concerned cold chain points take more than 1 hour time for vaccine & logistics transportation. So effort will be taken to identify new health facilities within the districts for expanding the cold chain point network in order to reduce the travel time to less than 1 hour.

Activity 2.4.2: Optimization of Cold Chain storage space at all levels of Vaccine stores

Considering the introduction of newer vaccines, replacement of older / CFC / beyond repair cold chain equipment, increase in beneficiary population and to make the newly created cold chain points, it will be required to procure new cold chain equipment.

Activity 2.4.3: Assess new available cold chain technologies for inclusion in UIP

The states face various challenges for maintaining cold chain system for storing and transporting the vaccines. The cold chain equipment currently being used in the program may have certain limitations, especially in resource poor settings as well as in areas with adverse climatic conditions. There are newer technologies available in cold chain, which may be able to address those challenges. The effort will be made to explore such technologies that may prove operationally feasible in those prevailing situations. This may include exploring various feasible options of using green energy sources.

Besides various alternative options may be explored for transfer of vaccines to the session sites, especially the hard-to-reach and remotely located sites.

Strategy 2.5: Strengthening of cold chain through efficient data management & supportive supervision

Activity 2.5.1: NCCMIS upgradation

The scope of NCCMIS has increased significantly in the last few years considering the expansion of the immunization program in the country. In order to meet the increasing programmatic demand and also decentralize the NCCMIS usage to sub-district level, NCCMIS features needs to be improved and it has to be made more user-friendly. Besides the upgraded MIS would serve as a platform for harmonization of the data from other databases (like eVIN) related to Immunization.

Following the upgradation, the user manual will be developed and trainings will be conducted at all levels for the users.

Activity 2.5.2: Supportive supervision for Immunization (S4i)

Supportive supervision has been a key tool in improving the immunization supply chain system especially through mentoring support at local level. In order to improvise the system, a mobile based application has been developed to capture the real-time data from the field, which includes cold chain, communication as well as operations. The data can be put to maximum usage by providing user-friendly dashboard, various analytical features to facilitate faster decision making and corrective action at local level.

Indicator for Objective 2

No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency
2.1	Number of states which conducted EVM in last 3 years	Number of states which conducted EVM in last 3 years	EVM dashboard/ NCCMIS	11	2017	23	Annual
2.2	Number of states having more than 80% Effective Vaccine Management Score (composite score)	Number of states having more than 80% Effective Vaccine Management Score (composite score)	EVM dashboard/ NCCMIS	0	2017	12	Annual
2.3	Percent of States with an Improvement Plan implemented after EVM assessment	(Number of states with IP implemented after EVM assessment/ Total states where EVM assessment done)*100	EVM dashboard/ NCCMIS	100%	2017	100%	Annual
2.4	Percentage of cold chain technicians training batch with positive increase in cold chain knowledge score (pre and post assessment)	(Number of cold chain technicians with positive increase in cold chain knowledge score/ Total CCT trained)*100	Training reports	0%	2016	90%	Annual
2.5	Percent of CCP with vaccine availability index more than 90% in eVIN states	(No. of CCP with VAI>90%/ Total CCP)*100	eVIN	92%	2016-17	100%	Annual
2.6	Percent of PHCs having cold chain points	(Number of PHC having CCP/ Total number of PHC)*100	NCCMIS	66%	2017	80%	Annual
2.7	Number of states/ UTs with cold chain sickness rate maintained within 2%	No. of states/UTs with cold chain sickness rate maintained within 2%	NCCMIS	21	2016-17	36	Annual
2.8	Number of states maintaining eVIN adherence rate > 90%	Adherence rate : (No. of CCP entering transaction at least once a week on eVIN/ Total no. of CCP in eVIN implementing states)*100	eVIN	Not available (eVIN baseline)	99.6% in 12 eVIN implementing states (Not Applicable in other states)	All eVIN states	Annual

Objective 3:
Improving data management for immunization

High-quality and timely immunization data are vital to inform decisions at local, national, and global levels. This includes decisions about how to better reach children, successfully introduce new vaccines, document impact, monitor and improve immunization system program performance, prioritize resources and activities, and engage in performance improvement. The greater availability and use of immunization data will result in positive gains in immunization coverage, equity, and program efficiency and effectiveness.

Strategy 3.1: Develop and promote the use of new technologies for collection, transmission and analysis of immunization data

Activity 3.1.1: Introduction of ANM Online (ANMOL) as way to improve data collection and service delivery

The application, named ANMOL, a multifaceted mobile tablet based android application helps ANMs in early identification and tracking of the individual beneficiary throughout their productive lifecycle. ANMOL would help ensure tracking of beneficiary for proper health care including immunization beneficiaries. The system also facilitates timely delivery of full component of antenatal, postnatal & delivery services and tracking of children for complete immunization services.

Activity 3.1.2: Develop automated need based, user defined, immunization dashboard

The coverage reports, concurrent monitoring data on key indicators on overall operations including cold chain supply system and communication landscape viewed in conjunction provides a holistic view to understand demand and supply gaps in immunization delivery services. The areas with poor coverages at the district and sub district need to be identified rapidly, intensify the efforts and continuously monitor the progress. The immunization dashboards at the national and state levels will inform the programme managers for guiding the program effectively. Utilizing the technology, the immunization dashboards customized at the level of district and sub district levels would help in rapidly identifying areas as soon as the data is processed for directing the ongoing efforts.

Strategy 3.2: Ensuring data quality

Activity 3.2.1: Data triangulation using different sources to ensure quality of data

The data handlers and program managers should have adequate capacity to triangulate the data from different sources to identify the issues and intervene to ensure high quality reliable data. Cascade training will be done based on a module which will be developed for capacity building of health workers.

Data Quality Assessments (DQA) will be undertaken in states, to triangulate data using different sources.

Activity 3.2.2: Capacity building of data handlers

Capacity building of data handlers including ANMs at block/urban immunization planning units and sensitization of programme managers SEPIOs/DIOs for data quality and analysis through data quality training package ensuring high quality reliable data.

Activity 3.2.3: Data quality assessments of HMIS, MCTS/ RCH to be expanded

National, state, district and sub district levels units are expected to desk review data annually (DQS – data quality self-assessment) preferably before the joint reporting form is filled up.

Activity 3.2.4: Continue to monitor HMIS, MCTS/ RCH data timeliness, completeness and data consistency

Regular continuous monitoring for data entry into the portal and tracking for the progress regarding completeness and consistency should be done monthly around the expected time of submission of reports.

Activity 3.2.5: Develop national data quality improvement plan

High quality and consistent immunization data is key to informed policy decisions. The evaluation surveys for estimating the coverage levels being resource and time intensive and the results reflect the coverage levels retrospectively at least two years back in time, hence it can't be held annually.The immunization programme largely depends upon the coverage estimates derived from the joint reporting form (JRF). WHO and UNICEF apply WUENIC methodology wherein consistency in reported coverage principally guides the estimation of coverages which even has the potential for retrospective adjustments. The national data quality improvement plan for capacity building of data managers at all levels along with data quality assessments will ensure improved data quality for reliable coverage estimates.

Activity 3.2.6: Develop data quality training package

The regular capacity building of medical officers and health workers through handbook on immunization dwell upon on data quality to some extent. The country lacks a structured training package for programme managers and data managers/handlers at different levels. Data needs assessment to be undertaken and a structured data quality training package will be developed.

Indicators for Objective 3

No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency
3.1	Percentage point difference between pentavalent 3 national administrative coverage and survey point estimate	National administrative Penta3 coverage - Penta3 survey coverage of the corresponding year	Survey (NFHS-4) & Administrative (HMIS)	9.8	2015-16	<5%	Midterm and End term
3.2	Number of states where more than 80% of districts have conducted Data Quality Training Workshop	(No. of districts conducted DQ training workshop/ Total districts in state)*100	Data quality training reports	0	2017	10	Annual
3.3	Percent of ANMs reporting data via ANMOL/other compatible software	(No. of ANM reporting data via ANMOL/ Total no. of ANM targeted for ANMOL)*100	ANMOL report	0	2016-17	80%	Annual

Objective 4:
Strengthen AEFI systems

Irrespective of the cause, when adverse events following immunization (AEFI) occur, people become confused to the extent that they refuse further immunization of their children, making the children susceptible to VPDs that are more disabling and life-threatening. Surveillance of AEFIs provides valuable information to help plan and take necessary actions in order to sustain public confidence and ensure smooth functioning of the program. The AEFI surveillance system is well established in country and steps will be taken to further strengthen the program.

Strategy 4.1: AEFI System strengthening at the state level

Activity 4.1.1: Implement Quality Management System (QMS) in all states/UTs

As a pilot, QMS for AEFI surveillance will be established in two districts each in two states. The existing state and district quality assurance committees for quality management of public health facilities and RMNCH+A services will be utilized to guide the development and implementation of QMS in AEFI surveillance. Based on the pilot, the QMS will be rolled out across the country in a phased manner.

The implementation of QMS for AEFI surveillance program in states/districts consists of 4 stages: Plan, Do, Check, Act.

Plan: As-Is study to analyse current system ad processes at all levels, identify root causes and generate and choose solutions for closure of gaps in QMS for AEFI surveillance program.

Do: Develop QMS documents such as SOPs, quality manuals, responsibility matrix, and competency matrix and implement QMS.

Check: Conduct internal and external audits and draw conclusions.

Act: Decision to adopt, adapt or abandon based on the conclusions and monitoring of the performance of the QMS for AEFI surveillance program.

Activity 4.1.2: Train DIOs/medical officers/ health workers in all states/UTs on AEFI surveillance guidelines

The trainings for the State AEFI Committee members will focus on AEFI surveillance performance indicators monitoring and review; conducting special investigations and causality assessments, etc. DIOs will be trained in AEFI surveillance focusing on reporting of all AEFIs (including minor AEFIs), conducting investigations for serious and severe AEFIs and ensuring timeliness and completeness of all reports and records. They will also be trained to conduct AEFI Committee meetings. The Medical Officers and health workers should be encouraged to report all AEFIs including minor AEFIs and maintain PHC AEFI registers.

The trainings should focus on ensuring completeness while filing the CRF, PCIF and FCIF. It should include the detailed description of the case and all relevant investigations carried out. The health workers should be encouraged to report AEFIs.

Strategy 4.2: Improving AEFI reporting systems

Activity 4.2.1: Implement PHC AEFI registers

All PHCs/Block PHCs should maintain an AEFI register in which all spontaneously reported minor, severe and serious AEFIs spontaneously reported should be recorded. Severe and serious AEFIs will also be reported and investigated promptly. Minor AEFIs will be periodically analysed by the MO PHC to look for clustering indicating batch defects, programme errors, etc.

Activity 4.2.2: Report and notify AEFI cases in a timely manner

The serious and severe AEFI cases should be

immediately notified to the medical officer by the health worker. Within the next 24 hours, the MO should report the case in CRF (Case Reporting Format) to the DIO. The DIO will in the subsequent 24 hours send it to the SEPIO and the Immunization Division/National AEFI Secretariat.

Activity 4.2.3: Timely investigate and classify AEFI cases

For all serious/severe AEFI cases, the DIO will conduct a field investigation, complete the PCIF and forward the same to the SEPIO and Immunization Division, MoHFW within 10 days of notification. If needed, he will take the support of the District AEFI Committee members for investigation. All relevant documents (hospital records, lab results, post mortem report) supporting formulating a provisional diagnosis will also be collected and sent along with the PCIF. Within 70 days of notification, the DIO will collect all documents available after sending the PCIF, fill the FCIF, conduct a District AEFI Committee meeting, get a provisional diagnosis on the FCIF and send these to the SEPIO and the Immunization Division. Following investigation, the cases are classified at the state level which is then verified at the national level.Causality assessment of serious and severe cases has to be conducted by the state AEFI committee within 100 days of case notification.

Strategy 4.3: Develop and implement IT based AEFI reporting system

Activity 4.3.1: Roll out of VAEIMS

The Vaccine Adverse Events Information Management System has been piloted in two states and will be implemented in all states. Data entry will be at the district level for all the formats. SEPIO can enter details of the causality assessment done for the cases in the VAEIMS. There is provision of auto generation of line lists, graphs, maps, etc. for district, state and national levels. Scanned documents can also be uploaded and downloaded, minimizing loss of records. Cases can also be cross-notified using this software.

Activity 4.3.2: Train all DIOs in the implementing states

States will start using VAEIMS in phased manner by December 2018. Training of the data entry operators and DIOs at state level will be held in batches at state level across the country.

Activity 4.3.3: Support system for VAEIMS maintenance and upgrading at national level

The VAEIMS will be shifted to a government server in a government organisation. Staff with software skills will be hired for maintenance and constant upgradation as per requirement from the field and policy decisions taken at the national level.

Indicators for Objective 4

No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency
4.1	Number of serious/ severe AEFI cases reported	No. of serious/severe AEFI cases reported	AEFI Secretariat line list	1564	2016-17	4000	Annual
4.2	Proportion of serious/severe AEFI cases investigated	(Number of serious/ severe AEFI cases investigated (cases with PCIF or PIR)/ Total serious/serious AEFI cases)*100	AEFI Secretariat line list	83%	2016-17	90%	Annual
4.3	Proportion of serious/severe AEFI cases reported and investigated in the current year causally assessed at state level	(Number of serious/ severe AEFI cases reported and causally assessed at state level in the current year / Total serious/severe AEFI cases)*100	AEFI Secretariat line list	16%	2016-17	90%	Annual
4.4	Proportion of states in which QMS has been implemented against target	(Number of states where QMS has been implemented/ Number of target states)*100	AEFI Secretariat	0%	2016-17	80%	Annual
4.5	Proportion of districts in which QMS has been implemented against target	(Number of districts where QMS has been implemented/ Number of target districts)*100	AEFI Secretariat	0%	2016-17	80%	Annual
4.6	Percent of state AEFI committees trained in AEFI surveillance and causality assessment at least once in last 3 years*.	(No. of state AEFI committees trained in AEFI surveillance and causality assessment at least once in last 3 years/ Total number of state AEFI committee members)*100.	AEFI Secretariat	100%	2016-17	100%	Once in 3 years
4.7	Percent of state holding at least 2 state AEFI committee meetings every year.	(Number of state holding at least 2 state AEFI committee meetings every year/ Total state AEFI committee)*100.	AEFI Secretariat	39%	2016-17	80%	Annual

** State AEFI Committee training means at least five state AEFI committee members are trained in AEFI surveillance and causality assessment*

Objective 5:
Strengthening VPD surveillance

The burden of diseases preventable by the vaccines is the most significant factor for making a decision on introducing relevant vaccines in the UIP. Therefore, a robust surveillance system to detect cases and deaths due to vaccine-preventable diseases is essential to generate evidence to inform the decision on introducing the vaccine as well as to measure its impact on the disease after its introduction. The main focus of strengthening of VPD surveillance will be moving towards case based surveillance and integration of various VPD surveillance systems.

Strategy 5.1: Assess VPD burden

Activity 5.1.1: Improve existing surveillance system

Strengthening of VPD surveillance will help to observe the impact of immunization activities. Disease trends will be regularly reviewed at national level, state level and district level. Identification of pockets at risk to be done through the surveillance data. Routine immunization services will be strengthened in these areas through microplanning, supervision and monitoring to aid in decreasing the morbidity and mortality and address inequity.

Activity 5.1.2: Case based system for detailed epidemiological analysis

Case based system for epidemiological analysis like AFP surveillance to be strengthened. The case based surveillance is currently done for measles rubella, diphtheria, pertussis and neonatal tetanus.

Case based surveillance for other vaccine preventable diseases will be initiated through strengthening and sensitization of laboratories for processing samples.

Activity 5.1.3: Expansion of VPD surveillance in all states

Seven states namely, Bihar, Haryana, Himachal Pradesh, Kerala, Madhya Pradesh, Punjab, and Uttar Pradesh, have initiated VPD surveillance till 2017. This is to be expanded in a phased manner in all states/UTs with 3-4 states/UTs each year.

Capacity building for VPD surveillance will done from national to district level for quality implementation of case based surveillance. The nodal officers and reporting networks at all levels to be strengthened through cascade training model.

Strategy 5.2: Enhance coordination between different sources (HMIS, IDSP, NPSP etc.) to gather information on VPDs

Activity 5.2.1: Develop a mechanism to streamline HMIS and IDSP data on VPD

To take appropriate measures to control or prevent any VPD, various sources which are collecting and collating VPD data need to reconcile the data at its source of origin i.e. at health sub centre or primary health centre level. A mechanism to be developed to streamline HMIS and IDSP data on VPD reporting.

Activity 5.2.2: Develop monthly dashboards on disease surveillance

Comprehensive monthly dashboard/ bulletin will be developed on disease surveillance, warning signals to provide easy access of data and help decision makers to take action at earliest.

Strategy 5.3: Involve private sector and AYUSH in reporting of VPD

Activity 5.3.1: Convergence and coordination between private and public sector

To obtain a comprehensive view on VPD burden, there is need to strengthen the convergence between government and private sector. Involvement of IAP, IMA, FOGSSI and other health bodies will be important to know the real burden of disease in the community. Approximately 60% of reporting sites under WHO-NPSP surveillance system are from private sector.

Activity 5.3.2: Orient AYUSH and other private practitioners towards VPD surveillance

Role of AYUSH system is increasing to provide health services to community. Capacity building and sensitization of AYUSH healthcare providers will increase the sensitivity of surveillance system.

Strategy 5.4: Strengthen sentinel surveillance for new antigens

Activity 5.4.1: Improve coordination between different networks to generate robust data by conducting orientation, trainings and advocacy

The incorporation of new antigens in UIP is guided by NTAGI and after its recommendation only it can be introduced. The new vaccines are introduced in states either through state's own initiative or through support from MoHFW. With the introduction of new vaccines, it is important to establish sentinel surveillance for new antigens to assess disease burden and strengthen AEFI surveillance. The appropriate health cadre to be trained at state and district level and follow cascade training, to generate and report quality surveillance data.

Activity 5.4.2: Involving ICMR, medical colleges and other institutions

Institutions like ICMR, medical colleges will be involved for providing support in strengthening of laboratory and reporting of VPD cases.

Indicators for Objective 5

No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Taraget (2022)	Freqauency
5.1	Percent districts in select state reporting VPD data	(Number of districts reportingVPD data/ Total number of districts in select states)*100	VPD surveillance data	90%	2016-17	100%	Annual
5.2	Number of states whereVPD surveillance is functional	Number of states whereVPD surveillance is functional	VPD surveillance data	5	2017	20	Annual
5.3	Percent VPD cases investigated by DIOs(or identified nodal person)	(Number of VPD cases investigated by DIO(or identified nodal officer)/ Total number of VPD cases in select cases)*100	VPD surveillance data	95%	2017	100%	Annual
5.4	Proportion of cases (DPnT)investigated within 48 hours of notification	(Number of cases investigated within 48 hours/ Total number of cases notified)*100	VPD surveillance data	84%	2017	95%	Annual

Objective 6:

Increase confidence and demand for vaccines in the community

Strategy 6.1 Strengthening institutional capacities for undertaking evidence based communication intervention

Activity 6.1.1: Development of communication guidelines for routine immunization

National Communication guidelines for routine immunization are being developed which will be the guiding document for planning and implementation of communication activities at state level.

Activity 6.1.2: SBCC cells with skilled HR trained in SBCC for evidence based communication planning

SBCC cells will be established at state level to support states in communication planning which includes evidence generation, strategic planning, operationalization, monitoring, analysis, training, documentation, knowledge sharing, including convening partnerships

Activity 6.1.3: Linking of communication plan to micro-plan to reach high-risk/underserved

Identification of underserved, resistant and hesitant groups and develop RI communication plans for state, district and blocks with components of Advocacy, Social Mobilization, Inter Personal Communication and media management.

Activity 6.1.4: Capacity building of health care workers

BRIDGE IPC Skills Training: GoI initiated the BRIDGE IPC Skills Training for FLWs, and has budgeted training for all states for approximately 27million FLWs by 2020. The lessons learnt from BRIDGE training will contribute establish the most effective communication strategies that are for providers in both initiating and engaging in conversations about vaccinations.[11]

Supportive supervision for AAAs: Supportive Supervision modalities currently in place for AAAs will be reviewed and strengthened. The GoI will also explore evidence-driven partnerships to strengthen Supportive Supervision for RI (AAAs).

AEFI and risk communication skills: Special focus will be given in building the capacity of Health officials in risk communication protocol and demonstrate strategic actions to mitigate or reduce the impact from the crisis.

Strategy 6.2 Use of Polio Network (SMNet) for routine immunization health systems strengthening

Activity 6.2.1: Strengthen systems for effective inter personal communication and social mobilization using Polio social mobilization network

SMNet will be used to create awareness and to mobilize, strengthen mothers' meetings, provide supportive communication planning and capacity building and support the campaigns like MR in other states beyond UP & Bihar

Activity 6.2.2: Deployment of monitors to high priority states for monitoring of RI and campaigns

SMNet along with national monitors are deployed to states and districts for communication monitoring of RI and campaigns.

Strategy 6.3 Communication monitoring, supportive supervision, research and development for communication activities

Activity 6.3.1: Adoption of the M&E tool and development of communication dashboard

A web-based comprehensive UIP dashboard

[11] *Ibid*

will be developed taking the data from various sources, that are available in the public domain (HMIS, AEFI) as well as those from various partners (field monitoring data on operations, cold chain, communications at various levels). The dashboard will become one-stop solution for accessing real-time analyzed indicators of the UIP from all the available data in the form of readymade graphs, charts and maps in a user-friendly platform. This dashboard will be helpful for program managers at all levels as well by concerned partners for gap identification and faster decision making at local level.

Strategy 6.4 Advocacy & media engagement strategies

Activity 6.4.1: Capacity Building of media spokespersons

The government officials will be trained on media interactions and a pool of officials (media spokespersons) will be created. This training will also include spokespersons training to manage AEFI's.

Activity 6.4.2: Media engagement and capacity building of media professionals

Urdu media, Radio-jockeys, mass media and print media will be engaged for immunization activities and their capacity building will be enhanced through various interventions.

Activity 6.4.3: Strategic media planning and engaging celebrities

Celebrities like Mr. Amitabh Bachchan will be engaged to create awareness on immunization in the community.

Activity 6.4.4: Social media engagement and news media monitoring

With increased usage of social media like Facebook, twitter and WhatsApp, it's important that social media platforms are included in the communication plan.

News media will be monitored for positive, neutral and negative stories on immunization. This will help in planning the media strategy

Strategy 6.5 Strengthening community based/ CSOs multi-stakeholder partnerships

Activity 6.5.1: CSO partnership framework to be developed and advocated for endorsement

The growing civil-society presence and the voice of youth and women groups, faith-based groups, lawyers-collectives, etc. (as non-governmental organizations and networks) especially in urban areas is noticeable in the impact that it is making at the ground level. The CSOs consisting of various networks like professional bodies (IMA, IAP), SHG, NGOs and CBOs etc. will be engaged through various modalities to increase immunization coverage.

Activity 6.5.2: An enabling environment for immunization

Community will be aware about immunization if messages about immunization reach them on a sustained basis. Community platforms will include personal face-to-face contacts through home visits, community meetings or opportunities of personal contacts with other health service providers, both in the informal and formal sectors, and key opinion leaders. Information through public platforms will make active use of traditional mass media platforms, social media, news media, and mid-media platforms.

Indicators for Objective 6

No.	Indicator	Definition	Data Sourcea	Baseline Value	Baseline Year	Target (2022)	Frequency
6.1	Percent of ANMs and ASHAs trained on BRIDGE module by Master trainers	(No. of ANMs and ASHAs trained on BRIDGE module by Master trainers/Total no. of ANMs and ASHAs in states)*100	MoHFW training report/ UNICEF	0	2016-17	100%	Annual
6.2	Percent of monitored districts with RI communication plan	(Number of monitored districts with RI communication plan/ Total number of districts monitored)*100	Monitoring report	50	2017	80	Annual
6.3	Percent of positive and neutral media information on RI in English, Hindi and Regional print, TV and Radio	(Total no. of positive print media news on immunization/ total no. of print media news on immunization)*100	Media analysis report	76%	2017	90%	Annual
6.4	Number of states/ UTs with SBCC/ BCC cells with HR trained in SBCC	Number of states/ UTs with SBCC/ BCC cells with HR trained in SBCC	Training reports	9	2017	16	Annual
6.5	Percent of caregivers who reported getting information about immunization from ANM/ASHA/AWW	(Number of caregivers who reported getting information about immunization from ANM/ASHA/AWW/ Total caregivers interviewed)*100	Monitoring report	78%	2016	90%	Annual
6.6	Percent of caregivers whose children received partial or no immunization due to information and awareness gap among caregivers and AEFI apprehension	(Number of caregivers whose children received partial or no immunization due to information and awareness gap among caregivers/ Total caregivers interviewed)*100	Monitoring report	62	2017	5%	Annual

Objective 7:

Ensuring measles elimination and rubella control

The government is fully committed to the goal of measles elimination and rubella control by 2020 and has introduced MR vaccine in the country in campaign mode. In addition to this, immunization coverage of MCV1 and MCV2 is also being improved and MR surveillance is being strengthened.

Strategy 7.1 Achieve and maintain at least 95% population immunity (High Population immunity against Measles Rubella)

Activity 7.1.1: Enhance coverage of MRCV1 & MRCV2 to 95% in RI

Efforts will be made by all the states and districts to increase routine immunization coverage including MRCV-1 and MRCV-2, through a systematic coverage improvement plan. Using standard RI monitoring chart, program managers at each level will conduct a monthly UIP review of their respective planning unit; block PHC/CHC, district and state to minimize dropouts and left-outs in their respective areas. Accountability framework in the form of NTFI (National Task Force for Immunization), STFIs (State Task Force for Immunization) and DTFIs (District Task Force for Immunization) will be the established platforms to conduct regular UIP progress reviews at each level. Task forces will regularly review progress, address challenges, including urban areas and other high risk areas/population. Both supply and demand sides in routine immunization will be augmented with the objective of reaching high coverage (>95% evaluated). Nodal officers and program managers will provide oversight, using supportive supervision, local innovative communication strategies and regular RI monitoring-feedback to guide, midcourse corrections to improve RI coverage and to reach the unreached.

Activity 7.1.2: High coverage in MR campaigns

Wide age range periodic MR vaccination (catch-up and follow-up) campaign targeting children from 9 months to less than 15 years will be undertaken, to boost the population immunity in the country. These MR vaccination campaigns will be planned, so as to cover maximum target children in minimum time span, in order to have the desired impact on measles and rubella transmission in the country. These MR campaigns will also be implemented in a phased manner across the states, with proper planning and monitoring, based on the lessons learnt form past MCV and MRCV campaigns. These MR vaccination campaigns will aim to achieve high quality coverage with safety. The task forces at every level must establish intradepartmental coordination and convergence between departments of Health, WCD (women and child development) and Education to get the maximum impact on vaccination coverage. These wide ages range MR vaccination campaign are critical for attaining and sustaining over 95% population immunity, that will help in reaching herd immunity threshold in the country population and thus eliminate measles and control rubella in India.

Strategy 7.2 Develop and sustain a sensitive and timely case based measles and rubella surveillance system (Establish case based surveillance for Measles & expand CRS surveillance)

Activity 7.2.1: Expand MR surveillance

MR surveillance is established across the country on the existing AFP surveillance platform, supported by a network of proficient MR laboratories with technical and strategic assistance from the WHO-India NPSP network. All the states in the country will need to transition rapidly from the current outbreak based MR surveillance system to case-based surveillance. In the case-based surveillance system each and every suspected MR case reported to the surveillance network, must be investigated, lab-confirmed and classified as either measles or rubella or discarded as non-

measles non-rubella case. Under the case-based MR surveillance system, each case will be given a unique identifier and all key core variables must be line-listed using MR-CIF (case investigation form). The MR surveillance data will be managed through SIMS (Surveillance Information Management System). The data will be compiled, analysed and disseminated in the form of a monthly MR surveillance bulletin. The data generated from this lab-based MR surveillance system, will provide measles and rubella epidemiology in the states and also guide the elimination strategies across the country.The MR surveillance system will be made more sensitive in states having completed the wide age range MR vaccination campaign, with a more sensitive case definition. Further transitioning to fever-rash surveillance across the country covering the entire population to be planned in the next two years.

Activity 7.2.2: Expand sentinel site CRS surveillance

A sentinel site CRS system has been established by ICMR across the country, in selected six tertiary care centers. This network of sentinel sites will be further expanded to nine more sentinel sites in the next phased expansion, to reach the country's elimination goal. The data generated from these sentinel site surveillance, will be used to measure the CRS burden in the country and also assess the impact following the introduction of RCV (Rubella containing vaccine) in the country's immunization program.

Strategy 7.3: Develop and maintain an accredited measles and rubella laboratory network

Activity 7.3.1: Annual accreditation of NMLs and RRLs

A network of 12 national laboratories and two reference laboratories that are WHO accredited, have been established across the country to support the ongoing MR surveillance. These 14 strong laboratories, are part of the GMRLN (Global Measles Rubella Laboratory Network) undertaking both serology and virology. Serum samples from each investigated case are collected and sent to these MR lab-network for IgM ELISA test, based on which all suspected cases are classified as either measles or rubella or discarded as non-measles non-rubella case. Specimens for virology are also sent in the form of either Nasopharyngeal Swab/Throat Swab/Urine samples to selected seven MR laboratories where RTPCR is conducted to carryout genetic characterization and identify the wild strain as either endemic or non-endemic measles orrubella virus. Genetic surveillance will be more essential as the country progresses towards the elimination goal. Further expansion of these proficient MR laboratories in coordination with VRDL (Viral Research Diagnostic Laboratory) network of ICMR needs to be scaled up, depending on the requirement as the suspected MR case load increases, following transitioning to case based MR surveillance with a more sensitive (fever-rash) case definition.

Activity 7.3.2: Case-based laboratory reporting from NML to the National Programme and to the South-East Asia Regional Office on a monthly basis

NMLs will submit a case-based line list report for measles and rubella laboratory data at least on a monthly basis and regularly share virus isolation and genotyping/sequencing data of measles viruses. Timeliness and completeness of reporting laboratory data to the South-East Asia Regional Office will be monitored.

Strategy 7.4: Strengthen support and linkages to achieve measles elimination and rubella control

Activity 7.4.1: Timely response to outbreaks

WHO has developed guidelines for measles outbreak investigation and response in mortality reduction settings that are also applicable to elimination settings. An outbreak is defined by evidence of any measles transmission within an area, i.e. two temporally and geographically linked confirmed cases. The approach to outbreak response immunization (ORI) varies depending on the level of susceptibility in the population, the risk for spread and complications and

the existing health service infrastructure and resource availability. A budgeted outbreak preparedness plan for locally funded outbreak response and provision of vaccine stocks will be established at national and subnational levels for emergency use. Risk or vulnerability assessments that assess population immunity, surveillance performance and migration patterns will be conducted periodically. Ideally, supplementary immunization interventions will occur based on such periodic vulnerability assessments before outbreaks occur. Measles and rubella outbreak response efforts will also seek to reduce morbidity and mortality by providing appropriate case management.

Activity 7.4.2: Measles immunization in emergency

An emergency is a situation in a subnational area, a country, a region or a society where there is considerable or even total breakdown of infrastructure, civil society or other authority. Emergencies can be caused by natural disasters, human events or a combination of both. Common natural disasters that cause emergencies include floods, typhoons/cyclones, forest fires, earthquakes, tsunamis and even volcanic eruptions. Measles vaccination is a key part of the health response in many situations. Activities before an emergency will include comprehensive planning, adequate funding, identification of adequate and accessible resources and supplies and staff training.

Indicators for Objective 7

No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency
7.1	No. of states/UTs with more than 95% MRCV1 coverage	No. of states/UTs with more than 95% MRCV1 coverage	HMIS	8	Apr-Dec 2017	36	Annual
7.2	No. of states/UTs with more than 95% MRCV2 coverage	No. of states/UTs with more than 95% MRCV2 coverage	HMIS	1	Apr-Dec 2017	36	Annual
7.3	No. of states with less than 5 cases of measles per million population each year	No. of states with less than 5 cases of measles per million population each year	MR surveillance report	17	2017	30	Annual
7.4	Proportion of states with >95% MR vaccination coverage during MR campaign	(Number of states with >95% MR vaccination coverage/ Total number of states where MR campaigns held)*100	Administrative coverage report	77%	2017	100%	Annual

Objective 8:

Ensuring sustenance of achievements under polio program and MNT elimination and legacy planning

Two major milestones of the country's immunization program are polio and MNT elimination and the country takes huge pride in the achievements but it is important that continuous efforts are being made to sustain these gains which can be done by maintain a high immunization coverage and strong VPD surveillance system.

Strategy 8.1 Maintain high level of population immunity

Activity 8.1.1: Strengthen routine immunization services

To maintain high level of population immunity, it is of utmost necessity to strengthen the routine immunization services, including service delivery and creating a demand for immunization in the resistant population and ensuring uninterrupted supply of the vaccine. The polio programme has reached a diverse socio-cultural population by overcoming geographical barriers and achieving high vaccination coverage in rural and urban areas. Also, the polio infrastructure, operational experience and expertise are utilized to strengthen routine immunization in India.

Activity 8.1.2: Achieve high coverage during NID and SNIDs

India continues to maintain calendar of 2 NIDs and 2 SNIDs as per recommendation from India Expert Advisory Group (IEAG). The high population immunity will be maintained through periodic assessment of situation and risk mitigation measures.

Strategy 8.2 Maintain the quality and effectiveness of existing surveillance systems to identify and respond to outbreaks/ polio detected

Activity 8.2.1: Regular sensitization of reporting sites through active case searches and workshops

The AFP surveillance system comprises of approximately 41,800 reporting sites that have been classified into VHP, HP and LP based on defined criterion. These sites need regular sensitization through active surveillance visits as per guideline.

Activity 8.2.2: Expansion of environmental surveillance

Considering the sensitivity of environmental surveillance in detection of silent transmission of WPV/VDPVs, ES was started in 2001 in Mumbai, Maharashtra. It has been expanded to Delhi in 2010, Bihar and West Bengal in 2011, Punjab in 2013, Gujarat in 2014 and Telangana and Uttar Pradesh in 2016. Environmental Surveillance is now functional at 42 sites in aforementioned eight states and plans are in the pipeline for further expansion in the country depending on the need of the program.

Activity 8.2.3: Expert review committee meetings for AFP case classification

Expert Review Committee (ERC) meetings are conducted to guide the country in timely classification of acute flaccid paralysis (AFP) cases with inadequate stool/vaccine virus isolation in stool specimen. ERC comprises of renowned pediatric neurologists, pediatricians, virologists and epidemiologists from the country participate.

Strategy 8.3 Reduce risks of polio importation based on WHO recommendations for travelers coming from endemic or infected areas

Activity 8.3.1: Continue Continuous Polio Vaccination Teams (CVT) at international borders

While tremendous progress has been made over the past many years and sustained over the past two years, India remains at a risk of polio resurgence through a distant or cross border importation of the wild poliovirus from countries where the virus continues to circulate. India, therefore, needs to ensure that high immunity is maintained against poliovirus, the surveillance remains sensitive to pick up any importation and all states are in a state of emergency preparedness to respond urgently to any importation, if it were to occur.

Activity 8.3.2: Vaccination of travelers (endemic countries) with one dose of OPV 4 weeks before their departure to India

To mitigate risk of importation of polio viruses, MoHFW, has put in place, the requirement of a dose of oral polio vaccine (OPV) for all travellers to and from polio endemic countries and countries with poliovirus circulation following importation. This will be continued to save the entire gains made by programme.

Strategy 8.4: Maintaining MNT elimination status

Activity 8.4.1: Maintain high coverage of TT2 and safe delivery practices

On 15 April 2015, the World Health Organization (WHO) confirmed that India has successfully eliminated maternal and neonatal tetanus (MNT). The success story does not end here, as tetanus spores will continue to be in the environment, and efforts will need to continue to maintain MNT elimination.

To maintain MNT elimination, focus will be continued on the best possible antenatal care and TT vaccination and hospital delivery services should be available to every mother as an integrated package to provide optimal care. Neonatal tetanus surveillance and other available data will be used to evaluate programme impact and focus interventions.

Indicators for Objective 8

No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency
8.1	Number of wild polio virus detected in the country	Number of wild polio virus detected in the country	Monitoring report	0	2017	0	Annual
8.2	Number of VDPV (AFP and environmental) detected in the country	Number of VDPV detected in the country	Monitoring report	1	2017	0	Annual
8.3	No. of states/UTs where non Polio AFP rate is maintained or exceeds 2 per 100,000 children under 15 years	No. of states/UTs where non Polio AFP rate is maintained or exceeds 2 per 100,000 children under 15 years	Monitoring report	32	2017	36	Annual
8.4	Number of surveillance reviews conducted annually	Number of surveillance reviews conducted annually	Monitoring report	3	2017	3	Annual
8.5	Number of states/ UTs with > 80% TT2 coverage for pregnant women	Number of states/ UTs with > 80% TT2 coverage for pregnant women	HMIS	36	2017	36	Annual

Objective 9:

Review and scale up of new vaccine introductions in the country

There are more and more new vaccine available in the world and it is important that as per the public health need of the country, new vaccines are introduced in the program with a special focus on maternal immunization.

Strategy 9.1 Governance and stewardship for NVI

Activity 9.1.1: Conduct regular NTAGI meetings

National Technical Advisory Group for Immunization (NTAGI) meets annually. The GoI will ensure that NTAGI meeting is conducted every year.

Activity 9.1.2: Establish need based STAGI for NVI

State Technical Advisory Group for Immunization (STAGI) are formed as required for the introduction of new vaccines. STAGI will be established for new vaccine introduction with state initiative.

Strategy 9.2 Making new vaccines accessible

Activity 9.2.1: Expansion of rotavirus vaccine and pneumococcal conjugate vaccine

MoHFW introduced RVV and PCV to address morbidity and mortality due to rotavirus and S. pneumoniae. RVV and PCV have been introduced at sub national level. RVV has been introduced in 9 states and PCV in 5 states. MoHFW will scale up RVV and PCV in a phased manner.

Activity 9.2.2: Replacement of TT vaccine with Td vaccine

MNT elimination has been achieved through concerted efforts of routine immunization without undertaking campaigns. It is feasible to protect a significant population of pregnant women against diphtheria by replacing TT with Td. Also as there is a shift in burden of diphtheria cases in adolescents and adults, supplementation of school age vaccination and routine coverage with Td would further increase coverage against diphtheria. The NTAGI recommends replacement of TT vaccine with Td vaccine in India's immunization programme for all age groups, including pregnant women.

TT vaccine booster doses will be replaced with Td vaccine in age group of 10 and 16 years and in pregnant women. 0.5 ml of Td vaccine dose will be administered intramuscularly. Two doses of Td vaccine (one dose if previously vaccinated within 3 Year) will be administered to pregnant women as per the UIP schedule.

Activity 9.2.3: Introduction of HPV vaccine

The NTAGI has endorsed the STSC recommendation for introduction of HPV vaccine in UIP to combat cervical cancer caused by HPV infection. The inclusion of specific HPV vaccines in the programme is subject to the outcome of the pending Supreme Court judgment.

While immunizing both boys and girls may be a strategy for the future, because of cost constraints the current priority of HPV immunization will be the immunization of girls. The age range will be harmonized to that of the extended 2-dose immunization schedule (0, 6/12 Months) recommended by WHO, i.e. 9 – 14 years – which gives the best immune response.

The goal is to introduce HPV vaccine country wide and uninterrupted supply of vaccine is required for sustainability of HPV immunization. Phased introductions toward that eventual goal can be done because of vaccine supply, affordability and implementation challenges of a country-wide vaccination programme in India.

Strategy 9.3: Strengthen immunization system for NVI - Enhance logistics management and build human resource capacity

Activity 9.3.1: Conduct preparedness assessment at state and district levels

Preparedness assessment will be conducted in states and districts selected for new vaccine introduction or scale up. The preparedness assessment will focus upon, development of operational guidelines, training status of health staff, review of cold chain system, review vaccine supply distribution system, tracking high priority districts/ blocks, review of availability of RI cards and registers, AEFI surveillance and reporting system.

National and State level teams to visit the state/districts to assess the preparedness before introduction of new vaccine.

Activity 9.3.2: Address gaps in stock management, timely revision of formats / address gaps in cold chain storage space

Prior to the introduction of a new vaccine, preparedness assessment at state and district level will be ensured. The gaps pertaining to stock management, revision of formats will be addressed through upgrading cold chain system, revising, printing and distributing of formats, RI cards and registers.

Activity 9.3.3: Capacity building of health workers about dosage, route and site of administration, revised vaccination schedule, recording and reporting

The new vaccine introduction or scale up of a vaccine requires capacity building of health workers about dosage, route and site of administration, and recording and reporting of data. Cascade trainings of appropriate health cadre from state level to frontline mobilizers, will be ensured for quality program implementation and data reporting. Training package for program managers and health workers covering both programme operations and demand creation will be developed.

Indicators for Objective 9

No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency
9.1	Number of NTAGI meetings held in a year	Number of NTAGI meetings held in a year	NTAGI secretariat	1	2017	1	Annual
9.2	Number of states/ UTs that have introduced PCV vaccine	Number of states that have introduced PCV vaccine	State reports and HMIS	3	2017	10	Annual
9.3	Number of states/UTs that have introduced Rotavirus vaccine	Number of states that have introduced Rotavirus vaccine	State reports and HMIS	4	2017	36	Annual
9.4	Number of states/UTs that have introduced MR vaccine.	Number of states that have introduced MR vaccine	State reports and HMIS	13	2017	36	Annual

Chapter 4
Sustainability

Sustaining RI monitoring and NPSP transition

The aim to achieve 90 percent full immunization coverage requires effective monitoring along with efficient service delivery. The focus is on improving programme supervision and monitoring for routine immunization at all levels with emphasis on hard to reach and tribal areas. MoHFW along with implementing partners actively participate in monitoring in field and assist states. Concurrent monitoring is currently being supported by WHO National Polio Surveillance Project (NPSP) staff across the country in 20 states.

Considering the wide divergence between reported and evaluated coverage, cconcurrent monitoring has assumed great importance for immediate corrective actions and remains a high priority for government. The data generated through concurrent monitoring provides accurate information on level of involvement of government in RI, areas missed, reasons for low coverage and quality of social mobilization activities. In concurrence with MoHFW, other partner agencies and CSOs-technical, WHO NPSP updated and circulated the ACCESS-VB based data tool – Intensified RI monitoring to all states through GOI to capture RI monitoring data. RI monitoring tools were also revised in 2016 as per the current programme needs.

MI and IMI was also supported by NPSP staff with intensive planning, training and monitoring of these drives and real-time feedback was shared with government to ensure immediate corrective actions. Continued support for RI monitoring through NPSP is envisaged as a priority.

A concurrent monitoring of RI programme at state, district, block, cold chain, session sites and community (house-to-house) levels through field monitors will continue, with plans to strengthen and expand the monitoring network in North East states. WHO India-NPSP will continue to provide support for intensive monitoring of RI services to identify gaps in the preparedness and implementation of the RI programme, and share monitoring feedback with government at all levels so that programmatic actions could be taken based on real-time evidences generated through this system.

With GoI's renewed commitment to address strengthening of immunization programme coverage and equity in the country over the coming years, the immunization activities will greatly increase through interventions like IMI.

With planning for IMI and multiple vaccine introductions such as pneumococcal and measles-rubella vaccines, WHO NPSP is committed to support MoHFW through preparedness assessment, capacity building and monitoring of activities. Against this backdrop, the monitoring needs of the programme will increase considerably in the coming years to sustain overall improvements of the UIP and continue to generate accurate, real-time data for programmatic actions. WHO supported preparedness assessment, planning and monitoring of MR campaign through deployment of nearly 25 additional surveillance medical officers (SMOs) in five states.

With the significant level of RI strengthening activities and new vaccine introductions planned over the coming years, WHO NPSP will require the continued services of independent monitors to conduct regular monitoring of the immunization activities in the field for a long term. Field monitors are expected to devote 60% of their time to RI activities. However, with the entry of the country into the transition phase, there will be a considerable reduction in the number of independent monitors that will significantly impact the quality of monitoring. The transition path supports the equity agenda, continuing to utilize the infrastructure and capacity of NPSP to address health priorities in underserved and high risk areas.

The sustainability for NPSP and in turn RI monitoring is part of a broader, concerted effort on polio transition planning. The RI programme will require the services of independent monitors to conduct regular monitoring in the field and generate data for programmatic actions. WHO as part of transition plan will reduce the strength of field monitors at 15% annually from year 2018. As per timelines mentioned and lessons learnt, the MoHFW is expected to provide funding support and institutionalize this monitoring mechanism through immunization field volunteers (IFVs) beyond 2021 for steering the programme. This is

expected to be supported through inclusion in the state PIPs, with currently 7 states already providing the required support.

During cMYP period, it is proposed to reduce the total number of SMOs as per the transition plan, meanwhile increasing their time allocation towards RI activities from current 25% to 50% by 2021 (this time will be split between surveillance, monitoring and capacity building). The cost is expected to be shared by GoI and other sources.

Beyond 2021, WHO India NPSP will only provide technical assistance in building capacity of government officials for monitoring of UIP activities. Monitors will focus on activities related to monitoring of RI, measles rubella campaigns and surveillance, etc. WHO will continue to provide technical supervision and guidance for these monitors.

Capacity building at national, state and district level for VPD surveillance

For a VPD surveillance system to be successful across the country and still be cost effective, its design should consider sustainability without compromising on quality of data, and this would be sustainable through capacity building of state and local health and IDSP officials, leading to ownership by state government for establishment of VPD surveillance and by providing initial support to laboratory based sentinel sites for 4 years and then finally exploring the possibility of transitioning the ownership to GoI or respective state governments.

In 2015, India initiated surveillance for diphtheria, pertussis and neonatal tetanus (DPnT) in 2 states i.e. Haryana and Kerala. By 2017, five more states initiated DPnT surveillance, namely Bihar, Uttar Pradesh, Madhya Pradesh, Punjab and Himachal Pradesh. This surveillance is providing intelligence regarding epidemiology of these diseases as well as helping in deciding the vaccination strategy.

The GoI is already supporting laboratory cost for VPD surveillance (USD 3 million per year). Of the four states where VPD surveillance has already been launched, the Government of Kerala is bearing the entire operational costs for VPD surveillance activities. From 2017 onwards, in states where VPD surveillance is being expanded, operational costs for VPD surveillance activities (sample collection, transportation, etc.) are borne by state governments. Beyond 2021, the total operational costs of VPD surveillance activities in all states is expected to be a part of state NHM PIP. WHO will continue to provide technical assistance.

GoI and states would shoulder the responsibility of establishing VPD surveillance under this approach in terms of providing necessary infrastructure, human resources and funds especially in terms of specimen collection and transport to the laboratories, case management and public health interventions.

Capacity building for RI strengthening and microplanning (of master trainers for microplanning and RI strengthening)

Routine immunization microplanning has been continuously identified as a critical impediment in achieving success in the program. Towards addressing this WHO has developed a unique “exercise only” two day training program which takes the participants through a step by step training program. The uniqueness of the training are the exercises which are fixed at each level and reduce in number as the training cascades down to the frontline health worker. At the state training 9 exercises including a role play are conducted while at the district and PHC levels 7 of the 9 exercises and for the frontline workers 2 of the 9 exercises which also include a roleplay exercise on inter personal communication. The objective of these trainings is to build capacity of medical officers in the state to conduct the trainings and cascade them to strengthen RI micro plans systematically.

The implementation agencies under the guidance of MoHFW will work in close coordination with NIHFW, an autonomous organization, under MoHFW, GoI and acts as an ‘apex technical institute’ for training. The concerned officials and managers at NIHFW will be involved in the development of the training packages to ensure that the packages are inclusive of the needs of NIHFW and can easily integrate with and complement with the existing system. The platforms required for developing and maintaining the e-learning and m-learning parts of the packages will be hosted via the NIHFW server. Technical expertise will be sought from NIHFW for conducting the pilots as well as to study the impact of the same. The partners along with NIHFW will also develop implementation plans for a selected number of districts across the country and based

on these learning, an expansion plan for the rest of the country will follow under the leadership of NIHFW and MoHFW.

Post Gavi transition, the capacity building trainings of master trainers are proposed to be institutionalized under the annual training plan of NIHFW, which subsequently will be implemented by SIHFW at the state level. GoI is expected to support these ToTs through NHM/other identified source whereas WHO India will continue to provide technical support for ToTs.

For the next evaluation of MO Immunization Handbook trainings beyond 2021, MoHFW is expected to undertake this activity with NIHFW. The printing and dissemination cost of revised 2019 edition MO Immunization Handbook package and 2020 edition of health workers immunization handbook is expected to be undertaken by the Govt. of India as per budget approved under the NHM PIP.

Funds are currently available under NHM PIP for strengthening RI micro-plans through meetings/ reviews. The implementation partner agencies work in collaboration to support state TOTs. Thereafter, the state should ensure that following the state workshops, one-day district workshops need to be conducted in all districts in a specified time frame so that the package could well be taken forward to a half to one-day package at block and planning units for training the ANMs and ASHAs. The trainings in the districts and blocks will be conducted as per NHM norms.

WHO India NPSP will only provide technical assistance for updating the RI microplanning tool after Gavi transition. Any microplanning trainings and evaluation in identified states beyond 2021 is expected to be institutionalized under the annual training plan of NIHFW, which subsequently will be implemented by SIHFW at the state level and financially supported by MoHFW through NHM PIP.

Development of tribal strategy for immunization program

Gavi HSS2 funds will be used only for development and pilot-testing of the special strategy for reaching out to the tribal population and government funds will be used for implementation of strategy across the country. In India, National Ministry of Tribal Affairs aims to provide more focused approach on the integrated socio-economic development of the Scheduled Tribes (STs), in a coordinated and planned manner. Hence the funds for the sustainability of development and implementation of tribal strategy for immunization program are available with both the National Ministry of Health & Family Welfare and National Ministry of Tribal Affairs.

Strengthening RI in urban areas

The activities to strengthen RI in urban areas include identification of cities for pilot, establishing accountability mechanism through state and district task forces, urban risk prioritization with identification of high risk areas, resource mapping to reach the communities and capacity building of health personnel at all levels. These activities will be institutionalized within the National Urban Health Mission (NUHM) activities after Gavi transition. With the strengthening of Urban Health Mission and greater engagement of state governments, especially the urban municipal bodies with the partner agencies, it is critical to optimally utilize Urban Health Mission for strengthening RI in urban and peri-urban areas. The workable models demonstrated in select cities to be expanded with need based supported through PIPs

eVIN sustainability

Overall eVIN provides a robust MIS for the entire vaccine and cold chain inventory in the country which is crucial for policy makers and programme managers at national and state levels to develop future policy and strategies for improving vaccine and cold chain logistics and supply chain management. The success and relevance of eVIN has convinced GoI to make it the mainstay of the national vaccine and cold chain logistics and MIS. GoI is committed to funding the cost of eVIN in the implementing states post Gavi transition. All eVIN recurring costs – HR, Hardware, Software, Infrastructure will be supported by GoI and be included in state PIPs. Guidelines for states on including eVIN in their respective PIPs have been developed and will be used for the upcoming annual work plan 2017-18.

The eVIN system has been designed in a way that lends to a smooth transition to the state health department right from its inception. The eVIN hardware – smart phones and temperature loggers get handed to the state governments at the

beginning of the programme, the entire basic data for eVIN is entered into the software by cold chain handlers who are existing government employees, with UNDP providing technical support, the vaccine cold chain manager who works at the district level is costed at NHM salary rates to ensure a smooth takeover by the state government at the time of eVIN handover.

NCCVMRC and NCCRC sustainability

The establishment of two national institutions i.e. NCCVMRC, New Delhi and NCCRC, Pune has been a milestone achievement and is primarily based on funds from Govt. of India including allocation of land and selected human resource. Gavi-HSS 1 funds have provided critical support in establishing these institutes including availability of cold chain equipment, tools and limited technical human resource. Now both the institutions have started gaining their foothold and demonstrated their capabilities in terms of providing technical support to MoHFW as well as the states in various programmatic issues. Majority of the funding for NCCVMRC and NCCRC is through GoI including infrastructure and HR. Limited support to this institution in the form of technical HR is provided under HSS. Moreover, a major portion of cost associated with technical trainings (travel cost of participants) is borne by GoI through PIP allocation. At present, these institutions have been placed in Govt. premises and more than 50% of the staff is being covered from Govt. of India resources. Gradually GoI is making its effort to cover all activities of these centres through it regular funding in a phased manner.

ITSU sustainability

The Immunization Technical Support Unit (ITSU) was created to rapidly augment the capacity of Immunization Division, Ministry of Health and Family Welfare in response to the recommendations of Mavalankar Committee Report, with a clear understanding that MoHFW will gradually take up selected activities to ensure sustainability. ITSU has also served as an in-house think tank for strategic planning to innovate, demonstrate and document best practices across the country for further scale-up. ITSU, augmented the technical capacity of the immunization division over the period of its existence, resulting in significant gains in the Universal Immunization Programme (UIP).

Considering the wide range of activities performed by ITSU, detailed sustainability plan needs to be in place. It is proposed that after end of the funding period, all activities performed by ITSU will be transitioned to government organizations with due diligence.


M.P.-45.MH-9016

Chapter 5

Costing and Financing for Immunization in India (2018-2022)

India's immunization programme is one of the largest public health programme in the world and strategic planning of India's immunization programme requires credible information about cost and financing of the programme especially in the situation when India will be graduating from the Gavi support soon. The costing of comprehensive multi-year plan (2013-17) found that most of the financing of the programme is by the government[12]. Currently government receives some support from Gavi for vaccines and health systems strengthening. Further, there are support from other immunization partners. Understanding the costing and financing of the immunization programme during 2017-2022 will help identifying the actual expenditure of the programme in the baseline year and resource requirements in next five years.

Methods

Data collection: Fiscal year 2017 (April 2017 to March 2018) was considered as the baseline for the cost and financing projections. Actual expenses of the government and immunization partners - the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), John Snow India (JSI), United Nations Development Programme (UNDP), National Cold Chain and Vaccine Management Resource Centre (NCCVMRC), National Technical Advisory Group on Immunization (NTAGI), Indian Council of Medical Research (ICMR), Bill & Melinda Gates Foundation (BMGF) and Gavi were included for the baseline cost calculation. Data were collected from the Immunization Division of the Ministry of Health and Family Welfare, Govt. of India, and from all the immunization partners mentioned above.

Demographic data

Table 5.1: Demographic information used in cost calculations (baseline – 2017)

Demographic indicators	
Total population (2017)	1,34,25,13,000
Annual population growth (%) (forecast)	1.15
New born (births) as % of total population	1.98
Infant mortality rate (per 1000 live births)	33.9
Pregnant women as a factor of births	1.00
Child bearing age women as % of total population	16.80
Children <1 year of age	26,571,000
Female aged 9-14 years	74,500,030
Sources: http://datatopics.worldbank.org/health/population accessed February 26, 2018; *Annual Population growth:https://esa.un.org/unpd/wpp/Download/Standard/Population/ accessed March 5, 2018.*	

Macroeconomic indicators

Table 5.2: Macroeconomic indicators used in the cost calculation

Indicators	
GDP per capita in 2017 (INR)	120,380
Total health expenditure per capita in 2014 (INR)	4,800
Government health expenditure as % of total health expenditure	30
Source: https://data.worldbank.org/indicator/ accessed February 26, 2018	

[12] *Chatterjee S, Pant M, Haldar P, Aggarwal MK, Laxminarayan R. 2016. Current costs and projected financial needs of India's universal immunization programme. Indian Journal of Medical Research, Vol. 143, No. 6, pp. 801-808*

Cost components

The cost components were categorized into the following line items: immunization specific personnel; vaccines; syringes; operational cost of campaigns; social mobilization, advocacy and communication activities; trainings and workshops; vaccine preventable diseases surveillance; programme management; other routine recurrent cost which included service provision in underserved and hard-to-reach areas, incentives given to accredited social health activists (ASHAs), intensification of routine immunization services, research studies on immunization etc. The capital cost included cold chain equipment; and vehicles used for the programme.

The assumptions regarding baseline vaccine prices, vial size, wastage rates, coverage are presented in Table 5.3A and the prices of syringes and wastage rates of syringes are given in Table 5.3B.

Table 5.3A: Details of vaccines used in cost calculations

Name of vaccines	Price per dose (INR) in 2017	Vial size	Wastage rate	Coverage rate in 2017
BCG	3.68	10	50	91.9%
DPT	5.01	10	10	78.4%
bOPV	5.64	20	10	72.8%
Measles	11.90	5	25	81.1%
Hepatitis B	5.30	10	10	91.9%
Pentavalent	51.98	10	10	78.4%
IPV	91.35	5	10	72.8%
Rotavirus	71.82	10	25	23.7%
JE	28.13	5	25	81.1%
MR	36.45	10	25	19.0%
PCV	198.00	4	10	3.4%
TT	2.93	10	10	80.0%
HPV	300.00	10	10	Not applicable

Notes: (1) Antigen wise price level (except for HPV), vial size and wastage rates were obtained from the immunization division, ministry of health and family welfare, government of India; HPV price information was obtained from Gavi (personal communication). (2) Coverage for BCG, Hepatitis B, pentavalent, polio and measles were taken from NFHS 4. NFHS4 reported DPT3 coverage rate, pentavlanet3 coverage was considered same as DPT3 coverage.

http://rchiips.org/NFHS/pdf/NFHS4/India.pdf accessed February 26, 2018. Others were calculated based on the current cohort covered and pentavalent3 coverage rate.

Table 5.3B: Details of syringes used in cost calculations

Syringes	Price per unit (INR)	Wastage rate
0.5 ml	1.91	10%
5 ml	1.58	10%
0.1 ml	1.83	10%

Source: Immunization division, ministry of health and family welfare, government of India

Data were also gathered on campaigns. During the baseline year 2017, JE, MR and polio vaccination campaigns were conducted. The target and coverage of the campaigns in the baseline year is given in Table 5.4.

Table 5.4: Campaign details used in cost calculation

Vaccine	Target for 2017	% covered	Remarks
Adult JE campaign*	18,665,074	62.7	Adult JE Campaign was conducted in five states (Tripura, Jharkhand, Assam, Uttar Pradesh & Odisha) in 2017
MR campaign*	79,544,000	96.7	MR Campaign was conducted in 15 states in 2017.
Polio campaign	173,703,356	95.0	Target was for NID
**data as reported by the states; source: ITSU*			

Current cold chain equipment stock and projections were collected from the Immunization Division of the Ministry. Table 5.5 below shows the inventory of cold chain equipment during the baseline year and their respective prices.

Table 5.5: Cold chain details used in cost calculations

Name of equipment	Numbers in 2017 (existing + new)	Price per unit (INR)
Walk in Cooler	247	1,684,620
Walk in Freezer	51	1,407,635
Ice-lined refrigerator	35,776	87,900
Deep Freezer	31,987	78,400
Solar Direct Drive refrigerator	100	455,000
Cold Boxes	79,358	5,000
Hybrid cold chain system	407	1,600,000
Vaccine carriers	1,443,945	431
Ice packs	1,181,594	14
Voltage regulator	24,415	2,267
Toolkit for technicians	175	132,000
Vaccine vans	700	800,000
Teeka Express	120	600,000
Source: Immunization division, ministry of health and family welfare, government of India		

Cost calculations

The projected costs of vaccines were based on number of target children, number of doses, price of the vaccines, wastage factor, and buffer stock. Projected coverages of vaccines for 2018-2022 were estimated based on discussions with the Immunization Division of the Ministry of Health and Family Welfare. As the IMI programme targets 90% full immunization coverage by 2018, we have also projected the traditional vaccine coverage at 90% from 2018 to 2020. For 2021 and 2022, we projected 92% coverage. For the new vaccines such as rotavirus vaccine and PCV, we projected the coverage as per the scale up plan as part of national nutrition mission.

Personnel costs included salary and benefits of all workers fully or partially involved in immunization activities. Personnel at the national level, cold chain handlers, and vaccine logistics managers at the state and district levels were assumed to spend full time on immunization. At the block level, the percentage of time spent by different categories of staff such as auxiliary nurse midwives (ANM), multipurpose workers, medical officers at the block and primary health centre, data entry operators were calculated using the results of the

recently completed immunization costing study[13]. The numbers of national level staff were gathered from the Immunization Division while the state and district level staff numbers were assumed based on the number of the states and districts in the country. The block level staff numbers were obtained from rural health statistics 2016-17[14]. We assumed a two per cent increase in staff at the block level.

The salary assumptions of different categories of staff at the national, state, district and block levels and their time spent for immunization are presented in Table 5.6. The salaries at the national level were collected from the Immunization Division of the Ministry while the same for state, district and block levels were calculated using the data from the immunization costing study conducted in 255 government health facilities across seven states in India[13]. A 10% increase in the salaries were assumed to convert the 2013-14 salaries into 2017 prices

Table 5.6: Staff information used for cost calculations

Designation of staff	Monthly gross salary	Number in 2017	% of time spent for immunization
National level			
Deputy Commissioners	3,16,667	2	100.0%
Director	2,00,000	1	10.0%
Under secretary	1,33,333	1	33.0%
Section officer	1,00,000	1	100.0%
Senior statistical officer	1,00,000	1	100.0%
Junior statistical officer	66,667	1	100.0%
Assistant section officer	66,667	1	100.0%
Project associate	55,000	1	100.0%
Project associate	70,000	1	100.0%
Consultant (Govt)	90,000	1	100.0%
Financial analyst	60,000	1	100.0%
Consultant (WHO)	1,48,200	1	100.0%
Data analyst	12,500	1	100.0%
Assistant commissioner	2,83,333	1	100.0%
AEFI staff (zonal consultants)	1,25,000	4	100.0%
NTAGI secretariat	96,080	5	100.0%
NCCVMRC staff (full time)	42,560	7	100.0%
NCCVMRC staff (shared)	40,000	2	22.5%
Software maintenance expert (VAEIMS)	75,000	0	100.0%
State level			
State immunization officer	1,71,178	36	80.0%
State cold chain officer	70,979	36	100.0%
State vaccine store in-charge	42,249	36	100.0%
State cold chain technician / refrigerator mechanic	51,915	36	100.0%

[13] *Chatterjee S, Das P, Nigam A, Nandi A, Sarkar A, Laxminarayan R. 2016. Cost of delivering routine immunization services in India. New Delhi: Public Health Foundation of India*

[14] *Government of India, Ministry of Health and Family welfare (2017). Rural health statistics 2016-17*

Driver at state vaccine store	43,915	36	100.0%
State data entry operator	16,442	36	100.0%
GMSD in-charge	55,926	4	100.0%
WIC / WIF handler at GMSD	53,595	4	100.0%
Driver at GMSD	40,721	4	100.0%
Attendant at state vaccine store	33,196	36	100.0%
Attendant at GMSD	40,834	4	100.0%
SIPSA	40,000	0	50.0%
District level			
District immunization officer	2,35,153	717	80.0%
District vaccine store in-charge	90,853	717	100.0%
District cold chain technician	72,606	717	100.0%
DIPSA	25,000	0	50.0%
District data manager	30,869	717	10.0%
District programme manager	53,437	717	25.0%
District accounts manager	37,007	717	15.0%
Immunization computer assistant	14,867	717	100.0%
Driver	37,955	717	25.0%
Vaccine cold chain manager	22,000	0	100.0%
Block level			
Block medical officer	1,16,983	7,061	5.0%
Cold chain handler at block level	51,568	3,940	22.0%
Auxiliary nurse midwife (Regular)	43,173	2,20,707	20.0%
Multi-purpose worker (Male)	19,930	56,263	11.0%
Block programme manager	23,252	7,061	25.0%
Block data manager	13,004	7,061	4.0%
Block accounts manager	16,546	7,061	4.0%
Cold chain handler at PHC level	40,083	16,500	13.0%
Medical officer (in-charge) PHC	82,979	27,124	6.0%

The exchange rate at the base year was 1 US$ = INR 65 (the average exchange rate during 2017). For projections, we assumed 1 US$ = INR 64, based on the trend in the exchange rate in 2018.

Results

The detailed baseline expenditure is given in Table 5.7. Total baseline expenditure for the programme was INR 6,864 crore during the fiscal year 2017-18. Shared personnel (those who spent a proportion of their time for immunization) was the largest cost component and it contributed about 44% of total cost, followed by vaccines and syringes (20%) for routine immunization only and supplemental immunization activities (17.5%).It should be noted in this context that the vaccines and syringes are for routine immunization only, the same used in campaigns were added in supplemental immunization activities. The distribution of logistics cost is given in Figure 5.1A, while the percentage share of different cost components excluding and including shared personnel are presented in Figures 5.1B and 5.1C respectively.

The detailed expenditures incurred under training, IEC/social mobilization, programme management and other activities are presented in Tables 5.8A through 5.8D.

During the baseline year, the government paid 79% of the programme expenditure (Table 5.9 and Figure 5.2). Table 5.9 presents component wise contribution by the Government and partners & donors, in the baseline year; whereas Figure 5.2 presents contribution of different partners. Gavi contributed 13% of total expenditure, which includes contribution for vaccines only. This does not include the health system strengthening (HSS) support which was channeled to immunization partners such as WHO, UNICEF, UNDP and others. The contributions of other partners are including their respective Gavi HSS grant. The contribution of BMGF for supporting the Immunization Technical Support Unit was only considered in this figure as details of other support of BMGF were not available.

Table 5.7: Baseline expenditure of India's national immunization programme, 2017-18

Cost components	INR (Crore)	% including shared personnel	% excluding shared personnel
Routine recurrent expenses	***2430.38***	***35.41***	***63.68***
Vaccines (routine only)	1265.70	18.44	33.16
Syringes	114.23	1.66	2.99
Personnel	169.10	2.46	4.43
Cold chain requirement	138.77	2.02	3.64
Training	224.09	3.26	5.87
IEC/social mobilization	131.83	1.92	3.45
Disease surveillance	114.75	1.67	3.01
Programme management	227.43	3.31	5.96
Other activities	44.47	0.65	1.17
Capital costs	***179.98***	***2.62***	***4.72***
Transport (vehicles)	99.44	1.45	2.61
Cold chain equipment	80.54	1.17	2.11
Supplemental immunization activities (SIAs)	***1206.31***	***17.57***	***31.61***
Shared personnel	***3047.68***	***44.40***	***0.00***
Grand Total	***6864.36***		
Note: SIAs include JE, MR and Polio vaccines, syringes and operational costs			

Figure 5.1A: Distribution of logistics costs, 2017-18

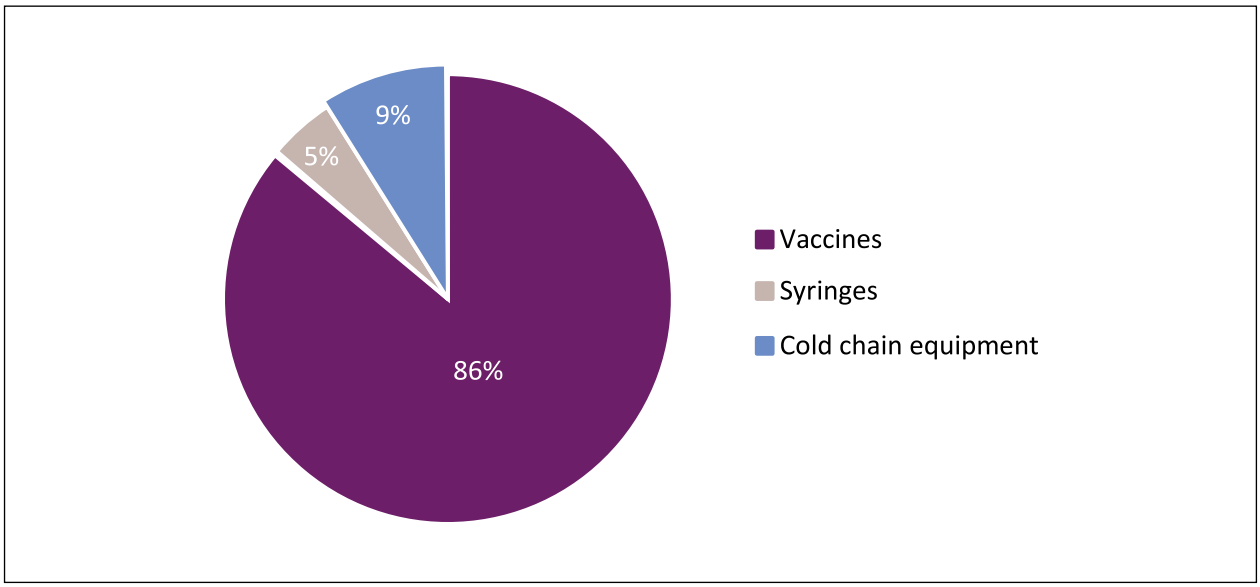


Figure 5.1B: Percentage of different cost components excluding shared personnel cost, 2017-18

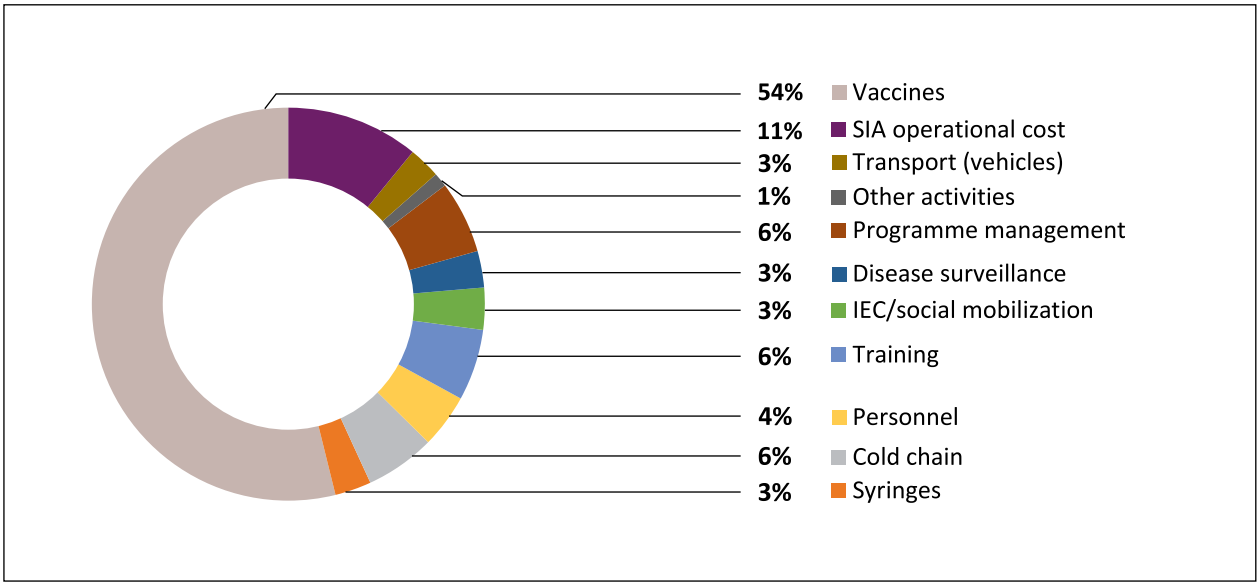


Figure 5.1C: Percentage of different cost components including shared personnel cost, 2017-18

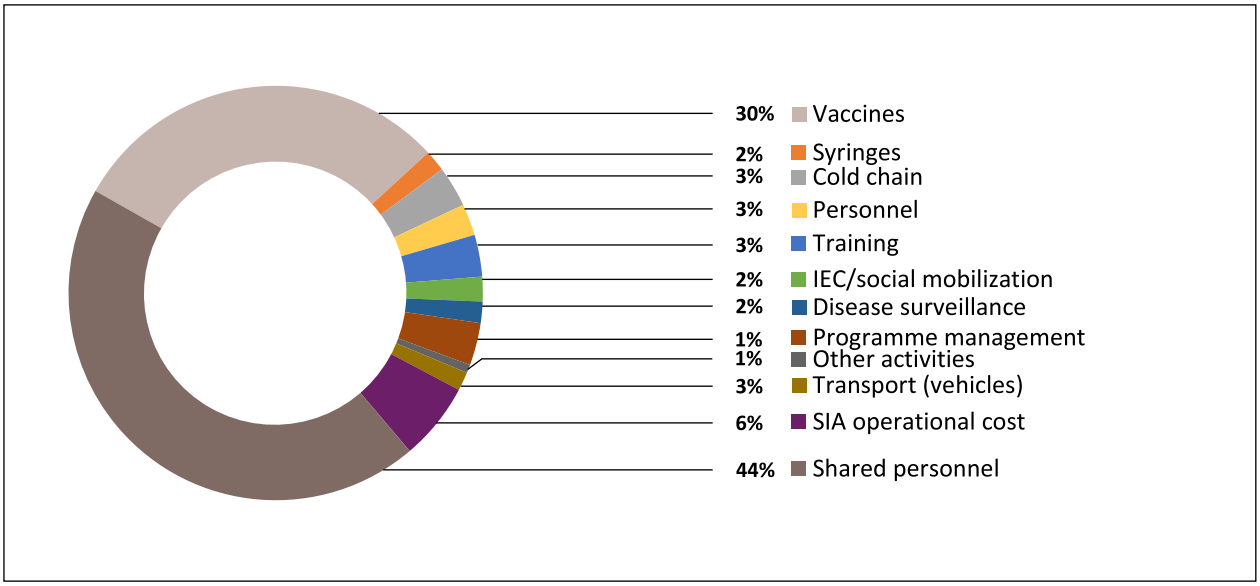


Table 5.8A: Details of expenses under training

Training	INR crore
Trainings, meetings and workshops (Government)	199.01
Training and workshops (WHO)	18.55
Trainings and workshops (UNICEF)	6.50
Meetings (NTAGI)	0.03
Total	**224.09**

Table 5.8B: Details of expenses under IEC/social mobilization

IEC/social mobilization	INR crore
SMNET (UNICEF)	65.00
ASHA incentives for mobilization	66.83
Total	**131.83**

Table 5.8C: Details of expenses under programme management

Programme management	INR crore
Immunization Technical Support Unit (BMGF)	5.58
New technology (UNICEF)	0.00
New vaccine introduction (WHO + UNICEF + JSI)	10.87
Monitoring and supervision (WHO)	26.66
NPSP running expenses (WHO)	41.46
ANMOL (UNICEF)	0.00
Microplanning	2.43
ASHA incentives	132.89
VAEIMS server rental	0.03
State specific requirements	7.50
Total	**227.43**

Table 5.8D: Details of expenses under other activities

Other activities	INR crore
MI / IMI / MR monitoring (WHO)	12.85
Research and assessment (WHO)	1.45
Assessments and surveys (UNICEF)	1.46
Research and assessment (JSI)	2.12
Research and assessment (ICMR)	12.00
Research and assessment (UNDP)	1.76
Data management (NCCVMRC)	0.03
Programme management (NCCVMRC + NTAGI)	0.07
Others*	12.73
Total	**44.47**

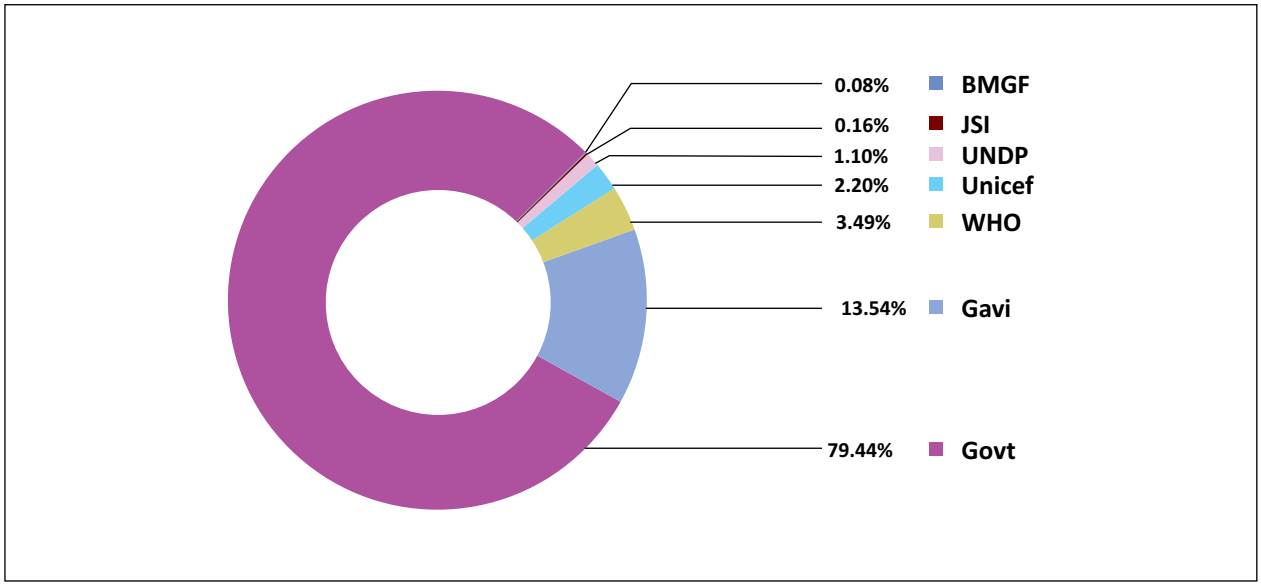
**The amount reported under "others" in financial management report was considered, no details available under this category*

Table 5.9: Component wise contribution of government and partners in baseline expenditure (INR crore), 2017-18

		Contribution	
Cost components	**Total Expenditure**	**Government**	**Partners & Donors**
Routine recurrent expenses	**2430.38**	**1446.01 (59)**	**984.38 (41)**
Vaccines (routine only)	1265.70	671.60 (53)	594.10 (47)
Syringes	114.23	114.23 (100)	0.00
Personnel	169.10	169.10 (100)	0.00
Cold chain requirement	138.77	63.37 (46)	75.41 (54)
Short-term training	224.09	199.04 (89)	25.05 (11)
IEC/social mobilization	131.83	66.83 (51)	65.00 (49)
Disease surveillance	114.75	0.00	114.75 (100)
Programme management	227.43	137.00 (60)	90.43 (40)
Other activities	44.47	24.83 (56)	19.64 (44)
Capital costs	**179.98**	**163.02 (91)**	**16.97 (9)**
Transport (vehicles)	**99.44**	**93.65 (94)**	**5.79 (6)**
Cold chain equipment	**80.54**	**69.36 (86)**	**11.18 (14)**
Supplemental immunization activities (SIAs)	**1206.31**	**796.66 (66)**	**409.65 (34)**
Total cost		**2405.69 (63)**	**1411 (37)**
Shared personnel cost	**3047.68**	**3047.68 (100)**	**0.00**
Total expenditure	**6864.36**	**5453.36 (79)**	**1410.99 (21)**

Note: Figures in parenthesis indicate percentage

Figure 5.2: Contribution of the government and partners in total expenditure (%), 2017-18



Total resource requirements during 2018-2022 was estimated at INR 52,220 crore (Table 5.10). Expenditure on routine vaccines will be double in 2018 (INR 2,609 crore) as compared to the baseline because of rotavirus vaccine and PCV scale up from 2018 onward. Expenditure of vaccines will increase significantly from INR 3,420 crore in 2020 to INR 4,673 crore in 2021 because of the introduction of HPV vaccine in 2020. HPV vaccine will be introduced for females aged 9-14 years and it is assumed that in 2020, 5% of the cohort will be immunized, in 2021 the coverage will be 25%, and in the next year, coverage will increase to 35%.

Table 5.10: Resource requirements (INR crore) for India's immunization programme (2018-2022)

Cost components	2018	2019	2020	2021	2022	Total
Routine recurrent expenses						
Vaccines (routine vaccines only)	2608.88	2975.74	3420.21	4673.37	5128.57	18806.77
Syringes	93.37	96.93	102.37	109.36	111.99	514.02
Personnel	188.94	214.49	241.72	273.51	307.86	1226.52
Cold chain requirement	139.51	152.72	173.59	210.35	173.78	849.95
Training	251.89	247.42	245.49	256.87	269.71	1271.38
IEC/Social Mobilization	116.40	83.39	76.18	79.98	83.98	439.93
Disease Surveillance	132.78	144.24	157.30	171.87	187.69	793.88
Program management	274.08	273.15	261.94	267.67	274.92	1351.77
Other routine recurrent costs	93.13	70.22	59.74	45.22	32.28	300.59
Routine capital costs						
Transport (vehicles)	127.74	131.56	156.14	185.59	220.88	821.91
Cold chain equipment	226.58	152.77	184.96	760.99	5.44	1330.74
Supplemental immunization activities (SIAs)	1156.02	1162.50	302.26	305.23	308.26	3234.28
Shared personnel	3355.04	3754.89	4206.41	4703.20	5258.94	21278.49
Total	**8764.36**	**9460.02**	**9588.32**	**12043.22**	**12364.31**	**52220.24**

Expenditure on supplemental immunization activities decreases over the projection period as MR vaccination campaign will end in 2019 and MR vaccine will be part of routine immunization. JE vaccination campaign (for children and adults) and polio campaign will continue, and it is assumed that the JE vaccination campaign will continue at the same level as in baseline, however, number of campaigns for polio will reduce from 2019 onward.

The details of trainings, programme management, other activities with different partners' contributions during the projected period are given in Figures 5.3A through 5.3C.

Figure 5.3A: Training costs, 2018-2022, INR crore

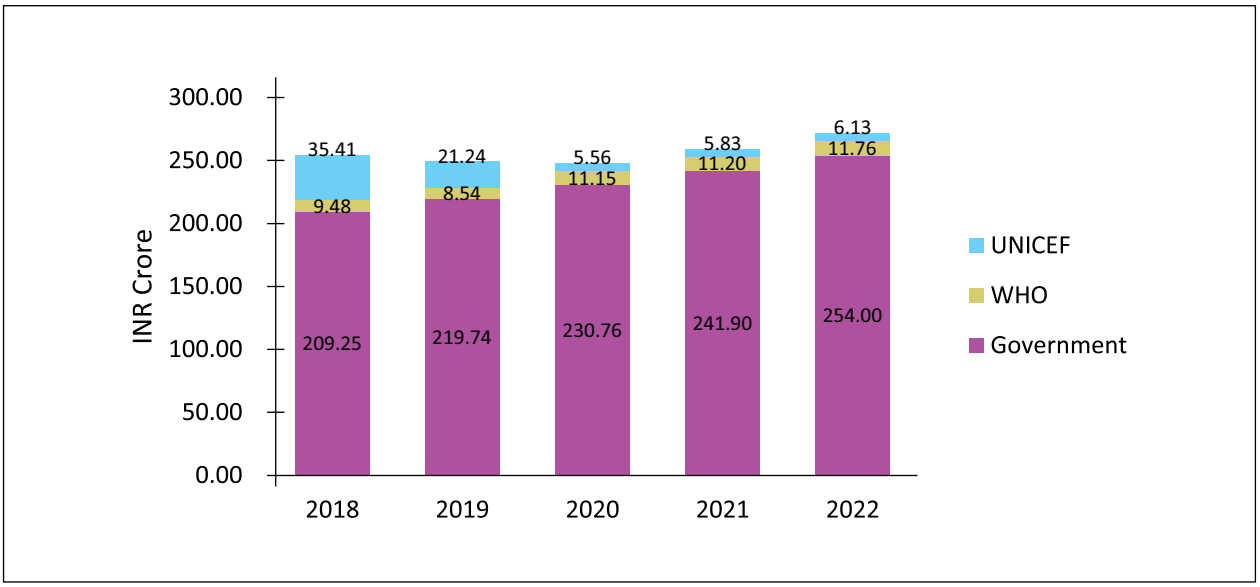


Figure 5.3B: Programme management costs, 2018-2022, INR crore

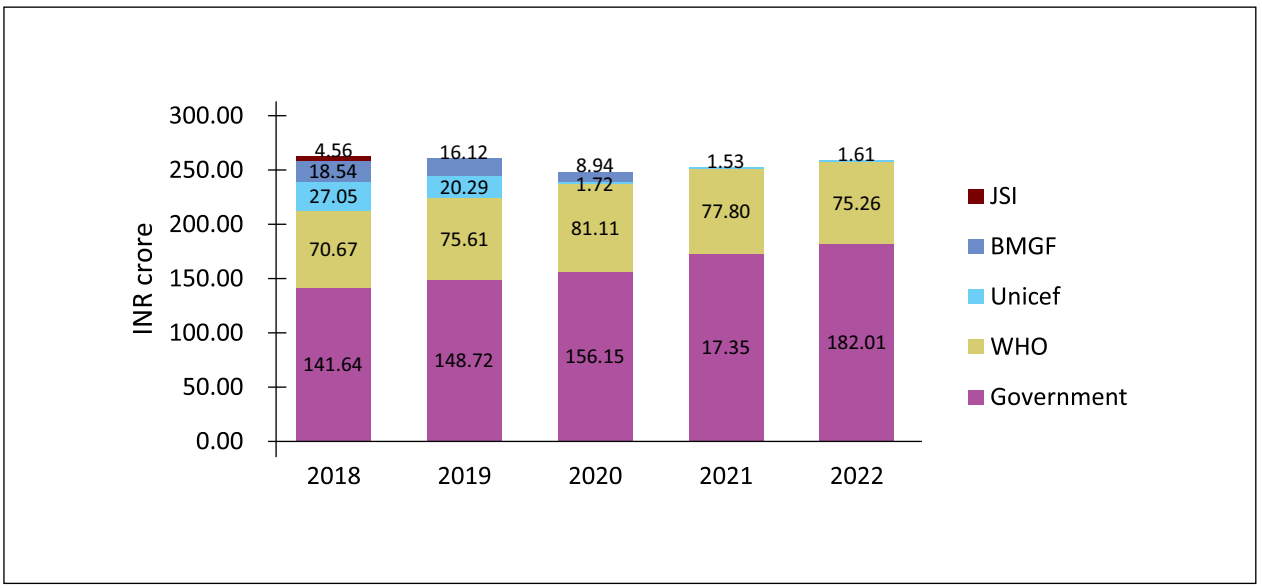
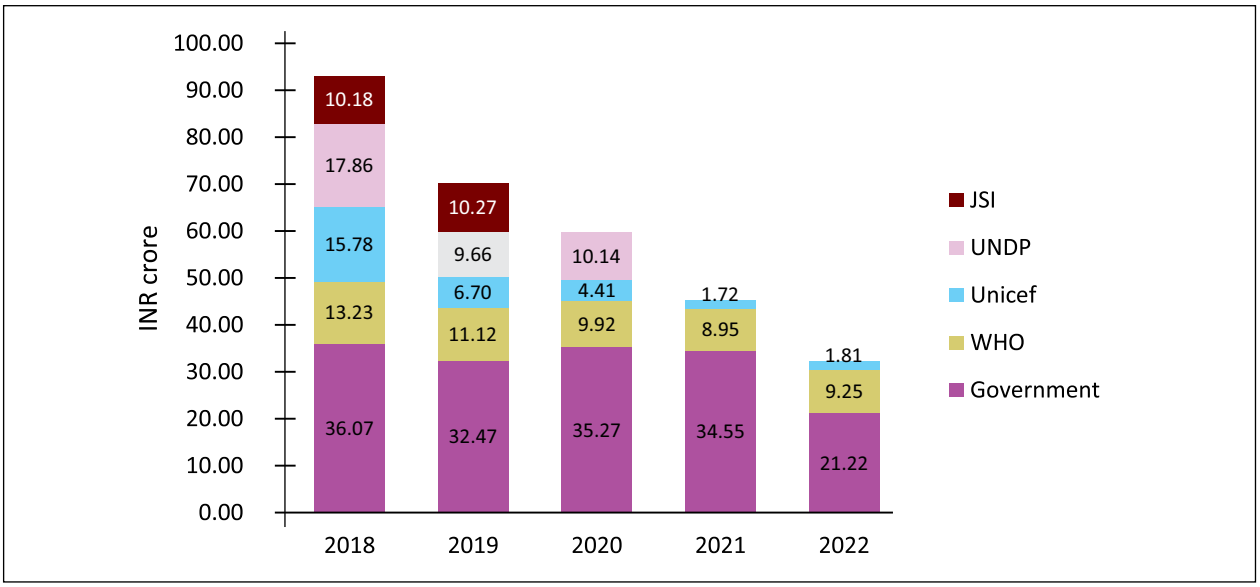
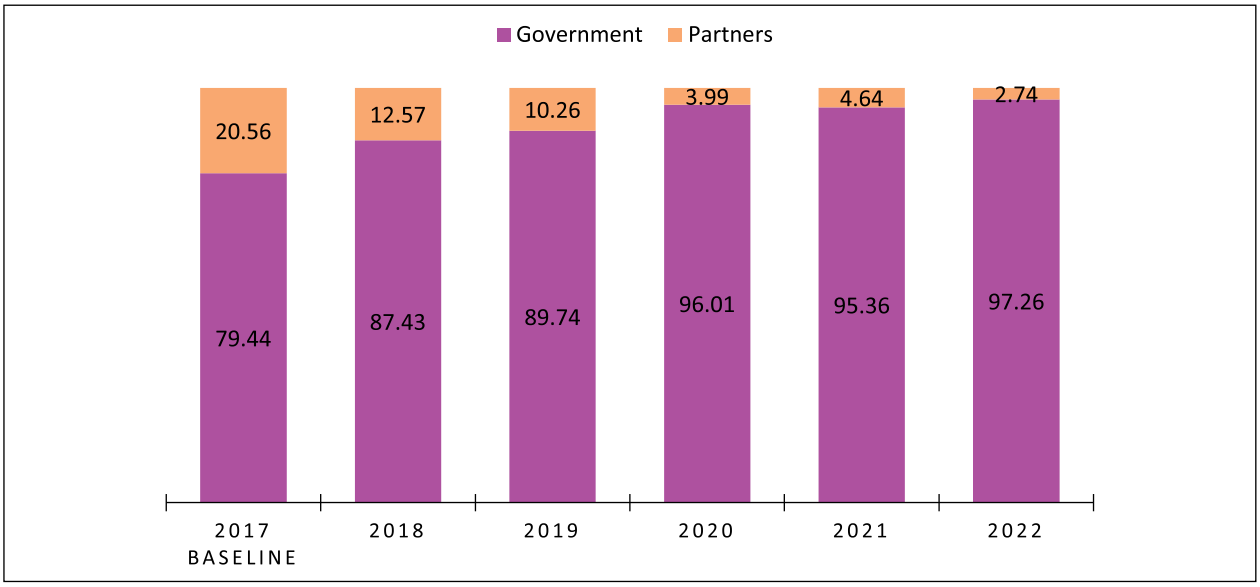


Figure 5.3C: Costs for other activities, 2018-2022, INR crore



The changes in financing pattern of the programme during the projection period is given in Figure 5.4. Government financing for the programme will increase substantially from 2017 to 2020 (79% in 2017 to 96% in 2020), and about 97% in 2022 as Gavi support will probably be over in 2021. The expected Gavi support for HPV in 2021 increased the partner support from about 4% in 2020 to 4.65% in 2021.

Figure 5.4: Change in financing pattern (%) in India's immunization programme (2018-2022)



Discussion

In this report we resent the current expenditure of India's immunization programme and the projected resource requirements for 2018-2022. The fiscal year 2017-18 was considered as the baseline year. While looking at the cost drivers both at the baseline and for the projected years, it was found that the shared personnel cost is the major cost driver. From 2021 onward, vaccine costs will have similar contribution in total cost as shared personnel because of the introduction

of HPV vaccine in the immunization programme. If we compare the cost drivers with the previous costing and financing analysis of India's cMYP (2013-17), we find the similar trend[15]. In the earlier analysis also, shared personnel were the major cost driver in all projected years except for 2017 when we assumed the introduction of PCV in the programme[15]. This finding, however, is in contrast with the historical analysis of immunization plans in Gavi eligible countries where vaccines were the major cost driver followed by immunization specific personnel[16].

The financing pattern of India's immunization programme also remains the same when compared with the previous costing analysis of cMYP15. The government financed the programme largely with support from Gavi and other immunization partners such as WHO, UNICEF, UNDP etc. However, in the baseline year of the current analysis, government finance was 79%, the lowest in last five years. This is because Gavi had contributed significantly in the programme in 2017 and Gavi's contribution for vaccines only was 13% of total expenditure of the programme in 2017. Apart from that, Gavi had contributed for health system strengthening (HSS) and WHO, UNICEF and other partners were the recipient of this grant. The contributions of other partners included their respective Gavi HSS grant. About $30 million support from Gavi was assumed in 2021 for HPV vaccine introduction (personal communication with Gavi). The contribution of other partners remained the same when compared with the previous cMYP cost analysis[17].

Limitations

The study had several limitations. First, the total target for MR vaccination campaign in 2018 and 2019 were distributed equally in these two years while in practice, it may not be equally distributed, and the target will be determined considering state priorities as well. Second, the target for JE adult vaccination campaign was assumed same as the baseline throughout the projection period. Third, JE campaign vaccine cost was added in routine vaccine cost as per the government reporting format, hence, JE vaccine cost was not added in supplemental immunization activities. Fourth, resource requirements for rotavirus vaccine and PCV introduction in 2018 onward were based on the national health mission plan, however, it could be different in practice. Fifth, HPV vaccine has been assumed to be introduced in 2020 with a 10-dose bi-valent vaccine, 2 doses in the schedule with a 5% coverage in the first year for 9-14 years old females. It could be different in practice. Sixth, the prices of vaccines were assumed same throughout the projection period while, the vaccine prices may reduce because of increased requirement of doses. Seventh, BMGF support for immunization technical support unit was only considered in this cost calculation as detailed support related information were not available. Finally, fiscal year 2017-18 was considered as the baseline for this cost calculation, however, final cost adjustments for few cost components are still not available (e.g. cold chain, operational cost). Hence, the estimates presented in this analysis is probably a bit underestimated.

[15] *Chatterjee S, Pant M, Haldar P, Aggarwal MK, Laxminarayan R. 2016. Current costs and projected financial needs of India's universal immunization programme. Indian Journal of Medical Research, Vol. 143, No. 6, pp. 801-808*
[16] *World Health Organization. Geneva, Switzerland. Available from: http://www.who.int/immunization/programmes_systems/financing/analyses/Historical_cMYP_Analysis_2012.pdf, accessed March 15, 2018*
[17] *Chatterjee S, Pant M, Haldar P, Aggarwal MK, Laxminarayan R. 2016. Current costs and projected financial needs of India's universal immunization programme. Indian Journal of Medical Research, Vol. 143, No. 6, pp. 801-808*

Annexure

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
1	1.1	Percent of districts with more than 90% DPT3	(Number of districts with more than 90% Pentavalent 3 coverage/ Total number of districts)*100	WUNIEC methodology	21%	2016-2017	80% of districts (RVAP)	Midterm and End term	WHO
2	1.2	Number of States/UTs where >95% sessions were held as planned	No. of sessions held/ Total number of sessions planned	Monitoring data	23	2017	36	Annual	WHO
3	1.3	Number of States/ UTs having less than 10% dropout from Pentavalent1- Pentavalent3	(Penta1 - Penta3 coverage)/Penta1 coverage * 100	Survey/HMIS	27	2016-17	36	Annual	MoHFW/ ITSU
4	1.4	Difference in FIC between the highest and lowest wealth quintiles (%)	Highest wealth quintile FIC - lowest wealth quintile FIC	Survey	17 (NFHS4)	2015-16	16%	Midterm and End term	MoHFW/ ITSU
5	1.5	Number of states that developed tribal immunization strategy (Only for high tribal population states)	Number of states that developed tribal immunization strategy in high tribal focus states	State PIP reports	0	2017	16	Annual	States/ UNICEF
6	1.6	Number of states where 80% districts conducted at least 6 DTFI meetings during the reporting year	Number of states where 80% districts conducted at least 6 DTFI meetings during the reporting year	Monitoring data	0	2017 (Gavi states)	36	Annual	States/ WHO

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
7	1.7	Percent Medical Officers trained on RI handbook in each state	(Number of MO trained in RI handbook/ Total number of MO in the state)*100	Training report	0	2017	80%	Annual	States/ NIHFW
8	1.8	Percent health workers trained on Health worker RI handbook in each state	(Number of health worker trained on health worker RI handbook/ Total number of health workers in the state)*100	Training report	0	2017	70%	Annual	States/ NIHFW
9	2.1	Number of states which conducted EVM in last 3 years	Number of states which conducted EVM in last 3 years	EVM dashboard/ NCCMIS	11	2017	23	Annual	UNICEF
10	2.2	Number of states having more than 80% Effective Vaccine Management Score (composite score)	Number of states having more than 80% Effective Vaccine Management Score (composite score)	EVM dashboard/ NCCMIS	0	2017	12	Annual	UNICEF
11	2.3	Percent of States with an Improvement Plan implemented after EVM assessment	(Number of states with IP implemented after EVM assessment/ Total states where EVM assessment done)*100	EVM dashboard/ NCCMIS	100%	2017	100%	Annual	States/UNICEF

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
12	2.4	Percentage of cold chain technicians training batch with positive increase in cold chain knowledge score (pre and post assessment)	(Number of cold chain technicians with positive increase in cold chain knowledge score/ Total CCT trained)*100	Training reports	0%	2016	90%	Annual	NCCVMRC/ UNICEF
13	2.5	Percent of CCP with vaccine availability index more than 90% in eVIN states	(No. of CCP with VAI>90%/ Total CCP)*100	eVIN	92%	2016-17	100%	Annual	States/ UNDP
14	2.6	Percent of PHCs having cold chain points	(Number of PHC having CCP/ Total number of PHC)*100	NCCMIS	66%	2017	80%	Annual	States/ NCCVMRC
15	2.7	Number of states/UTs with cold chain sickness rate maintained within 2%	No. of states/UTs with cold chain sickness rate maintained within 2%	NCCMIS	21	2016-17	36	Annual	States/ NCCVMRC
16	2.8	Number of states maintaining eVIN adherence rate > 90%	Adherence rate : (No. of CCP entering transaction at least once a week on eVIN/ Total no. of CCP in eVIN implementing states)*100	eVIN	Not available (eVIN baseline)	99.6% in 12 eVIN implementing states (Not Applicable in other states)	All eVIN states	Annual	States/ UNDP

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
17	3.1	Percentage point difference between Penta 3 national administrative coverage and survey point estimate	National administrative Penta3 coverage - Penta3 survey coverage of the corresponding year	Survey (NFHS-4) & Administrative (HMIS) [NFHS4-HMIS]	9.8	2015-16	<5%	Midterm and End term	MoHFW/ ITSU
18	3.2	Number of states conducted Data Quality Training Workshop	No. of states conducted DQ training workshop	Data quality training reports	0	2017	10	Annual	States/ NIHFW
19	3.3	Percent of ANMs reporting data via ANMOL/other compatible software	(No. of ANM reporting data via ANMOL/ Total no. of ANM targeted for ANMOL)*100	ANMOL report	0	2016-17	80%	Annual	States/ UNICEF
20	4.1	Number of serious/severe AEFI cases reported	No. of serious/severe AEFI cases reported	AEFI Secretariat line list	1564	2016-17	4000	Annual	AEFI Sec/ States
21	4.2	Proportion of serious/ severe AEFI cases investigated	(Number of serious/ severe AEFI cases investigated (cases with PCIF or PIR)/ Total serious/serious AEFI cases)*100	AEFI Secretariat line list	83%	2016-17	90%	Annual	AEFI Sec
22	4.3	Proportion of serious/ severe AEFI cases reported and investigated in the current year causally assessed at state level	(Number of serious/ severe AEFI cases reported and causally assessed at state level in the current year / Total serious/severe AEFI cases)*100	AEFI Secretariat line list	16%	2016-17	90%	Annual	AEFI Sec

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
23	4.4	Proportion of states in which QMS has been implemented against target	(Number of states where QMS has been implemented/ Number of target states)*100	AEFI Secretariat	0%	2016-17	80%	Annual	States/ AEFI Sec
24	4.5	Proportion of districts in which QMS has been implemented against target	(Number of districts where QMS has been implemented/ Number of target districts)*100	AEFI Secretariat	0%	2016-17	80%	Annual	States/ AEFI Sec
25	4.6	Percent of state AEFI committees trained in AEFI surveillance and causality assessment at least once in last 3 years*.	(No. of state AEFI committees trained in AEFI surveillance and causality assessment at least once in last 3 years/ Total number of state AEFI committee members)*100	AEFI Secretariat	100%	2016-17	100%	Once in 3 years	AEFI Sec
26	4.7	Percent of state holding at least 2 state AEFI committee meetings every year.	(Number of state holding at least 2 state AEFI committee meetings every year/ Total state AEFI committee)*100	AEFI Secretariat	39%	2016-17	80%	Annual	States/ AEFI Sec
27	5.1	Percent districts in select state reporting VPD data	(Number of districts reportingVPD data/ Total number of districts in select states)*100	VPD surveillance data	90%	2016-17	100%	Annual	States/ WHO

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
28	5.2	Number of states whereVPD surveillance is functional	Number of states whereVPD surveillance is functional	VPD surveillance data	5	2017	20	Annual	WHO
29	5.3	Percent VPD cases investigated by DIOs(or identified nodal person)	(Number of VPD cases investigated by DIO(or identified nodal officer)/ Total number of VPD cases in select cases)*100	VPD surveillance data	95%	2017	100%	Annual	States/ WHO
30	5.4	Proportion of cases (DPnT) investigated within 48 hours of notification	(Number of cases investigated within 48 hours/ Total number of cases notified)*100	VPD surveillance data	84%	2017	95%	Annual	WHO
31	6.1	Percent of ANMs and ASHAs trained on BRIDGE module by Master trainers	(No. of ANMs and ASHAs trained on BRIDGE module by Master trainers/Total no. of ANMs and ASHAs in states)*100	MoHFW training report/ UNICEF	0	2016-17	100%	Annual	States/ MoHFW/ UNICEF
32	6.2	Percent of monitored districts with RI communication plan	(Number of monitored districts with RI communication plan/ Total number of districts monitored)*100	Monitoring report	50	2017	80	Annual	UNICEF

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
33	6.3	Percent of positive and neutral media information on RI in English, Hindi and Regional print, TV and Radio	(Total no. of positive print media news on immunization/ total no. of print media news on immunization)*100	Media analysis report	76%	2017	90%	Annual	UNICEF
34	6.4	Number of states/ UTs with SBCC/ BCC cells with HR trained in SBCC	Number of States/ UTs with SBCC/ BCC cells with HR trained in SBCC	Training reports	9	2017	16	Annual	States/ UNICEF
35	6.5	Percent of caregivers who reported getting information about immunization from ANM/ ASHA/AWW	(Number of caregivers who reported getting information about immunization from ANM/ASHA/AWW/ Total caregivers interviewed)*100	Monitoring report	78%	2016	90%	Annual	WHO
36	6.6	Percent of caregivers whose children received partial or no immunization due to information and awareness gap among caregivers and AEFI apprehension	(Number of caregivers whose children received partial or no immunization due to information and awareness gap among caregivers/ Total caregivers interviewed)*100	Monitoring report	62	2017	5%	Annual	WHO
37	7.1	No. of states/UTs with more than 95% MRCV1 coverage	No. of states/UTs with more than 95% MRCV1 coverage	HMIS	8	Apr-Dec 2017	36	Annual	States/ ITSU

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
38	7.2	No. of states/UTs with more than 95% MRCV2 coverage	No. of states/UTs with more than 95% MRCV2 coverage	HMIS	1	Apr-Dec 2017	36	Annual	States/ ITSU
39	7.3	No. of states with less than 5 cases of measles per million population each year	No. of states with less than 5 cases of measles per million population each year	MR surveillance report	17	2017	30	Annual	WHO
40	7.4	Proportion of states with >95% MR vaccination coverage during MR campaign	(Number of states with >95% MR vaccination coverage/ Total number of states where MR campaigns held)*100	Administrative coverage report	77%	2017	100%	Annual	States/ WHO
41	8.1	Number of wild polio virus detected in the country	Number of wild polio virus detected in the country	Monitoring report	0	2017	0	Annual	WHO
42	8.2	Number of VDPV (AFP and environmental) detected in the country	Number of VDPV detected in the country	Monitoring report	1	2017	0	Annual	WHO
43	8.3	No. of states/UTs where non Polio AFP rate is maintained or exceeds 2 per 100,000 children under 15 years	No. of states/UTs where non Polio AFP rate is maintained or exceeds 2 per 100,000 children under 15 years	Monitoring report	32	2017	36	Annual	WHO
44	8.4	Number of surveillance reviews conducted annually	Number of surveillance reviews conducted annually	Monitoring report	3	2017	3	Annual	WHO

Monitoring and Evaluation Framework for cMYP 2018-22

S. No.	Indicator No.	Indicator	Definition	Data Source	Baseline Value	Baseline Year	Target (2022)	Frequency	Responsibility
45	8.5	Number of states/UTs with > 80% TT2 coverage for pregnant women	Number of states/ UTs with > 80% TT2 coverage for pregnant women	HMIS	36	2017	36	Annual	States/ ITSU
46	9.1	Number of NTAGI meetings held in a year	Number of NTAGI meetings held in a year	NTAGI secretariat	1	2017	1	Annual	NTAGI Sec.
47	9.2	Number of states that have introduced PCV vaccine	Number of states that have introduced PCV vaccine	State reports and HMIS	3	2017		Annual	States/ MoHFW
48	9.3	Number of states that have introduced Rotavirus vaccine	Number of states that have introduced Rotavirus vaccine	State reports and HMIS	4	2017	36	Annual	States/ MoHFW
49	9.4	Number of states that have introduced MR vaccine.	Number of states that have introduced MR vaccine	State reports and HMIS	13	2017	36	Annual	States/ MoHFW

IMMUNIZATION
TECHNICAL SUPPORT UNIT
Ministry of Health & Family Welfare