

**Comprehensive Multi-Year Plan of the  
National Immunization Programme of Armenia  
2011-2015**

**Republic of Armenia  
2010**

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## ACRONYMS

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

# **EXECUTIVE SUMMARY**

## **1. BACKGROUND**

### **1.1 GENERAL INFORMATION**

The Republic of Armenia is located between the Black and Caspian Seas, bordering on the north and east by Georgia and Azerbaijan, and on the south and west by Iran and Turkey. Armenia has a population of 3,238,000 (2008 est.)<sup>1</sup> and is the second most densely populated of the former Soviet republics. Ethnic Armenians make up 97.9% of the population. Armenia has a relatively large Diaspora (8 million by some estimates).

Age structure of the current population of the Republic is as the following (2009 est.):

- 0-14 years: 18.2%
- 15-64 years: 71.1%
- 65 years and over: 10.6%.

Life expectancy at birth in Armenia in 2007 was 73.5 years (for both sexes), and 70.2 and 76.6 years for men and women respectively. In 2007 87.3% deaths in Armenia were attributed to non-communicable diseases followed by ill-defined conditions (7.5%), external causes (4.5%) and communicable diseases (0.7%). In general, the situation with maternal and infant mortality in Armenia has been improving over the last years.

### **1.2 POLITICAL AND SOCIO-ECONOMIC TRENDS**

According to the Constitution of Armenia, the President is the head of government and of a multi-party system. Executive power is exercised by the government. Legislative power is vested in both the government and parliament.

Armenia has established diplomatic relations with 125 countries. In the first years of independence, Armenia became a member of the United Nations, the International Monetary Fund, the World Bank, the European Bank for Reconstruction and Development, and the Organization on Security and Cooperation in Europe. Armenia is a member of the Commonwealth of Independent States and at the same time enjoys good relations with the United States and the European Union. In October 1994, the country joined the Partnership for Peace program, which provides for limited military cooperation with the North Atlantic Treaty Organization (NATO).

Armenia is a lower middle income country with a gross national income per capita of \$3,350 (GNI per capita, Atlas method). About 64 percent of the total 3.2 million population lives in urban areas.

In the last decade unprecedented GDP growth rate registered during 2002-2004, 9.6%, 12.7% and 9.9% respectively, reached even higher values during 2006-2008, 13.3%, 13.8%, and 10.0% respectively.

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<sup>1</sup> "Statistical Yearbook of Armenia, 2009: Population". ArmStat. <http://www.armstat.am/file/doc/99458058.pdf>.

However, the impact of the recent global financial-economic crisis on Armenia was so powerful that the country is considered to be one of the most affected in the world. Armenia experienced its most severe economic crisis since the early years of transition.

Nevertheless, the Government has not cut back on social spending despite a sharp fall in tax revenues resulting from the ongoing economic recession.

### **1.3 HEALTH CARE SYSTEM**

The inherited system relied on large infrastructure and hospital-based care. Recognizing the need to address these issues, the Government of Armenia (GoA) developed its first PHC strategy in 1997, the implementation of which was supported by several external donors and technical agencies. Based on its implementation results, the GoA developed a new PHC strategy in 2003 which has the following tasks: (1) continue integration of currently separate PHC functions (children's and adults' consultancies) into/scale up the family medicine practice, (2) complete the retraining and training of family physicians and nurses, (3) introduce incentives for good quality services, particularly in remote areas, (4) raise awareness among the population about their rights, (5) increase the share of public expenditures allocated to PHC services, and (6) optimization of PHC and hospital networks.

Key objectives of the countries present health care system is to ensure financial protection and access to good quality services for the entire population with a focus on regions with high poverty rates through strengthening of primary health care services (Poverty Reduction Strategy Plan (2003-2015), Strategy for Maternal and Child Health (2003-2015), National Immunization Program (2011-2015)).

The next 10-12 years should be viewed as an important period from the perspective of adjusting the situation created in the health sector and assuring the prerequisites for the future development of the system.

### **1.4 IMMUNIZATION SERVICES WITHIN HEALTH CARE SYSTEM**

Immunization services are delivered by 850 health facilities under the jurisdiction of 225 Medical Service Providers in marzes and 36 in Yerevan.

The Immunization Manager is sitting in SHAEI central office, under the supervision of the Head of Communicable and NCD Epidemiology Department, with a couple of staffs working with her on immunization as part of their overall responsibilities as epidemiologists, while several other staffs involved in immunization are based in NCDC, under another supervisor. At the regional level immunization main functions are distributed between Inspection Centre, Expertise Centre and marz Health Directorate with a lack of clear lines of authorities and responsibilities.

A special group or "professional team" (32 persons) was recently created with the objectives to support the national immunization programme in its implementation.

## **2. DISEASE TRENDS AND VACCINATION COVERAGE**

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

The European Region, including the Republic of Armenia, was certified polio-free in 2002. 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 immunization coverage. Starting from 2007 active AFP surveillance is in place in the health care system of Armenia.

During 2004 and 2005 Armenia has experienced a nation-wide measles outbreak that has been widespread both geographically and across age-groups in the country. Since 2007 epidemiological situation attributable to measles, mumps and rubella has substantially improved, particularly supported by steady decline in incidence rates. According to Measles, Rubella and CRS National Control Programme adopted by the Government a country-wide catch-up campaign (SIA) with measles-rubella vaccine was conducted targeting all males and females regardless of disease and vaccine history with year of birth 1980-2000 (6-27 yr old in 2007) followed by rubella immunization of all women of child-bearing age in 2008-2009.

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) but since 2003 no indigenous case has been reported. For diphtheria control also, timely coverage and surveillance remain a priority in Armenia.

There is stable tendency for morbidity due to Hepatitis B to decline in Armenia during 1990-2009 period.

In 2009 sentinel surveillance system for rotavirus diseases was established in two hospitals of Yerevan. During February-December 2009 period 926 0-60 months old children were screened by the system. 318 of them or 34% had lab confirmed rotavirus infection.

## **2.2 VACCINATION SCHEDULE**

The National Vaccination Schedule was changed last time in 2009 with connection to introduction of the Hib-containing pentavalent vaccine (DTP-HepB-Hib). Next change is expected to be due to introduction of rotavirus and pneumococcal vaccines to the Schedule, if GAVI support is available.

## **2.3 VACCINATION COVERAGE**

Analysis of full immunization coverage rate for children under 1 reveals decline during 2000-2006 period in Armenia. However, during 2006-2009 the situation with full coverage was constantly improving. Thus, this rate in 2008 for children under 1 was 86% and in 2009 it was already 91%. However, in several districts of the Republic this rate has not reached yet an acceptable level of at least 90%.

### **Problems with the National Immunization Schedule**

- Unjustified breaks in timely vaccination
- Unjustified postponement of one of the injectable vaccine to be given simultaneously



- Unjustified contraindications
- Low coverage level with Td among adult population.

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

#### **3.1 SERVICE DELIVERY**

##### Sustaining polio-free status:

The European Region, including the Republic of Armenia, was certified polio-free in 2002. However, due to close relations with India Armenia is now at a particularly high risk for wild poliovirus importation. To prevent wild poliovirus importation and spread in RA, in 2008 supplementary polio vaccination activities were implemented among children under 5, with coverage around 97%. The number of AFP cases reported to WHO has decreased from 23 in 2000 (with an AFP rate of 2.56 cases per 100,000 children < 15 years old) to 9 in 2009 (AFP rate of 1.16/100,000). This indicates a serious decrease in the sensitivity of AFP surveillance.

##### Measles elimination:

The national strategic plan on Measles and Rubella Elimination and CRS control is in place. According to the plan 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.

##### Controlling diphtheria:

For diphtheria control also, timely coverage and surveillance remain a priority in Armenia. Hopefully, recent introduction of the pentavalent vaccine will facilitate addressing this problem.

Routine immunization delivery in Armenia is based on two standard strategies: fixed site and outreach session. There is no real “uncovered” population group (group like minority, with language barrier, displaced population, etc.). However, some factors still prevent the regular organization of outreach sessions, generating a population underserved by the immunization 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.

Concerning further introduction of new vaccines, there is currently only one in the pipeline, namely rotavirus vaccine.

#### **3.2 ADVOCACY AND COMMUNICATION**

In general, media relations regarding health topics, including immunization, are coordinated by designated official at the MoH.

There is no designated person for communication on immunization at the national level. The recent advocacy and communication efforts on introduction of new vaccines (HepB, MMR and Hib) as well as for the routine immunization were done with the support of international organizations.

Within the framework of National Immunization Programme, UNICEF is conducting a wide range of advocacy and communication activities that are included in the joint UNICEF-MoH annual work plan.

### **3.3 SURVEILLANCE**

Disease surveillance for vaccine preventable diseases 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 system for rotavirus diseases is conducted in two hospitals of Yerevan city. Surveillance is not conducted on congenital rubella syndrome or Hib.

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.

### **3.4 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.

Vaccines come through UNICEF Supply Division (UNICEF donated, Government procured, GAVI procured). Vaccine needs are calculated annually by the UNICEF Country Office Supply Division in September and by the Government in November. The present supply frequency is twice a year for all vaccines procured through UNICEF Supply Division. Arrangements with the customs authority for clearance of vaccine shipments at Yerevan airport, as well as airport cold storage arrangements, are satisfactory. Relevant documentation is processed by the Drug Agency of the Ministry of Health, which is a National Regulatory Authority (NRA).

The vaccine cold chain is maintained well in respect of cold storage space, vaccine arrangement, equipment condition, temperatures, cold boxes and icepacks.

### **3.5 PROGRAMME MANAGEMENT**

The main goal of the **National Immunization Programme (2011-2015)**, approved by the Government in 2010, is to decrease through immunization morbidity from preventable infectious diseases and as a result of this to prevent death cases and to secure immunity of the population from infectious diseases.

The objectives of the programme were defined as follows:

- Maintaining the political commitment, ensuring resource mobilization and management practices and enhancing legislature for the National Immunization Programme implementation;
- Ensuring the ongoing strong and sustainable Immunization systems;
- Ensuring and maintaining the routine immunization fully coverage (for all antigens) up to 95% or more at national level;
- Ensuring WHO quality-assured vaccines supply and safe and qualified injection practice;

- Ensuring equal access of all target groups to immunization services, including hard to reach population and integrating immunization services into other medical services;
- Eradication and elimination of the targeted diseases;
- Control of priority bacterial and viral diseases, including diseases with epidemic value;
- Protection of more people from more infection diseases by new and under-utilized vaccine introduction;
- Enhancing targeted diseases surveillance systems;
- Strengthening targeted diseases laboratory surveillance systems;
- Ensuring continuous improvement of healthcare workers involved in immunization process
- Ensuring public awareness, communication and social mobilization.

#### **4. IMMUNIZATION PROGRAMME STRATEGIES AND KEY ACTIVITIES**

Strategies and key activities necessary to achieve the above-mentioned objectives are presented in Table 6.

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

##### **5.1 OVERVIEW**

Vaccination services for antigens included in the national schedule are free for end-users and the corresponding costs are covered by the government and donors through different schemes.

Immunization financing for traditional vaccines, payroll and other recurrent costs at all levels of the immunization program comes only from the central budget. Sub-national governments do not participate in the financing of the immunization program components at all.

##### **5.2 DETAILED INFORMATION ON PROGRAMME COST BY CATEGORIES**

The total cost of the National Immunization Program (including campaign) in 2009 was \$ 6,192,751 including shared costs that comprising 54% of total immunization cost and consisting of shared personnel, transportation and building maintenance and overhead costs.

The major driver of the immunization specific costs was “personnel” - 32%, Vaccines’ share was the second largest 27%; followed by “transportation” 20%, “other recurrent costs” (17%), “injection supplies”-5% and “Vehicles” 1%.

##### **5.3 DETAILED INFORMATION ON PROGRAMME FINANCING**

The main player in the immunization program financing was the Government; The National Government rendered 73% of overall financing and the rest came from: GAVI Vaccine Funds (11%), WHO, GAVI ISS and UNICEF (9%), VRF (2%) and GAVI HSS (5%).

In 2009 the National Immunization program in Armenia was financed mainly by the Government.

## **5.4 FUTURE RESOURCE REQUIREMENTS, FINANCING AND FUNDING GAP**

In the baseline scenario the program only sustains current activities and does not imply any changes in the immunization calendar. MR campaign is planned for the children 2-6 years old group in 2014. Estimated total resource requirement for 2011-2015 is \$ 34, 4 million.

The government is supposed to provide 92 % of secure financing. The donor secure and probable financing is estimated to be \$1,5 million in total for entire projection period.

The national program strategies imply an alternative scenario (Scenario A) in addition to the basic one. The alternative scenario A assumes that country introduces a new rotavirus vaccine in 2012 and pneumococcal vaccine in 2013.

Financial analysis shows that scenario A increases the total resource requirements from \$ 34, 4 million to \$ 38,2 million during the whole five year period and with the same level of government financing the funding gap increases from \$0.8 to \$1,8 million.

## **6. Financial sustainability**

As it was mentioned above the basic scenario faces funding deficit that may substantially affect financial sustainability because lack of \$816 thousand does not allow the country to cover the needs for underused vaccines. On top of that, the introduction of two new vaccines implies approximately \$3,8 million extra burden on the total resource requirements for the projection period.

# 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 kilometers, 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 kilometers. 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 kilometers, and the longest distance between west and east is 200 kilometers. The country is subdivided into 11 regions (marzes), which includes the region of Yerevan, the capital city of Armenia.

Armenia has a population of 3,238,000 (2008 est.)<sup>2</sup> and is the second most densely populated of the former Soviet republics. There has been a problem of population decline due to elevated levels of emigration after the break-up of the USSR. The rates of emigration and population decline, however, have decreased drastically in the recent years, and a moderate influx of Armenians returning to Armenia have been the main reasons for the trend, which is expected to continue. In fact Armenia is expected to resume its positive population growth by 2011.

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.<sup>3</sup>

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.<sup>4</sup> 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.<sup>5</sup>

Age structure of the current population of the Republic is as the following (2009 est.):

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<sup>2</sup> "Statistical Yearbook of Armenia, 2009: Population". ArmStat. <http://www.armstat.am/file/doc/99458058.pdf>.

<sup>3</sup> Asatryan, Garnik; Arakelova, Victoria (2002), *The Ethnic Minorities of Armenia*, [Routledge](#), part of the [OSCE](#)

<sup>4</sup> "Jerusalem - The Old City: The Armenian Quarter". Jewish Virtual Library.

[http://www.jewishvirtuallibrary.org/jsource/Society\\_&\\_Culture/geo/armenianq.html](http://www.jewishvirtuallibrary.org/jsource/Society_&_Culture/geo/armenianq.html). Retrieved 2009-07-22

<sup>5</sup> [San Lazzaro degli Armeni - Venice for Visitors](#)

- 0-14 years: 18.2%
- 15-64 years: 71.1%
- 65 years and over: 10.6%

**Table 1: Some development indicators (literacy rate etc.)**

	Armenia	Europe & Central Asia	Lower-middle-income
<b>2008</b>			
Population, mid-year ( <i>millions</i> )	3.1	441	3,702
GNI per capita ( <i>Atlas method, US\$</i> )	3,350	7,418	2,078
GNI ( <i>Atlas method, US\$ billions</i> )	10.3	3,274	7,692
<b>Average annual growth, 2002-2008</b>			
Population (%)	0.1	0.1	1.2
Labor force (%)	0.9	1.0	1.6
<b>Most recent estimate (latest year available, 2002-2008)</b>			
Urban population ( <i>% of total population</i> )	64	64	41
Access to an improved water source ( <i>% of population</i> )	98	95	86
Literacy ( <i>% of population age 15+</i> )	99	98	83
Gross primary enrollment ( <i>% of school-age population</i> )	80	98	109
Male	79	99	112
Female	81	97	106

Life expectancy at birth in Armenia in 2007 was 73.5 years (for both sexes), and 70.2 and 76.6 years for men and women respectively.

In 2007 87.3% deaths in Armenia were attributed to non-communicable diseases followed by ill-defined conditions (7.5%), external causes (4.5%) and communicable diseases (0.7%). The leading causes of premature death (under 65), in order of magnitude are diseases of the circulatory system, cancer, external injuries and poisoning.

In general, the situation with maternal and infant mortality in Armenia has been improving over the last years. The latest indicators are presented in the Table 2.

**Table 2: Main health indicators**

Indicators	Figures
Number of live births per 1,000 population <sup>3</sup>	12.42 (2006)
Total fertility rate (TFR), average number of children per woman <sup>3</sup>	1.42 (2007)
Total fertility rate (TFR), average number of children per woman <sup>3</sup> (CIS)	1.62 (2007)
Maternal mortality rate, per 100,000 live births (MMR) <sup>3</sup>	14.96 (2007)

Under-five mortality rate, per 1,000 live births <sup>13</sup>	24.0 (2006)
Under-five mortality rate, per 1,000 live births <sup>1</sup> (Central and Eastern Europe and the CIS)	27.0 (2005)
Infant mortality rate, per 1,000 live births (IMR) <sup>3</sup>	13.04 (2006)
Infant mortality rate, per 1,000 live births (IMR) <sup>1</sup> (CIS)	12.78 (2006)
Standard death rate (SDR), per 100,000 population <sup>3</sup>	1083.26 (2003)
Acute poliomyelitis incidence per 100,000 population <sup>5</sup>	1.5 (2009)
AIDS incidence per 100,000 population <sup>3</sup>	1.46 (2006)
Human development index (HDI) <sup>1</sup>	0.775 (2005)
Human development index (HDI) <sup>1</sup> (Central and Eastern Europe and the CIS)	0.808 (2005)

## 1.2 POLITICAL AND SOCIO-ECONOMIC TRENDS

The Soviet republic of Armenia declared its independence in 1991. Politics of Armenia takes place in a framework of a presidential representative democratic republic. According to the Constitution of Armenia, the President is the head of government and of a multi-party system. Executive power is exercised by the government. Legislative power is vested in both the government and parliament. The unicameral parliament (also called the Azgayin Zhoghov or National Assembly) is controlled by a coalition of four political parties: the conservative Republican party, the Prosperous Armenia party, the Rule of Law party and the Armenian Revolutionary Federation. The main opposition party is Heritage party, which favors eventual Armenian membership in the European Union and NATO.

Armenia has established diplomatic relations with 125 countries. In the first years of independence, Armenia became a member of the United Nations, the International Monetary Fund, the World Bank, the European Bank for Reconstruction and Development, and the Organization on Security and Cooperation in Europe. Armenia is a member of the Commonwealth of Independent States and at the same time enjoys good relations with the United States and the European Union. In October 1994, the country joined the Partnership for Peace program, which provides for limited military cooperation with the North Atlantic Treaty Organization (NATO). Armenia continues striving towards development and reform and most recently was admitted to the Council of Europe.

Armenia is a lower middle income country with a gross national income per capita of \$3,350 (GNI per capita, Atlas method). The country is comprised of 10 regions (marzes) and the capital city of Yerevan, which also has the status of a marz. About 64 percent of the total 3.2 million population lives in urban areas, of which one third lives in Yerevan.

A land-locked country, Armenia has high transportation costs. Armenia's borders with two important neighbors, Azerbaijan and Turkey, were closed due to the conflict over Nagorno-Karabagh soon after Armenia's independence in 1991. The main surface trade links are limited to low-capacity rail, road connections with Georgia and its Black Sea ports, and a single road with Iran. Border closures have imposed costs on the economy.

Agriculture generates 16 percent of Armenia's gross domestic product (GDP) and employs about 46 percent of the labor force. The services sector, concentrated in trade, generates 34 percent of GDP. As a small developing economy, Armenia depends on external markets which are critical for sustaining high growth and reducing poverty.

In the last decade Armenia has experienced very strong economic growth, on an average 8% per year. Unprecedented GDP growth rate registered during 2002-2004, 9.6%, 12.7% and 9.9% respectively, reached even higher values during 2006-2008, 13.3%, 13.8%, and 10.0% respectively.

The economic reforms carried out by the Government, including development and successive revisions of Medium Term Expenditure Framework (MTEF), produced visible results. The economic growth recorded in Armenia in 2003-2007 was 13.1% on average instead 6.2% envisaged by the Poverty Reduction Strategy Paper (PRSP) adopted in August, 2003. According to the revised in September 2008 PRSP-II, the annual GDP per capita growth should be around 7.0% in 2009-2021. The PRSP proposes to sustain the macroeconomic framework by institutional reforms and improvements of the business environment.

However, all the above listed achievements along with the commitments of the endorsed PRSP are at some risk currently due to the consequences of the global financial and economic crisis. As a response to worsening economic situation in the country, the Government and the Central Bank of Armenia adopted a floating exchange rate policy. In the result, the AMD got depreciated overnight by 20%.

The impact of the global financial-economic crisis on Armenia was so powerful that the country is considered to be one of the most affected in the world. Armenia experienced its most severe economic crisis since the early years of transition. According to annual figures of 2009, Armenia's GDP has contracted by 14.4%. Poverty in Armenia has increased in 2009 for the first time in over a decade as a result of the ongoing economic recession. A large part of Armenia's gains in reducing poverty over the last years would be erased.

With one of the worst economic downturns in the world, Armenia has managed to keep its public expenditures high to prevent an extensive decrease in living standards. The Government has not cut back on social spending despite a sharp fall in tax revenues resulting from the ongoing economic recession. The funding has prevented a drastic sequestration of the state budget for 2009.

### **1.3 HEALTH CARE SYSTEM**

The present health system of Armenia has inherited the positive and negative features of the Soviet health system. On the positive side, it incorporates a rather developed structure and network, and sufficient staffing. However, the system is largely focused on hospital care, as well as deficiencies in the primary health system and a generally low quality of medical care.

The inherited system that relied on large infrastructure and hospital-based care was no longer affordable. Recognizing the need to address these issues, the Government of Armenia (GoA) developed its first PHC strategy in 1997, the implementation of which was supported by several external donors and technical agencies. Based on its implementation results, the GoA developed a new PHC strategy in 2003 which has the following tasks: (1) continue integration of currently separate PHC functions (children's and adults' consultancies) into/scale up the family medicine practice, (2) complete the retraining and training of family physicians and nurses, (3) introduce incentives for good quality services, particularly in remote areas, (4)



raise awareness among the population about their rights, (5) increase the share of public expenditures allocated to PHC services, and (6) optimization of PHC and hospital networks.

Primary health care is based on network of outpatient clinics or rural health posts and feldsher stations with one physician per 1200-2000 population and one pediatrician to 700-800 children.

Family medicine model, if implemented correctly, could be excellent step forward in improving immunization services. At the same time immunization program can be used as an excellent tool for monitoring the performance of PHC and family medicine clinics for the purposes of contracting with purchasers of health care services.

The MCH Strategy emphasizes the importance of improving nutritional status of women and children, ensuring full immunization coverage, and improving antenatal and obstetric care for pregnant women focusing on poor rural areas. Strengthened PHC services together with more effective public health services that work in close partnership with each other are the main instruments for achieving these intermediate objectives.

The system reforms initiated since the mid-1990s were based on the condition that health services could no longer be freely provided to the whole population. Thereafter, a majority of the population had to pay the full cost of medical services. Although the government tried to provide free medical care to vulnerable groups of the population under state-guaranteed programs, the under-financing of the health sector implied that even the persons included in these groups had to make partial or full informal payments. Thus, the changes violated the principle of equity and caused concerns about the deterioration of the population's health.

Key objectives of the countries present health care system is to ensure financial protection and access to good quality services for the entire population with a focus on regions with high poverty rates through strengthening of primary health care services (Poverty Reduction Strategy Plan (2003-2015), Strategy for Maternal and Child Health (2003-2015), National Immunization Program (2011-2015)).

PRSP (2003 - 2015) provides for a rapid increase in health expenditures financed from the state budget, particularly for the primary health care level. Thus, the share of health expenditures in total state budget expenditures increased from 6.5% in 2003 to 9.2% in 2006 and is planned to further increase to 11.9% by 2015. Moreover, by 2015, the share of health expenditures for primary care in total health expenditures from the state budget is to increase to 50%, whereas in 1998, this share was only 19%. Increased financing of the PHC services is seen as the key instrument in ensuring physical and financial access to health services for the entire population, but most importantly, for the poor. MCH services are described as a separate program priority in PRSP, which emphasizes the importance of achieving Millennium Development Goals for the country. Implementation of IMCI, ensuring full immunization coverage for children, improving nutritional status of women and children, and providing increased public financing for obstetric care at all levels are seen as important instruments for achieving these goals.

In addition to low volume of funds, early fiscal decentralization (11 regional authorities) resulted in unequal distribution and ineffective usage of low resources as a result of which

financial flows were basically unmanageable. The necessity of creating an independent body which would act as a purchaser of health care services was obvious. The Government established the State Health Agency (SHA) which was initially governmental agency and which from 2001 is under the authority of the MoH with its branches in each region. It was hoped that by establishment of SHA, issues of manageability of financial flows would be resolved, and that financial resources would follow the patient.

With success on macro-economic side, Armenia managed to increase public share of spending for health during the last several years. Still, increase in total Government spending should not mask the need for additional public funds for health. Armenia is among the countries that have highest out-of pocket expenditures for health in the region (62% of total health expenditures in 2005), which indicates to problems in access to some health services.

The main directions of health sector development in Armenia arise from the basic provisions of the Government's Action Plan and the document "Health for All in the 21st Century" adopted by the World Health Organization. The main tasks of the health system reforms are - given available resources and potential - ensuring citizens' constitutional right to health care, improving access to state-guaranteed free medical care, and initiating targeted balancing of the social and market values in the sector. In order to ensure the hygiene and epidemiological security of the population, it is planned to intensify activities aimed at prevention of infectious and mass non-infectious diseases, as well as the formation, strengthening, and further development of public health.

The health system optimization will continue in the regions and the city of Yerevan. The long-term continuous optimization programs provide for structural reforms and rationalization of the system, accurate assessment of health care needs, identification and rationing of the required capacities through the consolidation of premises and services, reorganization of ineffective health organizations, and redistribution of vacated capacities.

Further reforms of the health system financing mechanisms will be aimed at the reduction of the unofficial turnover, introduction of objective criteria for co-payments, clinical-economic standards, and reimbursement for provided services. The development of the hospital care system will proceed with short- and long-term planning aimed at introducing specific financing mechanisms, improving cost-efficiency, reducing excess capacities, and ensuring the quality of medical care. In order to ensure the provision of high-quality, accessible, and targeted health care to the population and to improve cost efficiency, it is planned to practice selection-based placement of the state order.

In the arrangement of medical care, it is envisaged to essentially enhance the role of the primary unit by forming the family medicine system and ensuring an adequate volume and quality of free ambulatory-polyclinic services through the use of borrowed and direct budgetary resources.

The main direction in the drug and technological policy will be the improvement of their accessibility, safety, and rational use. Actions will be taken for improving the state system of drug quality assurance, introducing prescription forms, and ensuring affordability of drug prices.

In relation to the further improvement of the medical education and scientific systems, it is planned to contract the volume of admissions to basic medical education and to improve the postgraduate education unit through partially transferring the educational process to the regional training centers.

The next 10-12 years should be viewed as an important period from the perspective of adjusting the situation created in the health sector and assuring the prerequisites for the future development of the system.

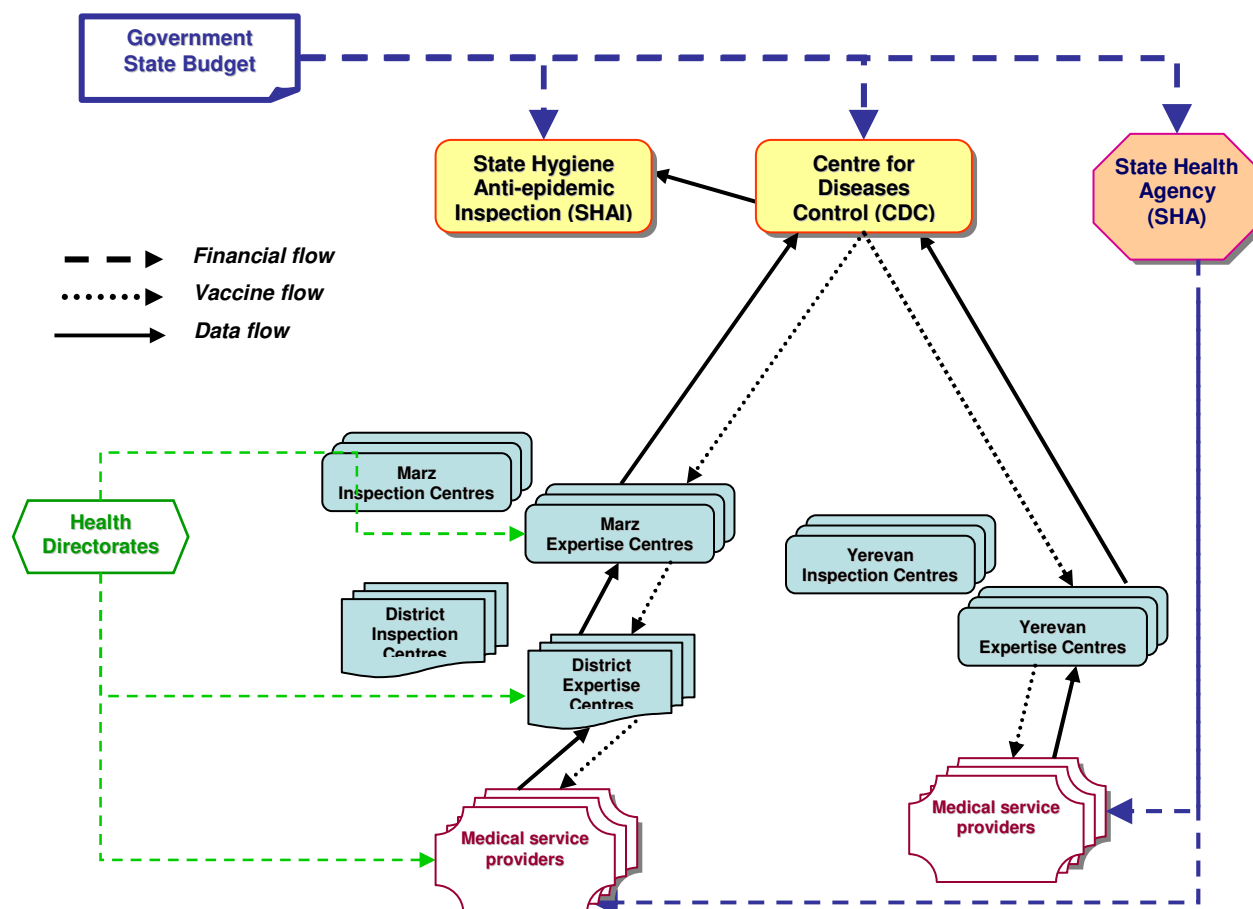
#### **1.4 IMMUNIZATION SERVICES WITHIN HEALTH CARE SYSTEM**

Immunization services are delivered by 850 health facilities under the jurisdiction of 225 Medical Service Providers in marzes and 36 in Yerevan. These Medical Service Providers are under the direct control of marz and Yerevan city Health Directorates. At the national level, under the overall responsibility of the Ministry of Health (MOH), immunization management and coordination is currently divided between two institutions, the State Hygiene and Anti-epidemic Inspection (SHAEL) for supervision, and the Centre for Disease Control and Prevention (NCDC) for issues concerning vaccine management, immunization monitoring and vaccine preventable diseases surveillance. Supervision of the Medical Service Providers' immunization activities is taken care of by marz/Yerevan city (17) and district (51) Inspection Centres. Vaccine management and logistics is under the responsibility of Expertises Centres, located at the same level with the Inspection Centres.

It should be emphasized that, at this stage, the Immunization Manager is sitting in SHAEL central office, under the supervision of the Head of Communicable and NCD Epidemiology Department, with a couple of staffs working with her on immunization as part of their overall responsibilities as epidemiologists, while several other staffs involved in immunization are based in NCDC, under another supervisor. The organization of the programme is more complex at the field level than at the national level. Immunization main functions are distributed between Inspection Centre, Expertise Centre and marz Health Directorate with a lack of clear lines of authorities and responsibilities. These aspects obviously do not currently facilitate the proper regeneration of the immunization programme, as needed, and will therefore have to be addressed in one or another way.

Moreover a special group or "professional team" (32 persons) was recently created with the objectives to support the national immunization programme in its implementation. This team involves most of national immunization staff, some marz immunization staff, epidemiologists, paediatricians and other public health specialists (terms of reference will be provided in annex). The challenge here will be, looking at the heavy work schedules of each of these professionals, to make sure that this group will be functional.

Figure 1: Immunization flow chart (funds, vaccine, data)



## 2. DISEASE TRENDS AND VACCINATION COVERAGE

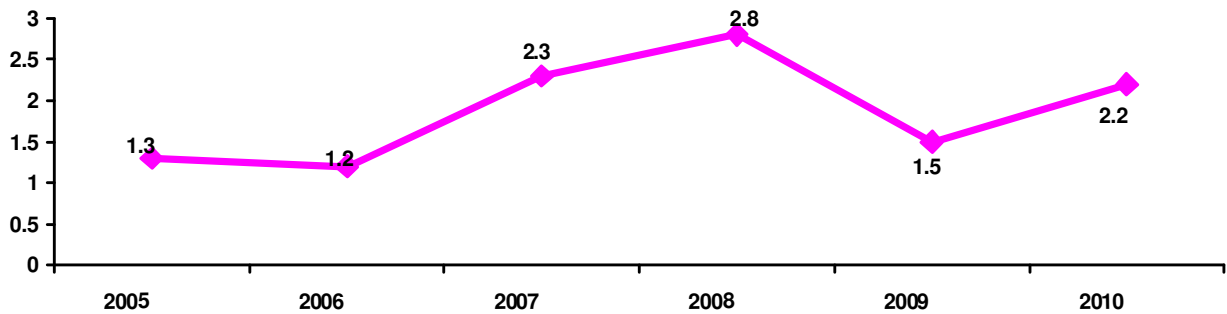
### 2.1 MORBIDITY AND MORTALITY TRENDS FOR VACCINE PREVENTABLE DISEASES

The European Region, including the Republic of Armenia, was certified polio-free in 2002. However, in 2006-2007, the 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. The Caucasus Region remains a geographical high risk area, being a population transit zone with direct links to polio-endemic countries. The last imported poliomyelitis cases in Europe were reported in Tajikistan in 2010. The imported virus was shown to be from India. This is a reminder that it is necessary for Armenia to remain vigilant and reinforce all polio eradication activities. Due to close relations with India Armenia is now at a particularly high risk for wild poliovirus importation.

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. To prevent wild poliovirus importation and spread in RA, in 2008 supplementary polio vaccination activities were implemented among children under 5, with very high immunization coverage.

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

Figure 2: AFP dynamic during 2005-2010 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.

During 2004 and 2005 Armenia has experienced a nation-wide measles outbreak that has been widespread both geographically and across age-groups in the country.

Figure 3: Incidence rate of measles during 2000-2010 (per 100,000 population)

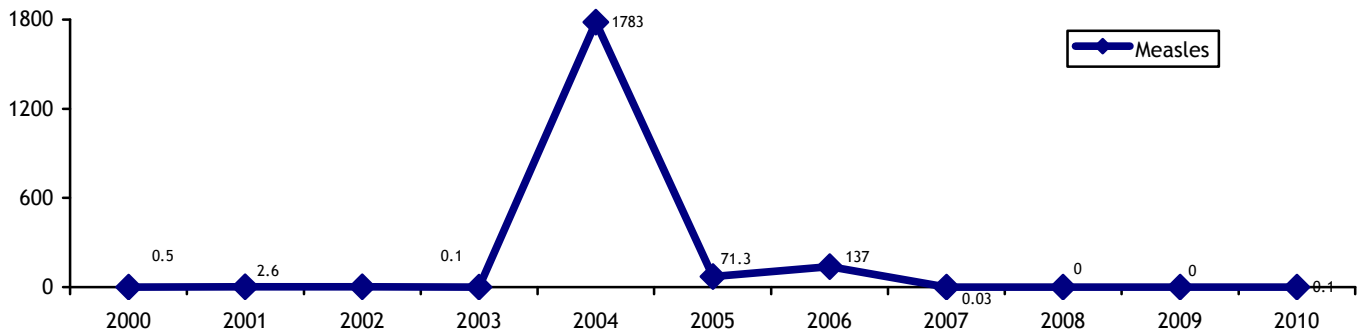
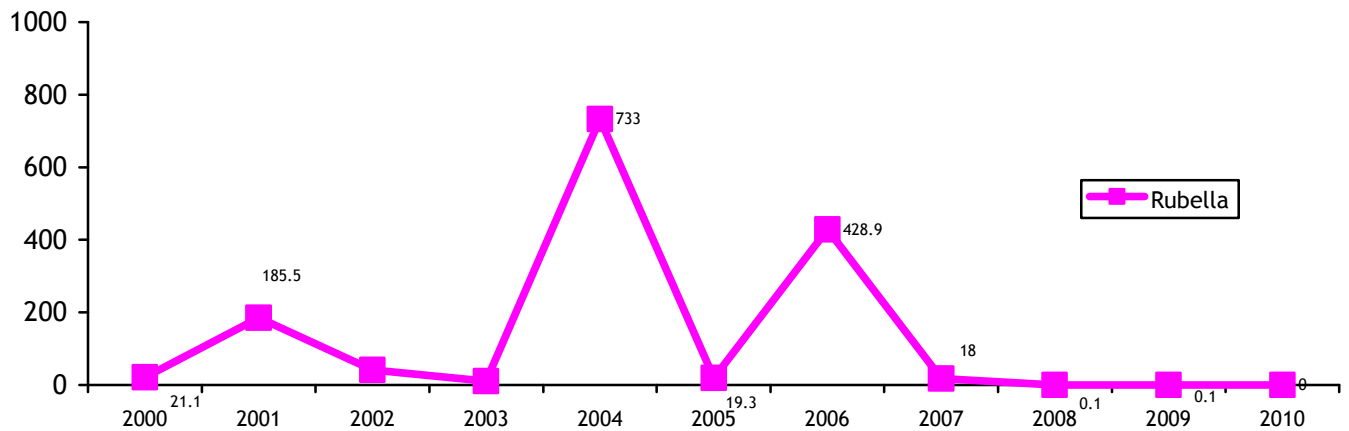


Figure 4: Incidence rate of rubella during 2000-2010 (per 100,000 population)

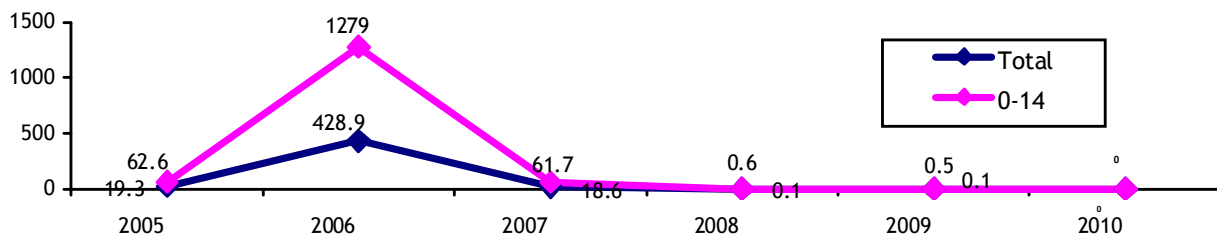


Birth cohorts with particularly high clinical measles attack rates have been in those highly vaccinated cohorts born between 1980 and 2001. There seem to be several explanatory factors for the high clinical measles incidence across age-groups, including reduced vaccine effectiveness, delays in delivery of the routine programme for the first and second measles dose, and historical variations in coverage level.

No cases of measles were registered in Armenia during 2007-2009 period. In 2010 measles lab confirmed two cases were registered in Armenia having epidemiological link with the measles suspect case from China.

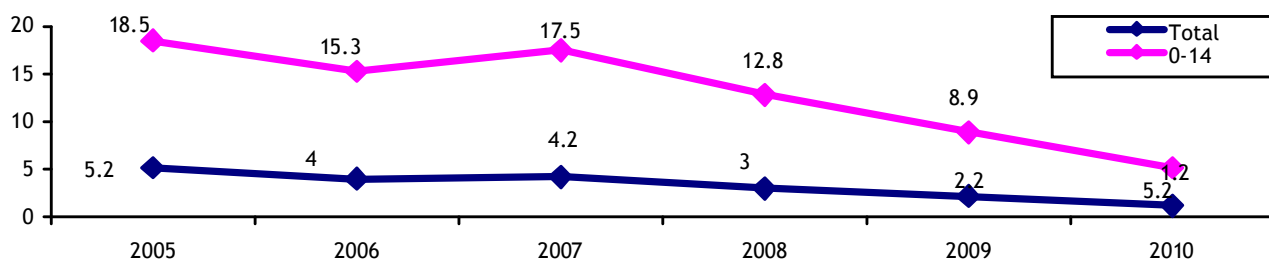
During 2000-2010 two peaks of incidence rate of Rubella were registered: in 2004 and 2006 (Figure 4). After the second peak in 2006 incidence of Rubella has dropped significantly to 0.1 in 2009 (Figure 5). In 2010 no lab confirmed cases were registered in Armenia.

**Figure 5: Incidence rate for rubella during 2005-2010 (per 100,000 population)**



The highest incidence rate of mumps during 2005-2010 period among the general population and 0-14 age group was registered in 2005.

**Figure 6: Incidence rate of mumps during 2005-2010 (per 100,000 population)**



Compared to incidence rate of 2010 and 2005 the decrease was 4.3 and 3.6 times respectively

Since 2007 epidemiological situation attributable to measles, mumps and rubella has substantially improved, particularly supported by steady decline in incidence rates.

According to Measles, Rubella and CRS National Control Programme adopted by the Government a country-wide catch-up campaign (SIA) with measles-rubella vaccine was conducted targeting all males and females regardless of disease and vaccine history with year

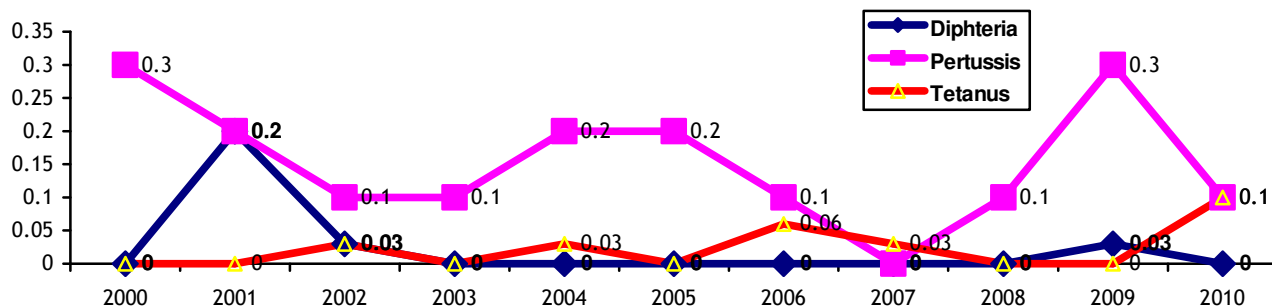
of birth 1980-2000 (6-27 yr old in 2007) followed by rubella immunization of all women of child-bearing age in 2008-2009.

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) but since 2003 no indigenous case has been reported. For diphtheria control also, timely coverage and surveillance remain a priority in Armenia.

However, in 2009 one case of diphtheria was registered in 15 years old adolescent caused by *Corinebacterium Gravis*. During 2001-2010 period morbidity due to diphtheria in Armenia was at 0 level.

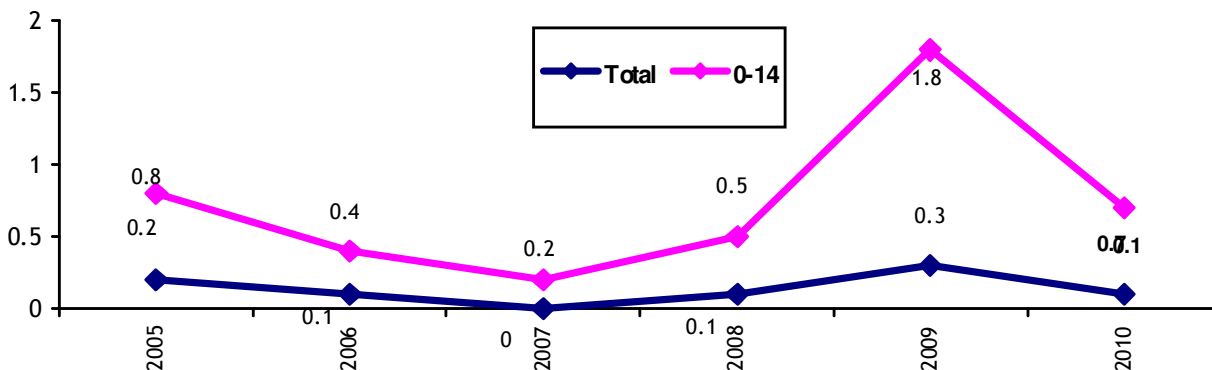
Graph below represents the dynamic of morbidity data due to diphtheria, pertussis and tetanus during 2000-2010.

**Figure 7: Incidence rates for diphtheria, pertussis and tetanus in Armenia during 2000-2010 (per 100,000 population)**



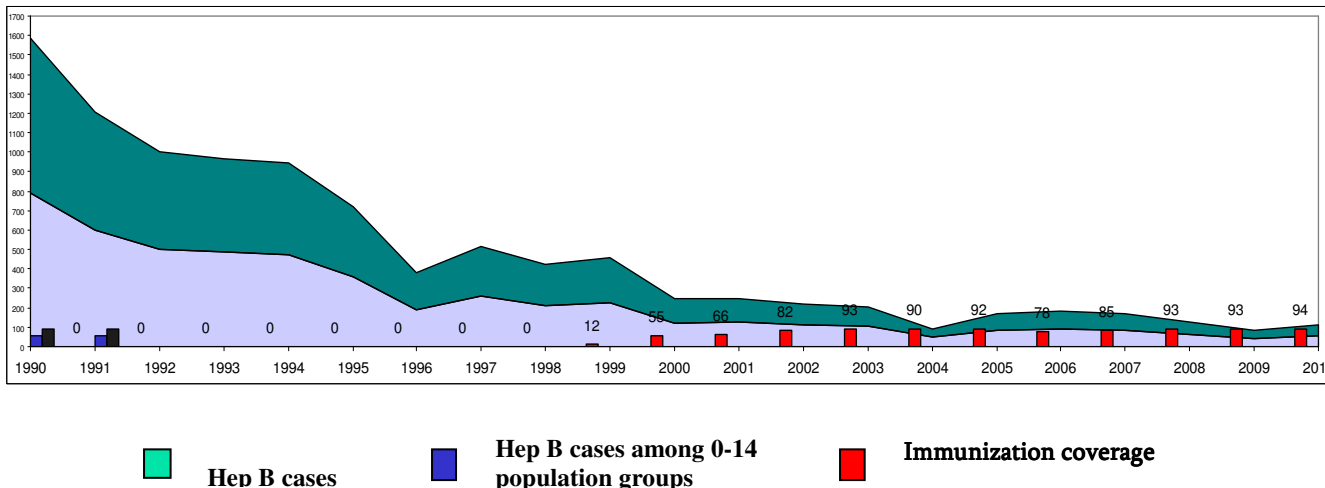
During 2005-2010 period the highest incidence rates of pertussis among general population and 0-14 age group in Armenia was registered in 2009.

**Figure 8: Incidence rates of pertussis in Armenia during 2005-2010 (per 100,000 population)**



There is stable tendency for morbidity due to Hepatitis B to decline in Armenia during 1990-2010 period (Figure 9). 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.

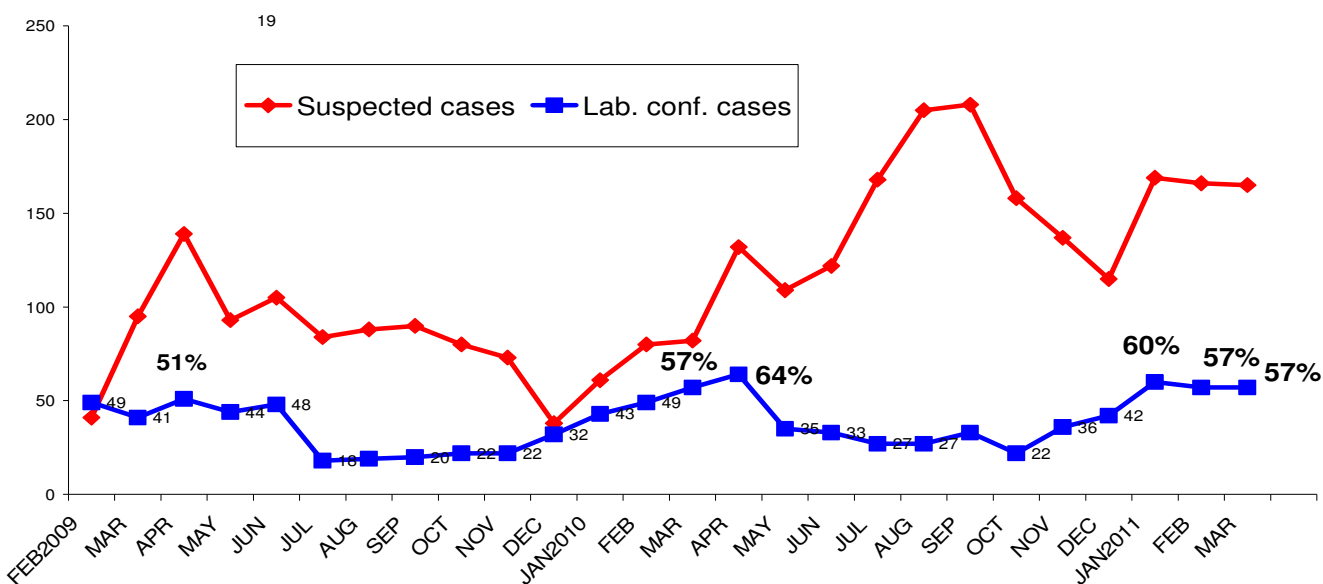
Figure 9: Tendency for morbidity due to Hepatitis B in Armenia during 1990-2010



In 2009 sentinel surveillance system for rotavirus diseases was established in two hospitals of 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 20-22% of lab confirmed rotavirus diseases is common for Armenia.

Figure 10: Dynamic of rotavirus diseases cases disaggregated by months (sentinel sites only), February 2009 - March 2011





## 2.2 VACCINATION SCHEDULE

The National Vaccination Schedule was changed last time in 2009 with connection to introduction of the Hib-containing pentavalent vaccine (DTP-HepB-Hib). The current vaccination schedule is as the following:

**NATIONAL VACCINATION SCHEDULE**

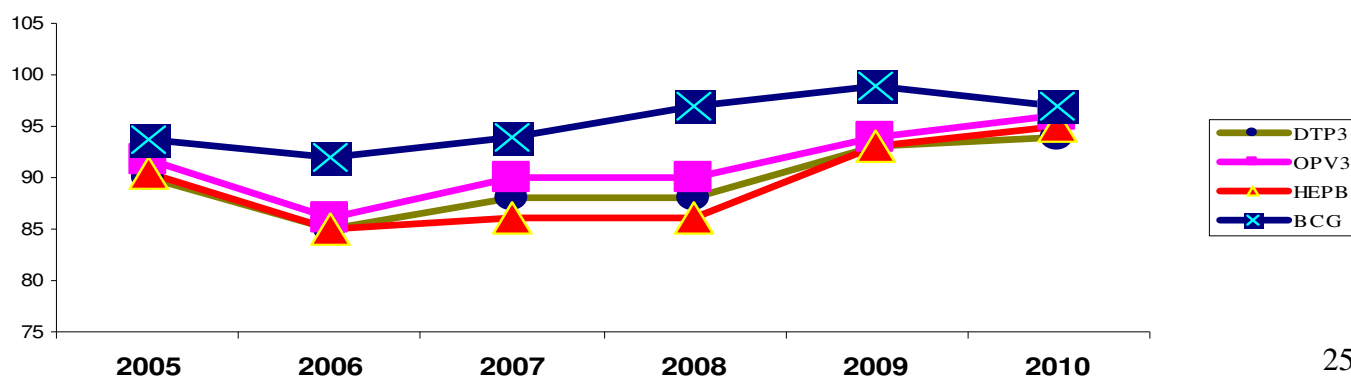
VACCINE	DOSES	VACCINATION TIME
BCG	1	AT BIRTH (24-48 hours after birth)
HEPATITIS B	1	AT BIRTH (24 hours after birth)
PENTAVALENT (DTP/HEPB/HIB) ,	1	6 WEEKS (1.5 MONTHS)
	2	10 WEEKS (2.5 MONTHS)
	3	14 WEEKS (3.5 MONTHS)
OPV	3	14 WEEKS (3.5 MONTHS)
MMR	1	12 MONTHS
DTP, OPV	4	18 MONTHS
Td for adults	1	6 YEARS
OPV	5	6 YEARS
MMR	2	6 YEARS
Td for adults	2	16 YEARS
	3	26 YEARS
	4	36 YEARS
	5	46 YEARS
	6	56 YEARS

In the near future no changes in the National Vaccination Schedule is planned other than introduction of rotavirus and pneumococcal vaccines to the Schedule, if GAVI support will be available. In this case the only change will be synchronization of vaccinations against rotavirus and pneumococcal diseases with the current schedule.

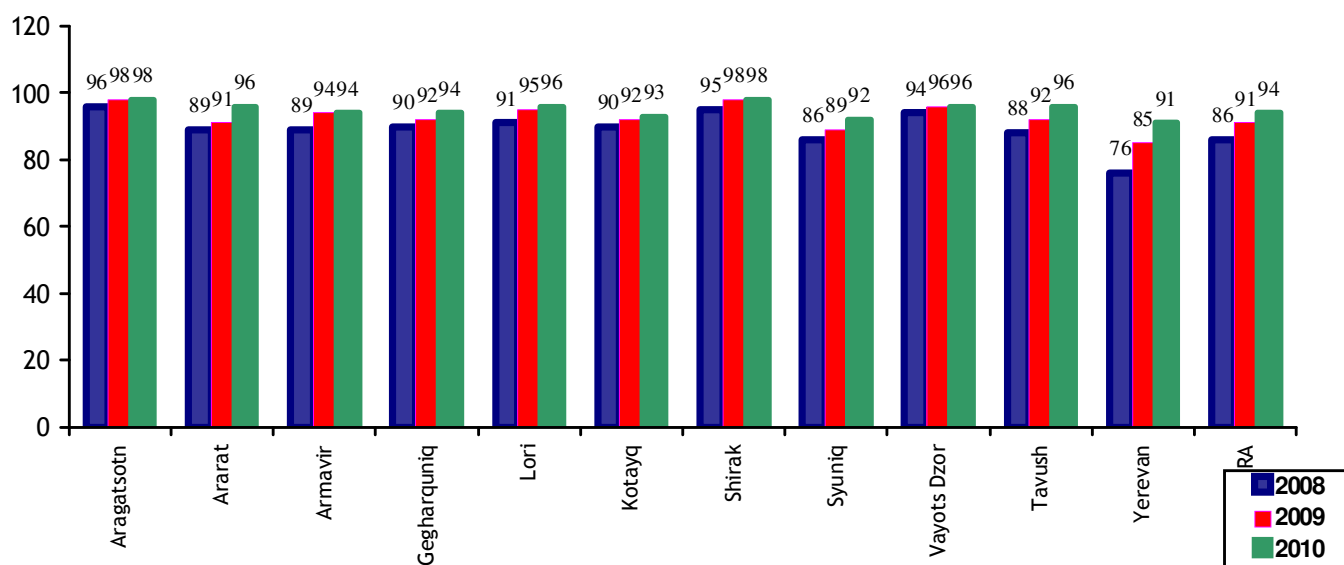
## 2.3 VACCINATION COVERAGE

Analysis of full immunization coverage rate for children under 1 reveals decline in 2006 in Armenia. However, during 2007-2010 the situation with full coverage was constantly improving.

**Figure 11: Full immunization coverage rate for children under 1 during 2005-2010 period in Armenia**

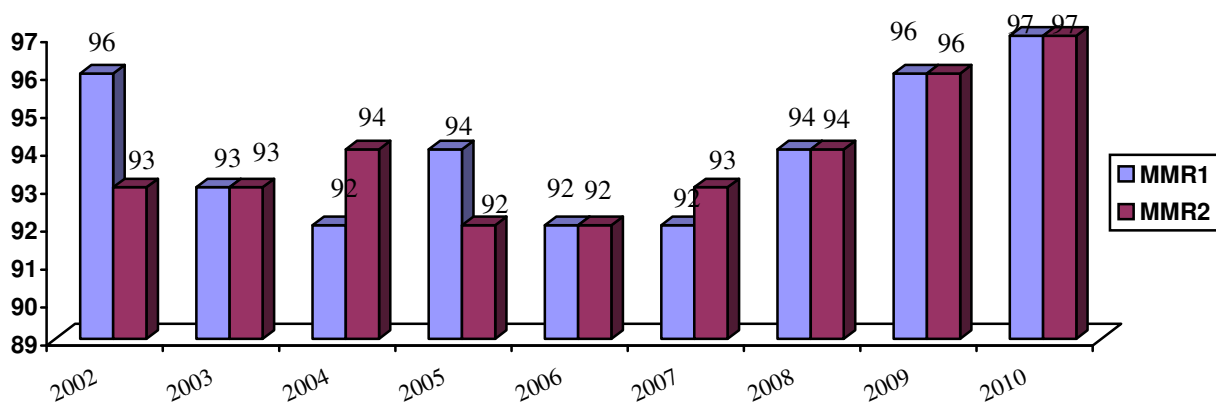


**Figure 12: Disaggregation of full immunization coverage rates by the regions of Armenia, 2008-2010**



Since 2007 a new system for reporting and monitoring immunization coverage was introduced. Full immunization coverage rate of target population is being monitored in the Republic for the first time. Thus, this rate in 2008 for children under 1 was 86% and in 2010 it was already 94%. 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.

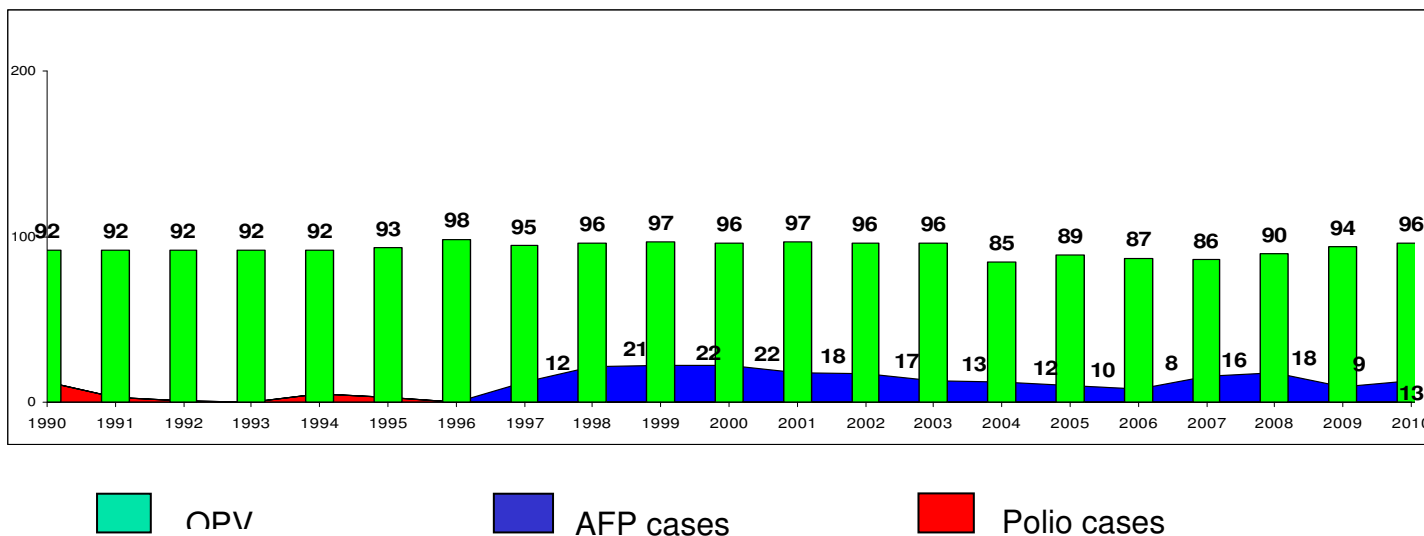
**Figure 13: Comparison of MMR1-MMR2 coverage rates, 2000 - 2010**



Comparison of MMR1-MMR2 coverage rates by years reveals significant achievements. In 2010 compared to 2008 the rate increased by three percents making 97% for both doses. 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 2007-2010 period it started increasing. However, there is lot to do in order to achieve targeted level of 97%.

Figure 14: OPV3 coverage rates, 2008-2010



### Problems with the National Immunization Schedule

- Unjustified breaks in timely vaccination
- Unjustified postponement of one of the injectable vaccine to be given simultaneously
- Unjustified contraindications
- Low coverage level with Td among adult population.

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

### 3.1 SERVICE DELIVERY

#### Sustaining polio-free status:

The European Region, including the Republic of Armenia, was certified polio-free in 2002. However, in 2006-2007, the 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. The Caucasus Region remains a geographical high risk area, being a population transit zone with direct links to polio-endemic countries. The last imported poliomyelitis cases in Europe were reported in Tajikistan in 2010. The imported virus was shown to be from India. This is a reminder that it is necessary for Armenia to remain vigilant and reinforce all polio eradication activities. Due to close relations with India Armenia is now at a particularly high risk for wild poliovirus importation.

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. To prevent wild poliovirus importation and spread in RA, in 2008 supplementary

polio vaccination activities were implemented among children under 5, with coverage around 97%.

The number of AFP cases reported to WHO has decreased from 23 in 2000 (with an AFP rate of 2.56 cases per 100,000 children < 15 years old) to 8 in 2006 (AFP rate of 1.2/100,000) indicating a serious decrease in the sensitivity of AFP surveillance. During 2007-2010 period the salutation has been improving.

#### Measles 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.

The national strategic plan on Measles and Rubella Elimination and CRS control is in place.

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. Recently conducted coverage survey showed, likely OPV, the overall high MCV1 coverage (94%), although a low timely vaccination coverage, according to the schedule (80.3% by 18 months of age).

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.

#### Controlling diphtheria:

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*. For diphtheria control also, timely coverage and surveillance remain a priority in Armenia. Hopefully, recent introduction of the pentavalent vaccine will facilitate addressing this problem.

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<sup>6</sup> 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

Quarterly report is supposed to be sent to WHO Regional Office for Europe. Completeness of this reporting is 100%. The RED strategy still remains a key to boost the timely immunization

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<sup>6</sup> 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.

within country, and Armenia will highly benefit in using it to strengthen its immunization programme. RED principles should be incorporated into the comprehensive multi-year plan (cMYP) if the goal of 95% coverage at district level is to be achieved.

Reported national coverage figures based on official country estimates by vaccine type for 2000-2009 are shown in Table 1. 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 3: Reported national coverage by year and vaccine type, Armenia 1992-2010**

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

Source: WHO

Armenia successfully introduced Hepatitis B vaccine in 1999 (UNICEF support and starting from 2001, GAVI support) MMR vaccine in 2002 (with UNICEF support and later on with VRF, UNICEF and ANMF support) and Hib-containing pentavalent vaccine in 2009 (with WHO and UNICEF support). Demand for these vaccines is high.

Concerning further introduction of new vaccines, there are currently two in the pipeline, namely rotavirus and pneumococcal vaccines. With WHO’s technical and financial support the

sentinel surveillance system for rotavirus diseases was introduced in the country in February 2009. System is functional in two hospitals of Yerevan city since 2009. Though there is no local data on burden of pneumococcal diseases in children of Armenia decision to introduce pneumococcal vaccine into the National Immunization Schedule was made based on WHO estimations for Armenia, as well as present positive experience of other countries.

### **3.2 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. Within the national plan of action and the draft Law (section in the Public Health Safety Law) there is a chapter on advocacy and communication for immunization where the major objectives are stated.

In general, media relations regarding health topics, including immunization, are coordinated by designated official at the MoH. This official keeps frequent contacts with media and journalists on behalf of the whole MoH.

There is no designated person for communication on immunization at the national level. The Immunization Manager is the focal point for advocacy and communication for immunization. The SHAEI is in charge of clearing up communication messages or communication materials. The existing and well functioning infrastructure of primary health care system enables the establishment of good parent-health care provider two ways communication at all levels (polyclinic, ambulatory, health post). Moreover, the implementation of social mobilization activities on all health related topics is also in the terms of references of regional epidemiologists and health workers. Above mentioned is proved by high awareness of the population on advantages of immunization revealed during several studies.

The recent advocacy and communication efforts on introduction of new vaccines (HepB, MMR and Hib) as well as for the routine immunization were done with the support of international organizations.

As a major achievement in the field of advocacy should be mentioned the development and endorsement of the Comprehensive Multi-Year Plan in joint collaboration with WHO, UNICEF and MoH, which serves as an effective advocacy tool in increasing the Government commitment and successful implementation of the Government Policy in gradually taking the responsibility for vaccine procurement and increasing the budget allocation for that purpose.

In addition, within the framework of National Immunization Programme, UNICEF is conducting a wide range of advocacy and communication activities that are included in the joint UNICEF-MoH annual work plan. These activities include printing of mother immunization cards, parental booklets on advantages of immunization, production and broadcast of video spots and TV programme series with special programmes on immunization.

### 3.3 SURVEILLANCE

The WHO publication, Surveillance Guidelines for Measles and Congenital Rubella Infection in the WHO European Region, highlights the importance of a strong disease surveillance system to a national immunization program. In particular, “Surveillance systems provide information both for the early detection of and rapid response to health events, including disease outbreaks, and also help to identify disease trends, risk factors and the need for intervention. They provide valuable information for priority-setting, planning, implementation and resource allocation for preventive programmes, and for evaluating control measures.”

Disease surveillance for vaccine preventable diseases 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 system for rotavirus diseases is conducted in two hospitals of Yerevan city. Surveillance is not conducted on Hib and Pneumococcal diseases. Reported cases of these diseases for the period 2000-2009 are shown in the following table.

**Table 4: Reported Cases 2000-2009**

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



Source: Armenia VPD surveillance

A measles outbreak occurred from January 2004-September 2005. A total of 4,064 clinical measles cases were reported from 48 of 51 districts in the country. 346 cases were laboratory tested, of which 73% were confirmed.

By age-group, the majority of cases occurred in age-groups 10-14 (n=867, 21%), 15-19 (n=1312, 32%) and 20-29 years (n=902, 22%). A smaller number occurred in those aged 1-4 (n=267, 7%), 5-9 (n=366, 9%) and over 30 years (n=189, 5%). 161 cases (4%) were reported in infants. The highest age-specific incidence was observed in infants, with high incidence (>50/100 000) in those aged 1-29 years. Incidence declined rapidly in those over 30 years. A smaller proportion of clinical cases (36%) in 1-9 year olds were laboratory confirmed in 2005 (36%) vs 2004 (76%).

By vaccination status, all cases under one year were unvaccinated, whereas a large proportion of 10-29 year old cases had received one or more doses of measles vaccine (>80%). Vaccine effectiveness was estimated to be reduced in these older age cohorts. Findings at national level were verified by case investigation locally.

The outbreak highlighted the need to implement MR case definitions. Rubella co-circulation in younger age-groups may have occurred in 2005.

AFP indicators show non-polio AFP rate under 15 years is above 1.0, specimen collection rate 100%, completeness 98%, and zero reporting exists. Reported cases of AFP for the period 2000-2010 are shown in the following table.

**Table 5: Reported Cases of AFP 2000-2010**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
<b>Armenia</b>	23	16	17	13	13	9	8	16	17	9	7
Yerevanskaya	9	6	7	4	6	1	3	2	8	3	3
Shirakskaya	0	3	2	2	0	1	1		2	2	0
Lorijskaya	1	1	0	0	2	0	1	2	1	0	0
Tavushskaya	3	0	0	0	0	0	0	0	0	1	0
Aragattsonskaya	0	1	1	1	1	1	1	1	0	0	0
Kotajskaya	0	0	1	1	0	1	1	1	0	0	1
Ghegarkunijskaya	3	1	3	0	2	1	0	3	2	0	1
Armauirskaya	3	1	2	3	0	2	1	4	2	0	0
Araratskaya	1	1	0	1	0	1	0	2	2	1	1
Vajotsdzorskaya	1	1	0	0	0	0	0	0	0	0	0
Siunikskaya	2	1	1	1	2	1	0	1	0	2	0

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.

### **3.4 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 Effective Vaccine Store Management (EVSM) assessment at the national vaccine store in 2005 and 2008, Effective Vaccine Management (EVM) assessment in 2010 and an Immunization Quality and Safety Assessment in 2006.

Vaccines come through UNICEF Supply Division (UNICEF donated, Government procured, GAVI procured). The Government has gradually increased its share of funding for routine vaccine and safe injection equipment supplies from 20% in 2002 to 100% by 2009 (exception is pentavalent DTP+HepB+HIB).

Vaccine needs are calculated annually by and by the Government in November. The present supply frequency is twice a year for all vaccines procured through UNICEF Supply Division. Arrangements with the customs authority for clearance of vaccine shipments at Yerevan airport, as well as airport cold storage arrangements, are satisfactory. Relevant documentation is processed by the Drug Agency of the Ministry of Health.

The Drug Agency does not carry out all vaccine-related functions of a National Regulatory Authority (NRA). As Armenia is importing UN pre-qualified vaccines, there is currently only a need for two functions for an NRA - vaccine licensing and AEFI surveillance, and no need for lot release and laboratory control. Various recommendations from the 2009 assessment of NRA functions await follow up.

The vaccine cold chain is maintained well in respect of cold storage space, vaccine arrangement, equipment condition, temperatures, cold boxes and icepacks.

### **3.5 PROGRAMME MANAGEMENT**

The main goal of the **National Immunization Programme (2011-2015)**, approved by the Government in 2010, is to decrease through immunization morbidity from preventable infectious diseases and as a result of this to prevent death cases and to secure immunity of the population from infectious diseases.

The objectives of the programme were defined as follows:

- Maintaining the political commitment, ensuring resource mobilization and management practices and enhancing legislature for the National Immunization Programme implementation;
- Ensuring the ongoing strong and sustainable Immunization systems;
- Ensuring and maintaining the routine immunization fully coverage (for all antigens) up to 95% or more at national level;
- Ensuring WHO quality-assured vaccines supply and safe and qualified injection practice;
- Ensuring equal access of all target groups to immunization services, including hard to reach population and integrating immunization services into other medical services;
- Eradication and elimination of the targeted diseases;
- Control of priority bacterial and viral diseases, including diseases with epidemic value;

- Protection of more people from more infection diseases by new and under-utilized vaccine introduction;
- Enhancing targeted diseases surveillance systems;
- Strengthening targeted diseases laboratory surveillance systems;
- Ensuring continuous improvement of healthcare workers involved in immunization process
- Ensuring public awareness, communication and social mobilization.

Until 2005, most of the documents related to immunization policies were not endorsed by the Government, but simply approved by the MOH, as per example the National Public Health Strategies and Policies drafted in 1999. However, starting from 2005 the **National Immunization Programme** is approved by the Government Decision.

New **Public Health Law** with an immunization component was recently drafted. It includes such elements as; State policy basics of immunization; Citizen's immunization rights and responsibilities; Basics of immunization organization and implementation; Financing of immunization process; Social protection of citizens in case of immune reactions and complications.

Planning of the National Immunization Programme is done through development of comprehensive Multi-Year Plans covering 3-5 years period. The multi-year plans, based on global and regional goals and national objectives and priorities, provide implementation strategies and key activities for the immunization programme for at least the next 3-5 years. Besides, the cMYPs have also costing component, which facilitates negotiation process between MoH and MoF when identifying NIP budget.

The main support to the programme includes the following **International Partners**:

- UNICEF, serving as a key partner for supply and logistics assistance, policy and strategy development, capacity building, advocacy and communication. Starting from 100% provision of vaccines and injection safety supplies to the immunization programme, UNICEF has succeeded in advocacy and political mobilization efforts through the MOH/ UNICEF five-year collaboration programme, leading to gradual replacement of donor funds by Government resources from 6% in 2004 to 60% by 2010.
- WHO, providing technical support in the fields of routine immunization strengthening including introduction of new antigens; disease control and elimination (diphtheria, polio, measles/rubella); coverage monitoring and disease surveillance; laboratory component; and finally immunization quality and safety, including national regulatory authority, vaccine procurement, vaccine management, injection safety and AEFI surveillance.

The **Interagency Coordinating Committee (ICC)** represents an essential body to coordinate the support of all agencies involved in the National Immunization Program. The President of the Committee is the Minister of Health. The Committee is composed of 22 Members, including 11 Vice Ministers from the MOH but also from several other ministries. WHO, UNICEF, VRF, World Bank and USAID are also represented. Although a very important step has been reached by establishing it, such a high level of ICC represents a challenge in keeping it active on the long run, especially if quarterly meetings have to be maintained. Another important factor is the necessity for the minutes and recommendations from the ICC to be well communicated to key partners, donors and policy-makers.

There still are shortages of staff due to vacant epidemiologist positions at national, marz and district levels. It became more difficult to attract epidemiologists into these positions, mainly because of lack of financial incentives. At the health facility level, the problem seemed to be less acute. Staff allocation and proper distribution should remain an essential component as the health sector reform continues. Incentive mechanisms should also be worked out, if immunization staff will remain motivated to perform properly their duty.

Concerning capacity building and staff development, starting from 2001 UNICEF supported the implementation of 3-day training courses on “Basic Principles of Immunization” for nurses in all districts and marzes of the country, and 4-day training courses based on WHO modules for doctors (covering paediatricians, epidemiologists, neonatologists, family doctors) in all districts and marzes of the country except of Yerevan city. “Mid-Level Management” course was implemented in 2002, and injection safety course for priority districts in 2003. Meanwhile Armenian professionals participated to regional courses organized by WHO, primarily on quality and safety (GTN AEFI in Moscow in 2004, 2005 and 2007, GTN Vaccine Store Management in Sofia in 2005, GTN Procurement in Riga in 2005, GTN Regulation in Moscow in 2006, GTN Vaccine Management in Chisinau in 2008), with 2 to 3 professionals attending each course. In 2007 “Immunization in Practice” course was adopted to Armenian content and during the recent 2-3 years this course was delivered with WHO and UNICEF support to almost all PHC providers. For 2010-2011 it also planned to conduct the trainings for PHC providers on “Integrated surveillance” and “Mid-level management”. The target will be mainly paediatricians, family doctors and nurses, but the epidemiologists at marz and district levels will benefit in getting their knowledge refreshed during those training courses.

Finally, as mentioned in the National Immunization Programme endorsed by the Government, there will be a component on implementation of the basis of immunization programme in curricula of medical universities, National Institute of Health and medical colleges. Such an initiative will be essential for future trainees and should be properly defined.

#### **4. IMMUNIZATION PROGRAMME STRATEGIES AND KEY ACTIVITIES**

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

Table. 6: cMYP Objectives, Strategies and Key Activities								
Problem or priority	NIP objectives	Implementation strategies	Key activities	Timing				
				2011	2012	2013	2014	2015
Targeted disease eradication	Maintaining polio-free status	Improving non-polio AFP surveillance performance	Training reporting site staff (on case definition and reporting procedures, including zero reporting)					
			Training district epidemiologists on active surveillance					
			Conducting supervisory visits to marz and district levels (using unified supervisory checklists)					
			Provision of regular feedback on AFP surveillance to sub-national levels					
			Preparing and distributing posters targeting reporting sites staff, reminding case definition and reporting procedures (including zero reporting)					
			Conducting studies for environmental surveillance for enteroviruses					
			Provision of regular meetings of Expert Committee					
			Providing equipment support to national polio lab and training lab staff					
			Finalization of accreditation of national polio laboratory					
	Improving routine OPV coverage at national, marz, district levels with special focus on increasing timely vaccination and decreasing drop-out rates and implementation of false contraindications		Ensuring proper supply and delivery of OPV to avoid stock-out problems					
			Training vaccination staff with special emphasis on timely vaccination, true contraindications, implementation of RED strategies, communications with parents, reporting procedures, micro-planning issues					
			Finalization of revision of national guidelines in line with WHO recommendations					
			Conduct Supportive Supervisory visits to low performance areas					
			Analyze the results of immunization performance to identify high risk and low performing areas at each level (regional and district).					
			Monitoring vaccination coverage at district and facility level in line with RED strategies					
			Increasing frequency of immunization sessions to reduce missed opportunities					
			Increasing frequency and regularity of outreach services (at least one per month per identified localities)					
			Provision of regular feedback on vaccination coverage to sub-national levels					
			Improving information technology capacity at marz level to improve performance of coverage monitoring, analysis and reporting/feedback functions					
			Preparing and distributing posters targeting health facility staff, reminding true contraindications					
Preparing and distributing posters targeting parents, reminding vaccination schedule and providing information on vaccine safety to increase demand for vaccination								

Risk of importation polio		Providing additional vaccination opportunity to children at increased risk	Conducting polio supplementary immunization activity for children under 5 years of age, in areas or populations groups at increased risk for importation (if necessary)					
Targeted disease elimination	Eliminating measles and rubella and controlling congenital rubella infection by 2015	Improving routine MMR coverage at national, marz, district levels with special focus on increasing timely vaccination and decreasing drop-out rates and implementation of false contraindications	Ensuring proper supply and delivery of MMR vaccine to avoid stock-out problems					
			Training vaccination staff with special emphasis on timely vaccination, true contraindications, implementation of RED strategies, communications with parents, reporting procedures, micro-planning issues					
			Finalization of revision of national guidelines in line with WHO recommendations					
			Monitoring vaccination coverage at district and facility level in line with RED strategies					
			Conducting supervisory visits to marz and district levels (using unified supervisory checklists)					
			Increasing frequency of immunization sessions to reduce missed opportunities					
			Increasing frequency and regularity of outreach services (at least one per month per identified localities)					
			Provision of regular feedback on vaccination coverage to sub-national levels					
			Improving information technology capacity at marz level to improve performance of coverage monitoring, analysis and reporting/feedback functions					
			Preparing and distributing posters targeting parents, reminding vaccination schedule and providing information on vaccine safety to increase demand for vaccination					
			Case based surveillance	Improve performance of surveillance for measles-rubella and congenital rubella syndrome	Continue providing regular (international) training for lab staff			
Continue supplying lab reagents and kits for measles-rubella analysis								
Designate staff for specimen collection and transportation at marz level								
Provide additional funds and resources for specimen transportation to national measles lab								
Retrain designated staff for case investigation								
Train facility staff in line with revised national guidelines								
Finalize revision of national guidelines in line with WHO recommendations								
Train district epidemiologists on active surveillance								
Conducting supervisory visits to marz and district levels (using unified supervisory checklists)								
Provision of regular feedback on MR and CRS surveillance to sub-national levels								
Implement certification of the country as measles free								

Targeted bacterial disease control	Improve accelerated control of diphtheria	Improving routine Pentavalent(DTP-HIB-Hep B), DTP, DT, Td coverage at national, marz, district levels with special focus on increasing timely vaccination and decreasing drop-out rates and implementation of false contraindications	Ensuring proper supply and delivery of Pentavalent, DTP, DT, Td vaccines to avoid stock-out problems					
			Training vaccination staff with special emphasis on timely vaccination, true contraindications, implementation of RED strategies, communications with parents, reporting procedures, micro-planning issues					
			Finalization of revision of national guidelines in line with WHO recommendations					
			Monitoring vaccination coverage at district and facility level in line with RED strategies					
			Increasing frequency of immunization sessions to reduce missed opportunities					
			Increasing frequency of outreach services (at least one per month per identified localities)					
			Provision of regular feedback on vaccination coverage to sub-national levels					
			Improving information technology capacity at marz level to improve performance of coverage monitoring, analysis and reporting/feedback functions					
			Conducting supervisory visits to marz and district levels (using unified supervisory checklists)					
Weakened surveillance	Improve performance of diphtheria surveillance with special emphasis to district level	Retrain facility staff on diphtheria control (with special focus to case definition and reporting procedures (including zero reporting))	Retrain facility staff on diphtheria control (with special focus to case definition and reporting procedures (including zero reporting))					
			Retraining lab staff					
			Ensure that at least one lab per district has capacity to conduct analysis of suspected cases					
			Conduct supervisory visits to designated labs at district level					
			Train district epidemiologists on active surveillance					
			Provision of regular feedback on diphtheria surveillance to sub-national levels					
Lack of evidence for decision making for introducing new vaccines	Expand national immunization programme through introduction of new and underused vaccines	Collect evidence for decision-making for introduction of new vaccines	Establish sentinel surveillance for Hib infections and continue					
			Continue sentinel surveillance for rotavirus infection					
	Introduction of Rota and Pneumo vaccinations through GAVI New and Underused Vaccines (NUV) support	Assess cost-effectiveness and financial sustainability of introducing new and underused vaccines	Assess cost-effectiveness and financial sustainability of introducing new and underused vaccines					
			Discuss introduction of rotavirus and/or pneumococcal vaccines through GAVI NUV support in Inter-Agency Coordinating Committee (ICC) meeting and obtaining commitment of Government and partners					
			Develop proposal for GAVI NUV support to introduce new vaccines (rotavirus and pneumococcal vaccines)					
			Introduction of rota vaccination					
			Introduction of Pneumo vaccination					

Existence of low performing districts, high drop-out rates, delayed vaccination, missed opportunities, implementation of false contraindications, insufficient and rare immunization sessions and outreach services	95% coverage for all antigens in all districts by 2015	With a specific focus on Pentavalent vaccination,; achieving 95% regional coverage	Ensuring proper supply and delivery of Pentavalent vaccine to avoid stock-out problems						
			Training vaccination staff with special emphasis on timely vaccination, true contraindications, implementation of RED strategies, communications with parents, reporting procedures, micro-planning issues						
			Monitoring vaccination coverage at district and facility level in line with RED strategies						
			Increasing frequency of immunization sessions to reduce missed opportunities						
			Increasing frequency of outreach services (at least one per month per identified localities)						
			Provision of regular feedback on vaccination coverage to sub-national levels						
			Improving information technology capacity at marz level to improve performance of coverage monitoring, analysis and reporting/feedback functions						
			Conducting supervisory visits to marz and district levels (using unified supervisory checklists)						
	Improving human resource management for immunization programme			Make inventory of human resource needs for programme management at all levels and deliver of services at facility level					
				Ensure availability of enough staff to manage and deliver the programme (especially, epidemiologists at district and medical doctors at health facility level in remote areas)					
				Ensure supportive supervision is planned and organized (issue an order)					
				Prepare a checklist to standardize supervision					
				Conduct training of supervisors and inspectors to improve their supervisory skills					
				Conduct regular supervision and monitoring using standardized supervision checklist					
				Monitor performance and effectiveness of supervision					
				Ensure quarterly RED reporting to WHO/EURO					
	Improve qualification of programme staff			Provide training to national, marz and district level programme managers on MLM/RED module of WHO to improve programme management capacity especially at marz and district levels					
				Provide training to health facility level staff on IIP/RED module of WHO					
	Increase availability of immunization services delivery			Increase frequency of immunization sessions through introduction of less dose vials and investing in cold chain infrastructure in remote facilities					
				Increase frequency of outreach services through providing additional staff and transportation facilities and better micro-planning					
				Ensure implementation of open vial policy in line with WHO recommendations					



		Strengthen programme management & monitoring capacity and programme policies	Improve vaccine management capability (especially in planning and forecasting needs, vaccine delivery and establishing reserve stocks) at national, marz and district level to avoid stock outs					
			Conduct regular analysis of coverage at all levels					
			Provide regular feedback to all sub-national levels on coverage					
			Conduct National meetings at least twice per year and discuss vaccination performance results in regions.					
		Increasing community demand for immunization	Providing training to immunization programme staff at all levels on advocacy and communication skills					
			Assessing communication gaps in reaching all communities and developing and implementing a communication and social mobilization plan					
			Disseminate programme messages regularly to parents through advocacy materials to reduce number of refusal due to misperceptions					
			Encourage staff for simultaneous administration of vaccines to avoid delays in vaccination schedule					
			Ensure legal protection of staff against inappropriate accusations on adverse events to reduce implementation of false contraindications					
			Strengthen Adverse Events Following Immunization (AEFI) surveillance system through provision of integrated surveillance training (training of trainers and training of facility level staff)					
Stock-out problems, reduced vaccine effectiveness (measles outbreaks/high incidence), cold chain infrastructure upgrade need, unsafe injection practices, weak AEFI surveillance system	Improve immunization quality and safety	Improving self-reliance in quality assurance and regulatory oversight	Conduct National Regulatory Authority assessment					
			Advocate for quality assured vaccines and communicate information on quality of vaccines to stakeholders to be proactive against mediatisation of misinformation about vaccines					
		Ensure long-term vaccine forecasting to avoid stock-outs	Incorporate long-term vaccine needs to cMYP, including amount for reserve stock					
		Ensure procurement of qualified vaccines that meet internationally recognized quality standards	Continue procuring vaccines through UNICEF Supply Division, if not, ensure that necessary documentation submitted indicating required quality (for Td and non routine IP vaccines)					
		Improve and strengthen	Establish reserve stock at defined amounts for all levels					
Retrain designated staff on vaccine management practices separately								

		vaccine stock management and delivery systems	Improve information and communication technology infrastructure for vaccine management especially at district level					
			Monitor and supervise implementation of vaccine stock management procedures and of recently introduced monthly reporting system (especially at all sub-national levels)					
			Deliver vaccines and consumables according to delivery plan					
			Improve vaccine delivery to meet set standards (using freeze indicators and conditioned ice-packs)					
		Ensure adequate cold chain and logistics is available to maintain quality of vaccines till consumption	Install automated alarm system in case of temperature deviations					
			Use continuous temperature reading for all units					
			Update and complete inventory of cold chain equipment at all levels					
			Identify cold chain equipment need, including replacement of old ones					
			Upgrade cold chain infrastructure (procure refrigerators, vaccine carriers, cold box and ice-packs, temperature monitoring devices, etc)					
		Ensure implementation of safe injection practices	Supply generators for missing districts					
			Integrate IQS components in the national training scheme					
			Offer complete course of HepB vaccination for all injection providers					
			Request report of accidental needle stick from all injection providers					
		Strengthen surveillance and response to adverse events following immunization	Ensure that AD syringes and safety boxes are used for all vaccinations					
			Incorporate AEFI surveillance training to integrated surveillance training					
			Ensure that zero AEFI reporting is implemented					
		Ensure proper management of (health care) waste and safe disposal	Develop and distribute posters to all vaccination posts, targeting parents indicating AEFI					
			Develop national guideline for waste management and safe disposal and ensure its availability at all levels					
			Develop a plan of action for waste management and safe disposal					
		Insufficient disease surveillance data	Improving disease surveillance for vaccine preventable diseases	Strengthening routine surveillance for vaccine preventable diseases	Train designated staff on waste management and safe disposal			
Conducting integrated surveillance assessment to identify problems, weaknesses of disease surveillance for vaccine preventable diseases								
Training of district and facility level staff on integrated surveillance of vaccine preventable diseases								
			Printing and distributing reporting forms and vaccination cards					

Programme functions distributed between units at all levels with lack of clear line of responsibilities and authorities, limited involvement of other units of MoH, shortage of management staff, lack of regular training support for management staff	Improve programme management capacity at all levels to strengthen implementation of immunization programme	Improve programme coordination and management capacity at all levels	Consider restructuring of immunization programme management at national, marz and district levels to avoid fragmentation					
			Define clearly line of responsibilities and authorities of each involved unit at all levels					
			Identify staff need for programme management and advocate for filling vacant positions					
			Establish communication and cooperation with other related units of MoH to improve programme coordination					
			Broaden Inter-Agency Coordinating Committee participation to involve all stakeholders (from Government units and partners)					
			Conduct Mid-Level Management (MLM) training for programme management staff at all levels					
		Closely monitor impact of health care reforms on immunization and implement necessary measures to minimize negative impact	Advocate for revision of contractual arrangements for family medicine doctors to cover immunization as a performance indicator and improvement of monitoring quality of their work					
			Identify and implement actions to be taken to integrate immunization programme to restructured health care system					
			Assess cost-effectiveness of using less dose vials in remote areas to reduce vaccine wastage and implement if appropriate					
			Advocate for prioritization of NIP by the MoH targeting gradual increase of domestic financial allocations towards the NIP					
	Increasing demand and support to immunization	Improving support to immunization programme through conducting advocacy activities	Prepare advocacy and communication plan (to obtain political, professional, public, media and partners' support)					
			Develop and distribute advocacy materials regularly					
			Regularly produce press releases to inform public on progress of routine immunization activities					
			Designate staff being responsible from advocacy and communication activities at national and marz levels					
			Make use of ICC and other mechanism for partner coordination					
			Plan and conduct activities annually under European Immunization Week initiative					
		Conducting social mobilization activities	Identify programme messages on benefits of immunization					
			Develop materials on benefits of immunization					
			Contact with community leaders to improve public involvement and participation through increased awareness on immunization benefits					
			Inform students on benefits of immunization to communicate programme messages to families					

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

### 5.1 OVERVIEW

Vaccination services for antigens included in the national schedule are completely free for end-users and the corresponding costs are covered by the government and donors through different schemes.

Immunization financing for traditional vaccines, payroll and other recurrent costs at all levels of the immunization program comes only from the central budget. Sub-national governments do not participate in the financing of the immunization program components at all.

The most recent changes in cMYP were incorporated in May 2011 addressing the new vaccine prices and co-financing levels shared by GAVI.

### 5.2 DETAILED INFORMATION ON PROGRAMME COST BY CATEGORIES

#### 5.2.1 Macroeconomic indicators

The major macroeconomic indicators for 2009 as well as projected data were provided by the Ministry of finance. Indicators are presented in local currency (DRAM).

#### 5.2.2 Demographic information

Source for demographic and health related indicators is the Ministry of Health.

#### 5.2.3 Vaccines & Injection Supplies

#### **Table 1.3 Immunization schedule, Target population, Vaccine prices and other vaccine reference information**

Information on doses per schedule, vial sizes, past coverage and projected coverage and wastage rates were provided by the EPI manager.

The Government purchases vaccines through the UNICEF procurement mechanism; therefore prices for each vaccine were calculated based on UNICEF recommended price per dose (including the most recent changes communicated by GAVI) and estimated freight cost to Armenia was added; estimated freight cost to Armenia for all vaccines is 20% of vaccine price. Data of estimated freight cost for vaccine was provided by the UNICEF.

In the Scenario A the Government co-financing level of the Rotavirus vaccine comes from the Decision letter from GAVI to the Ministry of Health of Armenia from 25 August 2010 where the price that should be paid by the Government in 2011 is estimated as \$0.4 per dose. The same Government co-financing level is used for Rotavirus vaccine in 2013. After 2013 the Government share of the Rotavirus vaccine price is forty, sixty and eighty percent respectively till 2015.

Some changes were introduced in May 2011 presenting the new number of the surviving infants, which is higher compared to those figures used last year. The new numbers are the following:

**Figure 15: The comparison of the estimated cohort figures used in the previous and current cMYP**

		2009	2011	2012	2013	2014	2015
Figures used in 2010	Births	39,167	39,719	39,838	39,957	40,077	40,197
	Surviving infants	38,744	39,301	39,427	39,550	39,672	39,795
New figures updated in May 2011	Births	40,657	44,962	45,164	45,368	45,572	45,777
	Surviving infants	40,234	44,499	44,704	44,910	45,116	45,319

Figures for coverage targets and wastage targets were revised for BCG, OPV, DTP-HepB-Hib, MMR1 and MMR2 (Figure 16 below).

**Figure 16: The revised cMYP coverage targets**

Type of Vaccine	Baseline	Coverage Targets				
	2009	2011	2012	2013	2014	2015
<b>Routine Immunization</b>	%	%	%	%	%	%
BCG	99%	96%	97%	97%	97%	98%
HepB	92%	94%	94%	95%	95%	96%
OPV	94%	96%	96%	97%	97%	97%
DTP-HepB-Hib	93%	95%	95%	95%	96%	96%
DTP4	91%	93%	94%	95%	95%	95%
OPV4	94%	95%	95%	96%	96%	96%
OPV5	96%	96%	96%	97%	97%	97%
MMR1	96%	96%	97%	97%	97%	97%
MMR2	96%	96%	97%	97%	97%	97%
Td1	95%	96%	96%	97%	97%	97%
Td2	85%	88%	88%	89%	89%	90%
Td3	35%	40%	40%	45%	45%	50%
Td4	35%	40%	40%	45%	45%	50%
Td5	35%	40%	40%	45%	45%	50%
Td6	35%	40%	40%	45%	45%	50%
Rota vaccine	0%	0%	70%	90%	93%	95%
Pneumococcal vaccine	0%	0%	0%	70%	90%	93%

**Figure 17: The revised cMYP wastage targets**

Type of Vaccine	Wastage Targets				
	2011	2012	2013	2014	2015
<b>Routine Immunization</b>	%	%	%	%	%
BCG	70%	70%	70%	70%	70%

HepB	5%	5%	5%	5%	5%
OPV	20%	20%	20%	20%	20%
DTP-HepB-Hib	10%	10%	10%	10%	10%
DTP4	25%	25%	25%	25%	25%
OPV4	20%	20%	20%	20%	20%
OPV5	20%	20%	20%	20%	20%
MMR1	5%	5%	5%	5%	5%
MMR2	5%	5%	5%	5%	5%
Td1	20%	20%	20%	20%	20%
Td2	20%	20%	20%	20%	20%
Td3	20%	20%	20%	20%	20%
Td4	20%	20%	20%	20%	20%
Td5	20%	20%	20%	20%	20%
Td6	20%	20%	20%	20%	20%
Rota vaccine	0%	8%	5%	5%	5%
Pneumococcal vaccine	0%	0%	8%	5%	5%

The abovementioned changes were applied to both scenarios.

Expenditures on vaccines and injection supplies as well as other supplies in 2009 were given by the EPI manager. UNICEF Expenditure on underused vaccines was given by the UNICEF.

All expenditures on other supplies were covered by the government. Calculations regarding the expenditure on cotton and alcohol were made as following: the total weight of the used cotton was multiplied by the total number of vaccinated children and by the unit cost of cotton. The same methodology was used to calculate expenditures on alcohol.

#### **Table 0.1 Past and future DTP coverage and 1.4 Coverage and wastage**

The data for this section was provided by the EPI manager.

#### **5.2.4 Personnel Cost**

Data on staff categories of the personnel involved in the immunization program at the national, regional, district and health care facility levels was given by the NCDC and State Hygiene Anti-Epidemic Inspection. Total number and gross monthly salary for the staff was provided by the Ministry of Health. The percentage of the time spent on immunization activities for the personnel is diverse and depends on the position they occupy.

No outreach activities are provided by the staff at the national, regional and district levels. Outreach activities are only provided by the staff of primary health care facility level and average number of outreach activities per month equals to 1. Supervision activities are conducted by the personnel at the national, regional and district levels.

## 5.2.5 Vehicles and transport cost

### Table 3.1 Average prices and utilization of vehicles.

The information regarding the vehicles was provided by the EPI manager.

Information of the types (categories) of vehicles used by the immunization program, average unit price including all taxes for new vehicles in 2009, average number of kilometres travelled per year, average fuel consumption per 100 km for vehicles were entered in the table. Prices of the vehicles entered into the tool are assumed as of new vehicles, although majority of them were purchased during previous years.

### Table 3.3 Other transport needs not elsewhere covered

The total amount of other transport costs including the transportation of vaccines and safe injection supply from the central level to the regional level and from the regional to the rayon level and transport maintenance cost are covered from the Government budget.

## 5.2.6 Cold chain equipment

Information on the types of the cold chain equipment was given by the NCDC, average unit prices for each type of cold chain equipment listed in the table was provided by UNICEF.

## 5.2.7 The average useful life year of cold chain equipment was defined as 8 years Program Activities, Other Recurrent Costs and Surveillance

### Table 6.0 Total Spending and Future Needs for Program Activities

These elements of the program are financed by the external donors (UNICEF, WHO, GAVI HSS, GAVI ISS) while Government's contribution is zero. All donors' expenditure was summarized and the total amount of expenditures was entered in the respective cells. Data regarding the GAVI ISS money were derived from the country progress report.

Future budget needs for other activities (IEC/social mobilization, disease surveillance, and program management) include donors' commitment for these activities for projection years.

## 5.2.8 Other Equipment Needs and Capital costs

### Table 7.1 Average Prices of Other Equipment Needs

Information on the total number, types and average prices including all taxes of other equipment needs were given by the EPI manager.

## 5.2.9 Building and Building Overhead

Information on the total number and type of building by administrative levels was given by the NCDC and State Hygiene Anti-Epidemic Inspection. For estimating the value of buildings cost of the construction of a similar new building was used. Prices of buildings entered into the tool are assumed as new building price. Allocation of space devoted to immunization activities served as a base for the

calculation of the buildings' capital costs. For all levels cost of entire building was calculated and the percentage of the space used for immunization was estimated and entered.

#### 5.2.10 Past Costs by categories

The total cost of the National Immunization Program (including campaign) in 2009 was \$6,192,751 including shared costs that comprising 54% in Figure 18 below) of total immunization cost and consisting of shared personnel, transportation and building maintenance and overhead costs.

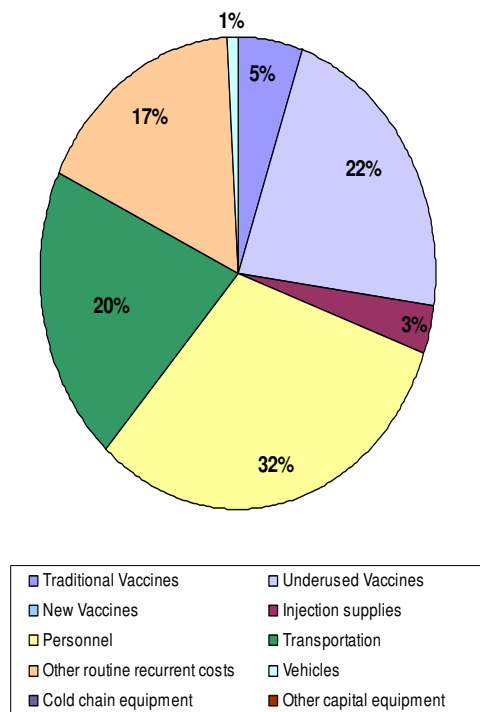
**Figure 18: Baseline indicators (including shared costs)**

Baseline Indicators	2009
Total Immunization Expenditures	\$2,830,326
Campaigns	\$307,151
Routine Immunization only	\$2,523,175
per capita	<i>\$1.9</i>
per DTP3 child	<i>\$165.9</i>
% Vaccines and supplies	<i>12.5%</i>
% National funding	<i>84.9%</i>
% Total health expenditures	<i>1.4%</i>
% Gov. health expenditures	<i>3.5%</i>
% GDP	<i>0.07%</i>
Total Shared Costs	\$3,362,424
% Shared health systems cost	54%
TOTAL	\$6,192,751

The breakdown of the total routine immunization expenditures, which equals to \$2,523,175 excluding shared costs and costs related to the campaign, is shown in Figure19.

**Figure 19: Structure of the NIP costs - only routine immunization (2009)**





The major driver of the immunization specific costs was “personnel” - 32%, Vaccines’ share was the second largest 27%; followed by “transportation” 20%, “other recurrent costs” (17%), “injection supplies”-5% and “Vehicles” 1%.

### 5.3 DETAILED INFORMATION ON PROGRAMME FINANCING

#### 5.3.1 Financing sheet

Data related to GAVI HSS and GAVI ISS funds distribution was provided by EPI manager.

Data about the WHO financing was provided by the national technical officer of WHO country office.

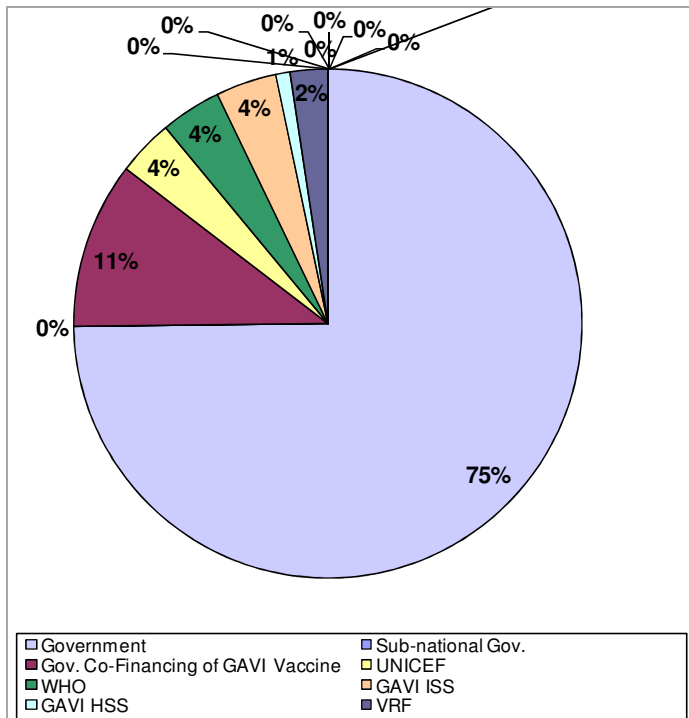
Data about UNICEF financing was provided by the UNICEF.

All funding from extra-budgetary support (other than GAVI) is marked as probable.

#### 5.3.2 Past Financing

The main player in the immunization program financing was the Government; The National Government rendered 75% of overall financing and the rest came from: GAVI Vaccine Funds (11%), WHO, GAVI ISS and UNICEF (4%-4%), VRF (2%) and GAVI HSS (1%) as shown in Figure 20.

**Figure 20: Structure of financing in 2009 (baseline financing profile - routine only)**



In 2009 the National Immunization program in Armenia was financed mainly by the Government.

The UNICEF provided financial support for the procurement of part of vaccines for routine immunization and for MR campaign as well, community mobilization activities.

The GAVI vaccine fund offered financial assistance for procurement of DTP-Hib-Hep-B vaccine, which was introduced in 2009.

GAVI HSS funds supported social mobilization and procurement of refrigerated truck which will be used for vaccine distribution from the central level to the regional and district levels.

GAVI ISS money supported social mobilization and providing of short-term trainings.

The WHO provided financial support for diseases surveillance, program management, and short-term trainings and provided technical assistance.

The Vishnevskaya-Rostropovich Foundation supported procurement of MMR Vaccine

#### 5.4 FUTURE RESOURCE REQUIREMENTS, FINANCING AND FUNDING GAP

In the baseline scenario the program only sustains current activities and does not imply any changes in the immunization calendar. MR campaign is planned for the children 2-6 years old group in 2014.

##### 5.4.1 Future resource requirements

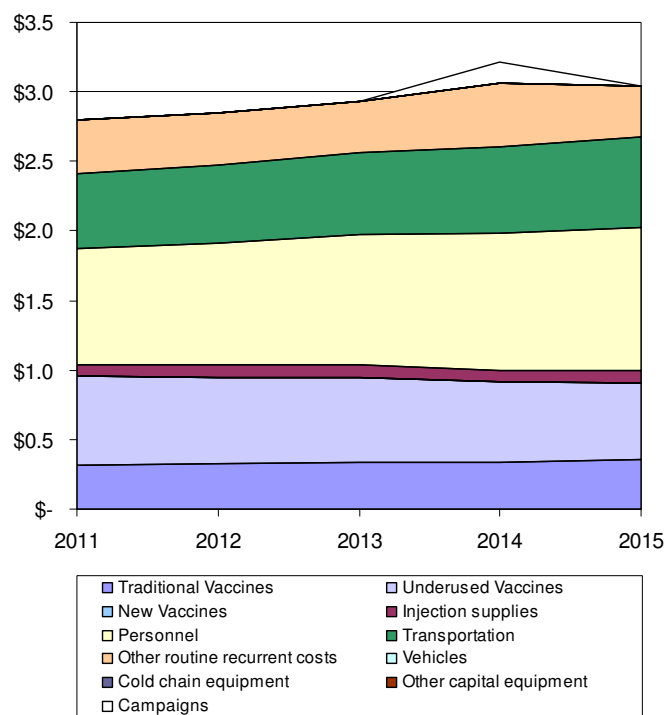
Estimated total resource requirement for 2011-2015 in the Baseline Scenario is \$ 34, 6 million as shown in Figure 21 below:

**Figure 21: Future resource requirements in the Baseline Scenario by program components and years (in thousands US\$)**

Program components	2011	2012	2013	2014	2015	Total	%
Vaccine Supply and Logistics	1,179	1,175	1,179	1,146	1,143	5,821	16.9
Service Delivery	1,365	1,442	1,524	1,600	1,680	7,611	22.1
Advocacy and Communication	18	10	10	60	10	108	0.3
Monitoring and Disease Surveillance	25	25	25	25	25	125	0.4
Program Management	209	194	197	229	187	1,016	3.0
Supplemental Immunization Activities	0	0	0	158	0	158	0.5
Shared Health Systems Costs	3,536	3,718	3,911	4,107	4,312	19,584	56.9
<b>Total</b>	<b>6,332</b>	<b>6,564</b>	<b>6,845</b>	<b>7,325</b>	<b>7,357</b>	<b>34,423</b>	<b>100</b>

“Shared Health Systems costs” are the most important cost of the program and responsible for more than half of the total resource requirements (56.9%), the second largest component is “Service delivery” (22.1%), and together both components constitute 79% of the total resource requirement, “Vaccine supply and logistics” (16.9%), “program management” (3%).

**Figure 22: Projection of Future Resource Requirements (baseline scenario)**



In the graph above there is a noticeable increase in the overall financing requirements in 2014 which is related to the MR campaign planned for that year. The financing source for the campaign is not identified yet, which affects the financing gap for the respective year in the overall picture.

Figure 23 presents donors' commitments to secure and probable financing in 2011-2015.

**Figure 23: Future secured and Probable Financing by sources of financing (excl. Government) in the Baseline Scenario**

	2011	2012	2013	2014	2015	Total
<b>Secure</b>						
UNICEF						
WHO						
GAVI ISS	25,000					25,000
GAVI Fund	320,122	306,005	334,476	139,777	56,954	1,057,334
<b>Probable</b>						
UNICEF	40,000	15,000	15,000	15,000	15,000	100,000
WHO	60,000	60,000	60,000	60,000	60,000	300,000
GAVI ISS						
GAVI Fund						

The government is supposed to secure and provide 92% of the overall financing in the Baseline scenario. The donor secured and probable financing is estimated to be \$1,482,334 in total for entire projection period.

When shared costs and financing is not considered, the financing gap as a percent of total resource requirement is 8% with secure financing and 5% with secure and probable financing as shown in Figure 24.

**Figure 24: Funding gaps by type and source of financing and years (without shared cost and financing) in thousands US\$ - Baseline scenario**

	2011	2012	2013	2014	2015	Total
<b>Total resource requirement</b>	<b>2,796</b>	<b>2,846</b>	<b>2,934</b>	<b>3,218</b>	<b>3,045</b>	<b>14,840</b>
<b>Total Secured Financing</b>	<b>2,613</b>	<b>2,664</b>	<b>2,719</b>	<b>2,758</b>	<b>2,870</b>	<b>13,624</b>
Government	2,268	2,358	2,484	2,618	2,813	11,912
Others	345	306	234	140	57	1,082
<b>Funding gap</b>	<b>183</b>	<b>182</b>	<b>215</b>	<b>460</b>	<b>175</b>	<b>1,216</b>
<b>% of Total needs</b>	<b>7%</b>	<b>6%</b>	<b>7%</b>	<b>14%</b>	<b>6%</b>	<b>8%</b>
<b>Total Secured and Probable Financing</b>	<b>2,713</b>	<b>2,739</b>	<b>2,794</b>	<b>2,833</b>	<b>2,945</b>	<b>14,024</b>
Government	2,268	2,358	2,484	2,618	2,813	11,912
Others	445	381	309	215	132	1,482
<b>Funding gap</b>	<b>83</b>	<b>107</b>	<b>140</b>	<b>385</b>	<b>100</b>	<b>816</b>
<b>% of Total needs</b>	<b>3%</b>	<b>4%</b>	<b>5%</b>	<b>12%</b>	<b>3%</b>	<b>5%</b>

Secured funding will not cover resource requirements in the projected years. Therefore, significant efforts are needed to increase resources for the

immunization program. The funding gap for the period 2011-2015 would be \$816 thousand.

**Figure 25: Future Secure + Probable Financing and Gaps (without shared cost and financing) by sources - Baseline Scenario**

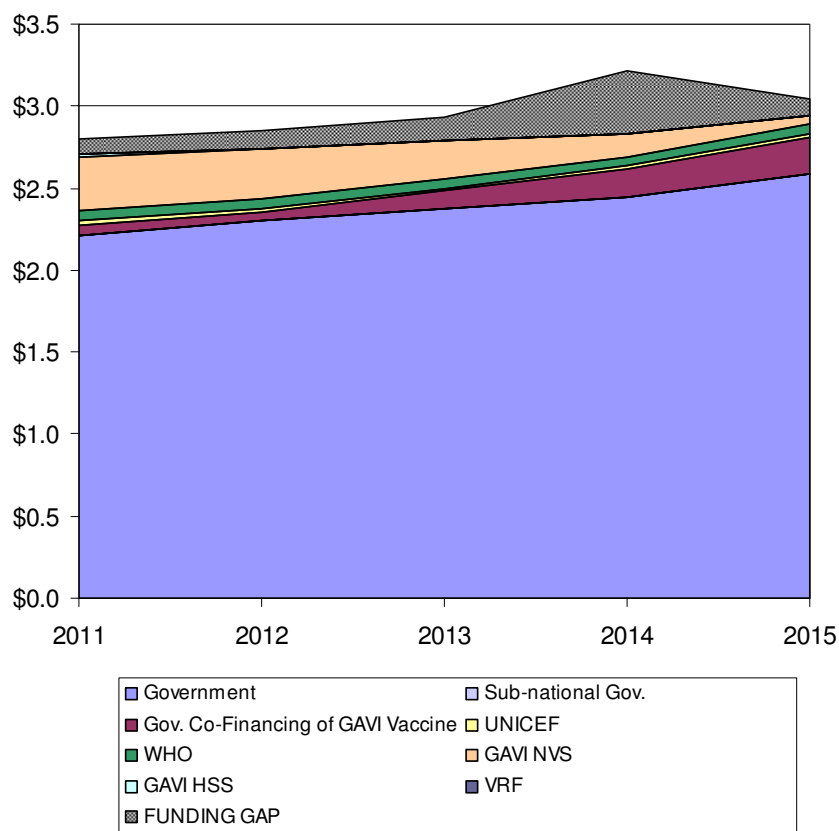


Figure 23 below describes the financing gaps in terms of immunization program components for each year.

The analyses of the financing gap structure for the entire projection period shows that \$492,281 (over 60%) of the total \$815,572 gap is constituted by “vaccines and injection equipment”. The second player in the gap composition is “Activities and other recurrent costs” \$165,000 and the third component of the program is “campaign” (\$158,291).

**Figure 26: Composition of funding gaps in the Baseline Scenario (with secured and probable funding)**

Composition of the funding gap	2011	2012	2013	2014	2015	Total
Vaccines and injection equipment	\$83,492	\$81,710	\$115,152	\$122,112	\$89,816	\$492,281
Personnel						
Transport						
Activities and other recurrent costs		\$25,000	\$25,000	\$105,000	\$10,000	\$165,000

Composition of the funding gap	2011	2012	2013	2014	2015	Total
Logistics (Vehicles, cold chain and other equipment)						
Campaigns				\$158,291		\$158,291
<b>Total Funding Gap</b>	<b>\$83,492</b>	<b>\$106,710</b>	<b>\$140,152</b>	<b>\$385,402</b>	<b>\$99,816</b>	<b>\$815,572</b>

Although the Government committed to increase budget for procurement of vaccines and injection supplies in each year, it is not sufficient to cover all resources required for traditional and underused vaccines and injection supplies.

This exercise revealed that with committed budget the government will be able to procure all required doses of traditional vaccines and injection supplies, but will not be able to cover resources needed for underused vaccines and their injection supplies. The financial gap for routine immunization (vaccines + injection supplies) is estimated at the level of \$492,281 for five years which questions the Government's ability to maintain the program at current and planned level even with the increasing budget allocations.

Furthermore, the current funding gap and the available funding for next five years **will not allow** the program to provide the MR campaign planned for 2014. Therefore, extra resources for these programmatic interventions are needed.

## 5.5 IMPLICATION OF PROGRAMME STRATEGIES ON FUTURE RESOURCE REQUIREMENTS

The national program strategies imply an alternative scenario (Scenario A) in addition to the basic one. It foresees the introduction of the Rotavirus vaccine from 2012 and Pneumococcal vaccine from 2013. The introduction grant of \$100,000 for each of the new vaccines is also taken into consideration while estimating the financing levels and the gap.

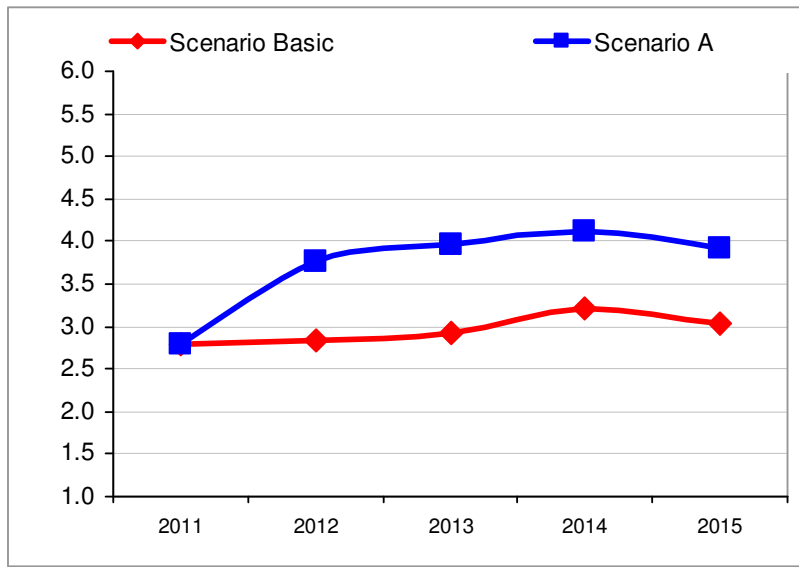
Scenario A reflects the introduction of two new vaccines implies approximately \$3,8 million extra burden on the total resource requirements for the projection period compared to the Baseline Scenario. The total share of the Vaccine supplies and Logistics increases from 17% in the Baseline Scenario to over 25% in the Scenario A.

**Figure 27: Future resource requirements of the National Immunization Program in the Scenario A (in thousands US\$)**

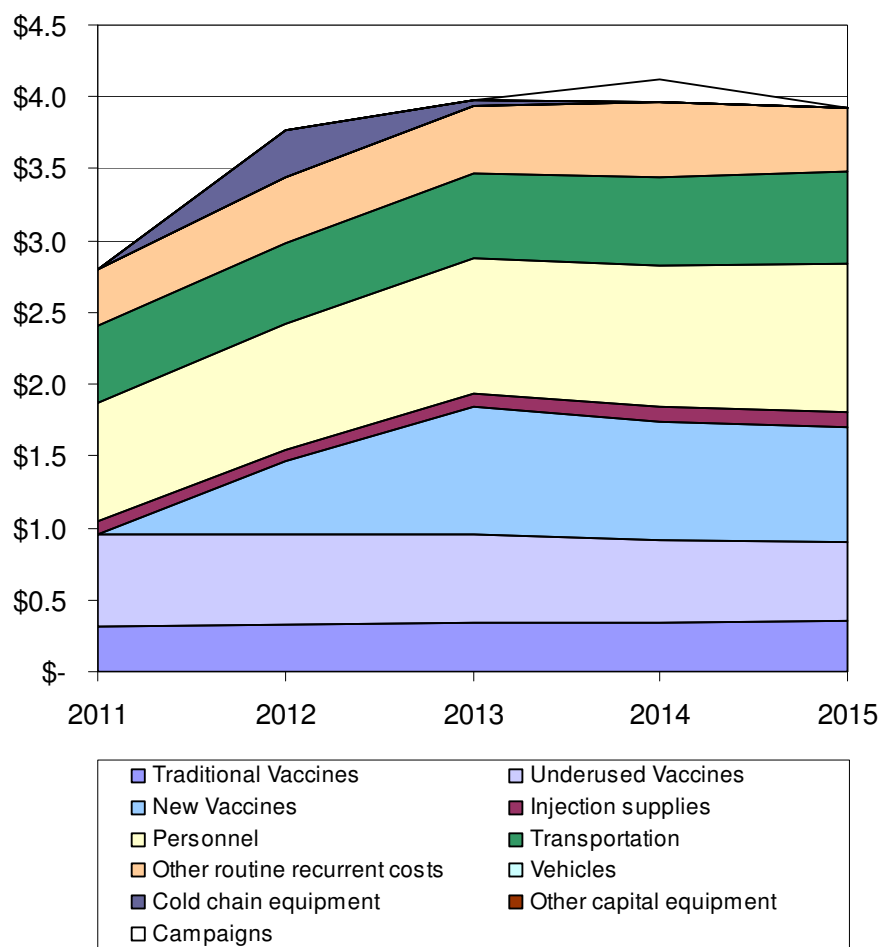
	2011	2012	2013	2014	2015	Total	%
Vaccine Supply and Logistics	\$1,179	\$2,057	\$2,172	\$2,044	\$2,014	\$9,466	24.8%
Service Delivery	\$1,365	\$1,442	\$1,524	\$1,600	\$1,680	\$7,611	19.9%
Advocacy and Communication	\$18	\$20	\$20	\$70	\$20	\$148	0.4%
Monitoring and Disease Surveillance	\$25	\$25	\$25	\$25	\$25	\$125	0.3%
Programme Management	\$209	\$229	\$232	\$229	\$187	\$1,086	2.8%
Supplemental immunization activities				\$158		\$158	0.4%
Shared Health Systems Costs	\$3,536	\$3,718	\$3,911	\$4,107	\$4,312	\$19,584	51.3%
<b>TOTAL</b>	<b>\$6,332</b>	<b>\$7,491</b>	<b>\$7,884</b>	<b>\$8,234</b>	<b>\$8,238</b>	<b>\$38,178</b>	<b>100%</b>

A significant increase in the resource requirements for the vaccine supply happens between 2011 and 2012, the year when one of two new vaccines is to be introduced. Approximately \$0.8 million will be additionally needed in 2012 because of the Rotavirus vaccine. The following years (2013-2015) show more linear increase of the resource requirements.

**Figure 28: Comparison of total resource requirements across scenarios by years (in US\$)**



**Figure 29: Projection of Future Resource Requirements (Scenario A)**



It is obvious that the introduction of new Rotavirus and Pneumococcal vaccines requires more financial resources not only for Vaccine and injection supplies, but for other program activities as well, such as social mobilization, trainings and program management.

In the Figure 30 and 31 below presented is the composition of the funding gap in the Scenario A with only secured (Figure 30) and secured + probable funding (Figure 31).

**Figure 30: Composition of the Funding Gap with secured funds - Scenario A in thousands US\$**

Immunization components	system	2011	2012	2013	2014	2015	Total
Vaccines and equipment	and injection	\$83,492	\$142,934	\$333,524	\$503,175	\$634,572	\$1,697,698
Personnel							
Transport							
Activities and other recurrent cost		\$100,000	\$75,000	\$75,000	\$190,000	\$95,000	\$535,000



Logistics (Vehicles, cold chain and other equipment)			\$296,748				\$296,748
Campaigns					\$158,291		\$158,291
<b>Total Funding Gap</b>	\$183,492	\$514,682	\$408,525	\$851,466	\$729,572		\$2,687,737

**Figure 31: Composition of the Funding Gap with secure and probable funds - Scenario A in thousands US\$**

Immunization components	system	2011	2012	2013	2014	2015	Total
Vaccines and injection equipment		\$83,492	\$81,710	\$115,152	\$122,112	\$89,816	\$492,281
Personnel							
Transport							
Activities and other recurrent cost					\$115,000	\$20,000	\$135,000
Logistics (Vehicles, cold chain and other equipment)			\$296,748				\$296,748
Campaigns					\$158,291		\$158,291
<b>Total Funding Gap</b>	\$83,492	\$378,458	\$115,152	\$395,402	\$109,816		\$1,082,321

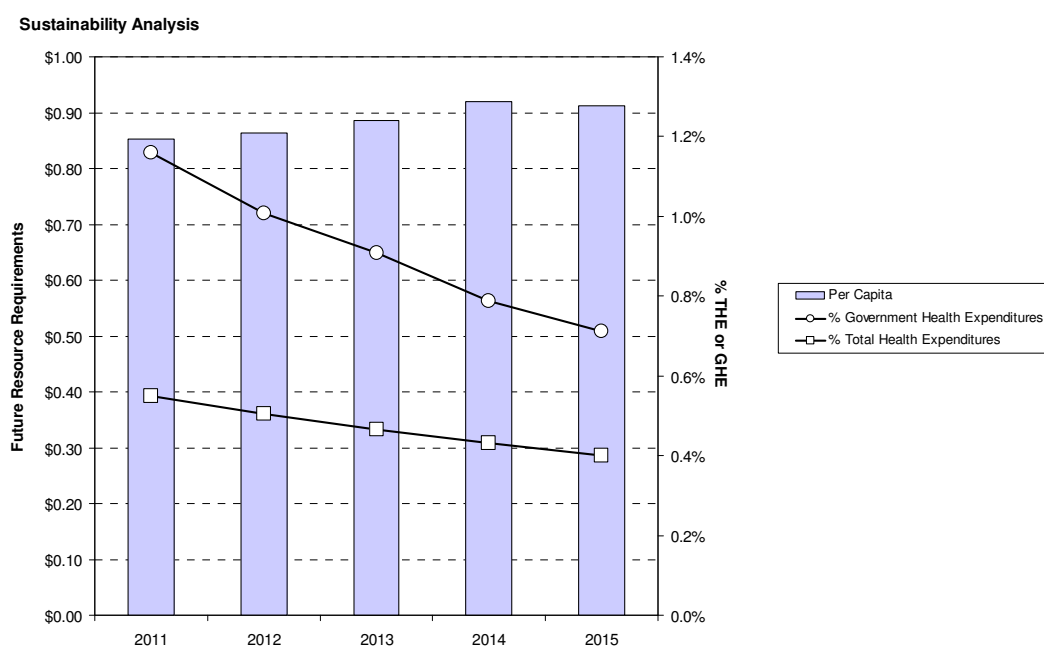
Comparison of two sets of figures in the tables above shows that probable funds cover a certain portion of the vaccines` cost. The resources expected from the Government as a co-financing of the new vaccines are identified as Probable. However, even with the probable financing expected from the Government the overall gap in the Scenario A is higher compared to the Baseline Scenario, which mainly can be explained by the increasing needs in the cold chain upgrade related to the introduction of new vaccines.

## 6. FINANCIAL SUSTAINABILITY

### 6.1 REVIEW OF MAJOR FINDINGS

The analysis revealed that for the Baseline Scenario there is a funding gap of \$492 thousand for the vaccines and injection supplies which puts the overall financial sustainability of the program under the risk. At the same time, if the Government fully finances the immunization program (assuming no donor support) the total cost of the program will only represent approximately 1.1% of the Government health budget and only 0.6% of the total health expenditures as shown in the Figure 32 below.

**Figure 32: Sustainability Analysis (Baseline Scenario)**



The baseline scenario faces funding deficit that may substantially affect financial sustainability as a lack of the overall \$ 816 thousand does not allow the country to cover the needs for underused vaccines. The introduction of two new vaccines (Rotavirus and Pneumococcal) in the Scenario A increases the financing gap even more, requiring more additional resources secured by the Government. Figure 33 presents some macroeconomic and sustainability indicators related to the financing of the Scenario A of the immunization program.

**Figure 33: Macroeconomic and Sustainability indicators without shared costs - Scenario A**

Macroeconomic and Sustainability Indicators	2011	2012	2013	2014	2015
<b>% Total Health Expenditures</b>					
<b>Resource Requirements for Immunization</b>					
Routine and Campaigns	0.6%	0.7%	0.6%	0.6%	0.5%
Routine Only	0.6%	0.7%	0.6%	0.6%	0.5%

Macroeconomic and Sustainability Indicators	2011	2012	2013	2014	2015
<b>Funding Gap</b>					
With Secure Funds Only	0.0%	0.1%	0.1%	0.1%	0.1%
With Secure and Probable Funds	0.0%	0.1%	0.0%	0.1%	0.0%
<b>% Government Health Expenditures</b>					
<b>Resource Requirements for Immunization</b>					
Routine and Campaigns	1.2%	1.3%	1.2%	1.1%	0.9%
Routine Only	1.2%	1.3%	1.2%	1.0%	0.9%
<b>Funding Gap</b>					
With Secure Funds Only	0.1%	0.2%	0.1%	0.2%	0.2%
With Secure and Probable Funds	0.0%	0.1%	0.0%	0.1%	0.0%
<b>% GDP</b>					
<b>Resource Requirements for Immunization</b>					
Routine and Campaigns	0.03%	0.04%	0.04%	0.03%	0.03%
Routine Only	0.03%	0.04%	0.04%	0.03%	0.03%
<b>Per Capita</b>					
<b>Resource Requirements for Immunization</b>					
Routine and Campaigns	\$0.85	\$1.14	\$1.20	\$1.24	\$1.17
Routine Only	\$0.85	\$1.14	\$1.20	\$1.19	\$1.17

The Government provided strict budget ceilings on vaccines and injection supplies during the development and the revision of cMYP. Nevertheless, if we look at the macroeconomic parameters in the Figure 33 above it shows that the immunization budget does not follow the increase in the state health expenditures over the projected period – Routine Immunization Expenditures as a % of Government Health Expenditures decrease from 1.2% in 2011 to 0.9% in 2015.

The recent revision of the vaccine prices and co-financing levels announced by GAVI, and optimization of the coverage and wastage targets initiated by the country allowed reducing the financing gap from 9% in the Baseline Scenario developed in 2010 to 5% in its recently revised version. This, together with the increasing total and specifically Government health spending in Armenia, provides a good basis to expect the extension of the volumes of the government support for the immunization program.