Ministry of Health of Azerbaijan

National Immunization Programme Comprehensive Multi-Year Plan 2016-2020

4/29/2016

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1. Background

1.1. General information

Azerbaijan is located in the southeast part of the Transcaucasia region, in the west of Asia. It borders upon Russia in the north (390 kilometers), Georgia in the northwest (480 kilometers), Iran in the south (765 kilometers), Armenia in the west (1007 kilometers), and Turkey in the far southwest (15 kilometers). It is washed by the Caspian Sea in the east (713 kilometers). The total area is 86, 6 thousand square kilometers (11, 5% are forests, 1, 6% are water pools, 50% are agricultural lands and the rest 36, 9% are mountains, steppes, etc. Besides the continental part, it contains numerous islands of the Caspian Sea (Baku and Absheron archipelagos).

The main impact of the climate of Azerbaijan is of its geographical position, relief and Caspian Sea. According to the Köppen's classification of climates, Azerbaijan has 9 climatic types from 11 existing ones.

The most part of Azerbaijan is located in subtropical belt. There are semi desert climate and arid steppes climate as well as subtropical, mediate and frigid climate here. The arid subtropical climate is characteristic for Absheron and Kur-Absheron lowland. The damp climate is observed only in the south of the Talish Mountains.

The temperate climate observed particularly on the wooded uplands of Great Caucasus and Small Caucasus is divided into arid, temperate-warm arid, temperate-warm damp and frigid types. The cold climate is observed on high mountain ridges and the picks of Great Caucasus and Small Caucasus as well as the alpine and alpestrine meadow belts.

According to the State Statistic Committee, the number of population of Azerbaijan Republic on January 01, 2015 was 9.593 million people including 5 098,3 people of urban and 4.494 rural people whereby 4.775 people are men and 4.817 are women. The density of the population, per 1 square kilometer, is 111 people. The capital of Azerbaijan is Baku city with a population of 2.204 million people.

The republic contains the following administrative units: 1 autonomous region, 66 urban districts, 78 cities, 14 urban regions, 261 urban settlements, 1727 rural districts and 4272 rural settlements.

According to the population census of the ethnic content of Azerbaijan implemented in 2009, the main part of population is ethnic Azerbaijanies (91.6%), Lezgies – 2.0%, Russians – 1.3%, Armenians – 1.3%, Talishes – 1.3%, Avars – 0.6%, Turkishes – 0.4%, Tatars – 0.3%, Tats – 0.3%, Ukrainians – 0.3%, Taskhurs – 0.1%, Georgians – 0.1%, Kurds – 0.1%, Jews – 0.1%, Kryzes – 0.4%, Udins – 0.04% and Khynaligs – 0,02%. Other ethnic groups aggregate 0.10% of the population. Approximately 13% of the populations are refugees and IDPs. The majority of the population is Muslim.

Demographic indicators according to the State Statistic Committee

No.	Factors (per 1000 people)	2013		2014	
		Absolute indicator	Indicator for 1000 people	Absolute indicator	Indicator for 1000 people
1	Natural increase	118,3	12,8	114,9	12,2
2	Fertility	172,7	18,6	170,5	18,1
3	Mortality	54,4	5,8	55,6	5,9
4	Mortality among children up to 1 year of age	1,9	10,8	1,7	12,2
5	Mortality among children up to 5 years of age	2,3	12,9	2,1	12,6
6	Maternal mortality	25	14,5*	25	14,6*
7	Registration of marriages	86,9	9,3	84,9	9,0
8	Registration of mortality	11,7	1,3	12,1	1,3
9	Expected life interval	74,2	-	74,2	

*- per 100 000 live-born

Indicator of mortality among children up to 1 year of age and coefficient of children's mortality

Years	Number of children dying at age up to 1 year, person			Per 1000 live-born people		
	Total	including		Total	including	
		urban regions	rural regions		urban regions	rural regions
2010	1843	1173	670	11,2	14,5	8,1
2011	1903	1536	367	11,0	16,2	5,9
2012	1884	1524	360	10,8	17,8	4,1
2013	1862	1459	403	10,8	17,3	4,4
2014	1655	1324	331	10,2	16,5	4,2

The main reasons for mortality among children up to 1 year of age in absolute numbers

The main reasons (number of people)	Years				
	2010	2011	2012	2013	2014
All reasons for infant mortality, including:	1843	1903	1884	1862	1655
Infectious and parasitic diseases	113	102	98	67	44
Diseases of nervous system	139	106	89	105	80
Diseases of respiratory apparatus	581	388	298	192	156
Diseases of digestive system	42	35	29	22	15
Circumstances occurring in perinatal life	367	627	937	1142	1103
Congenital anomalies (with increasing deficiencies)	327	297	214	126	116
Traumas, poisoning and other external influences	37	33	21	20	13
Other reasons	237	315	198	188	128

Indicator of mortality among children up to 1 year of age (per 10 000 live-born people)

The main reasons (number of people)	Years				
	2010	2011	2012	2013	2014
All reasons for infant mortality, including:	112,5	109,6	108	107,9	102,5
Infectious and parasitic diseases	7,4	6,3	5,7	4,7	3,2
Diseases of nervous system	9,1	7,2	5,6	5,6	5,4
Diseases of respiratory apparatus	36,1	28,4	19,6	14,1	10,1
Diseases of digestive system	2,4	2,3	1,8	1,5	1,1
Circumstances occurring in perinatal life	21,3	29,1	44,6	59,9	65,4
Congenital anomalies (with increasing deficiencies)	20,5	18,3	14,6	9,8	7,1
Traumas, poisoning and other external influences	1,8	2,0	1,5	1,2	1,0
Other reasons	13,9	16,0	14,6	11,1	9,2

Indicator of the population's level of literacy

Years	High and secondary (full and general) education thousand people	Including:			
		high	secondary-special	full-secondary	General secondary
2010	6730	857	592	4361	920
2011	6852	878	602	4445	927
2012	6953	897	609	4514	933
2013	7054	910	618	4579	947
2014	7145	922	626	4638	959
2015	7225	932	633	4690	970

Indicator of the population's level of literacy (from 15 years and older per 1000 people)

Years	High and secondary (full and general) education thousand people	Including:			
		high	secondary-special	full-secondary	general secondary
2010	966	123	85	626	132
2011	968	124	85	628	131
2012	969	125	85	629	130
2013	969	125	85	629	130
2014	971	126	85	630	130
2015	971	126	85	630	130

Basic financial indicators

	2010	2011	2012	2013	2014
Population of the republic (mln people)	8997,6	9111,1	9356,5	9477,1	9593,0
Gross domestic products (mln USD)	52 909,3	65 683,9	69 683,9	74 164,4	75 188,4
Gross domestic products per head (USD)	5 922,0	7 285,0	7 594,3	7 977,4	7 985,9
Total national income (mln USD)	49 741,1	61 439,9	65 739,2	70 476,0	-
Total national income per head (USD)	5 567,4	6 786,6	7 164,4	7 580,6	-
Budget of the Ministry of Health (mln USD)	534,8	624,8	662,0	857,7	929,5
Expenses for health per head (USD)	70,8	79,3	91,9	90,5	96,9

Public expenses (mln AZN)

	2010	2011	2012	2013	2014
Spent in total: *Including:*	**11765.9**	**15397.5**	**17416.5**	**19143.5**	**18699.3**
Economics	4889.9	6803.2	6960.7	8207.5	7596.6
Social and cultural arrangements	2901.4	3447.2	4072.9	4081.8	4484.4
Education *Including:*	1180.8	1268.5	1453.2	1437.7	1553.9
Health	429.2	493.4	609.4	618.9	665.3
Social protection and social maintenance	1123.0	1495.4	1769.5	1750.3	1971.2
Culture, art, information, physical training and other categories	168.4	189.9	240.8	274.9	294.0
Science	92.8	106.1	116.7	117.0	124.2
Court, law-machinery and prosecutor's office	668.5	710.3	929.2	1049.3	1103.6
Legislative and executive power and local self-management authorities	303.0	281.9	342.3	349.3	449.7
Other expenses	2910.3	4048.8	4994.7	5338.6	4940.8

Population's employment and economic activity of the republic (thousand people)

	2009	2010	2011	2012	2013
Total in economics	4271.7	4329.1	4375.2	4445.3	4521.2
Agriculture, forestry and fishing industry	1628.6	1655.0	1657.4	1673.8	1677.4
Extractive industry	42.7	41.5	41.2	41.8	42.3
Manufacturing industry	214.2	208.9	210.3	215.6	224.1
Power supply, gas and steam industry, procurement and facilities	30.0	30.6	30.8	31.2	32.3
Water supply, waste treatment and processing	25.3	25.2	24.6	24.7	25.7
Construction	229.0	287.5	308.9	321.8	325.5
Trade; repair of engine vehicles	678.9	626.7	635.4	646.8	664.0
Transportation and storage	183.6	179.1	181.8	182.7	183.8
Tourism and public catering	26.3	46.9	48.1	48.9	49.2
Information and communication	34.0	55.8	58.0	58.7	58.1
Financing and insurance	21.8	24.4	26.3	26.9	30.6
Operations with real estate	86.3	69.6	71.2	74.8	79.4
Professional, scientific and technical activity	45.6	45.6	46.7	54.6	56.3
Administrative and supportive service	38.7	46.5	47.4	49.2	52.4
Public management and defense; social maintenance	269.8	279.1	281.0	281.7	282.3
Education	361.0	349.8	349.9	349.0	366.2
Health and social services	201.9	170.3	165.2	165.4	171.8
Recreation, entertainment and art	56.9	59.6	60.3	61.1	61.8
Other services	97.1	127.0	130.7	136.6	138.0

1.2. Political and socio-economic trends

Azerbaijan gained independence from the Soviet Union in 1991. Establishment of the structure of the political system was completed by means of acceptance of a new Constitution, by means of general voting on November

12, 1995. The Constitution of Azerbaijan is the main law of the country. The public management system of Azerbaijan is based upon the principle of separation of powers (i.e. legislative, executive and judicial ones).

The National Meeting (Milli Medjilis), of the Azerbaijan Republic, executes the legislative power. Milli Medjlis is a one-chamber Parliament consisting of 125 deputies elected based upon majority and proportional elective systems by means of general, direct and equal voting for the election of its members for a five-year term. The last elections to the Milli Medjlis were held in 2010.

The head of the state is the President. The President holds executive power and is elected with direct voting for a five-year period. The supreme authority of the President's executive power is the Cabinet of Minister, managed by the prime minister.

The judicial authority is executed by the independent courts of Azerbaijan, i.e. the Constitutional Court, Supreme Court and Supreme Economic Court.

Since 1992, Azerbaijan Republic has been a member of the United Nations' Organizations (UNO) and Organization for Security and Co-operation in Europe (OSCE) and later joined the European Union. Presently, Azerbaijan is a member of and participates with 32 international and regional organizations like CIS (September 1993); Organization of the Islamic Conference (1992); European Union (Agreement for Partnership and Cooperation, 1996); ECO (European Cooperation Organization, 1992); Organization of Black Sea Economic Cooperation (1992); European Bank of Reconstruction and Development (1992), the World Bank (1992); UNESCO; UNISEF; World Health Organization; International Red Cross and Red Crescent Federation (IRCRCF); Interpol; International Olympic Committee and so on.

The purpose of the conceptual basis for the external policy of Azerbaijan is keeping and strengthening the national independence and territorial integrity of the country as well as development of equal and mutually profitable relations and, establishment of amicable connection with all countries across the world. The republic has concluded a certain number of international contracts and agreements, as well as joined essential conventions like Convention for Children's Rights and Convention for Liquidation of All Types of Discrimination in Relation to Women.

The zones exposed to conflicts

Azerbaijan still suffers from unsettled conflict with Armenia because of the Mountainous Garabagh region of Azerbaijan. The cease-free agreement was concluded between Armenia and Azerbaijan in 1994, upon a two-year armed conflict.

Subsequently, due to this conflict Azerbaijan has 1 million refugees and IDPs, 650 000 thousand of which are natives of the Mountainous Garabagh and adjacent territories. The main part of the diplomatic efforts of Azerbaijan is directed to determine ways to regulate the conflict in and around the Mountainous Garabagh. The UN Security Council has taken four resolutions: 822, 853, 874, and 884, regarding the occupied territories in and around the Mountainous Garabagh.

The economic context

The country is rich in minerals, including oil and gas sources. In the 19th century, the country had an unprecedented level of oil production involving foreign investments. At the start of the 20th century, Azerbaijan supplied approximately half of the oil produced all over the world and oil remains as the principal item of the national economy in the 21st century. In 1994, Azerbaijan signed an oil treaty with western consortium in the amount of USD 7.4 billion. Since then, the western companies have invested millions to process oil and gas deposits for the country. The present process of reforms and progress towards democracy and market economy has gradually increased economically and continued to accelerate. Azerbaijan turned from a country needing international support to one of the most dynamic and strong economics of the CIS region and the leading regional investor successfully implementing its own historical role in the oil and gas industry and, continues to provide

hope for further increase. The large-scale reforms are marked with certain progress in the sector of efficient regulation and economic diversification improving the general macroeconomic and entrepreneurship conditions in Azerbaijan. Openness for the world trade and investments stipulated the recent tax reforms and helped the country in passing to more perfect market system and improvement of its own positions in the worldwide ratings and fiscal indicators.

The State Program of Economic Development and Reduction of Poverty (SPEDRP) signed in 2003 have had particular aim of holding institutional reforms, including the health protection sector. The forecast of economic increase, particularly owing to the oil incomes, is one of the highest indicators in the world (2006). Exceeding all neighbors in CIS, Azerbaijan had reached 39th position (among 142 countries) in the Global Index of Competitiveness during the year 2013-2014. The increasing part of the budget is financed with the oil incomes. Further increase of the budget expenses were connected to the high social expenses of the government, including an increase in salary paid to the public sector and welfare payment. Addressed social aid is paid to 120000 families.

The level of unemployment in 2014 was equal to 5.0% and aggregated 236,6 thousand people. The state of the labor market in Azerbaijan is characterized with inconsistency between supply and demand and lack of employment and a high level of unemployment among youth. The level of poverty (with its very low indicator) reduced from 7.6% in 2010 to 5% in 2014. Azerbaijan confidently maintains its own rating in the category of “high development of human potential” and thus, according to the report from 2014, has an indicator of .747 for the Index of Development of Human Potential for 2013.

1.3. Health care system

Despite economic difficulties and lack of sources at the transition period, the government succeeded to maintain the health care system. The existing organizational structure of the health care system contains numerous key features of the Semashko’s system and gets exposed to many similar difficulties.

The main attention is paid to the provision of hospital services, which is still kept despite the intention of reorienting the system in favor of the initial medical aid. Consequently, the health protection system needs restructuring with reorientation of the public health services and provision of services in compliance with the current and forming level of diseases.

Development of the health care sector and maintenance of the population’s health are determined by the President of Azerbaijan as one of the priorities of the long-term development of the country. On December 27, 2007 the President approved establishment of the State Agency of Mandatory Medical Insurance under the Cabinet of Ministers and, on January 10, 2008 he signed a decree regarding acceptance of «The Concept of Reformation of the Financial System of Health Protection and Application of Mandatory Medical Insurance in Azerbaijan Republic». The last step is an important adherence to the systemic reformation because it touches realization of the conditions of separating the buyer and seller, reduction of fragmentation at financing and application of new payment schemes for suppliers – all of these measurements would rather act as essential help for change. Gradual application of the payment schemes, based upon the results, start from the pilot regions (payment of initial medical and sanitary aid for person and the stationary services depending on the cases) as an important step towards the successful implementation of the converted service package guaranteed by the government, as specified in the Concept of Reformation of Health Protection.

The Ministry of Health has established its own health care strategy in the Concept of Reforms of Health Care System in 2006. At the start of 2008, the updated and more detailed version of this Concept of Reforms was finally developed by the Ministry of Health based upon the process of consultations with the interested parties. The Concept of Reforms of Health Care describes the directions of development of the initial medical and sanitary aid, including development of the appropriate habits, organizational form and establishment of new structures. The new approach to the services of initial medical and sanitary aid is already formed and assumes expansion of

the range of services provided in the initial level, in case of the best usage of the existing opportunities and structures of ambulatory aid, which also includes polyclinics. Hereby, the access to the wide range of preventive and treating services of due quality are provided at the transitional phase. Other parts of the Concept determine the directions of the reforms with regard to the concrete fields of the health protection system allowing to move towards strengthening the services of the initial medical and sanitary aid (IMSA), including reforms of physical and human sources as well as new incentives of reforms while financing health protection.

The Ministry of Health, with the support of the governmental and international organizations (the World Bank, US International Development Agency, WHO, UNISEF), implemented a second project for reformation of health protection (for the years 2006-2012) based upon a loan agreement concluded by the World Bank in 2006. With regards to planning and taking certain reform measures, the government made an effort to settle some issues noted in the Concept of General Reformation of Health Protection and the Concept of Financing Health Care. Several pilot schemes were applied as part of a larger scale reform project of health protection serving the purpose of developing initial medical and sanitary aid while stimulating efficient usage of sources. The project provides the opportunity to experimentally apply new principles while organizing and financing the health protection services within five regions. Gradual application of the payment schemes, based upon the results which also will start in the pilot regions (payment of initial medical and sanitary aid for person and payment of stationary services depending on the cases) is an important step towards successful implementation of the converted service package guaranteed by the state as envisaged in the Concept of Reforms of Health Care.

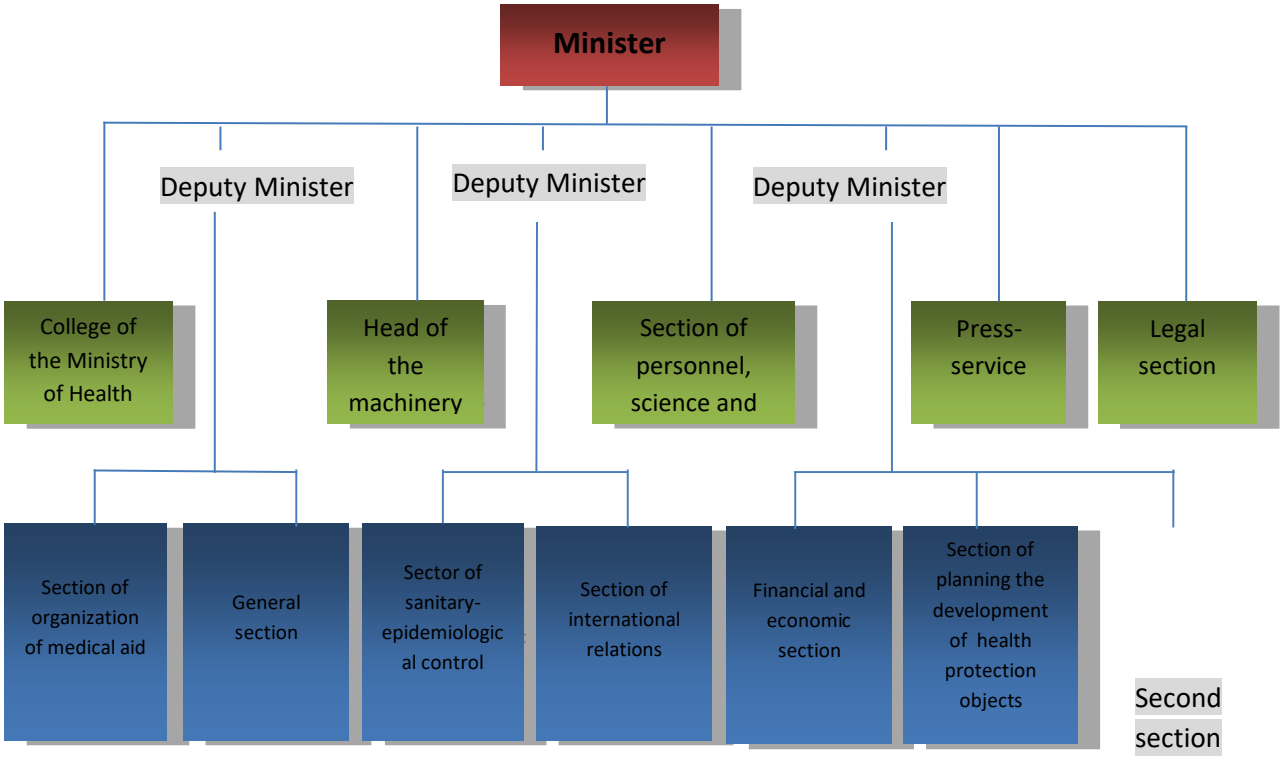
Improvement of quality of the health protection data is generally deemed as an essential factor for the development of the prior programs in the health protection sector (for instance, regarding mother's and child's health). Subsequently, the Ministry of Health paid attention to certain efforts for perfection of demographic statistics and mortality indicators, as well improving the situation and its compliance with other plans in the Concept of National Integrated Information System on Health Protection.

Despite the insignificant privatization within the health protection sector, there was a great growth in the provision of private services. A wide range of services are provided in private hospitals and clinics, mainly located in Baku city. Oncology services may be provided only in the public hospital whereas private suppliers may deal with other types of services and make decisions based on profitability of any sectors. Private enterprises also conclude agreements with foreign companies acting in Azerbaijan regarding provision of medical services in the production sector and provide similar services to personnel having private medical insurance.

The local bodies of power manage the regional hospitals, polyclinics and specialized clinics (dispensaries) and, public financing of these organizations is implemented from the budget of local structures of power through the regional board of health protection.

The regional boards of the health protection subordinate to the Ministry of Health regarding issues about health protection policies, although financially, they depend on the local bodies of power. Each regional board of health protection is also the managing structure of the central regional hospital and hereby, the chief physician of the regional hospital is responsible for all services of health protection in the region including the polyclinics, specialized clinics, rural hospitals and medical fields (MF).

Structure of the Ministry of Health of Azerbaijan



Financing of the Immunization Program

Presently only the PCV-vaccine is imported to the republic in the share with GAVI Alliance (in 2015 the share correlation of the imported vaccine was 60% of GAVI Alliance – 40% of state), and the rest of the financing of the national immunization work is covered in the expense of the public sources; however, during the past years donors also provided financial and technical aid to immunization. The big amount of the current cold chain as well as the lab and office equipment was provided by UNICEF, WHO, the World Bank, the Rostropovich-Vishnevskaya's Fund, etc. The donor support directed also to the activity within the frames of controlling program and training courses.

The government finances over 90% of all expenses; the regional and municipal authorities participate in financing immunization through the regular health protection budget, paying salary to the personnel and covering the expenses for maintenance and other items in the level of service provision; see the table 2 below.

Budget of the Ministry of Health

	2010	2011	2012	2013	2014
Budget of the Ministry of Health (mln USD)	534,8	624,8	662,0	857,7	929,5
Health protection expenses per head (in USD)	70,8	79,3	91,9	90,5	96,9

Vaccination is implemented in the boards of initial medical and sanitary aid, rural polyclinics and medical ambulatories as well as the urban and rural polyclinics, maternity houses and sections in the regional level. The local bodies of power cover salary expenses and other current expenditures that are connected to vaccination work, within this level of service.

WHO, GAVI, UNISEF and the Rostropovich-Vishnevskaya's Fund have rendered significant support for holding immunization campaigns and delivery of vaccines against hepatitis B and CPC in the early 2000's. In 2009, the country passed to full self-financing of the purchase of vaccines. Upon GAVI's support, simultaneously with the

traditional vaccines, Penta vaccine was applied in 2011 and pneumococcal vaccine in 2013. Since 2014, the Ministry of Health of Azerbaijan Republic commenced purchasing all vaccines through Purchasing Section of UNICEF.

The application of new vaccines are implemented based upon governmental order, jointly with valid legislation («law of immunoprophylaxis of the infectious diseases» and a 5-year measurement plan on immunoprophylaxis of the infectious diseases) strengthens legal basis of implementation of preventive vaccines and consequently, neither problem connected with stable financing of the immunization program is expected.

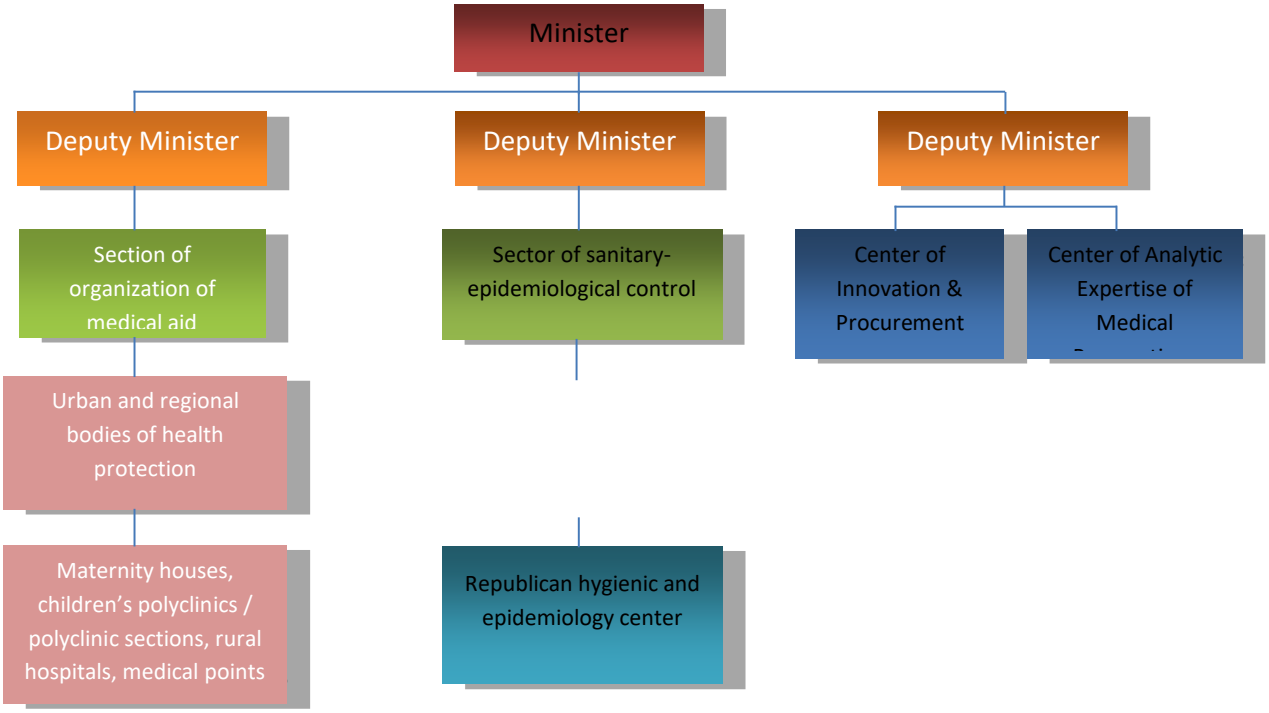
1.4. Immunization Services within the health care system

The Ministry of Health implements methodical and organizational work, public observation, development of normative and legal regulation for implementation of immunoprophylactic measurements in the territory of the republic and control of its implementation and, organizes supplement of public medical boards with immunobiological preparations, collection and analysis of the statistical data regarding managed and other infectious diseases as well as issuance of licenses for permission of vaccination in the private sector (maternity houses and polyclinics).

The Republican center of hygiene and epidemiology, through the network of urban and regional centers, controls organization and implementation of local immunoprophylaxis; observes collection of statistical information regarding infectious diseases in all levels; determines the target groups and planning the purchase of vaccines; implements analysis of the statistical data; supplies all medical boards involved to children's immunization up to 6 years of age with vaccines in compliance with their order plan; implements storage in local level of 3-month stock of vaccines in own cold warehouses and development of application for purchase of vaccine.

Application for necessary quantity of vaccines, developed by the Republican Center of Hygiene and Epidemiology and approved by the Ministry of Health, gets submitted to the Center of Innovations & Procurement of the Ministry of Health, a constitution with its own position responsible for procurement of the expanded immunization program with immunobiological preparations, and necessary vaccination inventory and equipment for the cold chain. The CHE is also responsible for storage and delivery of vaccines to the urban and regional hygiene and epidemiological centers. Since 2014, the retrained vaccines of famous manufacturers of the world, necessary for implementation of overall immunization programs, have been purchased through the Delivery Section of the UN Children's Fund (UNISEF), with delivery to the republic occurring once a year. For this purpose, CHE transfers the funds distributed by the Ministry of Health for purchase of immunobiological preparations to the account of the Children's Fund.

Structure of Immunization Service



The Center for Analytic Expertise of Medical Preparations controls the medicine market and bears responsibility for quality of the medical preparations imported to the republic including the immunobiological ones. The immunobiological preparations retrained by the WHO and imported to the country through the Delivery Section of UNICEF acquires permission for usage without passing lab control. Other vaccines delivered to the market pass the quality control, which, considering the absence of necessary lab equipment in the Center, is implemented via subagents in third countries and subsequently takes 7 months to receive permission.

The medical boards involved in the program of children's immunization up to 6 years of age include: maternity houses, children's polyclinics and polyclinic sections, rural hospitals and medical points as well as the private medical boards. Thus, they have gained licensing for the implementation of immunoprophylaxis and bear responsibility for local vaccine prevention, maintaining all valid normative and legal documents in the immunoprophylactic sector.

Relations of SPI with the national health protection policy

The Ministry of Health, jointly with other public and international organizations, implements 12 public programs in various stages of implementation. But as before, during implementation of the main Program for immunoprophylaxis of infectious diseases, the epidemiological service of the republic cooperates within the frames of the implemented measurements and partially implements the Program of protection of maternity and childhood health.

The main targets and tasks of the Program of protection of maternity and childhood health are:

- Improvement of supplement of medical preparations to the medical obstetrics boards;
- Perfection of the obstetric-gynecologic and neonatal service;
- Strengthening the material-technical basis and supplement of treatment and diagnostic machinery for the pediatric and obstetric-gynecologic medical boards;
- Organization of republican and interregional perinatal centers;
- Organization of protection of the reproductive health of population and provision of safe maternity.

One of the items of tasks of organization of protection of the reproductive health and provision of safe maternity is the immunization status of children aged 5 years old; in which immunoprophylaxis is implemented against the managed infectious diseases.

Besides all existing maternity houses and sections, initial vaccination of Hepatitis B is implemented within 12 hours and BCG and OVP within 4-7 days. Another program cooperating with the immunization service is "E-Card of Health".

The following information regarding the state of population's health is registered since the moment of birth and collected during the life in the e-data bank established in the Ministry of Health of Azerbaijan Republic:

- Demographic data (place of birth, residence, medical insurance, etc.);
- Immunization status (all data regarding the vaccines);
- Medical data (clinical data, used preparations, etc.);
- Other information regarding the medical legislation.

Upon the completion of realization of the components included in the plan of the program, since the moment of birth, all information regarding the immunization status of the child will be available in all medical boards of the republic and specified in the official monthly statistical report regarding immunoprophylaxis among children.

All three Public Programs approved by the Cabinet of Ministers in 2010 (i.e. protection of health of maternity and childhood, immunoprophylaxis of infectious diseases and «E-Card of Health»), have strategic character with mutually completed, long-term and rational development. In the background of already existing achievements, they provide bigger perspective for coordinated control of diseases in the field of vision of RPI, perfection of the system of control and elucidation of the cases of diseases, coverage of immunization, planning of target groups for gaining vaccination, increase of safety of immunization, provision of uninterrupted achievement and delivery of qualitative vaccines as well as provision of adequate and durable financing.

Coordination of the Immunization Program

From 2006 to 2011, the Intersectoral Coordination Committee of International Projects (similar to the UK Consultative Committee of Health and Safety) coordinated and implemented the Immunization Program. The meetings of the Intersectoral Coordination Committee of International Projects (ICCIP) are held at least once every three months. Besides the issues connected to immunization, the Committee is dealt with determination and coordination of two main strategic directions in the sector of health reforms. In 2012, upon initiatives of the Ministry of Health and international partners, including the World Health Organization and Rostropovich-Vishnevskaya's Fund, in order to provide stable coordination, it was agreed upon to include the immunization program in the NCM (National Coordination Mechanism on HIV, tuberculosis and malaria) which subsequently was renamed as the National Coordination Mechanism on International Programs in Azerbaijan (NCMIP). This offer was supported by the manager of the Global Fund and his secretariat and, unanimously accepted by the NCM Council at the 22nd meeting of the Coordination Mechanism. The working group coordinating the immunization program is established under the Council of National Coordination Mechanisms and regularly holds meetings at least once per quarter. The NCMIP includes the representatives of the civil community organizations but they do not participate at the meetings of the working group coordinating the immunization program.

The Minister of Health established the National Technical Coordination Group of immunization upon the decree in 2013. The group consists of pediatricians, epidemiologist, clinician, pharmacologist, neuropathologist and geneticist. The group has held 2 meetings, one of which was devoted to the application of an IPV-vaccine.

Management of the Immunization Program

The National Immunization Program is managed in a centralized manner, through the Ministry of Health mobilizing and coordinating all funds and work. The Deputy Manager of the Republican Hygiene & Epidemiological Center provides management of the large-scale Immunization Program. The National Immunization Program has organizational structures on the national, regional/municipal and local levels.

The Ministry of Health coordinates all immunization sources and measurements. The Ministry holds organizational and methodological work, observes implementation of the legal obligations during the immunization work and issues licenses to private sectors (private maternity houses) for vaccination as well as planning of the delivery of vaccines. The Republican Hygiene & Epidemiological Center controls the organizational works and implements immunization through its own network of centers in cities and regions. This Center also observes a collection of the statistical data regarding expansion of infectious diseases at all levels, determining target groups and providing an annual forecast for vaccines. Delivery of preparations, including medical and biological ones, is implemented through the Innovations & Delivery Center also bearing responsibility for their storage and distribution at the regional level point of realization. In order to improve realization of the immunization program at the national and regional levels, the Ministry of Health cooperates with the WHO, which accepts and officially approves the practical management of immunization for local usage.

Since 2006, the courses have been implemented in the topic of “immunization on practice” in the level of high and medium officials including the personnel of the Republican Hygiene & Epidemiological Center and the Innovations & Delivery Center as well as the regional pediatricians and epidemiologists.

Immunization services on operative level

The maternity houses and children’s polyclinic including the physicians’ and medical points, provide vaccination services. Registration in children’s polyclinics or other institutions is implemented directly upon discharge from the hospital. Immediately after registration the newborn child acquires ambulatory care and an e-card of the health status, used for vaccine registration.

Home visits are organized twice a year for determining the target group. The field pediatricians and medical nurses notify the parents in advance regarding the necessity of vaccination.

Each institution responsible for provision of vaccine services shall have separate vaccination rooms for permanent / stationary vaccination points.

The target of the vaccination room and vaccination groups in the ambulatory medical institution is shown below:

- Reach the target level of vaccination (minimum 95% of the target group);
- Reduce the disease and mortality cases caused by the managed infections using new means during organization of vaccination; and
- Control of the unfavorable post-immunization expressions and
- Tendencies on managed infections and vaccination.

2. Vaccine-preventable disease trends and vaccination

2.1. Vaccine-preventable diseases

Implementation of the immunization program allowed a high level of coverage (over 95%) of the country's population to be reached with prophylactic vaccination and hereby significantly reduced the morbidity with vaccine preventable diseases (whooping cough, epidemic parotiditis, etc.).

Poliomyelitis has not been discovered in the republic over 19 years (since 1996) and subsequently, besides other countries of the European region, Azerbaijan was awarded a status of a country free of poliomyelitis. The high level of coverage with routine immunization against poliomyelitis in the country and implementation of additional tours in the regions with coverage less than 90% prevented import of wild poliomyelitis virus and occurrence of paralytic poliomyelitis. In this regard, the arrangements directed at early discovery, registration and investigation of severe flaccid paralysis (SFP) became quite actual. High readiness of medical personnel achieved through systematic training and provision of information is the most essential link of the entire epidemic control of SFP existing in the republic since 1997.

According to the plan for liquidation of measles and rubella during the 2005-2010 period, the Ministry of Health, supported by the Rostropovich-Vishnevskaya's Fund, UNISEF, US Agency of international development and WHO, held a national immunization campaign against measles and rubella. In February and March 2006, continuation of the work from October to December in 2006, in immunization against measles and rubella was implemented in the country among women of fertile age. Subsequently to these measurements, the level of morbidity of measles and rubella reduced from 5796 cases of rubella and 1278 cases of measles during 2004-2005 to 0 cases in 2009.

On 06.02.2009, the Ministry of Health of Azerbaijan issued an edict of «Strengthening the epidemiological control of measles and rubella». According to this decree, each case suspicious for measles is registered; materials are selected for lab investigation from this patient as well as epidemiological control of the suspicious cases. Within the years of 2010-2012 Azerbaijan was in stage of measles elimination i.e. no local case of measles was discovered in the country. Existence of the "risky" group i.e. children unvaccinated against measles caused wide expansion of measles virus in January 2013 and infective episode upon import to Baku. Thus, 164 cases were registered in the country in 2013, 161 of which were certified in lab and 3 cases were epidemiologically connected to those approved in lab. In connection with the epidemiological state in 2013 additional cleaning immunization was held in Baku with coverage of 27083 children at age up to 10 years.

Based upon the data on epidemiological control on measles and despite the episode caused by an import, transfer of measles virus in the country was not restored. The genotype of the measles virus at this episode D-4 differs from the endemic genotype D-6 circulating in the territory of Azerbaijan till 2009.

The infective episode lasted seven months (from January to July) of 2013. Upon the episode, discovery of the suspicious cases continued till the end of 2013 and, 14 cases were discovered, researched and rejected in lab.

The immunological lab of the Republican Plague Station implementing lab investigations is accredited by the WHO and annually passes the professional panel. Morbidity of measles was not discovered in the country from 2014 hitherto. Nevertheless, measles has been absent from the country since 2008. 38 cases of rubella were discovered, researched and rejected in lab in 2013 and 35 in 2014.

Upon severe epidemic of diphtheria covering the republic during 1994-1995 and the measurements for the population's immunization, morbidity was reduced to individual cases and was not discovered during last 6 years.

Morbidity of whooping cough in the republic during the last years has tendency of reduction and, the level of morbidity of whooping cough reduced from 60 cases in 2006 to 4 cases in 2013. Particularly, whooping cough was discovered in children not passing entire course of vaccination (with whooping cough component) for age. In 2014 whooping cough was not discovered in the country.

Mortality from vaccine preventable diseases

Individual cases of mortality from managed infections were registered during the last 10 years: measles – 1 case in 2005; diphtheria – 1 case in 2009; tetanus – per 1 case in 2005 and 2007 and per 2 cases among adults within 2010-2014.

Morbidity from vaccine preventable diseases (absolute indicators for the years of 2005-2014)

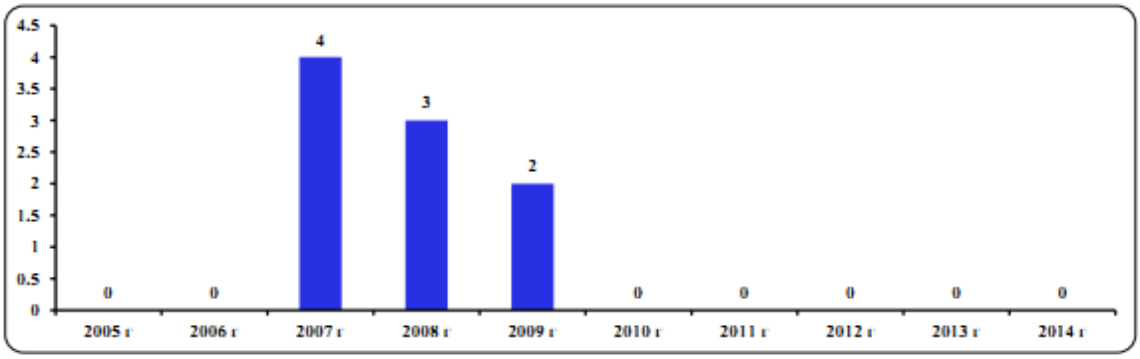
Vaccine managed infections	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Measles	1278	264	0	5	0	0	0	0	164	0
Rubella	1025	137	4	0	0	0	0	0	0	0
Epidemic parotiditis	303	162	129	82	232	125	101	126	76	9
Diphteria	0	0	4	3	2	0	0	0	0	0
Whooping cough	2	60	12	5	5	15	27	18	4	0
Tetanus	0	2	2	6	1	3	6	7	5	9
Poliomyelitis	0	0	0	0	0	0	0	0	0	0

Indicators of morbidity with vaccinal managed infections (per 100 thousand people for the years of 2005-2014)

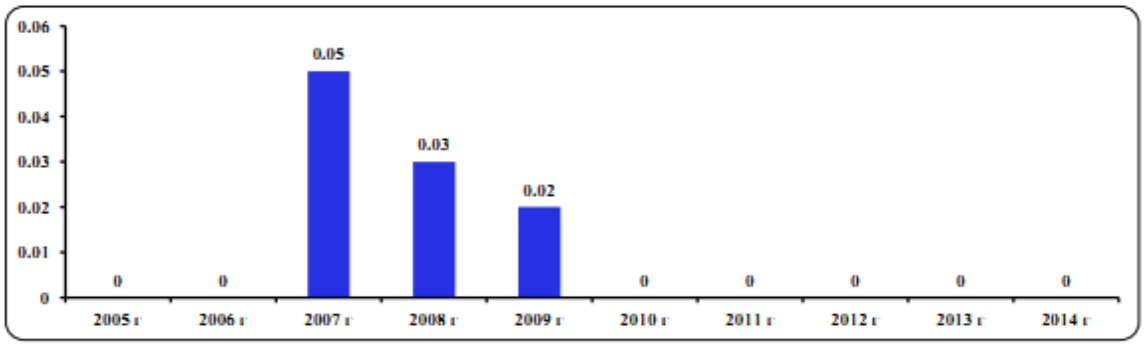
Vaccine preventable diseases	Years									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Measles	14,7	3,1	0	0,06	0	0	0	0		0
Rubella	12,1	1,6	0,05	0	0	0	0	0	0	0
Epidemic parotiditis	3,6	1,9	1,5	0,9	2,66	1,37	1,09	1,36	0,8	0,09
Diphteria	0	0	0,05	0,03	0,02	0	0	0	0	0
Whooping cough	0,02	0,7	0,14	0,06	0,06	0,16	0,29	0,19	0,04	0
Tetanus	0	0,02	0,02	0,07	0,01	0,03	0,06	0,08	0,05	0,09
Poliomyelitis	0	0	0	0	0	0	0	0	0	0

MORBIDITY OF DIPHTERIA FOR THE YEARS OF 2005-2014

Diphteria (absolute indicators)

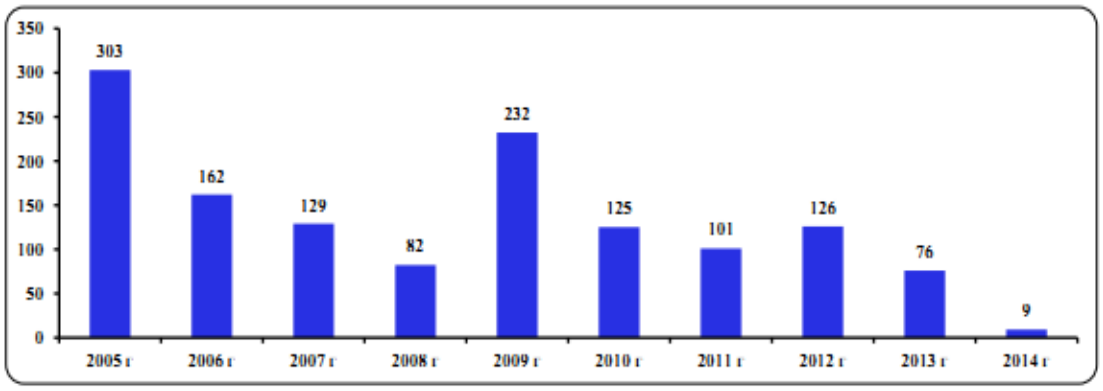


Diphteria (intensive indicators per 100 thousand people)

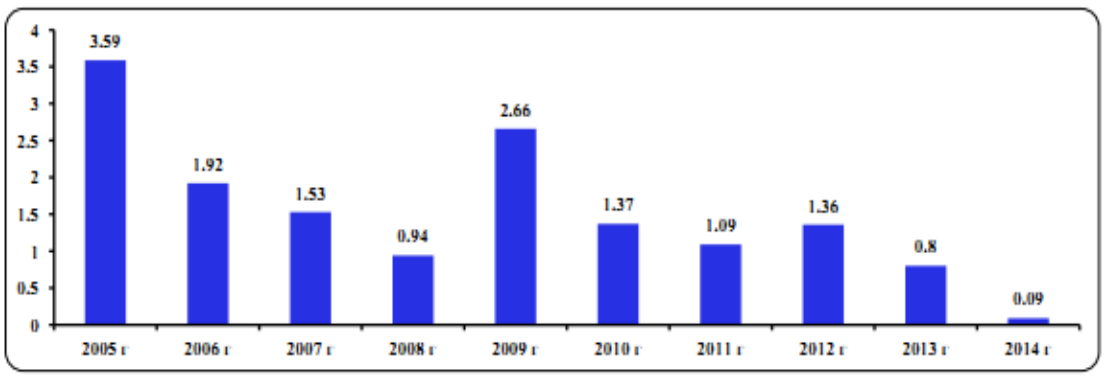


MORBIDITY OF EPİDEMİC PAROTİDİTİS FOR THE YEARS OF 2005-2014

Epidemic parotiditis (absolute indicators)

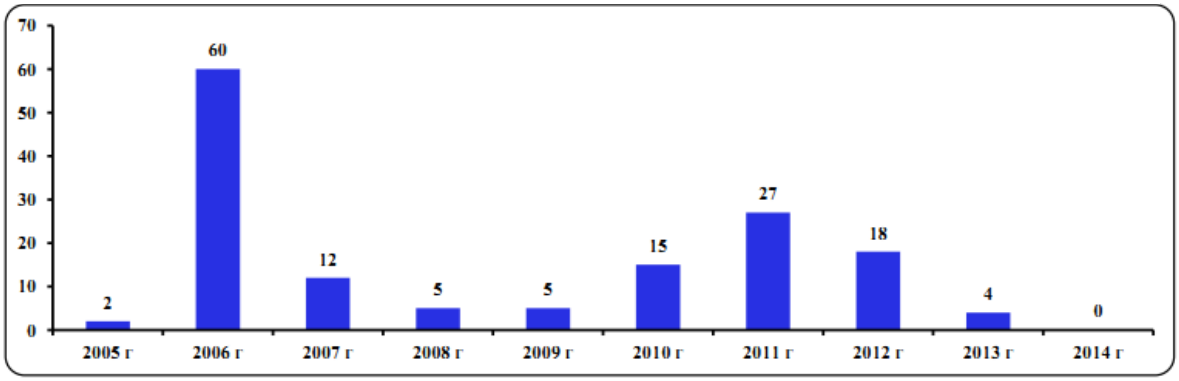


Epidemic parotiditis (intensive indicators per 100 thousand people)

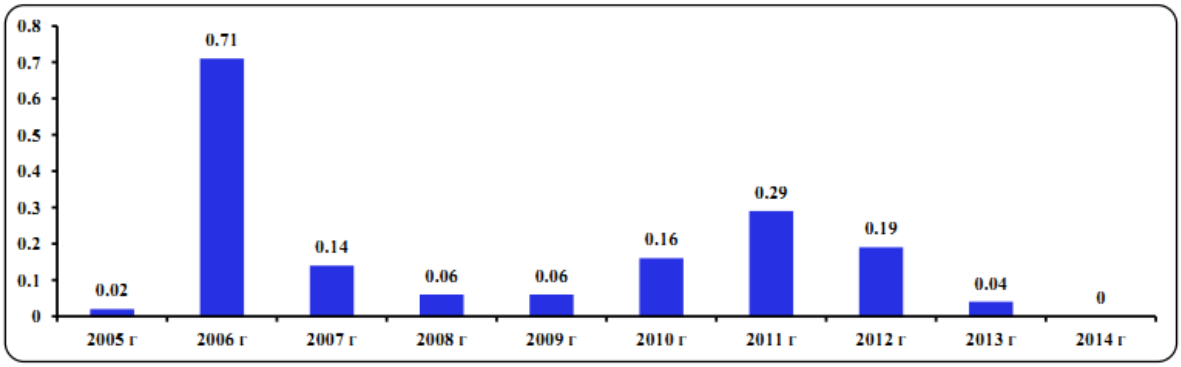


MORBIDITY OF WHOOPINGH COUGH FOR THE YEARS OF 2005-2014

Whooping cough (absolute indicators)

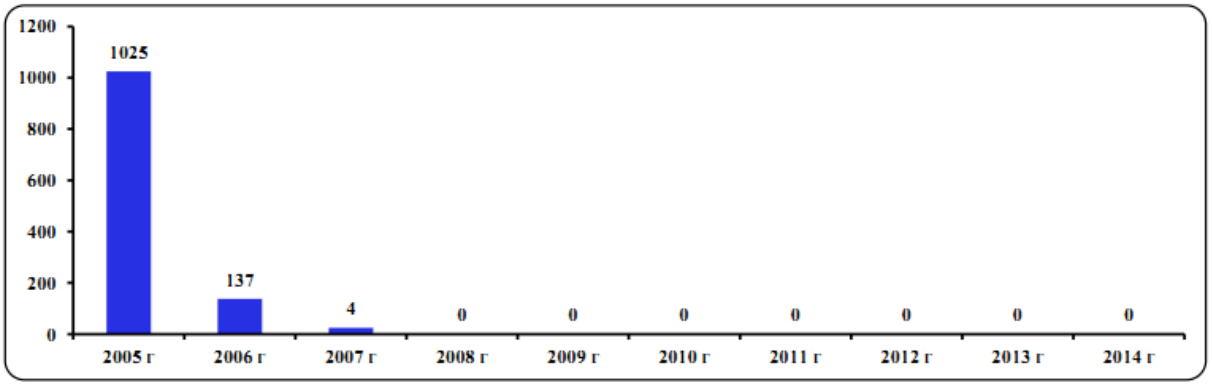


Whooping cough (intensive indicators per 100 thousand people)

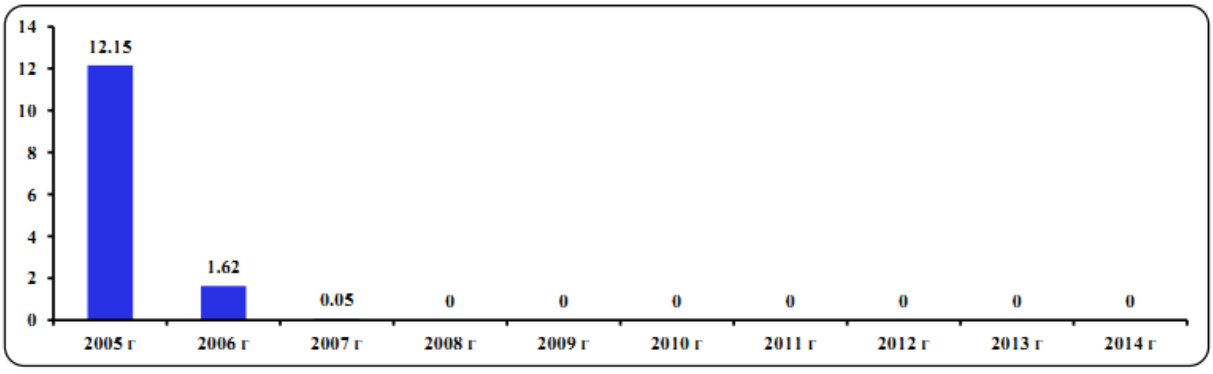


MORBIDITY OF RUBELLA FOR THE YEARS OF 2005-2014

Rubella (absolute indicators)

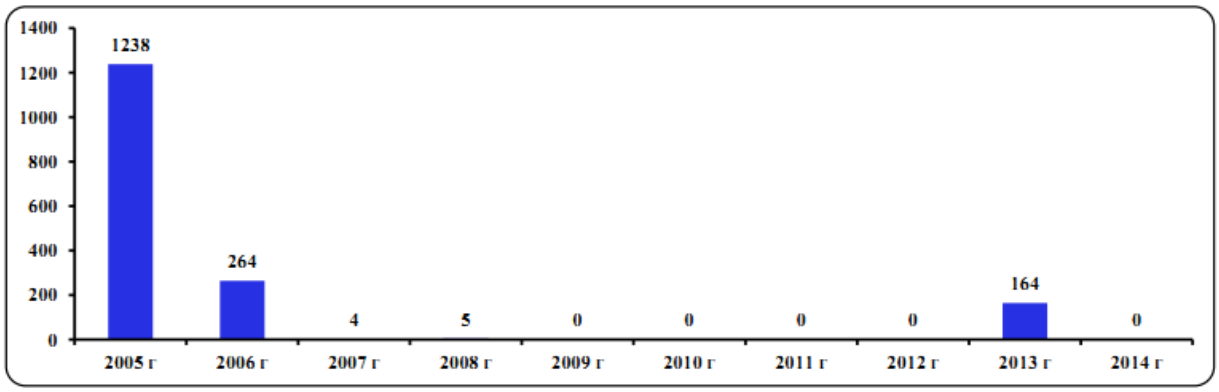


Rubella (intensive indicators per 100 thousand people)

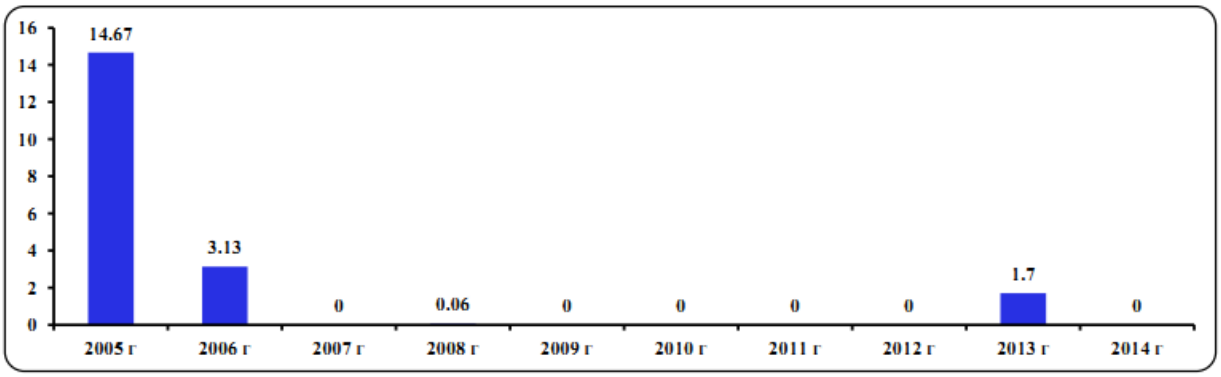


MORBIDITY OF MEASLES FOR THE YEARS OF 2005-2014

Measles (absolute indicators)

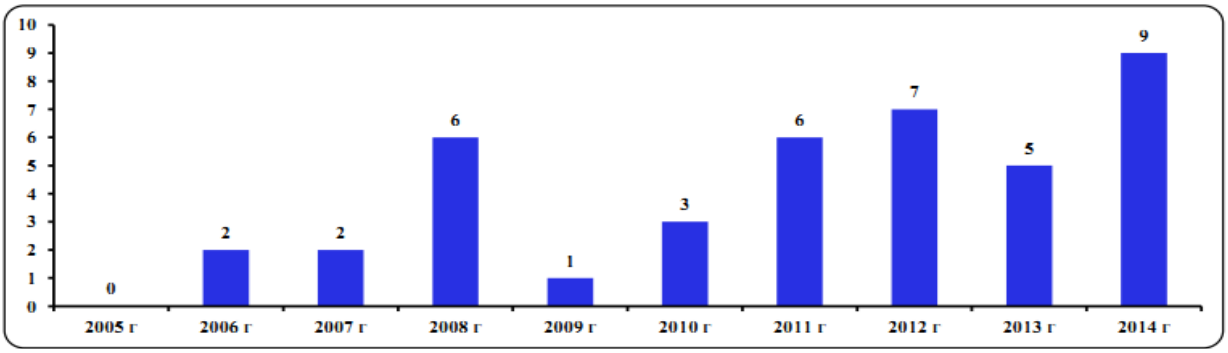


Measles (intensive indicators per 100 thousand people)

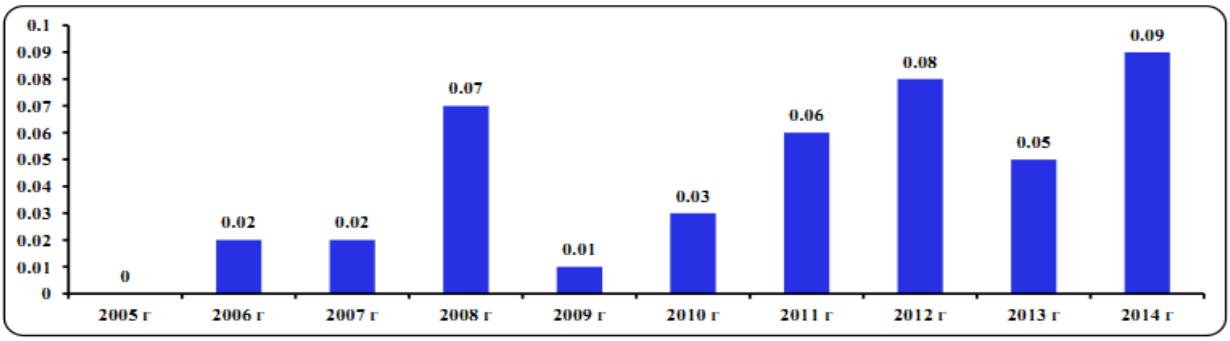


MORBIDITY OF TETANUS FOR THE YEARS OF 2005-2014

Whooping cough (absolute indicators)



Tetanus (intensive indicators per 100 thousand people)



2.2. National immunization schedule

The calendar of prophylactic vaccination is approved by the Ministry of Health of the Republic under No. 211 on 14.09.94. Starting from 2001, due to inclusion of new vaccines to the calendar of prophylactic vaccination the appropriate annexes were adopted:

- The Ministry of Health No. 15 dd. 19.02.2001 – application of revaccination against measles in age of 6 years old (second dose) starting from March 1, 2001.
- The Ministry of Health No. 84 dd. 17.08.2001 regarding "Inclusion of the vaccine against B Hepatitis into the calendar of prophylactic vaccination" – application of vaccine against B Hepatitis in first 12 hours since the moment of birth as well as 2 months and 4 months starting from October 1, 2001.
- The Ministry of Health No. 57 dd. 14.05.2003 – application of CPC vaccination to children in age of 12 months old starting from 01.10.2013.
- The Ministry of Health No. 156 – application of CPC vaccination to children in age of 12 months and 6 years starting from 01.12.2003.
- The Ministry of Health No. 65 – application of DTPHibHepB vaccine to children in age of 2, 3, 4 months starting from 01.07.2011.
- The Ministry of Health No. 121 dd. 30.10.2013 – application of 10-valent vaccine (PCV10) to children in age of 2, 4, 6 months starting from 01.12.2013.

Azerbaijan planned to introduce 13-valent pneumococcal vaccines into routine immunization from January 2013. However, due to global (productional) shortage of this vaccine GAVI notified the Ministry of Health on delivery of the 10-valency vaccine (PCV10) in 2013 with switch to the 13-valent PCV in 2016.

This issue was initially reviewed in the Ministry of Health with participation of WHO and the Rostropovich-Vishnevskaya's Fund and, approval of the Ministry of Health was gained with further inclusion of this issue to the agenda of meeting of the Working Group on Immunization of the Country's Coordination Mechanism for international health programs (CCM). The Working Group of CCM considered application to GAVI for support on introduction of PCV10 from 2012.

In 2012-2013 an investigation was implemented in the country for researching the economic efficiency of pneumococcal vaccine jointly with the WHO's European Regional Office (WHO EURO) and in cooperation with Pan-American Health Organization (PAHO) ProVac for supporting the scientifically grounded solution relative to inclusion of the pneumococcal vaccines into the calendar of prophylactic vaccinations.

At the present time the calendar of routine vaccinations of the Azerbaijan Republic includes mandatory vaccination against eleven infections, i.e. poliomyelitis, tuberculosis, diphteria, pertussis, tetanus, measles, parotitis, rubella, virus hepatitis B, pneumococcal and hemophilic infections.

National calendar of vaccines in Azerbaijan

Age of vaccination	Name of vaccines		
At birth	BCG	Hepatitis B	OPV
2 months	DTP-Hib-Hep B	PCV	OPV
3 months	DTP-Hib-Hep B		OPV
4 months	DTP-Hib-Hep B	PCV	OPV
6 months		PCV	
12 months	MMR, vitamin A		
18 months	DTP, vitamin A		OPV
6 years	MMR, vitamin A	DT	

The main requirements for the Immunoprophylactic Program were to include safe and highly efficient vaccines to the national calendar of prophylactic vaccination. The purchasing mechanism through the Delivery Section of UNICEF has been used since 2014, for the provision of quality and safety of vaccine preparations, imported to the Republic. Cooperation with UNICEF, on one hand, provides the republic with quality and reliability of vaccine preparations complying with the international standards and, on the other hand, allows the purchasing of vaccines with prices far less than the market one, promoting saving budget funds. The country does not purchase significant consignment of vaccines out of the FIR. Annually, CIS purchases only the necessary quantity of rabies vaccines, along with a few other vaccines, mainly for the cases of epidemiological indicators.

In regards to the vaccines for implementation of additional immunization measurements (AIM), limited AIMs on vaccination against poliomyelitis were implemented in the regions having coverage less than 90% and, the buffer stock existing within the frames of the planned immunization program was used for these purposes. The last large-scale AIM was implemented in the country in 2006; and in 2014 AIM was implemented against measles and rubella among the age category of 11-15 years old in Baku and some regions as well as cleaning among this age group in all regions and cities of the republic and, coverage was 95%.

At the same time, for the purpose of provision of safe practice of immunization and prevention of undesirable manifestations of vaccinated people at the post-vaccination period, only self-blocking syringes in capacity of 0,5 ml and 0,05 ml have been used for BCG vaccination in the republic since 2008. One dose of IPV is planned and approved as new vaccines for application until the end of 2015; decision regarding its application was accepted by NTCGI (National Technical Consultative Group of Immunization) and approved by the Ministry of Health in August 2014. Request for inclusion of IPV was submitted by the country to GAVI on September 15, 2014.

Upon decision of NITAG and based upon the request of the Ministry of Health to GAVI, one dose of IPV will be included into the calendar of vaccination for 6 month old babies, which will be included simultaneously with PCV. Transmission from 10-valency pneumococcal vaccine to 13-valency one is planned for the country in 2016. Transmission from tOPV to bOPV is planned in April 2016. The country is reviewing the opportunity for the inclusion of a combined hexavalent vaccine (aDTP-Hib-HepB-IPV) for 2018, when support by GAVI for a separate IPV dose is complete. The Ministry of Health of the Republic of Azerbaijan plans to implement HPV vaccine demonstration project with GAVI support in 2017-2018 and to introduce HPV vaccine nation-wide in 2019. The MoH reviews the opportunity for the introduction of vaccines against the rotavirus infection and chickenpox.

2.3. Vaccination coverage

Coverage of vaccination on the national level (years of 2003-2009)

Years	2003	2004	2005	2006	2007	2008	2009
BCG	98,9%	98,6%	98,0%	98,0%	97,8%	98,2%	98,1%
OPV-3	98,4%	97,1%	96,5%	97,1%	97,0%	97,5%	95,7%
Hep.B-1	99,1%	98,8%	98,2%	96,8%	98,9%	98,5%	99,0%
Hep.B-3	97,8%	97,0%	95,5%	93,1%	97,2%	97,2%	96,7%
DTP-1	98,1%	97,6%	97,4%	97,0%	97,1%	97,3%	95,9%
DTP-3	97,4%	96,2%	95,9%	95,2%	95,0%	95,0%	95,9%
DTP-4	97,6%	97,6%	94,1%	94,9%	94,6%	95,0%	93,5%
Measles -1d	98,0%	98,4%	98,2%	95,9%	97,4%	97,3%	98,3%
Measles -2d	96,8%	97,8%	97,6%	94,8%	97,4%	97%	96,3%

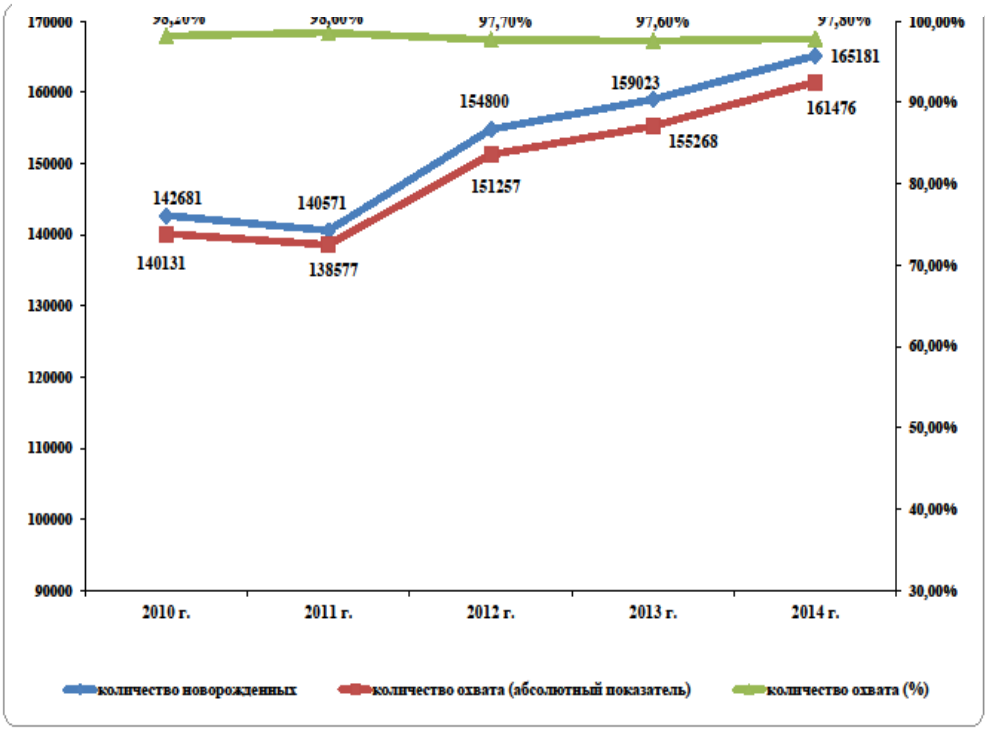
Evaluation health data for 2011 and official data of the country for coverage with vaccination on the national level for the years of 2010-2014 (administrative report)

	Evaluation data for 2011	2010	2011	2012	2013	2014
BCG	98	98,2	98,6	97,7	97,6	97,8
Hep.B newborn	95	98,8	99,2	98,8	99,3	99,2
DTP1 (Penta 1 since July 2011)	94	96,6 (DTP3)	95,7 (DTP1+Penta 1)	94,9 (Penta1)	94,8 (Penta1)	96,2 (Penta1)
DTP 3 (Penta 3 since July 2011)	81	93,5 (DTP 3)	94,6 (DTP3+Penta3)	92,8 (Penta3)	92,8 (Penta3)	94,2 (Penta3)
OPV3	85	96,5	97,8	95,9	96,4	96,8
CPC1	89	97,9	97,8	97,3	98,1	98,1
CPC2	NA	97,5	97,5	97,5		98
PCV1	NA	0	0	0	5,4 (since Dec. 2013)	91,1
PCV3	NA	0	0	0	0	63,7

The last investigation of the evaluation data was held in the country in 2011 by the Center of Public Health and Reforms of the Ministry of Health of the Republic. The inquiry was held using the methodology of inquiry held in 2006 by the State Statistics Committee of the Republic supported by the US International Development Agency, UNISEF with participation of Macro International Inc.

The results of the investigation of evaluation data of 2011 were accepted by the WHO and used while developing the evaluation data for coverage.

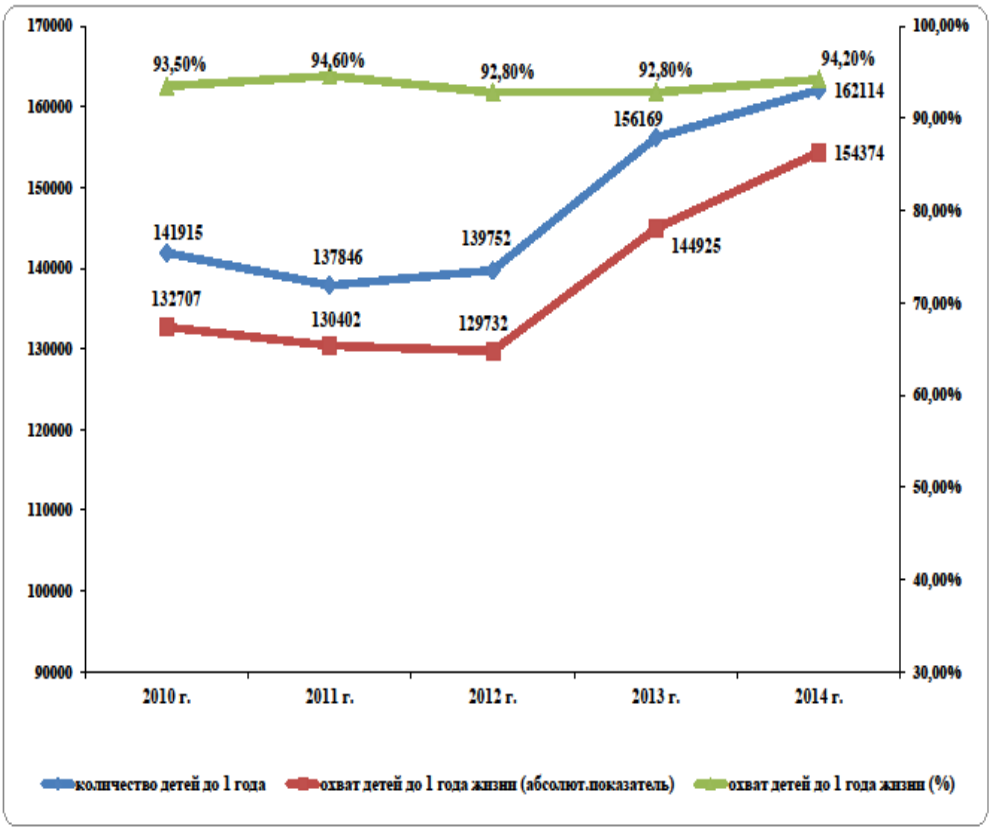
COVERAGE OF NEWBORN CHILDREN'S BCG VACCINATION IN THE REPUBLIC WITHIN 2010-2014



«Coverage of newborn children with BCG vaccine in the Republic for the years of 2010-2014» shows the tendency in the number of the target group, the capacity of the vaccinated population and coverage with BCG vaccination from 2010 to 2014.

The target group for BCG vaccination is all newborn children. In the years of 2011-2012, quite a rapid increase was observed in the number of the target group. The factual number of the vaccinated infants is included to a similar schedule and subsequently, the results of coverage are equally maintained on quite a high level during the entire period from 2010 to 2014.

COVERAGE OF DTP 3 (PENTA 3) IN THE REPUBLIC WITHIN 2010-2014

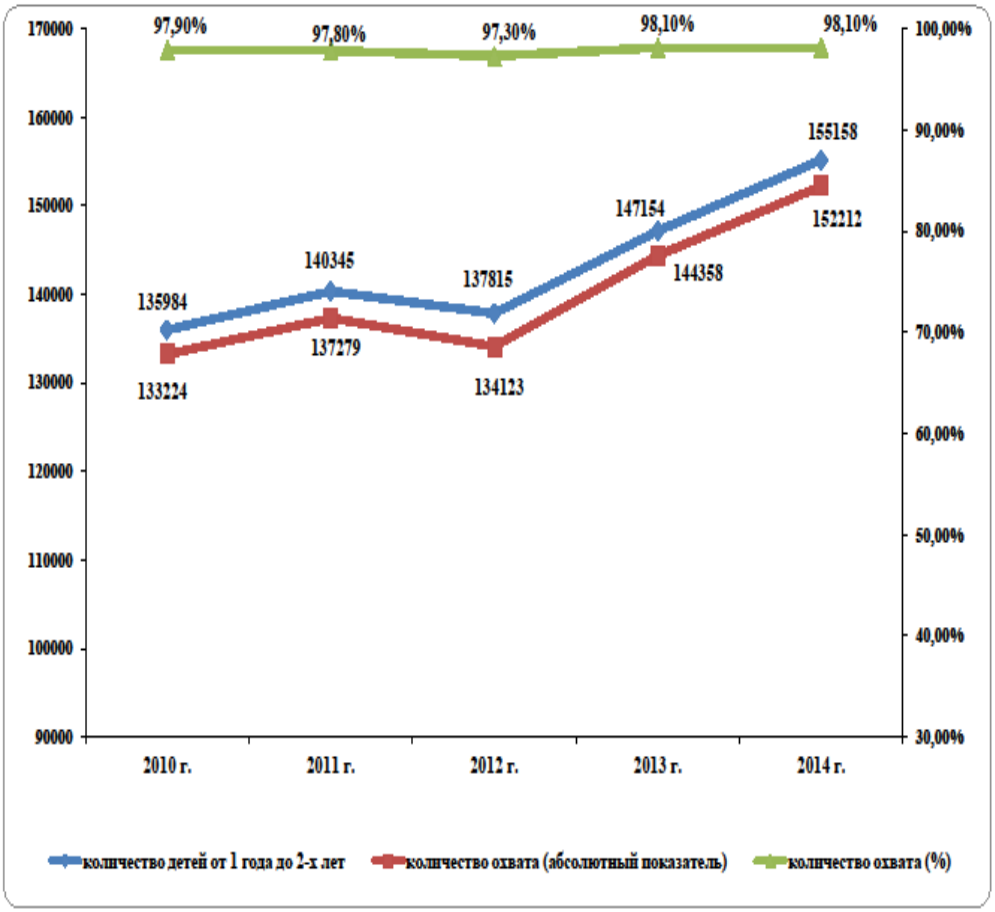


«Coverage of DTP 3 vaccine in the Republic for the period of 2010-2014» shows the tendencies in the number of the target group, the capacity of the vaccinated population and coverage with DTP vaccination from 2010 to 2014.

Coverage until 2013 increased monotonously with some hesitations, and starting from 2013 the difference between the target group for BCG in 2013 (159023) and the target group for DTP in 2013 (156169) significantly reduced in comparison with the past years but was higher than the data of infant mortality specified in the report of the country for the year 2013r.

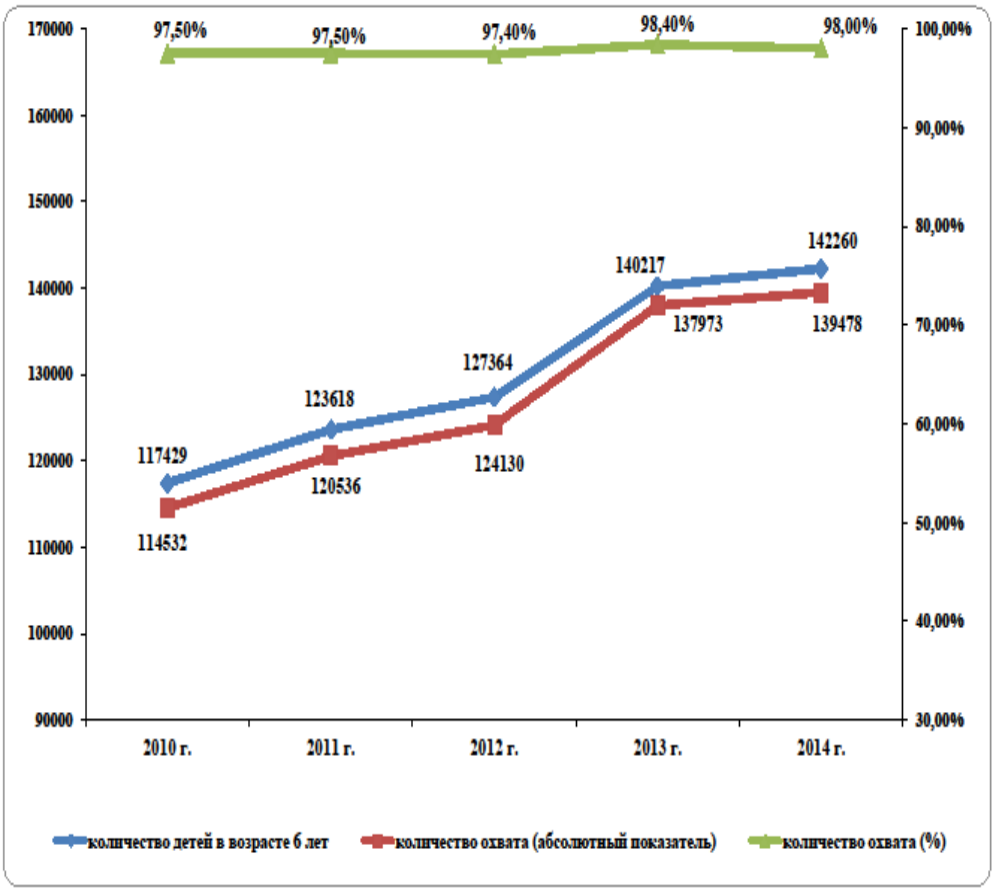
One of the main reasons for reduction in the target groups up until the 1st year of life is the internal and external migration.

COVERAGE OF CPC 1 VACCINE IN THE REPUBLIC WITHIN 2010-2014



«Coverage with CPC1 vaccine in the Republic for 2010-2014» shows the tendencies in the number of the target group, number of the vaccinated population and coverage with CPC 1 vaccine from 2010 to 2014. The target group for CPC1 is children in age from 1 to 2 years. Increase of the number in the target group is observed up to 2013. The factual number of the vaccinated infants is included in a similar schedule and subsequently, the results of coverage are equally maintained on quite a high level during the entire period from 2010 to 2014.

COVERAGE OF CPC 2 VACCINE IN THE REPUBLIC WITHIN 2010-2014



«Coverage with CPC2 vaccine in the Republic for 2010-2014» shows the tendencies in the number of the target group, number of the vaccinated population and coverage with CPC 2 vaccine from 2010 to 2014. The target group for CPC1 is children in age of 6 years. The target population increased starting from 2010 and the number of children in age of 6 years reached 142260 people.

Annually in January, since 2013, the Republican CHE (Center of Hygiene & Epidemiology) holds meetings with the directors and heads of epidemiological sections of the regional / urban CHE, submitting annual reports of immunization and numbers of the target groups. At these meetings, for precise calculation of the target groups of populations, the heads of the regions and coordinators of the national immunization program discuss the data of medical statistics and the data of regional / urban sections of statistics as well as calculation by CHE of the number of children born in this territory and registered with consideration of the incoming and outgoing ones. Each database is further evaluated from the immunization program's perspective used to determine a more precise number of the target groups (including age groups and regions) for use in the current year.

Currently, the State Statistics Committee calculates the target group based upon the data from the Ministry of Health using form No. 103 (for registration of children at birth in medical institution) including data from the Ministry of Justice (regarding children not born in medical institutions but registered; children not born in the accounting year but acquiring documents in the accounting year and children born out of the country). The

results differ between the data of the State Statistic Committee and those of the Information & Statistics Board of the Ministry of Health.

Approximately 85% of children are born in medical institutions in Azerbaijan, 2-3% - at home and the remaining 10-12% - outside of Azerbaijan.

Coverage in subnational level (2010-2014 r.r.)

DTP-3	**2010**	**2011**	**2012**	**2013**	**2014**
«50%	-	-	-	-	-
50-79%	-	-	-	1	-
80-89%	5	2	4	5	5
90-94%	20	23	17	15	15
«90%	39	39	43	43	44
CPC-1	**2010**	**2011**	**2012**	**2013**	**2014**
«50%	-	-	-	-	-
50-79%	-	1	1	1	-
80-89%	3	2	0	1	1
90-94%	12	7	11	6	6
«90%	49	54	52	56	57
CPC-2	**2010**	**2011**	**2012**	**2013**	**2014**
«50%	-	-	-	-	-
50-79%	-	-	-	-	1
80-89%	-	5	1	1	2
90-94%	5	7	10	1	3
«90%	59	52	53	62	58
Hep.B-3	**2010**	**2011**	**2012**	**2013**	**2014**
«50%	-	-	-	-	-
50-79%	-	-		1	-
80-89%	5	2	4	5	5
90-94%	11	17	17	15	15
«90%	48	45	43	43	44
OPV-3	**2010**	**2011**	**2012**	**2013**	**2014**
«50%	-	-	-	-	-
50-79%	-	2	-	-	-
80-89%	4	1	-	3	-
90-94%	13	6	9	5	6
«90%	47	55	55	56	58

According to the analysis of coverage with prophylactic vaccinations at the subnational level, regions with low indicators of coverage still exist. Low indicators of coverage resulting from 2014 include the regions of Yardimly, Agstafa, Khizy, Gazakh, Shabran and Goranboy, which have problems with personnel, lack of knowledge of physicians, insufficient analysis and usage of data, as well as a lack of regular monitoring, etc.

Results of the implemented evaluations

Evaluation of quality of the immunization data in 2012

Self-evaluation of data quality (DQS) was implemented in Azerbaijan in June 2012 with the support of an international consultant for researching the main aspects of quality of the immunization data. Numerous strong

features were discovered during self-evaluation: the immunization system is precise, the standard forms are used for reporting, forms are duly kept at the regional and national levels, reports get opportunely submitted by medical institutions at regional level to national level, and only minimal differences in the coverage of vaccinations are found in reports at regional and national levels. However, deficient features also were discovered including problems calculating the losses with children's coverage amongst doses, insufficient analysis and data usage, limited feedback, lack of regular monitoring and supporting curatorship, and insufficient financing. A mission to implement a situational analysis, based upon the facts discovered during DQS, was implemented in the country in June 2013. The target of the mission was to analyze the current situation in Azerbaijan with respect to the immunization data and information system of the immunization program, discovery of principle complications the system was exposed to, and development of a report on situational analysis and actions plan for settlement of the discovered complications. The analysis was implemented within 4 main sectors: inspection / certification of the coverage data, precision of the number of the target population, data processing aspects subject to improvement and system of e-health card. Recommendations for settlement of the complications discovered during the mission with regard to each of 4 sectors and Actions Plan was developed for improvement of data quality in Azerbaijan for the years of 2014-2015.

Evaluation of the application of pentavalent vaccines in Azerbaijan, in 2012

Numerous strong features were discovered during evaluation: support of the immunization program in high level, an efficient immunization system, responsible personnel at all levels, total successful application of pentavalent vaccine, high indicators of coverage with pentavalent vaccines, due adoption of vaccine by medical personnel and population, high-quality training materials in all institutions of initial health, cold chain of sufficient capacity in all levels and duly set delivery system of vaccines.

Deficiencies: social mobilization and information – lack of communicational components – undeveloped strategy and measurements on vaccination involvement with the population's reaction to immunization, lack of training materials for parents, lack of cold chain, lack of calculations of the target group, lack of vaccination coverage analysis; staff challenge – lack of personnel in the epidemiological section in the regional CHE, irregular inspections due to lack of financing, absence of standardized procedures / questionnaires on implementation of inspections, absence of the standardized protocol of classification, and monitoring and accounting of PIAM (post-immunization adverse manifestations). Appropriate recommendations were developed subsequently to evaluation.

Evaluation of efficient vaccines management (EVM) in 2014

Mission of evaluation of efficient vaccines management (EVM) worked in Azerbaijan in the period from August to September 2014. It was the second Evaluation of EVM in the Azerbaijan Republic. The first Evaluation of EVM was implemented in 2011. In comparison with results of the 2011 evaluation, improvement of situation was noted upon the following issues:

- Preparation of the temperature map of cold room in the central warehouse;
- Perfection of the procedures of acceptance of vaccine in the central warehouse;
- Provision of additional capacity of storages in the central and regional levels;
- Development of standardized forms for accounting of reserves in regional level and the level of immunization service;
- Development of standardized forms of forecasting the demands in vaccines and management of reserves in regional level and the level of immunization service;
- Purchase of devices for uninterrupted registration of temperature for the national / central warehouse and 30-day electronic devices for registration of temperature for the regional warehouses as well as freezing indicators; training of personnel for due usage of such devices (during evaluation these devices were used only in the central warehouse).

- Updating and wide usage of the standardized accounting form on the implementation of the immunization program (form No. 5).
- Application of practice for using PTI for some vaccines.
- Application of practice for using inventory of cold chain at the national level.

The experts of the mission visited thirteen warehouses at the regional level of vaccine distribution and 26 medioprophilactic institutions (MPI) where the existing indicators were evaluated during the 12-month period from September 1, 2013 to August 31, 2014.

It was analysis of the strong and deficient features in all stages of the vaccines delivery chain.

Among the strong features of the delivery chain the experts of the mission noted due organization of purchase and uninterrupted delivery of vaccines, perfection of vaccine acceptation in comparison with the last evaluations and purchase of vaccines through Delivery Section of UNISEF since start of 2014. Sufficient level of storage of vaccines is provided in the Innovation & Procurement Center in the central level, the system of accounting of reserves complies with the requirements and the personnel dealing with vaccines in the central level is duly trained and the most part of the working procedures exist in the central warehouse.

The demand for vaccines is forecasted by the personnel of the Expanded Immunization Program at the Republican Center of Hygiene and Epidemiology (RCHE). The vaccine demand is forecasted based upon the scientifically grounded data regarding the population's vaccine coverage and real level of losses.

The Innovation & Procurement Center (IPC) purchases vaccines complying with the forecasts developed by RCHE and, quarterly, according to the schedule developed by RCHE using the "per distribution" system to send the vaccines to the regional CHE. Medioprophilactic institutions (MPI) accept monthly vaccines at the regional CHE considering its own monthly demands are hereby used through a "per request" system.

Deficient features: accountings of reserves in the RS and MPI levels significantly differ and often do not meet the requirements, the level of training of the RS and MPI personnel in connection with reserves management is different and often insufficient; freezing indicators at transportation of vaccines are not used in the forms filled in while distributing the vaccines from the RS level to MPI level, the status of temperature indicator is not shown (vial thermoindicator and freezing indicator). The Mission developed recommendations on increasing the efficiency at the national level, regional vaccine warehouse and in the level of immunization services (MPI).

Evaluation of application of the 10-valency pneumococcal vaccine in 2015

Mission for the evaluation of the application of the 10-valency pneumococcal vaccine worked in Azerbaijan on March 2-8, 2015.

The evaluation discovered many strong features i.e. high-level support of the immunization program, efficient immunization system, responsible personnel at all levels, total successful application of 10-valency pneumococcal vaccine, implementation of preparation works in due level, high coverage indicators (V1- 91%, V3- 64%), due adoption of the vaccine by medical personnel and population, high-level training materials in all institutions of initial health, sufficient capacity of cold chain in all levels, and a precise vaccine delivery system (excluding Baku city).

Deficiencies: lack of communicational component, lack of a cold chain; lack of calculations regarding the target group; lack of vaccine coverage analysis; staff challenge – lack of personnel in the epidemiological section at the regional CHE, irregular inspections due to lack of financing, absence of standardized procedures / questionnaires on implementation of inspections, absence of the standardized protocol of classification, monitoring and accounting of PIAM. Appropriate recommendations were developed subsequently to evaluate.

2.4. Joint Appraisal Process

The Joint Appraisal was conducted from 13 to 16 July 2015 together with the Gavi Graduation Assessment. During the mission, participants from the Gavi Secretariat, WHO EURO Office, UNICEF Regional Office and US CDC met with representatives of the Ministry of Health, Republican Center of Hygiene and Epidemiology, Analytical Expertise Center for Medicines, Innovation and Supply Center, Center of Public Health and Reform, a key opinion leader in Pediatrics and Head of the National Immunization Technical Advisory Group (NITAG), and the WHO and UNICEF country offices.

A follow-up visit to Azerbaijan to discuss and validate the findings of the Joint Appraisal and Graduation Assessment took place on 18-19 August 2015. Based on the discussions during the two visits to Azerbaijan and relevant background documents, the Joint Appraisal report was drafted by independent technical experts in close cooperation with Gavi SCM. The report was shared for feedback with mission members and relevant country stakeholders, and the final findings and recommendations were discussed with and endorsed by the Ministry of Health and ICC members (Working Group of the Country Coordination Mechanism).

2.4.1. Technical Assistance: current areas in practice and agency responsibilities

In 2014 and 2015, Azerbaijan received technical assistance from the WHO on the following:

- National conference on immunization data quality in the framework of the European Immunization Week (EIW, April 2014)
- Development of publication on PCV cost-effectiveness study
- Monitoring of PCV implementation (May- July 2014)
- Effective Vaccine Management technical assistance on installation of continuous temperature monitoring equipment at national cold store, Log tag trainings for national level facilitators, SOP development on temperature monitoring (June 2014)
- IPV introduction decision-making and application to Gavi (June - September 2014)
- Effective Vaccine Management assessment and development of Improvement Plan (joint WHO and UNICEF consultancy, September 2014)
- Coordination, independent monitoring and LQA for measles-rubella SIA (July - September 2014)
- Technical support on maintaining polio-free status (annual activity 2014-2015)
- Invasive bacterial diseases sentinel surveillance (since 2009)
- Rotavirus sentinel surveillance (since 2006)
- PCV post-introduction evaluation (March 2015)
- IPV introduction trainings (May - June 2015)
- Graduation Assessment and development of Graduation Action Plan (July- August 2015)

The following activities are planned until the end of 2015:

- Technical support on cMYP development (on-going, July- November 2015)
- Training workshop on vaccine safety and contraindications to vaccination (September 2015)
- NRA assessment (September 2015)

UNICEF:

- During the 2014-2015 period, UNICEF provided the following technical assistance to Azerbaijan:
- Technical support and assistance in procurement of equipment for strengthening cold chain capacity of the country (refrigerators – April 2014)
- Assistance in procurement of cold chain monitoring equipment (2014)
- Technical support in estimation of needs for vaccines and vaccination devices (2014-2015)
- Procurement services for purchasing vaccines for routine immunization (2014-2015)
- Technical and financial support in implementation of selective components of PCV İntroduction
- Communication Strategy (training of health care providers and advocacy with parents-2014

2.4.2. Future Needs

As Azerbaijan will graduate from Gavi support in 2017, technical assistance availability is limited to the 2016- 2017 period. The majority of technical assistance during this period will be provided through the Graduation Action Plan, which is currently being finalized in close collaboration with partners and in-country stakeholders.

It has been proposed that some of the technical assistance - notably for the routine on-going immunization activities - be channeled through the Joint Appraisal/Partnership Engagement Framework stream. These activities include: assistance with IPV post-introduction evaluation; preparation of the potential new HPV proposal and introduction (if the country applies for HPV support and receives it); standard assessments and evaluations (e.g. coverage surveys), as well as regional workshops and conferences aimed at increasing capacity of in-country experts in various areas of immunization work. More details are provided below.

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

Short-term (2015):

- IPV vaccine introduction (revision of regulatory documents, development of training and communication and social mobilization materials, conducting national and regional workshops, trainings of HCWs and academic staff) – being implemented in 2015;
- Refresher training for supervisors and management training for programme management staff;
- Development of cMYP for 2016-2020;
- Maintenance and repair of idle equipment and procurement of cold chain equipment suitable to needs including those of district fixed, outreach and mobile providers;
- Creating a Web-site for immunization based on website of the Ministry of Health – if this is not implemented before September 2015, allocated funds for this activity should be returned to Gavi;
- Initiation of collaboration with partners and stakeholders to ensure programmatic readiness for a school based HPV vaccination programme before any firm decision is made;
- Visit countries with established e-Health systems (e.g. Georgia, Turkey) to learn and share experience and best practice; and
- Agree upon a clear set of needs from the perspectives of both the Health Informatics and the Republican
- Center for Hygiene and Epidemiology so that an e-Health system can be built based on needs.
- Continuation of vaccine safety and contraindications trainings and their integration into medical education curricula

Medium term (2016-2017):

- Stay vigilant to increasing financial requirements in coming years;
- Maintain current procurement modality in accessing vaccines at affordable prices;
- Introduce new technologies to supply chain to improve its efficiency;
- Sustain programme performance level by investing in quality of services (training, supervision);
- Be proactive in addressing (growing) vaccine hesitancy and refusals; and
- Target unification of current reporting system and e-health immunization module (and developing logistics module)
- Make an evidence-based decision on introduction of HPV vaccine
- Apply for GAVI support with HPV vaccine demonstration project

Based on the above priorities and key recommendations, the technical assistance areas and activities listed below have been proposed.

Immunization financing & resource mobilization	• Train key staff on immunization financing and monitoring performance (WHO TA) • Train relevant staff for resource mobilization and development of a resource mobilization plan – (WHO TA) • Develop resource mobilization plan – (WHO TA) • Develop advocacy materials (for resource mobilization) and advocate for immunization –(WHO TA) • Monitor implementation of resource mobilization action plan and report on progress achieved (WHO TA) • Include introduction of new vaccines in cMYP to be developed for 2016-2020 (as alternative scenarios) (WHO TA) • Advocate for increased funding for operational activities
Vaccine procurement	• Continued advocacy on benefits of procuring through UNICEF to sustain commitment • Increased and continued collaboration with UNICEF to find solutions to problems (including alignment of national procurement and accounting procedures with of UNICEF's process) – (UNICEF TA) • Continue building capacities in self-procurement (needed for procurement of vaccines that are not available in UNICEF's portfolio), by improving the knowledge on vaccine market dynamics, how vaccine prices evolve, measures that increase procurement efficiency; such as long-term contracting - (WHO and UNICEF TA) • Review vaccine procurement practices and identify areas for improvement - (WHO TA) • Participate in procurement-related WHO training workshops – (WHO TA)
Evidence-based decision-making	• Continued WHO support to the NITAG (in disseminating guidance and providing training, participation to WHO meetings, visit to other NITAGs, experts attending to NITAG meetings, twinning) & review of the NITAG performance – (WHO TA) • Ministry of Health may wish to consider adding members from social & behavioral sciences, health economics • NITAG should consider introduction of HPV vaccine (following collection of local evidence on vaccine cost-effectiveness) • WHO support in conducting cost-effectiveness and school vaccination readiness study on introduction of HPV vaccine – (WHO TA) • Development of national plan for prevention of cervical cancer – (WHO TA) Continued WHO support to both (rotavirus and IBD) surveillance networks – (WHO TA) • Ministry of Health should gradually take over the external financial support provided by WHO

Programme performance	• Conduct trainings to improve timeliness of vaccinations (by eliminating false contraindications and increasing simultaneous administrations; not limited to PCV, but for all vaccines – WHO TA) • Develop guidelines to complete interrupted and delayed vaccinations (for all vaccines) –WHO TA • Conduct qualitative studies to better understand reasons behind refusals to address vaccine hesitancy ad refusals and to reach the unreached – WHO TA • Use WHO tool on Tailoring Immunization Programme to address needs of unreached – WHO TA • Continued training (using MLM and IIP modules) to rayon and facility levels – WHO TA • Further strengthening of supportive supervision through introduction of SOPs and improved guidance – WHO TA • Continued quarterly supportive supervision with particular emphasis to relatively low performing districts – WHO TA (+financial support) • Conduct technical assistance in switching to b-OPV - (WHO TA) • Continue working on revision of nursing curricula and provide training materials to nursing schools and, expand the experience to the field of maternal and child health –(WHO TA)
Data quality	• Improve collaboration between the Programme and the e-health unit (Informatics Center) to ensure Immunization Programme needs are met through e-health modules developed (MoH) • Defining immunization programme data and analytical functions requirements – (WHO TA) • Review of the developed immunization module and development of an upgrade plan (particularly for analytical functions) – (WHO TA) • Development of vaccine stock management module (system design and software development – (WHO TA) • Provide technical assistance in improving registration of pregnant women through use of e-health system – (WHO TA) • Provide training to users of the e-health modules at rayon and facility levels – (WHO TA) • Conduct data quality review to assess bottlenecks and areas for improvement, with particular attention to target population estimates – (WHO TA) • Improve target population estimates – (WHO TA) • Assess private immunization services and define roadmap for integration of private immunization services to the national programme – (WHO TA)
Communication & social mobilization	• Conduct communications review – WHO TA • Develop communication plan – WHO TA • Conduct further (in-country) trainings to key staff (including spokespersons) on communications – WHO TA • Provide training to media staff (WHO TA) • Develop and produce key communication materials (WHO TA + financial assistance) • Conduct communication activities (WHO TA + financial assistance) • Develop software for the immunization website – (WHO TA) • Develop communication strategy and messages for HPV introduction (prior to HPV application) - (WHO TA)

Vaccine management & logistics	• Develop a renewal plan for cold chain equipment based on recent and upcoming cold chain inventory studies – (WHO TA) • Review of inventory study findings and develop procurement list (EVM recommendations) – (WHO TA) • Purchase cold chain equipment (freeze tags and voltage stabilizers for national level and other equipment according to findings of the inventory study and renewal plan for rayon and facility levels) – (UNICEF TA) • Explore and develop an efficient and feasible maintenance system for cold chain equipment in use – (WHO TA) • Follow up implementation of EVM recommendations at national level and during delivery of vaccines to district level (i.e., vaccine monitoring study; use continuous temperature recorders; recording of diluents; use of freeze indicators) for further institutionalization of vaccine management practices– (WHO TA) • Address identified weaknesses of vaccine management system (i.e., lack of established max- min stock levels; inappropriate stock recording system; diverse knowledge on stock management; not use of freeze indicators; temperature indicator status not indicated on vaccine receipt forms; no documentation of supervision; SOPs not available) at district and facility level – (WHO TA) • Follow-up implementation of EVM recommendations provided for rayon and facility levels – (WHO TA) • Develop a national systematic training programme on vaccine management - (WHO TA) • Train staff involved in vaccine management, particularly at district and facility levels –(WHO TA) • Develop action plan to implement WHO Open Vial Policy - (WHO TA) • Provide training to field staff on WHO Open Vial Policy – (WHO TA)
Vaccine regulations & AEFI surveillance system	• Familiarize staff to WHO recommendations on AEFI surveillance system by participate to the sub-regional workshop - (WHO TA) • Conduct AEFI surveillance system assessment to identify areas that require further improvement (legislation; case definitions; reporting forms; case investigation; filtering cases to be reported; causality assessment; data analysis; feedback) - (WHO TA) • Revise the AEFI surveillance system in line with the recommendations of the assessment - (WHO TA) • Train key field staff on revised procedures (make use of upcoming MLM and IIP trainings) • Train expert review committee members on causality assessment - (WHO TA) • Engage NRA to the AEFI surveillance system (data analysis and feedback functions) • Review vaccine registration procedures and develop action plan to introduce collaborative procedures for registration prequalified vaccines – (WHO TA) • Introduce collaborative procedures for registration of prequalified vaccines – (WHO TA)

3. Immunization programme components and characteristics

3.1. Immunization services

The National Immunization program is implemented based upon the Law of Azerbaijan Republic on April 14, 2000 «Immunoprophylaxis of infectious diseases». The Cabinet of Ministers accepted the State Program for Immunoprophylaxis of Infectious Diseases in 2010 and this program covers the period between the years of 2011-2015. Based on these documents, the vaccination services are rendered by maternity houses and children's polyclinics as well as physicians' and medical points. Each maternity house and polyclinic dealing with immunoprophylaxis as well as every institution responsible for rendering vaccination service has a separate vaccination room for permanent / stationary vaccination services and, valid legal, normative and methodical immunization documents exist and are implemented. Upon edict by head physician regarding immunization of immunoprophylaxis, authorized persons get assigned into these institutions responsible for vaccination and issuance of vaccination certificates as well as acquisition, storage and issuance of medical immunobiological preparations (MIBP) and maintenance of «cold chain». The edict certifies that the regulations for the departing vaccination personnel and its team plan for an increase in the qualification of medical personnel on immunoprophylaxis and their functional obligations, and algorithm physicians' and nurses' actions during assignments, implementation, accounting and reporting of vaccinations. Personnel of polyclinics responsible for work in vaccination are pediatricians and immunologist (if relevant). They work in close contact with the vaccination room and nurses vaccinating, and thus consult with other specialists to provide opportune vaccinations in compliance with the vaccination plan and calendar. Along with the main directions of patients' examination with mandatory thermometry for the exclusion of acute or chronic disease, notice is take in the appropriate account forms while include: prescription of vaccination, observation of the vaccinated people at the post-vaccinal period for discovery and evaluation of possible post-vaccinal reactions, prescription of inclinations from vaccination in compliance with the medical predictions and contradictions, analysis of implementation of the vaccination plan on fields, analysis on infections, development and implementation of additional measurements at discovered deficiencies; registration of medical documents, participation in the work of the departing vaccination teams at their complete supplement (according to the Methodical predictions with strict maintenance of the «cold chain»), rules of aseptic and antiseptics, preparation for immunization of patients having physical deflections, and notifying parents regarding the features of vaccines and implemented vaccinations including possible post-vaccinal reactions. Registration in children's polyclinics and other institutions is implemented directly after discharge from the maternity house. Immediately after registration the newborn child acquires an ambulatory card and e-health card which is used for registration of the vaccination status. Infant population census is implemented twice a year to determine the target group. The divisional pediatricians and nurses prematurely notify the parents regarding the necessity of vaccination.

The targets of the vaccination room and vaccination groups in the ambulatory medical institution are specified below:

- Reaching the target level of vaccination (minimum 95% of the target group);
- Reducing the cases of morbidity and mortality caused by managed infections;
- Increasing awareness among population;
- Controlling the post-immunization adverse manifestations and their prevention.

On 01.09.2014, 2265 vaccination points existed in Azerbaijan. According to the legislation, initial medical and sanitary aids were renamed to physicians' and medical points. Each physician's point covered about 2000 people and controlled up to 5 medical points.

Immunization services are rendered yearly during a fixed amount of days within 1777 (78, 4%) vaccination points. The target group in these institutions claims up to 50 children. Within 468 (20,7%) vaccination points, the immunization services are provided within 6 days of the week throughout the year.

According to the data analysis of the absolute number and percentage of the medical institutions rendered as immunization services, 1777 (78%) vaccination points only have one vaccinator. The rest of the 468 (22%) vaccination points have 2 or more vaccinators per target group and, the served target group up to 100 children or more.

There is no significant problem for access to immunization in the republic; however, it is necessary to note the existence of certain groups of people not desiring to pass immunization due to religious considerations. Besides these obstacles, there is a lack of physicians and vaccinators in some vaccination points (staff issue is at subnational level). The technical problem is the location of several vaccination points in un-adapted premises that are causing challenges for supporting the requirements of the cold chain for the storage of vaccines.

When comparing the coverage of a later dose or vaccine acquired one year after birth and coverage of a vaccine at the age of one, the indicator of incompleteness of immunization ranges from 3,2% (OPV 3) to 5,8% (Penta 3)

According to the legislation, a vaccine is injected in the case of absence of contra-indications within the terms set upon the national calendar of vaccination.

The main reasons for the absence of vaccination are medical declination, false contra-indications, parents' rejection due to various considerations (e.g., insufficient awareness of PIAM), reluctance to several vaccines in one day, migration of population, etc. In distant regions having difficult access (winter pastures, etc.) to vaccination is implemented by mobile teams in fixed days. However, in the case of immunization in the fixed days, parents may be unable to bring their own children for vaccination due to various reasons.

The demands in vaccines are forecasted by RCHE based upon the data of the number of the population. This Center controls and organizes the immunization measurements through the urban and regional CHE, observes collection of the statistical data regarding the expansion of infectious diseases in all levels and determination of the target groups and planning of the purchase of vaccines as well as coordinating the delivery of vaccines to medical institutions and points depending on the request plans, providing a reserve of vaccines in the regional warehouse. Immunization services cover the entire republic equally and, there is neither a difference in coverage between the lowest and highest social and economic quintiles nor the gender it belongs. According to the report for 2014, coverage of Penta 3 at the subnational level only in 5 regions was 80-89%, CPC 1 – 80-89% in one region, CPC 2 - 50-79% in 1 region, CPC 2 - 80-89% in 2 regions.

Immunization coverage in the country is high; however, there are some regions where the level of coverage is lower than 90% due to various reasons. Thus, according to the data of planned immunization in 2011 within the regions Barda, Khizy, Khodjavend, and in 2013 Khizy, Khodjavend, Yardimly, coverage with 3 doses of OPV was lower than 90%. Consequently, in the 2012 and 2014 additional immunization measurements were held in these regions for the immunization of children ages 0 to 5 years. In 2012, coverage was 99,1% during the 1st tour and 98,9% during the 2nd tour.

In 2013, as an additional measurement, cleaning immunization was implemented among children uncovered with planned immunization against poliomyelitis with coverage of 10525 children.

An additional 2 tours of immunization were implemented in 2014 against poliomyelitis among children aged 0 to 5 years in three regions having low indicators of coverage with OPV-3. The coverage during the tour was equal to 98%. Furthermore, cleaning immunization was implemented annually within the frames of Simultaneous National Immunization and therefore recovered the children not covered with planned vaccination due to various reasons. In 2014, with the support of the WHO, monitoring for the control of OVP and vaccination against poliomyelitis

was held in two silent territories of Astara and Dashkasan, and conditionally silent territories of Oghuz, Goygol and Udjar as well as regions with low coverage of OPV (i.e. Khizy).

Within the frames of the strategy for the settlement of problems, additional immunization against measles and rubella was implemented from October 14 to 28, 2014 amongst target groups of children ages 11 to 15 years old in the city of Baju and Sumgayit, as well as Absheron and Aghdjabedi regions. Vaccination covered (re-coverage till November 5, 2014) 122246 children in Baku (94, 6% of the target group), 17945 children in Sumgayit (99, 3% of the target group), 13558 children in Absheron district (99, 5% of the target group) and 7964 children in Aghdjabedi region (94, 5% of the target group).

According to the valid normative and legal basis, the planned immunization amongst children aged 0-6 years old was held. Implementation both in the public and private MPI included the structure of the Ministry of Health, and voluntary immunization amongst teenagers and adults.

Immunization of children at secondary schools has not been implemented in the republic. Teenagers and adults get vaccinated only within the frames of additional measurements or national immunization campaigns (NIC). Thus, NIC was held against measles and rubella in the country in 2006. Vaccination covered 2.802.888 people (7-35 years old), exceeding 95% of the target group. In 2007, immunization against measles and rubella covered 93, 2% of the target group (35-36 years old).

Between the years 2011 to 2014, 2 new vaccines were included into the vaccination calendar (i.e. pentavaccine since July 2011 and pneumococcal vaccine since December 2013). GAVI's support for PCV in Azerbaijan was approved in 2011. However, due to the problems connected to the delivery of the initially requested medical form of PCV-13, it was postponed until December 2013, and instead of PCV-13 the country applied PCV-10. Azerbaijan requested for a change of the issuance form from PCV-10 to PCV-13 in 2016 and, this request was approved by GAVI in August 2015. Inclusion of IPV vaccine to the national calendar was planned since January 2016. Transfer from tOPV to bOPV will be implemented from April 2016. Inclusion of vaccines against chickenpox, rotavirus infection and vaccines against human papilloma is in the stage of review.

Aside from traditional vaccinations, other vaccines not included to the national calendar are also used in the republic – these are vaccines against hydrophobia, tularemia, brucellosis, anthrax, yellow fever, etc. Vaccination against these diseases is implemented voluntarily in the private or public MPI, upon epidemical indicators, in case of departure abroad or for treating purposes (hydrophobia).

Despite few privatizations within the health protection sector, improvement of provisions of the private services was observed, including the immunization services. The services are provided in the private clinics which are located mainly in Baku. Since 2013, the private clinics submitted reports to the regional CHE.

3.2. Vaccine supply, quality and logistics

The Innovation & Procurement Center (IPC) as the central purchasing authority of the Ministry of Health deals with the purchase of vaccines and consumption materials as well as further due storage and distribution for final consumers in the regional and urban levels. Since 2014, IPC purchases all vaccines through the Purchase Section of UNICEF and, the consumption materials are bought through open tender. Vaccines are purchased in compliance with the forecasts developed by RCHE and, the capacity of the purchased vaccines and consumption materials are determined upon annual request by RCHE. Purchase is implemented once a year.

The Center of Analytical Expertise (CAE) implements the function of the national controlling authority which controls the sales market and bears responsibility for the quality of the imported medical preparations, including vaccines.

According to the rules of the center, since March 2008, all preparations imported to the country shall be officially registered by CAE; import of the non-registered medical preparations including vaccines is prohibited by the laws of the country. In order to provide vaccines of guaranteed quality, the vaccines qualified by the WHO are

preferential despite an approved fast-track mechanism. Registration of vaccines requires a quality certificate for 5 series (only one series for other products) and mandatory registration of this product in countries having a strong regulatory system. According to the registration of the Azerbaijan Republic, only the preparations registered in the republic, including vaccines may be bought by the government and exclusions belong only to the vaccines qualified by the WHO. The pharmaceutical section collects and analyses data regarding the side effects.

According to the legislation, the vaccines like other preparations qualified by the WHO may be imported or purchased by the country without state registration allowing purchase of vaccine in force-majeure circumstances (usually, the registration procedure takes 7 months). The last evaluation of the work of NOC was implemented in September 2015.

3.3. Surveillance & reporting

Progress of fulfillment of the previous recommendations

No	Categories & Recommendations	Level of vaccines delivery chain			Responsible authorities	Fulfillment status
		Nat'l	Region	MPI		
	Acceptance of vaccines (E1)				IPC	
1	Considering the various temperature stability and the type of vaccines package, separate VAR is subject to develop for each type of vaccines. Thus, in case of simultaneous delivery of several types of vaccines separate VAR must be developed for each vaccine in delivery (E1:03a).	+			RCHE, IPC	Implemented since end of 2011.
2	Documentation in VAR of all cases of vaccines delivery with incomplete set of accompanying documents for these cases of actions and date of acceptance of the absent documents (E1:05a).	+			IPC	Implemented since end of 2011.
3	Organization of training for treatment of vaccines for personnel of commercial organizations temporary providing warehouse premises in airports for the arriving deliveries (E1:10a).	+			MH, IPC	Personnel of private company are trained for strict maintenance of the recommendations on the label.
4	Development of written plan of emergent actions in case of unexpected delay of vaccine's arrival to the central warehouse (E1:11a). Delay of arrival includes: 1) delay of the flight; 2) malfunction of the cold room in airport or boundary access point (if available); or 3) delay of transportation to the national warehouse. Indeed, delay of flight is the supplier's responsibility; however, the personnel of the immunization program may admit the delayed flight.	+			MH, IPC, RCHE	Unfulfilled.
	Temperature mode (E2)				IPC	

7	Inspection of fulfillment of the temperature monitoring in the central vaccine warehouse of IPC and on routes of auto refrigerators' for the purpose of discovery of any possible risks of improper storage including vaccine freezing (E2:01a).	+			IPC	Unfulfilled.
8	Development of the temperature map in the cold rooms of IPC with condition of a map of temperature zone is subject to develop for each cold room. Such maps includes: 1) air temperature in the entire room, on idling and full loading of the cold room; 2) zones not suitable for storage of vaccine, e.g., close to cooling devices (E2:02a).	+			IPC	Fulfilled в 2014 г. in the cold room No. 1.
9	Supplement of the cold room in the central warehouse of IPC with e-sensors for permanent monitoring of temperature (E2:08a).	+			MH, RCHE, CHE, MPI	Fulfilled for the cold rooms No. 1, 2 and 3 (re-qualified by WHO, Berlinger)
10	Supplement of the auto refrigerators of the central warehouse with e-sensors for permanent monitoring of temperature (E2:09a).	+			MH, RCHE, CHE, MPI	30-day e-devices for registration of temperature are purchased, personnel is trained and their usage at transportation of vaccines is planned for October 2014.
11	Organization in the level of CHE and MPI of the inspection of temperature for vaccine storage and registration of temperature in days-off and holidays (E2:07a).		+	+	CHE, MPI	Implemented since July 2011 (excluding Sundays).
12	Application of the unique form for temperature registration for storage of vaccines in the levels of CHE and MPI using the temperature registration list recommended in the standard quality plan of WHO / UNISEF and basing upon the experience of IPC (E2:07a).		+	+	IPC, CHE, MPI	Implemented since July 2011 (excluding Sundays).
13	Provision of storage of the temperature accounting upon the entire cold chain equipment and in all levels in safe place at least 3 years (E2:11a).		+	+		Fulfilled but not everywhere.
	Storage capacities (E3)				IPC, CHE, MPI	

15	Provision in all CHE the storage capacities sufficient for location of maximal quantity of reserves; reviewing the vaccines distribution plan till solution of the problem (E3:01a).		+			44 fridges of MK 404 brand are purchased through Purchase Section of UNISEF in the 4th quarter of 2013, delivered to Azerbaijan in March 2014 and distributed in the regional level at the end of April 2014.
16	Development of the emergent actions plan for all cases of breaks in operation of the cooling equipment in all levels considering the features of each institution. Such plan has to include the following minimal requirements: 1) discovery of the main risk source (e.g., disturbance of power supply, etc.); 2) emergent actions plan in written form; 3) Provision of existence in visible place of the information stand with phone numbers and responsible people's names for the emergent cases; 4) notify all personnel of the warehouses that in emergent cases the average safe storage temperature for ALL vaccines is from +2°C to +8°C; 5) select at least two reserve cold warehouses / rooms and, inspection of sufficiency of their power and the conditions of storage; 6) conclusion of agreements with emergent services; 7) regular review and inspection of the efficiency and development of the emergent actions plan jointly with the warehouse personnel and emergent services (E3:10a).	+	+	+	IPC	Fulfilled for the level of national warehouse in 2013. Unfulfilled in the level of PC and MPI.
	Buildings, equipment and transport (E4)				IPC	
17	Provision in the level of IPC: 1) conditions for washing hand in the vaccines packing zone or near (E4:06a); 2) permanent temperature mode in the zone of packing vaccines stored in the cold rooms at the temperature from +15°C to +25°C any time of the year (E4:06a).	+			IPC	Implemented since March, 2012.
18	Supplement of the cold and freezing rooms with e-sensors of permanent monitoring of temperature with possibility of printing the results as well as voice and light alarm or dialing system (E4:11a, E4:19a, E4:20a).	+			IPC	Devices are purchased through the Purchase Section of UNISEF in the 4th quarter of 2013, delivered to Azerbaijan in March 2014 and installed with support of WHO at the 3rd quarter of 2014 (Only in cold rooms. There are not freezing rooms).

19	Provision of the personnel of cold storage with warm dress for working in the cold rooms. (E4:12a).	+			IPC	Implemented since 2013.
20	Provision of temperature registration log in all auto refrigerators (E4:13a).	+			IPC	Implemented since 1st quarter of 2012.
21	In case of modernization of the transport park of IPC, provide purchase of auto refrigerators supplied with autonomous diesel cooling devices operating at turned-off engine or, use the reserve power device able to connect to the feed circuit for the cooling equipment (E4:23a).	+			MH, RCHE, CHE	The transport park of IPC is not renewed since 2011
22	Supplement of auto refrigerators with e-sensors of permanent temperature monitoring with possibility of provision of information to printing (E4:23a).	+			MH, RCHE, CHE, MPI	Purchase of 30-day e-devices of temperature registration for auto refrigerators of IPC is completed in the 4th quarter of 2013, delivered in April 2014, training with support by WHO was organized in the 3rd quarter of 2014. Start of usage of the devices is planned for October 2014
23	Provision of separate premise for vaccine and dry vaccine in warehouse of each CHE (E4:03a).		+		IPC, CHE, MPI	Recommendation in interpreted improperly
24	Implementation of necessary repair and construction works in CHE and MPI, strengthen the doors and windows for reliable storage of vaccines and documentations and, supply the premises with air conditioning systems as necessary (E4:03a).		+	+	RCHE, CHE	Fulflled unsystematically
25	Annual inspection of the manual fire-extinguishers in all levels (E4:02a).	+	+	+	RCHE, CHE	Fulfilled in the central warehouse, in the level of PC and MPI – incompletely.
26	Usage of e-means of permanent temperature monitoring in CHE (E4:10a).		+		RCHE CHE	Purchase of 30-day e-devices of temperature registration for CHE level is completed in the 4th quarter of 2013, delivered in April 2014, training with support by WHO was organized in the 3rd quarter of 2014. Distribution of the devices to the regional CHE is planned for 2014

27	Prevention of vaccine storage in refrigerators having ice covers without shelves (E4:10a).		+		RCHE, CHE	New MK 404 refrigerators are equipped with shelves. Old fridges were not perfected.
28	Provision of installation and turning-on the e-generators in all CHE (E4:16a).		+		RCHE, CHE	Generators are purchased and installed in some (not all) regional CHE.
29	Turn-on the cooling device used for vaccine storage in CHE to the voltage stabilizers (E4:18a).		+			Unfulfilled.
30	Install facsimile devices in all warehouses of CHE. As necessary, train the CHE personnel for working with modern communication facilities (E4:21a).		+		MH, RCHE, CHE, MPI	Instead of facsimile devices, computers are provided with switching on Internet since 2012.
	Technical service (E5)				MH, RCHE, CHE, MPI	
32	Development of program for prophylactic technical service for cold chain equipment (E5:02a).	+	+	+	CHE, MPI	Fulfilled only for IPC.
33	Development of IPC program for planned repair of vehicles including demounting or substitution of main parts: clutch line, engine parts, speed boxes, etc. The period of repair for analogical vehicles may differ but they must be forecastable (E5:03a).	+			ISC	Fulfilled.
34	Assignment of personnel responsible for organization and control of prophylactic technical service for cold chain equipment in CHE and MPI (E5:02a).		+	+		Fulfilment is not completed.
35	Solution of the issue of repair or writing-off from balance of CHE of the cooling devices out of order for a long time (E5:5a).		+		IPC, CHE	Fulfilment is not completed (some regional CHE have a functional cold chain equipment).
	Management of reserves (E6)				IPC, CHE, MPI	
36	Provision of accounting of all data regarding settlement in the warehouse of all vaccines, solvents and consumables for immunization in the system of reserves accounting in the level of IPC and CHE (E6:04a).	+	+		IPC, CHE, MPI	Fulfilled in the national warehouse and incompletely fulfilled in the level of PC.
37	Provision of separate accounting in the reserve accounting system in all levels for the solvents not delivered in the day of delivery of vaccines (E6:05a).	+	+	+	RCHE, CHE	Unfulfilled.
38	Provision of separate accounting in the reserves accounting system in all levels of syringe movements including those delivered additionally to the separately purchased vaccine (E6:05a).	+	+	+	IPC	Fulfilled.

39	Development and application of the nique system of opportune previous notifications for accepting warehouses (local CHE and MPI) regarding delivery and acceptance of vaccine (including the vaccine's type, quantity and date) in written if possible (E6:08a).	+	+		CHE, MPI	Fulfilled.
40	Showing the date and time for acceptance of vaccine in the voucher form of IPC for acceptance and issuance.	+			MH, RCHE, IPC, CHE, MPI	Fulfilled in the national level since the 4th quarter of 2011.
41	Application of the vouchers system for acceptance / issuance in the level of delivery of vaccine from CHE to MPI considering the practical experience of IPC (E6:13a, E6:14a).		+		MH, RCHE, IPC, CHE, MPI	Regulated within the frames of PSA developed hitherto. Own vouchers are prepared in some regions but not in all ones
42	Application of the system of policy on supporting the reserves level and control of its maintenance in all institutions of the vaccines storage chain (E6:20a, E6:21a).	+	+	+	RCHE, IPC, CHE	Fulfilled since July 2011 but used uniformly in all MPI.
43	Development and application of guidelines regarding the procedure and period of physical inventory of vaccines in all levels (IPC, CHE and MPI). Ensuring accounting of the inventory results and implementation of physical inventory of all vaccines, solvents and consumables for immunization and development of inventory acts not less than once per quarter in IPC and each time during acceptance of vaccine in CHE and MPI (E6:22a).	+	+	+	RCHE CHE	The guidelines are developed since 2012 and their most part is fulfilled.
44	Preparation of stillage maps for cooling equipments in в IPC and CHE (at usage more than one cooling device) showing the type of the stored vaccines, consignment numbers and expiry date (E6:25a).	+	+		MH, RCHE, CHE, MPI	Fulfilled since 2013.
45	Application of the computerized system of reserves accounting in CHE (E6:01a).		+		MH, RCHE, CHE, MPI	Application is postponed till 2014 as a part of the immunization component of the program of electronic health system. Unfulfilled. Hardcopy forms are used. Medical e-cards are not applied yet.
46	Development of standard form of application for delivery of vaccine for MPI and CHE ordering additional vaccine and application of their practical usage (E6:07a).		+	+	RCHE, CHE, MPI	Fulfilled since July 2011.
47	Development and application of guidelines regarding procedure of accounting the spoilt vaccine and consumables for immunization in the accounting log of CHE and MPI (E6:15a).		+	+	RCHE, CHE, MPI	Fulfilled since 2012 but used unsystematically.

48	Provision of controlling the conditions for storage of consumables for immunization in all levels and, prevention of storage of the syringe boxes on floor (E6:26a)		+	+		Fulfilled.
49	Provision in all levels of safe storage of the accounting documentations regarding the vaccine reserves in the archive shelves (safes) locked with key (E6:7a).		+	+	RCHE, CHE	Partially fulfilled.
	Distribution (E7)				IPC	
50	Development of vaccines distribution plan and its submission to the accepting warehouses of all levels (E7:01a).	+	+			Unfulfilled.
51	Development of PSA for proper loading of auto refrigerators (E7:07a).	+				Unfulfilled.
52	Purchase and package of e-indicators of freezing to all thermal containers used for transportation of vaccines sensitive for freezing from IPC to CHE; location of one additional freezing indicator in the cabin of auto refrigerator for general control of temperature during transportation till installation of devices for permanent temperature monitoring in auto refrigerators with possibility of printing the results (E7:10a).	+				The freezing indicators were purchased in the 4th quarter of 2013, delivered in April 2014, training of personnel with support by WHO was held in 3rd quarter of 2014. The freezing indicators are subject to distribution till the end of 2014.
53	Perfection of the emergent actions plan during vaccines delivery (E7:12a). According to EVM, the emergent transportation plan depends on circumstances; however, it must mandatorily include these components (update as necessary): 1) discovery of the main risk source (e.g. damage of vehicle, malfunction in the work of refrigerating device, lack of fuel, etc.); 2) discovery of the principal risks for each route (bad or flooded roads, snow or ice-covered ground. Unsafe conditions, etc.); 3) development if written plan for each route showing the contact data of the responsible people, the location of the reserve cold warehouses, ice sources, etc.	+				Implemented since 2012.
54	Maintain the unique principle of vaccine distribution for the National Immunization Program and delivery of vaccine from the central warehouse of IPC not only to regions but also CHE in Baku city.	+				Unfulfilled. CHE of Baku city still take vaccine by own transport.
	Vaccines management (E8)					
55	Personnel's additional training for working with FTI before application of new pentavalency vaccine delivered from FTI (E8:06a).		+	+		Fulfilled in the 4th quarter of 2011

56	Certification and application of new accounting form of immunization program (Form No.5) in compliance with the new calendar of vaccination including information regarding movement of vaccines and expression of the vaccination data upon all categories of age (E8:12a).	+				Fulfilled since 2012.
57	Development and application of standard method and forms for accounting the losses in the level of MPI and regional CHE. As template, the control table for monitoring of the losses as well as the demand and level of sources may be used – Annex 1 (E8:13a).		+	+		Fulfilled since 2013. This table is useful for monitoring of the demands in vaccines, minimal / maximal level of source and the point of order in the level of MPI. The table must be changed for the PC level.
58	Provision of modernization (automation) of monitoring of the efficiency of immunization program and accounting of losses, first of all, in the level of regional CHE and RCHE (8:13a).	+	+			Implemented since 2013.
59	Holding arrangements for curatorial supports in IPC, CHE and all MPI upon management efficiency of vaccines (E8:14a).	+	+	+		Partially fulfilled within the frames of the PR program on curatorial support to application of the PCV10 vaccine in the levels of CHE and MPI (2013)
	Information system and functions of supplementary management (E9)					
60	Development of guideline for user of EVM for CHE and MPI basing upon the IPC experience (E9:01a).		+	+		Fulfilled in 2012.
61	Necessary training for MPI personnel and provision of methodological documents, in particular, upon usage of FTI (E9:05a).			+		Fulfilled in the 4th quarter of 2011.
62	Development and application in all levels of the standard method of accounting the annual demand in vaccines and consumables. As template, the control table for monitoring of the losses as well as the demand and level of sources may be used – Annex 1 (E9:08).	+	+	+		Fulfilled since July 2011. This table is useful for monitoring of the demands in vaccines, minimal / maximal level of source and the point of order in the level of MPI. The table must be changed for the PC level.
63	Inclusion of the issues of management of the medical wastes to the long-term complex budget plan of development (E9:13a).	+				Partially fulfilled.

64	Completion of the inventory and analysis of the cold chain of the entire CHE and MPI system. Annual update of database in the future. Usage of information regarding the planned modernization of the cold chain (E9:10a).	+				Completely fulfilled for the level of PC (CHE / regional CHE) in the 4th quarter of 2012, the next update is planned for the 4th quarter of 2014.
65	Settlement of the issue of purchase and usage of vaccines supplied by FTI including to the technical specifications the requirement regarding existence of monitoring and control of fulfillment of this requirement by the suppliers of equipment.	+				Fulfilled in 2014 upon the country's passing to purchases through the Delivery Section of UNISEF.

3.3.1. Epidemiological supervision and accounting

Epidemiological supervision of the infectious diseases in the republic is implemented by the Republican Center of Hygiene & Epidemiology, urban and regional centers of hygiene and epidemiology, the Republican Plague Station with regional sections, Republican Sanitary-Quarantine Inspection with sanitary-quarantine sections and the Center of Hygiene & Epidemiology of the Nakhichevan Autonomous Republic with its urban and regional centers of hygiene and epidemiology. The legislative basis in the field of provision of the population's sanitary and epidemiological welfare is based upon the Constitution of the Azerbaijan Republic and includes the Laws of «The population's sanitary and epidemiological welfare», «Protection of the population's health», «Immunoprophylactic of infectious diseases» and other normative and legal acts like sanitary rules and hygienic normative.

According to this legislation, the population's epidemiological welfare is provided by means of:

- prophylaxis of diseases in compliance with the sanitary-epidemiological situation;
- development and realization of targets programs for provision of the population's epidemiological welfare;
- state epidemiological control;
- holding anti-epidemiological (prophylactic) arrangements;
- implementation of the scientific researches in the field of provision of the population's epidemiological welfare;
- measurements for population's opportune notification regarding occurrence of diseases and the state of the living environment;
- measurements for population's hygienic literacy and propagandizing the population's healthy lifestyle;
- measurement of calling to responsibility for violation of the legislation in the field of provision of the population's epidemiological welfare.

The tasks of the epidemiological supervision include:

- evaluation of the scale and character of expansion of infectious disease;
- discovery of tendencies and evaluation of the dynamics of epidemic process of this infectious disease in time;
- regionalization of the territories considering the degree of the real and potential epidemiological trouble upon this infectious disease;
- discovery of the population's contingencies exposed to high risk of disease due to the features of their production, household or other life conditions;
- discovery of the reasons and conditions determining the observed character of occurrences of the epidemic process of this infectious disease;

- determination of the adequate system of prophylactic and anti-epidemic measurements as well as planning of consequence and terms of their implementation;
- supervision of the scales, quality and efficiency of the implemented prophylactic and anti-epidemic arrangements for the purpose of their rational correction;
- development of periodical forecasts of the epidemiological situations.

One of the deputies of the minister of health is te Head Public Sanitary Physician responsible for the sector of sanitary and epidemiological control. This structure supervises implementation of the appropriate orders and edicts of the Ministry of Health. Similar supervision is implemented by the Republican Center of Hygiene and Epidemiology over the urban and regional CHE. Epidemiological supervision is an uninterrupted systematic collection, analysis, interpretation and distribution of the data expressing the state of health. CHEs use the supervision data for the description and observation of the population's diseases and state of health as well as planning, application and evaluation of the prophylactic programs and actions. Epidemic supervision of the infectious diseases is implemented by the regional and urban CHEs. MPIs of various levels participate in the collection of information considering the specific features of each nosological form, jointly with CHE (discovery, registration, passing of information regarding them, etc.). During the registration of any managed infectious disease, the PCHE accepts urgent notification and passes it to the territorial CHE. Upon acceptance of the information, the specialists of the territorial center implements epidemiological research as well as anti-epidemic measurements in the source and fill in an epidemic card. Vaccine-managed diseases are supervised in compliance with the accepted standards of the WHO, and necessary material (blood, excrement, throat swab, etc.) gets collected depending on the type of disease for further analysis in the lab.

The official statistical report No.1 regarding «Infectious and parasitic diseases» is submitted to RCHE each month. This monthly report gets developed based upon the urgent notifications (Form No. 058) and aggregated data regarding separate infectious and parasitic diseases. In 2009, the Reporting Form No. 1 was added as separate nosology of diarrhea caused by rotavirus infection and meningitis, caused by Hib and pneumococcal infections.

The official statistical report included 67 infectious and parasitic diseases, 9 of which were managed infections. Epidemiological supervision over dyphteria, measles and rubella as well as acute flaccid paralysis is presently implemented based upon nominal lists.

EIDSS is Integrated Diseases Supervision System strengthening and maintaining control on and prevention of diseases within the frames of the "Unique World – Unique Health" treatment at integration of veterinary and medical supervision as well as supervision of disease carriers. Aside from edict by MoH, an appropriate e-form for infections was developed and included the Public Statistic Form No.1. The national guideline for supervision of infectious diseases was prepared in the country within the project of the health sector's reform in close cooperation with WHO in the years of 2008-2009. This guideline included the main standards for discovery of the diseases as well as investigations and accountings based upon the unique treatment to interpretations, classification of cases and laboratory certifications. The guideline covers all vaccine-managed diseases as well as other accounted diseases. EIDSS has been entirely functional since April 2010. It allows passive and active supervision and notifies regarding the events in the mode close to real time and, implementation of epidemic investigations based upon separate morbidity cases as well as full analysis of data and taken decisions including the history of diseases. The program database contains data of aggregated diseases and the veterinary data as well as samples and laboratory data connected to the morbidity cases. The program allows avoiding the deficiencies in the work of the epidemic supervision system like contradictions in discovery of the cases, inopportunity, unawareness regarding the requirements of the accounting and necessity of registration of this disease as well as assumption that anybody else (e.g. laboratory) will register this case and not know whom to notify regarding the discovered disease.

Specialists responsible for the data of epidemiologic researches and accountings were trained to work with the program and, computers were installed in all urban and regional RCHE. EIDSS database provides instantaneous

transfer of information to any infectious disease from any region to national level and its epidemiological analysis as well as monitoring of the dynamics of diseases at the national level. Since December 2014, the program was updated until the 6th version; the Web version of the program and the Analysis and Visualization of Researches (AVR) were developed. All regional CHEs are passed to the Web version of the program. Both the Web version and the main version of the EIDSS program exist in the level of MH, PCHE and Plague Station.

Besides the arrangements directed to total supervision of the system, the Ministry of Health of Azerbaijan implemented active observation and special strategies for target diseases such as poliomyelitis, measles and rubella.

On February 6, 2009 the Ministry of Health of Azerbaijan issued edict of «Strengthening the epidemiological supervision of measles, rubella and SVC». According to the edict, each case suspicious for measles and rubella was registered, material was collected from the patient for laboratory investigation and the suspicious cases passed individual epidemiological investigation. Certified results of the national laboratory investigations are approved by a reference-laboratory. Supervision of enteroviruses in the environment continued in 2014, including the implementation of the National Actions Plan for maintaining a status territory free of poliomyelitis between the years 2014-2016. According to the recommendations of the WHO, in 2014 the number of the subnational territories covered by the epidemiological supervision on the environmental objects increased from 10 to 1,3 with the inclusion of the city of Gadja, including supervision from the regions Zagatala and Gusar; selection of samples from waste waters was implemented in Nakhichevan Autonomous Republic in March 2015.

In 2014, supervision of the environment was implemented at the bordering territories and the zones of dislocation of refugees and IDPs, including the towns and regions of Agstafa, Astara, Baku city, Jalilabad, Imishly, Gazakh, Lankaran, Saatly, Sabirabad, Sumgayit, Gusar, Gandja and Zagatala. Collection and transportation of the samples were implemented by the personnel of the local CHEs and, storage and processing of the samples were implementd by the virologic laboratory of the Republican Plague Station (RPS).

In accordance with the "Recommendations on surveillance for polio virus in the environment, ” WHO, 2005, section 2.4, 2.5 and 2.6; "Guidelines for the laboratory studies of poliomyelitis", 4th edition. The WHO, 2005 and "Recommendations on surveillance for enteroviruses in support of polio eradication," WHO Geneva. 2005 used the following methods of supervision: for the monitoring of the pre-conditioned places held collection of wastewater samples. Consistent with epidemiologists regions and municipalities, the 2 points of collection were determined in each collector. The proportions of 1 to 5,000 residents of all ages and 1 in 2,000 people under the age of 15 years;

- Gauze pads were used for sampling. Torn gauze of 25 layers were taken for manufacturing of tampon and fixed with a fishing line. Ready swabs were thrown into the reservoir pool. Swabs were incubated in water within 3 days;
- Then, the collected samples were located into sterile vessels. Date and place of taking were shown on the sample. The samples were delivered to the laboratory at the temperature from +2 to + 8 C (covered with cold pillows in the fridge bag);
- The delivered samples were processed by the lab personnel. The gauzes were shaken in the vehicle for discharging the cellular material for avoiding occurrence of aerosol. The gained suspension was processed with chloroform and refined.
- In 2014, the samples were collected each month from January to December. In total, 294 samples were collected from the towns and regions of Agstafa, Astara, Baku city, Jalilabad, Imishly, Gazakh, Lankaran, Saatly, Sabirabad, Sumgayit, Gusar, Gandja and Zagatala. Upon appropriate processing, all samples were sent to the Regional Reference Laboratory of the WHO in Moscow, together with the samples from OPV, and maintained an appropriate mode (7 times).

BCE collected samples were investigated at the Regional Reference Laboratory of WHO on the basis of IPEV, named after Chumakov (Moscow). Within 2014, the Reference Laboratory investigated 294 wastewater samples

and 46 samples from children having OVP. Wild polio virus was not discovered in any of the samples. The measurements were directed to quality improvement of the epidemiological supervision of OVP who monitor the supervision of OVP in «silent» and «conditionally silent» territories, as well as those with low coverage of OVP. In this regard, upon support by the WHO monitoring, supervision of OVP against polyomilelitis was implemented in 2014 in 2 "silent" (Astara, Dashkasan), «conditionally silent» (Oghuz, Goygol, Udjar) and the regions with low coverage of OVP (Khizy). Thus, additional measurements for strengthening vaccination agaist polyomielitis were taken in the "silent", "conditionally silent" and territories with low coverage of OVP.

Results of epidemiological supervision of OVP in 2014

Number of MPI submitting OVP reports	Completion of accounting a submitted in the national level (%)	Opportunity of accounting b in the national level (%)	Total number of the registered non-poliomyelitis cases of OVP	Indicator of morbidity of the non-poliomyelitis OVP	% of total number of OVP with adequately collected samples of clinic material	Index of morbidity of the non-poliomyelitis OVP
2432	100%	98%	23	1,09	100%	1

For the purpose of perfection of submission of weekly accountings on OVP from subnational to national levels, the zero accounting tables are developed and included into the EIDSS e-system.

In 2014, there was continued analytic work on epidemiological supervision of OVP based upon the indicators of the supervision of OVP, included in EIDSS, accounting forms of OVP, continued centralized accounting system upon "feedback" principle from the national to subnational level (as part of monthly accounting), results of the laboratory investigations from the OVP cases and the environmental objects.

Supervision in the field of vaccine safety is implemented in Azerbaijan through the Republican CHE and Center of Analytic Expertise of medical preparations, although the main share of the monitoring is implemented factually within the frames of the NPI. Then, NCO accepts the NPI data regarding PIAM and tries to supervise all cases.

The measurements of controlling PIAM in the country are specified in several documents including:

- Resolution by the Cabinet of Ministers titled "The program of measurements for immunoprophylaxis of infectious diseases in the years of 2011-2015".
- Edict No. 139 by the Ministry of Health of the Republic dd. 1998 titled «The measurements for safe vaccination».
- Edict No. 99 by the Ministry of Health of the Republic dd. 01.09.2005 titled «Vaccination against measles and rubella».
- «Guidelines for vaccination against measles and rubella» certified by the Ministry of Health in 2005 (including the investigation map of PIAM, investigation map of anaphylactic shock, provision of first aid in case of post-vaccinal complications, etc.)
- Edict No. 08/09-3098 by the Ministry of Health of the Republic dd. 09.11.2006 titled «Maintenance of the vaccination calendar with consideration of indications and contra-indications».

Control of PIAM is coordinated by:

- The Republican Center of Hygiene & Epidemiology (CHE)
- Center for Analytic Expertise of Medical Preparations (NOC)

The country has a functioning system of epidemic supervision of PIAM at the national, subnational and level of medical institution (registration, notification, and accounting). Commission of PIAM investigation was established

in 2006 upon the edict of MoH. The data of post-vaccinal reactions and complications are included in Form No. 5 each month starting from 2012. The PIAM registration log is renewed within the Plan of Quality Improvement of the Data of Immunization Program.

According to the results of joint evaluation in 2015, the PIAM supervision system is not sufficiently functional or supplied for collection of information and reporting about the appropriate cases because there is not a standardized protocol containing clear interpretations of the cases or description of the order of accounting during monitoring and the investigation process. Thus, the accounting regarding the PIAM cases is improper. Medical personnel's reluctance for the submission of reports regarding PIAM is also noticeable. The PIAM supervision mechanism is functional at the regional and national levels.

Some improvements would provide positive results including:

- Review of the PIBE (post-immunization by-effect) supervision system: interpretation of the PIBE cases in compliance with the recommendations of WHO;
- Filtration of the cases in the level of medical institutions and / or regional level;
- Development of the modern protocols and forms as well as application of regulations of accounting;
- Implementation of training at all levels of supervision, classification and accounting on PIBE; additional trainings for causality evaluation for the medical personnel;
- Provision of proper planning and grounding the formation of the budget of the supplementary supervision program;
- Increase of significance of the preceptorship item in the field of supervision and monitoring of the waters utilization in the medical institutions of all regions.

The team of the National Commision of post-vaccinal reactions and complications:

Chairman: N. Guliyev – Director of the Pediatrics Institute

Members of the Commision:

M.Mammadova, neuropatologist of the Children's Neurological Hospital

G.Hasanguliyeva, assistant of the Children's Diseases Department of the Medical University

E.Kamranov, Head of the Therapeutical Section of the Clinical Medical Center of the Baku city Health Department

L. Akhundova, allergologist of the Children's Clinical Hospital No. 6

E.Jafarova, immunologist of the Children's Clinical Hospital No. 6

A.Aliyeva, Deputy General Director of the Republican CHE

G. Aliyeva, docent of the Infectious Diseases Department of the Azerbaijan Medical University

R.Jafarguliyev, resuscitation physician of the Clinical Medical Center of Baku city Health Department.

3.4. Demand generation & communication

Immunization is implemented in the Republic upon the principles of voluntarily. The preferential significance for success of immunization pertains to vaccination both from side of parents and the medical personnel and mass-media. Pertaining this formation, a lot of various factors are impacted. The RCHE and the Center of Public Health and Reforms have good contacts with mass-media as well as experience of submission of proper and thorough going information at emergent cases. There is efficient background with mass-media and, necessity of the population's periodical notification is well-known.

The plan of communications in conditions of crisis situation is developed in Azerbaijan; however, unique communication plans within the frames of NPI is not realized. Target financing of the concrete communication projects like application of PCV is implemented (owing to the GAVI's grant for application of the PCV vaccine). Concrete materials were issued regarding vaccines against pneumococcal infection and poliomyelitis as well as sanitary enlightenment.

Since 2007, Azerbaijan actively participates in holding of the European Week of Immunization (EWI) and uses this event as a national informational campaign. The idea of EWI became very successful in the work of mobilization of resources and gaining the attention of the community. This initiative is reviewed by the government as one of the best possibilities for achievement of high coverage with vaccination through stable social and enlightened campaigning of immunization. However, there are difficulties in connections regarding explanatory works; particularly, regarding connections with medical personnel, propaganda of mobilization of resources and application to small but increasing movement acting against vaccination: it is particularly concentrated among the parent groups; although, even some specialists of health act against vaccination.

According to the plan, each urban and regional CHE as well as pediatric service implements propaganda within campaigns on the actual tasks. The public health center and reforms of the Ministry of Health established in 2007 are the leading organization on social mobilization and increase of awareness of the community at the national level.

Besides the current achievements, there are significant problems in the field of social mobilization i.e. absence of reliable web-resources on immunization at the national level.

The second important problem is the absence of long-term complex strategies for cooperation with mass-media. Despite the existing relations between mass-media and press-service of the Ministry of Health, there are unused possibilities from the point of view of opportunity and efficiency.

In plan of the further perspective in the content of MoH there is an Intersectoral Coordination Committee for realization of the international projects also used as a means for communication with the partners working on immunization.

In 2013, within the plan of preparation for the application of pneumococcal vaccine at technical support of UNICEF in some regions of the Republic of Baku city, within the frames of the focus groups, the necessity and efficiency of prophylactic vaccination was discussed with parents, medical personnel and the total population. PCHE helped prepare communication arrangements reflecting the strategy of social mobilization and agitation, preparing multiple pamphlets on application of the pneumococcal vaccine for parents in quantities of 43000 pcs.

In March 2015, assessment of the introduction of the pneumococcal vaccine was conducted in the country. The evaluation showed that all visited health institutions expressed their satisfaction with the organized trainings on PC. Instructions and training materials on usage of PC were accessible at an interview in these health institutions. Health professionals asked to follow the instructions for the vaccination of children with delayed vaccination. At the same time, additional information on the management of adverse events following vaccination was asked.

In most parts of the coverage level, 1 PC had less coverage than Penta 1. During the interview, taken at 3 institutions (15%) of health at the subnational level, medical workers said that the local population, in particular at the beginning of the introduction of the PC vaccines were against immunization with the vaccine and, some parents refused to carry out several injections during one session.

Knowledge of the medical personnel passing the interview was good as a whole; 95% of the health care workers knew the calendar of PC inclusion and, 80% correctly pointed out diseases preventable with PC vaccine. Vaccination sessions were observed in twelve health facilities and in 10 of these sessions (83%), vaccines were stored and used properly. The proper method of the application of vaccine was observed in 11 sessions (92%).

16 mothers were interviewed after the vaccination sessions and, 7 of them (44%) knew some or all of the children's vaccines and, 11 of 15 (73%) knew the time of the next vaccination, etc.

Before using the PC vaccine, the RCHE and UNICEF developed a strategy of social mobilization and agitation for usage of PC vaccines.

Identifying strengths are the materials developed for parents regarding usage of PC. Brochures for parents on PC vaccines were printed and distributed in hospitals. Updated calendars, including PC vaccination, were suspended in Medical Institutions. At the same time, materials on usage of PC vaccines were submitted through newspapers as well as national TV and media.

Numerous difficulties were identified while presenting PC vaccine to population. Agitation, providing public and social mobilization plan had not been fully implemented.

3.5. Programme management

Immunization is one of the priorities of the government's policy. The National Immunization Program of Azerbaijan Republic is supported by the President and the governments, who seek to limit the spread of communicable diseases, reduce disability and death from vaccine-preventable diseases. The normative-legal basis for the activities of the state, in the field of immunization is found in the Law of "Immunoprophylaxis of Infectious Diseases," which was adopted in the year 2000. The Law of Azerbaijan Republic of «Immunoprophylaxis of communicable diseases" dd. April 14, 2000 established the legal and economic basis for the state policy, carried out in the area of immunization of infectious diseases for the protection of population health and health and disease.

In 2009, the Cabinet of Ministers of the Republic of Azerbaijan adopted a state program on the "Immunoprophylaxis of Infectious Diseases", covering the period of the years 2010-2015. The program sets out the main principles of state policy in the field of immunization. The basic principles in the field of public policy for immunization include: the need for preventive vaccinations for all citizens; free preventive vaccination to the population in the state and municipal medical institutions; implementation of public target programs and regional programs;

usage of effective medical immunobiological preparations for immunization; training of health workers in the field of immunization; the social protection of citizens in the post-vaccination complications; improvement of the statistical monitoring system; provision of conditions for the participation of humanitarian organizations in the field of immunization; development of international cooperation.

In accordance with the law in the field of immunization citizens have the right to:

- Receive from health care providers a complete and objective information on the need for preventive vaccination, the consequences of refusal from them, possible vaccine-related complications,
- To select medical institutions, regardless of ownership,
- Before the immunization budget funds held in public hospitals medical examination and inspection, receiving immunizations on epidemic indications, etc.

The national immunization program has a centralized management of the Ministry of Health, which brings together and coordinates all resources and immunization activities.

The Ministry of Health has formulated a strategy for a health reform concept of health care services in 2006. In early 2008, an updated and enhanced version of the concept of reform was completed by the Ministry of Health, in consultation with stakeholders. Concept of Reform of Health Services indicates the direction to strengthen primary health care, including the development of meeting the requirements of skills, organizational forms and new structures. A new approach to health care delivery, which expands the scope of services presented in primary care, with the best use of existing capacity and ambulatory structures, including clinics is developed. Thus, the transition period provides access to a wide range of services of preventive and curative medicine of appropriate quality. Other parts of the concept outline reforms aimed at specific parts of the health care system, which will ensure the transition to the enhanced primary care, including reform of logistics and human resources, and the introduction of new rewards / incentives by reforming health financing.

Activities of the Ministry of Health is guided by the Constitution of Azerbaijan, the Law "On public health", "On the sanitary-epidemiological welfare of population", "About immunoprophylaxis of communicable diseases" and other normative-legal acts of the state.

The Ministry of Health carries out the organizational and methodological work, exercises state supervision, controls over the execution of the established regulatory rules during the public immunization activities throughout the country, the analysis of statistical data on the managed and other infectious diseases, as well as the issuance of licenses to allow vaccination in the private sector and plans to supply vaccines.

The national immunization program has organizational structures at the national and sub-national levels. Republican Center of Hygiene and Epidemiology through a network of city and regional centers oversees the organization and execution of immunization in the field, following the collection of statistical information on infectious diseases at all levels, identifies the target groups; provides vaccine all medical institutions and items in accordance with their plans, applications, provides storage at the district level, 3-month stock of vaccines in the cold storages CHE, is the annual applications for the purchase of vaccines.

Analytical Center of Expertise (NCO) established on the basis of the order of the Ministry of Health of Azerbaijan Republic in June 2007. The activities of the Centre for Analytical Examination is based and carried out according to the regulations approved by the Ministry of Health. According to the current situation of the Centre for Analytical Examination is responsible for the safety and quality of all incoming and medicines used in the country, they are substances of medical immunobiological preparations, etc.; Innovation and Supply Center was established by order of the Ministry of Health of Azerbaijan Republic in November 2005.

Activity of the Innovation and Supply Center is based and carried out according to the regulations approved by the Ministry of Health. According to the regulations, based upon the applications from public health institutions approved by the Ministry of Health of Azerbaijan Republic, the Center for Innovations and Supply develops annual plans for the purchase of medical equipment inventory and other preparations, medical immunobiological drugs and vaccines, engaging in procurement of medicines, including medical and biological agents and, is responsible for storage and distribution of medicines.

Vaccines needed for the expanded immunization program purchased through the Department of Supply of UNICEF. At the operational level, the vaccination materials delivered to the district center of Hygiene and Epidemiology are distributed monthly in accordance with the plans, requests for medical institutions: children's clinics, rural hospitals, medical and health units, where it is carried out in accordance with the national calendar of vaccination routine vaccination of children up to 6 years . Maternity hospitals, children's hospitals, medical and health centers provide services for vaccination. The process of birth registration is as follows:

for every childbirth the medical institution fills out the form No. 103. The form is self-copying and consists of three parts. The first part is sent to the Office of Health Information and Statistics of the Ministry of Health to enter into Database, the second part is given the child's parents, and the third part remains in the medical organization. Parents with form No. 103 address in the Registration Department of the district, where the child’s birth is registered and the birth certificate is issued.

Registration in children's clinics or other institutions conducted immediately after the exit from the hospital. After checking into the clinic, the newborn patient card is opened (F 112) and parents are issued an electronic health card, which are used for recording vaccination status. Twice a year MPI carries local bypass for the identification and registration of contingent target group. The local doctor and patronage nurse inform the child’s parents in advance regarding the need for vaccinations.

In Azerbaijan, vaccination of children is carried out in the vaccination room of children's polyclinics, rural hospitals, outpatient clinics, medical and medical centers and private clinics, with the permission for private medical activity. The work of these medical institutions on immunization is carried out in accordance with the regulations, normative and methodological documents in the private sector even if the license for this type of activity. Each

institution responsible for providing vaccination services has a separate room for the permanent / fixed vaccination services.

The purpose of the health facility, cabinet of immunization and vaccination teams is to achieve high rates of vaccination (not less than 95% in the age decreed), reduce morbidity and mortality from vaccine-preventable diseases through the introduction of new vaccines, training of health workers, and monitoring of post-vaccination complications and prevent their development. Management of the medical facility approves the order of organizing and conducting vaccination, carried out the appointment of officials responsible for the vaccination work, reception, storage and use of medical immunobiological preparations, adherence to the cold chain, collection, temporary storage and disposal of medical waste generated by immunization and, affirms the position on the field vaccination teams.

The locally established reporting system provides a regular program of vaccination data (in terms of vaccination and vaccine management) of health facilities at the district level and then the national level. Form No. 5 revised in late 2011 with the inclusion of additional information on adverse events following immunization, non- vaccinated children and a medical exemption from vaccination, is the main form used to reflect these aggregate data at the facility level. Institutions fill this form and are submitted monthly to the district level. Each district has at least 1-2 computers for data entry; regions submit the aggregated data on Form No. 5 to the national immunization program in a paper form on a monthly basis. However, since the introduction of the updated and expanded version of the form No. 5, at the end of 2011 there were problems with the completeness of reporting. This updated form No. 5 requires submission of additional information (e.g., data on adverse events following immunization, medical taps, on the causes of missed vaccinations) and these fields are not always completely filled at the level of healthcare institutions.

The Office of Information and Medical Statistics of the Ministry of Health collects data from health facilities, processes, analyzes and distributes the data and uses it for prediction. The electronic health information system (HIS) is used since 2007 with limited functionality according to the immunization. The system includes 100% of the data from the form No. 103 for children born in hospitals in 2007 and also includes a retrospective - introduced immunization data from 2006. The Ministry of Health is currently piloting an e-health system in which every registered child receives an electronic health card, which is all of the information related to the calls for health, including immunizations. Next steps include the development of a functional module on the immunization for analysis, use and dissemination of data on immunization.

In 2007, Azerbaijan joined the initiative of the European Immunization Week, which is organized by Member States of the WHO European Region in April of each year. The first European Immunization Week was opened by First Lady Mehriban Aliyeva in 2007 and has had great success in mobilizing resources and public attention. This initiative is regarded by the Government as one of the best opportunities to achieve high coverage of vaccination through successive campaigns to raise public awareness about immunization.

Coordination of immunization programs

From 2006 to 2011, coordinating immunization programs was dealt by Intersectoral Coordination Committee for International Projects. In 2012, upon the initiative of the Ministry of Health and international partners, including the World Health Organization and the Fund Rostropovich-Vishnevskaya's Fund, in order to ensure sustained coordination was agreed to enable the immunization program in the function of NCM (National Coordinating Mechanism for HIV, tuberculosis and malaria) which subsequently changed its name to the National Coordination mechanism for International Programs in Azerbaijan. This proposal was supported by the manager of the Global Fund, as well as its secretariat and unanimously adopted by the Council of CCM at the 22nd meeting of the Coordination Mechanism. The Working Group coordinating the immunization program established under the Board of the National Coordination Mechanism and regularly holds meetings at least once every quarter.

RCHE within immunization programs for many years has been working closely with international organizations such as WHO, UNISEF, GAVI and others, in particular in the acquisition of immunobiological preparations, cold equipment. In addition, the partners provide advisory and methodological assistance for the activities for the safe practice of immunization and social mobilization, additional immunization campaigns. Within the frames of the cooperation there is carried out mutual exchange of information, normative documents in the area of immunization, as well as conducted training of specialists, their professional development, international conferences, seminars and other activities aimed at protecting and promoting public health.

The purpose of the Program is to reduce morbidity and mortality from preventable infectious diseases vaccines through sustainable immunization coverage, increase access to vaccines of assured quality and active immunization advocacy.

Each year, the epidemiological department of the Republican Center of Hygiene and Epidemiology, compiled the annual plan of the department with the inclusion of questions on the implementation of the CMP and the measures to implement the state program "Immunoprophylaxis of infectious diseases" in the period 2010-2015.

Implementation of CMP on the basis of annual plans

Sustainable development goals of eradicating polio and eliminating measles and rubella

According to the annual plan provides the implementation of the National Action Plan for the maintenance of the status of polio-free in the 2014-2016 year:

- Provides conduct routine monitoring of OVP surveillance and vaccination against poliomyelitis in "silent", "conditional silent" areas and in areas with low coverage of OPV, sent monthly bulletins and newsletters in the Hygiene and Epidemiology Center of the republic to improve the quality of OVP surveillance.
- Work to strengthen the epidemiological. OVP surveillance helped identify OVP cases with 2 «silent» areas (2014-2015) and as a result the number of «silent» territories reduced from 3 to 1.
- Ongoing supervision of enteroviruses in the environment. In accordance with WHO recommendations, in 2014, the year the number of sub-areas covered by the surveillance objects of the environment, has been increased from 10 to 13, sampling of the wastewater in the Nakhchivan Autonomous Republic was established in March 2015.
- With the support of WHO monitoring for OVP surveillance was carried out in 2014 and vaccination against poliomyelitis in the «silent» and "conditionally silent" areas.
- In 2014 Azerbaijan belonged to the group of countries with a low level of risk and perform surveillance on the basis of the target level is not polio OVP-1 per 100 000 population under 15 years old. In the calculation of the target at the level of supervision indicator amounted to 1 (all OVP cases were collected at 2 stool samples during the first 14 days of the onset of paralysis.
- In order to improve the provision of weekly reporting of OVP cases with sub-national to the national level are developed and implemented in an electronic system EIDSS table with zero accountability
- In 2014, the continued analytical work on OVP surveillance based on OVP surveillance indicators introduced in EIDSS in addition to the forms of reporting by OVP.

Held on OPV SIAs at the subnational level

Provides implementation of measures for elimination of measles and rubella:

- establishment of a national committee for the verification of measles and rubella elimination - 2013
- SIAs measles and rubella among pupils in age of 11-15 years - 2014
- immunization of adult migrant population in 2015

- Maintaining high vaccination coverage with 2 doses of the CPC (95% nationally and 90% in the sub-national)
- National surveillance based on individual data
- Laboratory testing of every suspected measles and rubella cases
- Annual conducting mop-up of MMR immunization among unvaccinated children according to the immunization calendar in the European Immunization Week

Immunization Program's Achievements (CMP cycle of 2011-2015)

The introduction of new vaccines:

- Penta-vaccine with Hib component – July 2011
- 10-valency pneumococcal vaccine - December 2013
- IPV - 2015 (in preparation)
- Achieving sustainable high coverage using both new and traditional vaccines
- Significant cost savings due to the purchase of vaccines through the Delivery Section of UNISEF since 2014
- Availability of sufficient financial resources to ensure sustainable funding after the end of support for Gavi
- High Level of political commitment to the implementation of the national immunization program
- A gradual increase in public funding of vaccination;
- Regular fulfillment of the obligations of co-financing
- Continuous Improvement of management structures and the implementation of procurement of vaccines
- Motivated, Functional and authoritative National Technical and Advisory Group on Immunization (NITAGs)
- Conduct training and curatorial support in the framework of IEF
- Strengthening the management capacity of vaccines, including the "cold chain" at the national and sub-national level (2011-2015)
- Inventory of "cold chain", development of programs and annual updates

Strengthening surveillance systems for vaccine-preventable diseases:

- Ensuring the surveillance of all vaccine-preventable diseases;
- The transition of accounting and reporting in the electronic form from April 2010.
- Direct data transmission of measles and rubella in CISID system
- Updating of national guidelines for measles and rubella surveillance and polio
- Conducting staff training at the subnational level in 2011
- Sentinel surveillance for rotavirus and IBS

Sustainable financing of immunization programs:

- Development and approval of NIP and CMP
- 100% financing by the Government since 2008 + penta-vaccine cofinancing from 2011 and a 10-valency pneumococcal vaccine with 2013;
- Purchase of vaccines for routine immunization through Delivery Section of UNICEF in 2014.

Monitoring with support from the WHO:

2013 - Monitoring at the course of "Immunization in Practice" (covering 15 districts), readiness assessment for the introduction of 10-valency pneumococcal vaccine (in 10 districts);

2014 - Monitoring the implementation of the 10-valency pneumococcal vaccine (in 17 districts), Evaluation of the EVM (introduction of the 10-valency pneumococcal vaccine (in 13 districts), Monitoring of OVP surveillance and vaccination OPV (6 areas), monitoring SIAs for Measles and Rubella (11 regions of Baku + 2 regions and Sumgait city)

The National Technical Advisory Group on Immunization (NITAGs) was established upon order of the Ministry of Health No.107 dd. 04.10. 2013

National Technical Advisory Group on Immunization (NITAGs) - consists of local experts, who on the basis of scientifically-based and evidence provide Recommendations to the Ministry of Health and the national immunization program for introduction of new vaccines, additions and changes to the vaccination schedule, the establishment of the priority areas in decision-making and offer development strategy vaccination policy.

NITAGs members are the leading experts of the country from a variety of disciplines (pediatrician, epidemiologist, clinician, neurologist, geneticist, etc.). NITAGs Meetings are held 2-3 times a year, Recommendations are sent to the Ministry of Health for further prioritization.

Problems in the management program (CMP cycle of 2011 - 2015)

- National Polio Laboratory is not accredited by WHO
- High external migration
- The lack of a laboratory-based surveillance for epidemic parotitis
- Lack of funding for the EPI components:
  - training
  - monitoring
  - Curatorial support
- Lack of an existing reporting system for adverse events following immunization (PIBE) standardized protocol containing a clear definition of the cases
- NPI does not fully use the potential of e-health systems
- The e-health system does not have inventory management module

Key planned activities (CMP cycle of 2016-2020)

- Implementation of IPV vaccine
- Monitoring the implementation of the IPV
- Assessment of the implementation of IPV
- Transition from tOPV to bOPV
- Consideration of the transition to Hib-IPV on penta and hexa-2018.
- Implementation of HPV vaccine GAVI demonstration project - 2017-2018
- Introduction of HPV vaccine nation-wide - 2019
- Saving sustained high vaccination coverage:
- Strengthening the NTCGE, additional training and exchange of experience with other countries
- Improving the quality of the data by improving electronic immunization registry and create a module on vaccine management electronic health card program.
- Revision of the medical tapping procedures
- Updated standards and guidelines for surveillance for PIAM
- Update of plans for the maintenance of the status territory free of polio in accordance with WHO standards and Global polio eradication strategy and implementation of the final phase of 2013-2018.
- Accreditation of the National Polio Laboratory
- The continuation of measures on elimination of measles and rubella
- The creation of a hepatitis B control program
- The creation of the country's laboratory surveillance for epidemic parotitis
- Direct data transfer via OVP and vaccine-preventable diseases in CISID system
- Maintenance and repair of retiring equipment and the purchase of cold chain equipment available, including for the needs of district inpatient medical facilities, services for individual support, and mobile services.

- Development of a website dedicated to immunization;
- Continued training on safety and contraindications of vaccines and their integration into the program of medical education
- Improving the quality of NPI data, in particular, through the union of the current reporting system with integrated electronic immunization healthcare system, improving electronic registers of vaccination and the development of vaccines and logistics distribution modules.

TECHNICAL SUPPORT

In 2014 and 2015, Azerbaijan received technical support from WHO for the following purposes:

- - National Conference on immunization data quality within the framework of European Immunization Week (April 2014)
- - Preparation of the publication of the study on the economic feasibility of PCI
- - Monitoring the implementation of PCI (May-July 2014)
- Support Effective Vaccine Management consisting of installation of equipment for continuous temperature monitoring at the state cold storage, training for work with «log tag» for facilitators at the national level, development of standard instructions for temperature monitoring (June 2014)
- The decision on the introduction of IPV and preparing an application to GAVI (June-September 2014)
- Evaluation of the effectiveness of vaccines and the development of management improvement plan (joint consultations of WHO and UNISEF, September 2014)
- Coordination, independent monitoring and quality assurance of laboratories (OKRL) for supplementary immunization activities (SIAs) against measles-rubella (July-September 2014)
- Technical support for the preservation of polio-free status (annual event 2014-2015.)
- Sentinel surveillance of invasive bacterial diseases (since 2009)
- Sentinel surveillance for rotavirus infection (since 2006)
- Assessment after the introduction of PCI (March 2015)
- Training for the implementation of inactivated polio vaccine (IPV) (May-June 2015)
- Evaluation of the process is complete and support the development of an action plan with the support of the completion (July-August 2015)

In addition, before the end of 2015 WHO planned the following activities:

- Support for the development of CMLP (currently, July-November 2015)
- Training seminar on safety in the use of vaccines and contraindications to vaccination (September 2015)
- Assessment of national regulatory authorities (NCO) (September 2015)

In the period 2014-2015 UNISEF has provided following technical assistance to Azerbaijan:

- Technical support and assistance in the purchase of equipment to improve the efficiency of the cold chain in the country (refrigerators - April 2014)
- Assist in the purchase of monitoring of the cold chain equipment (2014)
- Technical support needs assessment in vaccines and devices for vaccination (2014-2015)
- Procurement services for the acquisition of vaccines for routine vaccination (2014-2015).

Technical and financial support to the implementation of selected components of the information exchange strategy on the introduction of PCV (training of health workers and specialists, conducting explanatory work with parents - 2014)

3.5.1. Human resource management

One of the decisive factors of the effectiveness of the health system is actions to provide high-quality human resources. Providing the optimal balance of processes of renovation and preservation of the numerical and qualitative composition of staff in accordance with the needs of the organization takes place in the health system of the Republic in accordance with the requirements of the current legislation basing upon functioning of higher and secondary educational institutions of a medical structure, including:

- Azerbaijan State Medical University,
- 8 medical schools (2 capital + 6 urban and regional schools)
- Institute of Postgraduate Medical Education,
- Refresher courses on the basis of medical school No.2

Every year Azerbaijan Medical State University prepares more than 1,000 healthcare professionals in various fields, and the medical schools about 2,000 graduates. Jobs in public institutions, which are in Baku nearly filled. Towns and districts of the republic have the need for doctors and medical staff, and the Ministry of Health carried out a policy to address the human resources field deficits. For this purpose, the Ministry of Health, on the official website and in the "Medical newspaper," constantly provide vacancy information for all specialties.

The national immunization program has organizational structures at the national and sub-national levels. At national level, the issues involved in immunization branch of the Republican Center of Hygiene and Epidemiology in the composition of 3 epidemiologists: 1 of them works since 2014, 2 ones passed training courses, including certified 1. Immunization Branch of the Republican Center of Hygiene and Epidemiology through the network of city and regional centers oversees the organization and execution of immunization in the field, following the collection of statistical information on vaccine-preventable diseases at all levels, identifies the target groups. Provides all the district CHE vaccine in accordance with their plans, applications, provides storage at the district level, 3-month stock of vaccines in the cold storages CHE, is the annual applications for the purchase of vaccines, etc.

The entire volume of work on the coordination of immunization activities in most regions and municipalities is the responsibility of the epidemiologist. The epidemiologists of regional / urban CHE oversee the organization and execution of immunization in the field - in MPI, define target groups for Human Settlements, monthly provide vaccines and other vaccination MPI materials in accordance with their plans, applications, oversee vaccine-preventable diseases, generalize statistical information on the region / city and are in the Republican Center of Hygiene and Epidemiology.

The regional CHE have shortage of medical staff - epidemiologists - (302.25 units on staff - actually occupied 205.5 (68%) epidemiologist's assistants (586.5 units on staff – actually occupied 478, 5,5 (81.6%). 14 regions of the Republic and 5 regions of Nakhchivan Autonomous Republic have no epidemiologist. Every 5 years, medical professionals pass training courses, since 2011, the country began the certification of medical workers. Over the past 5 years have passed postgraduate courses 176 and 147 certified physicians, epidemiologists of the country, as well as improvements have been 477 and 300 epidemiologist's assistants certified courses.

Vaccination of the population of the republic is held in 2265 stationary vaccination points located in the children's health centers, rural hospitals, medical and health centers, hospitals and maternity units of territorial hospitals. According to official data of medical organizations, routine immunization coverage is more than 95% in the country. DHS data conducted in the country in 2011 indicate that immunization coverage ranges from 80% to 98% for different types of vaccinations. Despite the fact that the health care system of the Republic has a fairly wide network of health-care institutions, the problem of accessibility to health care, related primarily to the shortage of doctors in primary health care and medical staff in remote rural areas, leading to inadequate immunization coverage and the lack of services for maternal and child health.

RCHE employees work directly with staff at the district level and help them in the planning and monitoring and supportive supervision in medical institutions. Education in the workplace, along with the curatorship is an effective way to improve health care capacity to analyze and interpret data immunization programs. Republican CHE planned supervisory visits in the areas of the Republic / city at least 2 times a year. The DQS, conducted in the country in 2012 revealed inadequate analysis and use of data, particularly at the level of medical institutions, namely hospitals transmit reports to the next level, but do not often review and analyze the data. Increase the capacity of health care workers to conduct basic analysis of immunization data (e.g. graphics on a monthly coverage for key vaccines, losses in vaccination between doses penta-vaccine etc. is a key step in the formation of responsibility for the data and understand why this data is collected and how can be used. It subsequently will create interest among staff of medical institutions to participate actively in the data collection and to provide accurate, timely and up to the end of the completed reports.

DQS in 2012 also revealed a lack of feedback according to immunization. Improved feedback mechanism may also contribute to the improvement of health care reports, because that will allow to see how they represent the data used and their status in comparison with other data from other institutions that can serve as an important motivation to improve the quality of reports. Regular trainings for medical staff on the proper handling of vaccines, proper technique of safe injections, and disposal of used injection equipment and the provision of health surveillance following immunization are one of the main areas to improve the quality provided by primary health care services organizations.

It should be noted that some of the operations of the National Immunization Program underfunded and dependent on all declining donor support (training, supervision, monitoring, and supervision)

Immunization services of private clinics are not sufficiently integrated into national immunization programs (especially concerning the registration and reporting), there is a need to adapt the calendar of vaccinations in private clinics with the Ministry of Health license to conduct immunization on the national immunization schedule.

3.5.2. Programme cost and finance

In order to maintain the level of investment in immunization, as well as the good performance of the program, it is necessary to:

- Propagandize and mobilize the additional resources (from the state budget) for the growing financial needs (due to raising the country's share in the co-financing);
- Plan and coordinate the funding for operational activities training, supervision, monitoring, etc.).

4. Immunization programme objectives, strategies and key activities

Tasks, strategies and main arrangements of the immunization program for the periods of the years of 2016-2020

Task	Strategy	Main arrangements	Year				
1. Maintenance of the high priority of the immunization program for reduction of children's morbidity and mortality	1.1.Strengthening the mechanism of holding monitoring and evaluation for the purpose of analysis of stability of the national immunization program	1.1. Adaptation of the valid normative documents in compliance with the recommendations of WHO	1	2	3	4	5
		1.1.2. Holding short-term trainings for the initial staff					
		1.1.3. Inclusion of the expenses for holding monitoring and trainings to the budget of PCHE					
		1.1.4. Implementation of evaluation and analysis of the collected immunization data once half year					
	1.2. Strengthening the potential of the technical-consultation and coordination mechanisms functioning within the frames of the system	1.2.1. Expansion of the existing relations with the European technical consultative experts' group on immunization and other analogous consulting authorities for storing and strengthening the policy of adherence to immunization					
		1.2.2. Holding of operational meetings of NTAGI each quarter					
		1.2.3. Population's notification regarding the recommendations of NTAGI					
2. Free access to the immunization services of all target groups	2.1. Submitting to the population the information regarding the vaccine-managed infections as well as the opportunities and risks connected to vaccination and, strengthening to trust to	2.1.1. Usage of social networks and other media technologies for supporting dialogue with population					
		2.1.2. Development of the Website for immunization specifying the information for all interested people and partners					

	vaccines, immunization services and health authorities	2.1.3. Usage of the hotline of MoH for responding to the cases of the post-immunization by-effects and, awareness of safety and efficiency of vaccination					
		2.1.4. Strengthening the mutual relations with mass-media					
		2.1.5. Development of the communication plans basing upon the factual materials during application of new vaccines					
3. Introduction of new vaccines	3.1 Implement HPV Demonstration project with GAVI support	3.1.1. Implement HPV vaccination in selected districts to define optimal vaccine delivery and communication strategies					
	3.2 Introduce HPV vaccine nation wide	3.2.1. Develop and impellent HPV vaccine introduction plan using lessons learnt from demonstration project					
4 Perfection of the immunization system by means of strengthening the integration to the health protection system	4.1. Development of complex and coordinated attitudes for the immunization program and in the scale of total health protection system	4.1.1. Adaptation of the vaccination calendar in the private clinics having license of MoH for holding immunoprophylaxis to the national vaccination calendar					
		4.1.2. Making the private sector to submit annual request for acquisition of vaccine for immunization of children at age up to 6 years old in the territorial CHE.					
		4.1.3. Free usage of the vaccine further accepted from MoH for immunoprophylaxis of children at age up to 6 years old					
	4.2. Strengthening the system of monitoring and epidemic control of vaccine-managed infections	4.2.1. Starting lab diagnosis of epidemic parothytis basing upon the immunologic lab of the Republican Plague Station					
		4.2.2. Update of SOPs as well as					

		the accounting and reporting documentation connected to post-immunization by-effects (PIBE)					
5. Stable financing of the immunization program and provision of regularity of delivery of qualitative vaccines and additional toolbox	5.1. Optimal provision of vaccines with guaranteed quality and in available prices	5.1.1. Preparation of the immunization actions plan with financial expenses for immunization for the years of 2016-2020 for approval by the Cabinet of Ministers					
		5.1.2. Continuing purchase of vaccines through UNICEF Supply Division					

5. Monitoring and evaluation framework (indicators and targets)

5.1. Evaluation of EVM-warehouses at central level

Procedure of accepting vaccines

Separate VAR is developed for each delivery of vaccine. VAR is translated into Azerbaijani language. Acceptance Act of consumption materials and immunization equipment (PAR) gets developed separately for each product. The responsible personnel is trained for filling in the VAR (precisely showing the inspection date, number of delivery request, numbers of vaccine and solvent consignments as well as provision of existence of the set of documents) using the materials and Standard Operational Procedures (SOP) provided by WHO. An SOP is developed and approved in Azerbaijani language for filling in the PAR basing upon the standard Production Sharing Agreements (PSA) provided by the WHO.

Monitoring of the temperature mode

Temperature map is developed for the cold room No.1 with capacity of 46,2 m3. Presently monitoring the temperature mode in the cold rooms equipped with devices of uninterrupted registration of temperature is implemented also manually and signed by responsible person. Manual registration of the temperature mode in the deep-freezers of OPV was terminated in August 2014, however, the deep-freezers were supplied with 30-day e-devices for temperature registration and manual registration is restored.

30-day e-devices for registration of temperature are used in the auto refrigerators starting from March 2015 and simultaneously, log-book is kept for registration of temperature in machinery.

Starting from March 2015, frozen cold elements and freezing indicators are used while packing thermal containers. The temperature reports (both in computer and hardcopy) will be kept at least 3 years.

Capacity of storages and vehicles

Cold room No. 1 is used for storage of vaccine and temperature map is developed for this room. Presently vaccines take about 40% of storage capacity of the cold room No. 1 and, its rest part is used for storage of other medical products. The vaccines are settled in the cold room in compliance with the temperature map developed earlier this year considering the sensitiveness to cool. A part of the purchased consumption materials and solvents i.e. the quarter quantity of the annual request sufficient for one-time distribution is stored in the dry warehouse in the territory of IPC and, the rest part is stored in the so-called «mixed warehouses» belonging to the suppliers of these consumption materials. However, the total capacity of the dry warehouse is not sufficient for location of all consumption materials and solvents in case of their simultaneous delivery. The basement space of the main house of IPC also may be used as dry warehouse for storage of consumption materials for immunization and, it will allow expanding the storage space.

Buildings, equipment and transport

The buildings and equipment of the IPC cold chain are in due state and comply with the requirements of this criterion. There is a new requirement regarding the alert notification systems in the refrigerators and deep-freezers (in the central level); however, it is not maintained in the central warehouse and the deep-freezers are not supplied with recall system. 10 autorefrigerators are used for acceptance of vaccine in airport and its further distribution and, 6 of them are supplied with the autonomous cooling devices and reserve power supply system for cooling. Stillages are installed at the packing zone for conditioning the cold units.

Technical service

All devices are in due working order. The prophylactic technical service plans exist in written. Technical service of vehicles is duly implemented.

Management of reserves

The computerized system of reserves accounting is used for all medical preparations bought by IPC. Vaccines are duly accounted in the system, there is information of residuals for all vaccines and, all necessary information get registered (number of consignment, expiry term, manufacturer, form of output, quantity). Solvents are not accounted separately. The location of vaccines, consumption materials for immunization and solvents are not shown in the system. Physical inventory was implemented regularly but not recorded. Recording started according to recommendations, once per quarter after next distribution of vaccines. The warehouse has installed stillage maps with expiry date and series upon the stored products. The requirements regarding implementation of separate accounting of solvents are analogous to account of vaccines (both in accounting of warehouse and the vouchers for issuance of vaccine) are not fulfilled because in the documents of the accompanying vaccines (Cost estimate, proforma invoice) the solvents are shown together with the vaccine despite of our initial requirement in request form to UNICEF.

Distribution

Distribution of vaccine to warehouses is implemented in each quarter according to the schedules of RHEC. Vaccines are carried to the regional hygiene and epidemiological centers in auto refrigerators having autonomous cooling devices. Since fourth quarter of 2015, IPC provides delivery of vaccines to the CHEs of the districts of Baku city.

The auto refrigerators are supplied with devices of uninterrupted temperature registration.

30-day e-devices of temperature registration were purchased in 2014 which are used in autorefrigetarors since March 2015 for temperature registration during transportation of vaccine. Besides, few amounts of "freeze-tag" thermal indicators were bought also for using during transportation of vaccines by thermal containers.

RCHE implements collection of information necessary for accounting the loss of vaccines; however, WHO recommends to use these data also for forecasting the demands in vaccines.

Wastes management is not evaluated. Status of the temperature mode indicator (freezing indicator) is shown on the vauchers for issuance of vaccine.

Management of vaccines

The personnel is duly trained for management of vaccines. The country has own certified policy of usage of multidose bottles according which the frozen-dried vaccine has to be consumed within 6 hours upon its restoration and, thye 10-dose bottles with liquid vaccines within 6 days after opening the bottle.

PSA exist. PSA are updated in IPC and, individual staff is assigned for working with vaccines. Personnel of RPI uses the scientifically grounded data on the losses factor and coverage with vaccination during development of forecasts.

5.2. EVALUATION OF THE WAREHOUSES AT REGIONAL LEVEL

E2: Monitoring of temperature mode – evaluation: 74% (range 34-81%)

- The temperature is registered twice a day but not everyday (excluding Sunday).
- Inspection of the temperature accounting in the most warehouses is implemented formally.
- The personnel is sufficiently aware of the vaccines sensible to freezing.
- The temperature accounting in the most warehouses is kept within 3 years.
- The situation in the visited warehouses is different.

Recommendation is daily temperature registration twice a day. Daily implementation of the inspection of temperature accounting (with manager's signature) and keeping it in a safe place, no less than three years.

E3: Capacity of storages and vehicles – evaluation: 81% (range 20-100%)

- The capacity of the cooling warehouse is totally and completely sufficient.
- The capacity of storage in deep-freezers is sufficient not everywhere and totally sufficient.

- The capacity of the dry warehouse in the most of warehouse premises is sufficient.
- The capacity of the thermal containers is sufficient (in most cases MPI come for vaccine by themselves). Information of emergent actions, as a rule, is not suspended in the visible place.

Recommendations:
In case of insufficient capacity of storage the frequency of the vaccine distribution / acceptance from / to warehouse is subject to increase; or storage of solvents at the room temperature; or storage of CPC and BCG vaccine (without solvents!) in deep-freezers. OPV vaccine is subject to be stored in deep-freezers. Provision of existence in visible places of the information stand with phone numbers and are responsible for people's names in emergency cases. Update of PSA on action plan in emergent circumstances.

E4: Buildings, equipment and transport – evaluation 73% (range 55-88%)
- Buildings and equipment are mostly in good state.
- Transport is absent (MPI collect the vaccines independently).
- Generator and potentiostats exist not in all warehouses.
- Uniterrupted registration devices are absent.

Recommendations:
- 30-day e-devices of temperature registration are subject to use upon acceptance.
- Purchase and installation of potentiostats as necessary.
- Ensure in compliance of the cooling equipment to the WHO standards while purchasing them for the regional CHEs.

E5: Technical service – evaluation 59% (range 25-100%)
- Prophylactic technical servicing programs are absent.
- The results of the external review for implementation of technical service are sufficient.
- Totally and completely the equipment of the cold chain is fully functional.
- The situation in the visited warehouses is different.

Recommendations*:* Preparation, implementation and accounting of fulfillment of the prophylactic technical service plan.

E6: Management of reserves – evaluation 72% (range 22-90%)
- The situation in the visited warehouses is different.
- Solvents are not accounted properly.
- There is no information regarding residual in the warehouse at the current moment and, information is not updated within 24 hours.
- The temperature indicator's status is not registered while accepting vaccines.
- The personnel of the most of regional CHE do not know the maximal / minimal reserve level and ordering points.

Recommendations:
- Inclusion of some changes to the standard form of reserve accounting and the personnel's training.
- The maximal / minimal reserve level and ordering points are calculated at RCHE for all regional CHEs – the results of accounts and used methodology are subject to provision to all RCHEs.

E7: Distribution – evaluation 58% (range 5-74%)
The situation in the visited warehouses is different. Freezing indicators are not used during transportation of vaccines with the conditioned cold units. Cold units are subject to proper conditioning. Status of the temperature mode indicator is not shown on the vouchers.

Recommendations:
- Usage of freezing indicators ("freeze-tags") during transportation of vaccines sensitive to freezing.
- Ensure proper and regular conditioning of the frozen cold units.

- Preparation of standardized vouchers for issuance of vaccine with the place for showing the status of temperature indicator (as well as the number of consignment, expiry term and separately – solvents) basing upon the vouchers used in the central warehouse as template.

E8: Management of vaccines – evaluation 84% (range 43-100%)
Generally and totally knowledge of vaccines management is in good level (jog test, FTI, methods of loss calculation). Regular account of the loss factor is not implemented and, it is not used for monitoring of efficiency of vaccine management in MPI level.

Recommendations: Calculation of the loss factor in the level of MPI and inspection of existence of the falling out indicators / exclusions.

E9: ISU and supplementary functions – evaluation 42% (range 9-70%)

- The situation in the visited warehouses is different.
- Standard PSA are absent (at the same time, the personnel properly answer to the questions according to the training materials).
- The demand in vaccines is forecasted basing upon the data regarding the target population; the scientifically grounded data of coverage and losses are not used.
- Inventory list of the cold chain equipment is absent.
- Working plans exist but they are incomplete.
- The measurements of the curatorial support are insufficient and documentary accounting is rare.

Recommendations:

- RPI has to develop and submit PSA package (standard PSA exist in English and Russian languages).
- Calculation of coverage with vaccination and the losses factor and, use the acquired data for forecasting the demand in vaccines.
- Annual implementation of at least four measurements on curatorial support including in the form of remote training as well as Internet and TV conferences and visits. Documentary accounting of measurements.

Level of immunization services

Serious contradictions are observed in the level of immunization services in the state of cold chain equipment, vaccines management, reserve management, knowledge and state of buildings and premises.

5.3. EVALUATION OF THE MPI LEVEL

E2: Monitoring of temperature mode – evaluation 68% (range 0-100%)

- Temperature is controlled twice a day (excluding the premises not using the refrigerators) but not every day (excluding Sunday). Some MPIs do not use refrigerator and children get vaccinated in the day when MPI acquires vaccine in the regional CHE. Besides, MPI gained score of 0% on the indicator of manual registration of temperature; however, it was not considered in account of the total value.
- The temperature accounting in the most of MPIs is not formally implemented.
- The personnel of the most MPI is sufficiently aware of the vaccines sensible to freezing.

Recommendations:

- Daily manual registration of temperature twice a day.
- Daily inspection of the temperature accounting (with manager's signature) and storage in reliable place within 3 years.

E3: The capacity of storages and vehicles – evaluation 82% (range 0-100%)

- The capacity of the cold warehouse is totally and completely sufficient – some MPIs do not use refrigerator and children get vaccinated in the day when MPI acquires vaccine in the regional CHE. Such MPI gained score of 0% on the indicator of manual registration of temperature; however, it was not considered in account of the total value.
- The capacity of dry warehouse in all MPI is sufficient.
- The capacity of the thermal containers is sufficient (in most cases MPI come for vaccine by themselves).

- Information of emergent actions, as a rule, is not suspended in the visible place.

Recommendations:
- Increase frequency of distribution / acquisition of vaccines by regional CHE in case of insufficient capacity of storage.
- Provision of existence in visible place of the information stand with phone numbers and responsible people's names for the emergent cases.
- Update of PSA on action plan in emergent circumstances.

E4: Buildings, equipment and transport – evaluation 61% (range 9-91%)
- State of the warehouse premises and equipment changes from good to worst.
- The used transport is different (hospital cars, private vehicles, taxi, public transport is not used).
- Devices for permanent temperature registration are absent.

Recommendations:
- Provision of refrigerators in due order to all MPI where the refrigerators are in bad state and do not provide the appropriate temperature mode.
    - Purchase and distribution of freezing indicators to all MPI as minimal requirement for temperature monitoring (additionally to thermometers).

E5: Technical service – evaluation 53% (range 0-72%)
- Prophylactic technical servicing programs are absent.
- The results of the external review for implementation of technical service are sufficient.
- Totally and completely the equipment of the cold chain is fully functional.
- The capacity of the cold warehouse is totally and completely sufficient – some MPIs do not use refrigerator and children get vaccinated in the day when MPI acquires vaccine in the regional CHE. Such MPI gained score of 0% on the indicator of manual registration of temperature; however, it was not considered in account of the total value.
- The situation in the visited warehouses is different.

Recommendations: Applications of plans for prophylactic technical service, their implementation and documentary accounting – often the the central hospitals are responsible for it.

E6: Management of reserves – evaluation 61% (range 4-94%)
- The situation in the visited MPI is different.
- Solvents are not accounted properly.
- There is no information regarding residual in the warehouse at the current moment and, information is not updated within 24 hours.
- The temperature indicator's status is not registered while accepting vaccines.
- The personnel of the most of regional CHE do not know the maximal / minimal reserve level and ordering points.
- The capacity of the cold warehouse is totally and completely sufficient – some MPIs do not use refrigerator and children get vaccinated in the day when MPI acquires vaccine in the regional CHE. Such MPI gained score of 0% on the indicator of manual registration of temperature; however, it was not considered in account of the total value.

Recommendations:
- Correction of the existing standard form of reserves accounting and personnel's training.
- RCHE has to develop perfected standard form of reserves accounting and submit it to all MPIs for accounting the reserves.
- Calculation and usage of the maximal / minimal reserve level and ordering points in all large MPIs.

E7: Distribution – evaluation 46% (range 0-67%)

- The situation in the visited warehouses is different.
- Freezing indicators are not used during transportation of vaccines with the frozen cold units.
- Cold units are mainly conditioned properly.

Recommendations:

- Usage of freezing indicators ("freeze-tags") during transportation of vaccines sensitive to freezing (when the freezing indicators are shown).
- Ensure proper and regular conditioning of the frozen cold units.

E8: Management of vaccines – evaluation 84% (range 50-97%)

- Generally and totally knowledge of vaccines management is in good level (jog test, FTI, proper usage of solvents, screening of the open bottles, policy of using the multidose bottles, methods of loss calculation, waste management).

Data required for accounting the loss factor are available but the loss factor is not calculated.

Recommendations:

Calculation of the loss factors and their usage for ordering proper capacity of vaccines.

E9: ISU and supplementary functions – evaluation 42% (range 9-70%)

- The situation in the visited MPI is different.
- The demand in vaccines is forecasted basing upon the data regarding the target population; the scientifically grounded data of coverage and losses are not used.
- The measurements of the curatorial support are insufficient and documentary accounting is rare.

Recommendations:

Provision of existence of the updated scientifically grounded and proved data regarding the target population for forecasting the demands in vaccines and accounting the annual demand using the submitted model. Annual implementation of at least one measurement on curatorial support in the district / regional level and documentation of the results.

5.4. The main measurements envisaged in the plan for increase of EVM in 2014 and status of their implementation

5.4.1. The main recommendations on increase of efficiency at the national level:

Main Recommendations	Present fulfillment status
Usage of the devices for permanent temperature registration during transportation of vaccines.	Fulfilled
Separate accounting of solvents in analogical method as for accounting of vaccines (both in accounting in warehouse and on the vouchers for issuance of vaccine).	Unfulfilled
Permanent usage of freezing indicators during transportation of vaccines together with the conditioned frozen cold units.	Fulfilled
Proper accounting of the status of temperature indicators (freezing indicators, FTI) on all vouchers (documents) for issuance of vaccines.	Fulfilled
Usage of real loss factor for forecasting the demands in vaccines and consumption materials for immunization.	Unfulfilled

5.4.2. The main recommendations on increase of efficiency in the level of regional warehouse

Main Recommendations	Fulfillment status
Daily registration of temperature on hardcopy	Fulfilled
Daily implementation of inspection of the temperature accounting (with manager's signature) and keeping it in safe place not less than three years.	Unfulfilled
In case of insufficient capacity of storage the frequency of the vaccine distribution / acceptance from / to warehouse is subject to increase; or storage of solvents at the room temperature; or storage of CPC and BCG vaccine (without solvents!) in deep-freezers. OPV vaccine is subject to be stored in deep-freezers. Provision of existence in visible place of the information stand with phone numbers and responsible people's names for the emergent cases. Keeping OPV in deep-freezers.	Fulfilled
Provision of existence of the urgent measurements plan in the warehouse.	Unfulfilled
Update the PSA upon the urgent measurements plan.	Unfulfilled
Usage of 30-day e-devices of temperature registration upon acceptance.	Unfulfilled
Purchase and installation of potentiostats as necessary.	Unfulfilled
Ensure in compliance of the cooling equipment to the WHO standards while purchasing them for the regional CHEs.	Unfulfilled
Development of plans for prophylactic technical service, their implementation and documentary accounting	Unfulfilled
Perfection of the standard form of reserves accounting and personnel's training for its usage.	Unfulfilled
Mandatory calculation and usage of the maximal / minimal reserve level and ordering points in all regional CHEs and provide methodology and results to all regional CHEs.	Fulfilled
Mandatory usage of the freezing indicators upon their acquisition at each transportation of vaccine sensitive to freezing.	Fulfilled
Inspection of proper and regular conditioning of the frozen cold units.	Fulfilled
Preparation of standardized vouchers for issuance of vaccine with the place for showing the status of temperature indicator (as well as the number of consignment, expiry term and separately – solvents) basing upon the vouchers used in the central warehouse as template.	Fulfilled
Calculation of the loss factor in the level of MPI and inspection of existence of the falling out indicators / exclusions.	Fulfilled
Mandatory development of PSA in RPI and provision of their large-scale distribution (standard PSA are available in Russian and English languages). Calculation of coverage with vaccination and use the acquired data while forecasting the demands in vaccines.	Unfulfilled
Annual implementation of at least four measurements on curatorial support including in the form of remote training as well as Internet and TV conferences and visits. Documentary accounting of measurements.	Unfulfilled

5.4.3. The main recommendations on increase of efficiency in the level of MPI

Main Recommendations	Fulfillment status
Daily registration of temperature on hardcopy	Fulfilled

Daily implementation of inspection of the temperature accounting (with manager's signature) and keeping it in safe place not less than three years.	Fulfilled
In case of insufficient capacity of storage the frequency of the vaccine distribution / acceptance from regional CHE.	Fulfilled
Provision of existence in MPI of the actions plan in emergent cases.	Unfulfilled
Update PSA on the actions plan in emergent cases.	Unfulfilled
Purchase and distribution of freezing indicators to all MPI as minimal requirement for temperature monitoring (additionally to thermometers).	Unfulfilled
Development of plans for prophylactic technical service, their implementation and documentary accounting – often the the central hospitals are responsible for it.	Unfulfilled
Perfection of the standard form of reserves accounting and personnel's training for its usage.	Unfulfilled
Calculation and usage of the maximal / minimal reserve level and ordering points in all large MPIs.	Fulfilled
Usage of the freezing indicators upon their acquisition at each transportation of vaccine sensitive to freezing.	Fulfilled
Inspection of proper and regular conditioning of the frozen cold units.	Fulfilled
Usage of the scientifically grounded data regarding the target population for forecasting the deamds in vaccines and accounting the annual demand using the submitted model.	Unfulfilled
Annual implementation of at least four measurements on curatorial support including in the form of remote training as well as Internet and TV conferences and visits. Documentary accounting of measurements.	Unfulfilled

5.4.4. Equipment of cold chain used in all levels (national, subnational and level of medical institution), its characteristics

The central warehouse is located in the building of the Center of Innovations & Procurement managing purchase and distribution of vaccines to regions.

The refrigerating powers in the central warehouse are huge; there are three cooling rooms used at the present moment as well as three reserve rooms (one of them is located in the basement of the head office of IPC, the second one is settled in the address of the national controlling authority and the thirs one is located in the remote warehouse of IPC).

Presently all vaccines are stored in the large cooling room No. 1 about 40% of the area of which are taken by vaccines and the rest part is used for storing other products.

Temperature map is developed for this cooling room; in case of necessity in additional place, this cooling room is recommended to use only for storage of vaccines and, relocate other medical to the reserve cooling room. The capacity of the cooling room No. 1 is sufficient for storage of maximal level of vaccine reserves in the central warehouse. All three presently used cooling rooms are equipped with devices of permanent temperature registration and alarm systems.

Capacities of storages in central level

Cold warehouse, dry warehouse and freezing warehouse in central level	Total capacity	Approximate net capacity in cubic meter
Cooling room No. 1 in IPC	138,5	46,2
Cooling room No. 2 in IPC	14,2	4,7
Cooling room No. 3 in в IPC	14,2	4,7

Reserve cooling room in the basemenet premise of IPC	107,8	35,9
Reserve cooling room in the address of NCO	37,5	9,4
Reserve cooling room in the remote premise of IPC	31,8	10,6
All cooling rooms	**344,0**	**111,5**
Dry warehouse No. 1 in IPC	16,9	11,2
Dry warehouse No. 2 in IPC	89,0	29,7
All dry warehouses	**105,9**	**40,9**
Freezing powers for storage in IPC	2,2	1,9
Freezing power for remote storage of OPV	1,1	0,9
All freezing powers for strage of OPV	**3,3**	**2,8**
Cooling power for storage of frozen cold units, total	**1,4**	**1,1**
Power of autorefrigerators, total	**58,3**	**46,6**

The freezing power for OPV is sufficient for location of maximal quantity of OPV purchased last year (capacity of one dose is 1,2 ml), however, in case of further change of the output form of the vaccine purchased through UNISEF (e.g., increase up to 3,2 ml per dose), the existing storage powers at -20 °C will be insufficient. In this case, it is recommended to divide delivery of OPV to the central warehouse into three or four parts per annum or, purchase of additional deep-freezers is necessary.

The deep-freezers are in the storekeeper's room. The room is used also as dry warehouse for storage of other consumables. On Sundays the temperature mode of the cooling rooms in warehouse is manually registered by watchman and the storekeeper's room is locked with key and consequently, registration of temperature in the deep-freezers is impossible.

The capacity of the auto refrigerators is sufficient for location of maximal required volume of vaccines and consumption materials for immunization. 6 new auto refrigerators are supplied with autonomous cooling device; frozen and / or cold units are located in the thermal containers during transportation of vaccines. The cooling device in 4 auto refrigerators works only when engine is switched-on (10 auto refrigerators in total).

Capacity of the warehouse premises in the lowest level in the regional CHEs for storage in the temperature mode from +2 to +8 ºC as well as at -20 °C is sufficient for storage of maximal quantity of vaccines. The capacity of the dry warehouses is also mostly sufficient. Each quarter the regional CHE acquire vaccine and consumables for immunization from IPC. IPC delivers vaccine to the regional CHE in auto refrigerators and, the regional CHE take the vaccines in the city from IPC in the refrigerating bags and deliver them by own vehicle.

The regional CHE have acquired 30-day e-devices for temperature registration from RCHE. The personnel of warehouses – both central and regional – have passed training for usage of the 30-day e-devices for temperature registration.

The generators in the most regional CHE are in working order. In the central level RCHE implements annual inventory of equipment of the cold chain in the regional and MPI level. The inventory list of equipment is updated once a year. MPI monthly take vaccine from the PC warehouses. Some MPI use own vehicles, private cars, randomly taxi and, some of them are located near to the regional CHE and do not use vehicles.

The state of the buildings and equipment in this level strongly differs. Some MPI use domestic refrigerators; in some medical points such refrigerators are very old and do not maintain the temperature necessary for storage of vaccines and, cooling equipment are absolutely absent in other ones. Vaccines are not stored in the last ones and children get vaccinated in the day when MPI acquires vaccine in the regional CHE.

Some buildings are in very bad state and the premises are equipped neither with the telecommunication infrastructure not air conditioning system.

- In 2014 IPC bought 44 refrigerators of MK 404, 440 Freeze TAG, 300 LOG TAG and 75 USB brands.
- There is no certified plan on repair of the cold chain equipment – however, the occurring problems get settled.
- IPC is responsible for purchase of vaccines and consumables for immunization as well as their distribution to the regional CHEs.
- Once a year IPC acquires vaccines purchased through UNISEF.
- The forecast of demand in vaccines and consumables is developed by the RCHE. The vaccine is distributed to the RCHE per quarter according to the developed RCHE schedules. Before distribution RCHE collects information regarding residuals of vaccines and consumables in the central warehouse. RCHE having information regarding residuals in IPC and CHE develops quarter order. The regional CHE having lack of vaccines send letter to RCHE. Non-ordered vaccines are issued basing upon these letters.
- Vaccines are distributed to the regional CHE in auto refrigerators.
- Regional CHE distribute vaccine to MPI each month and basing upon the submitted applications.
- Absence of vaccines and consumables in the central level is not observed because 25% reserve is considered at purchase.
- Only self-destroying syringes are purchased for safety of injections and, safety boxes are used for safe utilization.
- Software errors are not observed.
- Waste management is not evaluated in the level of IPC. There is approved SOP for wastes management and utilization.

5.5. Results of the both evaluations and the state of implementation of recommendations:

EVMC Evaluation, 2009.

Recommendations:

- IPC has to require the consignment issuance certificate and the supplier has to submit such certificate. VAR (vaccines acceptance act) is subject to be developed for each consignment.
- Manual registration of the temperature mode for all cooling rooms and deep-freezers twice a day and, keeping the report in the central warehouse at least for three years. Purchase and installation in the cold rooms and deep-freezers the e-devices for temperature registration supplied with the alarm notification system and automatic dialing device.
- Training the warehouse personnel for EVMC initiative and efficient management of the cold warehouse.
- Establishment of the packing zone directly close to the cold rooms.
- Separate accounting of the solvents for the frozen-dried vaccines.
- Purchase of freezing e-indicators and their usage for all vaccines sensible for freezing.
- Evaluation of the power and quality of the cold chain in the regional level; it will help to understand the existing risks better and possibly, take decision regarding usage of more perfect system for distribution of vaccines.
- Monitoring of the temperature mode for storage of vaccines and discovery of the risks for freezing he vaccines.
- The management of the national cold warehouse must officially certify and apply the standard working procedures (PSA) and ensure their fulfillment by the responsible personnel.

EVM evaluation in 2011.

Recommendations:

- Application of the standardized form in the PC and MPI level for accounting the temperature mode for storage of vaccines. Storage of accountings in reliable place within 3 years.

- Development of the emergent actions plans for all levels of vaccines distribution.
- Preparation of the prophylactic technical service programs for buildings, cold chain equipment and vehicles of all levels.
- Proper accounting of solvents in all levels.
- Application of the reserves accounting policy and ensuring its implementation in all MPI storing vaccine.
- Implementation of measurements for curatorial support in all levels.
- Development of the reserves accounting forms and EVM management for PC and MPI levels.
- Development and application in all levels of standards methods for calculation of annual demand in vaccines and consumables for immunization.
- Development and submission of schedule for distribution of vaccine to the accepting warehouses of all levels.

Evaluation of quality of the immunization data in 2012

Self-evaluation of data quality (DQS) was implemented in Azerbaijan in June 2012 with support of international consultant for researching the main aspects of quality of the immunization data. Numerous strong features were discovered during self-evaluation: the immunization system is set precisely, the standard forms are used for reporting, these forms are duly kept in the regional and national levels; the reports get opportunely submitted by medical institutions on regional level and from regional to national level; there was only minimal difference among cover

However, deficient features also were discovered including the problems of calculating the losses with children's coverage among doses, insufficient analysis and data usage, limited feedback, lack of regular monitoring and supporting curatorship and their insufficient financing.

Mission for implementing situational analysis basing upon the facts discovered during DQS was implemented in the country in June 2013. The target of the mission was analysis of the current situation in Azerbaijan with respect to the immunization data and information system of immunization program, discovery of principle complications the system was exposed to, and development of report on situational analysis and actions plan for settlement of the discovered complications. The analysis was implemented in the period of mission in 4 main sectors: inspection / certification of the coverage data, precision of number of the target population, data processing aspects subject to improvement and system of health e-card. Recommendations for settlement of the complications discovered during the mission with regard to each of 4 sectors and Actions Plan was developed for improvement of data quality in Azerbaijan for the years of 2014-2015.

Evaluation of the application of the Pentavalency vaccine in Azerbaijan, in 2012.

Numerous strong features were discovered during evaluation: support of the immunization program in high level, efficient immunization system, responsible personnel in all levels, total successful application of pentavalency vaccine, high indicators of coverage with pentavalency vaccines, due adoption of vaccine by medical personnel and population, high-quality training materials in all institutions of initial health, cold chain of sufficient capacity in all levels and duly set delivery system of vaccines.

Deficiencies: social mobilization and information – lack of communicational component – undeveloped strategy and measurements on involvement to vaccination of the population negatively treating to immunization, lack of training materials for parents; lacks of cold chain; lacks in calculation of the target group; lack in analysis of coverage with vaccination; staff challenge – lack of personnel in the epidemiological section in the regional CHE, irregular inspections due to lack of financing, absence of standardized procedures / questionnaires on implementation of inspections, absence of the standardized protocol of classification, monitoring and accounting of PIAM (post-immunization adverse manifestations). Appropriate recommendations were developed subsequently to evaluation.

Evaluation of efficient vaccines management (EVM) in 2014

Mission of evaluation of efficient vaccines management (EVM) worked in Azerbaijan in the period from August to September 2014. It was the second Evaluation of EVM in Azerbaijan Republic.

The first Evaluation of EVM was implemented in 2011. In comparison with results of evaluation in 2011 improvement of situation was noted upon the following issues:

- Preparation of the temperature map of cold room in the central warehouse;
- Perfection of the procedures of acceptance of vaccine in the central warehouse;
- Provision of additional capacity of storages in the central and regional levels;
- Development of standardized forms for accounting of reserves in regional level and the level of immunization service;
- Development of standardized forms of forecasting the demands in vaccines and management of reserves in regional level and the level of immunization service;
- Purchase of devices for uninterrupted registration of temperature for the national / central warehouse and 30-day electronic devices for registration of temperature for the regional warehouses as well as freezing indicators; training of personnel for due usage of such devices (during evaluation these devices were used only in the central warehouse).
- Updating and wide usage of the standardized accounting form on implementation of the immunization program (form No. 5).
- Application of practice for using PTI for some vaccines.
- Application of practice for using inventory of cold chain in the national level.

The experts of the mission visited thirteen warehouses of regional level of vaccine distribution and 26 medioprophilactic institutions (MPI) where evaluated the existing indicators for the 12-month perios from September 1, 2013 to August 31, 2014.

It was analysis of the strong and deficient features in all stages of the vaccines delivery chain.

Among the strong features of the delivery chain the experts of the mission noted due organization of purchase and uninterrupted delivery of vaccines, perfection of vaccine acceptation in comparison with the last evaluations and purchase of vaccines through Delivery Section of UNICEF since start of 2014. Sufficient level of storage of vaccines is provided in the Innovation & Procurement Center in the central level, the system of accounting of reserves complies with the requirements and the personnel dealing with vaccines in the central level is duly trained and the most part of the working procedures exist in the central warehouse. The demand in vaccines is forecasted by the personnel of the Expanded Immunization Program at the Republican Center of Hygiene and Epidemiology (RCHE).

The demands in vaccines are forecasted basing upon the scientifically grounded data regarding the population's number considering coverage with vaccination and real level of losses.

The Innovation & Procurement Center (IPC) purchases vaccines complying with the forecasts developed by RCHE and, quarterly, according to the schedule developed by RCHE and using the "per distributon" system send the vaccines to the regional CHE. Medioprophilactic institutions (MPI) accept monthly vaccines in the regional CHE considering own monthly demands hereby using the "per request" system.

Deficient features: accountings of reserves in the RS and MPI levels significantly differ and often do not meet the requirements, the level of training of the RS and MPI personnel in connection with reserves management is different and often insufficient; freezing indicators at transportation of vaccines are not used in the forms filled in while distributing the vaccines from the RS level to MPI level, the status of temperature indicator is not shown (vial thermoindicator and freezing indicator). The Mission developed recommendations on increase of efficiency in the national level, regional vaccine warehouse and in the level of immunization service (MPI).

Evaluation of application of the 10-valency pneumococcal vaccine in 2015

Mission for evaluation of application of the 10-valency pneumococcal vaccine worked in Azerbaijan on March 2-8, 2015.

The evaluation discovered many strong features i.e. high-level support of the immunization program, efficient immunization system, responsible personnel in all levels, total successful application of 10-valency pneumococcal vaccine, implementation of preparation works in due level, high coverage indicators (V1- 91%, V3- 64%), due adoption of the vaccine by medical personnel and population, high-level training materials in all institutions of initial health, sufficient capacity of cold chain in all levels, presicely set of the vaccine delivery system (excluding Baku city).

Deficiencies: lack of communicational component, lacks of cold chain; lacks in calculation of the target group; lack in analysis of coverage with vaccination; staff challenge – lack of personnel in the epidemiological section in the regional CHE, irregular inspections due to lack of financing, absence of standardized procedures / questionnaires on implementation of inspections, absence of the standardized protocol of classification, monitoring and accounting of PIAM. Appropriate recommendations were developed subsequently to evaluation.

6. Background information on financial sustainability

6.1. Findings from previous assessments

The funds for the immunization program of Azerbaijan were provided by the Public Programme of Immunoprophylaxis of infectious diseases distributing the funds basing upon the national vaccination calendar hereby ensuring stable financing. As a rule, the state allocates the full amount requested by the NPI, and there are no delays or significant reductions of payments and the total approved amount. Between 2006 and 2010, the volume of distribution of funds for the vaccine, approved by the Cabinet of Ministers, ranged from AZN 530 thousand to AZN 1.2 mln (respectively by USD 504 thousand to USD 1.4 million). As shown below, in 2014 the volume of funds allocated for the NPI, was AZN 2.9 mln. and the preliminary budget for 2015 was AZN 3 mln., gradually increasing to AZN 4.8 mln by 2018, which reflects the commitment of government to ensure stable funding of vaccination.

The following table shows the health budget (public expenditure on health care) for the 2003-2013. About half of these expenditures is carried out at the central level of the Ministry of Health, two-thirds of the waste to the local authorities (districts), and the rest (one-sixth) by other ministries. Vaccines are procured centrally by the Ministry, while the budget of the NPC and vaccines and are funded from the budget allocated to the central level of the Ministry of Health.

Table 3. Accounting and forecasted budget of MoH (AZN)

	Central budget of Ministry of Health	Total budget of medical deliveries (including vaccines):	Budget of medical deliveries in % relative to the central budget of the Ministry of Health	Vaccination budget	Budget of vaccination in % relative to the central budget of the Ministry of Health
2013	310 427 632	15 400 000	5,0%	4 500 611	1,4%
2014	336 749 717	15 800 000	4,7%	2 790 364	0,8%
2015	405 286 991	14 800 000	3,7%	3 009 600	0,7%
2016	470 795 446	19 031 000	4,0%	3 459 600	0,7%
2017	541 414 763	21 885 650	4,0%	3 977 100	0,7%
2018	622 626 977	25 168 498	4,0%	4 572 225	0,7%

Resource of information: Ministry of Health, Financial Department

Currently Gavi is the only external source supporting NPI of Azerbaijan.

Procurement Mechanism: Until 2014, Azerbaijan independently purchased vaccines not included to the RPI, but in 2014 all vaccines were purchased by Delivery Section of UNISEF and, it helped the country to save about AZN 2.5 mln (USD 2.4 mln at the exchange rate of in 2015). In 2016 the only help on vaccines received from donors is GAVI's support in getting the pneumococcal vaccine. All other vaccines, noted in the chart, were financed from the state budget. Government-funded vaccines under the NPC reached 81.6% in 2011, the rest was provided by GAVI (18.4%). Furthermore, in recent years, there was no shortage in vaccine stocks.

Vaccines are acquired by the Ministry of Health in a centralized manner and therefore, the budget of NPC and vaccines are funded from the budget allocated to the central level of the ministry.

The Ministry of Health has successfully funded the NPC and fully complied with its obligation to co-financing in the 2011-2015's. Requirements regarding the resources allocated for the vaccine (as described in the comprehensive multi-year plan), were included in the medium-term expenditure framework and the required funding has been provided.

The Ministry of Finance determines the annual health budget and then allocates funds to the Ministry of Health for the provision of services under its control.

Currently, funding for national immunization work covered mainly from public sources; however, during the past years, donors have also provided financial and technical assistance for immunization.

Vaccination is carried out in primary health care, rural health centers and medical clinics as well as in urban and district clinics, maternity homes and offices at the district level. Expenses for salaries and other operating costs associated with the vaccination services at the subnational level are covered by the local authorities.

In recent years, national immunization program has become quite self-sufficient. At this point, the only help with vaccines obtained from donors, consists of GAVI on penta-vaccine containing Hib before the end of 2015 and support for the pneumococcal vaccine. All other vaccines in the schedule are covered by the state budget. During recent years, the depletion of the stock of vaccines was not observed.

Azerbaijan applied to GAVI for support with pneumococcal vaccine in 2010.

PCV vaccine in Azerbaijan was approved by GAVI in 2011. In connection with the problems associated with the delivery of the previously requested formulation of PCV-13, the implementation was delayed until December 2013 and, the country applied PCV-10 instead of PCV-13. FRV agreed to cover the country's share in the co-financing for the first three years. Unfortunately, FRV encountered difficulties in collecting funds and was unable to finance the country's share in the joint funding for more than one year, Azerbaijan has requested a change in the form of release from the PCI-10 to PCI-13 in 2016, and this request was approved by GAVİ in August 2015.

In general, the introduction of the pneumococcal vaccine in Azerbaijan went well. PCV introduced for all children free of charge in all available services of open access to immunization, including fixed, mobile, as well as by services for outreach activities. The vaccine is administered in three stages at two, four and six months. National coverage of PCV was 91% for 2014 years for the 1st dose, 80% for 2nd and 64% for the third dose. Significant shootout between 2nd and 3rd doses in the first place was due to the fact that relatively few children reached the required age for entering the 3 doses of the end of 2014.

In April 2014, Azerbaijan has received a grant for the introduction of PCV in the amount of USD 127 thousand for the development and maintenance of the Ministry of Health website on immunization and surveillance for vaccine-preventable diseases. Today the website is in the stage of development. Events for the actual preparation for the introduction of PCV were financed by the Vishnevskaya-Rostropovich Foundation (stickers according to the policy in respect of open vials at PCV-10 for medical professionals guide). Education on the introduction of PCV-10 and a national conference was held with the direct and financial support from WHO. WHO has also provided technical support for development of technical documents on PCV-10. Strategies of information exchange and related materials have been developed with consulting support of UNICEF.

The country previously planned to introduce IPV in July 2015, but implementation has been delayed due to problems with the delivery on a global level. Education and other preparatory measures have already been undertaken, and the implementation will be carried out immediately upon receipt of confirmation of the possibility of supply and arrival of the vaccine consignment (assumedly, in the early 2016).

Strengths and weaknesses relating to the financing of the program and immunization are described below, together with WHO recommendations to address the identified difficulties.

Advantages and Disadvantages

Strengths

- The special political commitment and prior feature of the national immunization program to achieve the Millennium Development Goals
- National Coordination Mechanism (NCC) is a real tool for ensuring coordination between the structures that perform immunization function
- All the basic functions of NPC are performed
- Main functions of NPC are centralized
- The status of a country free from polio persists
- Significant achievements in the elimination of measles and rubella
- Significant achievements in the issue of economic independence
- Successful extension of the immunization program; presently with 11 antigens
- Close cooperation with partners

- Creation of the National Technical Advisory Group on Immunization (NTAGI).

Strengths - financing of immunization

- There is a separate budget line for vaccines and supplies
- Calculation of funds required for vaccines is implemented
- Cyclic forecasting tools required for vaccines (vaccines for calendar vs annual demand vs estimated price)
- Request of funds necessary for vaccines is given in the process of forming the budget of the Ministry of Health
- Transfer of allocated funds is carried out in a timely and complete manner. As a result, there is a continuous process of supplement of vaccines.
- Financing of immunization is considered as priority.

Difficulties

- Important operations of NPC are underfunded and dependent on the declining donor support (training, monitoring, etc.)
- Incorrect understanding of the issue of quality of vaccines among some health professionals and parents leads to unnecessary expenditure of parents (for those who prefer private immunization services and products out of NPC)
- Private immunization services are not sufficiently integrated into the NPC (especially concerning the registration and reporting).

6.2. Financial sustainability strategies

Recommendations for achieving financial stability

General aspects

- Promote long way benefit of immunization for the mobilization of additional resources to achieve the objectives of the program.
- The most economical way of taking public health measures to prevent death, disability and disease.
- Allocation of funds for operational activities (training, supervision, monitoring and surveillance) in order to maintain the quality of services.
- To support and further enhance the CCM to ensure maximum benefit from coordination between the agencies involved in immunization
- Improve the integration of private immunization services to NPC. Develop and implement a strategic guide to the NPC by investing in NITAGs.
- Capacity-building efforts; participation at the national and regional levels in program activities (planning, implementation, monitoring); interaction with other consultation mechanisms
- Promote long way benefit of immunization to maintain the political commitment and the need to immunization services
- To predict the available fiscal space to ensure financial stability

Table 10: Analysis of the financial stability of NIP in Azerbaijan (held in 2011 by the European regional bureau of the WHO)

Initial indicators	• Annual increase of GDP - 4.4% (2009-2015) • Achievement of VND - $6,262 for person in 2015 • Correlation of the budget of the Ministry with GDP remains the same during 2009-2015 • Correlation of the budget of planned vaccines with the budget of the Ministry remains the same during 2009-2015
Conclusions	Increase of the country's share in the joint financing is increase of the state budget for 54% for the planned vaccines in 2015 (in comparison with the level of 2009).

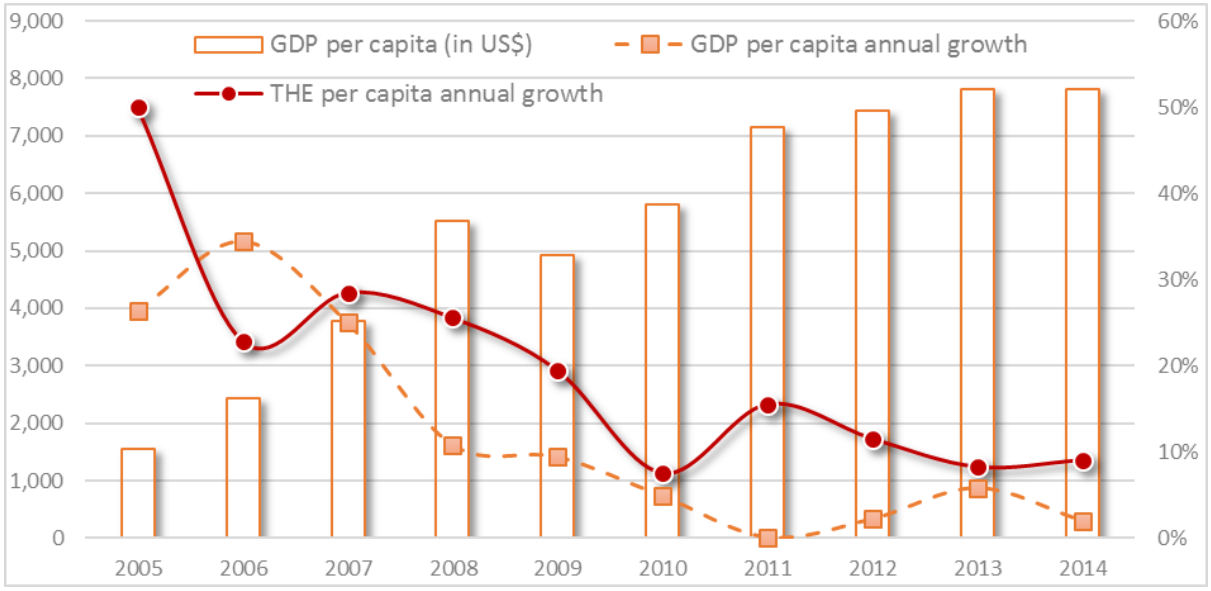
7. Immunization programme costs, financing and funding gaps

7.1. Macroeconomic context and demographics

Following assumptions have been used for macroeconomic projections for Azerbaijan 2016-2020 cMYP costing exercise:

- GDP per capita rate was set based on WHO estimates:
  - 0.07% - 5.8% GDP range of annual growth rate during 2010-2014 in accordance with the WB annual GDP growth rate forecast.
- GDP per capita (in current US$) was estimated at 7,809 in 2014 (according to the WHO NHA GHED data) as shown in Figure 28.
- Total Health Expenditure (THE) per capita was 471 US$ in 2014 (in accordance with the WHO NHA GHED). THE per capita projections were made using the GDP per capita annual growth rate (range 0.07% - 5.8%) based on the WHO NHA GHED data as described above.
- GHE as % of THE – constant value at the rate for baseline year (2014) – 20.4% (in accordance with the WHO NHA GHED).
- Inflation rate (Consumer price index) was estimated at level of 1.01 – 2.38 in previous 3 years (according to the World Bank World Development Indicators);

Figure 1: Macroeconomic trends and healthcare financing dynamics



Source: WHO Global Health Expenditure Database

- The population growth was projected at the annual growth rate of 1.19% (in accordance of the projections of MHSPP Republican Center of Medical Statistics and Information that is lower than the population annual growth % in last five years according to The World Bank data – 1.21 for 2014).

7.2. Current programme costs and financing

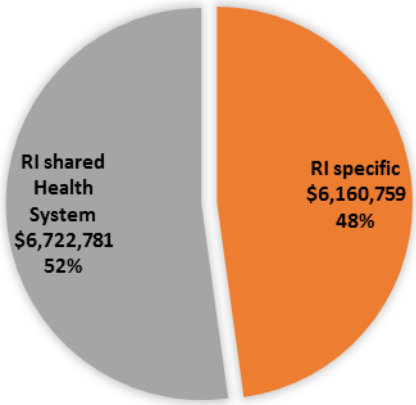
Expenditures on immunization in the baseline year

The national immunization program expenditures in 2014 amounted to 7.3 million US$ (with shared health system costs) as shown in Figure 2 below:

Figure 2: Baseline Indicators (2014)

Total Immunization Specific Expenditures	**$7,302,041**
Supplemental immunization activities	$1,141,282
Routine immunization only	$6,160,759
Per capita	$0.64
Per DTP3 immunized child	$40
% Vaccines and Supplies	52.18%
% Government Funding	58.64%
% Of Total Health Expenditures (THE)	0.66%
% Government Health Expenditures	3.25%
% GDP	0.01%
Total shared costs	**$ 6,722,781**
% Shared Health Systems Cost	**47.93%**
Total Immunization Expenditures	**$14,024,821**

Shared health system costs (6.7 million US$) accounted for 52% of the immunization expenditures in 2014 and the rest was spent specifically on routine immunization (48% or 6.2 million US$). The cost of fully (DTP3) immunized child was 40 US$.

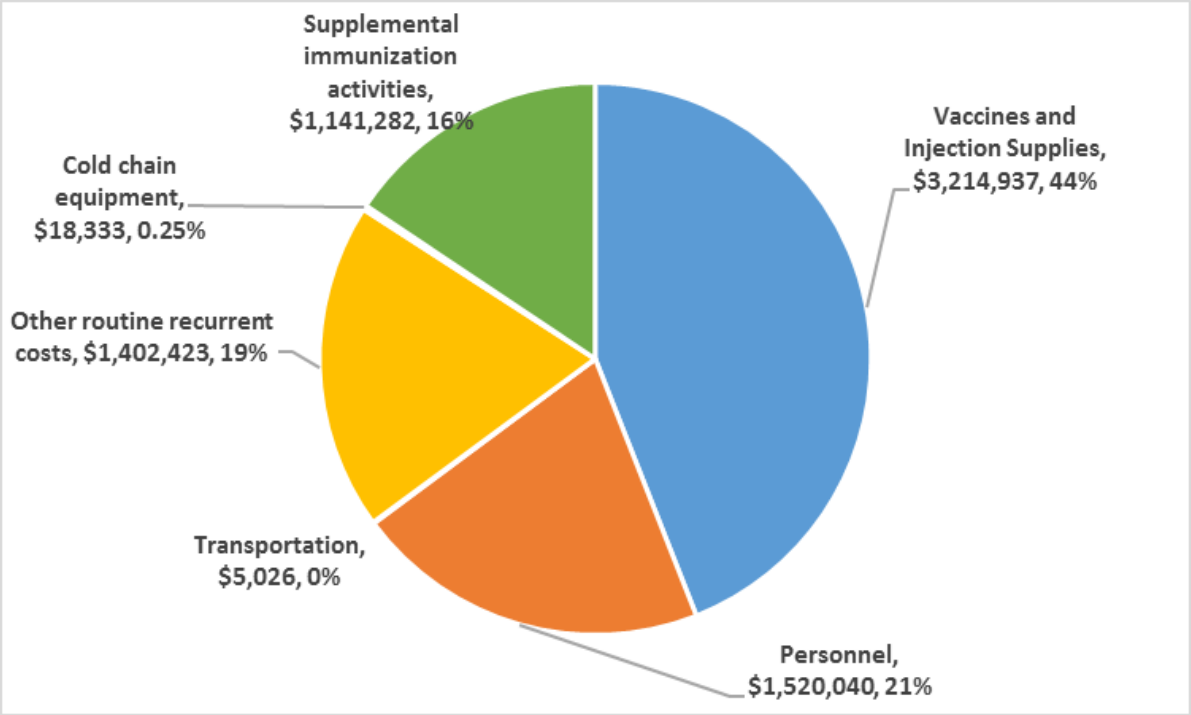


0.66% of the total health expenditures (or 3.25% of the government health expenditure) was spent on routine immunization.

"Vaccines and injection supplies" was the major cost driver of the National Immunization Program of Azerbaijan in baseline year constituting 44% of total program costs (or 3.2 million US$).

"Personnel" cost was the second major cost drivers and accounted for 21% (or 1.5 million US$) of total program costs followed by "Other Routine Recurrent Costs" accounting for 19% (or 1.4 million US$) of total program costs. "Cold-chain equipment" constituted 0.25% (or 18,333 US$) of total program costs. 0.07% (or 5,026 US$) of total program costs were spent on transportation in 2014 (see Figure 3 below):

Figure 3: Routine Immunization baseline cost structure



The cost of MR catch-up campaign, conducted among 11-15-year-old children, accounted for 16% of total program costs (or 1.1 million US$) in baseline year (2014).

Routine immunization cost structure

Personnel

Out of the total of 3,039 persons engaged in the national immunization program, 2,711 (89%) are shared health system personnel (allocating some portion of work time to immunization) and 280 (11%) persons dedicate full work time to immunization as shown in **Figure**. As it was mentioned above, "Personnel" cost was the second major cost driver of the National Immunization Program in baseline year, accounting to 21% (or 1.5 million US$) of total program costs in 2014.

Vaccines

In total 3.2 million US$ (44% of total routine immunization program cost) was spent on all vaccines. Share of traditional vaccines accounted for 12% (or 0.89 million US$), underused vaccines – 17% (1.3 million US$) of total program costs and new vaccines accounted for 12% (or 0.89 million USD). The cost of Injection supplies constituted 2% of total program costs (or 161,729 US$).

Other Routine Recurrent Costs

The total for "other routine recurrent costs" amounted to 1.4 million US$ in the baseline year.

"Cold-chain maintenance and overhead" was the major cost driver of "other routine recurrent costs" accounting for 55% (or 0.78 million US$) of total "other routine recurrent costs. "Program management" was the second main cost driver constituting 23% (or 325,613 US$) of total other routine recurrent costs. "Building overheads" (electricity, water…etc.) accounted to 7% (or 96,540 US$) followed by "disease surveillance" and "short term training" costs accounting for 6% (79,581 US$) and 5% (75,000 US$) respectively. 1% of total other recurrent costs were spent on "Maintenance of other capital equipment".

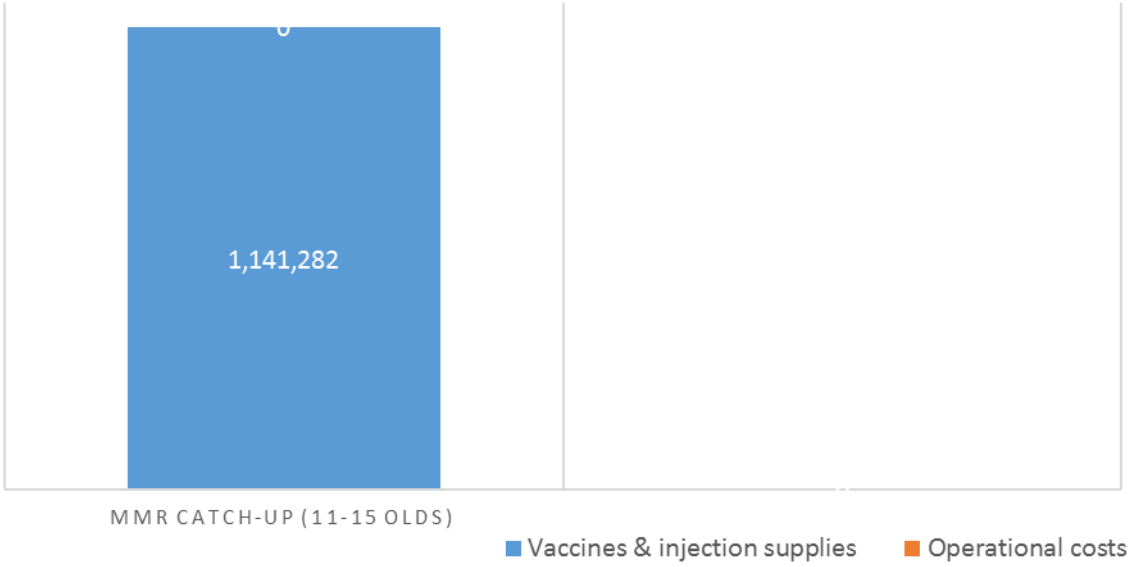
Vehicles and Transportation

In total 5,026 US$, or 0.07% of total program costs was spent for vaccine distribution in baseline year. No funds were spent for procurement of vehicles in 2014.

Supplementary immunization costs

EPI conducted MMR catch-up campaign among the children of 11-15 years old. Total cost of the SIA was 1.1 million US$, which was spent on vaccines and injection supplies. SIA operations were not related to the additional costs, as were implemented by the National Immunization Program staff (see Figure 4 below).

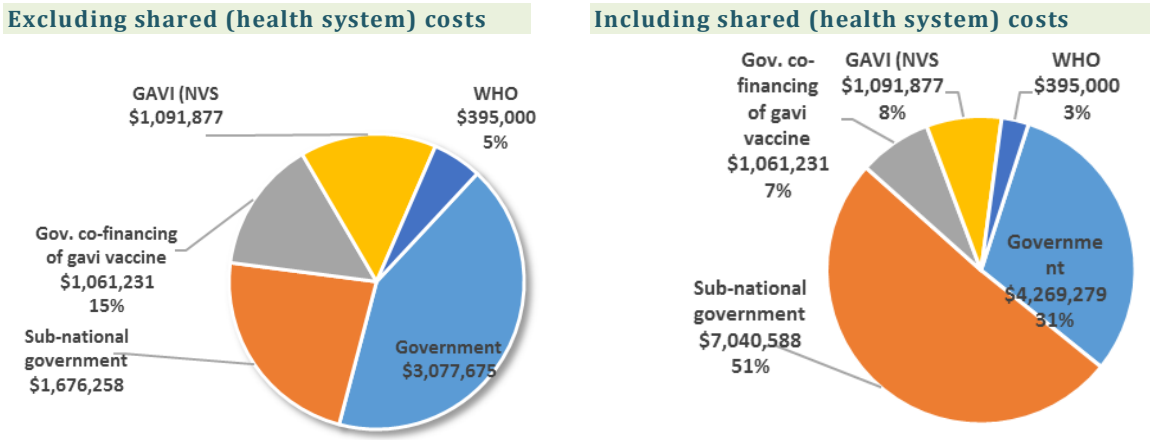
Figure 4: Supplemental Immunization Activities in the baseline year



Immunization financing in baseline year

There were three sources for funding National Immunization Program of Azerbaijan in baseline year (2014). The Government was the major source of financing of the program accounting for 80% (or 5.8 million US$) of all funds if shared health system costs are excluded and 89% (or 12.4 million US$) if shared health system costs are included as shown in Figure 5 below:

Figure 5: Immunization financing profile – baseline year



Gavi NVS was the second major source of funding. In 2014 Gavi contribution to the national immunization program amounted to 1.1 million US$ which translates into 15% of program funding if shared health system costs are excluded or 8% of program funding without shared health systems costs. WHO contribution in the national immunization program was equal to 395,000 US$ (3% with shared costs and 5% without shared health system costs).

7.3. Future resource requirements

Overview of the resource requirements' structure

The total resource requirements for cMYP 2016-2020 projection period were estimated at 76 million US$ (including shared health system costs) as shown in Figure 6 below:

Figure 6: National immunization program costs summary by system components and years – basic scenario

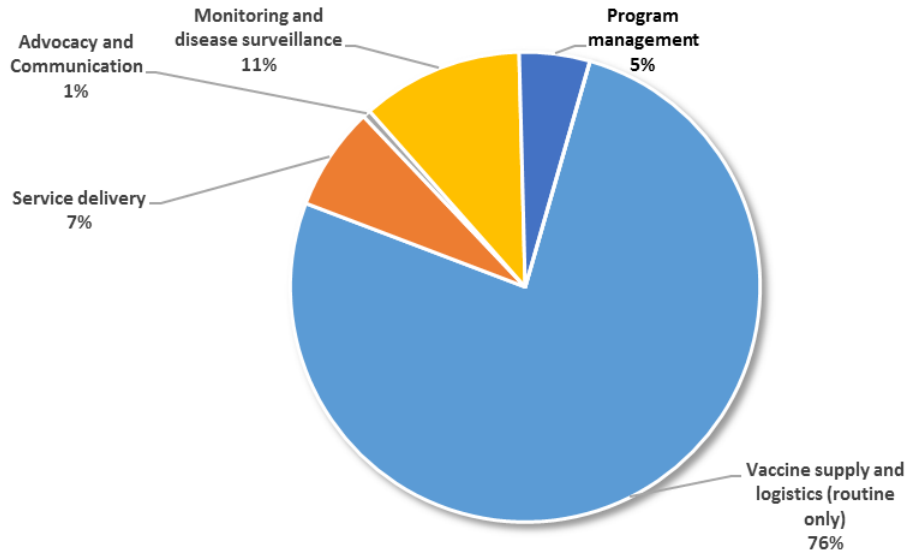
Immunization system components	Expenditures	Future resource requirements					Total 2016 -
	2014	2016	2017	2018	2019	2020	2020
Vaccine supply and logistics (routine only)	4,020,759	6,633,402	6,507,257	6,574,591	6,649,163	6,718,085	**33,082,498**
Service delivery	617,543	617,543	617,543	617,543	617,543	617,543	**3,087,713**
Advocacy and Communication	38,200	73,364	108,531	18,702	18,876	19,053	**238,527**
Monitoring and disease surveillance	987,104	987,296	987,491	947,691	947,894	948,101	**4,818,472**
Program management	497,153	529,265	791,419	258,617	260,858	263,145	**2,103,304**
Supplemental immunization activities (SIAs)	1,141,282	0	0	0	0	0	**0**
Total immunization Immunization costs	**7,302,041**	**8,840,869**	**9,012,241**	**8,417,143**	**8,494,334**	**8,565,928**	**43,330,514**
Shared Health Systems Costs (EPI Portion)	6,722,781	6,561,875	6,555,935	6,555,935	6,555,935	6,555,935	**32,785,614**
Total immunization resource requirements	**14,024,821**	**15,402,744**	**15,568,176**	**14,973,078**	**15,050,268**	**15,121,862**	**76,116,128**

The details of future resource requirement (by cost categories) is presented in Figure 27.

Description of cost drivers of the future resource requirements

"Vaccine supply and logistics" is the main cost driver of the NIP in Azerbaijan in next five-year period accounting for 76% (or 33.1 million US$) of total resource requirement of the program. This is followed by "Monitoring and disease surveillance" accounting to 11% of total program costs (or 4.8 million US$). "Service delivery" and "Program management" will account to 7% (3.1 million US$) and 5% (2.1 million US$) of total program costs respectively. The resource requirement for "Advocacy and communication" will constitute 1% of total resource requirements (or 238,527 US$) as it shown in the Figure 7 below:

Figure 7: The future total resource requirement structure by cMYP components (shared costs excluded)



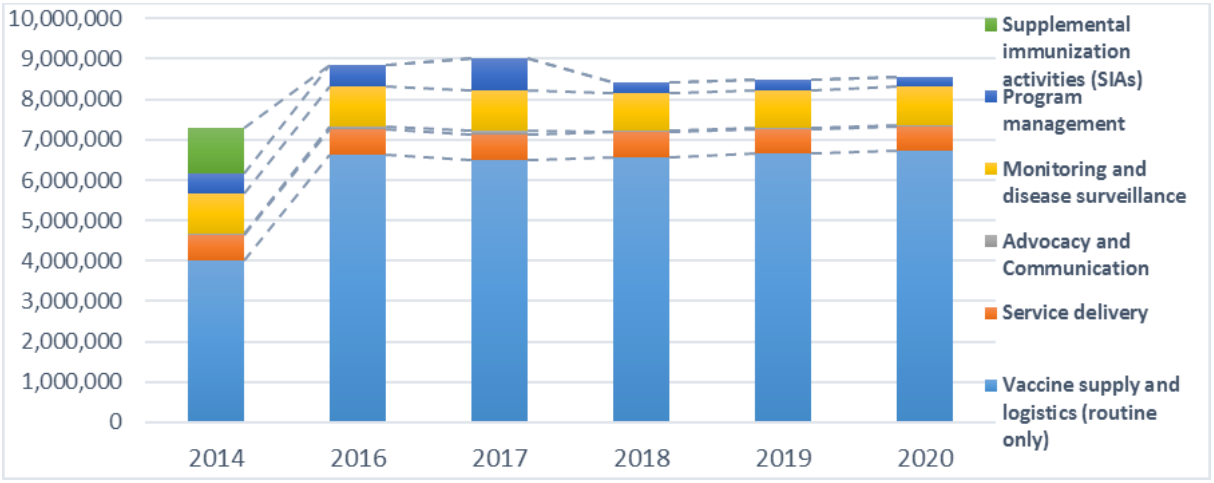
The resource requirements for routine immunization per annum varies between 8.4 and 9 million US$ in 2016-2020 (excluding shared health system costs).

When compared with the baseline year:

- Total immunization resource requirements will increase by 10% (or 1.4 million US$) in the first projection year - 2016.
- In 2017 the immunization resource requirements will increase by 11% (or 1.5 million US$).
- In 2018 and 2019 the resource requirements will increase by approximately 6.8% and 7.3% (or 0.95 million US$ and 1 million US$ respectively);

- In the last projection year (2020) resource requirement will increase by 8% or 1.1 million US$.
- According to the dynamics of the immunization program resource requirements, insignificant fluctuations of resource requirements is expected, which mainly will be driven by dynamics of "Vaccine supply and logistics" component of the immunization system, as it is shown in Figure 8 below.

Figure 8: The structure of future resource requirements by cMYP components and years (shared costs excluded)



Vaccines and injection supplies

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

- Coverage rates were set in line with the objective and targets of National Immunization Program by 2020 (>=95% by 2020).
- Government meets its co-financing obligations consistently and allocates sufficient funds for vaccine procurement.
- Vaccine wastage targets are estimated at 41% for BCG, 26% for DT, 25% for IPV, 23% for DTP, 14% for OPV, 5% for HepB and Pentavalent vaccine, 4% for MMR and 2.8% for PCV.

The present projections are based on vaccine price estimates provided by the UNICEF Supply Division and include 4.5% unicef handling fees and 10% of freight/insurance/inspection costs.

The resource requirement projections for vaccines (basic scenario) envisages costs of following vaccines:

- Traditional vaccines: BCG, DTP, DT, OPV and MMR vaccines;
- Underused vaccines: HepB and Pentavalent (introduced in national immunization schedule in 2011) Vaccines.
- New vaccines: PCV (introduced in national immunization schedule in 2013) and IPV Vaccines (planned for introduction in 2016).
- HPV vaccine for the cMYP scenario A, with implementation of the HPV Demo Project during 2017-2018 and nationwide scale-up from 2019.

Figure 9 below illustrates the structure of routine immunization vaccine and injection supplies' costs by vaccines and years.

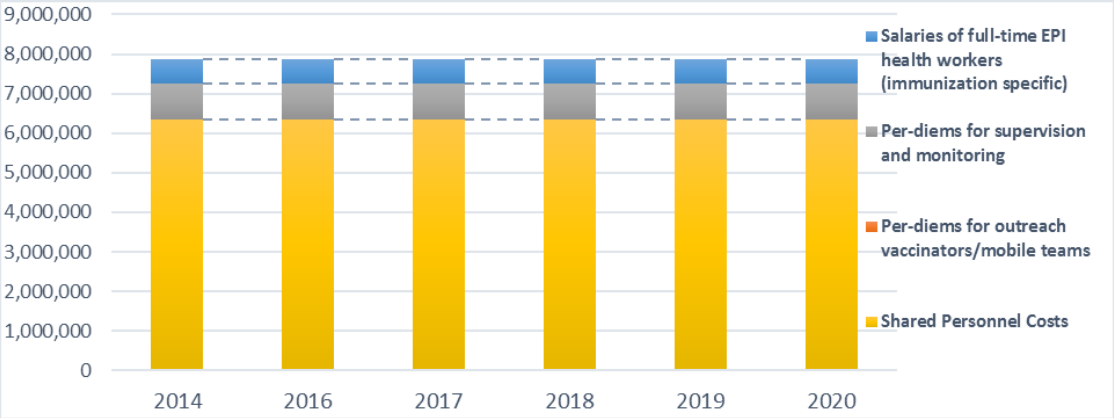
Figure 9: Vaccine and injection supply cost projections (routine immunization)

	2016	2017	2018	2019	2020
IPV	$755,073	$615,903	$623,232	$630,649	$638,153
PCV	$2,755,353	$2,788,045	$2,821,223	$2,854,795	$2,888,767
MMR	$514,618	$520,724	$526,920	$533,191	$539,536
OPV	$184,745	$186,937	$189,161	$191,412	$193,690
DT	$38,926	$39,388	$39,856	$40,331	$40,811
DTP	$56,249	$56,917	$57,594	$58,280	$58,973
DTP+Hib+HepB	$1,224,400	$1,238,928	$1,253,671	$1,268,590	$1,283,686
Hep B	$82,337	$83,314	$84,306	$85,309	$86,324
BCG	$45,718	$46,261	$46,811	$47,368	$47,932

Personnel

Personnel costs were estimated at 42.4 million US$ in 2016-2020, and salaries of the shared personnel accounted for 93% of total personnel costs (immunization specific and shared personnel costs).

Figure 10: Personnel costs by cost categories and years (routine immunization)



Personnel costs, per diems for supervision and monitoring will remain constant across all projection years as it is shown in Figure 23 and Figure 24.

Cold chain equipment

Cold chain maintenance and overhead is the major cost driver of the cold chain related resource requirements accounting for 89% (or 3.96 million US$). Resource requirements for procurement of cold-chain equipment amounts to 472,436 US$ or 11% total cold-chain related resource requirement (see Figure 11).

Figure 11: Cold chain related resource requirements

	2014	2016	2017	2018	2019	2020	Total 2016-2020
Cold chain maintenance and overhead	$775,249	$781,928	$789,351	$790,326	$797,749	$798,723	**$3,958,077**
Cold chain equipment	$18,333	$136,538	$83,974	$83,974	$83,974	$83,974	**$472,436**
Total	**$793,582**	**$918,467**	**$873,326**	**$874,300**	**$881,723**	**$882,698**	**$4,430,513**

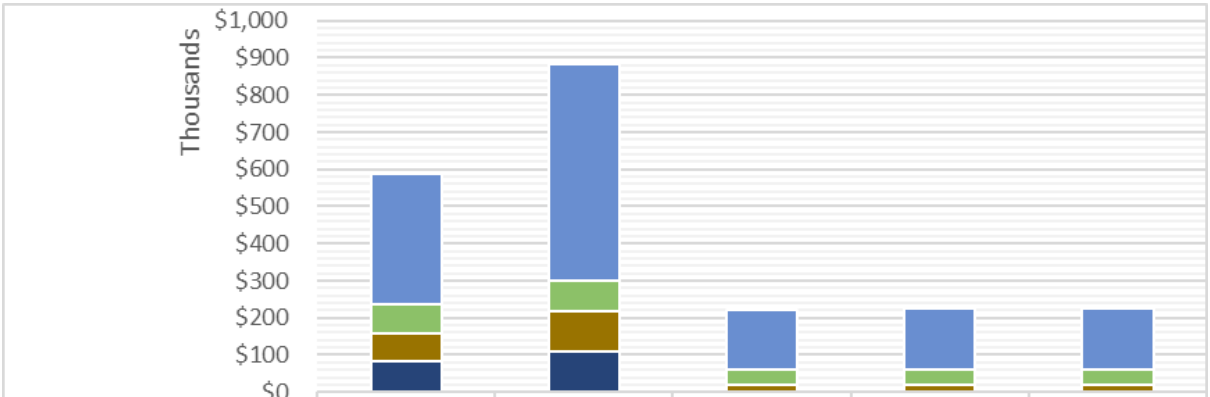
Cold chain maintenance and overhead costs account for 89% of the 4.4 million US$ estimated to cover the cold chain related needs as shown in Figure 11 above.

Other recurrent costs

Out of the total 6.6 million US$ required for "Routine Recurrent Costs", 67.8% (or 4.5 million US$) will be required for cover "maintenance and overhead" costs, includes "cold-chain maintenance and overhead" - 59.6% (or 3.96 million US$), "building overheads (water, electricity and etc.)" - 7.3% and "maintenance of capital equipment" - 0.9% (or 61,202 US$) of total "maintenance and overhead" costs.

"Program management" will account for 21.5% (or 1.4 million US$) of total routine recurrent costs. "Disease surveillance" and "IEC/Social Mobilization" will account for 4.2% (280,857US$) and 3.6% (238,527 US$) and Short-term training will consume 2.9% (195,000 US$) of total routine recurrent costs (see Figure 12 below).

Figure 12: The future resource requirements for "Activities and other recurrent costs"



	2016	2017	2018	2019	2020
Program management	$347,725	$584,879	$162,077	$164,318	$166,605
Disease Surveillance	$79,773	$79,968	$40,167	$40,371	$40,578
IEC/Social Mobilization	$73,364	$108,531	$18,702	$18,876	$19,053
Short-term training	$85,000	$110,000	$0	$0	$0

Supplementary immunization activities

No supplemental immunization activities are planned for projection years of cMYP 2016-2020.

Description of scenarios for introduction of new vaccines

Scenario building parameters

EPI Azerbaijan is considering two different scenarios for selection and implementation during the period 2016-2020:

Basic Scenario – which envisions implementation of existing routine immunization program and introduction of IPV in 2016.

Scenario A – in addition to the basic scenario envisions introduction of the two-year HPV Demo project during 2017-2018 with following nationwide scale-up of HPV vaccine in 2019.

Final selection of scenarios for implementation will be based on availability of financial resources for the national immunization program. The final decision will be done by the key stakeholders of the country based on discussion of these two scenarios.

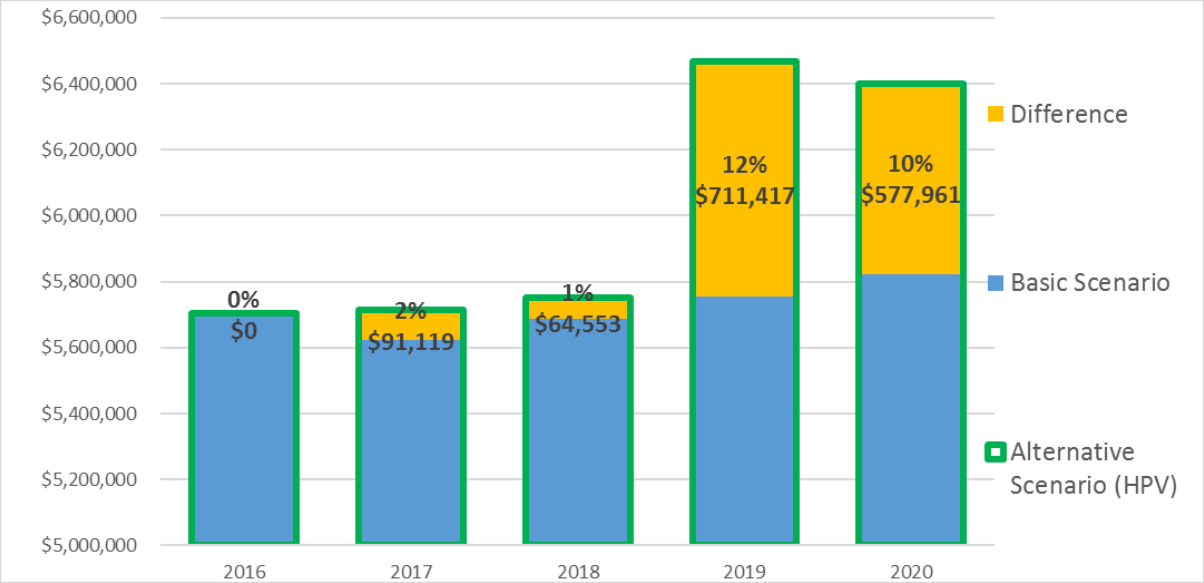
Results – financial implications of vaccine introduction

The implication of resource requirements for vaccines and injection supplies by scenarios and years is represented in Figure 13.

The introduction HPV vaccine will increase annual resource requirements from 2017. In the first year of introduction (2017), the resource requirement for vaccines will increase by 2% (or 91,119 US$) and in the year of 2018 – by 1% when compared by the baseline year. In 2019 the resource requirement will further increase by 12%

(or 0.71 million US$ in comparison with the previous year) and in the last projection year (2020) increase in required resources will account for 10% (or 0.58 million US$).

Figure 13: Commparison of resource requirements for vaccines and injection supplies by scenarios and years



Comparison of costs of vaccines and cold-chain across two different scenarios shows that introduction of HPV vaccine will not require substantial improvement or upgrade of existing cold-chain.

Figure 14: Comparison of costs of vaccines and cold chain across scenarios

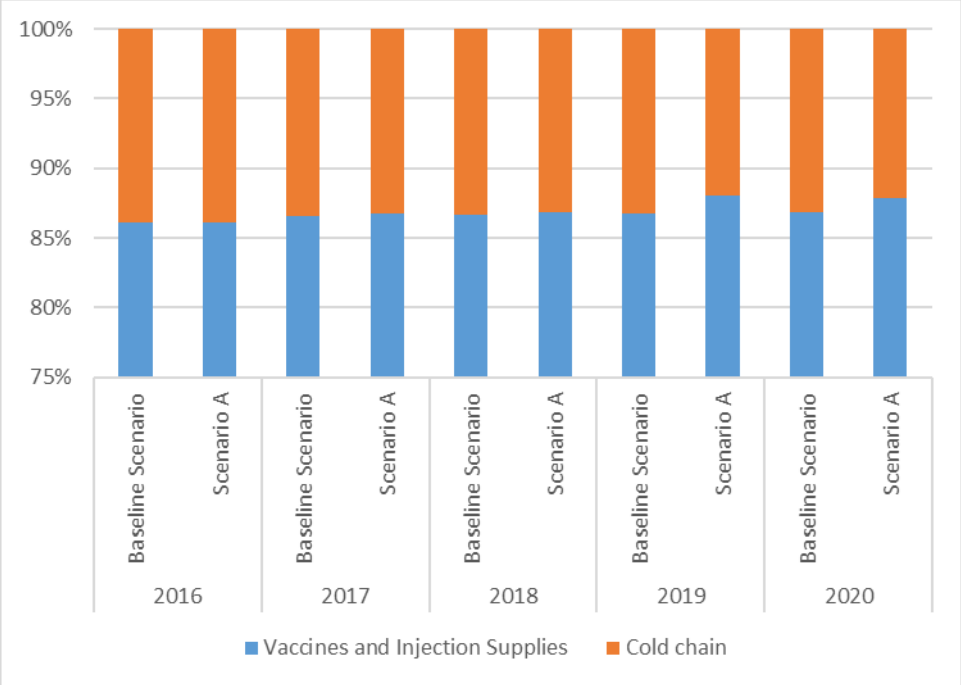
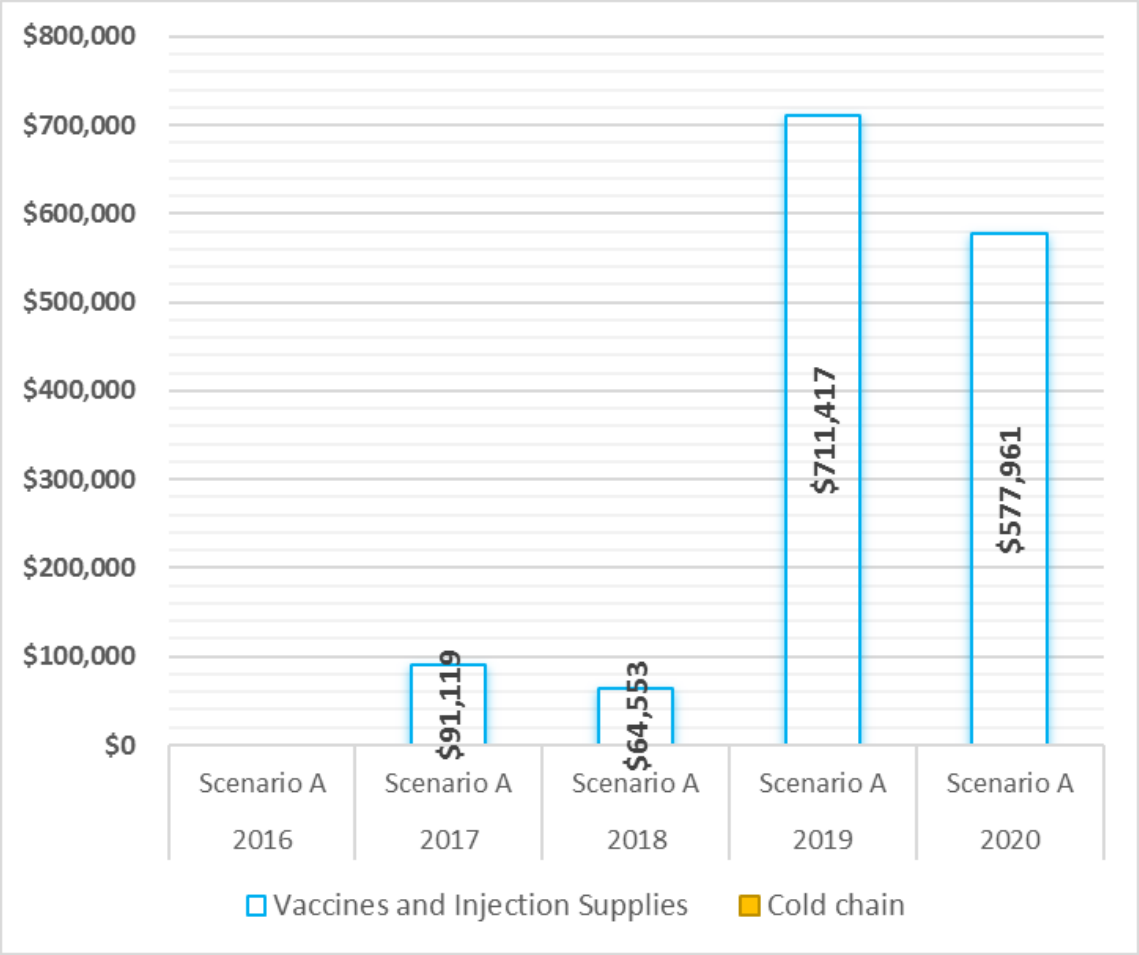


Figure 15 shows the cost implications of increased vaccines and injection supplies' requirement on the total resource requirement for Scenario A, which in case of implementation will increase resource requirement for the program by 5% (or 1.5 million US$) over the cMYP period.

Figure 15: Additional costs by types, scenarios and years

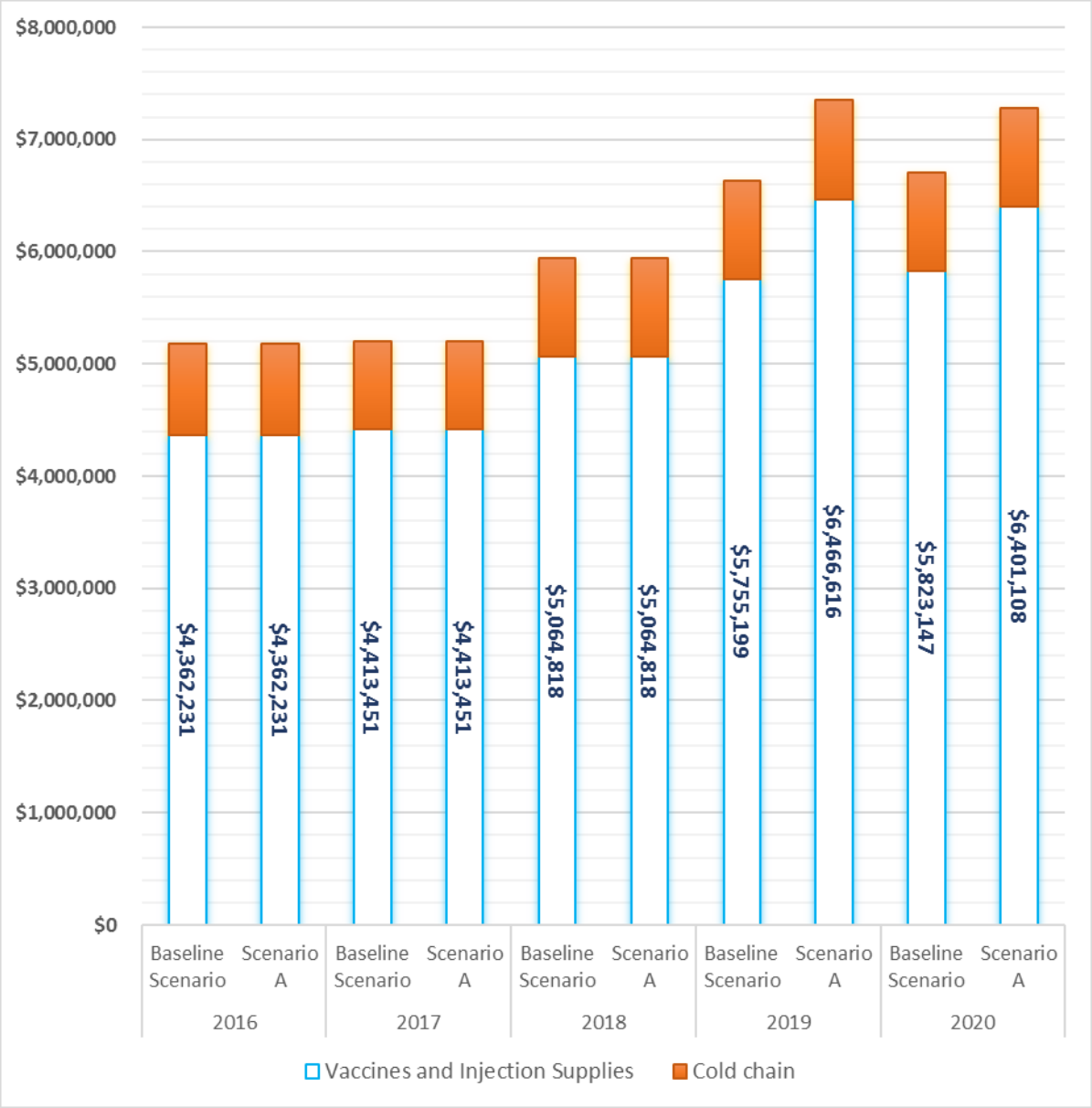


Further analysis of the HPV introduction financial implications shows that even though the total resource requirement for vaccines will increase with the HPV vaccine introduction, the Government financing of vaccines and cold chain in 2017 and 2018 will remain the same across the basic, A and B scenarios (where HPV introduction is considered); therefore, the introduction of HPV vaccine will not have a financial implication on the state budget **during the first two years of introduction** (see Figure 16 below):

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

However, the **introduction of HPV vaccine will have cost implications on the state budget in the two final years of projection (2019-2020)** if the country decides to roll-out HPV vaccine at the national level and include HPV vaccine into the routine immunization schedule. Particularly, in case of nationwide roll-out of the HPV vaccine **the additional financial burden to the state budget will amount to 1,3 million US$** for two final years of cMYP (711,417 US$ in 2019 and US$577,961 in 2020) as it is represented in the **Figure** below.

Figure 16: Government financing (both secured and probable) of vaccines and cold chain

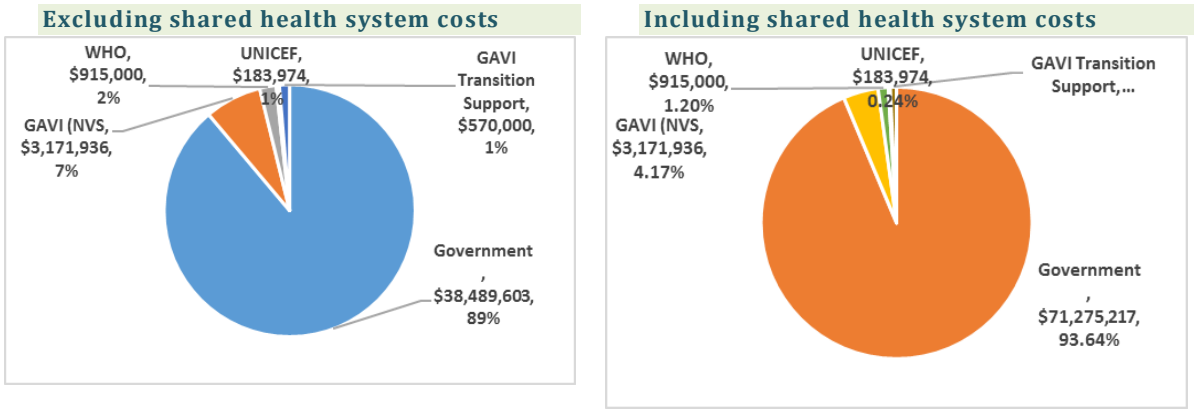


7.4. Future financing and funding gaps

The total financing for 2016-2020 was estimated at 76 million US$ (including shared health system costs) or at 43.3 million US$ (excluding shared health system costs).

Government is the major source of financing for Azerbaijan National Immunization Program. During the projection period the government is expected to contribute to the NIP 71.2 million US$ (or 93.6% of total funding) when the shared health system costs are included or 38.5 million US$ (or 88.8% of all funding) when shared health system costs are excluded as shown in Figure below. The details of program funding are represented in Figure 27.

Figure 17: The future financing (with secured and probable funds) structure



GAVI is the second major source of financing of Azerbaijan NIP. Through the NVS and Transition Support Plan, Gavi will contribute 3.1 million US$ to the program funding which translates in 4.2% of total resources required for the program with shared health system costs, or 7.3% of total resource requirements if the shared health system costs are excluded.

WHO will contribute in total 0.92 million US$ which constitutes 1.2% of total funding with shared health system costs or 2.1% without shared health system costs.

Unicef contribution will be 183,974 US$ which constitutes 0.24% of total funding with shared health system costs or 0.42% - without shared health system costs.

When only secured funding is considered (excluding shared health system costs):

- the share of government financing in secured funding accounts to 85% (or 21.6 million US$ out of total 25.5 million US$ of secured funds); however, 95% of probable funding (or 16.9 million US$) is expected to come from the state budget.
- The share of GAVI financing is 10% of total secured funds (or 2.5 million US$).

The secured funding is sufficient to cover only approximately 59% of the total resource requirements in 2016-2020 when shared health system costs are excluded and 76.6% of the total resource requirements when shared health system costs are included.

The funding gap with secured financing ranges from 39% (in 2018 and 2019) to 40% (in 2020) and amounts to 17.8 million US$ as it is shown in Figure 18.

Figure 18: Financing by sources and funding gap by years (with secured funds only)

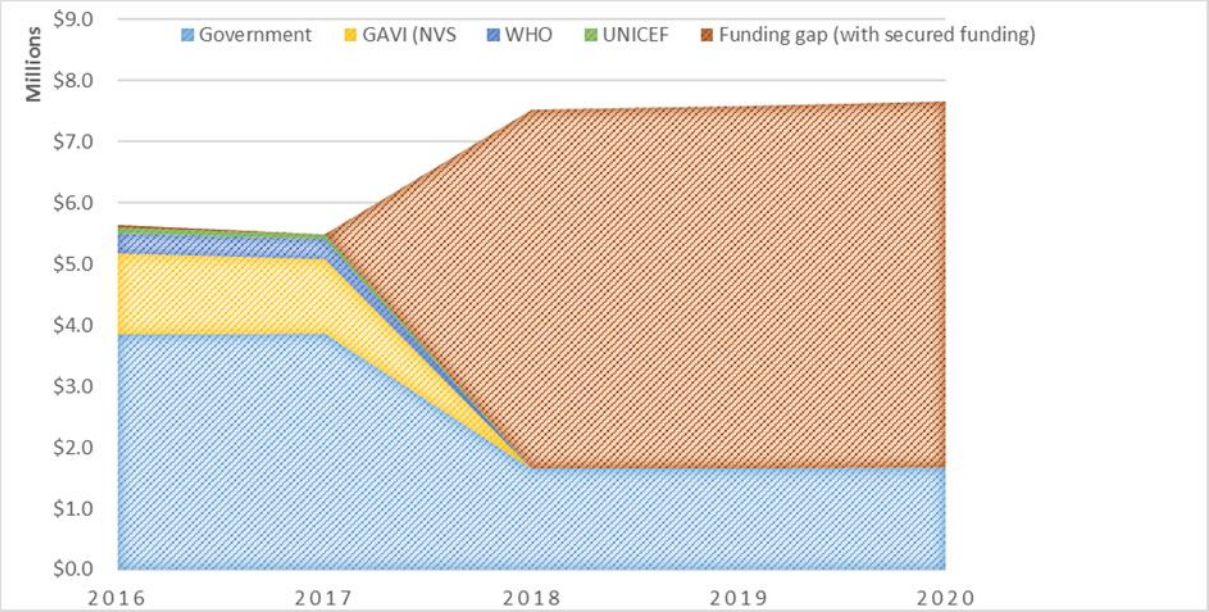
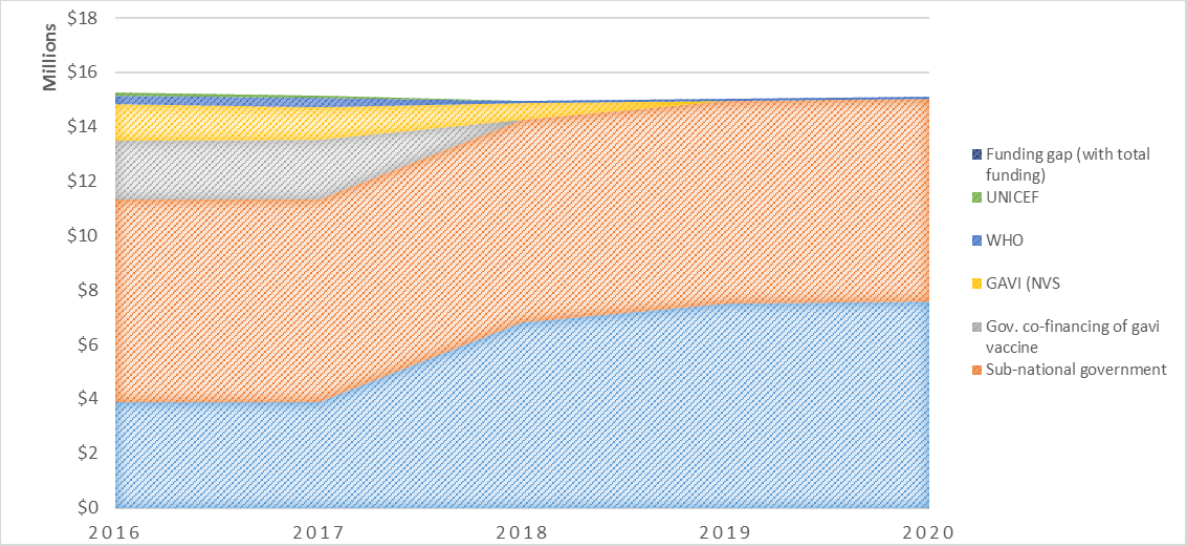


Figure 19shows that if probable funds are secured the funding gaps will be eliminated and the available financing will be sufficient to cover 100% of total resource requirements during the period 2016-2020.

Figure 19: Financing by sources and funding gap by years (with secured and probable funds)



7.5. Funding gap analysis and sustainability

Implications of funding gap on programmatic performance and sustainability

The funding gap (with secured funds only) in the amount of 57.8 million US$ affects the critical components of the immunization system – Vaccines and Injection Supplies and Logistics (cold-chain and other equipment), which means that if probable funds are not secured achievement of immunization program targets and objectives will be questionable.

Figure 20: Funding gap (with secured and secured and probable financing only) structure by years

	2016	2017	2018	2019	2020	Total
With secure financing						
Vaccines & injection supplies	0	0	5,688,050	5,755,199	5,823,147	**17,266,397**
Personnel	0	0	0	0	0	**0**
Transport	0	0	0	0	0	**0**
Activities and other recurrent costs	0	0	90,000	90,000	90,000	**270,000**
Logistics (vehicles, cold chain and other equipment)	36,538	0	83,974	83,974	83,974	**288,461**
Supplemental immunization activities	36,538	0	5,862,024	5,929,174	5,997,122	**17,824,858**
Total funding gap	**73,077**	**0**	**11,724,049**	**11,858,347**	**11,994,244**	**35,649,716**
With secure and probable financing						
Vaccines & injection supplies	0	0	0	0	0	**0**
Personnel	0	0	0	0	0	**0**
Transport	0	0	0	0	0	**0**
Activities and other recurrent costs	0	0	0	0	0	**0**
Logistics (vehicles, cold chain and other equipment)	0	0	0	0	0	**0**
Supplemental immunization activities	0	0	0	0	0	**0**
Total funding gap	**0**	**0**	**0**	**0**	**0**	**0**

A relative weight (and implication son programmatic performance) of the funding gap (with secured funds only) in the structure of future resource requirements and financing by each immunization system component is presented in Figure 20 above. Although being not high in absolute terms, the funding gap in logistics component constitutes more than 60% of the future resource requirements in this area. The funding gap in "Vaccines and injection supplies" accounts for 60% of total resource requirements and if not filled in fully, can affect the system performance significantly. The funding gap in area of "Activities and Other recurrent" costs is relatively small (0.27 million US$ vs. $7.6 million secured funds) and is not essential for the system performance, however it will have its implications on the programmatic sustainability of the immunization program.

Figure 21: Funding gap (with secured funds only) structure by the major cost categories

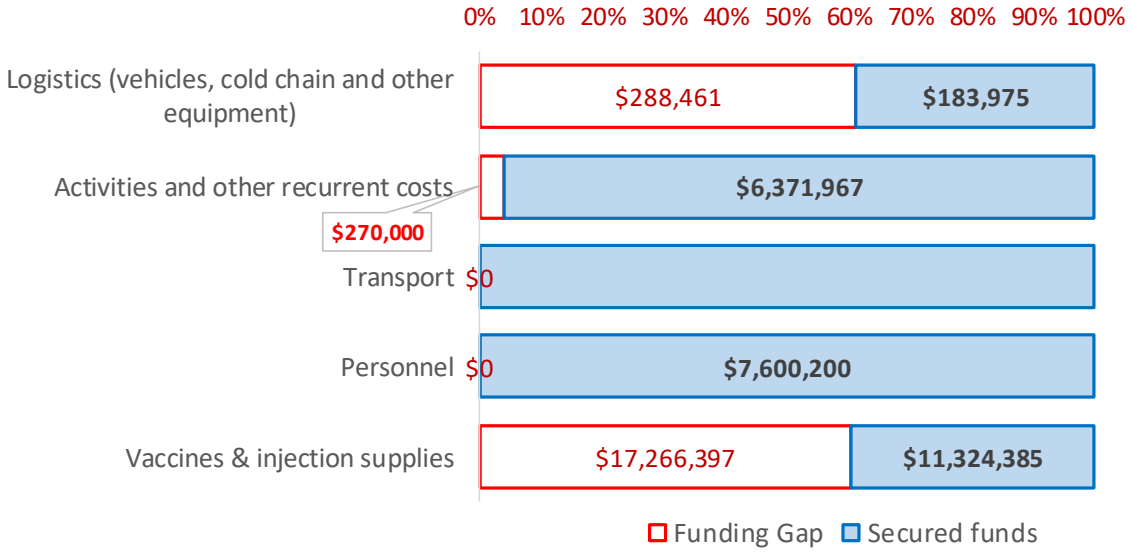


Figure 21 shows structure of funding gap in absolute terms for each underfunded system component.

Existence of funding gap could be attributed to the short-horizon of budgeting of the Azerbaijan national immunization program and decreased external financing, which explains funding gap related to the Activities and other recurrent costs, traditionally funded by development partners.

Financial sustainability strategies

The key objective of the EPI strategy to ensure financial sustainability of the National Immunization Program during the period 2016—2020 will be securing probable funds for ensuring sufficient financing of the program, as well as optimization and/or minimization of costs related to the main drivers of the funding gap.

This could include following:

1. Advocate for timely and sufficient allocations in the State, MoH budget for national immunization program; and
2. Strengthen fundraising capacity of EPI and accelerate fundraising activities through the work with national and international donor community over the course of cMYP cycle, to secure alternative funding for filling potential funding gaps.

Immunization program sustainability indicators are presented in Figure 29.

8. Annexes

Figure 22: Health workforce for immunization by levels and type (dedicated and shared)

			Full time equivalent (FTE)		
	Number of positions filled	% Time working for Immunization	**Dedicated**	**Shared**	**Total**
National					
MoH Chief of EPI sector	1	100%	1	-	1
MoH Advisor	1	100%	1	-	1
MoH Senior Advisor (Hygiene and sanitation)	1	100%	1	-	1
MoH Lead Advisor (Epidemiology)	1	100%	1	-	1
RCHE EPI Manager	1	70%	-	1	1
RCHE Chief of Epid department	1	50%	-	1	1
RCHE Chief of Immunoprophylaxis branch, Epid. Department	1	100%	1	-	1
RCHE Epidemiologist (Immunoprophylaxis)	3	100%	3	-	3
RCHE Epidemiologist Assistant	1	100%	1	-	1
RCHE driver	26	10%	-	3	3
IPC Director	1	10%	-	0	0
IPC Drug Procurement Planning and Rational Use of Drugs Chief of Department	1	30%	-	0	0
IPC Epidemiologist	1	100%	1	-	1
IPC Chief Cold Inventory	1	100%	1	-	1
IPC Cold Chain Technician	1	30%	-	0	0
IPC Driver	4	35%	-	1	1
IPC Expeditor	2	35%	-	1	1
Subtotal National	**48**	**37%**	**11**	**7**	**18**
Rayon/City					
CHE Epidemiologist	161	30%	-	-	48
CHE Assistant Epidemiologist	399	30%	-	120	120
CHE Rayon driver	102	20%	-	20	20
Maternity Hospital/Neonatal Dept Doctor	464	30%	-	139	139
Maternity Hospital/Neonatal Department Nurse	162	30%	-	49	49
Rayon/City Policlinics Doctor	1,400	30%	-	420	420
Rayon/City Policlinic Nurse	1,925	30%	-	578	578
Rayon/City Policlinic Vaccinator	269	100%	269	-	269
Subtotal Rayon/City	**4,882**	**34%**	**269**	**1,325**	**1,643**
Health facility					
Doctor	1,626	30%	-	488	488
Nurse	2,969	30%	-	891	891
Subtotal Health facility	**4,595**	**30%**	**-**	**1,379**	**1,379**
Grand Total	**9,525**		**280**	**2,711**	**3,039**

Figure 23: Salaries of EPI specific and shared personnel by administrative levels, positions and years

EPI SPECIFIC Salary							
National	$45,211	$45,211	$45,211	$45,211	$45,211	$45,211	$226,056
MoH Chief of EPI sector	$8,400	$8,400	$8,400	$8,400	$8,400	$8,400	$42,000
MoH Advisor	$6,864	$6,864	$6,864	$6,864	$6,864	$6,864	$34,320
MoH Senior Advisor (Hygiene and sanitation)	$7,200	$7,200	$7,200	$7,200	$7,200	$7,200	$36,000
MoH Lead Advisor (Epidemiology)	$6,996	$6,996	$6,996	$6,996	$6,996	$6,996	$34,980
RCHE Chief of Immunoprophylactic branch, Epid Dprt	$2,940	$2,940	$2,940	$2,940	$2,940	$2,940	$14,700
RCHE Epidemiologist (Immunoprophylaxis)	$7,200	$7,200	$7,200	$7,200	$7,200	$7,200	$36,000
RCHE Epidemiologist Assistant	$1,987	$1,987	$1,987	$1,987	$1,987	$1,987	$9,936
IPC Epidemiologist	$1,896	$1,896	$1,896	$1,896	$1,896	$1,896	$9,480
IPC Chief Cold Inventory	$1,728	$1,728	$1,728	$1,728	$1,728	$1,728	$8,640
Rayon/City	$432,552	$432,552	$432,552	$432,552	$432,552	$432,552	$2,162,760
Total	$477,763	$477,763	$477,763	$477,763	$477,763	$477,763	$2,388,816
Shared Salary							
	2014	2016	2017	2018	2019	2020	Total 2016 - 2020
National	$15,577	$15,577	$15,577	$15,577	$15,577	$15,577	$77,885
RCHE EPI Manager	$3,674	$3,674	$3,674	$3,674	$3,674	$3,674	$18,371
RCHE Chief of Epid department	$1,530	$1,530	$1,530	$1,530	$1,530	$1,530	$7,650
RCHE driver	$4,306	$4,306	$4,306	$4,306	$4,306	$4,306	$21,528
IPC Director	$583	$583	$583	$583	$583	$583	$2,916
IPC Drug Procurement Planning and Rational Use of Dr	$900	$900	$900	$900	$900	$900	$4,500
IPC Cold Chain Technician	$619	$619	$619	$619	$619	$619	$3,096
IPC Driver	$2,318	$2,318	$2,318	$2,318	$2,318	$2,318	$11,592
IPC Expeditor	$1,646	$1,646	$1,646	$1,646	$1,646	$1,646	$8,232
Rayon/City	$2,513,358	$2,513,358	$2,513,358	$2,513,358	$2,513,358	$2,513,358	$12,566,790
CHE Epidemiologist	$119,977	$119,977	$119,977	$119,977	$119,977	$119,977	$599,886
CHE Assistant Epidemiologist	$226,951	$226,951	$226,951	$226,951	$226,951	$226,951	$1,134,756
CHE Rayon driver	$32,314	$32,314	$32,314	$32,314	$32,314	$32,314	$161,568
Maternity Hospital/Neonatal Dept Doctor	$280,627	$280,627	$280,627	$280,627	$280,627	$280,627	$1,403,136
Maternity Hospital/Neonatal Department Nurse	$78,149	$78,149	$78,149	$78,149	$78,149	$78,149	$390,744
Rayon/City Policlinics Doctor	$846,720	$846,720	$846,720	$846,720	$846,720	$846,720	$4,233,600
Rayon/City Policlinic Nurse	$928,620	$928,620	$928,620	$928,620	$928,620	$928,620	$4,643,100
Total	$4,944,585	$4,944,585	$4,944,585	$4,944,585	$4,944,585	$4,944,585	$24,722,927

Figure 24: Supervision per diem costs by administrative levels, positions and years

Supervision							
	2014	2016	2017	2018	2019	2020	Total 2016 - 2020
National	$2,908	$2,908	$2,908	$2,908	$2,908	$2,908	$14,538
RCHE Chief of Epid department	$646	$646	$646	$646	$646	$646	$3,231
RCHE Chief of Immunoprophylactic branch, Epid Dprt	$646	$646	$646	$646	$646	$646	$3,231
RCHE Epidemiologist (Immunoprophylaxis)	$1,615	$1,615	$1,615	$1,615	$1,615	$1,615	$8,077
Rayon/City	$904,615	$904,615	$904,615	$904,615	$904,615	$904,615	$4,523,077
CHE Epidemiologist	$260,077	$260,077	$260,077	$260,077	$260,077	$260,077	$1,300,385
CHE Assistant Epidemiologist	$644,538	$644,538	$644,538	$644,538	$644,538	$644,538	$3,222,692
Total	$907,523	$907,523	$907,523	$907,523	$907,523	$907,523	$4,537,615

Figure 25: Financing projections by sources, years, and types of financing

	2016	2017	2018	2019	2020	Total
Secured funding						
Government	3,843,912	3,873,062	1,658,179	1,663,024	1,665,988	**12,704,165**
Sub-national government	7,451,867	7,452,192	7,452,874	7,458,070	7,458,752	**37,273,756**
Gov. co-financing of Gavi vaccine	2,169,962	2,195,708	-	-	-	**4,365,670**
GAVI (NVS	1,340,464	1,208,240	-	-	-	**2,548,704**
WHO	320,000	325,000	-	-	-	**645,000**
UNICEF	100,000	83,974	-	-	-	**183,974**
GAVI Transition Support	140,000	430,000	-	-	-	**570,000**
Subtotal secure funding	**15,366,205**	**15,568,176**	**9,111,053**	**9,121,095**	**9,124,741**	**58,291,269**
Probable funding						
Government	36,538	-	5,148,792	5,839,174	5,907,122	**16,931,626**
Sub-national government	-	-	-	-	-	**-**
Gov. co-financing of Gavi vaccine	-	-	-	-	-	**-**
GAVI (NVS	-	-	623,232	-	-	**623,232**
WHO	-	-	90,000	90,000	90,000	**270,000**
UNICEF	-	-	-	-	-	**-**
GAVI Transition Support	-	-	-	-	-	**-**
Subtotal probable funding	**36,538**	**-**	**5,862,024**	**5,929,174**	**5,997,122**	**17,824,858**
Total (secured and probable funding)						
Government	3,880,451	3,873,062	6,806,971	7,502,198	7,573,110	**29,635,791**
Sub-national government	7,451,867	7,452,192	7,452,874	7,458,070	7,458,752	**37,273,756**
Gov. co-financing of gavi vaccine	2,169,962	2,195,708	-	-	-	**4,365,670**

GAVI (NVS	1,340,464	1,208,240	623,232	-	-	**3,171,936**
WHO	320,000	325,000	90,000	90,000	90,000	**915,000**
UNICEF	100,000	83,974	-	-	-	**183,974**
GAVI Transition Support	140,000	430,000	-	-	-	**570,000**
Total funding	**15,402,744**	**15,568,176**	**14,973,077**	**15,050,268**	**15,121,862**	**76,116,128**

Figure 26: Healthcare financing trends

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total expenditure on health (THE) in million US$	**246**	**255**	**278**	**478**	**688**	**1,044**	**1,297**	**1,686**	**2,142**	**2,591**	**2,822**	**3,306**	**3,740**	**4,107**	**4,540**
Total Health Expenditure (THE) per Capita in US$	30	31	34	57	81	122	150	192	242	289	310	358	399	432	471
Total Health Expenditure (THE) per Capita in Int$ (PPP)	164	175	194	319	432	552	594	623	596	869	829	785	874	949	1,047
Total Health Expenditure (THE) % Gross Domestic Product (GDP)	4.7	4.5	4.5	6.6	7.9	7.9	6.2	5.1	4.4	5.9	5.3	5.0	5.4	5.5	6.0
General government expenditure on health (GGHE) in million US$	**46**	**48**	**49**	**60**	**89**	**117**	**182**	**324**	**404**	**593**	**618**	**713**	**844**	**853**	**926**
Ministry of Health expenditure in million US$	10	11	10	11	15	35	54	183	226	281	295	324	399	409	430
General Government Health Expenditure (GGHE) per Capita in US$	6	6	6	7	11	14	21	37	46	66	68	77	90	90	96
General Government Health Expenditure (GGHE) per Capita Int$ (PPP)	30	33	34	40	56	62	83	120	112	199	182	169	197	197	214
General Government Health Expenditure (GGHE) as % of THE	18.6	18.9	17.7	12.6	13.0	11.2	14.0	19.2	18.9	22.9	21.9	21.6	22.6	20.8	20.4
GGHE as % of General government expenditure (GGE)	5.4	5.6	5.2	4.8	5.9	5.2	4.3	4.6	3.1	4.5	4.2	3.7	3.8	3.5	3.9
GGHE as % of GDP	0.9	0.8	0.8	0.8	1.0	0.9	0.9	1.0	0.8	1.3	1.2	1.1	1.2	1.2	1.2
Private expenditure on health in million US$	**200**	**207**	**229**	**417**	**599**	**927**	**1,115**	**1,362**	**1,738**	**1,998**	**2,204**	**2,592**	**2,896**	**3,254**	**3,614**
Private Health Expenditure (PvtHE) as % of THE	81.4	81.1	82.3	87.4	87.0	88.8	86.0	80.8	81.1	77.1	78.1	78.4	77.4	79.2	79.6
Rest of the world funds / External resources in million US$	**10**	**10**	**4**	**5**	**5**	**3**	**8**	**12**	**12**	**14**	**20**	**23**	**38**	**19**	**27**
Rest of the world funds as % of THE	4.0	3.9	1.6	1.1	0.7	0.3	0.6	0.7	0.6	0.5	0.7	0.7	1.0	0.5	0.6
GDP per capita (in US$)	649	695	753	869	1,025	1,550	2,428	3,776	5,522	4,932	5,815	7,152	7,444	7,809	7,809
GGE as % of GDP	16.2	15.2	15.4	17.3	17.4	17.1	20.2	21.5	26.8	29.5	27.7	29.6	31.8	32.9	31.7
Ecxhange rate (AZE per US$)	0.90	0.93	0.97	0.98	0.98	0.94	0.89	0.86	0.82	0.80	0.80	0.79	0.79	0.78	0.78

Source: WHO NHA

Figure 27: National immunization program expenditures and future resource requirements (basic scenario) by cost categories

Cost category	2014	Future Resource Requirements					
		2016	2017	2018	2019	2020	Total 2016-2020
Routine recurrent costs							
Vaccines (routine vaccines only)	**3,053,208**	**5,467,583**	**5,384,326**	**5,448,399**	**5,513,235**	**5,578,843**	**27,392,387**
Traditional	890,958	765,620	774,704	783,922	793,251	802,691	**3,920,188**
Underused	1,271,308	1,248,738	1,263,554	1,278,591	1,293,806	1,309,202	**6,393,891**
New	890,942	3,453,225	3,346,068	3,385,886	3,426,178	3,466,950	**17,078,308**
Injection supplies	161,729	235,111	237,365	239,651	241,964	244,305	**1,198,396**
Personnel	**1,520,040**	**1,520,040**	**1,520,040**	**1,520,040**	**1,520,040**	**1,520,040**	**7,600,200**
Salaries of full-time EPI health workers (immunization specific)	612,517	612,517	612,517	612,517	612,517	612,517	**3,062,585**
Per-diems for outreach vaccinators/mobile teams							
Per-diems for supervision and monitoring	907,523	907,523	907,523	907,523	907,523	907,523	**4,537,615**
Transportation	**5,026**	**5,026**	**5,026**	**5,026**	**5,026**	**5,026**	**25,128**
Fixed Site Strategy (Incl. Vaccine Distribution)	5,026	5,026	5,026	5,026	5,026	5,026	**25,128**
Outreach strategy							
Mobile strategy							
Maintenance and overhead	**884,029**	**890,709**	**898,132**	**899,106**	**906,529**	**907,504**	**4,501,979**
Cold chain maintenance and overhead	775,249	781,928	789,351	790,326	797,749	798,723	**3,958,077**
Maintenance of other capital equipment	12,240	12,240	12,240	12,240	12,240	12,240	**61,202**
Building Overheads (Electricity, Water…)	96,540	96,540	96,540	96,540	96,540	96,540	**482,700**
Short-term training	75,000	85,000	110,000				**195,000**
IEC/Social Mobilization	38,200	73,364	108,531	18,702	18,876	19,053	**238,527**
Disease Surveillance	79,581	79,773	79,968	40,167	40,371	40,578	**280,857**
Program management	325,613	347,725	584,879	162,077	164,318	166,605	**1,425,604**
Other routine recurrent costs							
Subtotal	6,142,425	8,704,330	8,928,267	8,333,168	8,410,359	8,481,953	**42,858,078**
Routine capital costs							
Vehicles (100% EPI)							
Cold chain equipment	18,333	136,538	83,974	83,974	83,974	83,974	**472,436**
Other capital equipment							
Buildings Construction (100% EPI)							
Subtotal	18,333	136,538	83,974	83,974	83,974	83,974	**472,436**
Supplemental immunization activities (SIAs)							
MMR catch-up (11-15 olds)	1,141,282						
Vaccines & injection supplies	1,141,282						
Operational costs							
Subtotal	1,141,282						
Shared Health Systems Costs (EPI Portion)							
Shared Personnel Costs	6,339,212	6,339,212	6,339,212	6,339,212	6,339,212	6,339,212	**31,696,060**
Shared Transport Costs – Vehicles, Fuel and Maintenance	287,437	126,531	120,591	120,591	120,591	120,591	**608,894**
Shared buildings - construction							
Shared Buildings – Overhead	96,132	96,132	96,132	96,132	96,132	96,132	**480,660**
Subtotal	6,722,781	6,561,875	6,555,935	6,555,935	6,555,935	6,555,935	**32,785,614**
Grand Total	**14,024,821**	**15,402,744**	**15,568,176**	**14,973,078**	**15,050,268**	**15,121,862**	**76,116,128**
Routine Immunization	12,883,539	15,402,744	15,568,176	14,973,078	15,050,268	15,121,862	**76,116,128**

Cost category		Future Resource Requirements					
	2014	2016	2017	2018	2019	2020	Total 2016-2020
Supplemental immunization activities (campaigns)	1,141,282						

Figure 28: Total Resource Requirements, funding from all sources by risk types and government financing by cost categories

Cost category	Future resource requirements Total 2016-2020	Funding from all sources			Government Funding					
		Secured	Probable	Total	Secured	% of All secured funds	Probable	% of all probable funds	Total	% of Total funds
Routine recurrent costs										
Vaccines (routine vaccines only)	**27,392,387**	**10,851,909**	**16,540,478**	**27,392,387**	**8,418,286**	**78%**	**16,540,478**	**100%**	**24,958,766**	**91%**
Traditional	**3,920,188**	1,540,323	2,379,864	3,920,188	1,540,323	100%	2,379,864	100%	3,920,189	100%
Underused	**6,393,891**	2,512,293	3,881,599	6,393,891	2,512,293	100%	3,881,599	100%	6,393,892	100%
New	**17,078,308**	6,799,293	10,279,015	17,078,308	4,365,670	64%	10,279,015	100%	14,644,685	86%
Injection supplies	**1,198,396**	472,476	725,919	1,198,396	357,396	76%	725,919	100%	1,083,316	90%
Personnel	**7,600,200**	**7,600,200**	**0**	**7,600,200**	**7,600,200**	**100%**	**0**		**7,600,202**	**100%**
Salaries of full-time EPI health workers (immunization specific)	**3,062,585**	3,062,585	0	3,062,585	3,062,585	100%	0		3,062,586	100%
Per-diems for outreach vaccinators/mobile teams				0	0		0		0	
Per-diems for supervision and monitoring	**4,537,615**	4,537,615	0	4,537,615	4,537,615	100%	0		4,537,616	100%
Transportation	**25,128**	**25,128**	**0**	**25,128**	**25,128**	**100%**	**0**		**25,129**	**100%**
Fixed Site Strategy (Incl. Vaccine Distribution)	**25,128**	25,128	0	25,128	25,128	100%	0		25,129	100%
Outreach strategy + Mobile strategy	**0**	0	0	0	0		0		0	
Maintenance and overhead	**4,501,979**	**4,501,979**	**0**	**4,501,979**	0	0%	0		0	0%
Cold chain maintenance and overhead	**3,958,077**	3,958,077	0	3,958,077	3,958,077	100%	0		3,958,078	100%
Maintenance of other capital equipment	**61,202**	61,202	0	61,202	61,202	100%	0		61,203	100%
Building Overheads (Electricity, Water…)	**482,700**	482,700	0	482,700	482,700	100%	0		482,701	100%
Short-term training	**195,000**	195,000	0	195,000	0	0%	0		0	0%
IEC/Social Mobilization	**238,527**	208,527	30,000	238,527	43,527	21%	0	0%	43,527	18%
Disease Surveillance	**280,857**	190,857	90,000	280,857	50,857	27%	0	0%	50,857	18%
Program management	**1,425,604**	1,275,604	150,000	1,425,604	560,604	44%	0	0%	560,605	39%
Other routine recurrent costs				0	0		0		0	
Subtotal	**42,858,078**	**25,321,681**	**17,536,397**	**42,858,078**	**21,200,582**	**84%**	**16,540,478**	**94%**	**37,741,060**	**88%**
Routine capital costs										
Vehicles (100% EPI)				0	0		0		0	
Cold chain equipment	**472,436**	200,000	288,461	488,461	0	0%	288,461	100%	288,461	59%
Other capital equipment				0	0		0		0	
Buildings Construction (100% EPI)				0	0		0		0	
Subtotal	**472,436**	**200,000**	**288,461**	**488,461**	**0**	**0%**	**288,461**	**100%**	**288,461**	**59%**
Supplemental immunization activities (SIAs)										
MMR catch-up (11-15 olds)		**0**	**0**	**0**	**0**		**0**		**0**	
Vaccines & injection supplies				0	0		0		0	
Operational costs				0	0		0		0	
		0	**0**	**0**	**0**		**0**		**0**	
Vaccines & injection supplies				0	0		0		0	
Operational costs				0	0		0		0	
Subtotal		**0**	**0**	**0**	**0**		**0**		**0**	
Shared Health Systems Costs (EPI Portion)										
Shared Personnel Costs	**31,696,060**	**31,696,060**	**0**	**31,696,060**	**31,696,060**	**100%**	**0**		**31,696,061**	**100%**

Cost category	Future resource requirements Total 2016-2020	Funding from all sources			Government Funding					
		Secured	Probable	Total	Secured	% of All secured funds	Probable	% of all probable funds	Total	% of Total funds
Shared Transport Costs – Vehicles, Fuel and Maintenance	**608,894**	608,894	0	608,894	608,894	100%	0		608,895	100%
Shared buildings - construction				0	0		0		0	
Shared Buildings – Overhead	**480,660**	480,660	0	480,660	480,660	100%	0		480,661	100%
Subtotal	**32,785,614**	**32,785,614**	**0**	**32,785,614**	**32,785,614**	**100%**	**0**		**32,785,615**	**100%**
Grand Total	**76,116,128**	**58,307,295**	**17,824,858**	**76,132,153**	**53,986,196**	**93%**	**16,828,939**	**94%**	**70,815,135**	**93%**
Routine Immunization	**76,116,128**	58,307,295	17,824,858	76,132,153	53,986,196	93%	16,828,939	94%	70,815,135	93%
Supplemental immunization activities		0	0	0	0		0		0	

Figure 29: Macroeconomic and sustainability indicators

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