Comprehensive Multi-Year Plan of the National Immunization Programme of Armenia 2016-2020

Republic of Armenia

2015

T A B L E OF C O N T E N T S

L I S T OF F I G U R E S A N D T A B L E S

A C R O N Y M S

AEFI	Adverse Events Following Immunization
AFP	Acute Flaccid Paralysis
BBP	Basic Benefit Package
BCG	Bacillus Calmette-Guerin (tuberculosis vaccine)
CDC	Center(s) for Disease Control and Prevention
CRS	Congenital Rubella Syndrome
DHS	Demographic and Health Survey
DPT or 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
EPI	Expanded Programme on Immunization
EVSM	Effective Vaccine Store Management
FSP	Financial Sustainability Plan
GAVI	Global Alliance for Vaccines and Immunization
GoA	Government of Armenia
HepB	Hepatitis B vaccine
Hib	Haemophilus Influenza type b (disease or vaccine)
ICC	Interagency Coordinating Committee
IIP	Immunization in Practice
MCH	Maternal and Child Health
MDVP	Multi-Dose Vial Policy
MICS	Multiple Indicator Cluster Survey
MIS	Management Information System
MMR	Measles, Mumps and Rubella (vaccine)
MR	Measles and Rubella (vaccine)
MoH	Ministry of Health
MTEF	Medium Term Expenditure Framework
NIP	National Immunization Programme
NRA	National Regulatory Authority
OPM	Oxford Policy Management
OPV	Oral Polio Vaccine
PHC	Primary Health Care
RoA	Republic of Armenia
SHA	State Health Agency
SHAEI	State Hygiene and Anti-Epidemic Inspectorate
SIA	Supplementary Immunization Activity
SIP	Safe Immunization or Injection 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
VRF	Vishnevskaya-Rostropovich Foundation
WB	World Bank
WHO	World Health Organization

1. BACKGROUND

1.1 GENERAL INFORMATION

The Republic of Armenia is landlocked in the southern Caucasus. Located between the Black and Caspian Seas, the country is bordered on the north and east by Georgia and Azerbaijan, and on the south and west by Iran and Turkey.

Armenia is a small, mountainous country, 90 percent of which is located more than 1,000 meters above sea level. The area of the country is 29,743 square kilometres, 46.8 percent of which is agricultural land, 36.4 percent mountains and highlands, 11.2 percent forests, and 5.6 percent water surface. In Armenia, the largest lake is Lake Sevan, which has a surface area of 1,253 square kilometres. The longest river is the Araks. The highest point in the country is the peak of Aragats (4,090 meters); the lowest point is the Debet River (390 meters). The longest distance between the northwest and the southeast is 360 kilometres, and the longest distance between west and east is 200 kilometres. The country is subdivided into 11 regions (marzes), which includes the region of Yerevan, the capital city of Armenia.

1.2 DEMOGRAPHICS AND OTHER INDICATORS

Armenia has a population of 3,017,000 (2014 est.)[1] and is the second most densely populated of the former Soviet republics.

The demographic situation in Armenia raises concerns mainly with regards to three issues: low fertility, aging, and migration. According to the National Statistical Service (NSS) the fertility rate was is 1.5 children per woman in 2011 (1.7 according to the 2010 Demographic and Health Survey). In 2012 and 2013 the fertility rate remained unchanged – 1.6, whereas a rate of at least 2.1 is necessary to maintain the existing population level. In 2011, 43,340447 children were born, which is 3.1 per cent fewer than in 2010. Based on data reported by NSS, the number of babies born in the country in 2013 decreased by 1.7% (41,770 newborns) as compared to the previous year.

A number of concurrent economic, military-political, social, and other factors resulted in turbulent currents of migration over the last two decades, with an estimated 700,000 to 1.3 million people (22–40 per cent of Armenia's 2008 nominal population) leaving Armenia and settling abroad during the period 1990–2005 alone.

Ethnic Armenians make up 97.9% of the population. Yazidis make up 1.3%, and Russians 0.5%. Other minorities include Assyrians, Ukrainians, Greeks, Kurds, Georgians, and Belarusians. There are also smaller communities of Vlachs, Mordvins, Ossetians, Udis, and Tats. Minorities of Poles and Caucasus Germans also exist though they are heavily Russified.[2]

Armenia has a relatively large diaspora (8 million by some estimates). The largest Armenian communities outside of Armenia can be found in Russia, France, Iran, the United States, Georgia, Syria, Lebanon, Argentina, Australia, Canada, Greece, Cyprus, Israel, Poland and Ukraine. Around 70,000 Armenians live in Turkey. About 1,000 Armenians reside in the Armenian Quarter in the Old City of Jerusalem in Israel, a remnant of a once-larger community.[3] Italy is home to the San Lazzaro degli Armeni, an island located in the Venetian Lagoon, which is completely occupied by a monastery run by the Mechitarists, an Armenian Catholic congregation.[4]

Age structure of the current population of the Republic is as the following (2014 est.):

- 0-14 years: 19.1%
- 15-64 years: 70.3%
- 65 years and over: 10.6%

Life expectancy at birth in Armenia in 2013 was 74.8 years (for both sexes), and 71.5 and 77.9 years for men and women respectively. In 2014 81.4% deaths in Armenia were attributed to non-communicable diseases followed by ill-defined conditions (13.2%), external causes (4.5%) and communicable diseases (0.9%).

[1] "Statistical Yearbook of Armenia, 2014: Population". ArmStat. http://www.armstat.am/file/doc/99458058.pdf.
[2] Asatryan, Garnik; Arakelova, Victoria (2002), *The Ethnic Minorities of Armenia*, Routledge, part of the OSCE
[3] "Jerusalem – The Old City: The Armenian Quarter". Jewish Virtual Library. http://www.jewishvirtuallibrary.org/jsource/Society_&_Culture/geo/armenianq.html. Retrieved 2009-07-22
[4] San Lazzaro degli Armeni – Venice for Visitors

Table 1: Basic indicators

Indicators[5]	Figures			
	2000	2005	2010	2013
Number of permanent population as of end of year (thousand):	3 226.9	3 215.8	3,262.6	3 017.1
Urban	2 095.8	2 062.3	2 088.5	1 914.1
Rural	1 131.1	1 153.5	1 174.1	1 103.0
Out of total population at (thousand):				
Under able-bodied age	846.2	758.2	639.4	611.8
Of able-bodied age	1930.3	2036.9	2 247.1	2 034.0
Over able-bodied age	438.8	420.7	376.1	371.3
Life expectancy at birth, years:				
Total population	72.9	73.4	74.1	74.8
Males	70.1	70.3	70.6	71.5
Females	75.8	76.4	77.2	77.9
Net population migration (-,+)	-2.7	-2.4	-0.7	-8.1
Maternal mortality rate, per 100,000 live births (MMR)	33.0	19.0	9.0	22.0
Under-five mortality rate, per 1,000 live births	19.3	13.0	13.4	11.0
Infant mortality rate, per 1,000 live births (IMR)	15.4	11.6	11.4	9.7
Birth rate (per thousand people)	10.6	11.7	13.8	13.8
Death rate (per thousand people)	7.5	8.0	8.6	9.0
Natural growth of population	3.1	3.7	5.2	4.8

1.3. SOCIO-ECONOMIC TRENDS

Armenia is a lower-middle income country with a medium human development index (HDI). Armenia's HDI value for 2013 is 0.730 which is in the high human development category—positioning the country at 87 out of 187 countries and territories. Between 1990 and 2013, Armenia's HDI value increased from 0.632 to 0.730, an increase of 15.5 percent or an average annual increase of about 0.63 percent. Armenia's HDI value for 2011 was 0.716, positioning the country at 86 out of 187 countries and territories. It's GDP per capita in 2013 stood at $3,452 as compared to $2,950 in 2011, while its purchasing power party adjusted GDP per capita was $5,200 in 2011 and $7,526 in 2013. After a period of double-digit economic growth of 12 per cent from 2001 to 2007, the country was harshly hit by the global crisis in the last quarter of 2008 (totalled only 6.9%). As a result, the GDP dropped by 14.14 per cent in 2009, which indicated deep recession in the economy. The poverty level in the same year increased for the first time ever since 1998.

In 2010 the economy started to recover and by the end of the year 2.26 per cent GDP growth was registered. In 2011 the GDP growth reached was 4.76 per cent, which was considered as insufficient to overcome socio-economic distortions caused by the crisis. In 2012 the country recorded a 7.2% economic growth resulting in certain reduction of poverty. In 2013 the GDP growth reached 3.5 per cent. According to the results of the integrated study on living standards of households in Armenia in 2012, released by the National Statistical Service on 29 November 2013, almost every third citizen of Armenia (980 thousand, or 1.2 million people, or 32.46 per cent) was is poor, among them 408 thousand, 13.5 and 98,000 (3 per cent were very poor, and around 85 thousand or 2.8 per cent) live in extreme poverty. Although poverty rate decreased in 2012 in comparison with 2011, both poverty rate and its gap and severity were still at a higher level than in 2008. In 2012 poverty rate in Armenia constituted 32.4 per cent as compared to 27.6 per cent observed in 2008. According to the NSS, the level of poverty in 2010 increased by 1.7 per cent over the previous year and nearly

[5] "Statistical Yearbook of Armenia, 2000-2013: Population". ArmStat. http://www.armstat.am/file/doc/99458058.pdf

270,000 Armenian citizens became poverty-stricken over the two years 2010–2011. Approximately 2630 per cent of the budget allocation for 2013 was directed towards the social protection/benefits sector, while the health and education sectors received 5.611 per cent and 96 per cent respectively. Regional disparities and socio-economic inequalities have continued to be significant. Armenia's population has become socially polarized. During the period 2008 to 2010 the incidence of poverty in rural areas increased marginally faster than in urban areas (8.5 per cent vs. 8.1 per cent), though the majority of the poor (64.3 per cent) were urban residents.

1.4. MILLENIUM DEVELOPMENT GOALS PROGRESS

In general, the situation with maternal and infant mortality in Armenia has been improving over the last years[6].

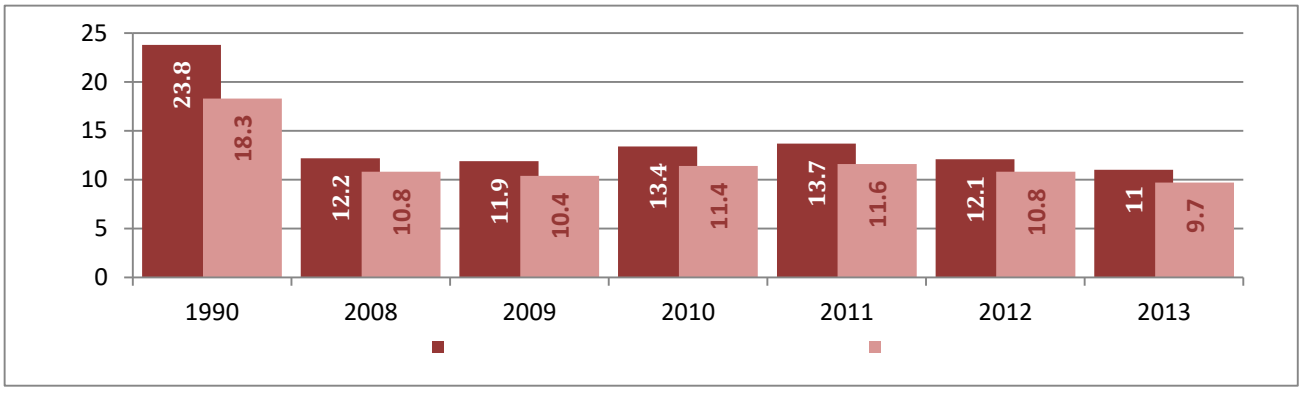
In 2004-2014, there was a reduction in maternal mortality from 26.7 to 18.6 per 100,000 live births, but this rate is still about four times higher than the EU average.

According to official statistics, there has been a stable trend of reducing child mortality in the period of 1990-2014, in terms of reducing both the rates of under-five mortality and of infant mortality. The national programs implemented by the Government of Armenia in the last decade towards the improvement of child healthcare have played a critical role in reducing child mortality in the country.

Armenia has made significant progress in reducing the rate of under-five mortality and infant mortality; though it has not yet achieved the MDG target of less than 10 deaths per 1000 live births. Since 1990, the under-five mortality rate has dropped by more than two times -from 24 to 11 deaths per 1,000 live births between 1990 and 2013. In 2013, the under-five mortality rate for boys was higher compared to the rate for girls - 12 and 10 per 1,000 live births, respectively.

Similar to the under-five mortality rate, the officially reported infant mortality rate has declined by about half, dropping from 18.5 to 9.7 deaths per 1,000 live births between 1990 and 2013. However, Armenia has not achieved its MDG target of less than deaths per 1000 live births.

Figure 1: Under five and infant mortality rates per 1,000 live births, 1990-2013



Source: NSS, 2014

[6] MDG National Progress Report, Armenia, 2015

1.5. HEALTH SYSTEM

Armenia inherited the health system from the former Soviet Union. The system was centralized and provided universal access to a wide range of state-financed services, with a heavy emphasis on secondary and tertiary care. The main challenge the country has faced since then was to maintain this complex and inefficient health care system in the new socio-economic circumstances. While formally public funding remained the main source of financing for the Armenian health system, it was insufficient to sustain the system even after a chain of reforms. According to *2013-2015 Mid-Term Expenditure Framework*, in 2012 the government expenditures in health care as a percentage of GDP is 1.5per cent and share of government spending allocated to health is 6per cent which are among the lowest in the region. Moreover, budget allocations for the health sector will continue to decrease up to 1.35 per cent in 2016[7]. International comparisons of public health expenditure as a percentage of GDP demonstrate that such level of public spending is among the lowest in the world[8][9] and is about 4 times below EU and about 5 times below OECD average indicator and about half of the CIS average[10][11].

Out of pocket payments still continue to be the main source of the health system's financing in the country, amounting to as much as about 60 per cent of total health expenditures in the country and 4 per cent of the national GDP[12]. High out-of-pocket payments result in a number of negative consequences, including poor utilization of healthcare services and have negative effects on care seeking behaviour and health outcomes. The current health budget is insufficient to pay for the full costs of the basic benefits package, which is one of the factors leading to a significant level of informal payments. This imposes a large barrier to health care access and a financial risk for many Armenians and undermines the trust of the population in measures taken by the Government to ensure access to medical services.

Regional disparities and socio-economic inequalities have continued to be significant. According to the ILCS 2012, although Armenia has succeeded in providing for good healthcare indicators, the utilization of healthcare services by population is rather low, particularly in rural communities and among the poor. In comparison with the previous year, patients had less often applied for medical advice or treatment. Proportion of the patients having consulted a doctor varied by poverty status: while 36.2 per cent of the non-poor applied for medical advice or treatment, only 25.1 per cent of the poor and 20.7 per cent of the extremely poor did so. The main reasons for not applying to primary healthcare facilities were self-treatment (47 per cent) and lack of finance (22 per cent). Lack of finance was indicated by 29 per cent in other urban communities, by 22 per cent in Yerevan, and by 19 per cent in rural communities. Sixty eight per cent of rural households reported that the nearest health care institution was within 1 km from their residence, 0.6 per cent of households reported that the distance to the nearest healthcare facility was more than 10 km away from their residence[13].

[7] 2014-2016 Mid-Term Expenditure Framework, Armenia
[8] The World Bank databank; Health expenditure, public (% of GDP), 2012
[9] 2010-2014 Factfish, Armenia: Health expenditure, public; (Armenia is #157 in the world ranking)
[10] European health for all database (HFA-DB), World Health Organization Regional Office for Europe Updated: April 2014
[11] OECD Health Statistics, 2014 (Overall health spending accounted for 9.3% of GDP on average across OECD countries in 2012)
[12] National Health Accounts database, World Health Organization, 2012
[13] Social Snapshot and Poverty in Armenia, 2013

The quality assurance (QA) in health care is defined as an integrated system of activities involving planning, quality control, assessment, and reporting – as well as quality improvement – so as to ensure that a health care service meets defined standards of quality within a stated level of confidence. Armenia has yet to implement such a systematic approach to the QA. The Ministry of Health is nominally the key regulator of the health system, but its regulatory capacity remains quite weak at the facility level. It is the role of the Ministry and its subordinated institutions to define and apply national health standards and norms, to ensure quality control and to develop as well as oversee state-funded programmes. The lack of an integrated quality assurance system also means that information on the quality of health services is not generally available[14]. Thus, there is a need for developing standards and key indicators for the quality and safety of health care services, including such services' adherence to clinical guidelines. There is a lack of clear mechanisms and institutional arrangements for the QA, and health care managers have little or no training in the organization of the process of care or in the principles and practices of the QA and quality improvement.

Although there is a national system for collection of health and demographic data performed by the National Institute of Health and National Statistics Services there are several issues and gaps in the overall information and monitoring system: a) insufficient links between different information flows; b) different standards, information, statistical and financial forms; leading to fractional and fragmented information; c) lack of monitoring on important indicators, particularly on child nutrition, growth and development; d) fragmented and not regularized information is not aggregated and analysed on a regular and timely basis impeding the process of decision-making. The mentioned gaps in the overall information and monitoring system also impede the reliability and validity of data on mother and child health and nutrition[15].

Armenia is also facing challenges in relation to continuous medical education. Existing regulations require that Armenian doctors and nurses take continuous education courses every five years. As of 2008, this standard had been met by 62 % of the medical doctors and 40 % of the nurses, which remains well below existing standards. Training for doctors and nurses, including refresher training, is provided chiefly by the National Institute of Health, with a small part of the training occurring at the Yerevan State Medical University on a paid basis. Training may be paid for by the government, a health care facility or personal funds. Since the National Institute of Health appears to have sufficient capacity to train the required number of doctors and nurses, the gap in training may be due to a lack of funds. There is no system for evaluation of training programmes or any other process to determine what impact they have[16]. Actions are required to introduce incentives and/or enforcement mechanisms to encourage participation in continuing medical education and to develop monitoring quality indicators, such as adherence to clinical practice guidelines.

Armenia counts with an extensive network of health facilities consisting of hospitals, regional poli-clinics and basic health services. The number of health professionals would be sufficient if they would not concentrate on larger urban areas, leaving rural areas unattended. Since 1991, the overall Armenian health workforce has contracted. The mix of medical personnel, particularly the ratio of general practitioners to narrow specialists and to nurses, appears unbalanced. The number of specialist doctors and dentists has increased, but the number of nurses per capita has fallen substantially. However, while the supply of physicians in the health system has remained relatively stable in per capita terms, the balance of specialists

[14] Richardson E. Armenia: Health system review. Health Systems in Transition, 2013; 15(4): 1– 99
[15] Armenia Health System Performance Assessment, 2009
[16] Armenia Health System Performance Assessment, 2009

has not shifted away from hospital services. There is a shortage of doctors serving rural areas while there is a surplus in Yerevan. The shortage of nurses in the health workforce has continued in Armenia, and it is still well below the average number of nurses per capita in the CIS or the EU (490 per 100,000 populations in 2011 vs. over 800 per 100,000 in CIS and EU)[17]. In addition, the nurse to physician ratio in Armenia is lower than in the other countries and country groups looked at, reflecting the fact that during the optimization phase of the national health reforms, the relative reduction in nurses was higher than in physicians (1.2 versus 2.1 in CIS and EU). Action is needed to develop overall health workforce plans to address both the mix and distribution of health professionals. Such plans will also require appropriate incentives and enforcement mechanisms to ensure that the targets are met.

On the whole, the identified challenges faced by the health system of Armenia include: (a) the absence of an overall health system reform strategy and limited policy instruments that would provide for coordination and coherence of interventions in areas such as maternal and child health care; (b) insufficient human resources in the system with skills imbalance and mal-distribution having direct reflection on availability of paediatricians and neonatologists in the country, particularly in rural settings; (c) inadequate knowledge of health specialists to deliver quality health care including child care services; (d) insufficient alternative mechanisms for continual clinical and managerial professional development for health providers; (e) high rate of out-of pocket payments, imposing a large barrier to health care access and a financial risk especially for poor and vulnerable families; (f) lack of quality assurance system reflected in inadequate level of the quality of child care services; (g) insufficient monitoring and evaluation system at local, regional and national levels[18].

2. NATIONAL IMMUNIZATION PROGRAMME

2.1. LEADERSHIP, GOVERNANCE AND PROGRAMME MANAGEMENT

Immunization services are delivered by 509 health facilities under the jurisdiction of 334 Medical Service Providers in marzes and 28 in Yerevan. These Medical Service Providers are under the direct control of marz and Yerevan city Health Directorates.

According to the Government Decree No1134-N dated October 17, 2013 the National Center for Disease Control and Prevention was reorganized by integration of several public health entities and was assigned for coordination and management of the National Immunization Programme.

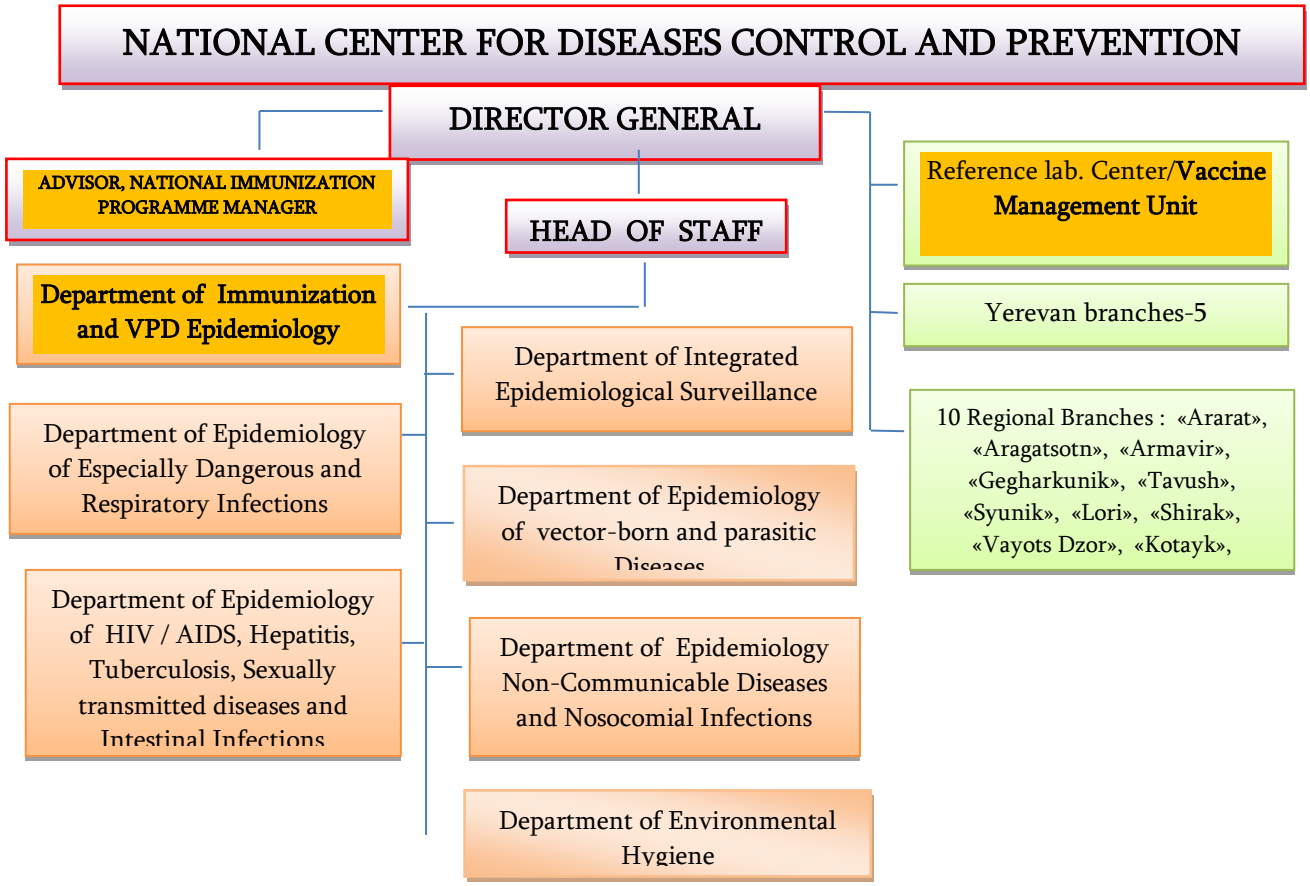
The National Center for Disease Control and Prevention (NCDC, Figure 2) in Yerevan manages all major logistics activities like forecasting, storage, distribution of vaccines and consumables. NCDC branches in the regions replicate these functions in that level. Primary health care facilities and maternity centers administer vaccines in fixed posts or during outreach activities.

There is a strong political commitment of the Government to support the immunization program, with immunization clearly expressed as a top government priority, as confirmed by a threefold increase of the immunization budget in 2015 and a 100% execution of the approved budgets. The Minister of Health is chairing the ICC and representatives from other ministries, including the Deputy Minister of Finance, are ICC members. Regular meetings are held between the key MoH officials and the EPI Manager. The Ministry of Finance also maintains awareness of program needs and financial requirements. Fund transfers from the

[17] Richardson E. Armenia: Health system review. Health Systems in Transition, 2013; 15(4): 1– 99
[18] Armenia Health System Performance Assessment, 2014

government are timely, and the immunization program hasn't faced any problems related to underfunding of implementation.

Figure 2: Structure of the National Center for Disease Control and Prevention



The ICC is chaired by the Minister of Health and is composed of 22 members, including Vice-Ministers from the MoH, deputy ministers of other ministries, including the Ministry of Finance, and in-country partners. Although establishment of the ICC at such a high level is an important evidence of the political commitment to immunization efforts in Armenia, it has been challenging to ensure regular and active participation of its members in regular and ad-hoc meetings and to benefit from effective follow-up and support from this group in proactively addressing immunization challenges.

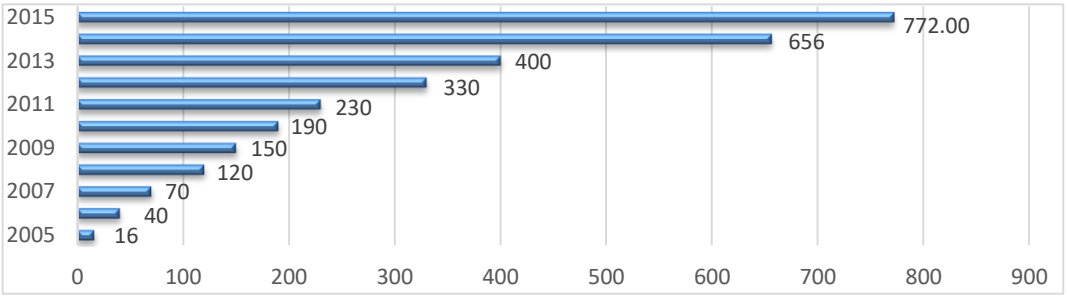
A number of different normative documents and guidelines cover various immunization-related aspects (e.g. the state's obligation to provide free vaccination, tax exemptions for UNICEF-procured vaccines, etc.). Although Immunization Sanitarian Norms state the obligation for every citizen to be vaccinated in accordance with immunization calendar, exemptions from vaccination due to medical or other reasons are relatively easy to obtain (through a simple letter of refusal).

Market authorization function is currently not applied for programme vaccines and mostly registration is waived. Expedited review procedures for registration of WHO pre-qualified vaccines is not in place. Adverse events following immunization surveillance system is functional and managed by the National Immunization Programme, but engagement of the NRA is not at desired level. The NRA requires further strengthening and particularly lacking independence of regulatory system. A new drug law has been submitted to the Parliament,

which is expected to contribute strengthening of medicine and vaccine regulatory system in Armenia, if approved.

Gavi is the only source of external funding for National Immunization Program, but its support will cease in 2018 following the country's graduation. Armenia has consistently complied with its co-financing obligations and has never defaulted on its co-payments despite a challenging economic situation. MoH budget has been progressively decreasing in relative terms (from 2.2% of GDP in 2008 to 1.73% in 2015, with a further expected decrease to 1.43% in 2018).

Figure 3. Routine Immunization Budget Dynamic, 2005-2015.



In the recent years, the government has nearly doubled routine vaccine budget (from 400 million dram, or US$988k, to 772 million dram, or US$1,9m) and budget commitments have been honoured in full and in a timely fashion. The increased vaccination budget is expected to cover growing co-financing commitments in the coming years.

Table 2. Public allocations for immunization program, health care budget, public health budget, 2012-2017, x 1,000 AMD

Expenditure/year	2012	2013	2014	2015	2016	2017
Total Health	67,171	72,020	80,729	84,227	82,097	82,244
Public Health	3,070	3,160	3,983	5,437	5,342	5,813
Routine Immunization	338	400	656	772	1,061	1,061
Government co-financing (routine vaccines)	55%	75%	60%	88%	91%	96%

Sources: National Budget Laws of 2012, 2013, 2014 and 2015; MTEF of 2015-2017; 2014 internal report on EPI performance

GAVI is the only external source supporting Armenia's NIP. From 2016 onwards, the MoH total budget will be capped at around 82 billion drams ($176m) and no further growth is expected in the immediate future. It is however not expected to affect immunization budget and specifically future co-financing payments, as the government has committed to covering immunization budget needs even if this requires reallocation of funds from other health budget lines. Donor funding from the Global Fund and USAID for areas other than immunization will also cease by 2017, making the coming two years critical for ensuring the sustainability of the Armenian health funding landscape.

Gavi-supported vaccines are procured through UNICEF Supply Division (SD), but the Government's commitment to procure through SD is short-term (annual), and thus vulnerable to potential changes. Among routine vaccines, about 25% in budget terms are self-procured (Hepatitis A, Meningococcal, Tularemia, Rabies, due to unavailability of relevant presentations through UNICEF). Self-procurement for Armenia would not be a sustainable and cost-effective option, and even the most conservative estimates of market prices would be significantly above those available through SD. Continuing procurement through UNICEF SD is especially important and beneficial for Armenia considering the June 2015 Gavi Board decision to approve access to Gavi prices for graduating countries for additional 5 years after graduation.

Table 3. Potential implications of changing procurement modalities in Armenia

Products	Cost/UNICEF	Median Cost /Self-procured	Min Cost /Self-procured
BCG	$ 10,720	$ 102,737	$ 30,977
DTaP	$ 338,556	$ 398,936	$ 114,598
DTwP-Hib-HepB	$ 337,690	$ 1,298,808	$ -
IPV	$ -	$ 312,179	$ 213,932
HepB_Pediatric	$ 19,049	$ 225,221	$ 21,060
MMR	$ 245,908	$ 624,743	$ 170,268
Td	$ 32,656	$ 1,011,849	$ 59,896
Rotavirus	$ 196,553	$ 1,266,162	$ 1,183,946
PCV	$ 408,197	$ 6,191,642	$ 4,081,728
OPV	$ 37,933	$ 68,131	$ 54,118
Total	$ 1,627,262	$ 11,500,408	$ 5,930,523
	Self-procurement/UNICEF	**x 7**	**x 3.6**

Source: UNICEF Supply Division data for EURO region

2.2. ROUTINE IMMUNIZATION, VACCINATION SCHEDULE AND COVERAGE

2.2.1. National Vaccination Schedule

The National Vaccination Schedule was changed last time in 2012 with connection to introduction of Rota and PCV vaccines introductions. The current vaccination schedule will be changed to include IPV vaccine for 24 weeks infants and adolescent vaccinations as well (Menngococcal, PCV13, Hepatitis A, MMR, Tularemia and Td immunization for 15-16 y.o).

Table 4. National Vaccination Schedule in Armenia

VACCINE	DOSES	VACCINATION TIME
HEPATITIS B	1	AT BIRTH (0-24 hours after birth)
BCG	1	AT BIRTH (0-48 hours after birth)
PENTAVALENT (DTP/HEPB/HIB), OPV, PCV	1	6 WEEKS (1.5 MONTHS)
	2	12 WEEKS (3 MONTHS)
	3	18 WEEKS (4.5 MONTHS)
ROTA	1	6 WEEKS (1.5 MONTHS)
	2	12 WEEKS (3 MONTHS)
MMR	1	12 MONTHS
	2	6 YEARS
DTP/PENTAVALENT, OPV	4	18 MONTHS
OPV	5	6 YEARS
Td	1	6 YEARS
	2	16 YEARS, AND EVERY 10 YEARS

Reported national coverage figures based on official country estimates by vaccine type for 1992-2014 are shown in Table 5. For all long established vaccines, reported coverage was sustained at above 90%, with the exception of measles containing vaccine (MCV) in 2002. Reported coverage for HepB3 increased rapidly following its introduction in 1999 and has been sustained above ninety percent since 2002. The immunization program has managed to sustain high reported coverage despite challenges related to vaccine shortages and issues regarding adverse events associated with one of the DTP vaccines used in the country.

Table 5: Reported national coverage by year and vaccine type, Armenia 1992-2014

Year	Vaccines					
	BCG	HepB3	DTP3	Polio3	Rota2	MCV
1992	88		85	92		93
1993	84		85	92		95
1994	83		86	92		95
1995	84		98	93		96
1996	82		86	97		89
1997	72		88	95		92
1998	95		82	96		94
1999	93		91	97		92
2000	97	55	93	96		92
2001	96	69	94	97		96
2002	97	91	94	96		60
2003	92	93	94	96		94
2004	96	91	91	93		92
2005	94	91	90	92		94
2006	92	78	85	86		92
2007	94	85	88	90		92
2008	97	86	88	90		94
2009	99	93	93	94		96
2010	99	94	94	96		97
2011	99	98	95	96		97
2012	99	98	95	96		97
2013	99	98	95	96	90	97
2014	99	98	96	95	91	97

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Figure 4: Full immunization coverage for 1 y.o children, 2005-2014 in Armenia

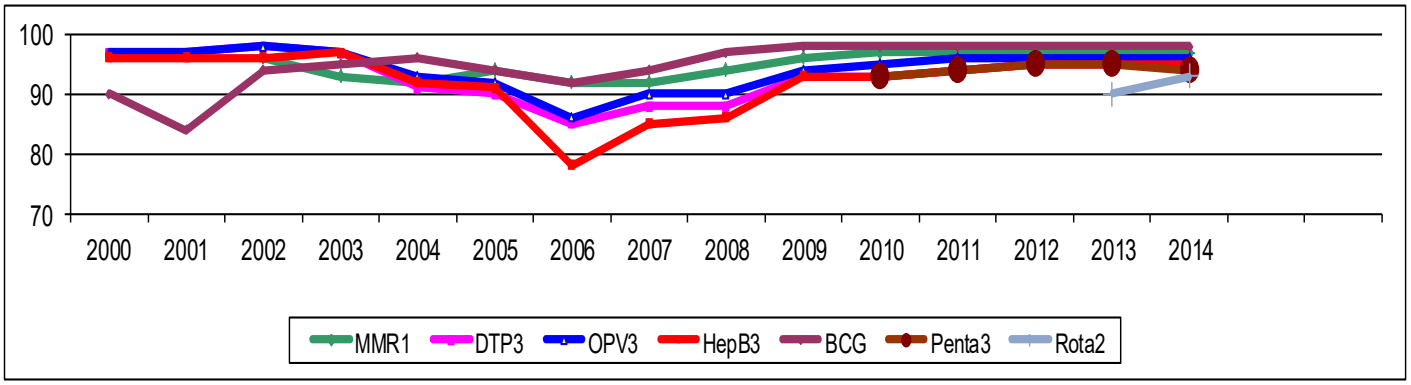
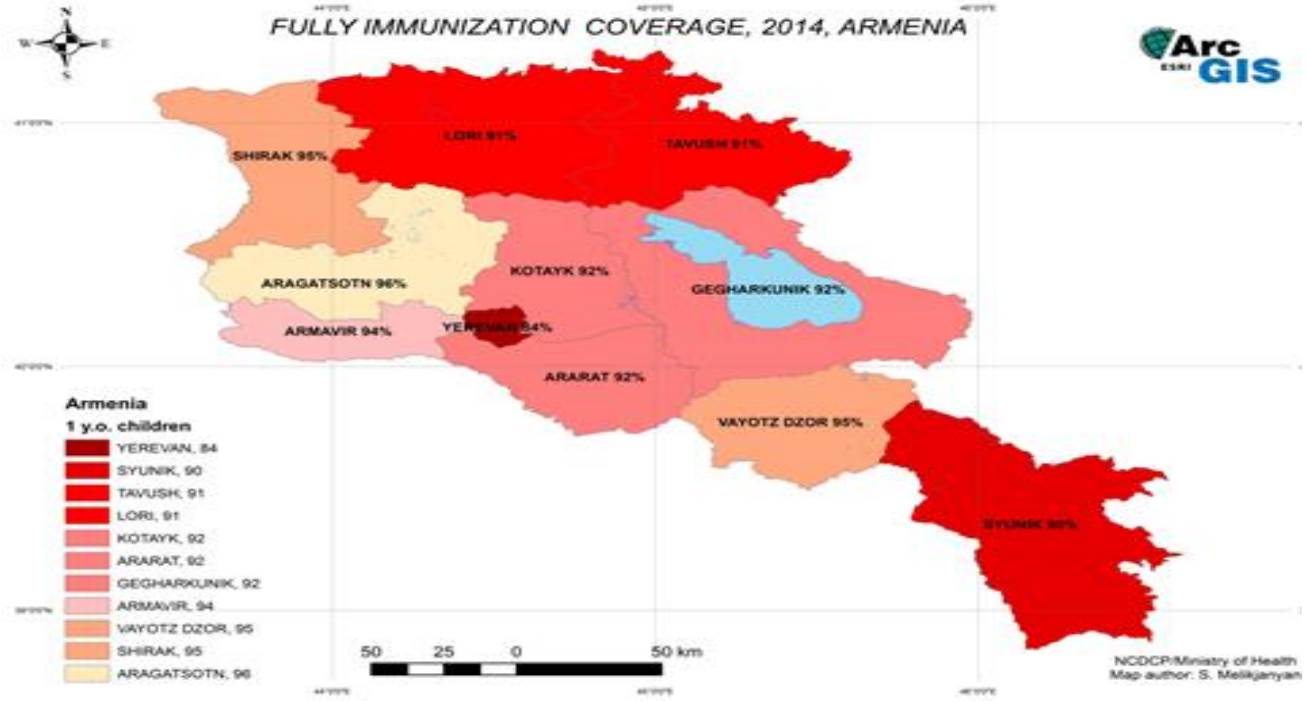
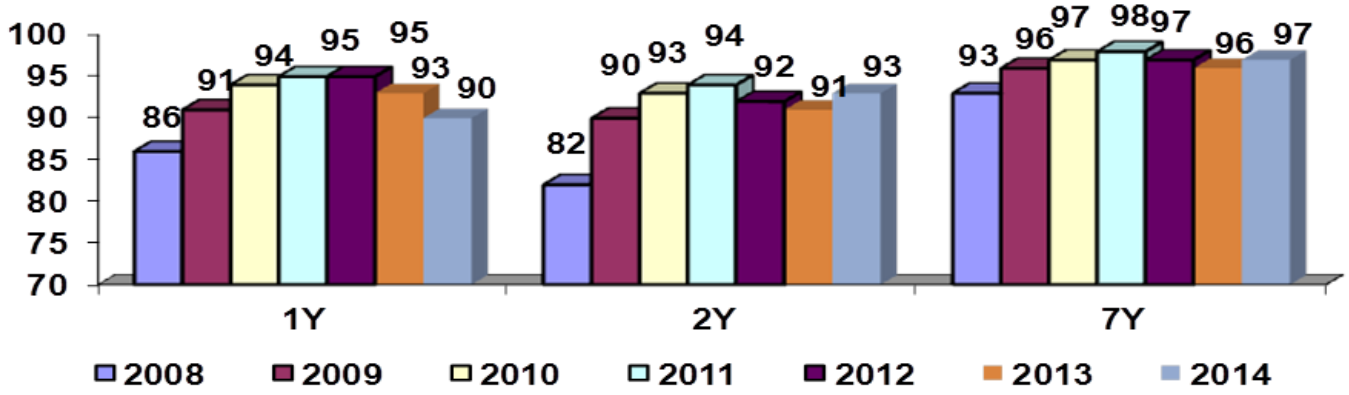


Figure 5: Full immunization coverage for 1 y.o children, 2014 in Armenia



Source: MoH, Immunization coverage

Figure 6: Full Immunization Coverage: RA, 2008-2014

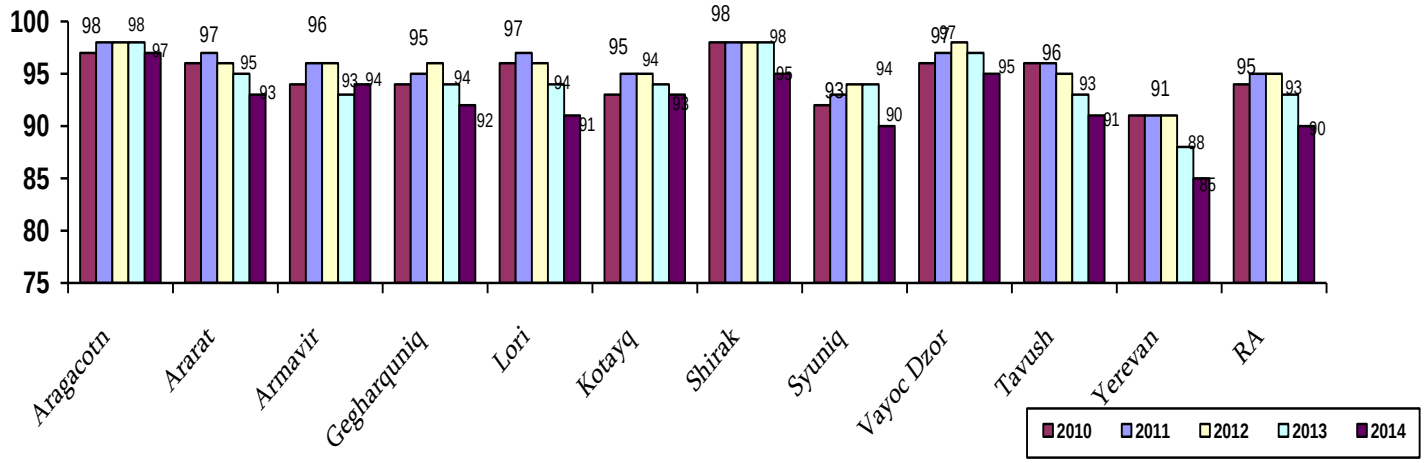


Source: MoH, Immunization coverage

Since 2007 a new system for reporting and monitoring immunization coverage was introduced. Full immunization coverage rate of target population is being monitored by National Center for Disease Control and Prevention. This rate in 2008 for children under 1 was 86% and it was already 94% in 2010 and 90% in 2014. Reduction of fully immunization coverage is due to age restriction of Rotavirus vaccination.

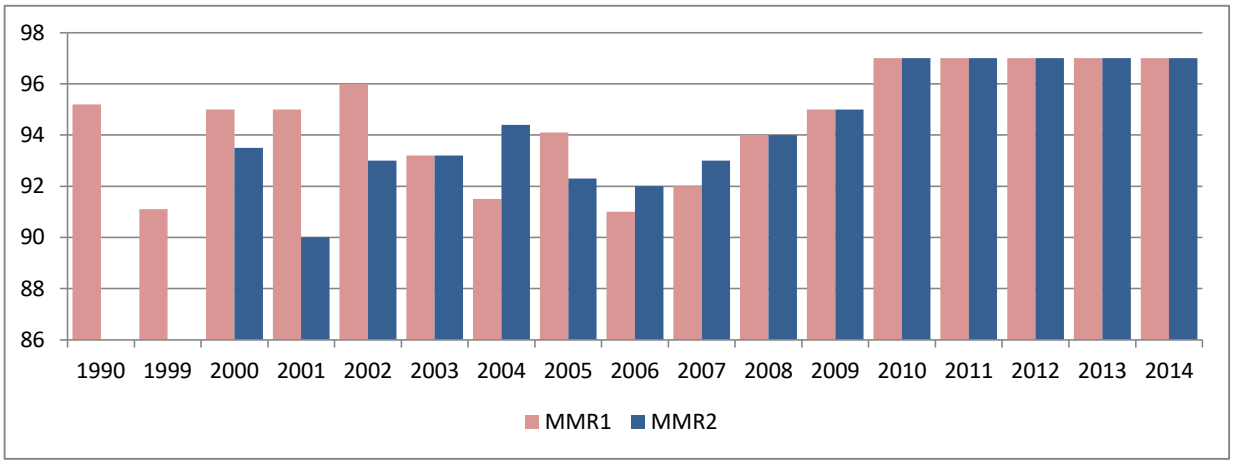
It should be mentioned that the lowest level of the indicator is registered in Yerevan city. In order to ensure reliability and completeness of the reports a monitoring of the health care facilities responsible for vaccinating and reporting is done on a quarterly basis.

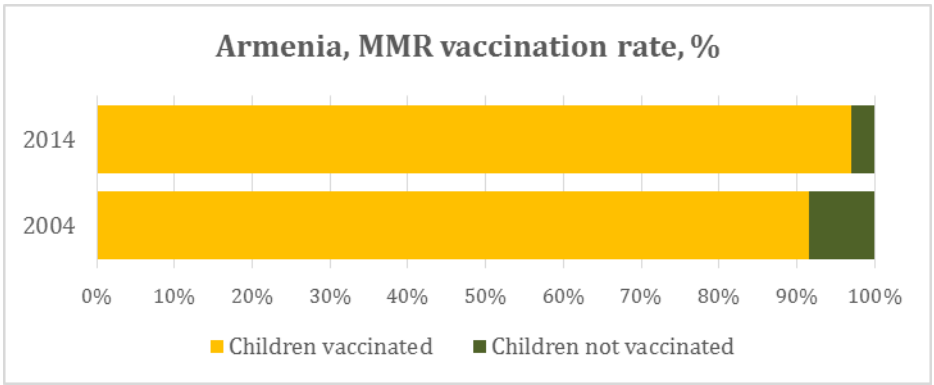
Figure 7: Disaggregation of full immunization coverage rates by the regions of Armenia, 2010-2014



Source: MoH, Immunization coverage

Figure 8: Comparison of MMR1-MMR2 coverage rates





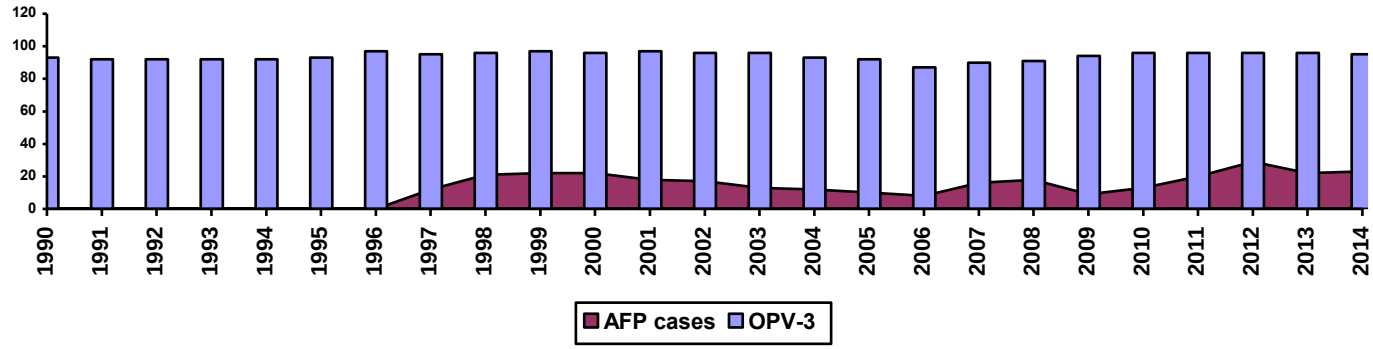
Source: MoH, Immunization coverage

Comparison of MMR1-MMR2 coverage rates by years reveals significant achievements. In 2014 97% of children in Armenia receive measles vaccinations (both MMR1 and MMR2, Measles, Mumps and Rubella) vs 90% in 2004. This vaccination rate has been steady and unchanged since 2010. The National Vaccination Schedule introduced a two-dose measles-mumps-rubella (MMR) vaccine program for children 12 months and 6 years of age. The high rate of immunization has improved child health and reduced under-five mortality. These

achievements are going to significantly contribute to realizing the goal of measles and rubella elimination.

Special attention is paid to the vaccination against polio. Similar to other vaccinations during 2000-2006 a decline in coverage level of OPV3 was registered, and during 2007-2014 period it started increasing. However, there is lot to do in order to achieve targeted level of 97%.

Figure 9: OPV3 coverage and AFP rates, 1990-2014, Armenia



Source: MoH, Immunization coverage

Along with significant achievements, National Immunization Program still faces major challenges. Particularly, there are high rates of breaks/dropout in timely vaccination or postponement of one of the vaccinations in the set (unjustified breaks, postponement of one of the injectable vaccine to be given simultaneously and unjustified contraindications) which reduces the positive effects of immunization. Improved quality of service and enhanced communication between healthcare services and parents, as well as educating and raising the awareness of parents (especially in remote and rural areas) can help address this challenge.

2.3. SERVICE DELIVERY

Routine immunization delivery in Armenia is based on two standard strategies: fixed site and outreach session. As to fixed site strategy, primary health care facilities delivering regular immunization service include polyclinics and ambulatories for most of the antigens, and maternity hospitals for BCG and Hepatitis B first dose. Often one specific antigen is given on a specific day of the week, when more children could be gathered, thus allowing to decrease vaccine wastage when using multi-dose vials. Outreach sessions (one day operation) are supposed to take place in facilities where medical doctors are coming once in a week, or every 2 weeks, every month or 1.5 month (rural ambulatory, FAP).

Shortage of medical doctors in remote areas, lack of local transport, small size of target population, geographically remote area and seasonality play important roles in the regularity of the outreach sessions. These are factors which adversely affect the timeliness of children's vaccination, recognized to be a major problem in Armenia. Strengthening planning, supervision and advocating for conducting regular outreach sessions (minimum one session per month) will be essential to improve vaccination timeliness.

In Armenia there is no real "uncovered" population group (group like minority, with language barrier, displaced population, etc.). The list of the population is regularly updated, including children from other regions. However, as above mentioned, some factors still prevent the regular organization of outreach sessions, generating a population underserved by the

immunization programme, often with delayed vaccination. Often this population, remote and with low economic status, have difficulties to bring their children for immunization to the fixed centres. Ensuring regular and frequent outreach sessions remain one of the key responses to this problem.

Another category of underserved population could be defined with the "refusers", parents not accepting vaccination or a specific vaccine and/or health staff having reserve with a specific vaccine. However not a critical issue for Armenia, it is an area which shouldn't be neglected. This issue started to rise in 2004 with the increase of adverse events (AEFI) following DTwP vaccine. The subsequent mediatisation and the perception that the country of origin of one particular vaccine plays a role on the quality of the vaccine had negative influence on health staff and possibly parents. Here it should be reemphasized that the Indian vaccine used, as it was the one concerned, was a UN pre-qualified[19] vaccine, guarantying its quality-assurance. It should also be mentioned that there is currently no specific communication plan to inform parents and health staff on the quality and safety of the vaccines used. Vaccine safety is an important issue which will need more advocacy and communication to prevent any further disturbance in the programme.

Reaching the "un-reached" is part of the **Reach Every District** (RED) strategy which was introduced in Armenia in 2003 with the objective of strengthening district capacity through 5 components.

1. Re-establishing outreach services
2. Supportive supervision
3. Linking services with communities
4. Monitoring and use of data for actions
5. Planning and management of resources

2005 and 2010 DHS surveys, as well as the 2006 coverage survey show no gender inequity in Armenia with respect to immunization. Strengthening the immunization program in order to reach the remaining under-vaccinated populations remains a priority. Incomplete vaccination in Armenia is multifactorial, with major variables of parents' income and educational status, as well as religious tendencies that lead to refusals.

2.4. NEW AND UNDERUSED VACCINE INTRODUCTION

Armenia successfully introduced Hepatitis B vaccine in 1999 (UNICEF support and starting from 2001, GAVI support) MMR vaccine in 2002 (with ANMF- Diaspora and later on with VRF, UNICEF support) and Hib-containing pentavalent vaccine in 2009 (with Gavi, WHO, UNICEF support), Rotavirus vaccine in 2012 (with Gavi, WHO, UNICEF support), and PCV vaccine in 2014 (with Gavi, WHO, UNICEF support).

Concerning further introduction of new vaccines, there are currently three vaccines that are planned to be introduced for the period until 2020: IPV (2016), HPV vaccine GAVI Demonstration project (2017), national introduction of HPV vaccine (2019), Hexavalent vaccine (2018).

NIP has extensive experience and well-functioning systems for new vaccine introductions. The country has a strong capacity for implementation of essential activities, including social mobilization of target communities, development and application of AEFI guidelines,

[19] UN pre-qualified vaccines: The process of pre-qualification aims at determining the acceptability in principle of vaccines from different sources for supply to UN agencies and is recognized as a label of quality for vaccines.

conforming to the crisis management plan, and assigning experienced personnel to implementation of program activities on the grass-roots level.

Lessons learned from rota introduction in 2012 were used for planning and developing strategies that were effectively implemented during the introduction of PCV, including communication with hesitant parents, collecting data on the safety of multiple injections and providing reminders for health facilities on proper temperature monitoring and recording. Important advocacy and communication efforts were undertaken prior to PCV introduction as this vaccine would be less likely to be accepted by parents due to having multiple injections.
In 2016 National Immunization Program will switch the preferred presentation to PCV13 (1 dose), notably to reduce wastage.

As per the June 2015 Gavi Board Decision, Armenia can benefit from access to Gavi's catalytic support for HPV vaccine. There is an interest from the population for introducing HPV in Armenia, but the issue has not yet been discussed by NITAG, and no cost-effectiveness or other studies or analyses have so far been carried out.

The IPV introduction is rescheduled to introduce in May 2016. Armenia will receive Gavi support for IPV until the end of 2018.

Armenia will implement HPV vaccine demonstration project with Gavi support in 2017-2018 and will introduce HPV vaccine nation-wide in 2019.

2.5. MORBIDITY AND MORTALITY TRENDS FOR VACCINE PREVENTABLE DISEASES

2.5.1. SURVEILLANCE AND REPORTING

National Immunization Program has strong capacity for evidence-based decision-making through analysis of data obtained from robust reporting and surveillance systems. Supportive supervision program is in place, with defined frequency of visits, supervisory tools and feedback mechanisms.

Safety surveillance of vaccines is duly established in Armenia and is headed by the Scientific Centre of Drug and Medical Technology Expertise. AEFI system is functional and well-equipped to collect and report relevant cases. Vaccinovigilance functions are carried out at the immunization service provider level, in regional centers and regions' preventative organizations, and at the national level. Overall legal framework of the AEFI system is well established and responsibilities of the different stakeholders are well-defined. There are clear pathways of reporting and giving feedback to the relevant parties. Analysis of the data on AEFI is done regularly and results are brought to the attention of decision makers.

A number of improvements would be beneficial, such as aligning AEFI case definitions with WHO recommendations to avoid over reporting of AEFIs, additional trainings on causality assessments, etc. Currently, the system is very broad, trying to capture every event after immunization, including the minor ones. At the same time, thorough data analysis of AEFI is not performed and does not appear in key reports. AEFI cases are documented and presented in absolute numbers, making it difficult to carry out relevant analyses.

Vaccine preventable diseases surveillance in Armenia is part of a broad disease surveillance system and currently includes surveillance for measles, mumps, rubella, hepatitis B, diphtheria, pertussis and polio, as well as sentinel surveillance for rotavirus, intussusception and bacterial meningitis. However, the sentinel surveillance systems have traditionally always been funded by the external resources and there is no confirmation that the government will finance them after graduation. Financial sustainability of these systems is thus questionable,

despite their high value for measuring vaccination impact. Surveillance is not conducted on Hib and Pneumococcal diseases.

Reported cases of these diseases for the period 2000-2014 are shown in the table below.

Table 6: Reported Cases 2000-2014

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Measles - Number of cases	15	69	40	4	1783	2281	133	1	0	0	2	0	0	10	13
Measles – Incidence (cases per 100,000 population)	0.4	1.82	1.06	0.11	46.97	60.05	137	0.03	0	0	0.1	0	0	0.3	0.31
Mumps - Number of cases	3431	987	1759	728	504	167	128	133	98	34	38	15	6	2	2
Mumps – Incidence (cases per 100,000 population)	90.6	26.05	46.41	22.7	13.28	4.4	4.0	4.2	3.0	1.1	1.2	0.5	0.2	0.07	0.07
Rubella - Number of cases	673	5936	1318	333	733	620	110	87	4	2	0	0	0	4	0
Rubella – Incidence (cases per 100,000 population)	17.77	156.7	34.77	8.78	19.31	16.32	428.9	18	0.1	0.1	0	0	0	0.13	0
Hepatitis B - Number of cases	122	122	111	103	106	86	92	85	111	90	57	73	63	58	57
Hepatitis B – Incidence (cases per 100,000 population)	3.22	3.22	2.9	2.72	2.79	2.7	2.9	2.6	3.4	2.8	1.8	2.2	1.9	1.8	1.8
Diphtheria - Number of cases	0	6	1	0	0	0	0	0	0	1	0	0	0	0	0
Diphtheria - Incidence rate (per 100,000 population)	0	0.16	0.03	0	0	0	0	0	0	0.03	0	0	0	0	0
Pertussis - Number of cases	10	1	3	3	7	6	3	1	3	11	4	1	8	30	85
Pertussis – Incidence (cases per 100,000 population)	0.26	0.03	0.08	0.08	0.18	0.16	0.1	0	0.1	0.3	0.1	0.03	0.2	1.0	2.8
Total tetanus - Number of cases	0	0	1	0	1	0	2	1	0	0	3	0	0	0	1
Total tetanus – Incidence (cases per 100,000 population)	0	0	0.03	0	0.03	0	0.06	0.03	0	0	0.1	0	0	0	0.03

Source: Armenia VPD surveillance

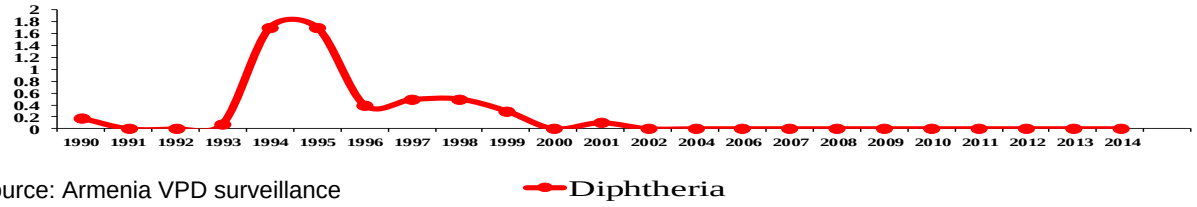
The surveillance system is based on a four level reporting system. Health facilities report cases of infectious diseases to district level epidemiologists in person using “urgent case” reporting. District staff use standard reporting forms to report data to marz level and similarly marz level staff use standard reporting forms to report data to the national level.

2.5.2. DISEASE CONTROL AND SENTINEL SURVEILLANCE

Control of Diphteria, Pertusis, Mumps and Hepatitis B:

Following the major outbreak in the region in 1995, the situation has been stabilized and the control of diphtheria progressively stepped up. Cases of diphtheria occurred in Armenia in 2001 (6) and 2002 (1). In 2009 one case of diphtheria was registered in 15 years old adolescent caused by Corinebacterium Gravis.

Figure 10: Incidence rate for diphtheria, 1990 -2014 (per 100,000 population)



Source: Armenia VPD surveillance

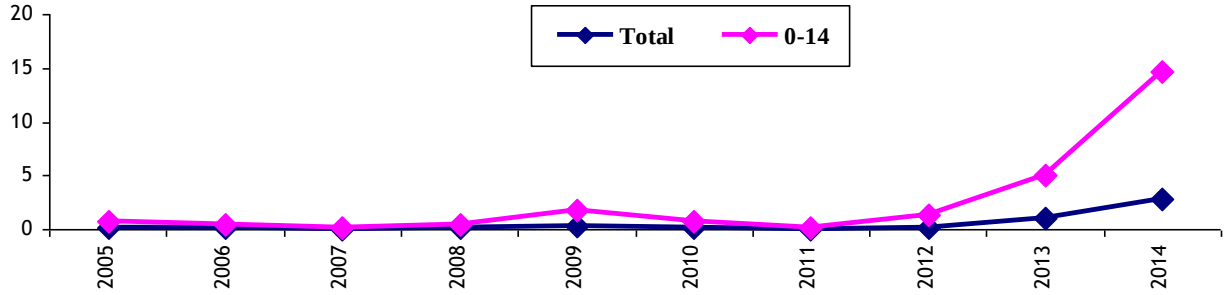
Figure 11: Incidence rates for pertussis and tetanus in Armenia during 2000-2014 (per 100,000 population)

Source: Armenia VPD surveillance

During the 2012-2014 period the highest incidence rates of pertussis among general population and 0-14 age group in Armenia was registered in 2009.

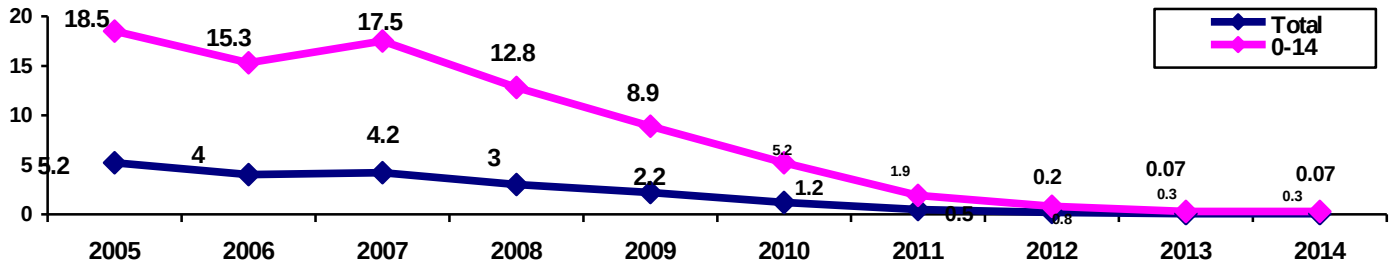
Since 2007 epidemiological situation of mumps has substantially improved, particularly supported by steady decline in incidence rates.

Figure 12: Incidence rates of pertussis in Armenia during 2005-2014 (per 100,000 population)



Source: Armenia VPD surveillance

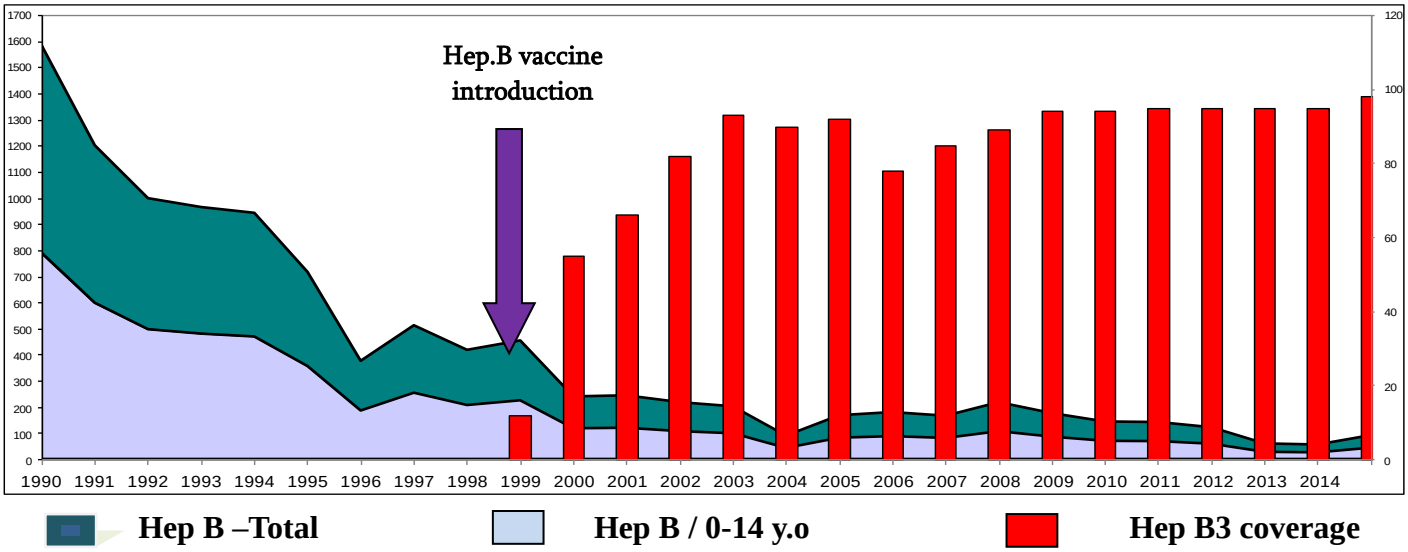
Figure 13: Incidence rate of mumps during 2005-2014 (per 100,000 population)



Source: Armenia VPD surveillance

There is stable tendency for morbidity due to Hepatitis B to decline in Armenia during 1990-2014 period. This tendency is observed for both general population and 0-14 age group. This decline in morbidity is obvious after introduction of Hepatitis B vaccine into the national Immunization schedule in 1999.

Figure 14: Tendency for morbidity due to Hepatitis B in Armenia during 1990-2014

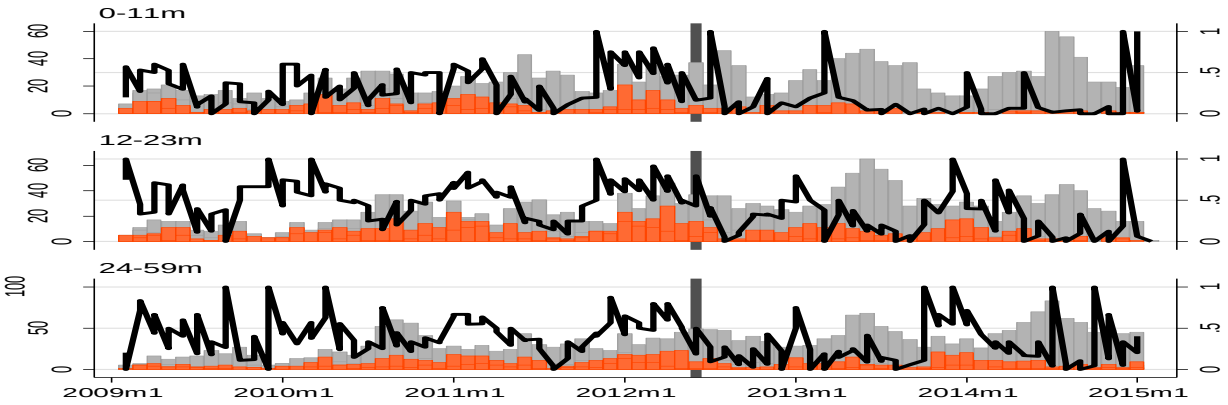


Rotavirus Sentinel Surveillance and Rota Vaccine Impact study:

In 2009 NIP established active Rotavirus Sentinel Surveillance system at two hospitals in the country capital, Yerevan.

Monthly disaggregation of dynamic of rotavirus diseases cases shows that the majority of them were registered during February-June period with peak of 51-64% registered in April. However, baseline data documented that rotaviruses cause 38% of acute gastroenteritis hospitalizations among children aged<5 years. In November 2012, RV1 (Rotarix, Belgium) was introduced for infants at ages 6 and 12 weeks to reduce the burden of rotavirus disease.

Figure 15: Dynamic of rotavirus diseases cases disaggregated by months and ages (sentinel sites only), February 2009 – 2015 Jan



Source: Armenia VPD surveillance: Case Control study for Rota vaccine impact

Among infants, rotavirus hospitalizations were reduced by 49% in less than one year after introduction and by ≥75% in years 2 and 3 following introduction. Reductions of ≥30% in other

young children too old to have been vaccinated suggest additional benefit through indirect protection. The VE of 2 RV1 doses in protecting against rotavirus hospitalization (any disease severity) was 64% (95% CI 41, 78); 74% among those aged 6-11 months, and 58% (CI 14-79) in children aged 12-23 months. Against more severe rotavirus disease, VE was 80% (CI 57-91) and similarly high in both age groups.

2.5.3. ACCELERATED DISEASE INITIATIVE

Sustaining polio-free status:

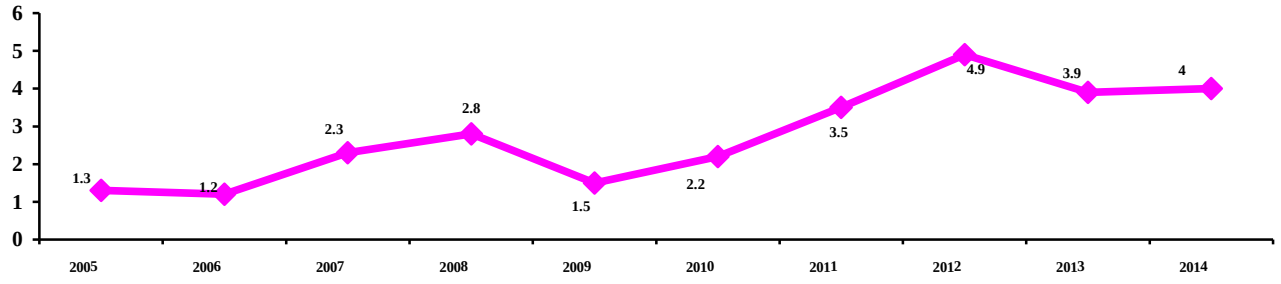
The European Region, including the Republic of Armenia, was certified polio-free in 2002. European Regional Commission for the Certification of Poliomyelitis Eradication (RCC) concluded that the entire European Region remains at risk for the importation of wild polioviruses, and that the risk appears to be growing. However, the Caucasus Region remains a geographical high risk area, being a population transit zone with direct links to polio-endemic countries. To prevent wild poliovirus importation and spread in RA, in 2008 supplementary polio vaccination activities were implemented among children under 5, with very high coverage (98%). Starting from 2007 active AFP surveillance is in place in the health care system of Armenia. At the same time the country has taken recommended measures for laboratory containment of wild poliovirus and has developed an emergency outbreak preparedness and response plan in case of wild poliovirus importation or circulating vaccine derived poliovirus (cVDPV) outbreaks.

In accordance with WHO recommendations Armenia is preparing to proceed with the recommended process of cessation of oral polio vaccines through introduction of one dose of inactivated polio vaccine (IPV) in routine immunization schedule and through replacement of trivalent oral polio vaccine (tOPV) with bivalent oral polio vaccine (bOPV) in 2016. According to Global Polio End Game strategy introduction of at least one dose of IPV will ensure protection of children against type 2 WPV and type 2 VDPV while withdrawing type 2 wild poliovirus from OPV vaccine and then stopping use of all types of oral polio vaccines.

The primary public health actions that protect the population from transmission of wild polioviruses after an importation is high quality polio immunization coverage and AFP surveillance.

During 2005-2010 period the AFP rate in Armenia was > 1.0.

Figure 16: AFP dynamic during 2005-2014 period (under 15 years old/100,000 population)



Until recently AFP surveillance in Armenia was done passively, upon admission to a hospital. Starting from 2007 active AFP surveillance is in place in the system.

Table 7: Reported Cases of AFP 2000-2014

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Armenia	23	16	17	13	13	9	8	16	17	9	7	21	29	22	24
Yerevanskaya	9	6	7	4	6	1	3	2	8	3	3	8	12	4	8
Shirakskaya	0	3	2	2	0	1	1		2	2	0	5	4	4	7
Lorijskaya	1	1	0	0	2	0	1	2	1	0	0	0	4	0	0
Tavushskaya	3	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Aragattsonskaya	0	1	1	1	1	1	1	1	0	0	0	0	2	1	1
Kotajskaya	0	0	1	1	0	1	1	1	0	0	1	3	3	3	2
Ghegarkunijskaya	3	1	3	0	2	1	0	3	2	0	1	0	1	4	0
Armauirskaya	3	1	2	3	0	2	1	4	2	0	0	1	0	2	2
Araratskaya	1	1	0	1	0	1	0	2	2	1	1	2	1	1	2
Vajotsdzorskaya	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0
Siunikskaya	2	1	1	1	2	1	0	1	0	2	0	1	2	2	1

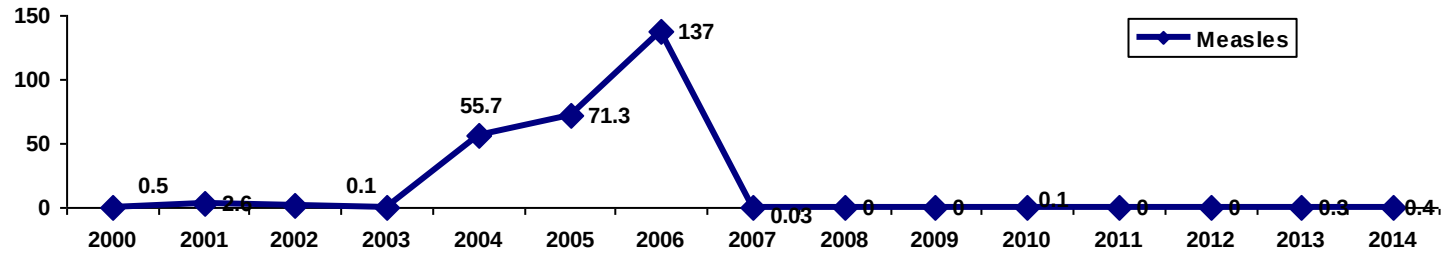
Source: Armenia VPD surveillance

Measles and Rubella elimination:

In Armenia, the measles programme was started in 1967 with the introduction of a single dose vaccine programme given at 9-12 months of age. In 1986, a second dose was introduced at the age of 3.5 years and the first dose was moved to 12 months of age, together with a catch-up campaign targeted at 7-14 year olds. For the period 1967-1993, the monovalent vaccine was the Leningrad strain. After this time various monovalent vaccines were used up until 2002. Following a national measles epidemic in 1996, a measles campaign was undertaken in 1997, targeted at 1-14 years who were unvaccinated or who had only received only one dose previously. Finally, in late 2002, a two-dose measles-mumps-rubella (MMR) vaccine programme was introduced at 12 months and 6 years of age. Rubella immunization had not previously been in the national immunization programme with no routine programme for women of childbearing age or adolescent girls.

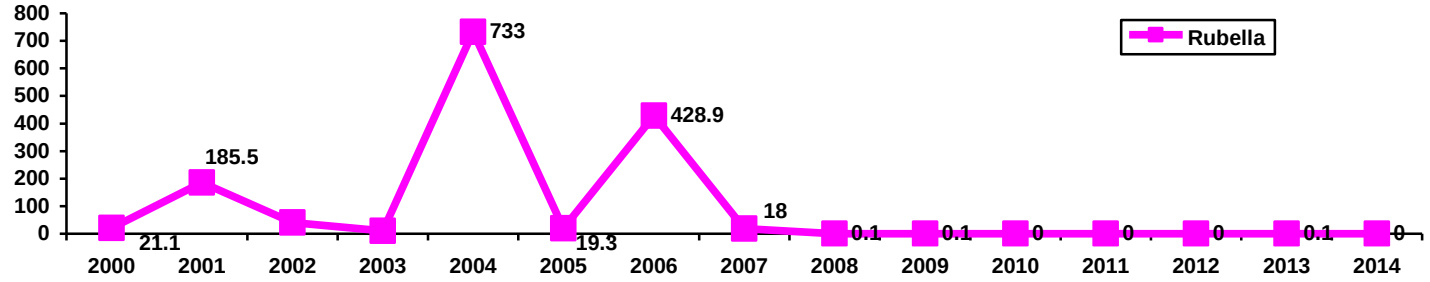
Armenia has experienced a nation-wide measles outbreak during 2004 and 2005 that has been widespread both geographically and across age-groups in the country. Birth cohorts with particularly high clinical measles attack rates have been in those highly vaccinated cohorts born between 1980 and 2001. There seem to be several explanatory factors for the high clinical measles incidence across age-groups, including reduced vaccine effectiveness, delays in delivery of the routine programme for the first and second measles dose, and historical variations in coverage level. On the basis of these findings, a country-wide catch-up campaign (SIA) with measles-rubella vaccine was conducted in 2007 targeting all males and females regardless of disease and vaccine history with year of birth 1980-2000 (6-27 yr old) followed by rubella immunization of all women of child-bearing age in 2008-2009.

Figure 17: Incidence rate of measles during 2000-2014 (per 100,000 population)



Source: Armenia VPD surveillance

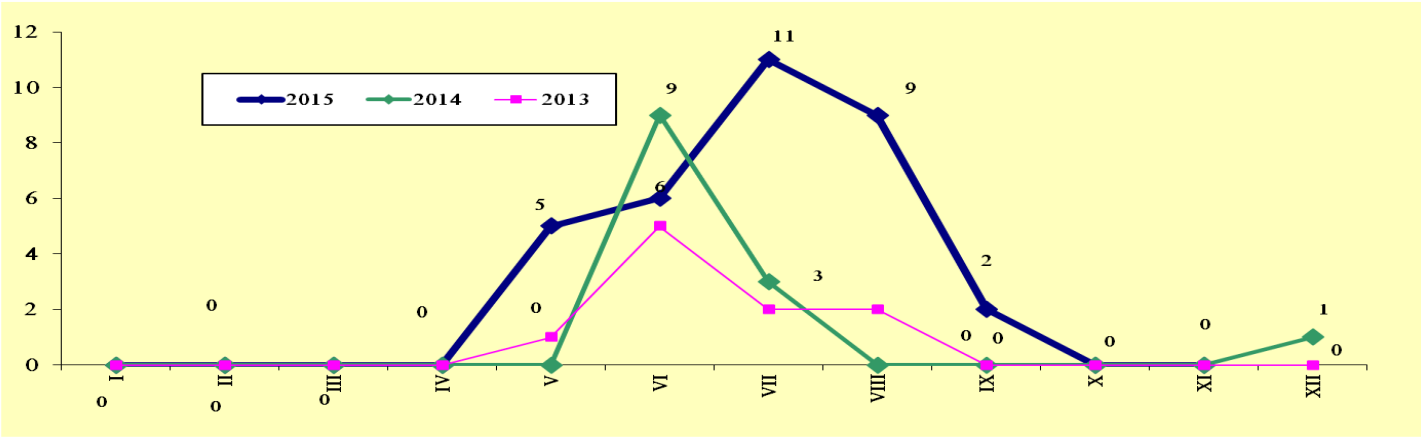
Figure 18: Incidence rate of rubella during 2000-2014 (per 100,000 population)



Source: Armenia VPD surveillance

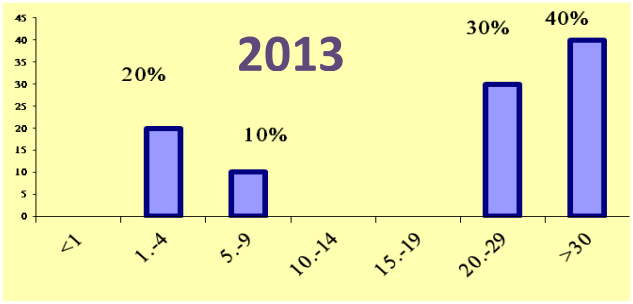
During 2000-2014 two peaks of incidence rate of Rubella were registered: in 2004 and 2006 (Figure 4). After the second peak in 2006 incidence of Rubella has dropped significantly to 0.1 in 2009 (Figure 5). In 2010 no lab confirmed cases were registered in Armenia.

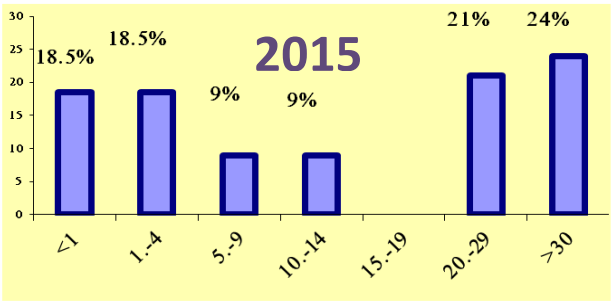
Figure 19: Imported Measles cases during 2013-2015, Armenia

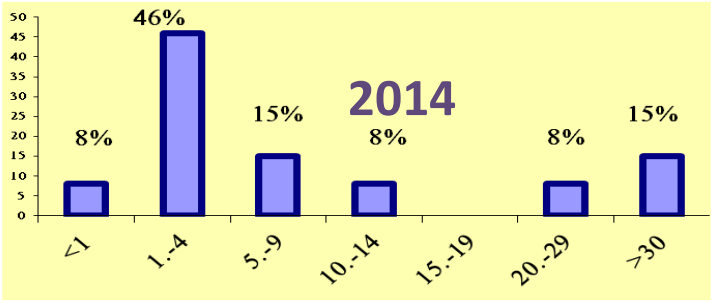


Source: Armenia VPD surveillance

Figure 20: Imported Measles cases by age groups, 2013-2015, Armenia







Source: Armenia VPD surveillance

In 2013-2015 imported Measles cases were epidemiologically linked to Georgia, Austria, France and Russia, and mainly were registered during the seasonal activation of international travel. 95% of cases are unvaccinated or vaccination status is unknown. Almost all age groups, except of 15-19 y.o, are involved in the epidemiological chain.

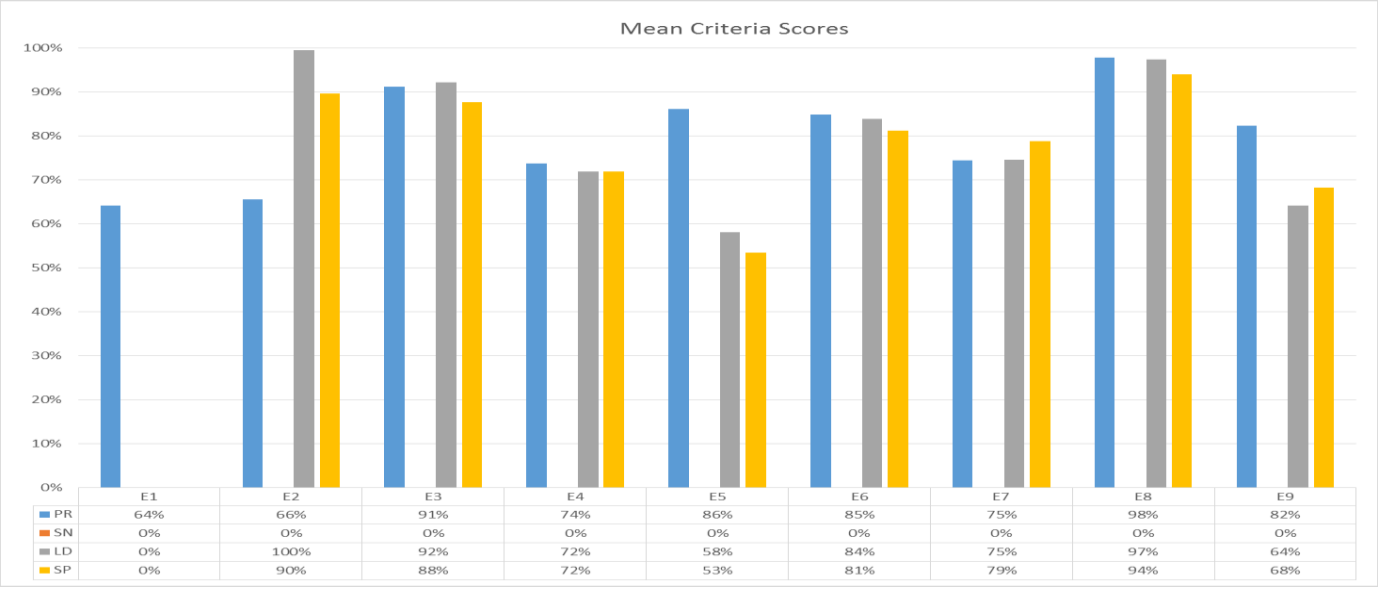
2.5. VACCINE SUPPLY, QUALITY AND LOGISTICS (IMMUNIZATION QUALITY AND SAFETY)

Quite a number of assessments have been undertaken in recent years relating to immunization quality and safety in Armenia: an Injection Safety Policy and Plan in 2001, followed by an Injection Safety Assessment in 2002, an assessment of the National Regulatory Authority (NRA) and Vaccine Procurement in 2003 and 2009, a Waste Management Assessment and Plan in 2004, an Immunization Quality and Safety Assessment in 2006, an Effective Vaccine Store Management (EVSM) assessment at the national vaccine store in 2005 and 2008, Effective Vaccine Management (EVM) assessment in 2010 and 2014.

Armenia has a well-established vaccine management system, including effective cold chain and logistics management systems. Investment in strengthening cold chain capacity is continuous. National guidance documents and visual aids are available to support best vaccine management practices. Immunization supply chain has been optimized by reducing one level (district), bringing the total number of levels to 3 (national, marz, and facility). Armenia has had an uninterrupted and efficient vaccine supply (with no stock-outs, no wasted doses in unopened vials, low open vial wastage).

However, a number of challenges have been identified, including self-procurement for non-EPI vaccines that requires strong procurement capacity, wide use of unqualified cold chain equipment at service provision level, limited use of computerized data management systems (e.g. temperature monitoring, VSSM, CCEM), need for further strengthening of temperature monitoring in vaccine cold chain, and current structure of shared vaccine management responsibilities by several MoH structures that requires clear definition of roles and responsibilities and a strong coordination.

Figure 21: Mean criteria scores for all assessment levels (criterion E1 is assessed only at PR level)



	E1	E2	E3	E4	E5	E6	E7	E8	E9
PR	64%	66%	91%	74%	86%	85%	75%	98%	82%
SN	0%	0%	0%	0%	0%	0%	0%	0%	0%
LD	0%	100%	92%	72%	58%	84%	75%	97%	64%
SP	0%	90%	88%	72%	53%	81%	79%	94%	68%

The last EVM assessment was carried out in July 2014. A systematic sample of vaccine storage facilities is surveyed and the data is collated and assessed by three supply chain

levels: primary, regional stores, and health facilities. WHO/UNICEF standard EVM tools were used to assess the quality and sufficiency of nine supply chain evaluation criteria.

Assessment results revealed that certain progress has been done following previous (2011) EVM assessment and 2013 follow up visit mainly on the primary store level. However, there still is room for further improvements especially at the lower levels of the vaccine supply chain. Assessment results also indicated that although the national immunization programme is staffed with knowledgeable and dedicated personnel, unfortunately, most of the improvement recommendations that have been developed following the previous assessment, have been only partially implemented. Mean criteria scores at all levels are summarized in Figure above.

2.6. ADVOCACY AND COMMUNICATION

The Advocacy and Communication is one of the essential components of the National Immunization Programme in Armenia. It is aimed at increasing the awareness of the population on advantages of Immunization. In recent years this component was mainly supported by UNICEF in joint collaboration with the MOH.

The Immunization Manager is the focal point for advocacy and communication for immunization. National Center of Disease Control and Prevention has good relations with the media and is experienced in providing clear and unequivocal messages in emergency situations. Effective media follow-up is in place and importance of the need to periodically inform the population is well recognized. A website to increase public awareness on immunization has been developed with the support of UNICEF, but it has not been operational due to software problems. A crisis communication plan is being developed.

Communications on advocacy issues have however been challenging, especially with respect to communicating to health staff, advocating for resource mobilization, and addressing the small but growing anti-vaccine movement.

3. GOALS OBJECTIVES AND MILESTONES

3.1 GOALS AND INDICATORS

Table 8: Goals and Indicators

Goal	Indicator
1.Achieve financial sustainability of the national immunization programme	Achieve **financial self-sufficiency from domestic resources for defined set of vaccines**
2. Maintain polio free status	**Confirmed absence of re-established transmission of** wild **poliovirus by annual RCC**
3. Eliminate measles and rubella	Achieve **interruption of endemic measles and rubella virus transmission with high quality surveillance verified by RVC**
4. Control hepatitis B infection.	Achieve **absence of acute hepatitis B cases among children <18**
5. Meet vaccination coverage targets at all administrative levels throughout the country.	Achieve **with DTP3 containing vaccine coverage ≥95 % at national and regional, and ≥ 90% at Marz /Health facility levels.**
6. Make evidence-based decisions on introduction of new vaccines.	**Decisions on new vaccine introductions are made, following the review of the relevant evidence by NITAG.**

3.2 OBJECTIVES, INDICATORS, STRATEGIES, ACTIVITIES AND TIMELINES

Table 9: Goals and Indicators

Objectives	Indicators	Strategies	Activities	Timelines
1. Maintain political commitment to immunization as a priority	Presence of a NITAG	1.1 Enhance governance of national immunization programmes with legislative and managerial tools.	1.1.1 Establish and strengthen legislative basis for immunization to enhance financial and programmatic sustainability of national immunization programmes.	2016-2020
			1.1.2 Strengthen monitoring and evaluation mechanisms to assess financial and programmatic sustainability of national immunization programmes	2016-2020
			1.1.3 Strengthen existing, coordination and collaboration mechanisms between immunization stakeholders to enhance performance of the immunization programme through alignment and effective management (regular presentations on programme performance, expenditure, costs of outbreaks vs prevention etc.)	2016-2020
			1.1.4 Strengthen immunization programme management capacity through continuous sustainable invest-ment in immunization programme administration at all levels (on programme planning, implementation, evaluation).	2016-2020
			1.1.5 Use immunization coverage as one of the key performance indicators	2016-2020

			for the national functionality of the overall health system.	
		1.2 Inform and engage opinion leaders (religious, etc.) and stakeholders with regard to the value of immunization to enhance commitment to immunization as a priority.	1.2.1 Establish and support mechanisms to engage opinion leaders to build a strong alliance for the promotion of immunization at all levels, including the regional level.	2016
			1.2.2 Develop and disseminate audience-targeted evidence on the value and benefits of immunization (public health value, averting vaccine-preventable diseases and deaths; eliminating and eradicating targeted vaccine-preventable diseases; minimizing risks, social and economic costs associated with vaccine-preventable diseases).	2016-2020
			1.2.3 Develop and disseminate the evidence base for the broader impact of immunization for individuals, households, communities and countries (on school enrollment, productivity, physical and cognitive development).	2016-2020
			1.2.4 Advocate for inclusion of immunization in the agendas, plans and policies of wider governmental and nongovernmental for a both at an intra- and inter-country level.	2016-2020
			1.2.5 Train immunization programme core staff and provide tools to build alliances, advocate for immunization and facilitate peer-to-peer exchange of information and best practices.	2016-2020

		1.3 Strengthen the national immunization technical advisory mechanism to formulate and implement evidence-based policies.	1.3.1 Strengthen independent advisory groups on immunization composed of recognized experts that provide evidence-based policy and strategy guidance to national immunization programmes in order to ensure improved credibility and good governance.	2016
			1.3.2 Participate in peer-to-peer exchange of information, best practices and tools between national immunization technical advisory groups (NITAGs) to create synergies.	2016-2020
			1.3.3 Use available tools and methods to evaluate the quality of evidence to strengthen the strategic guidance formulation (decision-making) process.	2016-2020
			1.3.4 Consider briefing the public on advisory group recommendations to contribute to transparency and credibility.	2016-2020
2. Individuals understand the value of immunization services and vaccines and demand vaccination	Existence of a communications plan in case of a VPD outbreak and rapid response	2.1 Ensure that individuals receive information about the risks of vaccine-preventable diseases and the benefits of and risks of vaccination, and that trust in vaccines, immunization services and health authorities is enhanced.	2.1.1 Develop a communications plan in case of a VPD outbreak, serious AEFIs and rapid response	2016
	Domestic expenditure for routine vaccines per newborn increase to 15.5$		2.1.2 Introduce research methods to monitor public perceptions, knowledge, attitudes and opinions. Ensure that research-practice mechanisms are in place to assure evidence-informed communication and messaging.	2016-2020

			2.1.3 Implement multi-channel vaccination advocacy and communication activities and dedicated media campaigns, using traditional and new media to transmit information that responds to people's concerns and fears.	2016-2020
			2.1.4 Monitor and respond to inaccurate or false information and anti-vaccination sentiment.	2016-2020
			2.1.5 Expand the immunology and vaccinology components of the basic medical education curricula and provide health worker in-service training opportunities – through medical education institutions, health authorities and health professional associations and societies.	2016-2020
		2.2 Engage new partners, advocates, champions and ambassadors to convey messages and maintain a positive media environment.	2.2.1 Map and recruit new voices and agents of change, including educators, religious leaders, traditional and social media personalities, family physicians, community health workers, health mediators and trained immunization champions.	2016-2020
			2.2.2 Cultivate relationships with media, encouraging balanced immunization reporting and immunization training of national and subnational media, ultimately increasing the share of voice in the media for the benefits of vaccines, especially online.	2016-2020
			2.2.3 Engage, enable and support in-country professional associations and	2016-2020

			societies, academic institutions and civil society organizations, to advocate the value of vaccines to communities, policy-makers and the media.	
		2.3 Build the risk communication capacity of authorities, so that they can prepare and implement communication strategies and campaigns based on reliable research and evidence in order to stimulate demand for routine childhood vaccination and for inclusion of new and underused vaccines in the national immunization schedule.	2.3.1 Develop evidence-informed communication plans for new vaccine introduction.	2016-2020
			2.3.2 Leverage the routine immunization communications and advocacy legacy to support new vaccine introduction. At the same time, maximize the opportunity presented by vaccine introduction to promote immunization services and advocate for vaccination.	2016-2020
			2.3.3 Include a public opinion, knowledge and attitudes research component in all post-introduction evaluations	2016-2020
3. The benefits of vaccination are equitably extended to all people through tailored, innovative strategies	Ensure ≥ 95% coverage with three doses of DTP-containing vaccine at national level, ≥ 90% in all HFs	3.1 Identify underserved populations (groups) and the causes of inequities on a regular basis.	3.1.1 Make use of immunization programme data (vaccination coverage and disease epidemiology data) and other information to identify underserved populations (groups).	2016-2020

	Ensure ≥ 95% IPV and OPV coverage at national level, ≥ 90% in HFs		3.1.2 Utilize operational research and social sciences to identify underlying causes for inequities.	2016-2020
	Ensure ≥ 95% MCV2 coverage at all administrative levels	3.2 Design and implement tailored, innovative strategies to address identified causes of inequity.	3.2.1 Build upon proven-effective approaches in reaching underserved groups, such as the “Reaching Every District” strategy, planning of outreach sessions).	2016-2020
			3.2.2 Expand a network of mobile teams for reaching the population in hard---to---reach or low density areas	2016-2020
			3.2.3 Track each individual’s immunization status, preferably through introduction of electronic immunization registries that are well integrated within health information systems and leverage other relevant civil registries.	2016-2020
			3.2.4 Pay special attention to migrants, international travelers and marginalized communities, in ensuring their eligibility and access to (culturally) appropriate immunization services and information.	2016-2020
			3.2.5 Develop plans and standard operating procedures for timely and effective response to vaccine-pre-ventable diseases during outbreaks, humanitarian crises and emergencies.	2016
			3.2.6 Train immunization managers and service providers to implement new strategies and tailored approaches to underserved and marginalized populations (training on planning and implementing tailored approaches,	2016-2020

			communication skills, engaging existing community structures and civil society organizations in planning and implementing tailored approaches, monitoring and evaluation).	
	Implement HPV Demonstration project with GAVI support	Implement HPV vaccination in selected districts to define optimal vaccine delivery and communication strategies	Develop and implement HPV Demo project plan of activities Develop communication and social mobilization plan Conduct trainings for medical workers Assess implementation of joint deliver of HPV vaccination and other adolescent health interventions Develop national strategy on comprehensive cervical cancer prevention and control Conduct coverage survey and post-introduction evaluation Assess cost of HPV vaccination	2017-2018
	Introduce HPV vaccine nation wide		Develop and impellent HPV vaccine introduction plan using lessons learnt from demonstration project Conduct post-introduction evaluation	2019 2020
4. Strong immunization systems are an integral part of a well-functioning health system	Percentage of districts with ≥ 90% coverage with three doses of DTP-containing vaccine	4.1 Develop comprehensive, coordinated approaches within the immunization programme and the health system.	4.1.1 Ensure that global disease eradication and elimination initiatives (polio eradication, measles–rubella elimination) are incorporated into national immunization programmes and do not operate independently.	2016-2020

	Percentage of districts with < 5% drop-out rate between first and third dose of DTP-containing vaccine	4.1.2 Ensure that new vaccine (IPV, pneumococcal, human papilloma virus vaccine) introduction plans are accompanied by comprehensive plans to control targeted diseases in a more effective manner.	2016-2020
	Presence of an expert review committee to assess causality for AEFI	4.1.3 Conduct post –introduction evaluations for Rota and IPV.	2016-2017
	Percentage of districts with no stock-outs for any routine vaccine	4.1.4 Develop Hep B control strategy including baseline assessment of disease epidemiology, reliability of coverage data and timeliness for vaccine birth dose to infants born at home.	2016-2018
	Number of personnel that completed training in data quality control, processing and reporting	4.1.5 Ensure that national immunization programme components (such as vaccine procurement, vaccine regulations, vaccine pharmacovigilance, laboratory-based vaccine-preventable disease surveillance, immunization information systems) are well integrated with broader (health) system components.	2016-2020
	Rate of measles-rubella suspected cases >2/100 000	4.1.6 Ensure coherence and alignment with broader health policies (child and adolescent health, public health and health systems policies).	2016-2020
	Rate of non-polio AFP >2/100 000	4.1.7 Ensure active engagement of immunization advocates in planning and	2016-2020

	among children <15y		management of health system changes (decentralization, changes in service provision and financing) to secure and reposition essential functions of the national immunization programmes within restructured health systems.	
			4.1.8 Ensure that essential functions of immunization programmes are kept centralized under decentralized health systems (so that the public good aspect of immunization is not neglected, inequities are not exacerbated and economies of scale are not lost).	2016-2020
		4.2 Strengthen monitoring and surveillance systems.	4.2.1 Improve the quality of immunization data and promote its analysis and use on a regular basis at all administrative levels (facility, subnational and national levels) to improve programme performance (through introduction of standard operating procedures).	2016-2020
			4.2.2 Develop and promote the use of new information technologies for collection, transmission and analysis of immunization data within immunization information systems that are well integrated with communicable disease and health information systems.	2016-2020
			4.2.3 Assess quality of immunization data by checking validity of immunizations and accuracy of processed data and target population data for immunizations (data quality review, coverage /sero surveys)	2016-2020

			4.2.4 Further strengthen and expand laboratory-based and case-based vaccine-preventable disease sur-veillance systems to generate information for decision-making and monitor the impact of immunization.	2016-2020
			4.2.5 Strengthen the quality of laboratories through introduction of quality assurance and accreditation systems.	2016-2020
			4.2.6 Strengthen data management systems so that laboratory-based surveillance and epidemiology data systems reconcile and support each other.	2016-2020
			4.2.7 Ensure capacity for vaccine safety activities, including capacity to collect and interpret safety data, with particular emphasis on newly developed and introduced vaccines.	2016-2020
			4.2.8 Ensure that adverse events following immunization (AEFI) surveillance systems (pharmacovigilance) are in place and are an integral part of regional and global networks.	2016-2020
		4.3 Strengthen the capacity of managers and front-line workers.	4.3.1 Ensure that immunization and other primary health care programmes have adequate human resources to plan and deliver predictable high-quality services, and efficiently use existing human resources (through incentive mechanisms).	2016-2020

			4.3.2 Increase levels of pre-service and in-service training for human resources, and develop new, relevant curricula that approach immunization as a component of comprehensive disease control.	2016-2020
			4.3.3 Utilize new learning techniques to intensify capacity building efforts, and promote and support learning at all levels (such as e-learning, peer-to-peer, twinning, and networking).	2016-2020
			4.3.4 Enhance sustainability of in-service training activities through integration with continuous medical education and accreditation systems.	2016-2020
			4.3.5 Ensure synergies between training and supportive supervision efforts.	2016-2020
		4.4 Strengthen infrastructure and logistics.	4.4.1 Develop and introduce standards and operating procedures for immunization supply systems that are well integrated with broader supply systems.	2016-2020
			4.4.2 Explore introduction of new technologies and innovative solutions to immunization supply systems and waste management systems.	2016-2020
			4.4.3 Adopt systematic approaches to assess the quality of immunization supply systems on a regular basis, and develop and implement immunization supply system improvement plans.	2016-2020
			4.4.4 Apply similar standards to the quality of supply systems that are not	2016-2020

			directly supervised by national immunization programmes (private sector supply and outsourced systems)	
			4.4.5 Minimize the environmental impact of energy, materials and processes used in immunization supply systems, where applicable and affordable	2016-2020
			4.4.6 Staff supply systems with adequate competent, motivated and empowered personnel at all levels.	2016-2020
			4.4.7 Establish information systems and where affordable, electronic systems, that help staff to accurately track available supply and to monitor quality of the cold chain system (national and branches).	2016-2020
5. Immunization programmes have sustainable access to predictable funding and high-quality supply	Existence a fully functional national regulatory authority	5.1 Allocate adequate financial resources to national immunization programmes to achieve their objectives in the context of achievement of financial self-sufficiency.	5.1.1 Establish a commitment from governments to allocate adequate financial resources to immunization as required, to meet programme objectives.	2016-2020
			5.1.2 Conduct representative epidemiological, immunological, social and operational studies and investiga-tions of vaccine impact to guide advocacy efforts on benefits of immunization and value of vaccines	2016-2020
	Number of stock outs at any administrative level		5.1.3 Allocate adequate funding for operational activities to improve the quality of immunization services, such as training, supervision, monitoring, surveillance, advocacy and communication.	2016-2020

			5.1.4 Allocate adequate funding for EVM assessment recommendations into annual planning and budgeting	2016-2020
			5.1.5 Establish resource mobilization plan	2016-2020
			5.1.6 Increase reliability of funds through earmarking and ensuring timely disbursement of funds.	2016-2020
		5.2 Improve Efective Vaccine Management and increase access to quality-assured vaccines and cold chain equipment	5.2.1 Implement EVM assessment recommendations	2016-2020
			5.2.2 Establish a formal procedure to review EVM improvement plan implementation progress during ICC meetings	2016-2017
			5.2.3 Develop Cold Chain Enhancement (CCE) proposal and submit to Gavi Secretariat	2016-2017
			5.2.4 Develop integrated national regulations on storage of vaccines and cold chain requiring pharmaceuticals	2016-2017
			5.2.5 Improve knowledge on the specificities of vaccine procurement and global market dynamics to optimize actions and activities in countries.	
		5.3 Strengthen regulatory mechanisms to ensure access to and use of quality-assured vaccines in national	5.3.1 Conduct assessment of national regulatory authorities on a regular basis (against established international standards for required functions) and	2016-2020

		immunization programmes.	formulate institutional development plans that address challenges.	
			5.3.2 Implement institutional development plan activities and recommendations to strengthen national regulatory authority functions.	2016-2020
			5.3.3 Harmonize national vaccine quality assurance activities with regional and global systems.	2016-2020
			5.3.4 Build and support networks of regulators to share best practices and to improve quality assurance capacities.	2016-2020

3.3 MONITORING AND EVALUATION

Table 10: Baseline and Target Indicators

Objective	Indicator	Source of data	Baseline (2014)	Target indicator (years) 2016	2017	2018	2019	2020
1. Maintain political commitment to immunization as a priority	Presence of a fully functional NITAG	NCDC	Yes	Yes	Yes	Yes	Yes	Yes
2. Individuals understand the value of immunization services and vaccines and demand vaccination	Existence of a communications plan in case of a VPD outbreak and rapid response	NCDC	No	Yes	Yes	Yes	Yes	Yes
	Domestic expenditure for routine vaccines per newborn	NCDC	$80	$80	$80	$100	$110	$120
3. The benefits of vaccination are equitably extended to all people through tailored, innovative strategies	≥ 95% coverage with three doses of DTP-containing vaccine at national level	NCDC	93%	94%	95%	95%	96%	97%
	≥ 90% coverage with three doses of DTP-containing vaccine in all HFs	NCDC	88%	90%	92%	95%	95%	98%
	≥ 95% IPV coverage at national level	NCDC	NA	50%	90%	95%	95%	95%
	≥ 90% IPV coverage in all HFs	NCDC	NA	50%	60%	70%	80%	90%
	≥ 95% OPV3 coverage at national level	NCDC	95%	96.5%	97%	98%	98%	98%

	≥ 90% OPV3 coverage in all HFs	NCDC	93%	95%	96%	97%	97%	98%
	≥ 95% MCV2 coverage at all administrative levels	NCDC	97%	98%	98%	98%	98%	98%
	HPV vaccine is introduced into national immunization programme	NCDC	0				Yes	
4. Strong immunization systems are an integral part of a well-functioning health system	% districts with ≥ 95% DTP3 coverage	NCDC	100%	100%	100%	100%	100%	100%
	% of HFs with < 5% drop-out rate between first and third dose of DTP-containing vaccine	NCDC	70%	75%	80%	90%	90%	90%
	Presence of a functional expert review committee to assess causality for AEFI	NCDC	Yes	Yes	Yes	Yes	Yes	Yes
	% of districts with no stock-outs for any routine vaccine	NCDC	92%	95%	95%	95%	100%	100%
	% of personnel that completed training on Immunization in practice (data quality control, processing and reporting, contraindications)	NCDC	50%	50%	90%	95%	95%	100%

	Rate of measles-rubella suspected cases per 100 000	NCDC	2.8	3	3	3	3	3
	Non-polio rate of AFP per 100 000 among children <15y.o	NCDC	4	4	4	4	4	4
5. Immunization programmes have sustainable access to predictable funding and high-quality supply	Existence a fully functional national regulatory authority	NCDC	Yes	Yes	Yes	Yes	Yes	Yes
	Number of stock outs at any administrative level	NCDC	0	0	0	0	0	0

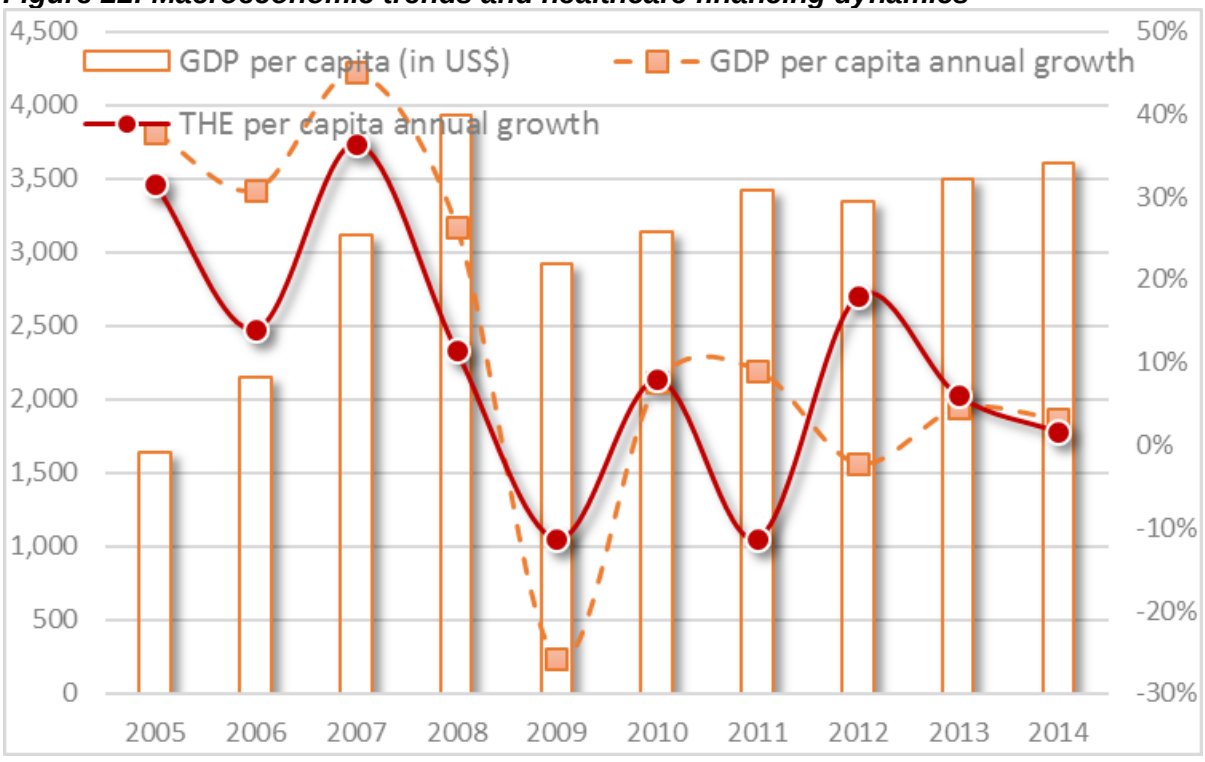
1 Immunization program costs and financing

1.1 Macroeconomic context and demographics

The following assumptions have been used for macroeconomic projections for cMYP costing exercise:

- GDP per capita rate was set based on WHO estimates:
  - 2.29% - 6.83% GDP range of annual growth rate during 2010 – 2014 in accordance with the WB annual GDP growth rate forecast. No data is available for the cMYP projection years.
  - Population annual growth rate of 0.51% in accordance with the projections of MoH Armenia.
- GDP per capita (in current US$) was estimated at 3,606 in 2014 (according to the WHO Global Health Expenditure Database (GHED)) as shown in Figure 48.
- Total Health Expenditure (THE) per capita was 162 US$ in 2014 (in accordance with the WHO NHA GHED).
- GHE as % of THE – constant value at the rate for 2014 – 43%.
- Inflation rate (Consumer price index) was estimated at level of 2.56 – 5.79 in previous 3 years (according to the World Bank World Development Indicators);

Figure 22: Macroeconomic trends and healthcare financing dynamics



Source: WHO Global Health Expenditure Database

The total population was estimated at 3,017,100 in 2014 (in accordance with Census 2014 findings):

- The population growth was projected at the annual growth rate of 0.51%, that is higher than the population annual growth % in last five years according to the World Bank projections).
- Infant mortality rate – constant at the rate 8.8 per 1000 live birth in 2014 in accordance with the MoH Armenia data (Note: GHED data is 1 per 1,000 live births)
- According to the Ministry of Health of Armenia in 2014:
  - The number of surviving infants was 41,868 in 2014, that translates into 42,239 newborns at the infant mortality rate of 8.8 per 1,000 live births (that accounts for 1.4% of the total population in 2014)
  - The number of Childbearing Age Women (CBAW) 81,462 in 2014, that translates into 2.7% of total population.

1.2 Current program costs and financing

1.2.1 Expenditures on immunization in the baseline year

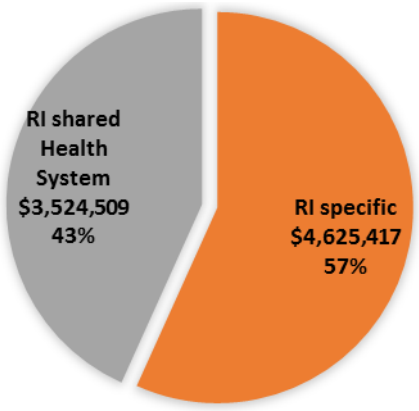
The national immunization program expenditures in 2014 amounted to 7.75 million US$ (with shared health system costs) as shown in Figure 23 below:

Figure 23: Baseline Indicators (2014)

Total Immunization Specific Expenditures	**$4,625,417**
Supplemental immunization activities	$0
Routine immunization only	$4,625,417
Per capita	$1.53
Per DTP3 immunized child	$119
% Vaccines and Supplies	58.43%
% Government Funding	57.61%
% Of Total Health Expenditures (THE)	0.95%
% Government Health Expenditures	2.21%
% GDP	0.04%
Total shared costs	**$3,524,509**
% Shared Health Systems Cost	43.25%
Total Immunization Expenditures	**$8,149,925**

No supplementary immunization activity was conducted in 2014.

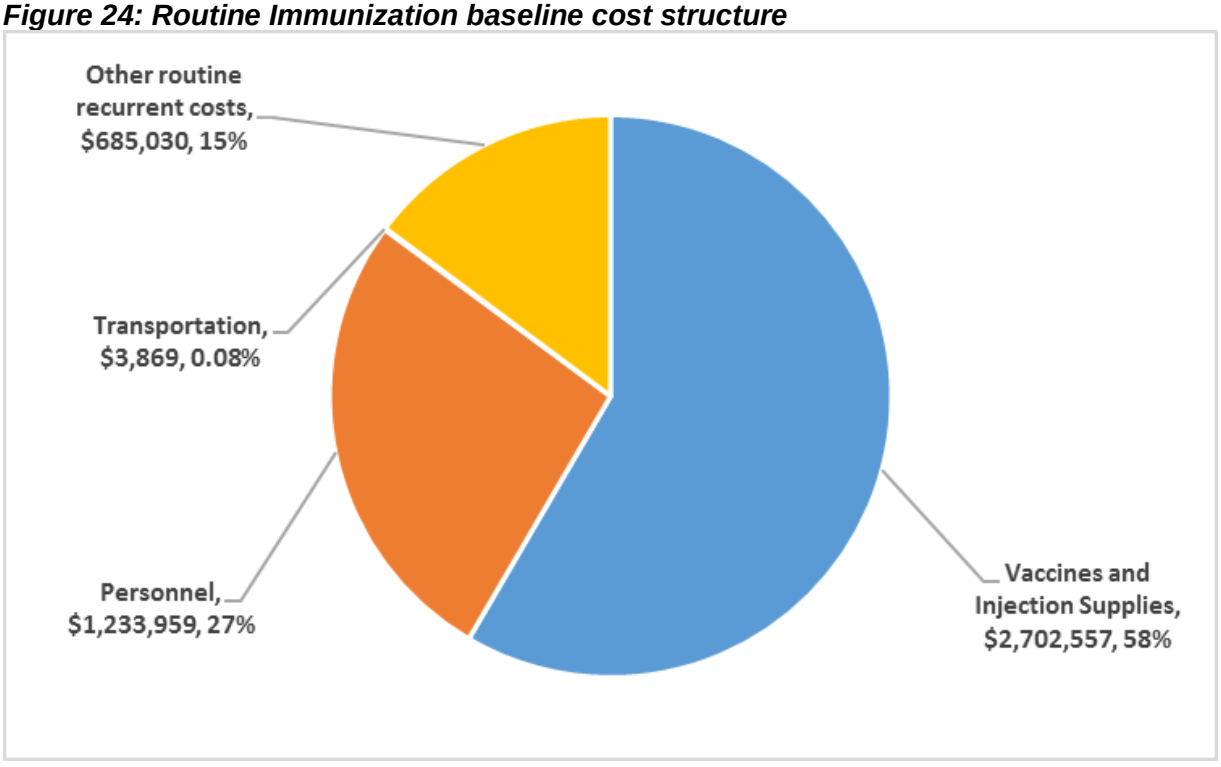
Shared health system costs (3,524,509 US$) accounted for 43 per cent of the immunization expenditures and the rest was spent specifically on routine immunization. The cost of fully (DTP3) immunized child was 119 US$.



0.95% of the total health expenditures (or 2.2% of the government health expenditure) was spent on routine immunization.

Vaccines and injection supplies were the major cost driver accounting for 58.4% (or 2.7 million US$) of all expenditures as shown in Figure 24:

Figure 24: Routine Immunization baseline cost structure



"Personnel" costs were the second major cost driver accounting for 26.68% (or 1,233,959 US$) of the total expenditures, followed by "other routine recurrent costs" accounting for 14.81% (or 685,030 US$) of the total expenditures. 7.91% or (or 572,460 US$) was spent on the SIAs and 14,81% (or 3,869 US$) - on transportation in 2014.

1.2.2 Routine immunization cost structure

Personnel

The majority of the total of 2,789 persons engaged in the national immunization program 1,958 (70%) were shared health system personnel (allocating some portion of work time to immunization) and 829 persons dedicated full work time to immunization as shown in Figure 43.

Vaccines

In total 105,462 US$ (or 2.28% of total program costs) were spent on traditional vaccines, 2,09 million US$ (or 45.27% of total program costs) were spent on underused vaccines and 465,000 US$ - (10.05% of total program costs) on new vaccines in 2014. Total expenditures for vaccines and injection supplies amounted to 2.7 million US$ (or 58.43% of total program costs).

Other Routine Recurrent Costs

"Program Management" accounted for 35.03% of "other routine recurrent costs", followed by "cold-chain maintenance and overhead" – 24.24% of total other routine recurrent costs. 14.60% was spent on "Disease Surveillance" and "building overheads" (electricity and water) accounted for 12.99% of "other routine recurrent costs". The remaining 8.76% and 4.38% were spent on "short-term training" and "IEC/Social Mobilization" respectively. Total expenditures for "other routine recurrent costs" amounted to 685,030 US$.

Vehicles and Transportation

Transportation expenditures for vaccine distribution from the Central to the sub-national levels to 3,869 US$ in 2014 that constituted 0.08% of the total program expenditures in the baseline year. No investments made in vehicles or other transportation means in 2014.
Fuel cost in baseline year was estimated at 0.87 U$ per liter.

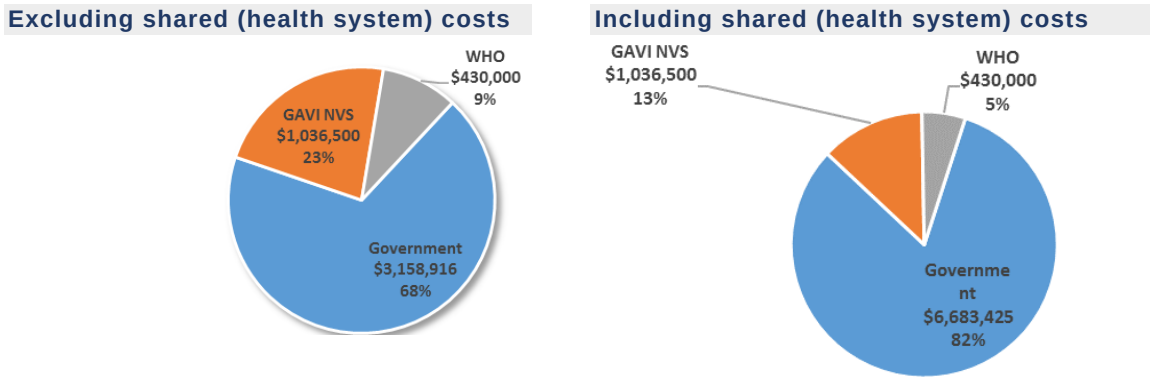
1.2.3 Supplementary immunization costs

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 82% of all funds if shared health system costs are excluded and 68% if shared health system costs are included as shown in Figure 25 below:

Figure 25: Immunization financing profile – baseline year



Gavi was the second major source of funding through NVS (1.04 million US$) accounting for 12.72% of the total funding (excluding shared costs). WHO contribution in the National Immunization program accounted for 5.28% (or 430,000 US$) (excluding shared health system costs).

1.3 Future resource requirements

1.3.1 Overview of the resource requirements' structure

The total resource requirements were estimated at 43.9 million US$ (including shared health system costs) for 2016-2020 as shown in Figure 26 below:

Figure 26: National immunization program costs summary by system components and years – basic scenario

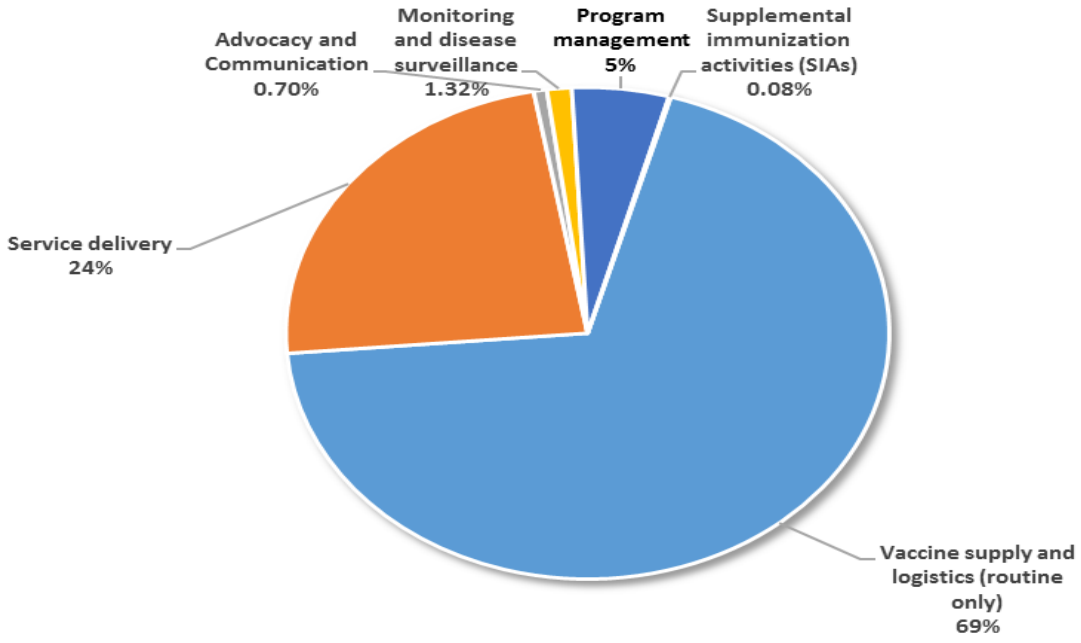
Immunization system components	Expenditures	Future resource requirements					Total 2016 -
	2014	2016	2017	2018	2019	2020	2020
Vaccine supply and logistics (routine only)	2,868,630	3,640,173	3,833,865	3,572,981	3,587,341	3,621,797	**18,256,157**
Service delivery	1,227,236	1,238,140	1,238,140	1,238,140	1,234,271	1,234,271	**6,182,963**
Advocacy and Communication	30,000	60,000	95,000	10,000	10,000	10,000	**185,000**
Monitoring and disease surveillance	110,593	111,839	111,839	41,839	41,839	41,839	**349,195**
Program management	388,957	398,957	553,957	138,957	138,957	138,957	**1,369,787**
Supplemental immunization activities (SIAs)	0	22,114	0	0	0	0	**22,114**
Total immunization Immunization costs	**4,625,417**	**5,471,224**	**5,832,801**	**5,001,918**	**5,012,408**	**5,046,864**	**26,365,216**
Shared Health Systems Costs (EPI Portion)	3,524,509	3,524,509	3,524,509	3,524,509	3,524,509	3,524,509	**17,622,543**
Total immunization resource requirements	**8,149,925**	**8,995,732**	**9,357,310**	**8,526,426**	**8,536,917**	**8,571,373**	**43,987,759**

The details of future resource requirement (by cost categories) is presented in Figure 49.

1.3.2 Description of cost drivers of the future resource requirements

The resources required for "vaccine supply and logistics" account for 69% of the total costs for 2016-2020 (excluding shared health system costs) as shown in Figure 27 below. "Service delivery" is the second major cost driver – accounting for 24% of the future resource requirements followed by "Program Management" accounting for 5% of total resource requirements. "Advocacy and Communication" and "Monitoring and Disease surveillance" accounting for 0.7% and 1.32% of the total resource requirements respectively. The resource requirement for SIA was estimated at 0.08%.

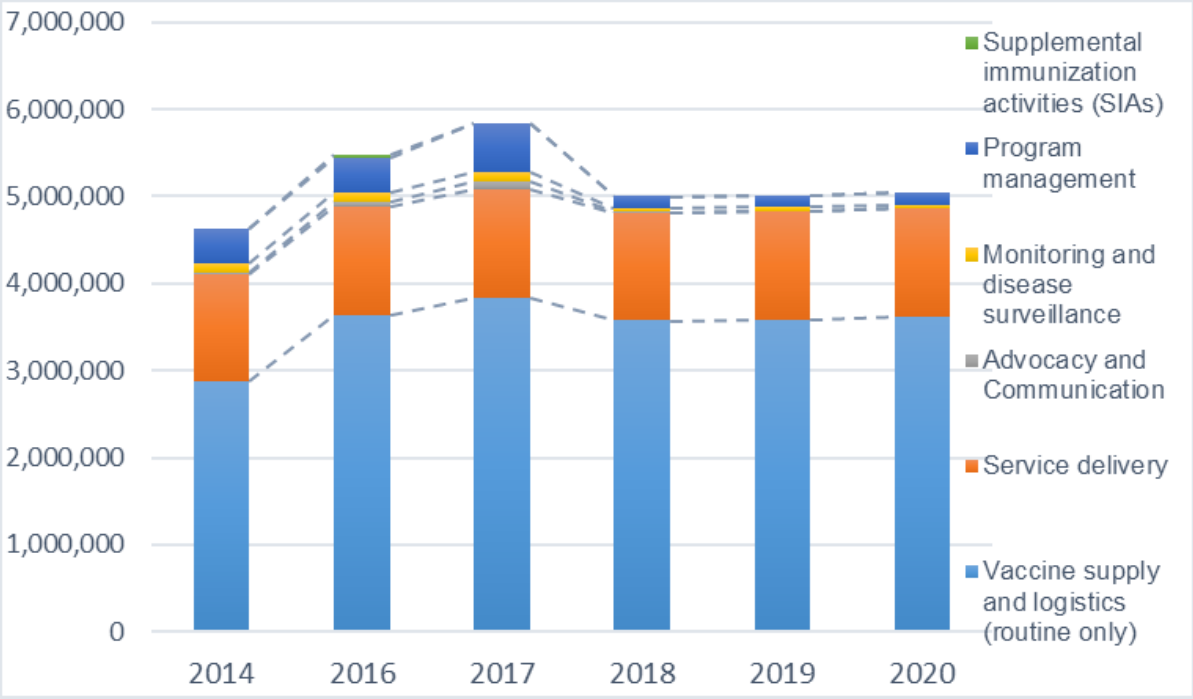
Figure 27: The future total resource requirement structure by cMYP components (shared costs excluded)



The resource requirements for routine immunization per annum varies between 5 and 5.8 million US$ in 2016-2020 (excluding shared health system costs):

- In the first projection year (2016) the resource requirement will increase by 18.29%, from 4.6 million US$ in the baseline year to 5.5 million US$. Polio mop-up campaign planned for 2016 will increase the immunization resource requirements by 22,114 US$ in 2016.
- In 2017 the resource requirements will increase by 6.61% (or 361,577 US$) in comparison with the preceding year.
- In the third projection year (2018), the resource requirement will rapidly decrease by 14.25% (or 830,884 US$) which can be attributed with full concentration of the EPI on routine immunization service provision and lower investment in program activities such as “Monitoring and disease surveillance”, “Advocacy and Communication” and “Program Management” as shown in Figure 28 below.
- In the two final years of projection period, 2019 and 2020 the resource requirement will continue modest increase by 0.21% (or 10,491 US$) in 2019 and 0.69% (or 34,456 US$) in 2020.

Figure 28: 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 MMR and OPV. 10% wastage target rate for IPV and 7.1% - for PCV; Td - at 5.4% and 5% wastage target rate was estimated for Pentavalent and HepB 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.

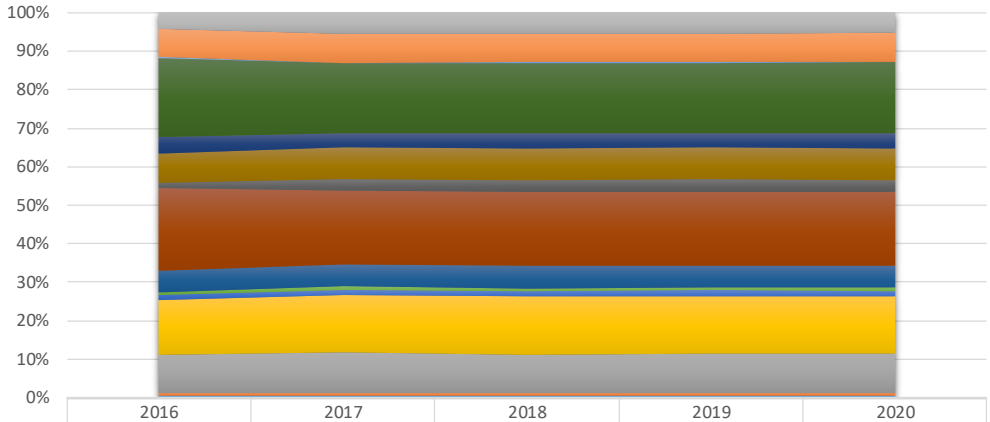
The resource requirement projections for vaccines (basic scenario) envisages costs of following vaccines:
Traditional vaccines: BCG, OPV and Td vaccines;
Underused vaccines: HepB (introduced in 2001), Pentavalent (introduced in 2009) and MMR;
New vaccines: Rotavirus (introduced in 2012), PCV (introduced in 2014);

- In addition, the projections of vaccines consider procurment of non-epi vaccines, such as Meningitis vaccine, Hepatitis A, Hepatitis B for adult specific group, Rabies and Seasonal Influenza.

The resource requirement projections for Scenario A, B and C envisages costs of HPV (Demo project in 2017-2018 and Hexavalent vaccines.

Figure 29 below illustrates that the structure of routine immunization vaccine and injection supply costs by vaccines and years.

Figure 29: Vaccine and injection supply cost projections (routine immunization)

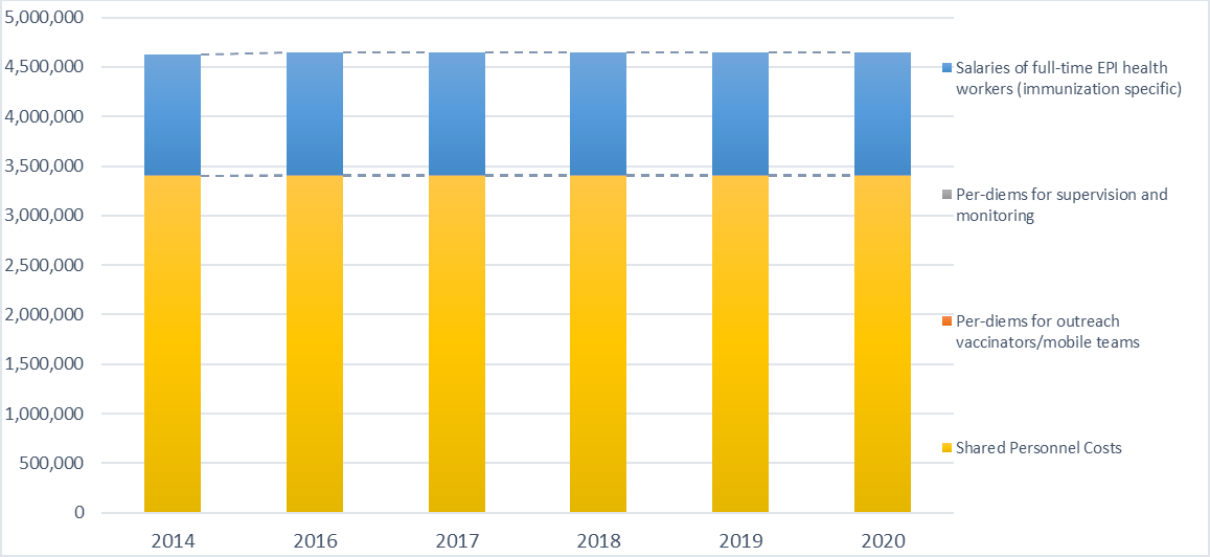


	2016	2017	2018	2019	2020
Seasonal Influenza	$146,585	$182,743	$182,743	$182,743	$182,743
Rabies	$249,562	$249,562	$249,562	$249,562	$249,562
Hepatitis B Specific group	$10,017	$10,017	$10,017	$10,017	$10,017
Hepatitis A	$714,146	$599,317	$613,629	$613,551	$624,783
Tularemia	$153,440	$129,107	$132,191	$132,174	$134,594
Meningitis ACYW-135	$260,320	$270,369	$277,586	$278,990	$283,370
IPV	$52,787	$99,487	$100,772	$102,352	$103,946
PCV	$746,193	$639,707	$651,230	$653,217	$658,051
Rota	$190,351	$193,346	$193,825	$194,813	$195,807
Td	$23,389	$24,509	$23,399	$23,590	$23,710
OPV	$47,548	$48,285	$48,408	$48,655	$49,408
MMR	$497,165	$501,329	$509,956	$511,262	$513,870
DTP+Hib+HepB	$346,958	$352,415	$339,159	$345,728	$351,065
Hep B	$22,127	$22,239	$22,353	$22,467	$22,581
BCG	$13,512	$13,581	$13,650	$13,720	$13,790

Personnel

Personnel costs were estimated at 23.2 million US$ in 2016-2020. Salaries of the shared personnel accounted for its 73%.

Figure 30: Personnel costs by cost categories and years (routine immunization)



Personnel costs, per diems for supervision and monitoring will remain constant throughout the projection years as it is shown in Figure 42, 43 and 44.
EPI Armenia is not planning outreach during the projection period.

Cold chain equipment

EPI plans to invest in cold chain improvement over the projection period. More specifically EPI will upgrade cold chain equipment at Marz and Health facility level and renovate cold rooms at the central level with support provided through the Gavi transition plan. For this purpose, 60,000 US$ will be allocated and channeled to the country through the Ministry of Health.

Figure 31: Cold chain related resource requirements (thousand US$)

	2014	2016	2017	2018	2019	2020	Total 2016-2020
Cold chain maintenance and overhead	$166,073	$166,073	$264,500	$204,500	$204,500	$204,500	**$1,044,074**
Cold chain equipment			$233,350				**$233,350**
Total	**$166,073**	**$166,073**	**$497,850**	**$204,500**	**$204,500**	**$204,500**	**$1,277,424**

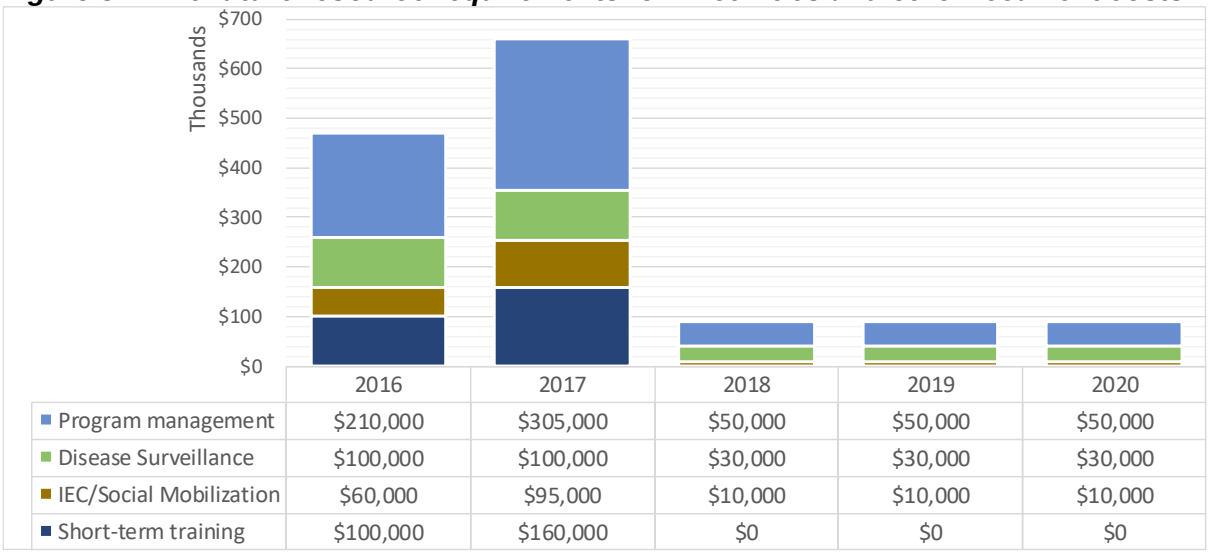
Cold chain maintenance and overhead costs is account for 81.73% of total 1.27 million US$, estimated to cover the cold chain related needs as shown in Figure 31 above.

Other recurrent costs

Out of the total 2.8 million US$ required for “Routine Recurrent Costs”, 51% or 1.5 Million US$ will be used for maintenance and overhead including: “cold chain maintenance and overhead” (1.04 million US$ or 36.1% of total routine recurrent costs) and “building overheads (water, electricity and etc.)” accounting for 15.4 % (or 444.787 US$). 23% (or 665,000 US$) will be spend to cover “Program Management” costs. 10% of “Routine Recurrent Costs” will be spent for disease surveillance and

9% and 6.4% - for Short-term training and IEC/Social mobilization respectively (see Figure 32 below).

Figure 32: The future resource requirements for "Activities and other recurrent costs"



	2016	2017	2018	2019	2020
Program management	$210,000	$305,000	$50,000	$50,000	$50,000
Disease Surveillance	$100,000	$100,000	$30,000	$30,000	$30,000
IEC/Social Mobilization	$60,000	$95,000	$10,000	$10,000	$10,000
Short-term training	$100,000	$160,000	$0	$0	$0

Supplementary immunization activities

The cost of Polio Mop-up campaign in 127 selected communities in 2017 was estimated at 22,114 US$. This amount represents cost of vaccines and injection supplies only. The operation costs will be covered through the routine immunization budget and will not be related to any additional expenditure.

1.3.3 Description of scenarios for introduction of new vaccines

Scenario building parameters

Armenia EPI considers selection of cMYP 2016-2020 scenario, out of four different potential scenarios. Final selection of the implementation scenario will depend on availability of resources and considerations of the key decision makers of the country based on the discussion of all potential scenarios.

Baseline scenario considers full concentration of the EPI on routine program implementation, with no introduction of new vaccines or any other major interventions in program implementation.

Scenario A envisions introduction of two new vaccines in the routine immunization schedule during the projection period in addition to the basic scenario. More specifically, within the framework of the Scenario A, EPI will introduce:

- HPV vaccine two-year Demo project in 2017 with following scale-up of the vaccine at the country level; and
- Hexavalent vaccine in 2018 with simultaneous withdrawal of IPV, OPV and Pentavalent vaccine from the national routine immunization schedule.

Scenario B considers introduction of the HPV two-year Demo Project in 2017 with national roll-out of the vaccine in 2019 in addition to the **Basic Scenario** of the routine immunization program.

Scenario C considers introduction of Hexavalent vaccine in routine immunization schedule in addition to the implementation of the **Basic Scenario**, which similarly to the Scenario A, will require withdrawal of IPV, OPV and Pentavalent vaccine from the routine immunization schedule.

All these scenarios have different financial implication and different resource requirements related to the vaccine procurement budget and program activities that are to be implemented to ensure effective introduction of vaccines and their inclusion in the routine immunization schedule (cost-effectiveness analysis, staff training, post introduction evaluation and etc.).

Results – financial implications of vaccine introduction

Figure below represents cost implications of Scenario A (Baseline+HPV+Hexa). Financial resource requirement in the second projection year (2017) will increase by 3% (or 94,173 US$) followed by rapid increase in resource requirement in 2018, accounting for 138% (or 4.6 million USD), which is attributed to the introduction of an expensive Hexavalent vaccine. In 2019 resource requirement will increase by 111% (or 3.8 million USD) and in the last projection year by 110% (or 3.8 million US$). In total, implementation of the Scenario A will increase financial resource requirement by 72% (or 12 million US$) during the projection period.

Figure 33: Commparison of resource requirements for vaccines and injection supplies by scenarios and years

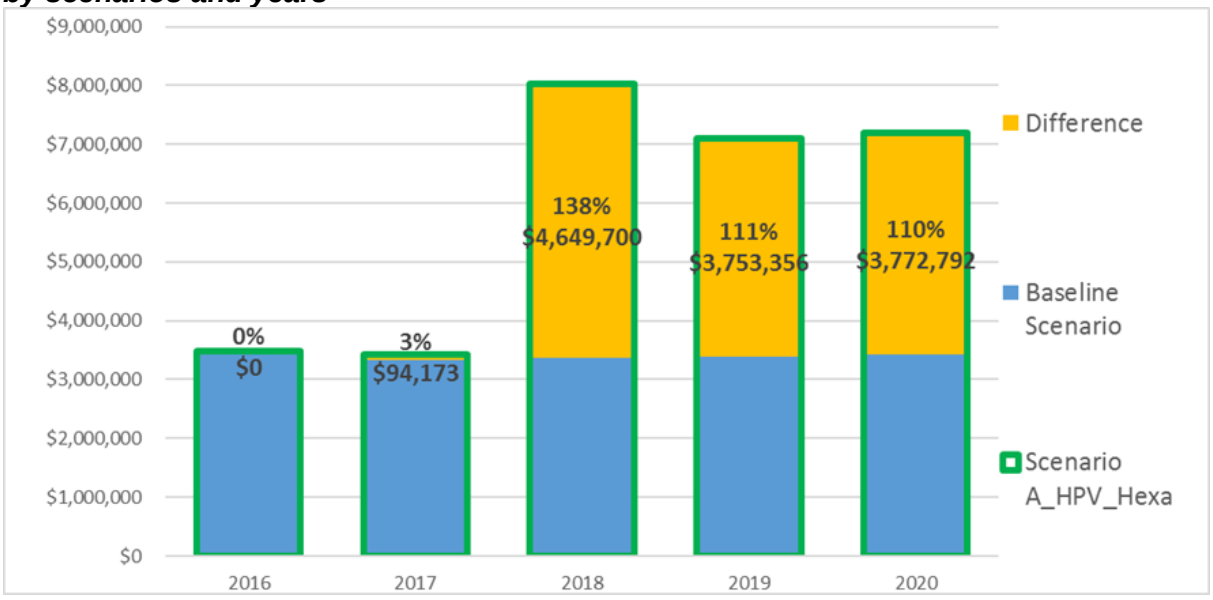


Figure 34 represents composition of cost of vaccines and cold chain across four potential scenarios and shows that implementation of the any additional scenarios (A, B or C) will mainly have financial implications on the resource requirements for vaccines and injection supplies and will not require any substantial investments in the cold-chain in addition to already planned cold-chain improvement.

Figure34: Comparison of costs of vaccines and cold chain across scenarios

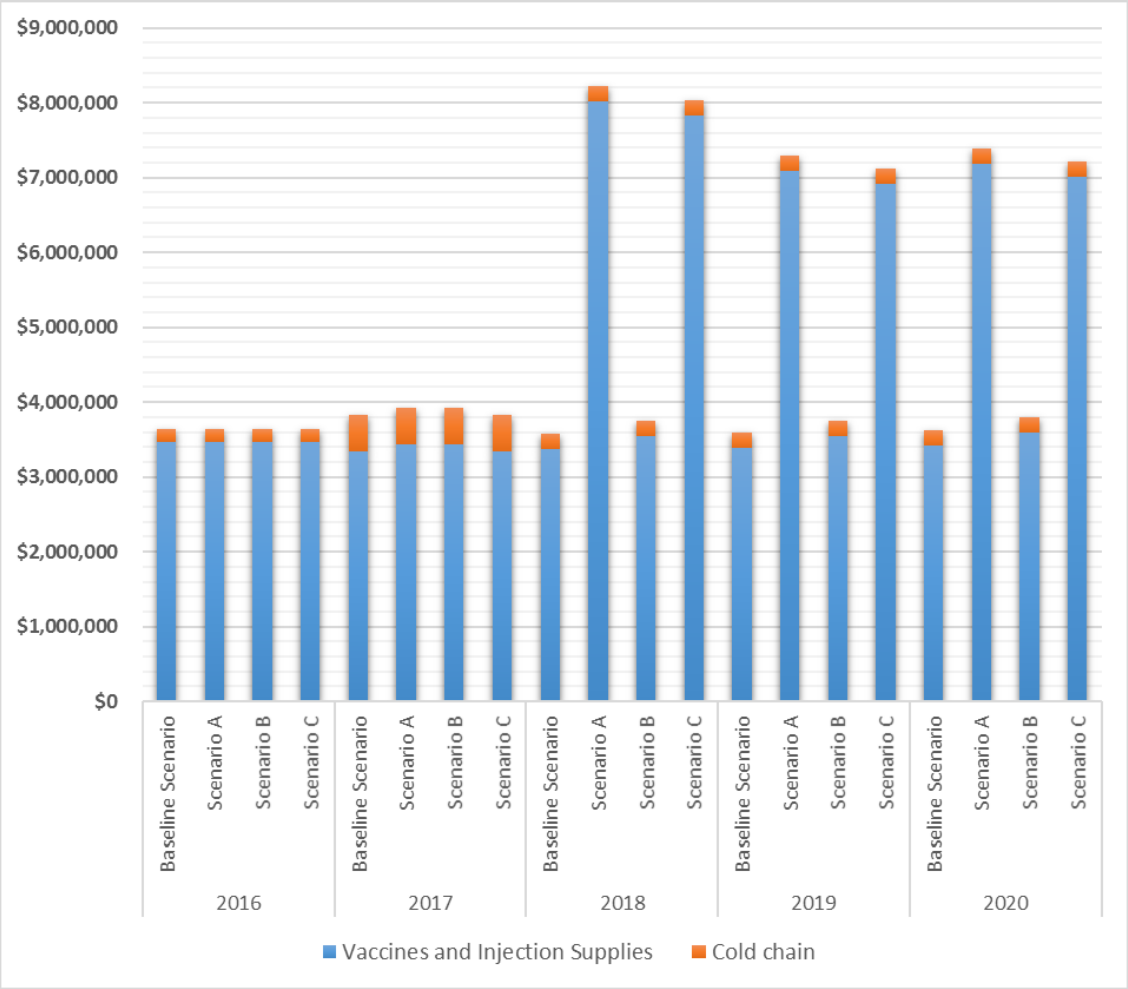
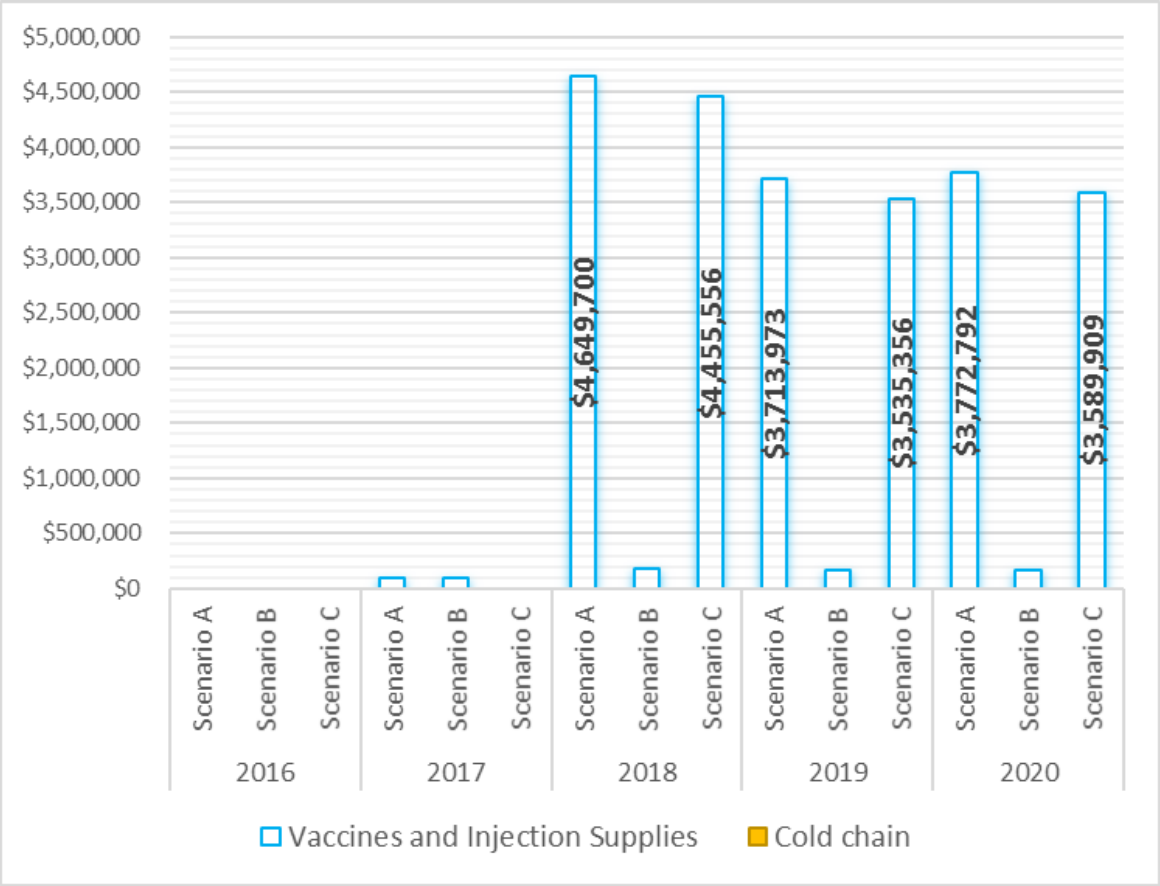


Figure 35 shows the cost implications of increased vaccines and injection supplies' requirement on the total resource requirement for A, B and C scenarios. Scenario A (Basic+HPV+HEXA) will have the highest cost implication on resource requirement of the program, increasing its total cost by 72% (or 12 million US$) over the cMYP period.

Figure35: Additional costs by types, scenarios and years



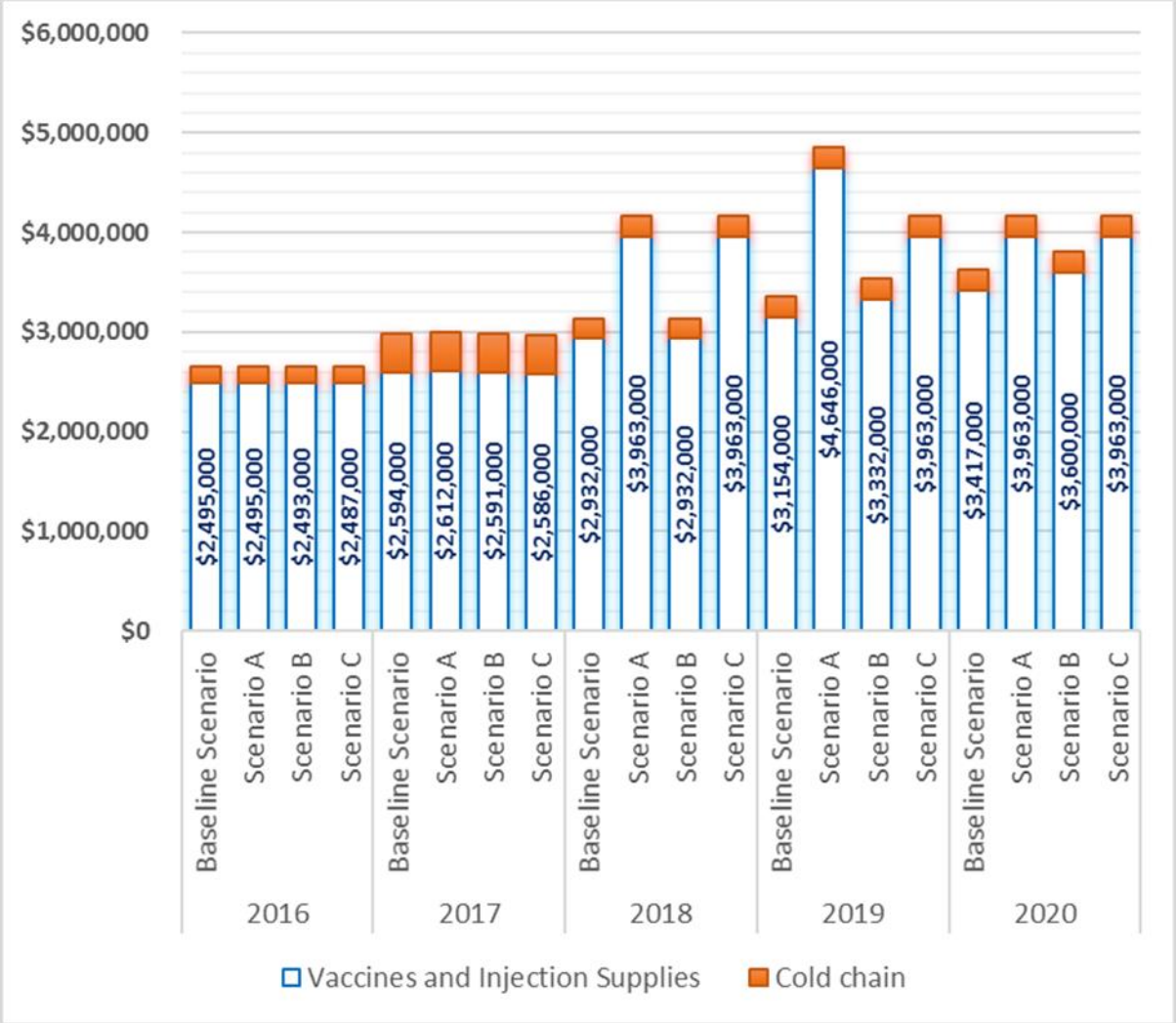
Implementation of Scenario B (Basic scenario + HPV) will have relatively modest financial implication on the financial resource requirement. Particularly, the total difference between the Basic scenario and Scenario B accounts for 3.65% (or 619,919 US$) for the entire projection period. In comparison with the baseline year in 2017 financial resource requirement for program implementation will be increased by 2.82% (or 94,173 US$), in 2018 – by 5.47% (or 184,333 US$), in 2019 – by 4.99% (or 168,651 US$) and in the final projection year (2020) the program financial resource requirement will increase by 5.06% (or 172,762 US$).

Further analysis of the HPV introduction financial implications shows that even though the total resource requirement for vaccines will increase with the HPV vaccine introduction, the Government financing of vaccines and cold chain in 2017 and 2018 will remain the same across the basic, A and B scenarios (where HPV introduction is considered); therefore, the introduction of HPV vaccine will not have a financial implication on the state budget **during the first two years of introduction**:

- Increased resource requirements for vaccines will be addressed through the GAVI support provided within the framework of the HPV vaccine demonstration program. The purpose of the program is to assess and develop capacity of the country in delivering a complete multi-dose series of HPV vaccines and gather relevant data to inform a potential nationwide introduction of HPV vaccine. The Demo project will enable the country to implement a small scale HPV vaccine introduction in a typical district of the EPI and gather the data and information necessary to inform any subsequent decision-making on national introduction of HPV Vaccines.

- However, the **introduction of HPV vaccine will have cost implications on the state budget in the two final years of projection (2019-2020)** if the country decides to roll-out HPV vaccine at the national level and include HPV vaccine into the routine immunization schedule. Particularly, in case of nationwide roll-out of the HPV vaccine **the additional financial burden to the state budget will amount to US$361,500** for two final years of cMYP (178,617 US$ in 2019 and US$182,883 in 2020) as it is represented in the Figure 36 below.

Figure 36: Government financing (both secured and probable) of vaccines and cold chain



In difference with the HPV vaccine, the costs related to the introduction of Hexavalent vaccine will become the financial burden of the Government from the first year of introduction in 2018 and will require additional 13.1 million US$ (or 29.71% of total baseline scenario cost) during the last three years of projection (2018,2019 and 2020). In the first year of introduction (2018) the financial implication of HEXA introduction will amount to 4.94 million US$, in 2019 – to 4.03 million US$ and in the final projection year (2020) – 4,09 million US$.

Implementation of the Scenario C will have more significant impact on financial resource requirement. Total difference between the Baseline Scenario and Scenario C resource requirements accounts for 68% (or 11.5 million US$). The resource

requirement rapidly increases in 2018 by 132% (or 4.5 million US$). In 2019 the financial resource requirement will be more by 104% (or 3.5 million US$) compared by the baseline year and in the last projection year (2020) resource requirement increase reaches 105% (or 3.6 million US$).

1.4 Future financing and funding gaps

The total financing for 2016-2020 was estimated at 43,987,759 US$ (including shared health system costs) or at 26,365,216 US$ (when shared costs are excluded).

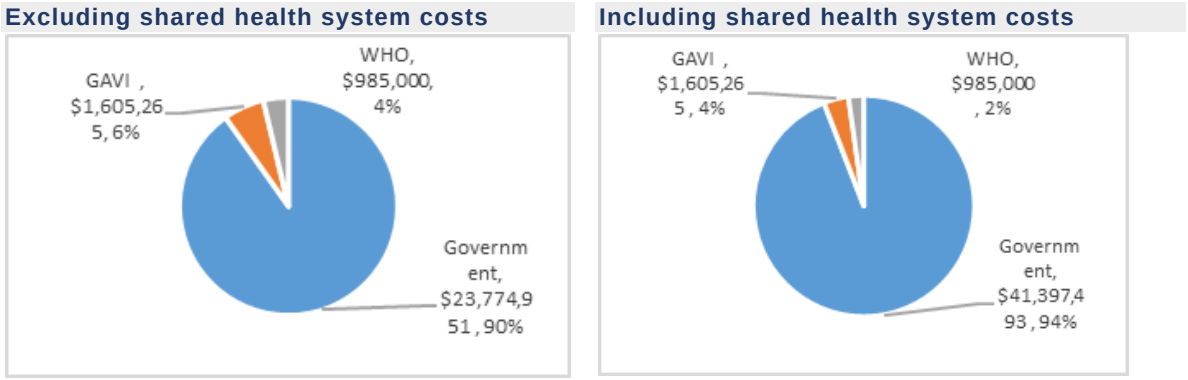
The government is the major source of financing expected to contribute 36.5 million US$ (if shared health system costs are included) that constitutes 90.96% of all funding, or 18.9 million US$ (if shared health system costs are excluded), that is 83.88% of the total funding (as shown in
Figure below). Government financing details for the projection period are presented in Figure.

Gavi is the second major source of financing, contributing through NVS and Transition grant 2.9 million US$, accounting for 11.04% of total funding when shared health system costs are excluded or 6.62% including shared health system costs.

WHO is expected to contribute 0.99 million US$ over the course of cMYP period, which accounts for 3.74% excluding shared health system costs or 2.24% of total funding when shared health system costs are included.

85.32% (or 22.5 million US) of funding is considered to be secured out of the total immunization specific financing 44 million US$ as shown in Figure 47 (excluding shared health system costs).

Figure 37: The future financing (with secured and probable funds) structure



When only secured funding is considered (excluding shared health system costs), the share of government in total program financing accounts for 71.56% (or 18.9 million US$ out of total 22.5 million US secured funds). However, 93.02% of probable funding (or 3.6 million US$) is expected to come from the state budget.

The secured funding is sufficient to cover only 85% of the total resource requirements in 2016-2020 and the funding gap with secured financing ranges from

0% in 2016 to 69% in 2019 and amounts to 3.9 million US$ as shown in Figure 38 below.

Figure 38: Financing by sources and funding gap by years (with secured funds only)

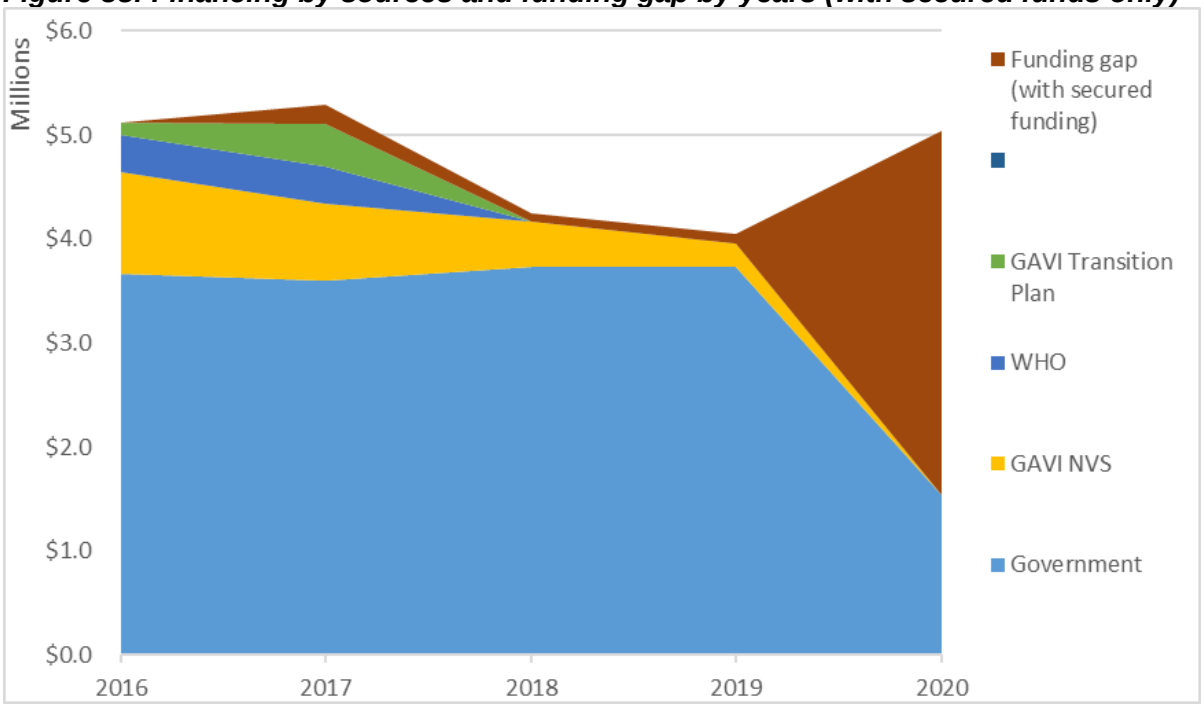
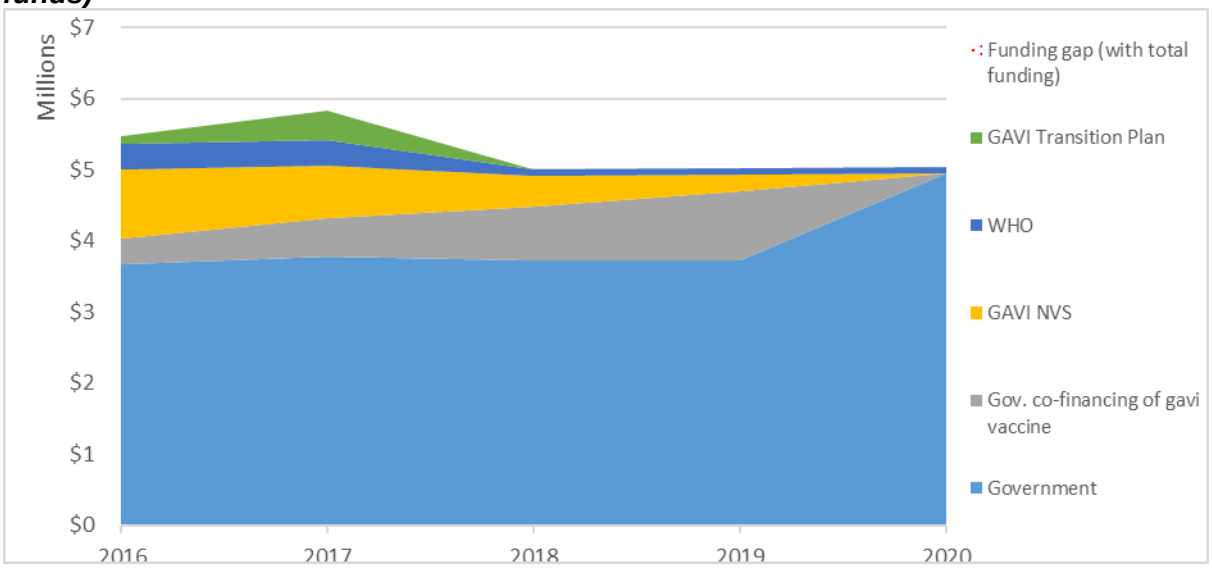


Figure 39 below illustrates funding conditions of the national immunization program with secured and probable funding. If probable funds are secured the available financing will be sufficient to cover 100% of the total resource requirement for implementation of the baseline scenario during 2016-2020.

Figure 39: 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

Analysis of total funding gap structure (see Figure 40) shows that the funding gap with secured funding only in the amount of 3.9 million US$ will affect three components of the immunization system: “Vaccines and injection supplies” accounting for 88% (or 3.4 million US$) of the total funding gap, “Logistics” component, accounting for 5% (or 183,350 US$) and “Activities and other recurrent costs”, which accounts for 7% (or 270,000 US$) of total funding gap.

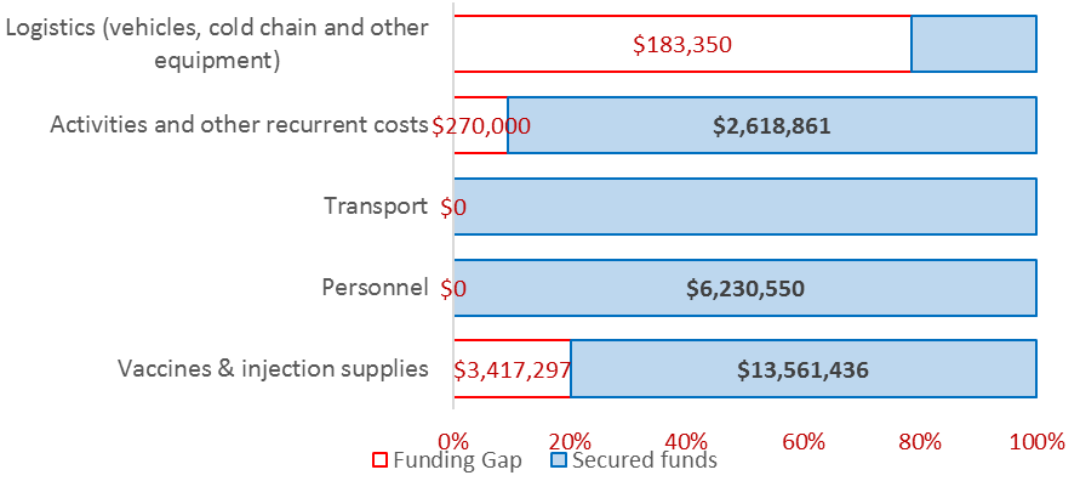
Figure 40: Funding gap (with secured and secured and probable financing only) structure by years

	2016	2017	2018	2019	2020	Total
With secure financing						
Vaccines & injection supplies	0	0	0	0	3,417,297	3,417,297
Personnel	0	0	0	0	0	0
Transport	0	0	0	0	0	0
Activities and other recurrent costs	0	0	90,000	90,000	90,000	270,000
Logistics (vehicles, cold chain and other equipment)	0	183,350	0	0	0	183,350
Supplemental immunization activities	0	0	0	0	0	0
Total funding gap	**0**	**183,350**	**90,000**	**90,000**	**3,507,297**	**3,870,647**
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**

Further analysis of funding gap by system components shows that although the funding gap in “Logistics” component is not high in absolute terms, it constitutes approximately 79% of total future resource requirements in this area and thus has to be fully filled to ensure effective logistics of the program. The funding gap in “Vaccines and injection supplies” accounts for nearly 20% of total resource requirements for this system component and if not fully filled will pose significant threat to the achievements of the program objectives.

The funding gap in area of “Activities and other recurrent costs” is relatively small, accounting to 9% of total resource requirements in this area and won’t have substantial impact on effectiveness of program implementation (see Figure 41).

Figure 41: Funding gap (with secured funds only) structure by the major cost categories



1.5.2 Financial sustainability strategies

Results of the funding gap analysis shows that the most effective strategy for ensuring financial sustainability of the National Immunization Program for the baseline scenario and scenario B (Baseline + HPV) will be to undertake efforts for securing existing probable funding, which will be sufficient to cover 100% of all program expenditures.

This could include:

- Strengthening advocacy for ensuring timely release of funds for Immunization Program Implementation;
- Strengthening fundraising activities/capacity for accessing alternative funding for ensuring financial sustainability of the program.

Implementation of the scenario A will require EPI to raise additional 10 million US$ in addition to securing all probable funding to ensure availability of sufficient funding for vaccines procurement; and

Implementation of the Scenario C will require additional 9.9 million US$ on the top to all secured and probable funding.

Main strategies for ensuring financial sustainability of Scenario A and C could include following:

1. Advocate for increase of funding from the state budget and timely release of funds for implementation of the national immunization program at all levels; and
2. Strengthen fundraising capacity of the EPI and accelerate fundraising processes among the domestic and international partners.

Annexes

Figure 42: 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					
General Director NCDC	1	10%	-	0	0
NIP Manager	1	100%	1	-	1
Head of Immunization and VPD Department	1	100%	1	-	1
Head of Vaccine Management Department	1	100%	1	-	1
Head of Travel Health Department	1	100%	1	-	1
Pediatrician	4	100%	4	-	4
Epidemiologist	5	100%	5	-	5
Assistant Head of Vaccine Management Department	2	100%	2	-	2
Assistant Head of Travel Health Department	2	100%	2	-	2
Logistics Manager	1	100%	1	-	1
Driver	1	100%	1	-	1
Driver expeditor	1	10%	-	0	0
Director Reference Lab	1	10%	-	0	0
Head of Lab/Virus	1	50%	-	1	1
Head of Lab/Bacterial	1	10%	-	0	0
Virologist	3	50%	-	2	2
Bacteriologist	3	10%	-	0	0
Lab technician	6	40%	-	2	2
Subtotal National	**36**	**67%**	**19**	**5**	**24**
Marz					
Director NCDC branch	14	10%	-	-	1
Immunization coordinator	14	100%	14	-	14
Cold-chain officer	14	100%	14	-	14
Assistant immunization coordinator	10	100%	10	-	10
Driver	14	10%	-	1	1
Head of lab	14	10%	-	1	1
Bacteriologist	14	10%	-	1	1
Lab technician	14	10%	-	1	1
Subtotal Marz	**108**	**42%**	**38**	**6**	**45**
Health Facilities					
Director of HF	371	20%	-	74	74
Immunologist	30	100%	30	-	30
Vaccinator	742	100%	742	-	742
Pediatricians	473	50%	-	237	237
General Practitioners/Family Medicine Doctors	1,247	50%	-	624	624
Nurse	2,007	50%	-	1,004	1,004
Drivers	100	10%	-	10	10
Subtotal Health Facilities	**4,970**	**55%**	**772**	**1,948**	**2,720**
	-	0%	-	-	-
	-	0%	-	-	-
	-	0%	-	-	-
Subtotal	**-**	**0%**	**-**	**-**	**-**
Grand Total	**5,114**		**829**	**1,958**	**2,789**

Figure 43: Salaries of EPI specific personnel by administrative levels, positions and years

EPI SPECIFIC Salary							
	2014	2016	2017	2018	2019	2020	Total 2016 - 2020
National	**$93,206**	**$104,111**	**$104,111**	**$104,111**	**$104,111**	**$104,111**	**$520,554**
NIP Manager	$7,789	$7,789	$7,789	$7,789	$7,789	$7,789	$38,944
Head of Immunization and VPD Department	$7,789	$7,789	$7,789	$7,789	$7,789	$7,789	$38,944
Head of Vaccine Management Department	$7,789	$7,789	$7,789	$7,789	$7,789	$7,789	$38,944
Head of Travel Health Department	$5,322	$5,322	$5,322	$5,322	$5,322	$5,322	$26,612
Pediatrician	$21,289	$26,612	$26,612	$26,612	$26,612	$26,612	$133,059
Epidemiologist	$27,910	$33,492	$33,492	$33,492	$33,492	$33,492	$167,460
Assistant Head of Vaccine Management Department	$4,154	$4,154	$4,154	$4,154	$4,154	$4,154	$20,770
Assistant Head of Travel Heatlh Department	$4,154	$4,154	$4,154	$4,154	$4,154	$4,154	$20,770
Logistics Manager	$3,894	$3,894	$3,894	$3,894	$3,894	$3,894	$19,472
Driver	$3,116	$3,116	$3,116	$3,116	$3,116	$3,116	$15,578
Marz	**$127,997**	**$127,997**	**$127,997**	**$127,997**	**$127,997**	**$127,997**	**$639,983**
Immunization coordinator	$78,148	$78,148	$78,148	$78,148	$78,148	$78,148	$390,740
Cold-chain officer	$29,078	$29,078	$29,078	$29,078	$29,078	$29,078	$145,392
Assistant immunization coordinator	$20,770	$20,770	$20,770	$20,770	$20,770	$20,770	$103,851
Health Facilities	**$1,002,164**	**$1,002,164**	**$1,002,164**	**$1,002,164**	**$1,002,164**	**$1,002,164**	**$5,010,818**
Immunologist	$38,944	$38,944	$38,944	$38,944	$38,944	$38,944	$194,721
Vaccinator	$963,219	$963,219	$963,219	$963,219	$963,219	$963,219	$4,816,097
Total	$1,223,367	$1,234,271	$1,234,271	$1,234,271	$1,234,271	$1,234,271	$6,171,354

Figure 44: Salaries of shared personnel by administrative levels, positions and years

Shared Salary							
	2014	2016	2017	2018	2019	2020	Total 2016 - 2020
National	**$21,977**	**$21,977**	**$21,977**	**$21,977**	**$21,977**	**$21,977**	**$109,887**
General Director NCDC	$1,051	$1,051	$1,051	$1,051	$1,051	$1,051	$5,257
Driver expeditor	$312	$312	$312	$312	$312	$312	$1,558
Director Reference Lab	$909	$909	$909	$909	$909	$909	$4,543
Head of Lab/Virus	$3,894	$3,894	$3,894	$3,894	$3,894	$3,894	$19,472
Head of Lab/Bacterial	$779	$779	$779	$779	$779	$779	$3,894
Virusologist	$8,373	$8,373	$8,373	$8,373	$8,373	$8,373	$41,865
Bacteriologist	$1,675	$1,675	$1,675	$1,675	$1,675	$1,675	$8,373
Lab technician	$4,985	$4,985	$4,985	$4,985	$4,985	$4,985	$24,924
Marz	**$33,440**	**$33,440**	**$33,440**	**$33,440**	**$33,440**	**$33,440**	**$167,200**
Director NCDC branch	$10,904	$10,904	$10,904	$10,904	$10,904	$10,904	$54,522
Driver	$4,362	$4,362	$4,362	$4,362	$4,362	$4,362	$21,809
Head of lab	$7,815	$7,815	$7,815	$7,815	$7,815	$7,815	$39,074
Bacteriologist	$7,451	$7,451	$7,451	$7,451	$7,451	$7,451	$37,257
Lab technician	$2,908	$2,908	$2,908	$2,908	$2,908	$2,908	$14,539
Health Facilities	**$3,340,865**	**$3,340,865**	**$3,340,865**	**$3,340,865**	**$3,340,865**	**$3,340,865**	**$16,704,327**
Director of HF	$231,173	$231,173	$231,173	$231,173	$231,173	$231,173	$1,155,863
Pediatricians	$491,216	$491,216	$491,216	$491,216	$491,216	$491,216	$2,456,080
General Practitioners/Family Medicine Doctor	$1,295,024	$1,295,024	$1,295,024	$1,295,024	$1,295,024	$1,295,024	$6,475,119
Nurse	$1,302,683	$1,302,683	$1,302,683	$1,302,683	$1,302,683	$1,302,683	$6,513,414
Drivers	$20,770	$20,770	$20,770	$20,770	$20,770	$20,770	$103,851
Total	$3,396,283	$3,396,283	$3,396,283	$3,396,283	$3,396,283	$3,396,283	$16,981,415

Figure 45: Supervision per diem costs by administrative levels, positions and years

Supervision							
	2014	2016	2017	2018	2019	2020	Total 2016 - 2020
National	$10,593	$11,839	$11,839	$11,839	$11,839	$11,839	$59,195
NIP Manager	$415	$415	$415	$415	$415	$415	$2,077
Head of Immunization and VPD Department	$623	$623	$623	$623	$623	$623	$3,116
Head of Vaccine Management Department	$623	$623	$623	$623	$623	$623	$3,116
Head of Travel Health Department	$415	$415	$415	$415	$415	$415	$2,077
Pediatrician	$2,492	$3,116	$3,116	$3,116	$3,116	$3,116	$15,578
Epidemiologist	$3,116	$3,739	$3,739	$3,739	$3,739	$3,739	$18,693
Assistant Head of Vaccine Management Department	$1,662	$1,662	$1,662	$1,662	$1,662	$1,662	$8,308
Driver	$623	$623	$623	$623	$623	$623	$3,116
Driver expeditor	$623	$623	$623	$623	$623	$623	$3,116
Total	$10,593	$11,839	$11,839	$11,839	$11,839	$11,839	$59,195

Figure 46: Financing projections by sources, years, and types of financing

Total Resource requirement	**$8,995,732**	**$9,357,310**	**$8,526,426**	**$8,536,917**	**$8,571,373**	**$43,987,759**

Secured funding						
	2016	**2017**	**2018**	**2019**	**2020**	
Government	$7,191,111	$7,121,898	$7,252,212	$7,253,158	$5,064,076	**$33,882,456**
Sub-national government	$0	$0	$0	$0	$0	**$0**
Gov. co-financing of Gavi vaccine	$355,194	$540,372	$747,824	$964,617	$0	**$2,608,007**
GAVI NVS	$979,427	$741,690	$436,390	$229,142	$0	**$2,386,649**
WHO	$355,000	$360,000	$0	$0	$0	**$715,000**
GAVI Transition Plan	$115,000	$410,000	$0	$0	$0	**$525,000**
Total Secured funding	**$8,995,732**	**$9,173,960**	**$8,436,426**	**$8,446,917**	**$5,064,076**	**$40,117,112**
Secured and Probable Financing						
	2016	**2017**	**2018**	**2019**	**2020**	
Government	$7,191,111	$7,305,248	$7,252,212	$7,253,158	$8,481,373	**$37,483,102**
Gov. co-financing of Gavi vaccine	$355,194	$540,372	$747,824	$964,617	$0	**$2,608,007**
GAVI NVS	$979,427	$741,690	$436,390	$229,142	$0	**$2,386,649**
WHO	$355,000	$360,000	$90,000	$90,000	$90,000	**$985,000**
GAVI Transition Plan	$115,000	$410,000	$0	$0	$0	**$525,000**
Total Funding	**$8,995,732**	**$9,357,310**	**$8,526,426**	**$8,536,917**	**$8,571,373**	**$43,987,759**
Funding gap (with total funding)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Figure 47: 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$	**119**	**126**	**128**	**156**	**198**	**260**	**295**	**401**	**444**	**393**	**424**	**377**	**447**	**476**	**486**
Total Health Expenditure (THE) per Capita in US$	39	41	42	52	65	86	98	134	149	133	143	127	150	159	162
Total Health Expenditure (THE) per Capita in Int$ (PPP)	145	155	162	195	220	248	253	279	270	280	291	253	332	352	362
Total Health Expenditure (THE) % Gross Domestic Product (GDP)	6.3	5.9	5.4	5.6	5.5	5.3	4.6	4.3	3.8	4.5	4.6	3.7	4.5	4.6	4.5
General government expenditure on health (GGHE) in million US$	**22**	**34**	**32**	**43**	**51**	**94**	**132**	**195**	**206**	**174**	**179**	**197**	**187**	**204**	**209**
Ministry of Health expenditure in million US$	18	28	28	33	42	81	114	175	182	160	156	163	154	171	181
General Government Health Expenditure (GGHE) per Capita in US$	7	11	11	14	17	31	44	65	69	59	60	66	63	68	69
General Government Health Expenditure (GGHE) per Capita Int$ (PPP)	26	41	41	53	56	90	113	136	125	124	123	132	139	151	156
General Government Health Expenditure (GGHE) as % of THE	18.2	26.8	25.2	27.3	25.5	36.3	44.8	48.7	46.4	44.2	42.1	52.2	41.8	42.8	43.0
GGHE as % of General government expenditure (GGE)	5.3	7.7	7.0	7.9	8.0	10.2	11.3	10.4	7.0	6.7	7.0	7.4	7.4	7.3	7.0
GGHE as % of GDP	1.1	1.6	1.4	1.5	1.4	1.9	2.1	2.1	1.8	2.0	1.9	1.9	1.9	1.9	1.9
Private expenditure on health in million US$	**98**	**92**	**96**	**114**	**148**	**165**	**163**	**205**	**238**	**219**	**245**	**180**	**260**	**272**	**277**
Private Health Expenditure (PvtHE) as % of THE	81.8	73.2	74.8	72.7	74.5	63.7	55.2	51.3	53.6	55.8	57.9	47.8	58.2	57.2	57.0
Rest of the world funds / External resources in million US$	**10**	**24**	**14**	**12**	**14**	**34**	**44**	**62**	**46**	**34**	**32**	**30**	**29**	**27**	**21**
Rest of the world funds as % of THE	8.7	18.8	10.8	7.8	7.0	13.0	14.8	15.6	10.3	8.5	7.5	8.0	6.4	5.7	4.3
GDP per capita (in US$)	621	692	778	926	1,190	1,639	2,146	3,111	3,932	2,915	3,136	3,420	3,345	3,494	3,606
GGE as % of GDP	21.6	20.8	19.4	19.2	17.5	18.6	18.1	20.2	25.2	29.9	27.6	26.2	25.2	26.8	27.3
Exchange rate (AMD per US$)	539.96	555.05	575.03	577.95	529.63	453.79	412.34	338.75	305.05	363.30	372.35	372.19	401.58	409.03	417.79

Source: WHO NHA

Figure 48: 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)	**2,664,314**	**3,424,856**	**3,284,581**	**3,316,991**	**3,331,022**	**3,364,999**	**16,722,448**
Traditional	105,462	74,967	76,582	75,974	76,375	77,270	**381,168**
Underused	2,093,852	2,372,184	2,288,515	2,308,183	2,317,321	2,343,107	**11,629,310**
New	465,000	977,706	919,483	932,834	937,326	944,622	**4,711,970**
Injection supplies	38,244	49,244	51,434	51,490	51,819	52,298	**256,285**
Personnel	**1,233,959**	**1,246,110**	**1,246,110**	**1,246,110**	**1,246,110**	**1,246,110**	**6,230,550**
Salaries of full-time EPI health workers (immunization specific)	1,223,367	1,234,271	1,234,271	1,234,271	1,234,271	1,234,271	**6,171,354**
Per-diems for outreach vaccinators/mobile teams							
Per-diems for supervision and monitoring	10,593	11,839	11,839	11,839	11,839	11,839	**59,195**
Transportation	**3,869**	**3,869**	**3,869**	**3,869**			**11,608**
Fixed Site Strategy (Incl. Vaccine Distribution)	3,869	3,869	3,869	3,869			**11,608**
Outreach strategy							
Mobile strategy							
Maintenance and overhead	**255,030**	**255,030**	**353,458**	**293,458**	**293,458**	**293,458**	**1,488,861**
Cold chain maintenance and overhead	166,073	166,073	264,500	204,500	204,500	204,500	**1,044,074**
Maintenance of other capital equipment							
Building Overheads (Electricity, Water…)	88,957	88,957	88,957	88,957	88,957	88,957	**444,787**
Short-term training	60,000	100,000	160,000				**260,000**
IEC/Social Mobilization	30,000	60,000	95,000	10,000	10,000	10,000	**185,000**
Disease Surveillance	100,000	100,000	100,000	30,000	30,000	30,000	**290,000**
Program management	240,000	210,000	305,000	50,000	50,000	50,000	**665,000**
Other routine recurrent costs							
Subtotal	4,625,417	5,449,110	5,599,451	5,001,918	5,012,408	5,046,864	**26,109,752**
Routine capital costs							
Vehicles (100% EPI)							
Cold chain equipment			233,350				**233,350**
Other capital equipment							
Buildings Construction (100% EPI)							
Subtotal			233,350				**233,350**
Supplemental immunization activities (SIAs)							
Mop up Polio campaign in 217 communities		22,114					**22,114**
Vaccines & injection supplies		22,114					**22,114**
Operational costs							
Vaccines & injection supplies							
Operational costs							
Subtotal		22,114					**22,114**
Shared Health Systems Costs (EPI Portion)							
Shared Personnel Costs	3,396,283	3,396,283	3,396,283	3,396,283	3,396,283	3,396,283	**16,981,415**

Cost category		Future Resource Requirements					
	2014	2016	2017	2018	2019	2020	Total 2016-2020
Shared Transport Costs – Vehicles, Fuel and Maintenance	39,268	39,268	39,268	39,268	39,268	39,268	**196,341**
Shared buildings - construction							
Shared Buildings – Overhead	88,957	88,957	88,957	88,957	88,957	88,957	**444,787**
Subtotal	3,524,509	3,524,509	3,524,509	3,524,509	3,524,509	3,524,509	**17,622,543**
Grand Total	**8,149,925**	**8,995,732**	**9,357,310**	**8,526,426**	**8,536,917**	**8,571,373**	**43,987,759**
Routine Immunization	8,149,925	8,973,619	9,357,310	8,526,426	8,536,917	8,571,373	**43,965,645**
Supplemental immunization activities (campaigns)		22,114					**22,114**

Figure 49: 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)	**16,722,448**	**13,357,449**	**3,364,999**	**16,722,448**	**12,301,866**	**92%**	**3,364,999**	**100%**	**15,666,868**	**94%**
Traditional	**381,168**	303,898	77,270	381,168	303,898	100%	77,270	100%	381,169	100%
Underused	**11,629,310**	9,286,203	2,343,107	11,629,310	9,286,203	100%	2,343,107	100%	11,629,311	100%
New	**4,711,970**	3,767,348	944,622	4,711,970	2,711,765	72%	944,622	100%	3,656,388	78%
Injection supplies	**256,285**	203,987	52,298	256,285	179,305	88%	52,298	100%	231,603	90%
Personnel	**6,230,550**	**6,230,550**	**0**	**6,230,550**	**6,230,550**	**100%**	**0**		**6,230,552**	**100%**
Salaries of full-time EPI health workers (immunization specific)	**6,171,354**	6,171,354	0	6,171,354	6,171,354	100%	0		6,171,355	100%
Per-diems for outreach vaccinators/mobile teams				0	0		0		0	
Per-diems for supervision and monitoring	**59,195**	59,195	0	59,195	59,195	100%	0		59,196	100%
Transportation	**11,608**	**11,608**	**0**	**11,608**	**11,608**	**100%**	**0**		**11,609**	**100%**
Fixed Site Strategy (Incl. Vaccine Distribution)	**11,608**	11,608	0	11,608	11,608	100%	0		11,609	100%
Outreach strategy + Mobile strategy	**0**	0	0	0	0		0		0	
Maintenance and overhead	**1,488,861**	**1,488,861**	**0**	**1,488,861**	0	0%	0		0	0%
Cold chain maintenance and overhead	**1,044,074**	1,044,074	0	1,044,074	984,074	94%	0		984,075	94%
Maintenance of other capital equipment				0	0		0		0	
Building Overheads (Electricity, Water…)	**444,787**	444,787	0	444,787	444,787	100%	0		444,788	100%
Short-term training	**260,000**	260,000	0	260,000	0	0%	0		0	0%
IEC/Social Mobilization	**185,000**	155,000	30,000	185,000	0	0%	0	0%	0	0%
Disease Surveillance	**290,000**	200,000	90,000	290,000	0	0%	0	0%	0	0%
Program management	**665,000**	515,000	150,000	665,000	0	0%	0	0%	0	0%
Other routine recurrent costs				0	0		0		0	
Subtotal	**26,109,752**	**22,422,455**	**3,687,297**	**26,109,752**	**19,972,885**	**89%**	**3,364,999**	**91%**	**23,337,885**	**89%**
Routine capital costs										
Vehicles (100% EPI)				0	0		0		0	
Cold chain equipment	**233,350**	50,000	183,350	233,350	0	0%	183,350	100%	183,350	79%
Other capital equipment				0	0		0		0	
Buildings Construction (100% EPI)				0	0		0		0	
Subtotal	**233,350**	**50,000**	**183,350**	**233,350**	**0**	**0%**	**183,350**	**100%**	**183,350**	**79%**
Supplemental immunization activities (SIAs)										
Mop up Polio campaign in 217 communities	**22,114**	**22,114**	**0**	**22,114**	**22,114**	**100%**	**1**		**22,116**	**100%**
Vaccines & injection supplies	**22,114**	22,114	0	22,114	22,114	100%	1		22,116	100%
Operational costs				0	0		0		0	
		0	**0**	**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
Vaccines & injection supplies				0	0		0		0	
Operational costs				0	0		0		0	
Subtotal	**22,114**	**22,114**	**0**	**22,114**	**22,114**	**100%**	**1**		**22,116**	**100%**
Shared Health Systems Costs (EPI Portion)										
Shared Personnel Costs	**16,981,415**	**16,981,415**	**0**	**16,981,415**	**16,981,415**	**100%**	**0**		**16,981,416**	**100%**
Shared Transport Costs – Vehicles, Fuel and Maintenance	**196,341**	196,341	0	196,341	196,341	100%	0		196,342	100%
Shared buildings - construction				0	0		0		0	
Shared Buildings – Overhead	**444,787**	444,787	0	444,787	444,787	100%	0		444,788	100%
Subtotal	**17,622,543**	**17,622,543**	**0**	**17,622,543**	**17,622,543**	**100%**	**0**		**17,622,544**	**100%**
Grand Total	**43,987,759**	**40,117,112**	**3,870,647**	**43,987,759**	**37,617,542**	**94%**	**3,548,350**	**92%**	**41,165,893**	**94%**
Routine Immunization	**43,965,645**	40,094,998	3,870,647	43,965,645	37,595,428	94%	3,548,349	92%	41,143,778	94%
Supplemental immunization activities	**22,114**	22,114	0	22,114	22,114	100%	1		22,116	100%

Figure 50: Macroeconomic and sustainability indicators

	2014	2016	2017	2018	2019	2020
Macroeconomic projections						
Population	3,017,100	3,047,953	3,063,497	3,079,121	3,094,825	3,110,608
GDP ($)	10,879,541,206	10,990,795,503	11,046,848,560	11,103,187,488	11,159,813,744	11,216,728,794
Per capita GDP ($)	3,606	3,606	3,606	3,606	3,606	3,606
Total Health Expenditures (THE $)	487,419,703	492,404,061	494,915,322	497,439,390	499,976,331	502,526,210
Total Health Expenditures (THE) per capita	162	162	162	162	162	162
Government Health Expenditures (GHE $)	209,504,686	211,647,083	212,726,483	213,811,388	214,901,827	215,997,826
Government Health Expenditure per capita ($)	69	69	69	69	69	69
Resource requirements for immunization						
Routine and SIAS (Campaigns) includesvaccines and operational costs)	4,625,417	5,471,224	5,832,801	5,001,918	5,012,408	5,046,864
Routine only (includes vaccines and operational costs)	4,625,417	5,449,110	5,832,801	5,001,918	5,012,408	5,046,864
Per DTP3 immunized child	119	137	144	122	120	119
Per capita						
Routine and SIAS (Campaigns) includesvaccines and operational costs)	1.53	1.80	1.90	1.62	1.62	1.62
Routine only (includes vaccines and operational costs)	1.53	1.79	1.90	1.62	1.62	1.62
% Government Health Expenditures						
Routine and SIAS (Campaigns) includesvaccines and operational costs)	2.21%	2.59%	2.74%	2.34%	2.33%	2.34%
Routine only (includes vaccines and operational costs)	2.21%	2.57%	2.74%	2.34%	2.33%	2.34%
% Of Total Health Expenditures (THE)						
Routine and SIAS (Campaigns) includesvaccines and operational costs)	0.95%	1.11%	1.18%	1.01%	1.00%	1.00%
Routine only (includes vaccines and operational costs)	0.95%	1.11%	1.18%	1.01%	1.00%	1.00%
% GDP						
Routine and SIAS (Campaigns) includesvaccines and operational costs)	0.04%	0.05%	0.05%	0.05%	0.04%	0.04%
Routine only (includes vaccines and operational costs)	0.04%	0.05%	0.05%	0.05%	0.04%	0.04%
Funding gap						
Funding gap (with secured funds only)		0	183,350	90,000	90,000	3,507,297
% of the future resource requirements for immunization		0%	3%	2%	2%	69%
% Government Health Expenditures		0.00%	0.09%	0.04%	0.04%	1.62%
% Of Total Health Expenditures (THE)		0.00%	0.04%	0.02%	0.02%	0.70%
% GDP		0.00%	0.00%	0.00%	0.00%	0.03%
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%