**Ministry of Health**

**Republic of Uzbekistan**

# COMPREHENSIVE MULTI-YEAR PLAN FOR IMMUNIZATION 2016-2020

**Tashkent 2015**

# TABLE OF CONTENTS

## ACRONYMS

| | |
|---|---|
| AEFI | Adverse Events Following Immunization |
| AFP | Acute Flaccid Paralysis |
| BBP | Basic Benefit Package |
| BCG | Bacillus Calmette-Guerin (tuberculosis vaccine) |
| CDC | US Center(s) for Disease Control and Prevention |
| CRS | Congenital Rubella Syndrome |
| DHS | Demographic and Health Survey |
| DTP | Diphtheria-Tetanus-Pertussis vaccine |
| DQS | Data Quality Self Assessment |
| DTaP | Diphtheria-Tetanus-acellular Pertussis vaccine |
| DTwP | Diphtheria-Tetanus-whole cell Pertussis vaccine |
| DT | Diphtheria-Tetanus toxoids |
| EIW | European Immunization Week |
| EPI | Expanded Programme on Immunization |
| EVSM | Effective Vaccine Store Management |
| FSP | Financial Sustainability Plan |
| GAVI | Global Alliance for Vaccines and Immunization |
| GoUz | Government of Uzbekistan |
| HepB | Hepatitis B vaccine |
| Hib | Haemophilus Influenza type b |
| ICC | Interagency Coordinating Committee |
| IIP | Immunization in Practice |
| MCH | Maternal and Child Health |
| MDVP | Multi-Dose Vial Policy |
| MICS | Multiple Indicator Cluster Survey |
| MMR | Measles, Mumps and Rubella (vaccine) |
| MR | Measles and Rubella (vaccine) |
| MoH | Ministry of Health |
| NIP | National Immunization Programme |
| NRA | National Regulatory Authority |
| OPV | Oral Polio Vaccine |
| PHC | Primary Health Care |
| RCSSES | Republican Center for State Sanitary Epidemiological Surveillance |
| SIA | Supplementary Immunization Activity |
| SIP | Safe Immunization Practices |
| SOP | Standard Operating Procedures |
| Td | Tetanus and Diphtheria toxoids for adults |
| UNICEF | United Nations Children's Fund |
| USAID | United States Agency for International Development |
| VPD | Vaccine Preventable Disease |
| VVM | Vaccine Vial Monitor |
| WB | World Bank |
| WHO | World Health Organization |

# LIST OF FIGURES AND TABLES

# 1. BACKGROUND

## 1.1 GENERAL INFORMATION

Republic of Uzbekistan is a landlocked country located in central Asia. It is bordered to the north and northeast by Kazakhstan, to the west and south-west by Turkmenistan, to the south by Afghanistan and to the east by Tajikistan and Kyrgyzstan. Uzbekistan's territory is 447 400 $km^2$. Its terrain is a combination of sandy deserts, intensely irrigated river valleys and mountains. The climate is continental, with long hot summers and short mild winters.

**Figure 1. Map of Uzbekistan**


Since the 1970s, Uzbekistan's population has more than doubled. The most recent estimates put the total population at 31 million people[1]. The high population growth rates that occurred in the 1970s, however, have gradually decreased and population growth was 2% in 2014. This change can be primarily attributed to decreasing birth and fertility rates, as death rates slightly declined. The declining population growth is reflected in a changing demographic structure and age–dependency ratio. The share of the population aged 0–14 decreased from 45% of the total population in 1970 to 31.5% in 2014, while the age–dependency ratio declined by 40% over the same period.

Despite these demographic developments, the pressures on the health system that arise from an ageing population in many countries in Western Europe do not seem to currently be in place in Uzbekistan. The share of the population over 65 years of age has decreased from 5.9% in 1970 to 3.9% in 2015. Uzbekistan is a multiethnic country. It has been estimated that in 1996, 80% of the population were ethnic Uzbeks, 5.5% Russians, 5% Tajiks, 3% Kazakhs, 2.5% Karakalpaks and 1.5% Tatars, with the remaining 2.5% belonging to smaller ethnic groups. It can be assumed that the ethnic composition of Uzbekistan's population has changed since then, as the country has experienced significant emigration, in particular of Russian speaking residents.

In terms of religious affiliation, most of the population identify themselves as Muslims (88%, mostly Sunnis). Other religious groups represented in Uzbekistan are Eastern Orthodox Christians (9%) and Jews (3%). The majority of the population (63%) lives in rural areas.

[1] The State Committee of Republic Uzbekistan on statistics. www.stat.uz

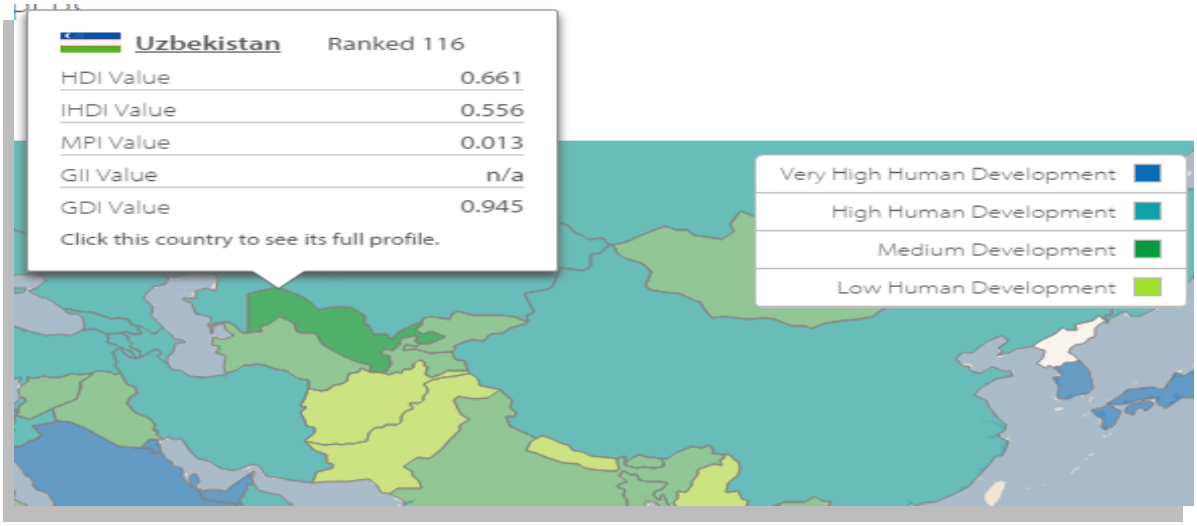
## 1.2 POLITICAL AND SOCIO-ECONOMIC TRENDS

Uzbekistan's economy is mostly oriented towards services and agriculture, with a small share of gross domestic product (GDP) generated by industry. Despite being a dry and landlocked country, 11% of Uzbekistan consists of intensely cultivated, irrigated river valleys. It is the world's second-largest cotton exporter, a large producer of gold and oil, and a regionally significant producer of chemicals and machinery. Since independence, Uzbekistan has focused on the development of its industry and pursued a policy of self-sufficiency in energy, grain and other selected items. The Government has provided subsidies to textile and car production including many other industries.

After the break-up of the Soviet Union, Uzbekistan experienced a significant fall in its GDP. Following a steady recovery in the period 1995–1999, GDP declined again by almost 40% between 1999 and 2002. Since then, GDP has slowly increased again.

### Figure 2. Human Development Index of Uzbekistan

*According to the GDP index, Uzbekistan is classified as a lower-middle-income country*




This year's HDI highlights the very large gaps in well-being and life changes that continue to divide our increasingly interconnected world. The HDI for Uzbekistan is 0.661, which places the country at a rank of 116 out of 182 countries with data[2].

In the last years, the country has taken a gradual, step-by-step approach to structural reforms, cautiously introducing features of an open-market economy through measures such as adjustment of energy prices, current account convertibility, and lease-holding of collective farms. Nonetheless, the policy framework for Uzbekistan's crucial agricultural sector still requires significant strengthening to achieve the sector's full potential. An important source of income for many poor households in the past years came from the remittances of labor migrants, mainly to Russia and Kazakhstan, but unfortunately the global financial affected also their economic key sectors, forcing them to cut down immigration quotas and to send back the workers to their home country. Overall, the impact of economic growth on improving livelihoods has been inadequate: indeed, while poverty has decreased nationwide – largely on the strength of a reduction in urban areas[3] – it is falling more slowly in rural areas, where the overwhelming majority of the population is concentrated. Thus, over the last several years the differences in poverty rates between rural and urban households have increased, rising from 8 percentage points in 2001 to almost 12 percentage points in 2005.[4]

[2] UNITED NATIONS DEVELOPMENT PROGRAMME. Human Development Reports, 2015
[3] Welfare Improvement Strategy (WIS), 2007. The share of the disadvantaged urban population fell from 22 percent in 2001 to 18 percent in 2005.
[4] Ibid.

By looking at some of the most fundamental aspects of people's lives and opportunities the HDI provides a much more complete picture of a country's development than other indicators, such as GDP per capita (3,425 USD in Uzbekistan). The figure shows that countries on the same level of HDI can have very different levels of income or that countries with similar levels of income can have very different HDIs.

The Government is keen to ensure that high economic growth is sustainable, in the range of 8 to 10 % per annum through the year 2020. Although the short-term outlook appears positive, further major reforms will be necessary to stimulate additional private sector development, including deepening liberalization of trade and exchange systems and modernizing the financial sector.

The Constitution of Uzbekistan of 1992 defines the country as a democratic republic with the state power divided between the executive, legislative and judicial branches of governmentThe country retains its strong concentration of power in the executive branch. The Government attaches the highest priority to maintaining economic, social and political stability. The current President was most recently re-elected in December 2007. In 2009, Parliamentary elections took place. In these elections, about 150 MPs, including 135 from single-member territorial constituencies and 15 from the Ecological Movement of Uzbekistan, were elected to the lower chamber of the Uzbek parliament – Oliy Majlis.

## 1.3 HEALTH CARE SYSTEM

Until 1991, the highly centralized health system of Uzbekistan was managed from Moscow. Since independence, the system is moving towards privatization and strengthening primary health care. The economic problems in 1990s have led to problems in vaccine supplies and general immunization coverage, which eventually allowed for outbreaks of poliomyelitis, diphtheria, and measles.

The health insurance system does not exist yet, but its introduction is envisaged by the ongoing reforms. 90% of health care services are being provided by government facilities, and remaining share belongs to non-governmental institutions and private practitioners.

The healthcare delivery system was condensed from six layers to three. These are primary health care (Rural Medical Centres), a system of outpatient and general hospital secondary care (Regional and Central district hospitals) and highly specialized tertiary hospital care.

Regional and city hospitals, located in the main town of the region, have between 600 and 1000 beds and offer a range of secondary care specialists and more complex services. Central district hospitals have about 100–300 beds and are staffed with a range of specialists. Some incorporate a polyclinic.

Rural medical centres (SVPs) are introduced throughout the country within the framework of ongoing WB-financed health sector reform and are currently supposed to serve between 4000 and 6000 people each (up to 10 000 in remote areas). Compared with feldsher–midwifery posts, rural medical centres are staffed with more physicians (between one and five), who are often specialists in internal medicine, paediatrics or gynaecology, and between four and eight nursing and auxiliary health personnel.

Maternal and child health is one of the priorities for healthcare in Uzbekistan and the majority of aid projects are focused on this topic.

Key indicators on the healthcare system are summarised in the below table.

**Table 2: Selected indicators on healthcare system, Uzbekistan 2015**

| Indicator | Figure |
|---|---|
| Hospitals (per 100,000 population) | 2.9 |
| Acute care hospitals (per 100,000 population) | 13.1 |
| Primary healthcare units (per 100,000 population) | 0.75 |

| | |
|---|---|
| Hospital beds (per 100,000 population) | 478.1 |
| Hospital beds in acute care hospitals (per 100,000 population) | 1,002.1 |
| In-patients at stationary hospitals (per thousand) | 3,482.2 |
| Average length of stay (days) | 8.3 |
| Bed occupancy rate (days) | 312.8 |
| Number of in-patients (in-patients per 100 persons | 21.1 |

### 1.4 IMMUNIZATION SERVICES WITHIN HEALTH CARE SYSTEM

Immunization services are delivered in 4400 health facilities throughout the country. The immunization program is managed by State Surveillance Department of the Ministry of Health and the NIP Manger is a Lead Specialist of the Department. Planning, procurements and distribution of immunization supplies, including vaccines, is managed by RCSSES (Republican Center for State Sanitary and Epidemiological Surveillance), which has a network in all province and district centers. The epidemiologists employed at the branches of RCSSES are acting as province and district EPI managers, respectively.

## 2. DISEASE TRENDS AND VACCINATION COVERAGE

### 2.1 MORBIDITY AND MORTALITY TRENDS FOR VACCINE PREVENTABLE DISEASES

The European Region, including the Republic of Uzbekistan, was certified polio-free in 2002. However, in 2009, the European Regional Commission for the Certification of Poliomyelitis Eradication (RCC) concluded that Uzbekistan remains at risk for the importation of wild polioviruses, and that the risk appears to be growing. Due to geographical proximity between Tajikistan and Afghanistan, the RCC recommended polio sub-NIDs in the bordering areas, which were not implemented due to lack of internal and external funding. In 2010, during the polio outbreak in Tajikistan, Uzbekistan was provided 12 rounds of polio vaccination to avoid the spread of polio between borders.

**Figure 3. Polio morbidity (per 100 000 population) and vaccination coverage (%), 1991-2014**

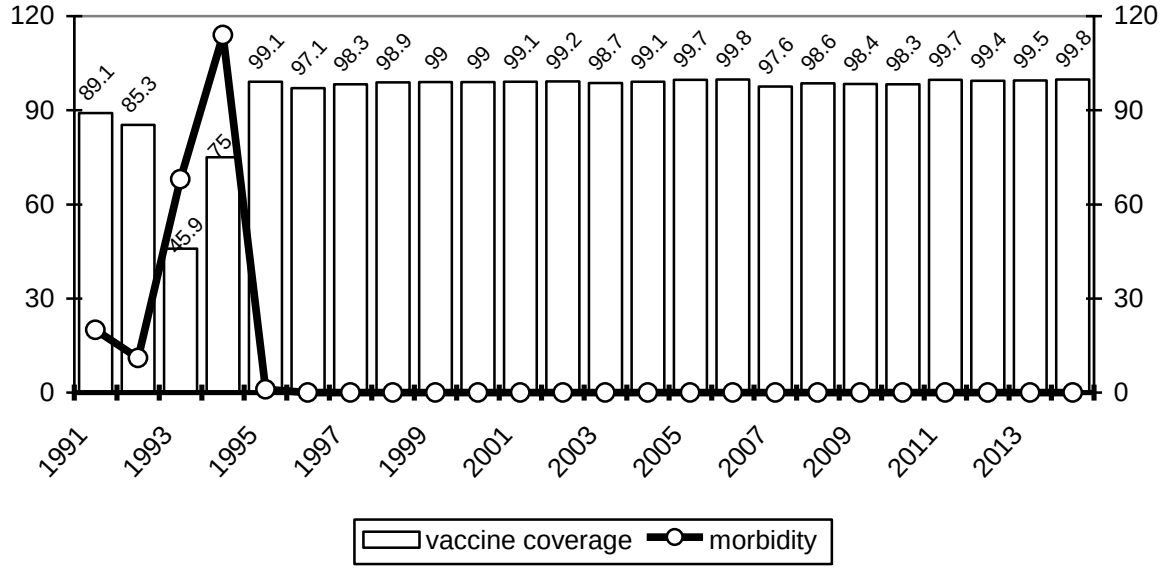


**Figure 4. Diphtheria morbidity (per 100 000 population) and vaccination coverage (%), 1991-2014**

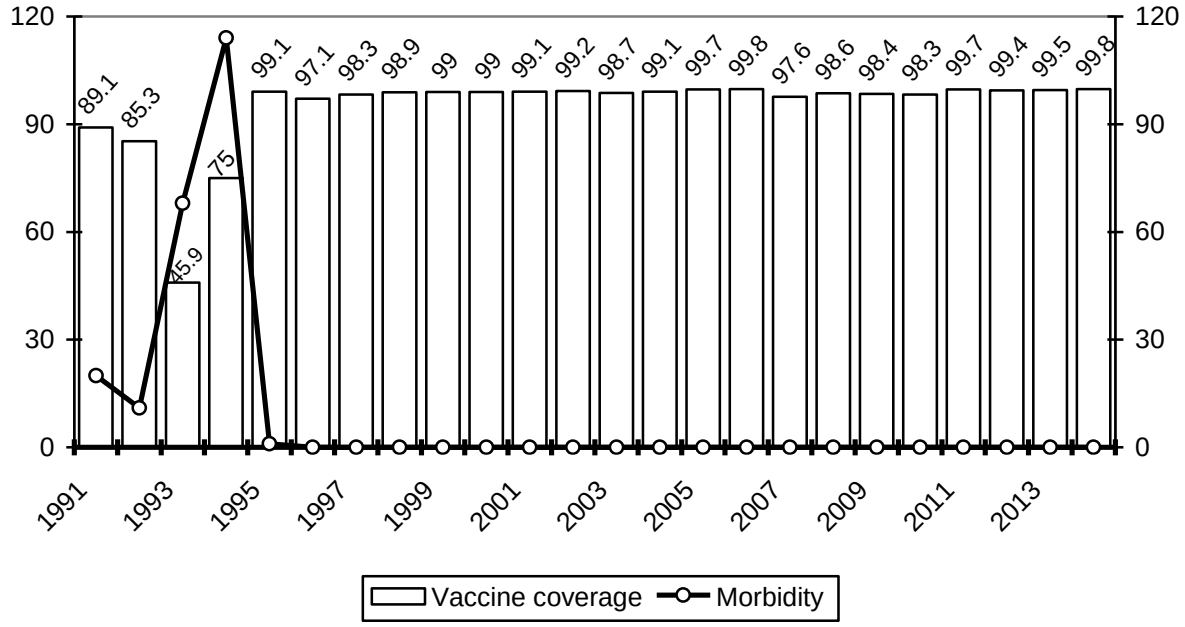



**Figure 5. Measles morbidity (per 100 000 population) and vaccination coverage (%), 2001-2014**

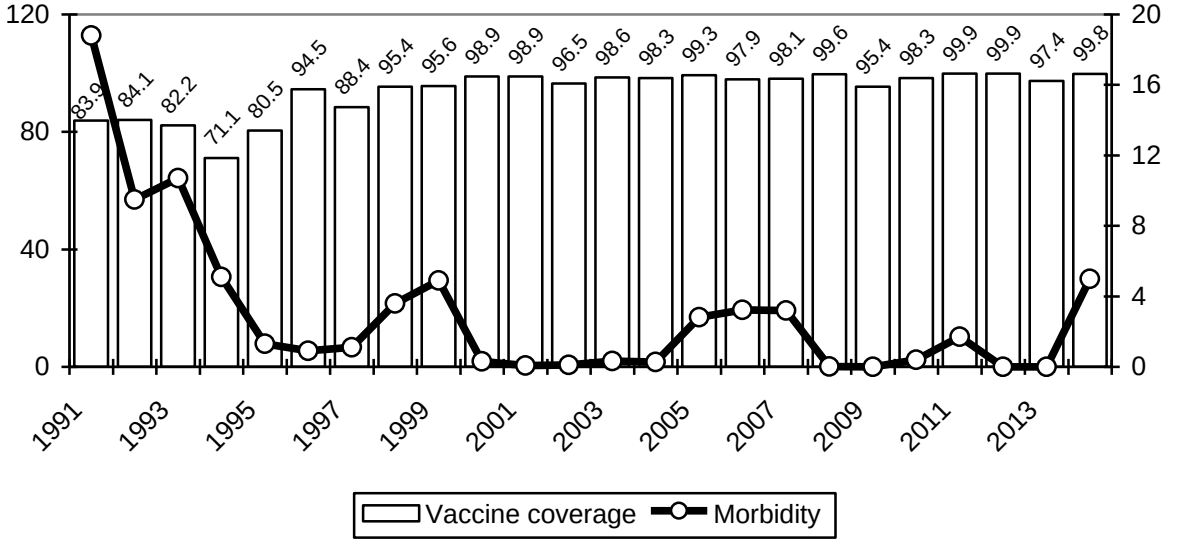


**Figure 6. Hepatitis B morbidity (per 100 000 population) and vaccination coverage (%), 2001-2014**

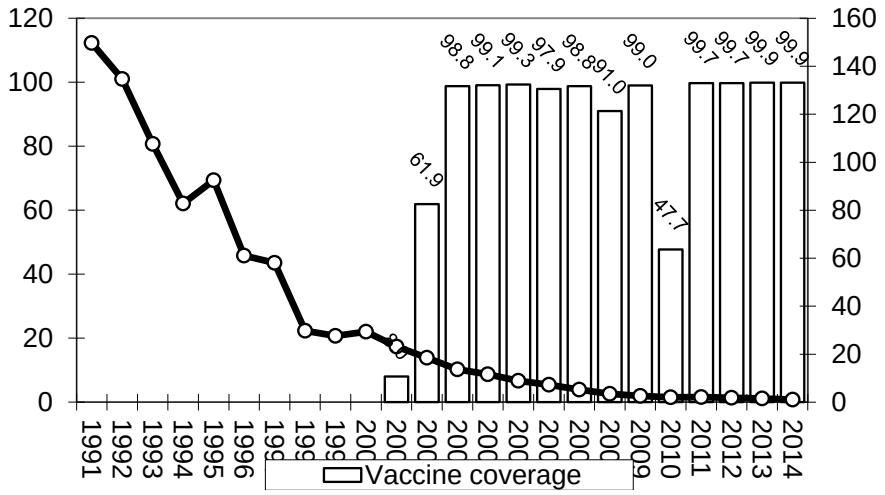



**Figure 7. Rubella morbidity (per 100 000 population) and vaccination coverage (%), 2001-2014**

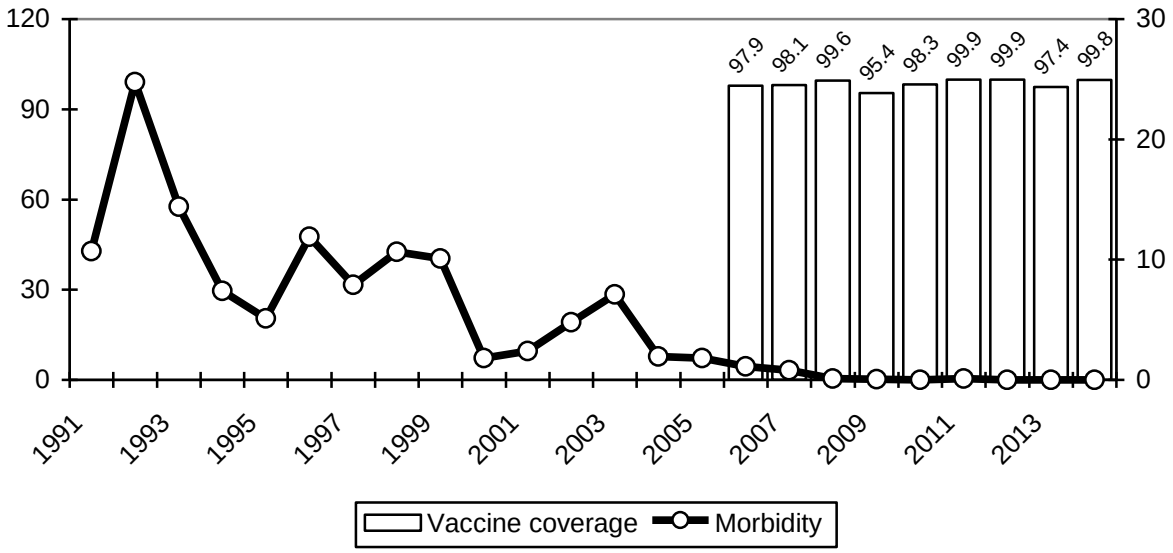
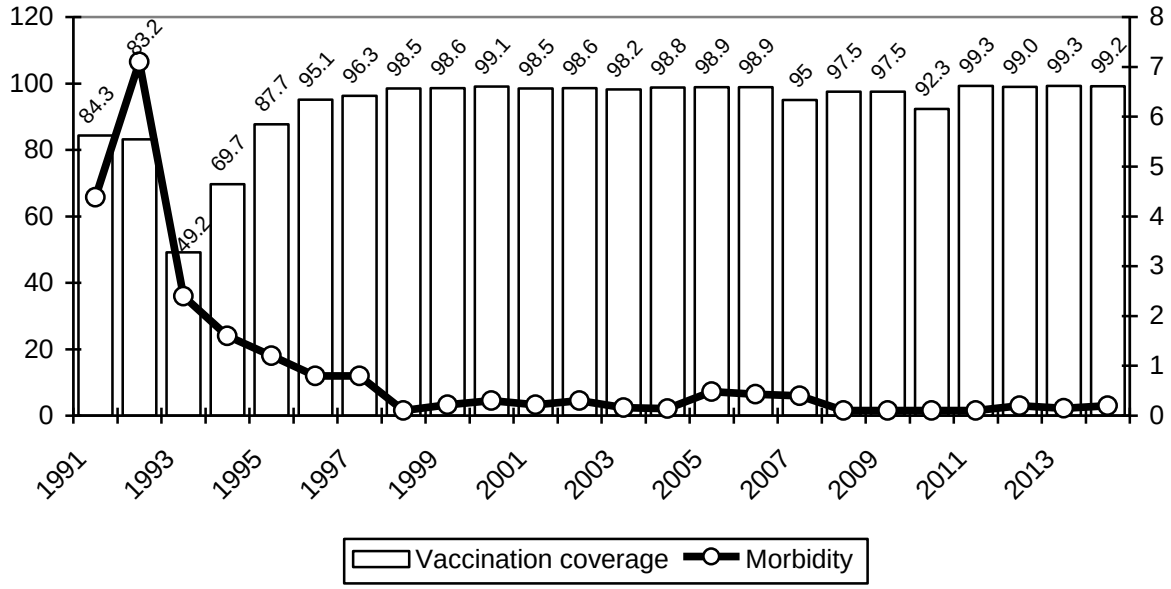


**Figure 8. Pertussis morbidity (per 100 000 population) and vaccination coverage (%), 2001-2014**




## 2.2 VACCINATION SCHEDULE

The National Vaccination Schedule (Sanitary norms and regulations #0239-07) was changed last time on November 6, 2014 with connection to introduction of the Rotavirus Pneumo, HPV and IPV vaccines, The current vaccination schedule is as the following:

**Table 2. National vaccination schedule [5]**

| Age | Vaccine |
|---|---|
| At birth | HepB -1 |
| 2-5 days | OPV-0, BCG-1 |
| 2 month | DTP-1, HepB -2 +Hib-1, OPV-1 , Rota-1, Pneumo-1 |
| 3 month | DTP-2, HepB -3 +Hib-2, OPV-2 , Rota-2, Pneumo-2 |
| 4 month | DTP-3, HepB -4 +Hib-3, OPV-3, IPV |
| 12 month | MMR – 1, Pneumo-3 |
| 16 month | DTP- 4, OPV - 4 |
| 6 years | MMR-2 |
| 7 years (1 grade) | tD, OPV-5, BCG-2 |
| 16 years | tD-6 |

The next revision of the national calendar is planned in connection with withdrawal of the type 2 component of OPV (OPV2) in 2018.

[5] Source: Sanitary norms and regulations #0239-07 Updated: 6/11/2014

## 2.3 VACCINATION COVERAGE

Coverage with routine vaccine is traditionally high in Uzbekistan. Coverage graphs for various antigens are presented in the previous chapter.

The annual data analysis shows above 95% national coverage against all antigens.

**Table 3. Vaccination coverage at national level, 2001 - 2014[6]**

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|
| **DTP3** | 98 | 95 | 95 | 98 | 98 | 99 | 99 | 99 | 99 | 99 |
| **OPV3** | 99 | 94 | 97 | 98 | 99 | 99 | 99 | 99 | 99 | 99 |
| **BCG** | 93 | 99 | 99 | 96 | 99 | 99 | 99 | 99 | 99 | 99 |
| **HepB3** | 99 | 97 | 99 | 91 | 98 | 99 | 99 | 99 | 99 | 99 |
| **MCV1** | 98 | 97 | 98 | 98 | 95 | 98 | 99 | 99 | 97 | 99 |

Nevertheless, there are several low-performing districts. In addition, problems with vaccine financing and supply during 2008-2010 have led to several stock-outs for various vaccines. Consequently, the coverage during certain periods was inadequate, and caught-up only in Q4 of the year or Q1 of the following year. In 2009, booster vaccines against polio and measles were not at all procured, thus MCV2 coverage in 2009 was only 8%, and OPV4 – 0%. Data on vaccine coverage shows the highest level, at more than 99%.

# 3. IMMUNIZATION PROGRAMME CHARACTERISTICS (ACHIEVEMENTS, PROBLEMS AND OBJECTIVES)

## 3.1 SERVICE DELIVERY

### 3.1.1 Routine activities

Routine immunization delivery in Uzbekistan is based on fixed immunization point strategies – vaccines are administered through the network of about 4400 sites. BCG1 and OPV0 are administered in maternity hospitals. In rural areas, at SVPs, vaccination is carried out on specific in order to decrease vaccine wastage when using multi-dose vials.

Reaching the “un-reached” population is part of the Reaching Every District (RED) strategy with the objective of strengthening district capacity through 5 components.

- Re-establishing outreach services
- Supportive supervision
- Linking services with communities
- Monitoring and use of data for actions
- Planning and management of resources

The RED strategy activities are being complemented with Immunization in Practice (IIP) trainings for health staff. RED strategy implies use of additional strategies, such as outreach and mobile teams.

### 3.1.2 Supplementary immunization activities

Uzbekistan together with other countries of the WHO European Region was certified polio-free in 2002. Uzbekistan participated in all MECACAR and MECACAR Plus activities. The last polio SIA, however, was conducted in the country in 2005. In 2009, the European Regional

[6] Source: Uzbekistan: WHO and UNICEF estimates of immunization coverage: 2014 revision

Commission for the Certification of Poliomyelitis Eradication (RCC) recommended Uzbekistan to resume polio SIA in areas bordering Afghanistan and Tajikistan given the geographical proximity to endemic countries. This recommendation was not implemented due to the lack of internal resources and limited attention of international partners. The polio outbreak in Tajikistan in April 2010 served as a trigger and allowed mobilization of resources for response activities. The 12-round SIA with mOPV1 were implemented among children at risk in Uzbekistan in 2010 to prevent importation of wild polio virus from Tajikistan. AFP surveillance will be further strengthened to ensure sensitivity of the system and ability to timely detect cases.

Uzbekistan conducted two measles and rubella immunization campaigns: the first occurred in 2006-2007 in Tashkent city and Fergana region, targeting populations of 7-29 years old, and the second occurred nation-wide in 2010-2011, targeting populations of 1-10 years old. The SIA was conducted with high coverage which was confirmed by post-campaign assessment. The national strategic plan on Measles and Rubella Elimination and CRS control is in place. Since the campaign, there are few reported cases of measles. Thus, all cases were imported from neighbouring countries.

The country was not able to implement SIA on diphtheria included in the previous cMYP due to lack of resources. In the next few years, the country is planned to provide a study assessment to detect the prevalence of specific diphtheria markers among different ages and discover populations at risk for diphtheria. Such data will be used for recommendations to local authorities to provide additional vaccination to populations at risk for their local budgets.

### 3.1.3 Introduction of new vaccines.

The MMR vaccine was introduced into the national immunization calendar from 2007. The pentavalent Hib-containing vaccine was introduced with GAVI support in 2009.

The rotavirus vaccine was introduced with the support of GAVI in June of 2014. According to the recommendations of the WHO, the post-introduction evaluation (PIE) was implemented during August 2015. Overall, the introduction of the rotavirus vaccine in Uzbekistan was a smooth process. The national administrative RV1 coverage was 99.4% and RV2 coverage was 99.9% between June and December 2014. As is expected with the implementation of a new vaccine, some areas for improvement (vaccine trainings, vaccine coverage, cold chain and vaccine supplies and supportive supervision) were identified and recommendations were made.

Taking into account that pneumococcal infection is the important cause of childhood morbidity and mortality in Uzbekistan, as well as the efficacy and effectiveness of available pneumococcal vaccines, the Government of Uzbekistan decided to introduce the PCV into the routine immunization programme with GAVI support from November 2015. The vaccine of choice would be conjugate 13-valent PCV vaccine in one-dose liquid presentation. PCV13 provides protection against more serotypes of Spn, and one-dose presentation would to lower wastage of vaccine, even though one-dose vaccine will have impact on cold chain capacity of the NIP. In accordance with WHO recommendations, PCV vaccination should be initiated before 6 months of age and may start as early as 6 weeks of age. The childhood immunization schedule with introduction of PCV vaccine will be as follows:

- PCV first dose at 6 weeks (with Rota1; Penta1 and Polio1)
- PCV second dose at 10 weeks (Rota2; Penta2 and Polio2)
- PCV third dose at 14 weeks (with Penta3 and Polio3).

The country plans to introduce at least one dose of inactivated polio vaccine (IPV) into the national routine immunization programme in 2016 to mitigate the risks and consequences associated with the eventual withdrawal of the type 2 component of OPV (OPV2) in 2018.

The country plans to introduce one new vaccine: based on successful experience of using quadrivalent HPV vaccines in Uzbekistan. Having a long-standing tradition of successful school-based immunization programs, and as part of the preparation of the comprehensive strategy of cervical cancer prevention and control, the Ministry of Health of Uzbekistan is planning the nationwide introduction of HPV vaccine into the routine immunization schedule from 2017, targeting a one-year cohort of adolescent girls and requesting support from GAVI for the

introduction of the vaccine. HPV surveillance is implemented by the Research Institute of Obstetrics. The country does not have data on prevalence of HPV serotypes in Uzbekistan and thus has no preference for any of the two vaccines available in the marker, quadrivalent Gardasil or bivalent Cervarix. Both vaccines are registered in the country. The vaccine of choice is Gardasil due to experience with its use, protection against more serotypes, and single-dose presentation which will allow reduction of wastage. The school based vaccination schedule is: first dose in April, second dose in May, +1 month and third dose in October, +5 month. According to the MoH, enhancing cold-chain supply and training the personnel to link the introduction of new vaccines, is required.

## 3.2 ADVOCACY AND COMMUNICATION

The Advocacy and Communication activities for immunization are being implemented through the National Institute of Health, a leading PR and social mobilization agency under MOH. The external support to advocacy and communication activities is provided mainly by UNICEF and mostly during campaigns and other events. MOH collaborates with WHO and other partners in planning and implementing social mobilization activities. Relationships with mass media on health topics, including immunization, are arranged via press office of MOH. There is no designated person for communication on immunization at the national level. The National Immunization Manager is the focal point for advocacy and communication for immunization.

Since 2005, Uzbekistan has participated in European Immunization Week (EIW) Initiative of WHO. This initiative is considered by Government as one of the best opportunities to achieve high vaccination coverage through sustainable public awareness campaigns on immunization. The objective of EIW is to increase vaccination coverage by raising awareness of importance of immunization. It initiated a broad spectrum of national events targeted at high risk population groups by means of advocacy, communication and supplementary immunization. Special attention is given to the activity targeted at vulnerable or hard-to-reach population groups. EIW promotes the key message that immunization of every child is vitally important from the point of view of disease prevention and life protection.

In light of increasing anti-vaccination processes through mass media, especially via the Internet, the Ministry of Health is faced with problems regarding lack capacity in Advocacy and Communication activities. Therefore, a website about vaccination was created (privivka.uz). The web site is accessible in two languages, Russian and Uzbek; however, there is the problem of updating the site.

## 3.3 SURVEILLANCE

The epidemiological surveillance system of vaccine preventable infections in Uzbekistan is based on a standard case definition of disease, identification of epidemiological links and laboratory examination of clinical samples.

With regard to measles, rubella and poliomyelitis, the surveillance system is based on the detection and registration of each suspected case with obligatory laboratory examination of clinical samples.

With regard to diphtheria, a whooping cough, mumps, and viral hepatitis B, the surveillance system aimed on the surveillance of disease by registering the number of cases and identifying the immunization status.

With regards to rotavirus the surveillance system is based on sentinel hospital-based surveillance in two infectious diseases hospitals in Tashkent and Bukhara cities.

**Table 4. AFP surveillance indicators**

| Indicator | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|
| AFP cases | 99 | 103 | 102 | 102 | 134 | 196 | 208 | 193 | 167 | 120 |
| AFP rate per 100,000 <15 | 1,16 | 1,23 | 1,21 | 1,22 | 1.49 | 2.18 | 2.32 | 2.15 | 1.85 | 1.87 |
| % adequate stool samples | 100 | 100 | 100 | 100 | 97 | 96.4 | 99.0 | 96.4 | 100 | 99.2 |
| % cases with 2 samples | 100 | 100 | 100 | 100 | 97 | 96.4 | 99.0 | 96.4 | 100 | 99.2 |
| AFP rate | 0,99 | 0,99 | 0,99 | 0,98 | 0.97 | 0.96 | 0.99 | 0.96 | 0.99 | 0.99 |
| % AFP within 7 days after onset of paralysis | 89,9 | 94,2 | 91,2 | 92,2 | 88.8 | 91.3 | 93.8 | 92.7 | 94.0 | 95.0 |
| % investigated within 48 hours | 93,9 | 94,2 | 91,2 | 93,1 | 91.0 | 85.7 | 94.7 | 93.3 | 92.2 | 93.3 |
| Hot cases | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| VAPP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Case-based surveillance for measles and rubella was introduced in the country after the MR SIA in 2007. The surveillance guidelines have been respectively revised, and introduction of measles and rubella surveillance module (MRSM) software is done.

The sentinel invasive bacterial diseases (IBD) surveillance project has been implemented in Uzbekistan since 2011. In 2008, the Minister of Health signed a decree on establishing the surveillance for IBD, including Spn, in the country. The sentinel surveillance in Uzbekistan is carried out based on two referral sites in the capital Tashkent and the second largest city, Samarkand. WHO European Regional Office is supporting the surveillance project.

National policy for AEFI reporting is well defined, guidelines are developed and the process for reporting is implemented. The AEFI guidelines will be updated to include information on PCV.

Several clinical studies were carried out in Uzbekistan to assess the prevalence of diseases caused by Spn in the country. The MoH plans to continue a prospective surveillance in two sentinel hospitals after introduction of pneumococcal vaccine. The MOH also plans to conduct cost-effectiveness analysis of PCV introduction prior to the beginning of vaccination.

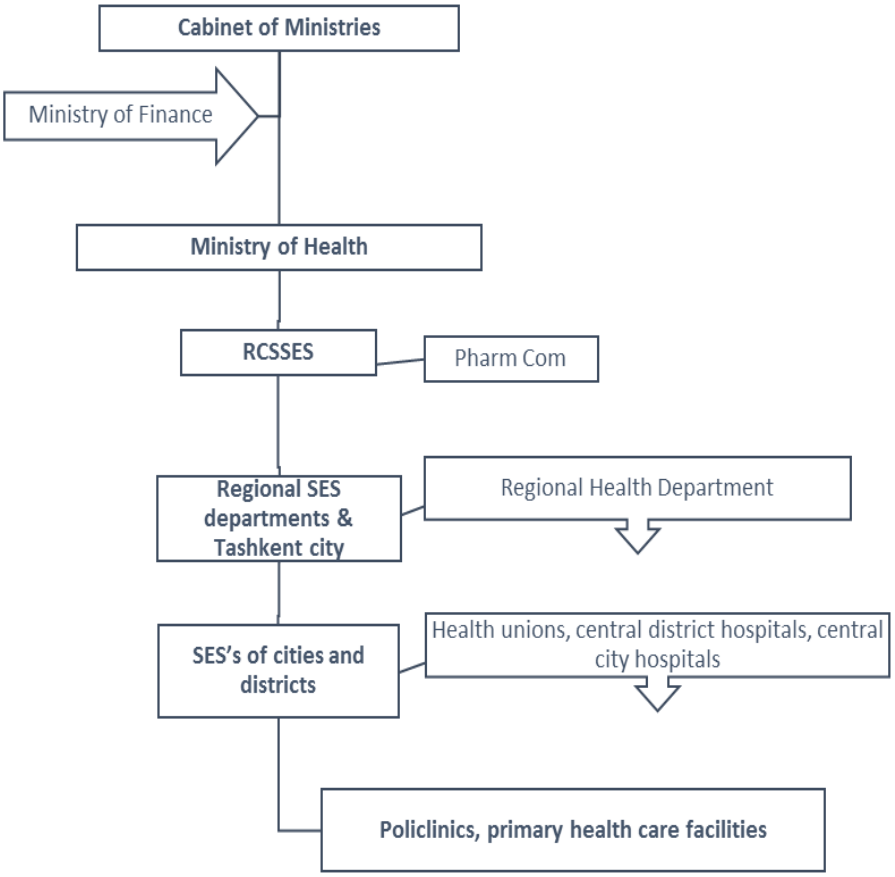
Uzbekistan RCSSES virology laboratory is certified as national reference lab for polio and MR surveillance.

## 3.4 VACCINE SUPPLY, QUALITY AND LOGISTICS (IMMUNIZATION QUALITY AND SAFETY)

### 3.4.1 Vaccine procurement system

There is legislation for public procurement established in Act no. 318. There is also an agreement in place between the MoH and UNICEF for the supply of vaccines. This initial agreement was signed in December 2006, and was renewed in March 2010. UNICEF delivered all vaccines to the MoH of Uzbekistan up to and through 2006. Since 2007, the MoH of Uzbekistan had only procured some vaccines but since 2012, they procured all vaccines themselves. The MoH procures vaccines by means of one (open) tender per year.

**Figure 9. Flowchart of vaccine procurement and distribution in Uzbekistan.**



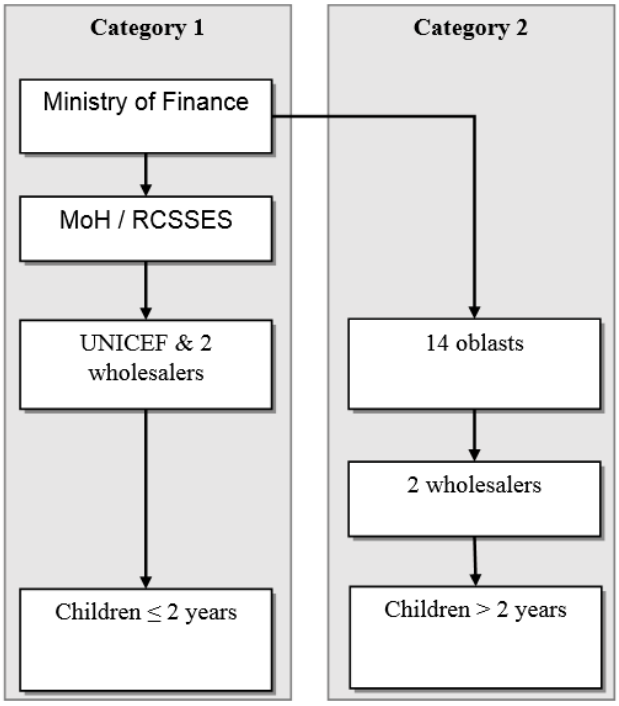

Each quarter there is an inter-ministerial coordinating committee that come together to discuss immunization issues. Meetings between RCSSES and Pharm Com occur on a regular basis to discuss daily matters and issues.

The oblasts have to procure all vaccines themselves for children over 2 years of age. The other vaccines are procured by RCSESS and supplied by UNICEF or two wholesalers: Tibbiyot Dunyosi and Grand Gross Medical.

The EPI manager is responsible for forecasting. A forecasting tool is in place. Forecasting is based on the demand and not on history. Wastage (approximately 25% for HepB) and available stock on oblast level is included in each forecast. Once a month, all oblasts have to report to the RCSSES with regard to their available stock. The definitive forecast is finalised and authorised at least before December. However, there is not an official deadline for finalising the yearly forecast.

In Uzbekistan the supply of vaccines is defined in two categories. The MoH on central level is responsible for the procurement of vaccines for children up to and including 2 years of age. On a decentralised level the oblasts are responsible for the procurement of all vaccines and other pharmaceuticals for children over 2 years of age. UNICEF is delivering some of the vaccines to the RCSSES for category 1. The RCSSES is paying in local currency (UZS) to UNICEF. First UNICEF has to agree with the concerting conditions UZS / USD and payment conditions, then delivery can take place.

**Figure 10. Vaccine financing categories**




There is a separate budget line for vaccines within the MoH, so the necessary financial resources are clearly earmarked. Release of the budget by the MoF to the MoH / RCSSES and oblasts is done every quarter (25%). This periodical release can cause some inconsistency in relation to timely ordering, supply and payment of vaccines. Sometimes this system creates situations with minimum stock (under the recommended 25% safety stock). The fiscal year in Uzbekistan runs from January 1 to January 1 of the following year and VAT is not applicable in Uzbekistan. A tender committee is present in Uzbekistan.

Timely release of the budget and available storage capacity are factors that determine how many deliveries the RCSSES can / will have during the year. UNICEF delivers 4 times per year (each quarter); the two wholesalers deliver twice per year. In case there is a lack of sufficient storage capacity, the RCSSES can use additional storage owned by one of the wholesalers “Tibbiyot Dunyasi”.

Upon arrival, the Vaccine Arrival Report of UNICEF is used for each delivery. Transportation from the Tashkent airport to the central store is done by one or two refrigerated trucks.

There are verbal agreements between RCSSES and Pharm Com (national NRA) and customs. Based on these agreements, vaccines are allowed to be taken from the customs before the clearance. This is why customs holding store is not used for vaccines. However, airport cold store can be used during the domestic air cargo services. There is no clearing agent for vaccines shipped through UNICEF procurement division. This is performed by the EPI designated staff. Staff also perform physical inventory once per month.

Temperature monitoring in the cold rooms is done by computer system established with assistance of UNICEF in 2007-2008.

All procured vaccines should be registered in the country. Each registration costs USD 3,000 per registration and has no expiry date. However, it is not compulsory that all procured vaccines are also WHO pre-qualified. The requirement of only using WHO pre-qualified vaccines should be considered to ensure and continue high quality of vaccines.

**Strengths of Vaccine procurement in Uzbekistan**

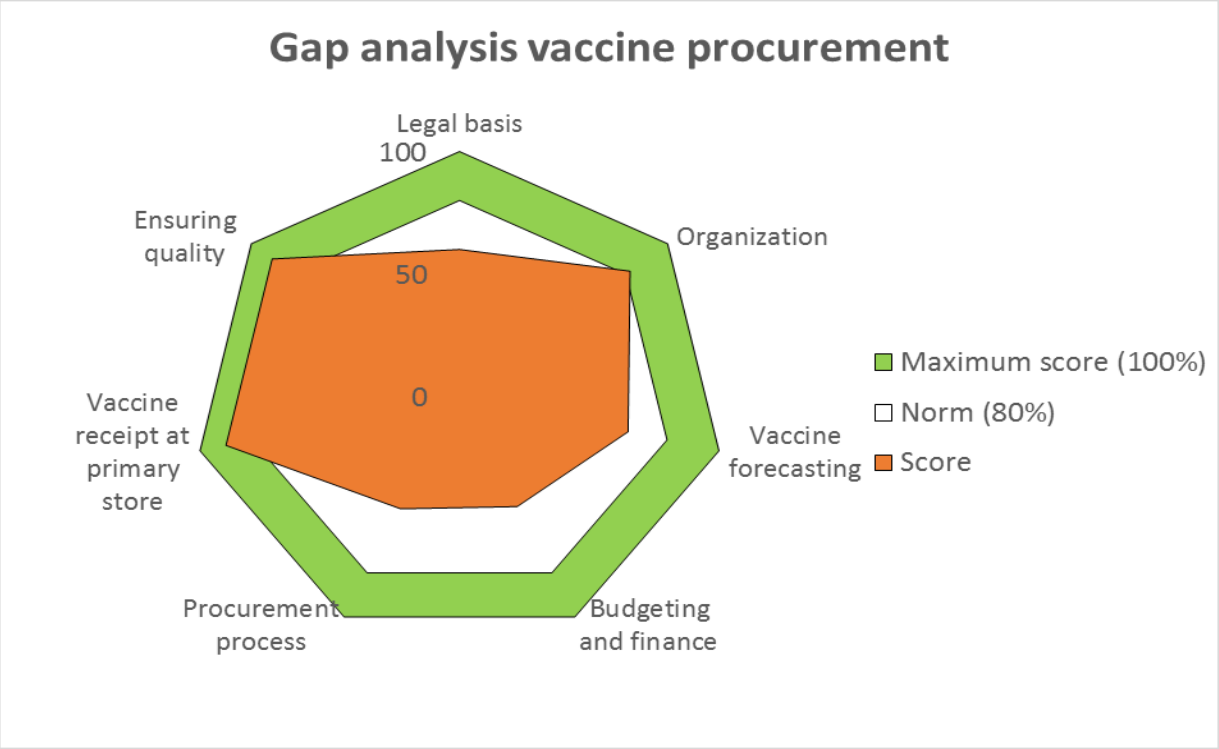
- Benefiting from procurement through UNICEF- efficient use of resources (recommendation of 2013 assessment)

- Eligible to access GAVI prices another 5 years after graduation (2019-2023)
- National procurement capacity exists and functional system
    - For purchase of non-Programme vaccines (for epidemiological indications)
- Use of WHO prequalified vaccines is a condition in self-procurement

**Challenges of Vaccine procurement in Uzbekistan**

- Government's current commitment to procure vaccines through UNICEF Supply Division may be vulnerable to potential changes
- Centralize procurement of all vaccines and supplies to improve efficient use of available resources
- Alignment of national procurement and accounting procedures with that of UNICEF's process
- Lengthy clearance procedures and unnecessary regulatory procedures
- Self-procurement of non-programme vaccines (that are not available in Supply Division's portfolio) require strengthened procurement capacity to improve its efficiency

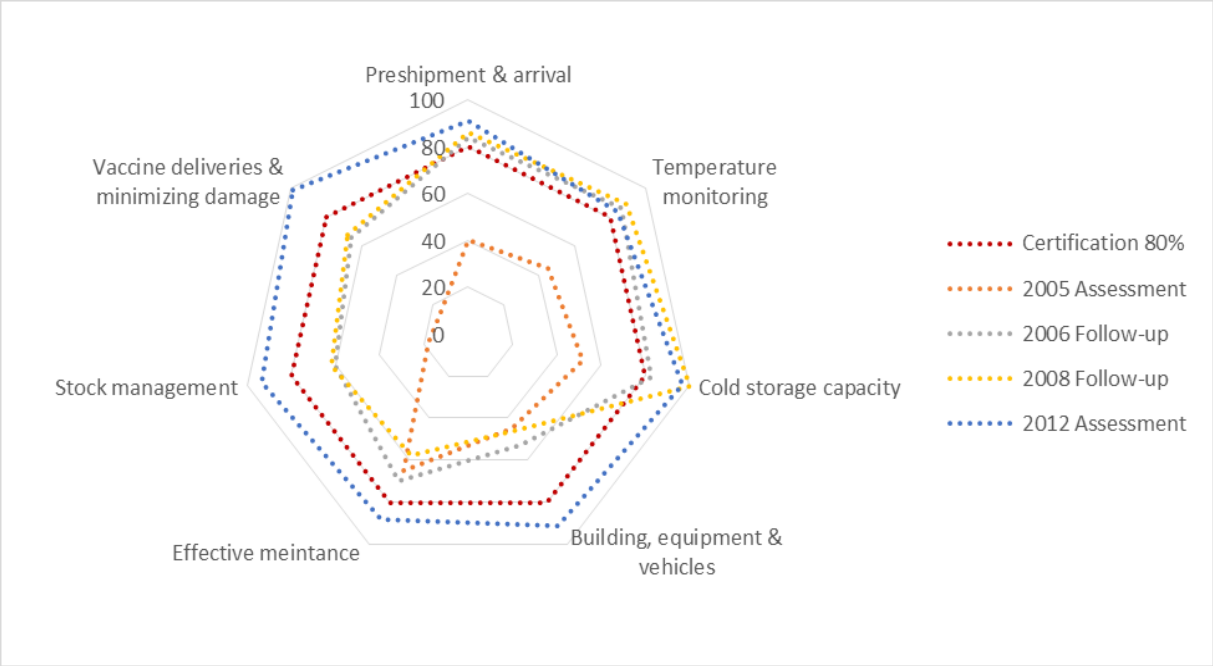
**Figure 11. Gap analysis vaccine procurement**




### 3.4.2 Vaccine store management

Latest EVM assessment was conducted in Uzbekistan in 2012. Next EVM is planning in 2015-2016. The outcomes of assessment are presented in the figure below:

**Figure 12. Vaccine storage management evaluation outcomes (EVM), 2012**




### 3.4.3. Waste management and disposal

Sharps waste, which is generated during immunization activities, is handled distinctly from other risk waste. For example, the waste is not disinfected by chloride solution but disposed of without any further handling in the sharps containers.

In order to meet the GAVI requirements the MoH has developed specific guidelines at country level for the destruction of the syringes in the framework of the EPI. These guidelines include: 1) a specific procedure for collecting syringes directly into safety boxes without removing or recapping needles, 2) the incineration of the syringes (plus needles) in the HCF (either in rural or in urban areas) at specially chosen places and burying the remnants in special refuse pits. These guidelines were formalized in the decree Order N° 107 issued on March 23rd, 2001.

One objective of the GAVI application was the installation of 223 “De Montfort” incinerators in all central and urban hospitals until the end of 2008 to dispose of HCW. Within the Immunization Programme of UNICEF (2002) a pilot project was conducted and 25 incinerators were built in 2 provinces (Karakalpakstan republic, Khorezm province) in 2002-2003 with UNICEF assistance. Two small scale incinerators were built in 1 province in 2001 with SDC assistance.

The sharps boxes are made of cardboard and are delivered together with vaccines and are incinerated (together with infectious waste).

The waste is disposed of through open air burning in rural areas and centralized incineration in urban areas where possible.

### 3.4.4 National Regulatory Authority

The following laws, regulatory acts and orders compose the legal-regulatory basis for national regulation system:

Law of the Republic of Uzbekistan #393 26.08.2015 “About sanitary-epidemiological wellness of population”

Law «About Drugs and Pharmaceutical Activity» (April 1997) with amendments and additions (April 1999)

Law of the Republic of Uzbekistan «About Licensing of Certain Types of Activities», 25 May 2000;

Law of the Republic of Uzbekistan as of 28 December 1993 «About Certification of Products and Services»;

Decree of the Cabinet of Ministers of the Republic of Uzbekistan, 6 July 2004, № 318 «About Additional Measures on Simplifying Production Certification Procedure»;

Decree of the Cabinet of Ministers of the Republic of Uzbekistan, 5 December 2002, № 427 «About Realization of Measures on Improvement of Consumer Commodities Import to the Republic Uzbekistan»;

Decree of the Cabinet of Ministers of the Republic of Uzbekistan as of 7 May 2008, №90 «About Introduction of Ammendments as well as Recognizing some Decisions of the Governemnent of the Republic of Uzbekistan Stale (Decree of the President of the Republic of Uzbekistan as of 27 March 2008, N ПП-823 “About Further Measures on Regulating Foreign-economic activity of the Republic of Uzbekistan”) »;

«Rules for Products Certification» registered by the Ministry of Justice of the Republic of Uzbekistan» as of 18 March 2005, N 1458;

«Rules for Certification by Separate Types of Homogenous Products Required for Compulsory Registration», approved by the order of the Director General of the Agency “Uzstandard" on 07.09.2005, N 340, registered by the Ministry of Justice of the Republic of Uzbekistan as of 28.09.2005, N 1513;

«Rules for Inspection Control of Certified Products and Services», approved by the order of Director General of the Agency "Uzstandard" as of 1 February 2005, N 24-П;

Order of the Main Department on Quality Control of Drugs and Medical Products MoH RUz №01-19 as of 18.08.1999 «About Improvement of Work on Quality Control of Medical Immunobiologicals»

Order MoH RUz №566 as of 31.10.2000 «About Registration of Medical Immunobiologicals and Their Application in Medical Practice»

Order MoH RUz №29/51 as of 20.11.2000 «About Improvement of Work on Quality Control of Medical Immunobiologicals»

Methodical Guidelines «Construction, Content and Exposition of Pharmacopeia Articles Related to Medical Immunobiologicals»

«Construction and Exposition of Specifications for Medical Immunobiologicals»

Guiding document «Manufacturing and Control of Medical Immunobiologicals for Quality Assurance». РД 42-06:2008

About Measures on Improvement of Immunoprophylaxis of Infectious Diseases and Introduction of Surveillance System for Adverse Events Following Immunization. Order of MoH Uz № 759, December 1999

Sanitary norms and regulations #0239-07 for Organization and Conduction of Immunoprophylaxis of Infectious Diseases in the Republic of Uzbekistan (SanPiN), approved by the Chief Sanitary Doctor RUz (2013).

In 1995 by the Order MoH Uz the Main Department on Quality Control of Drugs and Medical Equipment was established in the MoH. Within the Department, the State Center for Drug Expertise and Standardization was established including four experimental laboratories (three of which participate in vaccine control) as well as Certification Authority and Pharmacological and Pharmacopiea committees. These subdivisions are involved into vaccine registration. Laboratory of Vaccines, Sera and Microbiological Research is responsible for vaccine control during registration. Pharmacopeia Committee provides expertise of regulatory document (requirements for vaccines and appropriate control measures) and considers control findings of vaccine lot presented for registration. Pharmacopeia Committee sends its conclusion to the Pharmacological Committee. MIB Commission of Pharmacological Committee considers

materials of pre-clinical and clinical vaccine researches, conclusion of Pharmacopeia Committee as well as control findings of vaccines are presented for registration and at the conclusion sent to the Expert Council of the MoH RUz. Based on its recommendations MoH RUz registers vaccines.

Certification Authority certifies (controls) each lot of vaccine imported and produced in Uzbekistan under the Law about Drugs and the Law about Certification and on the basis of control findings obtained from experimental laboratories of the State Center for Drug Expertise and Standardization. Issuance of certification is a ground for vaccine import. A separate permit for vaccine lot release is not issued, and thus consolidated protocol of vaccine manufacturing and control is not considered. The Licensing Department under the MoH licenses medical activity.

Investigation of adverse events following immunization is under responsibility of Immunoprophylaxis Department of the Republican State Center of Sanitary and Epidemiological Surveillance (RSCSES).

## 3.5 PROGRAMME MANAGEMENT

National Immunization Program as part of wider surveillance and prevention of activities is overall managed by the Deputy Minister of Health, Chief Sanitary Doctor of Uzbekistan. The day-to-day management is implemented by a NIP Manager who is the Lead specialist in the Chief Department of State Epidemiological Surveillance of the MOH.

Surveillance, vaccine procurement, storage and distribution are being implemented by RCSSES through networks of CSSES branches in each province and district. The head epidemiologists in provincial and district RCSSES act as local EPI managers. RCSSES has cold stores at each level.

Administration of vaccines is implemented by the staff in health facilities who report to the MCH department or Curative department of MOH.

The **Interagency Coordinating Committee** (ICC) represents an essential body to coordinate the support of all agencies involved in the National Immunization Program. The ICC is chaired by the Deputy Minister of Health, Chief Sanitary Doctor of Uzbekistan. The ICC includes lead officials from the MOH, representatives of major academic and research institutions and representatives of major international partners in health: WHO, UNICEF, USAID, the World Bank, JICA, TIKA. Unfortunately, due to the limited presence of international donors in Uzbekistan or their limited interest in immunization issues, the international partners are really underrepresented in ICC and only WHO and UNICEF participate in all meetings.

## 3.6 GENERAL OBSERVATIONS OF IMMUNIZATION PROGRAM IN UZBEKISTAN

### 3.6.1 Strengths

- Strong political commitment to and prioritization of the national immunization programme
- Equitable access to vaccines – free of charge vaccinations provided by public services
- Most essential functions of the NIP are in place and kept centralized
- National Immunization Technical Advisory Group (NITAG) established
- Sustained polio-free status and, significant progress toward measles and rubella elimination goal
- Sustained efficiency through procuring UNICEF (significant savings)
- Successful expansion of the Programme (currently with 11 antigens, soon with PCV and HPV antigens)
- Strong collaboration with partners

### 3.6.2 Challenges

- Future financial requirements for the Programme require intensified and effective communication to all decision-makers (stakeholders)
- Private immunization services pose a threat to equitable access
- Vaccine management at national, provincial, district and facility level requires significant improvement (prior to introduction of HPV)
- Procurement of supplies (syringes & safety boxes) require full centralization
- Further upgrade and expansion of e-health (disease surveillance) system is required by adding immunization and vaccine & supply stock management module, to maximize the benefits of an immunization programme. Critical operations of the NIP being underfunded and dependent on decreasing donor support (training, supervision, monitoring, surveillance)
- Collaborative procedures (expedited review) for registration of WHO prequalified vaccine is not in place

## 3.7 JOINT APPRAISAL PROCESS

The Joint Appraisal was conducted from 14th to 23rd September 2015 together with the Gavi graduation and national regulatory authority assessments. During the mission, participants from Gavi Secretariat, WHO Regional Office for Europe, UNICEF Supply Division and Sabin Institute met with representatives of the Ministry of Health, Republican Center for State Sanitary Epidemiological Surveillance (RCSSES), Cabinet of Ministers (Department of Social Services), Ministry of Finance (Department of Health Services), the World Bank Country Director and Health Officer, the acting Head of the WHO Uzbekistan office, UNICEF country office Representative, health and procurement officers, the Social Services Committee of the Parliament, Directorate for Pharmaceuticals and Medical Equipment Quality Control (NRA), Manager and representatives of the National Immunization Program. Based on the discussions during the mission and relevant background documents, the Joint Appraisal report was drafted by an independent technical expert in close cooperation with GAVI SCM. The findings and recommendations were discussed with the Deputy Minister of Health and ICC members during a meeting held on 22nd September 2015.

### 3.7.1 Technical Assistance: current activities and agency responsibilities

WHO and UNICEF Country Offices: During Jan 2014-Aug 2015, Uzbekistan received technical assistance from the WHO on the following:

1. Preparatory work for rotavirus vaccine introduction: capacity for health managers, health professionals and vaccination nurses at all levels, revision of reporting and recording forms, including training of updated reporting.
2. National conference on rotavirus vaccine introduction with participation of international experts
3. Technical support and provision of supplies to new vaccine (IBD and Rota) surveillances, including peer review visits by surveillance staff from other countries in the network
4. Technical support and provision of supplies for rotavirus vaccine effectiveness study.
5. Rotavirus vaccine post-introduction evaluation (PIE)
6. Workshop on immunization financing and immunization
7. Capacity building activities for NITAG members through participation in regional meetings
8. Participation in regional technical advisory group and program managers meeting, both from EPI and NITAG side
9. Comprehensive cold chain inventory study

10. Monitoring of implementation of prior recommendations
11. Preparatory work for PCV and IPV vaccines introduction
12. Development of the national plan on bOPV switch
13. Sub-regional workshop on vaccine risk management and risk communication
14. EVM assessment and development of improvement plan (planned for November 2015)
15. Work with NRA and MOH on implementation of expedited licensure of pre-qualified vaccines

During the same period, the country received technical assistance from the UNICEF on the following

16. Facilitation of the vaccine forecast and procurement process;
17. Preparatory work for PCV introduction,
18. Adaptation of WHO's Safe Immunization training modules and approving it as official teaching textbook;
19. Printing of the Safe Immunization textbook
20. ToT in 9 medical universities on Safe Immunization textbook
21. In-service training of 1 000 GPs on Safe Immunization
22. Provision of supplies to the offices of province level EPI managers

Sabin Vaccine Institute

23. Support for advocacy effort to achieve sustainable financing: documenting immunization budget planning and execution processes and assessing sources of immunization financing; mapping stakeholders and developing stakeholder-specific messages related to immunization financing
24. Strengthen immunization legislation: reviewing literature on immunization-related laws and regulations; developing minimum set of legislation provisions (in collaboration with WHO); reviewing immunization-related legislation as needed
25. Establish relations with national counterparts in Parliament, MoH and MoF (2015)

### 3.7.2 Future Needs

The key future priorities for Uzbekistan as reported by the country in the 2014 APR and redefined during the joint appraisal, are:

**Short-term (remainder of 2015):**

1. IPV vaccine introduction (revision of regulatory documents, development of training and communication and social mobilization materials, conducting national and regional workshops, trainings of HCWs and academic staff) – being implemented in 2015
2. EVM assessment
3. Support for cold chain equipment and procurement

**Medium- to long-term (2016-2017):**

4. Proposal development for Gavi's CCE Platform opportunity
5. TA during switch from tOPV to bOPV
6. Conducting PCV PIE – scheduled for Q4 2016
7. Support for financial planning and management for coming years to ensure sustainability
8. Support to MoH for advocacy and resource mobilization for immunization financing

9. Improve NRA functionality, integrate expedited review of WHO pre-qualified vaccines
10. Strengthen NITAG
11. Improve AEFI surveillance
12. Work on improvement of legislation for immunization and vaccine procurement.
13. Assist country for procurement of new cold chain equipment
14. Provide technical assistance to improve the cold chain system and introduction of new technologies to improve its efficiency.
15. Provide further support on quality of services
16. Support MoH in development of comprehensive national plan on cervical cancer prevention and control, including development and costing of national cervical cancer screening strategy, conducting HPV vaccine cost-effectiveness study, and integration of HPV vaccination with other adolescent health intervention.
17. Engage national counterparts in peer-to-peer, inter-institutional work to review and update existing immunization-related legislation (based on the assessment findings)

Based on above (medium-to-long term) priorities and key recommendations, the technical assistance areas and activities listed below have been proposed. Detailed list of activities for the next two years – 2016/2017 – (that require technical assistance), together with intended outcome/s, indication of the implementing agency (potential provider), modality and potential sources of funding, is provided is provided in Annex D.

| | |
|---|---|
| Immunization financing & resource mobilization | **WHO:**<br>• Training of key staff on immunization financing and monitoring performance on immunization financing<br>• Training staff on resource mobilization and development of a resource mobilization action plan<br>• Develop advocacy materials for resource mobilization (to communicate benefits of immunization, impact of vaccination, etc.)<br>• Monitor implementation of resource mobilization action plan and report on progress achieved<br><br>**UNICEF:**<br>• Follow up to the results of PFM systems analysis, building capacity at system level to produce/secure better outcomes in MCH, nutrition and immunisation<br><br>**Sabin Vaccine Institute**:<br>• Develop parliamentary network and engage parliamentarians in immunization advocacy, budget oversight and development immunization-related legislation as needed<br>• Engagement of national institutional counterparts (Parliament, MoH and MoF) with local NGOs and think tanks in joint advocacy activities for immunization financing<br>• Conduct peer exchanges and regional workshop on immunization-related legislation to facilitate the collaboration between national counterparts and their international peers |

| | |
|---|---|
| Vaccine procurement | **UNICEF**:<br>• Conduct external review of vaccine procurement practices to identify areas for improvement for efficiency increase<br>• Continued capacity building in (self) procurement<br>• Conduct orientation workshop on procurement procedures with support of UNICEF SD<br><br>**WHO:**<br>• Develop national guidelines to facilitate and streamline clearance and regulatory procedures for procurement<br>• Review legislation and budgetary procedures to centralize procurement of all vaccines and supplies |
| Evidence-based decision-making | **WHO:**<br>• Continued capacity building support to NITAG members (participation in regional meetings, visit to other NITAGs to exchange knowledge and experiences)<br>• Expand disciplines engaged in NITAG (including social & behavioural sciences, health economics)<br>• Develop national communication strategy and plan for HPV vaccine introduction<br>• Conduct a HPV vaccine cost effectiveness study<br>• Conduct a study to investigate possibilities to integrate HPV vaccination with other adolescent health interventions<br>• Development of comprehensive national plan for prevention and control of cervical cancer<br>• Conduct IPV PIE and provide technical assistance in switching to b-OPV<br>• Document impact of rotavirus and pneumococcal vaccines<br>• Provide continued technical assistance and supply support to both new vaccine sentinel surveillance networks<br>**UNICEF**:<br>• KAP Study on Nutrition Practices and Demand and coverage for immunization |
| Programme performance | **WHO:**<br>• Address false contraindications and hesitation to administer vaccines simultaneously through capacity building activities<br>• Conduct qualitative study to better understand reasons for vaccine refusals and hesitancy and tailor immunization programme according to needs of un- and under-vaccinated<br>• Conduct MLM training to rayon level and IIP training to facility level staff<br>• Assess and revise medical and nursing curricula according to needs of the NIP<br>• Provide support to implementation of quarterly supportive supervision<br>• Review legal provisions on immunization (scattered in current legislative documents) and advocate for introduction of consolidated provisions through the new public health law in the pipeline, if any.<br>• In country immunization/technical officer to support the program management during critical transition processes (can be housed in the MoH or the Country office)<br><br>**UNICEF:**<br>• Conduct MLM training to rayon level and IIP training to facility level staff |

| | |
|---|---|
| | • Assess and revise medical and nursing curricula according to needs of the NIP |
| Data quality | **WHO:**<br>• Conduct (external) data quality review to assess areas for improvement<br>• Conduct capacity building in improving target population estimates<br>• External support to review immunization module of the e-health under design<br>• Provide support to development of analytical functions and data visualization by use information technologies.<br>• Provide support to development of vaccine stock management module.<br>• Provide support to implementation of home-based vaccination cards in line with WHO recommendation.<br>• Provide technical support to introduce electronic immunization registries |
| Communication & social mobilization | **WHO:**<br>• Conduct communications review<br>• Finalize communication strategy and plan<br>• Finalize vaccine safety risk and crisis communication plan<br>• Provide technical assistance in design and software development and restore /improve immunization website (upgrade software)<br>• Support to development and printing of key communication materials<br>• Support in conducting communication activities, including to key staff (including spokespersons) on communications<br>• Provide in-country training on crisis communication<br>• Provide training to media staff<br>• Develop communication strategy and messages for HPV introduction<br><br>**UNICEF:**<br>• Community mobilization towards acceptance of new vaccines<br>• Support to development and printing of key communication materials<br>• Support in conducting communication activities |
| Vaccine management & logistics | **WHO:**<br>• Provide technical assistance to institutionalize best vaccine management practices<br>• Perform a cold-chain temperature monitoring study in accordance with WHO guidelines<br>• Perform temperature mapping study of cold rooms<br>• Provide technical assistance to strengthen temperature monitoring in vaccine cold chain and procurement of continuous temperature monitoring devices for critical levels<br>• Provide technical assistance to strengthen immunization logistics information system and data management<br>• Conduct cold chain inventory review and needs assessment (calculation of cold chain storage capacity required to accommodate and deliver vaccines and supplies).<br>• Provide support to adopt national policy for vaccine stock management, including safety stock at each level of the chain.<br>• Provide support to development of a quality management policy.<br>• Upgrade cold chain infrastructure within the HSS framework and support for application to Gavi's CCE platform.<br>• Provide support to revision and update of multi-dose vial policy for all relevant vaccines.<br>• Provide support to development of standardized supervisory tools |

| | |
|---|---|
| | and SOPs for each level.<br><br>**UNICEF:**<br>• Facilitate the process of procurement of cold chain devices in the framework of HSS implementation (and potentially via CCE platform) |
| Vaccine regulations & AEFI surveillance system | **WHO:**<br>• Introduce market authorization procedures for programme vaccines<br>• Introduce expedited review procedures for registration of WHO pre-qualified vaccines<br>• Strengthen national capacity through inter-country platforms (sub-regional workshops)<br>• Conduct assessment of the AEFI surveillance system;<br>• Revise AEFI surveillance system in line with assessment recommendations<br>• Update the national AEFI surveillance guidance and tools according to WHO recommendations (including roles, responsibilities, reporting, definitions, data standards, forms)<br>• Establish a national independent committee for AEFI causality assessment;<br>• Familiarize health staff with WHO recommendations on AEFI surveillance system (through a sub-regional workshop)<br>• Train key field staff on revised procedures<br>• Provide TA to establish an AEFI electronic database to facilitate notification, access to and use of case based data<br><br>**UNICEF:**<br>• Advocate for soonest adoption expedited review procedures for registration of WHO pre-qualified vaccines |

# 4. IMMUNIZATION PROGRAMME STRATEGIES AND KEY ACTIVITIES

Strategies and key activities necessary to achieve the above-mentioned objectives are presented in table below:

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| **Sustaining polio-free status** | | | | | | | | |
| Risk of wild polio virus importation | Maintaining polio-free status; through 98 % coverage for OPV3 at national and 97% at each district level, sustaining AFP rate of 1/100000 under 15 years and providing supplemental vaccination to susceptible populations, if needed | Enhancing surveillance for polioviruses to rapidly detect any importation (epidemiological and laboratory) | Review national AFP surveillance guidelines in line with WHO recommendations | x | | | | |
| | | | Conduct refresher training on AFP surveillance to major reporting site staff (on case definition and reporting procedures, including zero reporting) | x | x | | | |
| | | | Supply lab reagents, kits and equipment for polio analysis (WHO) | x | x | x | x | X |
| | | | Conducting studies for environmental surveillance for Enteroviruses | x | x | x | x | X |
| | | Improving routine OPV coverage at national, regional, district levels with special focus on increasing timely vaccination and decreasing drop-out rates and implementation of false contraindications | Ensuring proper supply and delivery of OPV to avoid stock-out problems | x | x | x | x | X |
| | | | Training vaccination staff with special emphasis on timely vaccination, true contraindications, implementation of RED strategies, communications with parents, reporting procedures, micro-planning issues | x | x | x | x | x |
| | | | Revision of national guidelines in line with WHO recommendations | x | | x | | |
| | | | Conduct Supportive Supervisory visits to low performance areas | x | x | x | x | x |
| | | | Analyze the results of immunization performance to identify high risk and low performing areas at each level (regional and district). | x | x | x | x | x |
| | | | Monitoring vaccination coverage at district and facility level in line with RED strategies | x | x | x | x | x |
| | | | Increasing frequency of immunization sessions to reduce missed opportunities | x | x | x | x | x |
| | | | Provision of regular feedback on vaccination coverage to sub-national levels | x | x | x | x | x |
| | | | Improving information technology capacity at national and regional level to improve performance of coverage monitoring, analysis and reporting/feedback functions | x | | x | | x |
| | | | Preparing and distributing posters targeting health facility staff, reminding true contraindications | x | | x | | x |
| | | | Preparing and distributing posters targeting parents, reminding vaccination schedule and providing information on vaccine safety to increase demand for vaccination | x | | x | | x |
| | | Improving active surveillance | Conduct training for district epidemiologists with focus on active surveillance | x | x | | | |

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| | | | Conduct regular active surveillance to major reporting sites (with special focus to high risk / silent areas) | x | x | x | x | x |
| | | | Conduct supportive supervision to district epidemiologists | x | x | x | x | x |
| | | Arising awareness of reporting site staff | Refresh knowledge of hospital staff on AFP surveillance | x | | | | |
| | | | Provide feedback to district level and reporting sites on AFP surveillance | x | x | x | x | x |
| | | Providing additional vaccination opportunity to children at increased risk | Conducting polio supplementary immunization activity for children under 5 years of age, in areas or populations groups at increased risk for importation (if necessary) | x | x | x | x | x |
| **Measles and Rubella elimination and congenital rubella infection control** | | | | | | | | |
| No actual CRS surveillance, underreporting of cases, poor implementation of case-based surveillance | Achieve verification of measles, rubella and CRS elimination, through coverage above 95% with two doses of MMR vaccine sustaining at least 2 suspected cases per 100,000 | Strengthening lab based measles and rubella surveillance | Continue providing regular (international) training for lab staff | x | | | | |
| | | | Continue supplying lab reagents and kits for measles-rubella analysis | x | x | x | x | x |
| | | | Designate staff for specimen collection and transportation at regional level | x | x | x | x | x |
| | | | Provide additional funds and resources for specimen transportation to national measles lab | x | x | x | x | x |
| | | | Retrain designated staff for case investigation | x | x | | | |
| | | | Train facility staff in line with revised national guidelines | x | | x | | x |
| | | | Revision of national guidelines in line with WHO recommendations | x | | x | | |
| | | | Train district epidemiologists on active surveillance | x | | x | | x |
| | | | Conducting supervisory visits to regional and district levels | x | x | x | x | x |
| | | | Provision of regular feedback on MR and CRS surveillance to sub-national levels | x | x | x | x | x |
| | | Strengthening measles and rubella case-based surveillance | Introduction of MRSM software for use at national and province levels | x | | | | |
| | | | Conduct training for staff on MRSM | x | | | | |
| | | | Conduct active surveillance at reporting sites | x | x | x | x | x |
| Accumulation of susceptible population | | Catch-up supplementary immunization activity | Conducting SIA for susceptible groups | x | | | | |
| Low routine coverage MCV2 | | Improving routine MMR coverage at national, regional, district levels with special focus on | Ensuring proper supply and delivery of MMR vaccine to avoid stock-out problems | x | x | x | x | x |
| | | | Training vaccination staff with special emphasis on timely vaccination, true contraindications, implementation of RED strategies, communications with parents, reporting procedures, micro-planning | x | | x | | x |

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| | | increasing timely vaccination and decreasing drop-out rates and implementation of false contraindications | issues | | | | | |
| | | | Revision of national guidelines in line with WHO recommendations | x | | x | | |
| | | | Monitoring vaccination coverage at district and facility level in line with RED strategies | x | x | x | x | x |
| | | | Conducting supervisory visits to regional and district levels (using unified supervisory checklists) | x | x | x | x | x |
| | | | Provision of regular feedback on vaccination coverage to sub-national levels | x | x | x | x | x |
| | | | Improving information technology capacity at regional level to improve performance of coverage monitoring, analysis and reporting/feedback functions | x | | x | | x |
| | | | Preparing and distributing posters targeting parents, reminding vaccination schedule and providing information on vaccine safety to increase demand for vaccination | x | | x | | |
| **Elimination of diphtheria** | | | | | | | | |
| Accumulation of susceptible population due to insufficient coverage in-schools | Elimination of diphtheria | Improving routine Pentavalent(DTP-HIB-Hep B), DTP, DT, Td coverage at national, regional, district levels with special focus on increasing timely vaccination and decreasing drop-out rates and implementation of false contraindications | Ensuring proper supply and delivery of Pentavalent, DTP, DT, Td vaccines to avoid stock-out problems | x | x | x | x | x |
| | | | Training vaccination staff with special emphasis on timely vaccination, true contraindications, implementation of RED strategies, communications with parents, reporting procedures, micro-planning issues | x | | x | | |
| | | | Revision of national guidelines in line with WHO recommendations | x | | x | | x |
| | | | Monitoring vaccination coverage at district and facility level in line with RED strategies | x | x | x | x | x |
| | | | Provision of regular feedback on vaccination coverage to sub-national levels | x | x | x | x | x |
| | | | Improving information technology capacity at regional level to improve performance of coverage monitoring, analysis and reporting/feedback functions | x | | x | | x |
| | | Providing additional dose of diphtheria containing vaccine to susceptible age groups | Evaluation of seroconversion against diphtheria, to assess the risk of diphtheria cases by reducing the immunized and accumulation of susceptible contingent in all regions of the Republic | x | x | | | |
| | | | Provide guidance and methodological assistance local governments to in relation to the risk of diphtheria cases and deciding on vaccination of the population at risk | x | x | | | |
| | | | Provide an assist to local governments in the selection and providing of vaccination against diphtheria | | x | x | x | x |
| | | Improve performance of diphtheria | Conduct refreshing training to district level staff on diphtheria control | x | | | | |

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| | | surveillance to enable lab confirmation of all suspected cases | | | | | | |
| **New and underutilized vaccines introduction** | | | | | | | | |
| Accumulation of susceptible population | Expand national immunization programme through introduction of new and underused vaccines | Provide additional immunological protection for population | Submit application to GAVI, conduct assessment of cold-chain capacity, obtain commitment of the government for co-financing | x | x | x | x | x |
| | To immunize infants with 3 doses of PCV vaccine attaining 95% coverage at the national level with at least 90% coverage at the district level | Pneumococcal vaccine introduction | Review and revise national guidelines for vaccination in line with WHO recommendations on the introduction of pneumococcal vaccine | x | | | | |
| | | | Conduct regular training of staff at regional and district levels for HPV vaccination | x | | x | | x |
| | | | Insure the necessary capacity of the national system of vaccination in connection with the introduction of new vaccine (supplement additional cold chain equipment to increase the storage space, providing the necessary supplies of vaccine for the vaccination centers, injection safety, waste disposal and etc.) | x | x | x | x | x |
| | | | Strengthening the monitoring and surveillance system, and establishing of vaccination effectiveness assessment | x | | x | | x |
| | | | Strengthening surveillance for invasive bacterial diseases (providing reagents and laboratory supplies, training of personnel) | x | x | x | x | x |
| | To immunize adolescent girls of 12 years of age with 3 doses of HPV vaccine achieving at least 90% coverage at both national and province levels and at least 80% coverage at the district level by the end of 2018 and increase to 95% coverage at both national and province levels and at least 90% coverage at the district level from 2019 and further. | Introduction of human papilloma virus vaccine | Review national vaccination guidelines in line with WHO recommendations on introduction of HPV vaccine | x | | x | | |
| | | | Insure the necessary capacity of the national system of vaccination in connection with the introduction of new vaccine (supplement additional cold chain equipment to increase the storage space, providing the necessary supplies of vaccine for the vaccination centers, injection safety, waste disposal and etc.) | x | | | | |
| | | | Conduct refreshing training to district level staff on HPV vaccination | x | | x | | |
| | | | Strengthening school-based immunization (training, outreach work with school children and their parents, providing evident materials) | x | | x | | x |
| | | | Strengthening the monitoring and supervision system | x | | x | | x |
| | | | Strengthening surveillance and comprehensive prevention program | x | | x | | x |
| | | | Preparing and distributing posters targeting parents, reminding vaccination schedule and providing information on vaccine safety to increase demand for vaccination | x | | x | | x |
| Threat of | Reducing the number | Improving and | Ensuring constant stock vaccines against tetanus and rabies | x | x | x | x | x |

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| distribution especially dangerous communicable diseases | of deaths from rabies and tetanus | maintaining the of working capacity of rabies and anti-tetanus aid at primary and secondary health care levels | Conduct regular training of staff at regional and district levels to maintain awareness against rabies and tetanus | x | x | x | x | x |
| | | | Revision of national guidelines in the line of the existing and updated WHO guidelines, and development of guidelines and SOPs in relation to application of vaccine against tetanus and rabies | x | | x | | x |
| | | | Continuous monitoring and control of accuracy and timeliness of application of vaccine against tetanus and rabies | x | x | x | x | x |
| The presence of susceptible population at risk of anthrax | Reducing the number of cases of anthrax among risk groups | Providing of immunization of risk groups against anthrax. | Ensuring proper supply and delivery of anthrax vaccine to avoid stock-out problems | x | x | x | x | x |
| | | | Detection and vaccination of risk groups | x | x | x | x | x |
| | | | Conducting regular visits to monitor accuracy and timeliness of application of vaccine against anthrax | x | x | x | x | x |
| | | | Analysis of the results of the immunization, to identify areas with high risk and low coverage (at the regional level and districts). | x | x | x | x | x |
| Presence of risks and consequences associated with the eventual withdrawal of the type 2 component of OPV (OPV2) | 98 % coverage for OPV3 at national and 97% at each district level | Introduction of one dose of inactivated polio vaccine (IPV) in national routine immunization programme | Review national vaccination guidelines in line with WHO recommendations on introduction of IPV | x | | | | |
| | | | Insure of necessary capacity of national vaccination system in connection with introduction of new vaccine | x | x | | | |
| | | | Conduct refreshing training to district level staff on polio vaccination | x | | x | | x |
| The high prevalence of hepatitis A | 100% coverage of vaccination against HAV preschool children | Increasing the number of vaccinated at the non-government expense | Enhancing access to the vaccine against HAV, development of competition and reducing the cost of vaccination by increasing number of private vaccination centres | x | x | x | x | x |
| | | | Advocacy among the population about the necessity vaccination against HAV, consequences and benefits of vaccination through performances on the media and distribution of posters and leaflets. | x | x | x | x | x |
| | | Providing of state support for vaccination against HAV | Development of a national program of vaccination against HAV population at risk and socially unprotected populations. | x | x | x | x | x |
| The necessity of a sufficient evidence base for decisions on the introduction of | Provide evident based data on vaccine introduction foundation and effectiveness | Conducting research to provide data on the epidemiological and financial | Conduct evaluation of Hib-containing vaccine introduction in 10 years after the vaccine is introduced. | x | | | | |
| | | | Provide activities on obtaining of evidence based data on economic burden and effectiveness of HPV vaccination | x | | | | |
| | | | Conduct active hospital based surveillance among children under 5 with acute gastroenteritis in two sentinel sites aimed to detect of rotavirus | x | x | x | | |

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| new vaccines | | burden of the disease with the aim of making decisions on the introduction of new and underused vaccines, as well as the maintenance of financial sustainability of vaccines | prevalence | | | | | |
| | | | Enhance of active hospital based surveillance among children suspected of meningococcal infection | x | x | x | | |
| **Routine immunization** | | | | | | | | |
| 20% of districts have DTP3 coverage below 95% | Ensure >95% coverage at sub-national and >98% coverage at national level | Implement RED strategies | Update micro planning figures at least twice a year | x | x | x | x | x |
| | | | Organize mobile sessions in the hard to reach areas at least 4 times a year. | x | x | x | x | x |
| | | | Conduct outreach immunization sessions in each district | x | | x | | |
| | | | Implement AEFI and coverage surveillance protocols for hard to reach areas | x | x | x | x | x |
| | | | Conduct advocacy sessions with community leaders to increase immunization uptake | x | x | x | x | x |
| | | Improving human resource management for immunization programme | Make inventory of human resource needs for programme management at all levels and delivery of services at facility level | x | | | | |
| | | | Ensure availability of enough staff to manage and deliver the programme (especially, epidemiologists at district and medical doctors at health facility level in remote areas) | x | | | | |
| | | | Conduct training of supervisors and inspectors to improve their supervisory skills | x | | x | | x |
| | | | Conduct regular supervision and monitoring | x | x | x | x | x |
| | | | Monitor performance and effectiveness of supervision | x | x | x | x | x |
| | | | Ensure quarterly RED reporting to WHO/EURO | x | x | x | x | x |
| | | | Conduct coverage survey (DHS) | x | x | x | x | x |
| | | Improve qualification of programme staff | Provide training to national, regional and district level programme managers on MLM/RED module of WHO to improve programme management capacity especially at marz and district levels | x | | x | | x |
| | | | Provide training to health facility level staff on IIP/RED module of WHO | x | | x | | x |
| | | Increase availability of immunization | Increase frequency of immunization sessions through introduction of less dose vials and investing in cold chain infrastructure in remote facilities | x | x | x | x | x |
| | | | Increase frequency of outreach services through providing additional | x | x | x | x | x |

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| | | services delivery | staff and transportation facilities and better micro-planning | | | | | |
| | | | Ensure implementation of open vial policy in line with WHO recommendations | x | x | x | x | x |
| | | Strengthen programme management & monitoring capacity and programme policies | Improve vaccine management capability (especially in planning and forecasting needs, vaccine delivery and establishing reserve stocks) at national, regional and district level to avoid stock outs | x | x | x | x | x |
| | | | Conduct regular analysis of coverage at all levels | x | x | x | x | x |
| | | | Provide regular feedback to all sub-national levels on coverage | x | x | x | x | x |
| | | | Conduct National meetings at least twice per year and discuss vaccination performance results in regions. | x | x | x | x | x |
| | | Increasing community demand for immunization | Providing training to immunization programme staff at all levels on advocacy and communication skills | x | | x | | x |
| | | | Assessing communication gaps in reaching all communities and developing and implementing a communication and social mobilization plan | x | | x | | x |
| | | | Disseminate programme messages regularly to parents through advocacy materials to reduce number of refusal due to misperceptions | x | x | x | x | x |
| | | | Encourage staff for simultaneous administration of vaccines to avoid delays in vaccination schedule | x | x | x | x | x |
| | | | Ensure legal protection of staff against inappropriate accusations on adverse events to reduce implementation of false contraindications | x | x | x | x | x |
| | | | Strengthen Adverse Events Following Immunization (AEFI) surveillance system through provision of integrated surveillance training (training of trainers and training of facility level staff) | x | x | x | x | x |
| Prevalence of Hepatitis B among children up to 14 years | Control hepatitis B infection | Improving routine HepB coverage at national, regional, district levels with special focus on increasing timely vaccination and decreasing drop-out rates and implementation of false contraindications | Strengthen national regulation of Hep B control | x | | | | |
| | | | Maintain high coverage of Hep B containing vaccine | x | x | x | x | x |
| | | | Strengthen Hep B surveillance | x | | | | |
| | | | Ensuring proper supply and delivery of HepB and Penta vaccine to avoid stock-out problems | x | x | x | x | x |
| | | | Training vaccination staff with special emphasis on timely vaccination, true contraindications, implementation of RED strategies, communications with parents, reporting procedures, micro-planning issues | x | | x | | x |
| | | | Revision of national guidelines in line with WHO recommendations | X | | | | |
| | | | Monitoring vaccination coverage at district and facility level in line with RED strategies | x | x | x | x | x |
| | | | Conducting supervisory visits to regional and district levels (using unified supervisory checklists) | x | x | x | x | x |
| | | | Provision of regular feedback on vaccination coverage to sub-national levels | x | x | x | x | x |

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| | | | Improving information technology capacity at regional level to improve performance of coverage monitoring, analysis and reporting/feedback functions | x | | x | | x |
| | | | Preparing and distributing posters targeting parents, reminding vaccination schedule and providing information on vaccine safety to increase demand for vaccination | x | | x | | x |
| **Immunization quality and safety** | | | | | | | | |
| Insufficient provision of safe injection supplies | National immunization safety policy implementation | Review of injection supplies procurement policies | Place orders for vaccines using bundling policy | x | x | x | x | x |
| Inadequate management of vaccine stores | | | Introduction of EVM practices at national and provincial levels | x | | | | |
| A risk of nosocomial infection during immunization | | Increased awareness and improving professional skills of medical staff in practice of safe injection | Introduction of a program safe injection at all levels medical care | x | x | x | x | x |
| | | | The introduction of training module on safe injection into the curriculum of GPs and nurses | x | x | | | |
| | | | Continuous monitoring of the implementation of safe injection policy within the framework of periodic follow-up visits at all levels medical care | x | x | x | x | x |
| Weak system of monitoring of side effects and reactions | | Strengthening of the National Control Authority | Legislating the role and powers of the National Control Authority | x | | | | |
| | | Enhancing of national system of monitoring of side effects and reactions | Preparation of experts for the monitoring of side effects and reactions by integrating of modules into the curricula of GPs and conducting continuous workshops and training into institutions of post-graduate education | x | x | x | x | x |
| | | | Development and introduction of SOPs for monitoring of side effects and reactions | x | x | x | x | x |
| | | | Development of sanitary regulations (SanPiN) for monitoring of side effects and reactions | x | x | x | x | x |
| **Immunization financing** | | | | | | | | |
| Weak implementation of the financial mechanism of immunization | Ensure adequate and timely supply of vaccines | Ensuring sustainable financing for immunization | Continue procurement of routine vaccines through UNICEF | x | x | x | x | x |
| | | | Improving the mechanism of allocation of funds according to the Order of the Ministry of Finance № 114 from 2003 (cl.№ 08-41) | x | x | x | x | x |
| National currency | | | Advocate with the government of easing the currency conversion procedures for vaccine procurement | x | | | | |

| Problem or priority | NIP objectives | Implementation strategies | key activities | timing (year) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 2016 | 2017 | 2018 | 2019 | 2020 |
| inconvertibility | | | | | | | | |
| **Program management** | | | | | | | | |
| Passive ICC with limited representation of international partners and state financing institutions | Strengthening partnership and coordination for immunization | Enhancing the role of ICC in the strategic decision-making on issues of immunization | Develop annual work plan for immunization at national and sub-national levels; | x | x | x | x | x |
| | | | Prepare a calendar of major events; | x | x | x | x | x |
| | | | Advocate for active participation of all immunization partners in coordination of activities; ensure transparency of the program | x | x | x | x | x |
| Risk of disturbance providing the vaccine other unexpected situations | Ensuring continuity of providing vaccines in a force majeure and unexpected internal and external situations | Organization of the strategic minimum of 25% of the stock of vaccines against vaccine-preventable diseases with a high risk of importation into the territory of the Republic of Uzbekistan | The development of regulations (order of the MOH and MOF practical recommendations, guidelines, SOPs) for the organization, supply and use of strategic stocks of vaccines against vaccine-preventable diseases with high risk of importation (measles, rubella, polio, diphtheria) into the territory of the Republic of Uzbekistan | x | x | | | |
| | | | Preparation of additional storage facilities, transportation and utilization of strategic stocks of vaccines | x | x | x | | |
| | | | Ensuring financial sustainability of the strategic stock | x | x | x | x | x |
| | | | Providing strategic stock replenishment of vaccines | x | x | x | x | x |

## 5. IMMUNIZATION PROGRAMME COSTS AND FINANCING (CURRENT AND FUTURE)

# Table of figures

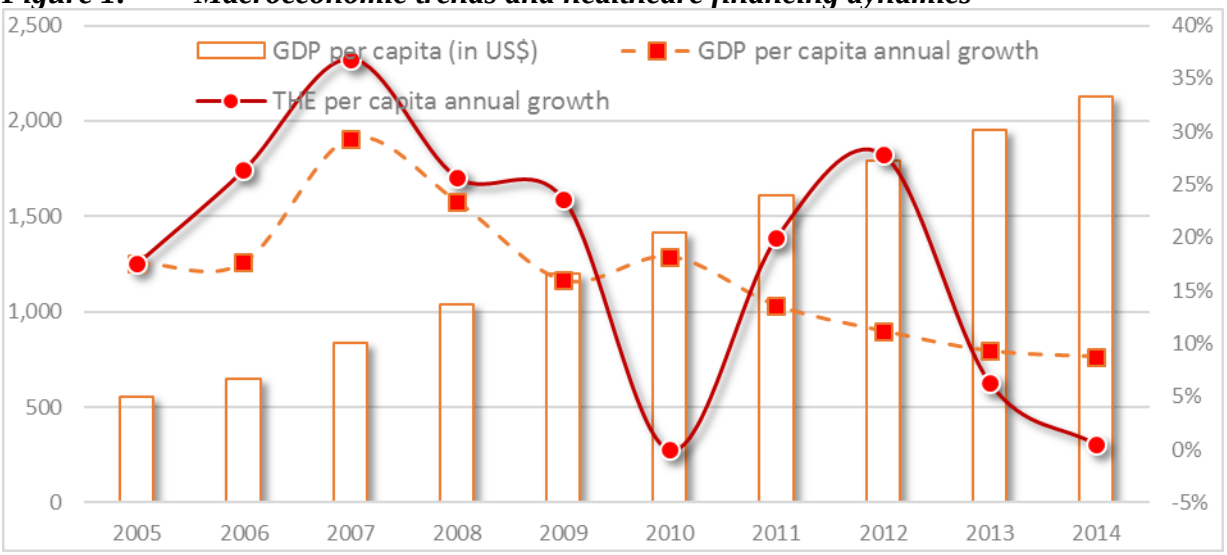
# 1 IMMUNIZATION PROGRAM COSTS AND FINANCING

## 1.1 Macroeconomic context and demographics

The following assumptions have been used for macroeconomic projections for Uzbekistan cMYP 2016-2020 costing exercise:

- GDP per capita rate was set based on WHO estimates:
  - 5.43 and 6.62% GDP range of annual growth rate during 2010-2014 in accordance with the WB annual GDP growth rate forecast.
- GDP per capita (in current US$) was estimated at 2,126 in 2014 (according to the WHO Global Health Expenditure Database (GHED) as shown in Figure 25.
- Total Health Expenditure (THE) per capita was 124 US$ in 2014 (in accordance with the WHO NHA GHED). THE per capita projections were made using the GDP per capita annual growth rate (range 5.43-6.62%) as described above
- GHE as % of THE – constant value at the rate for baseline year (2014) – 53.3% (in accordance with the WHO NHA GHED).
- Inflation rate (Consumer price index) was estimated at level of info is unavailable on the WB page in previous 3 years (according to the World Bank World Development Indicators);

***Figure 1: Macroeconomic trends and healthcare financing dynamics***




*Source: WHO Global Health Expenditure Database*

The total population was estimated at 31,022,500 in 2014 (in accordance with information provided by the EPI/MoH Uzbekistan):

- The population growth was projected at the annual growth rate of - rate of 1.6% (in accordance of the projections of MoH Uzbekistan). The annual population growth rate is slightly lower than the WB data on population annual growth % in last five years (1.60%).
- Infant mortality rate – constant at the rate 11.3 per 1000 live birth in 2014 in accordance with the MoH Uzbekistan data. Estimates of infant mortality rate was not available for projection years and thus for cMYP costing and financing analysis the constant rate was used.

- According to the Ministry of Health of Uzbekistan:
  - The number of surviving infants was 690,119 in 2014, that translates into 698,006 newborns at the infant mortality rate of 11.3 per 1,000 live births (that is 2.22% of the total population in 2014).

## 1.2 Current program costs and financing

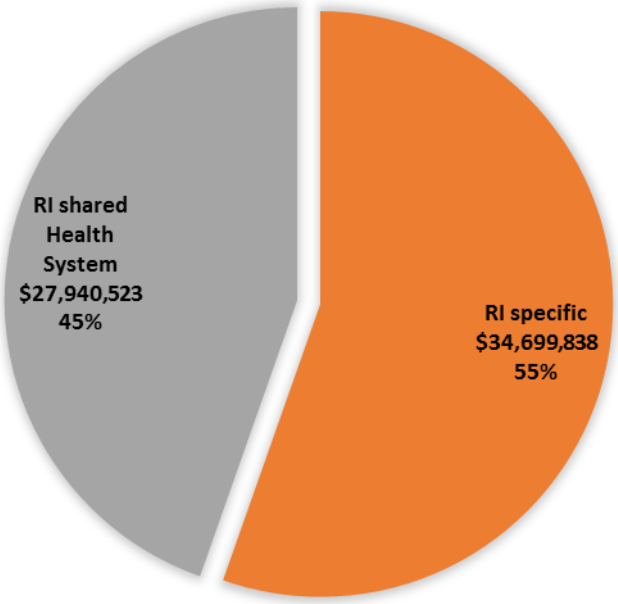
### 1.2.1 Expenditures on immunization in the baseline year

The national immunization program expenditures in 2014 amounted to 62.6 million US$ (with shared health system costs) as shown in Figure 2 below:

***Figure 2: Baseline Indicators (2014)***

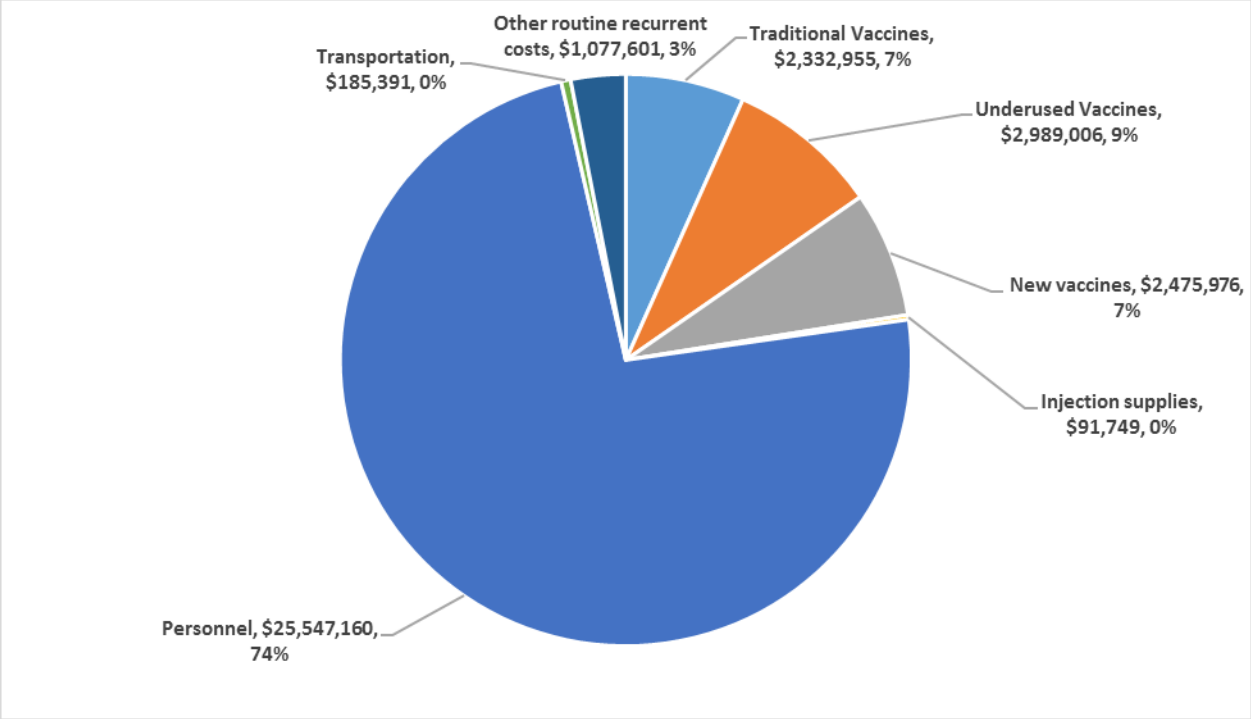
| | |
|---|---|
| **Total Immunization Specific Expenditures** | **$34,699,838** |
| Supplemental immunization activities | $0 |
| Routine immunization only | $34,699,838 |
| Per capita | $1.12 |
| Per DTP3 immunized child | $51 |
| % Vaccines and Supplies | 22.74% |
| % Government Funding | 82.86% |
| % Of Total Health Expenditures (THE) | 0.90% |
| % Government Health Expenditures | 1.69% |
| % GDP | 0.05% |
| **Total shared costs** | **$ 27,940,523** |
| % Shared Health Systems Cost | 44.60% |
| **Total Immunization Expenditures** | **$62,640,361** |

No supplemental immunization activity was conducted in 2014.
Shared health system costs (27.9 million US$) accounted for 44.6% of the immunization expenditures in 2014 and the rest was spent specifically on routine immunization. The cost of fully (DTP3) immunized child was 51 US$.



0.9% of the total health expenditures (or 1.69% of the government health expenditure) was spent on routine immunization in 2014.
“Personnel” costs were the major cost driver in baseline year, accounting for 73.62% (or 25.5 million US$) of all expenditures as shown in figure below:

***Figure 3: Routine Immunization baseline cost structure***




“Vaccines and injection supplies” costs were the second major cost driver accounting for 22.74% (or 7.9 million US$) of the total expenditures. “Other routine recurrent costs” constituted 3.11% (or 1.07 million US$) of the total cost and 0.53% (or 185,391 US$) was spent on “Transportation” in the baseline years.

## 1.2.2 Routine immunization cost structure

### Personnel

Out of the total of 17,926 persons engaged in the national immunization program 9,458 (53%) are shared health system personnel (allocating some portion of work time to immunization) and 8,361 (47%) persons dedicate full work time to immunization as shown in Figure 19.

### Vaccines

In total 2.33 million US$ (6.72% of total program cost) were spent on traditional vaccines; 2.99 million US$ (8.61% of total program cost) - on underused vaccines and 2.5 million US$ (7.14% of total program cost) on new vaccines in 2014; the total expenditures on vaccines and injection supplies amounted to 7,889,686 US$ (or 22.74% of total program costs).

### Other Routine Recurrent Costs

The total for “other routine recurrent costs” amounted to 1,077,601 US$ in the baseline year. “Cold chain maintenance and overhead” was the main cost driver of “other routine recurrent costs” accounting for 47.95% (or 516,712 US$). This was followed by “Program management”, consuming 25.35% (or 273,139 US$) of other routine recurrent costs in baseline year. “Disease surveillance” accounted for 9.28% (or 100,000 US$). 7.42% (or

80,000 US$) and 7.22% (77,750 US$) was spent on “Short-term trainings” and “Building overheads” respectively and 2.78% (or 30,000 US$) accounted for “IEC/Social mobilization”.

**Vehicles and Transportation**

Transportation expenditures for vaccine distribution from the Central level to the sub—national levels amounted to 0.53% of total program costs (or 185,391 US$) in baseline year. No funds were spent for vehicle procurement in the baseline year.

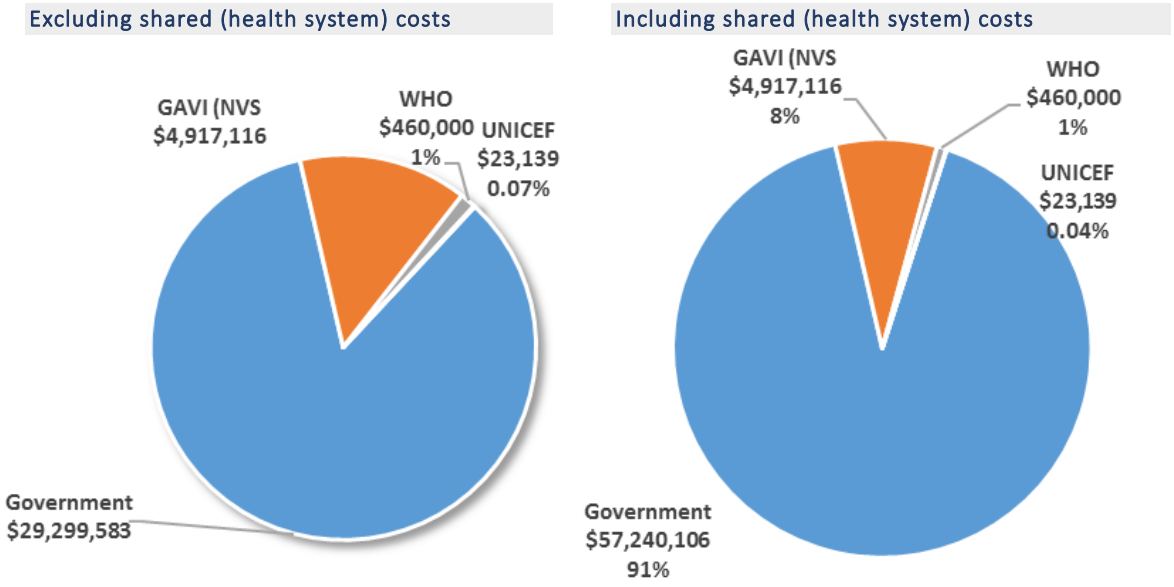
### 1.2.3 Supplementary immunization costs

No SIA was conducted in 2014.

### 1.2.4 Immunization financing in baseline year

The Government was the major source of financing of the national immunization program accounting for 84% of all funds if shared health system costs are excluded and 91% if shared health system costs are included as shown in
Figure 4 below:

***Figure 4: Immunization financing profile – baseline year***




Gavi (NVS) was the second major source of funding. In 2014 Gavi provided 4.9 million US$ accounting for 8% of total program funding with shared health system costs or 14% - without shared health system costs. WHO contribution accounted for 1% of total program funding (or 460,000 US$). and Unicef provided 0.04% of total program financing (or 23,139 US$) in baseline year.

## 1.3 Future resource requirements

### 1.3.1 Overview of the resource requirements’ structure

The total resource requirements were estimated at 425.4 million US$ (including shared health system costs) for 2016-2020 as shown in

Figure 5 below:

***Figure 5: National immunization program costs summary by system components and years – basic scenario***

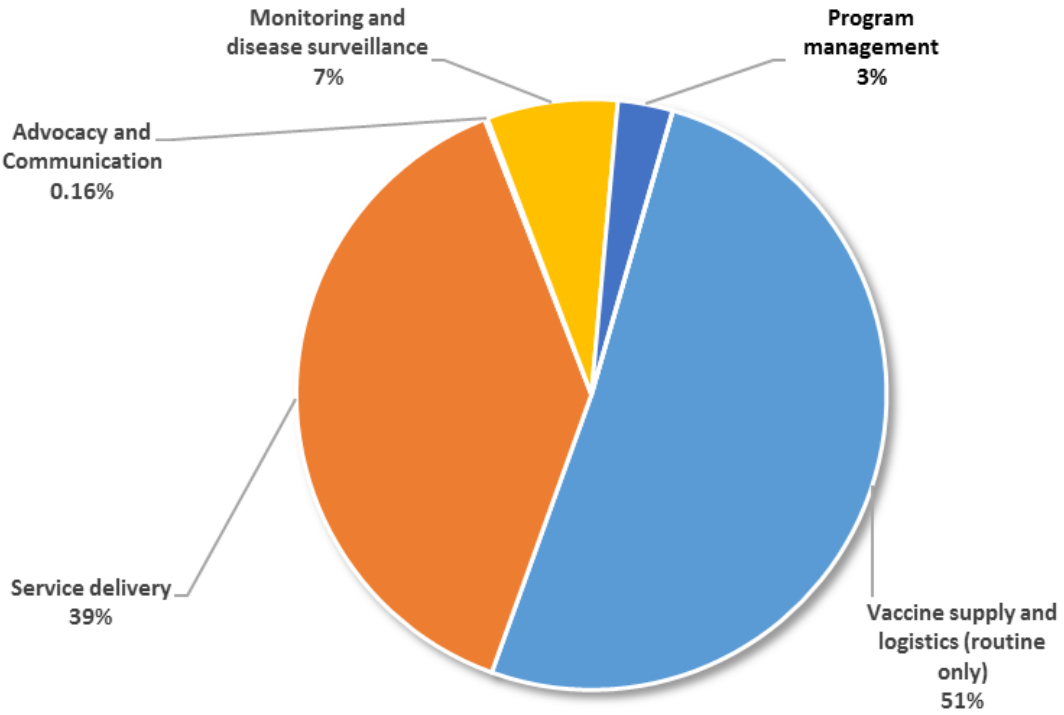
| Immunization system components | Expenditures | Future resource requirements | | | | | |
|---|---|---|---|---|---|---|---|
| | 2014 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2016 - 2020 |
| Vaccine supply and logistics (routine only) | 8,406,398 | 30,638,827 | 26,661,129 | 29,545,257 | 29,220,265 | 29,790,641 | **145,856,119** |
| Service delivery | 21,719,451 | 22,541,471 | 22,484,937 | 21,728,299 | 21,762,120 | 21,796,688 | **110,313,516** |
| Advocacy and Communication | 30,000 | 120,000 | 80,998 | 80,998 | 80,998 | 80,998 | **443,992** |
| Monitoring and disease surveillance | 4,113,099 | 4,143,099 | 4,113,099 | 4,083,099 | 4,083,099 | 4,083,099 | **20,505,497** |
| Program management | 430,889 | 2,402,449 | 1,601,210 | 1,565,260 | 1,670,222 | 1,371,472 | **8,610,613** |
| Supplemental immunization activities (SIAs) | 0 | 0 | 0 | 0 | 0 | 0 | **0** |
| **Total immunization Immunization costs** | **34,699,838** | **59,845,847** | **54,941,374** | **57,002,913** | **56,816,704** | **57,122,899** | **285,729,737** |
| Shared Health Systems Costs (EPI Portion) | 27,940,523 | 27,940,523 | 27,940,523 | 27,940,523 | 27,940,523 | 27,940,523 | **139,702,616** |
| **Total immunization resource requirements** | **62,640,361** | **87,786,370** | **82,881,897** | **84,943,437** | **84,757,228** | **85,063,422** | **425,432,353** |

The details of future resource requirement (by cost categories) is presented in Figure 26.

## 1.3.2 Description of cost drivers of the future resource requirements

The resources required for "vaccine supply and logistics" account for 51% of the total immunization specific costs for 2016-2020 (excluding shared health system costs) as shown in
Figure 6 below. "Service delivery" is the second major cost driver – accounting for 39% of future immunization specific resource requirements followed by "monitoring and disease surveillance" – 7% and "Program management" – 3%. "Advocacy and Social Mobilization" will account for 0.16% of immunization specific resource requirements. "Shared health system costs" are estimated at 33% of total future resource requirements.

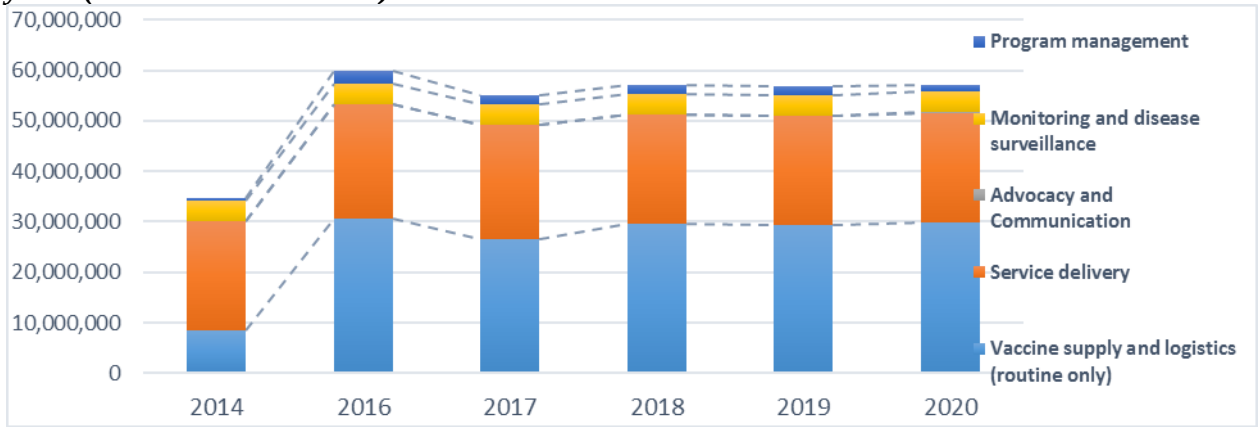
***Figure 6: The future total resource requirement structure by cMYP components (shared costs excluded)***




The resource requirements for routine immunization per annum varies between 54.9 and 59.8 million US$ in 2016-2020 (excluding shared health system costs):

- The resource requirements for routine immunization will significantly increase in the first projection year (2016) by 72.47%, from 34.7 million US$ in the baseline year to 59.8 million US$ in 2016.
- In the second projection year (2017) routine immunization resource requirements will decrease by 8.2% (or 4.9 million US$) in comparison with the previous year.
- During the three projection years the resource requirement fluctuates, increasing by 3.75% (or 2.1 million US$) in 2018, slightly decreasing in 2019 by 0.33% (or 186,029) and increasing again in the last projection year (2020) by 0.54% (or 306,194 US$).
- The analysis of resource requirement fluctuation shows that it is driven with three main components, “vaccines and injection supplies” and “Program management” as it is shown in Figure 7 below.

***Figure 7: The structure of future resource requirements by cMYP components and years (shared costs excluded)***




**Vaccines and injection supplies**

The following assumptions were used for the projection of vaccine and injection supply requirements:

- Coverage rates were set in line with the objective and targets of National Immunization Program by 2020 (>=95% by 2020).
- Wastage rates are estimated at 50% for BCG and at 15% for DTP, MMR, OPV and Td. 5% wastage target rate was estimated for Pentavalent, HepB, Rotavirus, PCV and IPV vaccines.

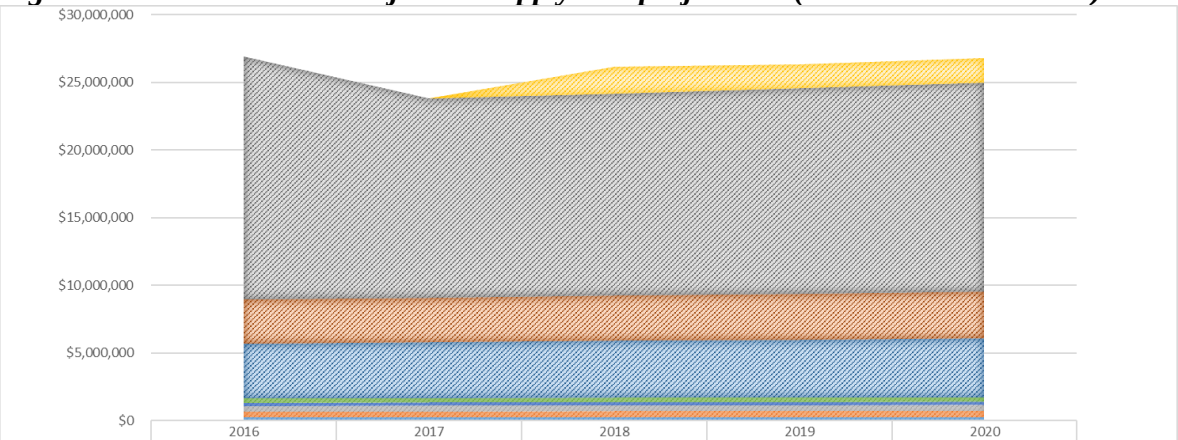
The present projections are based on vaccine price estimates provided by the UNICEF Supply Division and includes 4% Unicef handling fee and 10% fee for freight, insurance and inspection.
The resource requirement projections for vaccines (basic scenario) envisages costs of following vaccines:

- Traditional vaccines: BCG, DTP, MMR (introduced in the national immunization schedule in 2007), OPV, HepB and Dt vaccines;
- Underused vaccines: Pentavalent vaccines introduced in Uzbekistan in 2009.

- New vaccines: Rotavirus (introduced in Routine Immunization schedule in 2014), PCV (introduced in national routine immunization schedule in 2015) and IPV (to be introduced in Routine Immunization schedule in 2018) vaccines.
- HPV vaccine for the cMYP scenario A, with implementation of the HPV Demo Project in 2018.

Figure 8 below illustrates the structure of routine immunization vaccine and injection supplies' costs by vaccines and years.

***Figure 8: Vaccine and injection supply cost projections (routine immunization).***

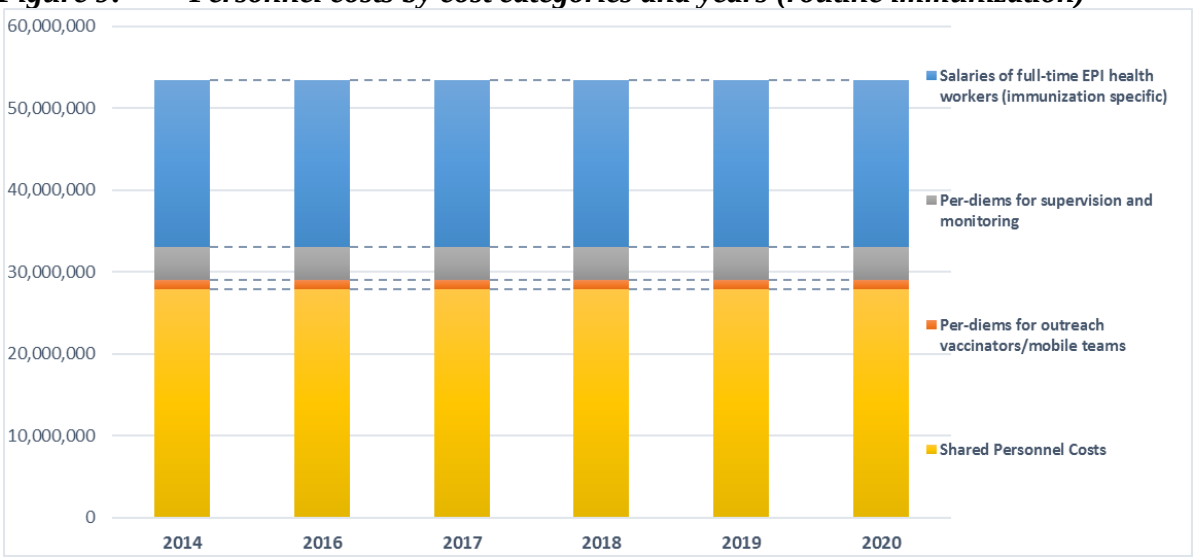



| | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| IPV | $0 | $0 | $1,983,829 | $1,732,105 | $1,848,990 |
| PCV | $17,991,091 | $14,727,866 | $14,963,512 | $15,202,929 | $15,446,175 |
| Rota | $3,238,025 | $3,289,627 | $3,342,261 | $3,395,737 | $3,450,069 |
| DTP+Hib+HepB | $4,081,122 | $4,146,162 | $4,212,500 | $4,279,900 | $4,348,379 |
| Td | $317,642 | $322,705 | $327,868 | $333,114 | $338,444 |
| Hep B (birth dose) | $221,539 | $225,070 | $228,671 | $232,330 | $236,047 |
| MMR | $422,790 | $429,529 | $436,401 | $443,383 | $450,478 |
| DTP | $444,331 | $451,412 | $458,635 | $465,973 | $473,428 |
| BCG | $224,278 | $227,853 | $231,498 | $235,202 | $238,965 |

## Personnel

Personnel costs were estimated at 268.9 million US$ in 2016-2020, and salaries of the shared personnel accounted for its 62%.

***Figure 9: Personnel costs by cost categories and years (routine immunization)***



Personnel costs, per diems for outreach vaccination and supervision and monitoring will remain constant throughout the projection years as it is shown in

Figure 20, 22 and 23.

### Cold chain equipment

In total 9 million US$ will be invested in the cold-chain during the projection period. Cold-chain procurement will be the major cost driver accounting of cold-chain related resource requirements.

***Figure 10: Cold chain related resource requirements (thousand US$)***

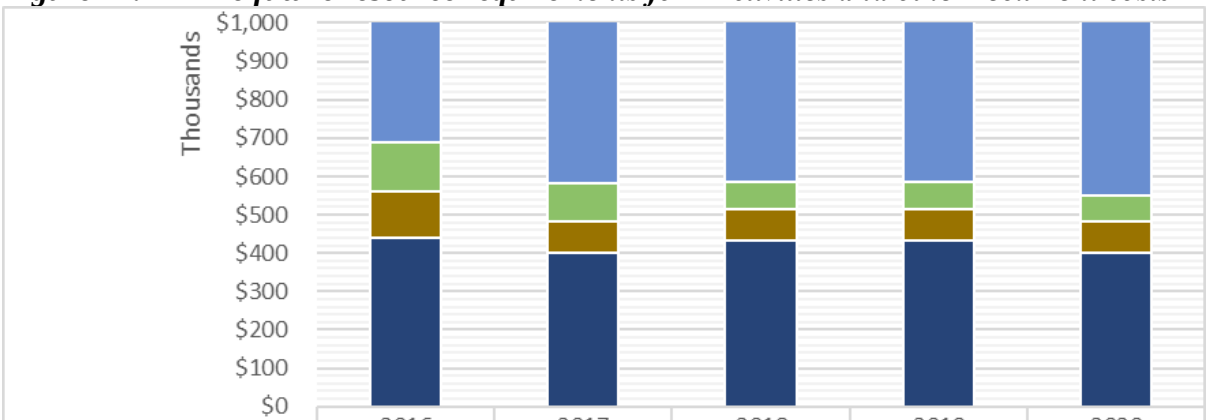
| | 2014 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2016-2020 |
|---|---|---|---|---|---|---|---|
| Cold chain maintenance and overhead | $517 | $762 | $912 | $952 | $498 | $513 | **$3.64** |
| Cold chain equipment | | $2,295 | $1,278 | $766 | $709 | $602 | **$5.65** |
| **Total (thousand US$)** | **$0.52** | **$3.06** | **$2.19** | **$1.72** | **$1.21** | **$1.12** | **$9** |

Cold chain maintenance and overhead costs will account for 61% of the 5.65 million US$ estimated to cover the cold chain related needs as shown in Figure 10 above.

### Other recurrent costs

Out of the total 13.1 million US$ required for “Routine recurrent costs”, 46.5% (or 6.1 million US$) will be required to cover “program management” costs, followed by “maintenance and overhead costs”, which will account for 30.7% (or 4.02 million US$) including: 27% (or 3.6 million US$) for “cold-chain maintenance and overhead”, 0.01% (or 1,500 US$) for “maintenance of other capital equipment” and 3% for “building overheads (electricity, water and etc.)” costs. “Short-term training” will account for 16.1% of total routine recurrent costs (2.1 million US$). 3.38% (or 443,992US$) and 3.35% (440,000 US$) will be spent for “IEC/Social Mobilization” and “Disease surveillance” respectively during the projection period (see Figure 11 below).

***Figure 11: The future resource requirements for “Activities and other recurrent costs”***




| | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| Program management | $1,885,034 | $1,122,939 | $1,053,239 | $1,158,201 | $893,201 |
| Disease Surveillance | $130,000 | $100,000 | $70,000 | $70,000 | $70,000 |
| IEC/Social Mobilization | $120,000 | $80,998 | $80,998 | $80,998 | $80,998 |
| Short-term training | $439,665 | $400,521 | $434,271 | $434,271 | $400,521 |

### Supplementary immunization activities

No SIAs are planned for the next cMYP cycle by EPI Uzbekistan.

### 1.3.3 Description of scenarios for introduction of new vaccines

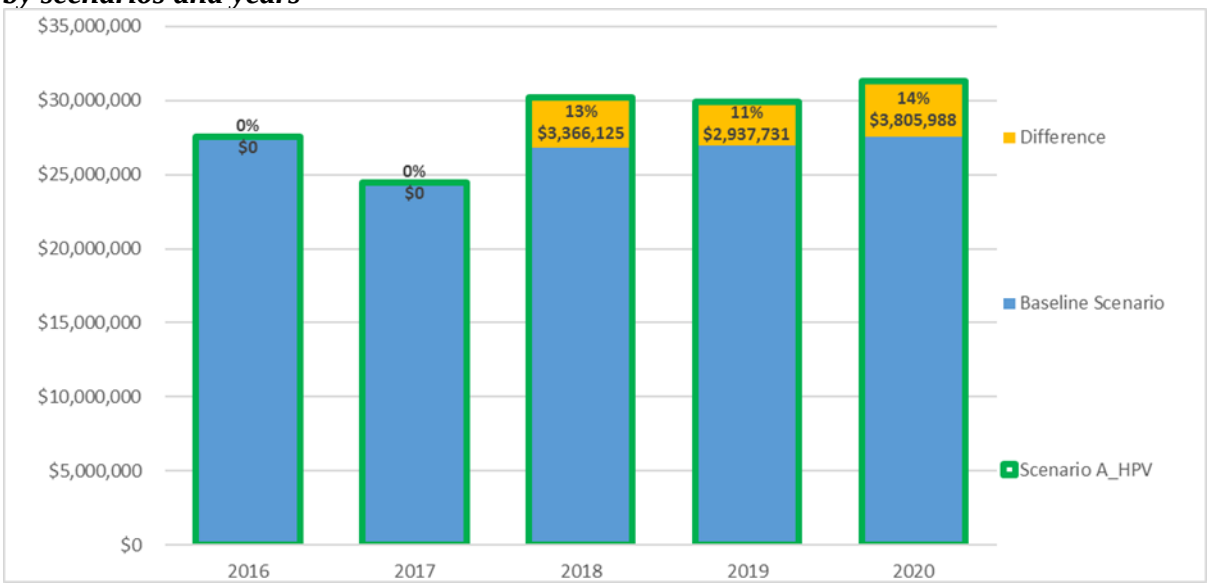
**Scenario building parameters**

Two different scenarios were developed for Uzbekistan cMYP 2016-2020.
**Basic Scenario** – which envisions implementation of existing routine immunization program and introduction of IPV in 2018.
**Scenario A** – in addition to the basic scenario, introduction of HPV two-year Demo project in 2018 with the following national wide scale-up in 2020.

**Results – financial implications of vaccine introduction**

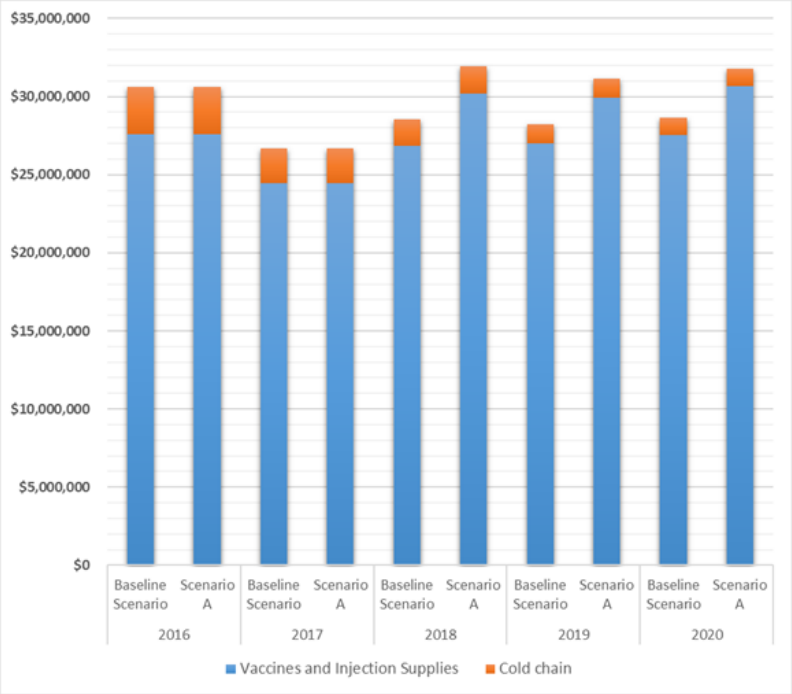
The implication of resource requirements for vaccines and injection supplies by scenarios and years is presented in Figure 12 below. The introduction HPV vaccine in 2018 will increase annual resource requirement by 13% (or 3,4 million US$) in the first year of introduction which will follow by 11% (or 2.9 million US$) increase in the second year of introduction (2019). In 2020 the total program resource requirement will further increase by 14% (or 3.81 million US$).
As it is shown in Figure 12 below, introduction of the new HPV vaccine will have significant implication on the resource requirements for vaccines and injection supplies, increasing resource requirement for vaccines by 8% or 10.1 million US$.

***Figure 12: Commparison of resource requirements for vaccines and injection supplies by scenarios and years***




Comparison of costs of vaccines and cold-chain across two different scenarios shows that introduction of HPV vaccine will not require substantial improvement or upgrade of existing cold-chain in addition to already planned cold-chain upgrade within the framework of basic scenario.

***Figure 13: Comparison of costs of vaccines and cold chain across scenarios***

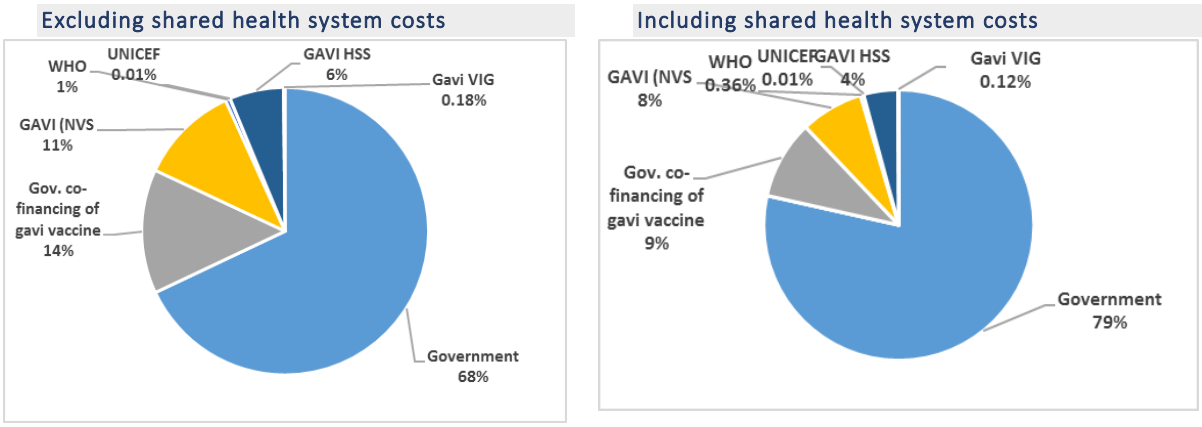



## 1.4 Future financing and funding gaps

The total financing for 2016-2020 was estimated at 425.4 million US$ (including shared health system costs) or at 285.7 million US$ (excluding shared health system costs). Government is the major source of financing of Uzbekistan National Immunization Program. As it is expected, the Government will provide 373.9 million US$ to the national immunization program during the cMYP period, which constitutes 88% of all funding including shared health system costs or 234.2 US$ excluding shared health system costs which represents 81% of all funding (as shown in

Figure 14 below).
Gavi is the second major financing sources of Uzbekistan National Immunization Program. During the projection period Gavi through its NVS (32.03 million US$), HSS (17.4 million US$) and VIG (505,000 US$) financial support scheme (1.03 million US$) will contribute 49.95 million US$ in NIP funding, accounting for 11.74% of total funding when shared health system costs are included and 17.48% when shared health system costs are excluded.
Total contribution of WHO will amount to 1.55 million US$ which constitutes 0.36% of total funding with shared health system costs and 0.54% without shared health system costs.
Unicef contribution in the NIP funding will be 37,000 US$ accounting for 0.01% of total program funding.
The detail information on program financing for the projection period are represented in Figure 24.

***Figure 14: The future financing (with secured and probable funds) structure***




77.78% (or 222.2 million US$) of funding is considered to be secured out of the total immunization specific financing 285.7 million US$ as shown in Figure 27.
When only secured funding is considered (excluding shared health system costs):

- the share of government financing is 82% (234 million US$ out of total 222.2 million US$ secured funds).
- The share of GAVI financing is 22% (49.95 million US$ of total secured funds).
- WHO contribution is 0.29% (or 650,000 US$), and
- Unicef contribution accounts for 0.02% (or 37,000 US$).

The secured funding is sufficient to cover only 77.78% of the total immunization specific resource requirements in 2016-2020 (without shared health system costs). The funding gap with secured financing ranges from 4% in 2017 to 49% in 2019 and amounts to 62.5 million US$ as shown in Figure 15 below.

***Figure 15: Financing by sources and funding gap by years (with secured funds only)***

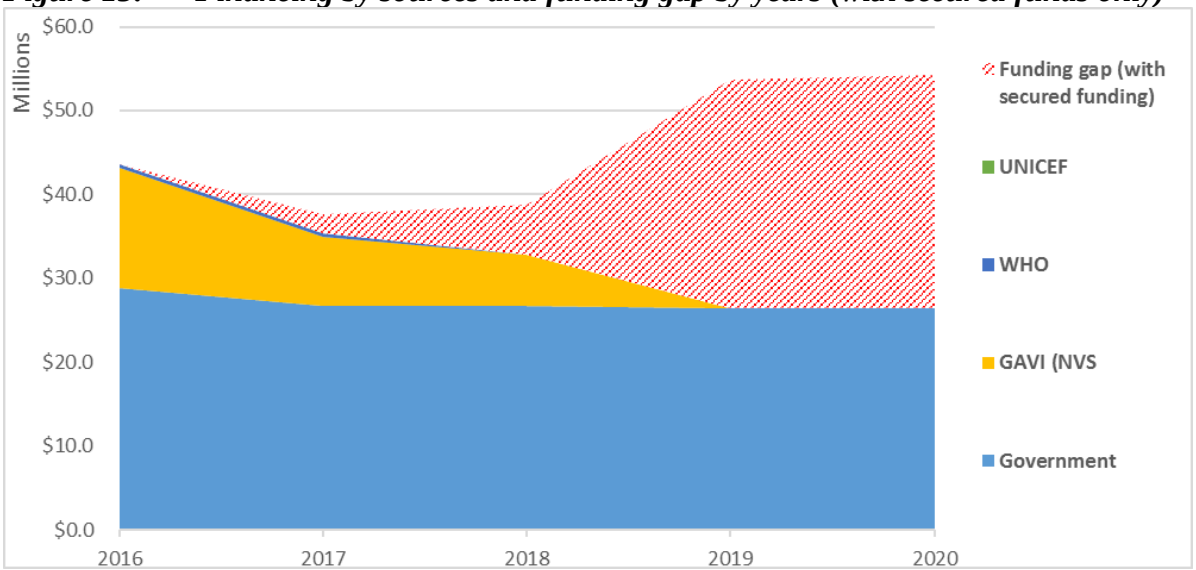
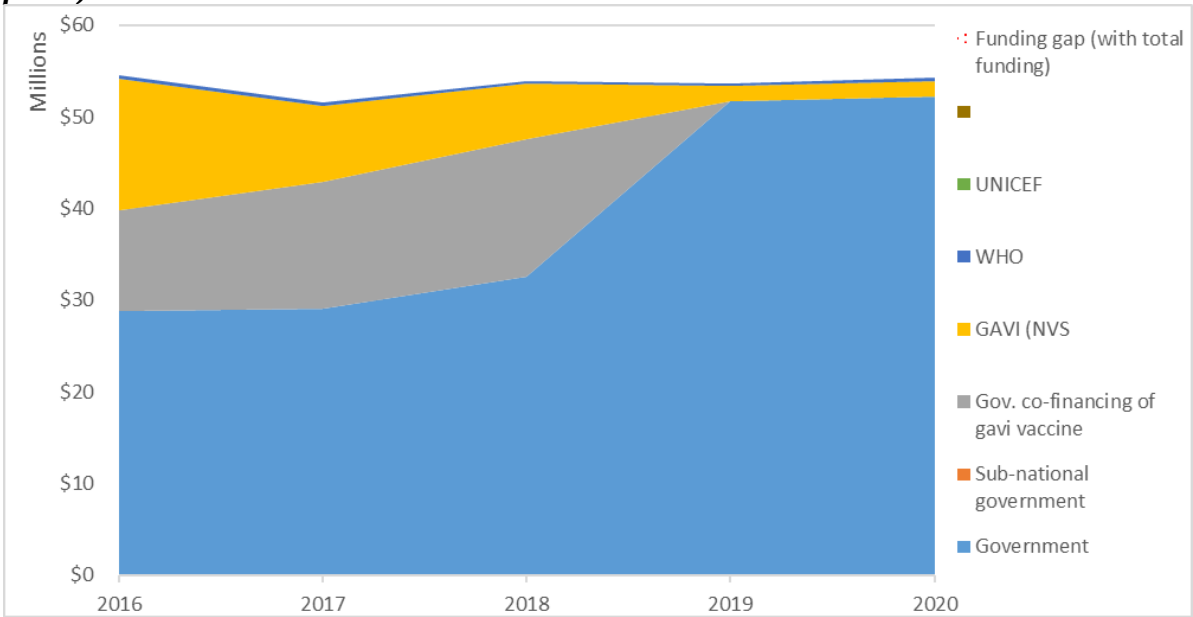


Figure 16 illustrates funding conditions of the national immunization program with secured and probable funding. If probable funds are secured the available financing will be sufficient to cover 100% of the total resource requirement for 2016-2020.

*Figure 16: Financing by sources and funding gap by years (with secured and probable funds)*




## 1.5 Funding gap analysis and sustainability

### 1.5.1 Implications of funding gap on programmatic performance and sustainability

The funding gap (with secured funds only) in the amount of 65.1 million US$ affects the "Vaccines and Injection Supplies", "Logistics" and Activities and other recurrent cost" components of immunization system. Vaccines and injection supplies and logistics components are among the most critical system components and thus if probable funds are not secured the EPI Uzbekistan will not be able to achieve immunization program targets and objectives. "Activities and other recurrent costs" could be important for the quality of immunization services and its programmatic sustainability, however this component alone, does not pose immediate threat to the achievement of the immunization outcomes in the projected period.

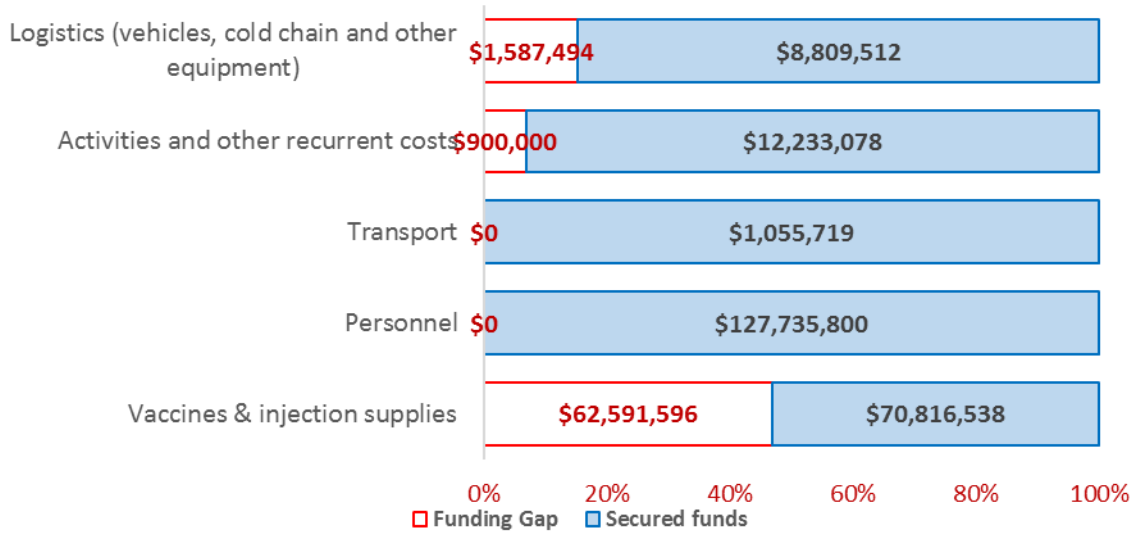
*Figure 17: Funding gap (with secured and secured and probable financing only) structure by years*

| | 2016 | 2017 | 2018 | 2019 | 2020 | Total |
|---|---|---|---|---|---|---|
| **With secure financing** | | | | | | |
| Vaccines & injection supplies | 0 | 2,308,202 | 5,776,580 | 26,992,967 | 27,513,847 | **62,591,596** |
| Personnel | 0 | 0 | 0 | 0 | 0 | **0** |
| Transport | 0 | 0 | 0 | 0 | 0 | **0** |
| Activities and other recurrent costs | 0 | 0 | 300,000 | 300,000 | 300,000 | **900,000** |
| Logistics (vehicles, cold chain and other equipment) | 822,014 | 765,481 | 0 | 0 | 0 | **1,587,494** |
| Supplemental immunization activities | 0 | 0 | 0 | 0 | 0 | **0** |
| **Total funding gap** | **822,014** | **3,073,683** | **6,076,580** | **27,292,967** | **27,813,847** | **65,079,091** |
| **With secure and probable financing** | | | | | | |
| Vaccines & injection supplies | 0 | 0 | 0 | 0 | 0 | **0** |
| Personnel | 0 | 0 | 0 | 0 | 0 | **0** |
| Transport | 0 | 0 | 0 | 0 | 0 | **0** |
| Activities and other recurrent costs | 0 | 0 | 0 | 0 | 0 | **0** |
| Logistics (vehicles, cold chain and other equipment) | 0 | 0 | 0 | 0 | 0 | **0** |
| Supplemental immunization activities | 0 | 0 | 0 | 0 | 0 | **0** |
| **Total funding gap** | **0** | **0** | **0** | **0** | **0** | **0** |

Figure 18 shows relative weight of funding gap (with secured funds only) in the structure of resources requirements for each immunization system component individually – the higher the share of funding gap the more detrimental is the funding gap on programmatic

performance if not addressed. Figure 18 shows that the funding gap affects the critical component of the immunization system - vaccines and injection supplies - thee funding gap for vaccines and injection supplies amounts to 62.6 million US$ compared to 70.8 million US$ secured funding, or 47% of the resource requirements for vaccines and injection supplies are not secured. As to the funding gap in another area – logistics, it accounts for 15% of future resource requirements for this component and still can affect immunization system performance if not filled (although not as critical as for vaccines and injection supplies)

***Figure 18: Funding gap (with secured funds only) structure by the major cost categories***




Existence of the funding gap could be attributed to the several factors:

- Short horizon of secured government funding for national immunization program (not more than one year);
- Decreased of external financing, which could be explanation of funding gap related to the Activities and other recurrent cost component, which traditionally has been funding through the financial support provided by implementing partners and external donors.

### 1.5.2 Financial sustainability strategies

The main strategy to ensure financial sustainability of the National Immunization Program during the period 2016—2020 will be directed towards securing probable funds and increasing reliability of financing from the domestic sources, as well as optimization and/or minimization of costs related to the main cost drivers of existing funding gap.
This could include following:

1. Advocate for sufficient allocations in the State, MoH budget for national immunization program;
2. Advocate for increased financing of National Immunization Program through strengthening communication between EPI and Ministry of Health and the Ministry of Finances for:
   - providing evidence based recommendations to the ministries ensuring effectiveness in NIP implementation; and
   - increasing ownership of ministries in National Immunization Program;

3. Accelerate fundraising activities and work with donor community over the course of cMYP cycle to secure alternative funding for filling existing funding gaps;

Immunization program sustainability indicators are presented in

Figure 28.

# ANNEXES

## *Figure 19: Health workforce for immunization by levels and type (dedicated and shared)*

**Full time equivalent (FTE)**

| | Number of positions filled | % Time working for Immunization | **Dedicated** | **Shared** | **Total** |
|---|---|---|---|---|---|
| **National** | | | | | |
| Medical Doctor | 6 | 100% | 6 | - | 6 |
| Assistant medical doctor | 2 | 100% | 2 | - | 2 |
| Warehouse manager | 1 | 100% | 1 | - | 1 |
| Pharmacist | 1 | 100% | 1 | - | 1 |
| Head Doctor | 1 | 10% | - | 0 | 0 |
| Deputy Head Doctor | 1 | 30% | - | 0 | 0 |
| Accountant | 2 | 30% | - | 1 | 1 |
| Economist | 2 | 30% | - | 1 | 1 |
| Driver | 3 | 50% | - | 2 | 2 |
| Worker | 2 | 100% | 2 | - | 2 |
| **Subtotal National** | **21** | **72%** | **12** | **3** | **15** |
| **Oblast** | | | | | |
| Epidemiologist | 15 | 50% | - | - | 8 |
| Assistant Epidemiologist | 15 | 50% | - | 8 | 8 |
| Immunilogist | 40 | 100% | 40 | - | 40 |
| Neurologist | 20 | 30% | - | 6 | 6 |
| Infectious Diseases/MD | 20 | 30% | - | 6 | 6 |
| Deputy Head Doctor | 15 | 30% | - | 5 | 5 |
| Accountant | 1 | 30% | - | 0 | 0 |
| Economist | 1 | 30% | - | 0 | 0 |
| Driver | 15 | 50% | - | 8 | 8 |
| **Subtotal Oblast** | **142** | **56%** | **40** | **32** | **80** |
| **Rayon** | | | | | |
| Epidemiologist | 890 | 40% | - | 356 | 356 |
| Assistant Epidemiologist | 2,392 | 40% | - | 957 | 957 |
| Immunologist | 30 | 100% | 30 | - | 30 |
| Neurologist | 180 | 30% | - | 54 | 54 |
| MD/Infectious diseases | 190 | 30% | - | 57 | 57 |
| Pediatrician | 195 | 50% | - | 98 | 98 |
| Warehouse manager | 195 | 100% | 195 | - | 195 |
| Driver | 195 | 30% | - | 59 | 59 |
| **Subtotal Rayon** | **4,267** | **42%** | **225** | **1,580** | **1,805** |
| **Health Facility** | | | | | |
| Immunologist | 100 | 100% | 100 | - | 100 |
| Pediatrician | 3,709 | 50% | - | 1,855 | 1,855 |
| Vaccinator | 7,984 | 100% | 7,984 | - | 7,984 |
| Nurse | 11,976 | 50% | - | 5,988 | 5,988 |
| **Subtotal Health Facility** | **23,769** | **67%** | **8,084** | **7,843** | **15,927** |
| **Grand Total** | **28,199** | | **8,361** | **9,458** | **17,826** |

***Figure 20: Salaries of EPI specific personnel by administrative levels, positions and years***

| EPI SPECIFIC Salary | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2014 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2016 - 2020 |
| **National** | **$39,998** | **$39,998** | **$39,998** | **$39,998** | **$39,998** | **$39,998** | **$199,992** |
| Medical Doctor | $26,801 | $26,801 | $26,801 | $26,801 | $26,801 | $26,801 | $134,007 |
| Assistant medical doctor | $6,372 | $6,372 | $6,372 | $6,372 | $6,372 | $6,372 | $31,861 |
| Warehouse manager | $1,567 | $1,567 | $1,567 | $1,567 | $1,567 | $1,567 | $7,835 |
| Pharmacist | $2,409 | $2,409 | $2,409 | $2,409 | $2,409 | $2,409 | $12,046 |
| Worker | $2,849 | $2,849 | $2,849 | $2,849 | $2,849 | $2,849 | $14,244 |
| **Oblast** | **$178,676** | **$178,676** | **$178,676** | **$178,676** | **$178,676** | **$178,676** | **$893,378** |
| Immunilogist | $178,676 | $178,676 | $178,676 | $178,676 | $178,676 | $178,676 | $893,378 |
| **Rayon** | **$439,584** | **$439,584** | **$439,584** | **$439,584** | **$439,584** | **$439,584** | **$2,197,920** |
| Immunologist | $134,007 | $134,007 | $134,007 | $134,007 | $134,007 | $134,007 | $670,033 |
| Warehouse manager | $305,577 | $305,577 | $305,577 | $305,577 | $305,577 | $305,577 | $1,527,887 |
| **Health Facility** | **$19,681,218** | **$19,681,218** | **$19,681,218** | **$19,681,218** | **$19,681,218** | **$19,681,218** | **$98,406,092** |
| Immunologist | $446,689 | $446,689 | $446,689 | $446,689 | $446,689 | $446,689 | $2,233,445 |
| Vaccinator | $19,234,529 | $19,234,529 | $19,234,529 | $19,234,529 | $19,234,529 | $19,234,529 | $96,172,647 |
| **Total** | **$20,339,476** | **$20,339,476** | **$20,339,476** | **$20,339,476** | **$20,339,476** | **$20,339,476** | **$101,697,382** |

***Figure 21: Salaries of shared personnel by administrative levels, positions and years***

| Shared Salary | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2014 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2016 - 2020 |
| **National** | **$7,750** | **$7,750** | **$7,750** | **$7,750** | **$7,750** | **$7,750** | **$38,752** |
| Head Doctor | $530 | $530 | $530 | $530 | $530 | $530 | $2,652 |
| Deputy Head Doctor | $1,574 | $1,574 | $1,574 | $1,574 | $1,574 | $1,574 | $7,869 |
| Accountant | $1,455 | $1,455 | $1,455 | $1,455 | $1,455 | $1,455 | $7,276 |
| Economist | $1,567 | $1,567 | $1,567 | $1,567 | $1,567 | $1,567 | $7,836 |
| Driver | $2,624 | $2,624 | $2,624 | $2,624 | $2,624 | $2,624 | $13,118 |
| **Oblast** | **$147,220** | **$147,220** | **$147,220** | **$147,220** | **$147,220** | **$147,220** | **$736,100** |
| Epidemiologist | $33,502 | $33,502 | $33,502 | $33,502 | $33,502 | $33,502 | $167,508 |
| Assistant Epidemiologist | $23,896 | $23,896 | $23,896 | $23,896 | $23,896 | $23,896 | $119,478 |
| Neurologist | $24,785 | $24,785 | $24,785 | $24,785 | $24,785 | $24,785 | $123,924 |
| Infectious Diseases/MD | $26,801 | $26,801 | $26,801 | $26,801 | $26,801 | $26,801 | $134,007 |
| Deputy Head Doctor | $23,607 | $23,607 | $23,607 | $23,607 | $23,607 | $23,607 | $118,034 |
| Accountant | $728 | $728 | $728 | $728 | $728 | $728 | $3,638 |
| Economist | $784 | $784 | $784 | $784 | $784 | $784 | $3,918 |
| Driver | $13,118 | $13,118 | $13,118 | $13,118 | $13,118 | $13,118 | $65,592 |
| **Rayon** | **$5,621,389** | **$5,621,389** | **$5,621,389** | **$5,621,389** | **$5,621,389** | **$5,621,389** | **$28,106,944** |
| Epidemiologist | $1,590,213 | $1,590,213 | $1,590,213 | $1,590,213 | $1,590,213 | $1,590,213 | $7,951,064 |
| Assistant Epidemiologist | $3,048,422 | $3,048,422 | $3,048,422 | $3,048,422 | $3,048,422 | $3,048,422 | $15,242,112 |
| Neurologist | $223,064 | $223,064 | $223,064 | $223,064 | $223,064 | $223,064 | $1,115,319 |
| MD/Infectious diseases | $254,613 | $254,613 | $254,613 | $254,613 | $254,613 | $254,613 | $1,273,064 |
| Pediatrician | $402,754 | $402,754 | $402,754 | $402,754 | $402,754 | $402,754 | $2,013,770 |
| Driver | $102,323 | $102,323 | $102,323 | $102,323 | $102,323 | $102,323 | $511,617 |
| **Health Facility** | **$22,086,483** | **$22,086,483** | **$22,086,483** | **$22,086,483** | **$22,086,483** | **$22,086,483** | **$110,432,415** |
| Pediatrician | $7,660,586 | $7,660,586 | $7,660,586 | $7,660,586 | $7,660,586 | $7,660,586 | $38,302,930 |
| Nurse | $14,425,897 | $14,425,897 | $14,425,897 | $14,425,897 | $14,425,897 | $14,425,897 | $72,129,485 |
| **Total** | **$27,862,842** | **$27,862,842** | **$27,862,842** | **$27,862,842** | **$27,862,842** | **$27,862,842** | **$139,314,211** |

***Figure 22: Supervision per diem costs by administrative levels, positions and years***

| Supervision | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2014 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2016 - 2020 |
| **National** | **$3,136** | **$3,136** | **$3,136** | **$3,136** | **$3,136** | **$3,136** | **$15,681** |
| Medical Doctor | $1,882 | $1,882 | $1,882 | $1,882 | $1,882 | $1,882 | $9,409 |
| Assistant medical doctor | $627 | $627 | $627 | $627 | $627 | $627 | $3,136 |
| Head Doctor | $314 | $314 | $314 | $314 | $314 | $314 | $1,568 |
| Deputy Head Doctor | $314 | $314 | $314 | $314 | $314 | $314 | $1,568 |
| **Oblast** | **$39,203** | **$39,203** | **$39,203** | **$39,203** | **$39,203** | **$39,203** | **$196,013** |
| Epidemiologist | $4,704 | $4,704 | $4,704 | $4,704 | $4,704 | $4,704 | $23,522 |
| Assistant Epidemiologist | $4,704 | $4,704 | $4,704 | $4,704 | $4,704 | $4,704 | $23,522 |
| Immunilogist | $12,545 | $12,545 | $12,545 | $12,545 | $12,545 | $12,545 | $62,724 |
| Neurologist | $6,272 | $6,272 | $6,272 | $6,272 | $6,272 | $6,272 | $31,362 |
| Infectious Diseases/MD | $6,272 | $6,272 | $6,272 | $6,272 | $6,272 | $6,272 | $31,362 |
| Deputy Head Doctor | $4,704 | $4,704 | $4,704 | $4,704 | $4,704 | $4,704 | $23,522 |
| **Rayon** | **$840,819** | **$840,819** | **$840,819** | **$840,819** | **$840,819** | **$840,819** | **$4,204,095** |
| Epidemiologist | $279,123 | $279,123 | $279,123 | $279,123 | $279,123 | $279,123 | $1,395,615 |
| Assistant Epidemiologist | $375,091 | $375,091 | $375,091 | $375,091 | $375,091 | $375,091 | $1,875,456 |
| Immunologist | $9,409 | $9,409 | $9,409 | $9,409 | $9,409 | $9,409 | $47,043 |
| Neurologist | $56,452 | $56,452 | $56,452 | $56,452 | $56,452 | $56,452 | $282,259 |
| MD/Infectious diseases | $59,588 | $59,588 | $59,588 | $59,588 | $59,588 | $59,588 | $297,940 |
| Pediatrician | $61,156 | $61,156 | $61,156 | $61,156 | $61,156 | $61,156 | $305,781 |
| **Health Facility** | **$3,129,942** | **$3,129,942** | **$3,129,942** | **$3,129,942** | **$3,129,942** | **$3,129,942** | **$15,649,708** |
| Vaccinator | $1,251,977 | $1,251,977 | $1,251,977 | $1,251,977 | $1,251,977 | $1,251,977 | $6,259,883 |
| Nurse | $1,877,965 | $1,877,965 | $1,877,965 | $1,877,965 | $1,877,965 | $1,877,965 | $9,389,825 |
| Total | $4,013,099 | $4,013,099 | $4,013,099 | $4,013,099 | $4,013,099 | $4,013,099 | $20,065,497 |

***Figure 23: Outreach per diem costs by administrative levels, positions and years***

| Outreach | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2014 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2016 - 2020 |
| **Health Facility** | **$1,194,584** | **$1,194,584** | **$1,194,584** | **$1,194,584** | **$1,194,584** | **$1,194,584** | **$5,972,920** |
| Immunologist | $31,362 | $31,362 | $31,362 | $31,362 | $31,362 | $31,362 | $156,811 |
| Pediatrician | $1,163,222 | $1,163,222 | $1,163,222 | $1,163,222 | $1,163,222 | $1,163,222 | $5,816,109 |
| Total | $1,194,584 | $1,194,584 | $1,194,584 | $1,194,584 | $1,194,584 | $1,194,584 | $5,972,920 |
| **Supervision** | | | | | | | |

***Figure 24: Financing projections by sources, years, and types of financing***

| | 2016 | 2017 | 2018 | 2019 | 2020 | Total |
|---|---|---|---|---|---|---|
| **Secured funding** | | | | | | |
| Government | 2,519,286 | 3,728,995 | 3,818,433 | 4,013,452 | 4,100,797 | **18,180,963** |
| Sub-national government | - | - | - | - | - | **-** |
| Gov. co-financing of gavi vaccine | 268,695 | - | - | - | - | **268,695** |
| NHIC | 3,000,476 | 3,035,990 | 3,041,533 | 3,047,187 | 3,052,954 | **15,178,140** |
| GAVI (NVS) | 826,069 | 106,541 | 105,736 | - | - | **1,038,345** |
| WHO | 330,000 | 140,000 | - | - | - | **470,000** |
| UNICEF | - | 200,000 | - | - | - | **200,000** |
| SDC | 105,000 | 162,500 | 61,000 | 162,500 | - | **491,000** |
| GAVI Transition Plan | 140,000 | 430,000 | - | - | - | **570,000** |
| EU | - | - | - | - | - | **-** |
| **Subtotal secure funding** | **7,189,526** | **7,804,026** | **7,026,701** | **7,223,139** | **7,153,750** | **36,397,143** |
| **Probable funding** | | | | | | |
| Government | - | - | - | - | - | **-** |
| Sub-national government | - | - | - | - | - | **-** |
| Gov. co-financing of Gavi vaccine | - | - | - | - | - | **-** |
| NHIC | - | - | - | - | - | **-** |
| GAVI (NVS) | - | - | - | - | - | **-** |
| WHO | - | - | 90,000 | 1,000,000 | 90,000 | **1,180,000** |

| | | | | | | |
|---|---|---|---|---|---|---|
| UNICEF | - | - | - | - | - | **-** |
| SDC | - | - | - | - | - | **-** |
| GAVI Transition Plan | - | - | - | - | - | **-** |
| EU | - | - | - | - | - | **-** |
| **Subtotal probable funding** | **-** | **-** | **90,000** | **1,000,000** | **90,000** | **1,180,000** |
| **Total (secured and probable funding)** | | | | | | |
| Government | 2,519,286 | 3,728,995 | 3,818,433 | 4,013,452 | 4,100,797 | **18,180,963** |
| Sub-national government | - | - | - | - | - | **-** |
| Gov. co-financing of Gavi vaccine | 268,695 | - | - | - | - | **268,695** |
| NHIC | 3,000,476 | 3,035,990 | 3,041,533 | 3,047,187 | 3,052,954 | **15,178,140** |
| GAVI (NVS) | 826,069 | 106,541 | 105,736 | - | - | **1,038,345** |
| WHO | 330,000 | 140,000 | 90,000 | 1,000,000 | 90,000 | **1,650,000** |
| UNICEF | - | 200,000 | - | - | - | **200,000** |
| SDC | 105,000 | 162,500 | 61,000 | 162,500 | - | **491,000** |
| GAVI Transition Plan | 140,000 | 430,000 | - | - | - | **570,000** |
| EU | - | - | - | - | - | **-** |
| **Total funding** | **7,189,526** | **7,804,026** | **7,116,701** | **8,223,139** | **7,243,750** | **37,577,143** |

*Figure 25: Healthcare financing trends*

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total expenditure on health (THE) in million US$** | **30** | **25** | **21** | **21** | **24** | **28** | **36** | **49** | **61** | **76** | **76** | **91** | **116** | **123** | **124** |
| **Total Health Expenditure (THE) per Capita in US$** | 30 | 25 | 21 | 21 | 24 | 28 | 36 | 49 | 61 | 76 | 76 | 91 | 116 | 123 | 124 |
| **Total Health Expenditure (THE) per Capita in Int$ (PPP)** | 104 | 109 | 118 | 118 | 128 | 139 | 163 | 192 | 215 | 246 | 226 | 260 | 324 | 340 | 340 |
| **Total Health Expenditure (THE) % Gross Domestic Product (GDP)** | 5.3 | 5.3 | 5.4 | 5.2 | 5.1 | 5.1 | 5.5 | 5.8 | 5.9 | 6.3 | 5.3 | 5.6 | 6.5 | 6.3 | 5.8 |
| | | | | | | | | | | | | | | | |
| **General government expenditure on health (GGHE) in million US$** | **14** | **12** | **9** | **10** | **11** | **13** | **16** | **19** | **26** | **31** | **39** | **46** | **56** | **61** | **66** |
| **Ministry of Health expenditure in million US$** | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 3 | | | | | | |
| **General Government Health Expenditure (GGHE) per Capita in US$** | 14 | 12 | 9 | 10 | 11 | 13 | 16 | 19 | 26 | 31 | 39 | 46 | 56 | 61 | 66 |
| **General Government Health Expenditure (GGHE) per Capita Int$ (PPP)** | 50 | 53 | 53 | 54 | 56 | 62 | 73 | 76 | 92 | 102 | 116 | 132 | 156 | 168 | 181 |
| **General Government Health Expenditure (GGHE) as % of THE** | 47.5 | 48.3 | 44.6 | 46.0 | 44.2 | 44.6 | 44.7 | 39.5 | 42.7 | 41.5 | 51.5 | 50.7 | 48.2 | 49.4 | 53.3 |
| **GGHE as % of General government expenditure (GGE)** | 8.7 | 9.6 | 6.5 | 7.0 | 7.0 | 7.3 | 11.8 | 11.1 | 7.6 | 7.6 | 8.7 | 9.0 | 9.6 | 9.7 | 10.7 |
| **GGHE as % of GDP** | 2.5 | 2.6 | 2.4 | 2.4 | 2.3 | 2.3 | 2.5 | 2.3 | 2.5 | 2.6 | 2.8 | 2.9 | 3.1 | 3.1 | 3.1 |
| | | | | | | | | | | | | | | | |
| **Private expenditure on health in million US$** | **16** | **13** | **12** | **11** | **13** | **16** | **20** | **29** | **35** | **44** | **37** | **45** | **60** | **63** | **58** |
| **Private Health Expenditure (PvtHE) as % of THE** | 52.5 | 51.7 | 55.4 | 54.0 | 55.8 | 55.4 | 55.3 | 60.5 | 57.3 | 58.5 | 48.5 | 49.3 | 51.8 | 50.6 | 46.7 |
| | | | | | | | | | | | | | | | |
| **Rest of the world funds / External resources in million US$** | **2** | **2** | | **1** | | | **1** | **1** | **1** | **1** | **1** | **2** | **2** | **2** | **1** |
| **Rest of the world funds as % of THE** | 6.7 | 6.5 | | 2.6 | | | 2.2 | 1.4 | 2.0 | 1.5 | 1.7 | 2.0 | 1.3 | 1.7 | 0.9 |
| | | | | | | | | | | | | | | | |
| **GDP per capita (in US$)** | 561 | 469 | 385 | 399 | 469 | 551 | 649 | 839 | 1,035 | 1,200 | 1,417 | 1,609 | 1,789 | 1,955 | 2,126 |
| **GGE as % of GDP** | 28.9 | 26.7 | 37.2 | 33.9 | 32.1 | 31.1 | 20.8 | 20.7 | 33.2 | 34.3 | 31.7 | 31.9 | 32.6 | 32.2 | 29.0 |
| | | | | | | | | | | | | | | | |
| **Exchange rate (UZS per US$)** | 236 | 423 | 771 | 971 | 1,019 | 1,113 | 1,219 | 1,264 | 1,320 | 1,466 | 1,586 | 1,715 | 1,890 | 2,096 | 2,312 |

*Source: WHO NHA*

***Figure 26: National immunization program expenditures and future resource requirements (basic scenario) by cost categories***

| Cost category | | Future Resource Requirements | | | | | |
|---|---|---|---|---|---|---|---|
| | 2014 | 2016 | 2017 | 2018 | 2019 | 2020 | Total 2016-2020 |
| **Routine recurrent costs** | | | | | | | |
| **Vaccines (routine vaccines only)** | **7,797,937** | **26,550,902** | **23,424,088** | **25,693,339** | **25,832,471** | **26,330,874** | **127,831,674** |
| Traditional | 2,332,955 | 1,711,931 | 1,739,212 | 1,767,040 | 1,795,312 | 1,824,037 | **8,837,532** |
| Underused | 2,989,006 | 3,845,607 | 3,906,892 | 3,969,402 | 4,032,912 | 4,097,439 | **19,852,252** |
| New | 2,475,976 | 20,993,364 | 17,777,984 | 19,956,897 | 20,004,246 | 20,409,398 | **99,141,889** |
| Injection supplies | 91,749 | 1,031,503 | 1,047,769 | 1,153,719 | 1,160,495 | 1,182,973 | **5,576,460** |
| **Personnel** | **25,547,160** | **25,547,160** | **25,547,160** | **25,547,160** | **25,547,160** | **25,547,160** | **127,735,800** |
| Salaries of full-time EPI health workers (immunization specific) | 20,339,476 | 20,339,476 | 20,339,476 | 20,339,476 | 20,339,476 | 20,339,476 | **101,697,382** |
| Per-diems for outreach vaccinators/mobile teams | 1,194,584 | 1,194,584 | 1,194,584 | 1,194,584 | 1,194,584 | 1,194,584 | **5,972,920** |
| Per-diems for supervision and monitoring | 4,013,099 | 4,013,099 | 4,013,099 | 4,013,099 | 4,013,099 | 4,013,099 | **20,065,497** |
| **Transportation** | **185,391** | **185,397** | **185,396** | **194,239** | **228,060** | **262,628** | **1,055,719** |
| Fixed Site Strategy (Incl. Vaccine Distribution) | 185,391 | 185,397 | 185,396 | 194,239 | 228,060 | 262,628 | **1,055,719** |
| Outreach strategy | | | | | | | |
| Mobile strategy | | | | | | | |
| **Maintenance and overhead** | **594,462** | **839,463** | **989,507** | **1,029,663** | **575,878** | **592,712** | **4,027,223** |
| Cold chain maintenance and overhead | 516,712 | 761,713 | 911,757 | 951,913 | 498,128 | 513,462 | **3,636,973** |
| Maintenance of other capital equipment | | | | | | 1,500 | **1,500** |
| Building Overheads (Electricity, Water…) | 77,750 | 77,750 | 77,750 | 77,750 | 77,750 | 77,750 | **388,750** |
| Short-term training | 80,000 | 439,665 | 400,521 | 434,271 | 434,271 | 400,521 | **2,109,249** |
| IEC/Social Mobilization | 30,000 | 120,000 | 80,998 | 80,998 | 80,998 | 80,998 | **443,992** |
| Disease Surveillance | 100,000 | 130,000 | 100,000 | 70,000 | 70,000 | 70,000 | **440,000** |
| Program management | 273,139 | 1,885,034 | 1,122,939 | 1,053,239 | 1,158,201 | 893,201 | **6,112,614** |
| Other routine recurrent costs | | | | | | | |
| **Subtotal** | 34,699,838 | 56,729,124 | 52,898,379 | 55,256,627 | 55,087,534 | 55,361,067 | **275,332,731** |
| **Routine capital costs** | | | | | | | |
| Vehicles (100% EPI) | | | | 980,000 | 1,020,000 | 1,130,000 | **3,130,000** |
| Cold chain equipment | | 2,294,709 | 1,277,514 | 766,286 | 709,170 | 601,832 | **5,649,512** |
| Other capital equipment | | | | | | 30,000 | **30,000** |
| Buildings Construction (100% EPI) | | 822,014 | 765,481 | | | | |
| **Subtotal** | | 3,116,723 | 2,042,995 | 1,746,286 | 1,729,170 | 1,761,832 | **10,397,006** |
| **Shared Health Systems Costs (EPI Portion)** | | | | | | | |
| Shared Personnel Costs | 27,862,842 | 27,862,842 | 27,862,842 | 27,862,842 | 27,862,842 | 27,862,842 | **139,314,211** |
| Shared Transport Costs – Vehicles, Fuel and Maintenance | 264 | 264 | 264 | 264 | 264 | 264 | **1,322** |
| Shared buildings - construction | | | | | | | |
| Shared Buildings – Overhead | 77,417 | 77,417 | 77,417 | 77,417 | 77,417 | 77,417 | **387,083** |
| **Subtotal** | 27,940,523 | 27,940,523 | 27,940,523 | 27,940,523 | 27,940,523 | 27,940,523 | **139,702,616** |
| **Grand Total** | **62,640,361** | **87,786,370** | **82,881,897** | **84,943,437** | **84,757,228** | **85,063,422** | **425,432,353** |
| Routine Immunization | 62,640,361 | 87,786,370 | 82,881,897 | 84,943,437 | 84,757,228 | 85,063,422 | **425,432,353** |
| Supplemental immunization activities (campaigns) | | | | | | | |

***Figure 27: Total Resource Requirements, funding from all sources by risk types and government financing by cost categories***

| Cost category | Future resource requirements Total 2016-2020 | Funding from all sources | | | Government Funding | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Secured | Probable | Total | Secured | % of All secured funds | Probable | % of all probable funds | Total | % of Total funds |
| **Routine recurrent costs** | | | | | | | | | | |
| **Vaccines (routine vaccines only)** | **127,831,674** | **68,819,816** | **59,011,859** | **127,831,674** | **41,638,723** | **61%** | **55,594,698** | **94%** | **97,233,424** | **76%** |
| Traditional | **8,837,532** | 1,711,931 | 7,125,602 | 8,837,532 | 1,711,931 | 100% | 7,125,602 | 100% | 8,837,533 | 100% |
| Underused | **19,852,252** | 11,721,901 | 8,130,352 | 19,852,252 | 7,780,990 | 66% | 8,130,352 | 100% | 15,911,342 | 80% |
| New | **99,141,889** | 55,385,984 | 43,755,905 | 99,141,889 | 32,145,803 | 58% | 40,338,745 | 92% | 72,484,548 | 73% |
| Injection supplies | **5,576,460** | 1,996,722 | 3,579,738 | 5,576,460 | 560,237 | 28% | 3,579,738 | 100% | 4,139,975 | 74% |
| **Personnel** | **127,735,800** | **127,735,800** | **0** | **127,735,800** | **127,735,800** | **100%** | **0** | | **127,735,803** | **100%** |
| Salaries of full-time EPI health workers (immunization specific) | **101,697,382** | 101,697,382 | 0 | 101,697,382 | 101,697,382 | 100% | 0 | | 101,697,383 | 100% |
| Per-diems for outreach vaccinators/mobile teams | **5,972,920** | 5,972,920 | 0 | 5,972,920 | 5,972,920 | 100% | 0 | | 5,972,921 | 100% |
| Per-diems for supervision and monitoring | **20,065,497** | 20,065,497 | 0 | 20,065,497 | 20,065,497 | 100% | 0 | | 20,065,498 | 100% |
| **Transportation** | **1,055,719** | **1,055,719** | **0** | **1,055,719** | **1,055,719** | **100%** | **0** | | **1,055,720** | **100%** |
| Fixed Site Strategy (Incl. Vaccine Distribution) | **1,055,719** | 1,055,719 | 0 | 1,055,719 | 1,055,719 | 100% | 0 | | 1,055,720 | 100% |
| Outreach strategy + Mobile strategy | **0** | 0 | 0 | 0 | 0 | | 0 | | 0 | |
| **Maintenance and overhead** | **4,027,223** | **4,027,223** | **0** | **4,027,223** | 0 | 0% | 0 | | 0 | 0% |
| Cold chain maintenance and overhead | **3,636,973** | 3,636,973 | 0 | 3,636,973 | 3,636,973 | 100% | 0 | | 3,636,974 | 100% |
| Maintenance of other capital equipment | **1,500** | 1,500 | 0 | 1,500 | 1,500 | 100% | 0 | | 1,501 | 100% |
| Building Overheads (Electricity, Water…) | **388,750** | 388,750 | 0 | 388,750 | 388,750 | 100% | 0 | | 388,751 | 100% |
| Short-term training | **2,109,249** | 1,959,249 | 150,000 | 2,109,249 | 0 | 0% | 0 | 0% | 0 | 0% |
| IEC/Social Mobilization | **443,992** | 353,992 | 90,000 | 443,992 | 0 | 0% | 0 | 0% | 0 | 0% |
| Disease Surveillance | **440,000** | 230,000 | 210,000 | 440,000 | 0 | 0% | 0 | 0% | 0 | 0% |
| Program management | **6,112,614** | 5,662,614 | 450,000 | 6,112,614 | 0 | 0% | 0 | 0% | 0 | 0% |
| Other routine recurrent costs | | | | 0 | 0 | | 0 | | 0 | |
| **Subtotal** | **275,332,731** | **211,841,135** | **63,491,596** | **275,332,731** | **174,457,465** | **82%** | **55,594,698** | **88%** | **230,052,164** | **84%** |
| **Routine capital costs** | | | | | | | | | | |
| Vehicles (100% EPI) | **3,130,000** | 3,130,000 | 0 | 3,130,000 | 0 | 0% | 0 | | 0 | 0% |
| Cold chain equipment | **5,649,512** | 5,649,511 | 0 | 5,649,511 | 0 | 0% | 0 | | 0 | 0% |
| Other capital equipment | **30,000** | 30,000 | 0 | 30,000 | 0 | 0% | 0 | | 0 | 0% |
| Buildings Construction (100% EPI) | | | | 0 | 0 | | 0 | | 0 | |
| **Subtotal** | **10,397,006** | **8,809,511** | **0** | **8,809,511** | **0** | **0%** | **0** | | **0** | **0%** |
| **Supplemental immunization activities (SIAs)** | | | | | | | | | | |
| | | **0** | **0** | **0** | **0** | | **0** | | **0** | |
| Vaccines & injection supplies | | | | 0 | 0 | | 0 | | 0 | |
| Operational costs | | | | 0 | 0 | | 0 | | 0 | |
| | | **0** | **0** | **0** | **0** | | **0** | | **0** | |
| Vaccines & injection supplies | | | | 0 | 0 | | 0 | | 0 | |

| Cost category | Future resource requirements Total 2016-2020 | Funding from all sources | | | Government Funding | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Secured | Probable | Total | Secured | % of All secured funds | Probable | % of all probable funds | Total | % of Total funds |
| Operational costs | | | | 0 | 0 | | 0 | | 0 | |
| **Subtotal** | | **0** | **0** | **0** | **0** | | **0** | | **0** | |
| **Shared Health Systems Costs (EPI Portion)** | | | | | | | | | | |
| Shared Personnel Costs | **139,314,211** | **139,314,211** | **0** | **139,314,211** | **139,314,211** | **100%** | **0** | | **139,314,212** | **100%** |
| Shared Transport Costs – Vehicles, Fuel and Maintenance | **1,322** | 1,322 | 0 | 1,322 | 1,322 | 100% | 0 | | 1,323 | 100% |
| Shared buildings – construction | | | | 0 | 0 | | 0 | | 0 | |
| Shared Buildings – Overhead | **387,083** | 387,083 | 0 | 387,083 | 387,083 | 100% | 0 | | 387,084 | 100% |
| **Subtotal** | **139,702,616** | **139,702,616** | **0** | **139,702,616** | **139,702,616** | **100%** | **0** | | **139,702,617** | **100%** |
| **Grand Total** | **425,432,353** | **360,353,262** | **63,491,596** | **423,844,859** | **314,160,081** | **87%** | **55,594,698** | **88%** | **369,754,780** | **87%** |
| Routine Immunization | **425,432,353** | 360,353,262 | 63,491,596 | 423,844,859 | 314,160,081 | 87% | 55,594,698 | 88% | 369,754,780 | 87% |
| Supplemental immunization activities | | 0 | 0 | 0 | 0 | | 0 | | 0 | |

## *Figure 28: Macroeconomic and sustainability indicators*

| | 2014 | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| **Macroeconomic projections** | | | | | | |
| **Population** | 4,061,550 | 4,053,431 | 4,049,378 | 4,045,328 | 4,041,283 | 4,037,242 |
| **GDP ($)** | 9,118,179,750 | 9,099,952,509 | 9,090,852,556 | 9,081,761,704 | 9,072,679,942 | 9,063,607,262 |
| Per capita GDP ($) | 2,245 | 2,245 | 2,245 | 2,245 | 2,245 | 2,245 |
| **Total Health Expenditures (THE $)** | 930,094,950 | 928,235,690 | 927,307,455 | 926,380,147 | 925,453,767 | 924,528,313 |
| Total Health Expenditures (THE) per capita | 229 | 229 | 229 | 229 | 229 | 229 |
| **Government Health Expenditures (GHE $)** | 478,068,804 | 477,113,145 | 476,636,032 | 476,159,396 | 475,683,236 | 475,207,553 |
| Government Health Expenditure per capita ($) | 118 | 118 | 118 | 118 | 118 | 118 |
| **Resource requirements for immunization** | | | | | | |
| **Routine and SIAS (Campaigns) includes vaccines and operational costs)** | 5,218,463 | 5,018,761 | 5,633,260 | 4,945,936 | 6,052,374 | 5,072,985 |
| **Routine only (includes vaccines and operational costs)** | 5,218,463 | 5,018,761 | 5,633,260 | 4,945,936 | 6,052,374 | 5,072,985 |
| Per DTP3 immunized child | 126 | 120 | 134 | 116 | 141 | 117 |
| **Per capita** | | | | | | |
| Routine and SIAS (Campaigns) includes vaccines and operational costs) | 1.28 | 1.24 | 1.39 | 1.22 | 1.50 | 1.26 |
| Routine only (includes vaccines and operational costs) | 1.28 | 1.24 | 1.39 | 1.22 | 1.50 | 1.26 |
| **% Government Health Expenditures** | | | | | | |
| Routine and SIAS (Campaigns) includes vaccines and operational costs) | 1.09% | 1.05% | 1.18% | 1.04% | 1.27% | 1.07% |
| Routine only (includes vaccines and operational costs) | 1.09% | 1.05% | 1.18% | 1.04% | 1.27% | 1.07% |
| **% Of Total Health Expenditures (THE)** | | | | | | |
| Routine and SIAS (Campaigns) includes vaccines and operational costs) | 0.56% | 0.54% | 0.61% | 0.53% | 0.65% | 0.55% |
| Routine only (includes vaccines and operational costs) | 0.56% | 0.54% | 0.61% | 0.53% | 0.65% | 0.55% |
| **% GDP** | | | | | | |
| Routine and SIAS (Campaigns) includes vaccines and operational costs) | 0.06% | 0.06% | 0.06% | 0.05% | 0.07% | 0.06% |
| Routine only (includes vaccines and operational costs) | 0.06% | 0.06% | 0.06% | 0.05% | 0.07% | 0.06% |
| **Funding gap** | | | | | | |
| **Funding gap (with secured funds only)** | | 0 | 0 | 90,000 | 1,000,000 | 90,000 |
| % of the future resource requirements for immunization | | 0% | 0% | 2% | 17% | 2% |
| % Government Health Expenditures | | 0.00% | 0.00% | 0.02% | 0.21% | 0.02% |
| % Of Total Health Expenditures (THE) | | 0.00% | 0.00% | 0.01% | 0.11% | 0.01% |
| % GDP | | 0.00% | 0.00% | 0.00% | 0.01% | 0.00% |
| **Funding gap (with secured & probable funds)** | | 0 | 0 | 0 | 0 | 0 |
| % of the future resource requirements for immunization | | 0% | 0% | 0% | 0% | 0% |
| % Government Health Expenditures | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| % Of Total Health Expenditures (THE) | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| % GDP | | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |