

MINISTRY OF HEALTH OF THE REPUBLIC OF ARMENIA
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REPORT

**ANALYSIS OF STATE AND PRIVATE EXPENSES ON MOTHER AND
CHILD HEALTH SERVICES**



Yerevan - 2018

ABBREVIATIONS

PHCS	Primary Health Care Services
NHA	National Health Accounts
WHO	World Health Organization
SNA	System of National Accounts
MoH	RA Ministry of Health
NSS	RA National Statistical Service
RA	Republic of Armenia
UN	United Nations
CARO	Civil Acts Registration Office
ILCS	Integrated Living Conditions Survey

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Introduction

In the current context of demographic trends in Armenia, mother and child and reproductive health plays a special role, which is also the most important component of national security.

The main purpose of this work is to examine mother and child health status, public and private sector expenditure especially the volume, content, trends and dynamics of households' expenditure. It is a unique experience to start diagnosing mother and child health care funding and contribute to the development of targeted programs and funding strategies in this area.

For this purpose the situation and the dynamics of maternal and child health, health services and supply dynamics, key sources of funding, types, volume, structure of expenditure and cost burden.

The survey was conducted based on the methodological recommendations of cost-benefit analysis investment projects adopted by the European Union, taking into account the peculiarities of healthcare and, in particular, mother and child healthcare, and the expected benefits from expenditure (in case of state, also from investments).

As a rule, the average monthly health expenditure per capita and its structure by type of medical services, specialists and payment purposes based on the results of the Integrated Living Standards Survey are used to calculate the summary of households' expenditure on health care services.

The following methods used to conduct the analysis:

1. Performed economic and functional classification and analysis of expenditure, as well as estimated the expenditure comparable indicators for making a comparison with the indicators of health.
2. Implemented financial analysis of expenditure and assessed their financial and economic efficiency.

Estimated and calculated financial, economic, non-economic and additional benefits derived from current expenditure.

The results of the report substantiate the need for continued state support in mother and child health and reproductive health, also the need and urgency of effective current and capital expenditures.

Mother and child health status

Indicators reflecting the level and dynamics of morbidity of mother, women and children are worthy of attention.

In 2016 the complications during pregnancy, childbirth and postnatal period of fertility age (15-49 years) were 1,864.9 cases per 100,000 women (In 2015 was 2,125.8 cases). There are still cases of delivery at home without interventions of qualified medical staff, therefore it makes difficult to record them and is the cause of many diseases. In 2016, the number of births taken by doctors and midwives at home was 18 cases (in 2015, 20 cases).

The table below shows the main indicators of the mother and child health subsystem, according to which in recent years the number of health care providers has increased in the country, but the number of beds for these group of populations, as well as the number of doctors and midwives has decreased (Table 1 and 2)

Table 1: Key Indicators of Mother and Child Healthcare, 2011-2016

		2011	2012	2013	2014	2015	2016
Number of pediatric and maternity welfare clinics, independent clinics, facilities with pediatric and maternity welfare departments (unit)		365	375	380	378	447	453
Number of beds for pregnant and parturient women (unit)	Total	1216	1295	1269	1293	1295	1265
	Per 10.000 women of fertile age	13.6	15.9	15.9	16.4	16.7	16.5
Number of beds for sick children, (unit)	Total	1194	1189	1184	1523	1532	1515
	Per 10.000 children	20.3	20.8	20.6	26.1	26.0	25.5

Source: Social Statistics, RA NSS

Table 2: Provision of population by doctors by profession, 2015-2016, person

	2015	2016
Obstetrician-gynecologists ¹	926	906
Pediatricians ²	1118	1102
Pediatric surgeons ¹²	147	147
Pediatric dentists ¹²	129	113
Total	13 117	13 148

Source: Social Statistics, RA NSS:

Data on women's morbidity during pregnancy, childbirth and postpartum period, infant morbidity and surgical intervention during childbirth are also important.

First, in parallel with the changes in the number of live births in 2009-2016, the proportion of live births with a weight up to 2 500 grams (premature birth, where the high level of morbidity is maintained) was changing at almost the same pace up to 2014 and changed from 7.5% to 9.2%,. The reduction in the number of live births recorded since 2015 has already been accompanied by a reduction in those

¹ Indicator is calculated for women

² Indicator is calculated for 0-17 y.o population

indicators, though it is still exceeding the level of 2014.

It is clear from the chart below that the morbidity rate of all illnesses among premature born is several times higher than among mature born.

Table 3: The morbidity of newborns, 2012-2016

a) Per 1 000 mature births

	2012	2013	2014	2015	2016
Inborn abnormalities	15.6	16.3	15.2	16.0	15.9
Labor traumas	9.9	12.4	10.7	11.2	11.1
Intra-uterine hypoxia and asphyxia during the delivery	19.9	16.5	17.5	15.8	13.6
Congenital pneumonia	3.3	3.7	4.6	5.2	6.9
Septicemia	0.4	0.6	0.6	0.9	0.4
Hemolytic disease	5.5	5.7	6.2	6.7	7.0
Total	78.9	81.2	85.2	94.1	84.2

b) Per 1 000 premature births

	2012	2013	2014	2015	2016
Inborn abnormalities	47.3	49.8	40.2	47.5	51.0
Labor traumas	12.7	11.5	8.1	7.1	10.9
Intra-uterine hypoxia and asphyxia during the delivery	178.8	176.8	144.9	102.2	96.8
Congenital pneumonia	52.7	55.7	72.6	77.9	87.5
Septicemia	9.8	24.9	30.4	23.6	24.5
Hemolytic disease	13.1	15.6	10.5	18.2	11.3
Total	741.2	688.3	683.8	674.2	744.1

Source: Social statistics, RA NSS

One of the most important achievements in mother and child health is the reduction of the tendency of mortality among newborns and, especially, among premature infants, in particular in the beginning and the end of 2009-2016, per 100 infected it has decreased from 1.3 to 0.5 among mature births and from 7.3 to 3.4 among premature births.

Maternal healthcare expenditure, first and foremost, is conditioned by state funding and direct household payments for birth care. The number of births in the last five years has remained almost at the same level with small fluctuations.

Table 4: Labor in the medical obstetrics and gynecology facilities, 2012-2016, unit

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Number of the births	41462	44554	44739	43301	42709	41923	43332	42123	40809
of which`									
Normal birth	24949	27337	29595	25697	22611	22257	22899	21811	20589
Multiple birth	431	421	442	443	438	427	467	519	505

Source` Social situation in RA, Reports, RA NSS

This expenditure is also conditioned by surgical interventions during the birth care. During reviewed period, the number of women that completed pregnancy each year was over 45,000, of which almost half received the surgical intervention.

Households' expenditure on artificial interruption of pregnancy (abortion) also requires attention. The price of the abortions varies between 40,000 and 75,000 AMD. Every year about 10-12,000 cases of abortion are registered among fertile age women, of which more than half are artificially permitted abortions, the next group is spontaneous, which are often performed using medicine and the last group is abortions with medical instruction. As compared to the number of live births, the numbers of abortions have fluctuated between 28 and 31% in recent years, or, in other words, an abortion of 28-30 pregnancies per 100 live births.

Table 5: Number of abortions (without mini) by type, 2011-2014, unit

	2009	2010	2011	2012	2013	2014	2015	2016
Spontaneous	3648	3718	3796	4277	4128	3640	2752	2235
Artificial-permitted	9156	7396	6847	6894	5964	6040	6607	6721
Artificial-medical instruction	993	1181	1322	1789	1875	2212	1744	1492
Total	13797	12295	11965	12960	11967	11892	11104	10448

Source: Social Situation of RA, Reports, NSS

From the perspective of the reproductive health, it is worrisome not only a great number of abortions, where each year four cases of childbirth accounts for one case of abortion, but also the structure of abortions by women age groups. More than 4 % of cases of abortions are attributed to a group of 15-19 year women, and 78 % are attributed to the most reproductive group of 20-34 years women.

The state and household expenditure on women morbidity, maternal health protection and rehabilitation, as well as family planning are the separate areas of the women morbidity and reproductive health expenditure.

Table 6: Incidence of women morbidity by disease group, 2009-2016, per 100 000 women

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Malignant neoplasm	211.1	222.2	219.9	231.6	248.9	252.1	263.7	259.9	256.1
Ovaries inflammation	264.2	277.0	293.0	283.4	284.1	284.1	292.5	325.8	279.5
Cervical erosion and ectropion	248.3	262.4	256.1	277.7	289.3	259.8	268.7	299.0	281.0
Endometriosis	24.0	25.4	28.8	29.8	28.2	32.3	30.2	34.4	34.9
Dysfunctions of menopause and during menstrual cycle	141.3	191.1	189.6	192.3	198.5	201.4	196.4	255.5	240.4
Dysfunctions of menstrual cycle ³	386.1	454.8	530.2	533.9	596.5	605.0	602.9	686.9	652.6
Women infertility ³	99.7	129.9	185.0	191.5	218.1	213.8	185.7	164.4	163.9
Pregnancy, delivery and postpartum ³	1561.3	1563.4	1457.4	1576.7	1705.2	1646.2	1644.0	2125.8	1864.9

Source: Social Situation of RA, Reports, RA NSS

After 2008, the increase of morbidity rate is evident in almost all types of diseases. **The only significant positive change is noticeable in terms of women's infertility, where the number of cases is decreasing since 2014, which indicates significant achievements in family planning sector.**

³ Per fertile age women

The next positive shift was recorded in terms of pregnancy, childbirth and postpartum morbidity per fertile age women, whose absolute numbers are still worrying, with more than 20,000 morbidity cases per 40,000 live births.

Table 7: General morbidity by disease group, 2009-2016, unit

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Complications of pregnancy, delivery and postpartum	18865	19758	17714	18039	19101	18986	17220	16615	18394
Certain conditions in perinatal period (babies)	3643	3557	3279	3115	3219	2771	2770	2413	2638
Total	22508	23315	20993	21154	22320	21757	19990	19028	21032

Source: Social Situation of RA reports, NSS

Analysis of mother and child health expenditures

The range and the dynamics of state and household expenditure on mother and child health care sector

Since 2008, the state policy on maternal and child health has become more active, targeted and effective, with the contribution of "Implementation of state birth assistance certificate" and many other programs and strategies, as well as the growth of the volume of state funding. Informal payments for birth care services in the country have been reduced more than ten times (16 times in the village, 7.7 times in the city). The implementation of the project has made considerable contribution to providing free and affordable birth care services for the population.⁴ Additionally, the program notes that the logical continuity of the birth assistance certificate was the introduction of the state certificate system under 7 years old children from January 1, 2011, which significantly improved the quality and availability of medical care and service for newborns and early age children. With the introduction of a certificate system, informal payments have been reduced more than four times.⁵

⁴ 2017-2019 Medium-Term Expenditure Framework of RA , page 201

⁵ Same place:

Table 8: Operational expenditure (by sections, groups and classes) of mother and child health in state budgets, 2008-2017 mln AMD

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
07.02.	Outpatient services, of which:	1,120.		1,392.		1,579.	1,596.	1,729.	1,903.	2,024.	2,015.
		7	2,498.2	9	1,567.2	4	5	4	2	9	1
07.02.02.01	Services for the assessment and rehabilitation of children with mental (behavioral), physical (listening), and other development disorders.	128.0	732.5	128.0	173.0	173.0	173.0	223.0	249.9	258.9	258.9
07.02.02.03	Obstetrician-gynecological medical services, thousand AMD	887.5	1,663.6	1,171.9	1,298.9	1,312.7	1,332.4	1,418.7	1,519.8	1,632.5	1,627.0
07.02.02.08	Ensure accessibility to modern means of contraceptives in order to prevent unwanted pregnancies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.8	45.8	45.8
07.02.03.02	Primary Dental Prevention Services for children	105.2	102.0	93.0	95.3	93.7	91.0	87.7	87.7	87.7	83.4
07.03.	Hospital services, of which:	7,327.		9,353.	13,813.	13,700	13,787	14,449	15,130	15,627	15,364
		7	10,044.6	2	1	.1	.0	.4	.1	.5	.1
07.03.02.03	Medical care services for sexually transmitted diseases	169.8	169.8	170.1	170.1	170.1	171.2	181.4	185.7	186.4	185.2
07.03.03	Services of mother and child healthcare facilities, of which:	7,157.8	9,874.8	9,183.1	13,642.9	13,530.0	13,615.8	14,268.0	14,944.4	15,441.1	15,179.0
07.03.03.01	Obstetric medical services	3,871.4	6,102.0	5,697.0	6,858.8	6,438.8	6,479.3	6,759.9	6,922.0	6,945.3	6,693.9
07.03.03.02	Gynecological diseases medical care services	350.0	401.8	359.9	396.1	396.1	398.7	367.5	372.8	374.1	367.0
07.03.03.03	Children medical care services	2,936.5	3,371.0	3,126.1	6,388.0	6,695.0	6,737.7	7,140.6	7,570.9	8,043.2	8,039.4
07.03.03.04	Medical care services with reproductive auxiliary technologies for infertile couples	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.6	78.6	78.6
07.04.	Public health services, of which:	0.0		190.0	230.0	338.4	399.6	655.8	1,890.	1,890.	1,890.
		0.0	150.0	190.0	230.0	338.4	399.6	655.8	4	4	4
07.04.01.03	National Immunization Program	0.0	150.0	190.0	230.0	338.4	399.6	655.8	1,890.4	1,890.4	1,890.4

07.06.	Healthcare services (not included in other classes), of which:	81.8	81.8	81.8	81.8	81.8	81.8	81.8	92.0	92.0	92.0
07.06.01.07	Orthotics and corset delivery services for disabled and needy children	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8	81.8
07.06.01.18	"Healthy nutrition for children." public awareness services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.2	10.2	10.2
	Total	8,530.2	12,774.6	11,017.9	15,692.1	15,699.6	15,864.9	16,916.4	19,015.6	19,634.7	19,361.6

Source: The RA state budget, 2008-2017

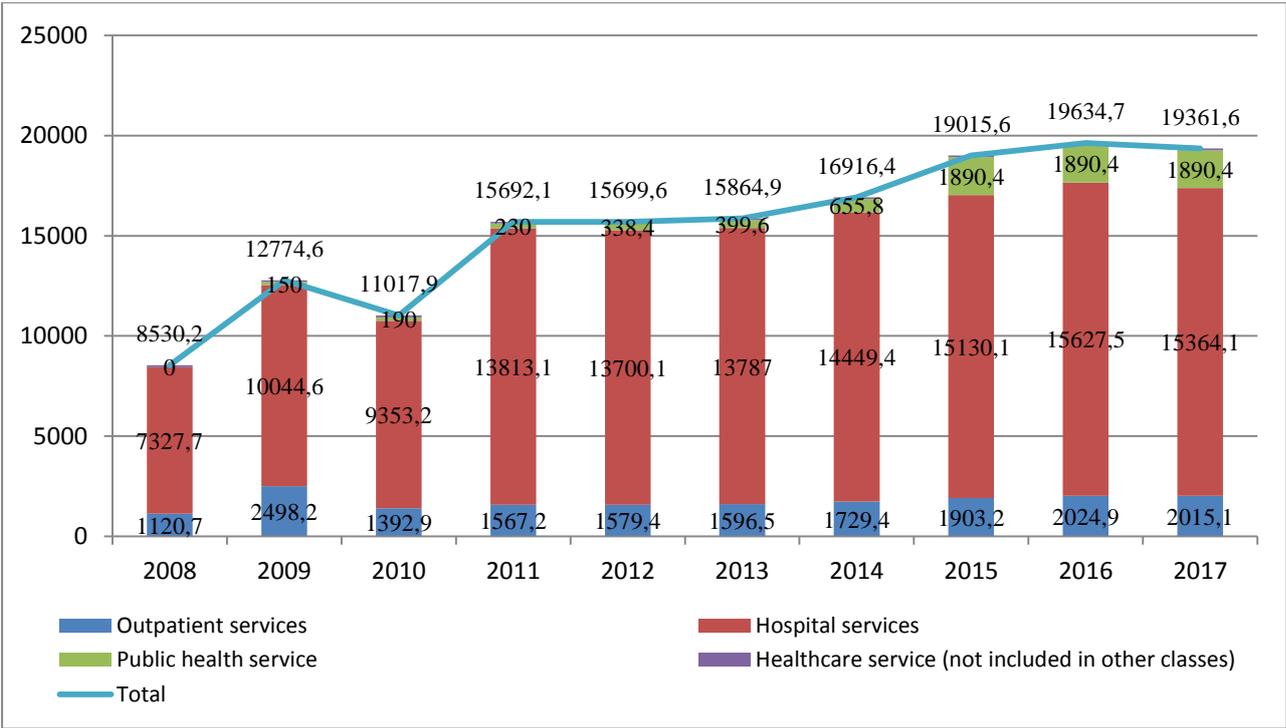
Table 9 presents, that mother and child health state financing has recorded substantial growth each year over the last ten years. An exception to the general trends was 2010, when financing was decrease as a result of the financial and economic crisis (Figure 1). As a result of increasing targeted funding in the state budget, the mother and child health expenditures in 2017 exceeded the 2008 figure by 2.3 times, mainly due to an increase of the volume of hospital services by 2.1 times.

Table 9: Mother and child health expenditure in 2008 and in 2017, growth

		Total million AMD		Growth in 2017 compared to 2008
		2008	2017	
07.02.	Outpatient services	1,120.7	2,015.1	1.8 times
07.03.	Hospital services	7,327.7	15,364.1	2.1 times
07.04.	Public Health services	150.0	1,890.4	12.6 times
07.06.	Healthcare services (not included in other classes)	81.8	92.0	12.5 percent
Total		8,530.2	19,361.6	2.3 percent

Source: The RA state budgets, 2008-2017

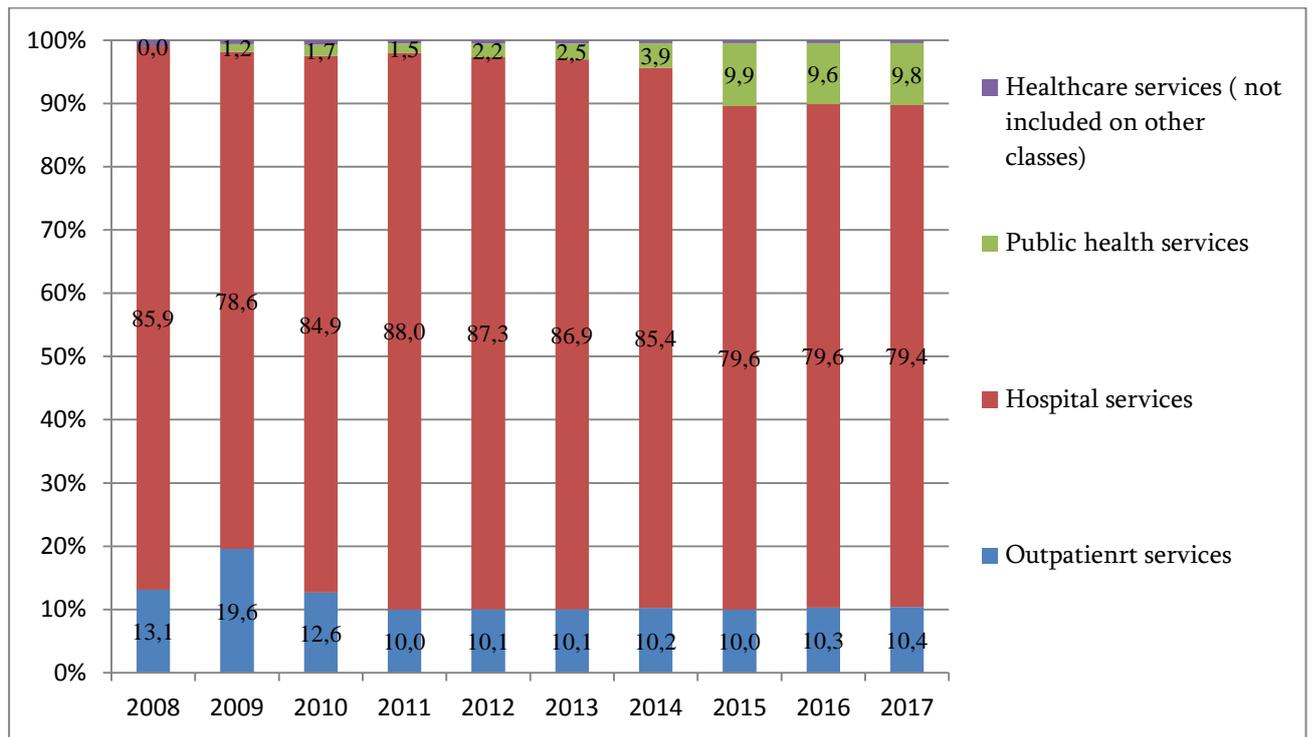
Figure 1: Dynamics of state expenditure nũ the mother and child health, 2008-2017, million AMD



Source: The RA state budgets, 2008-2017

Although all the major accounts had substantial and progressive growth, due to the additional funding in three new accounts ("Ensure accessibility to modern means of contraceptives in order to prevent unwanted pregnancies", "Medical care services with reproductive auxiliary technologies for infertile couples", "Healthy nutrition for children public awareness services") the overall expenditure structure has changed in 2015-2017.

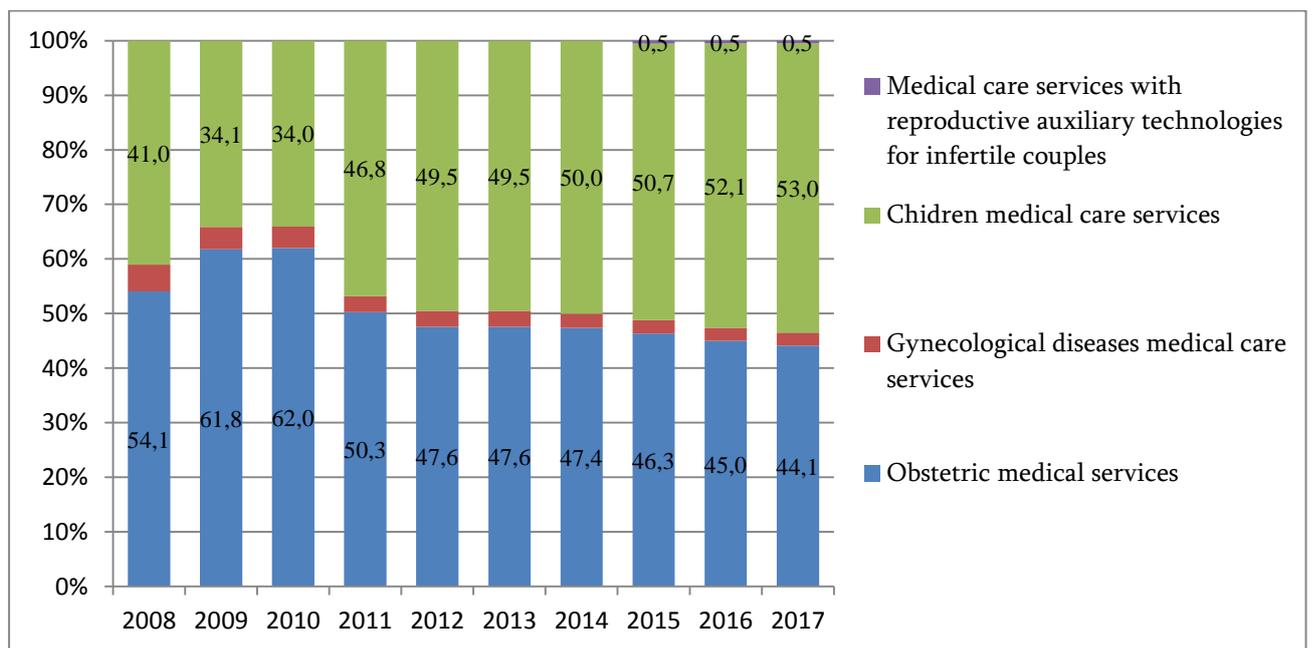
Figure 2: Change of structure of mother and child health expenditure, 2008-2017, %



Source: The RA State budgets, 2008-2017

During review period, about 80% of the outpatient service state funding was allocated to the “Obstetrician-gynecological medical services”, and 99 % of the hospital service state finding provided to “Services by mother and child healthcare facilities”. There are two significant changes in this service group. First, if more than half of the funding has been provided to "Obstetric medical services" in 2011, then "Child medical care services" had bigger share in 2012. Secondly, about 79 million AMD have been allocated for "Reproductive medical care services for infertile couples" in 2015-2017

Figure 3: Structure of funding for mother and child care services by components, %



Source: The RA state budgets, 2008-2017

During review period, the considerable funds were provided from the state budget within the framework of the "National Immunization Project". Immunization is one of the most economically effective strategies for public health. Currently, infectious diseases such as diphtheria, blue cough, rash, measles, rubella, mumps, poliomyelitis, hepatitis A and B, tuberculosis, hemophilia type B infection, tularemia, seasonal flu, rotavirus, pneumococcal and meningococcal infections are included in the National Immunization Calendar. By vaccinating at a childhood, millions of adults can survive from infectious diseases that are hidden in childhood and are expressed in adulthood. The vaccine demand and the availability of permanent reserve quantities in the National Immunization Calendar have been provided by donor organizations (primarily the United Nations Children's Fund and the Global Alliance of Vaccines and Immunization). Since 2005, the government also participates in the procurement of vaccines, annually increasing the amount of investments.⁶ Starting from 2015, about 1.9 billion AMD will be provided from the state budget for this purpose, thanks to which more than 90 percent of the targeted children receive vaccination, which is an adequate indicator of international standards.

Tables 10 and 11 present data on direct household payments for mother and child health services calculated using two methodologies. It is evident from the comparison of the data calculated using two different methodologies that it is more expedient and realistic for further analysis to use indicators calculated based on the final consumption expenditure of households by National Accounts of Armenia. This approach is justified by the simple logic that in 2012 and 2016, households' consumption expenditures calculated based on the ILCS results and the population number were 34 -40% of the same indicator of the national accounts.

Similarly, we see almost the same difference between the expenditure on mother and child healthcare services calculated by two different methodologies.

⁶ 2017-2019 Medium-Term Expenditure Framework of RA, page 191-196

Table 10: Direct payments of households for mother and child health services based on the health expenditure as share of customer expenditure (ILCS) and based on final consumption expenditure of households (SNA)

Expenditure Accounts	Monthly average per capita households' expenditure on Mother and Child Health Services (ILCS) Total RA, AMD					Monthly average per capita households' expenditure on mother and child health services as share of expenditure structure (ILCS) Total RA, %					Direct payments of households for mother and child health services as share of final consumption expenditure (SHA results), million AMD				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
	Customer expenditure, of which:	34,832	36,787	40,770	42,867	43,978	100	100	100	100	100	3,700,442.9 ⁷	3,951,200.8	4,110,248.1	3,915,973.0
Health care, of which:	2,012	2,876	2,666	4,542	4,277	5.8	7.8	6.5	10.6	9.8	214,625.7	308,193.7	267,166.1	415,093.1	380,996.4
Mother and Child health	15.1	77.4	110.6	91.2	81.7	0.0	0.2	0.3	0.2	0.2	1,602.1	8,311.5	11,146.0	8,327.8	7,220.5

Source: *National Accounts of Armenia 2012-2016, and ILCS 2012-2016: author's calculation*

Table 11: Direct payments of households' for mother and child health services based on the health expenditure as share of customer expenditure (ILCS) and the average annual number of population

Expenditure accounts	The average monthly per capita expenditure of households' by type, AMD					Household expenditures on mother and child health by type of services, million AMD				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Customer expenditure, of which:	34,832	36,787	40,770	42,867	43,978	1,264,025.4	1,334,043.8	1,474,471.5	1,545,578.3	1,579,144.4
Health care, of which:	2,012	2,876	2,666	4,542	4,277	73,013.9	104,295.3	96,417.5	163,762.7	153,576.8
Mother and Child health	15.1	77.4	110.6	91.1	81.7	547.2	2,806.2	3,998.4	3,286.1	2,932.9
Annual average number of the population, person	3,024,100	3,022,000	3,013,800	3,004,600	2,992,300	0	0	0	0	0

Source: *National Accounts of Armenia 2012-2016, and ILCS 2012-2016: author's calculation*

⁷ Final consumption of household expenditure according to National Accounts of Armenia

Monitoring of the household's per capita average monthly consumer and health expenditure data for 2012-2016 reveals the following patterns and deviations:

- ✓ During review period, the consumer expenditure showed a steady growth trend
- ✓ There has been a drastic shift in healthcare expenditures in 2015, when the nominal increase in healthcare expenditures compared to previous year has decreased by 5.8%
- ✓ Mother and child health expenditure has sharply increased in 2013, reaching a maximum of 110 AMD in 2014. In 2015, unlike the general health care expenditure, mother and child health expenditure have shown a downward trend.
- ✓ The 2012 indicator is essentially deviating from the dynamics of the upcoming years, which is probably due to the 2012 indicators recalculation based on new classification, or the characteristics of households' expenditure of that year included in the sample. The first hypothesis, in our opinion, is more substantiated, as, for example, the mother and child health expenditure of the 2011 classification are presented in two components (Gynecologist's consultation, pregnancy and delivery), whose total per capita expenditure was 26.6 AMD and surpassed the 2012 total expenditure of the five components by 76% (15.1 AMD). The 2012 expenditure could not be realistically be so little, as both births and all indicators of mother and child health are higher than in subsequent years.

For further analysis of the payments of the households for mother and child health care services, we are going to use indicators calculated based on the National Accounts of Armenia.

Table 12: Direct payments of households for mother and child health services as share of final consumption expenditure (SHA results), million AMD

Expenditure accounts	2012	2013	2014	2015	2016
Healthcare, of which:	214,625.7	308,193.7	267,166.1	415,093.1	380,996.4
Mother and child health, of which	1,602.1	8,311.5	11,146.0	8,327.8	7,220.5
<i>Obstetric / Gynecologist Services (PHC)</i>	605.6	1,761.5	2,430.3	1,172.7	1,526.5
<i>Pediatrician Services (PHC)</i>	265.6	290.0	368.1	98.7	251.6
<i>Midwives, nurses, orderlies private services</i>	19.1	588.9	1,262.4	919.8	816.9
<i>Maternity hospital and gynecological services (Hospital)</i>	648.0	5,252.2	6,550.8	5,599.9	4,578.8
<i>Pediatrician Services (Hospital)</i>	63.7	418.9	534.3	536.8	46.7

Source: ILCS 2012-2016 researches

The increase in funding by the state on maternal and child health had a direct impact on the dynamics and structure of households' expenditure.

In 2014, the reduction in maternal and child health expenditures has been registered, which has taken place in the background of the growth of government funding and the direct reduction of household payments.

It is noteworthy, that after 2014, in parallel with the reduction in the expenditure of hospital services, which is significantly related to maternal hospital and gynecological services, the payments for outpatient services were also reduced, but in 2016 the payments for outpatient services has recorded

increase compared to the previous year

As a result, in 2016, more than 60% of households' expenditures on maternal and child health care still continue to be paid to maternity hospitals and gynecological services (hospital), and more than 20% are payments for obstetrician gynecologist services (PHC) and over the past three years, more than 11% have been attributed to the midwives and nurses of private services.

Apart from the changes in the dynamics and structure of expenditures for maternal and child health services, a rather striking picture is presenting the dynamics and structure of expenditure by nature. According to the Integrated Living Conditions Survey Methodology, the surveyed households asked about the nature of their expenses in polyclinics and hospitals.

During review period, during the last visitation of the reviewed month, the expenditure of the population applying for the help to polyclinic medical specialists were striking structure fluctuations, which definitely complicates the discovery of patterns. In the beginning and at the end of the 2012-2016 periods, 88-75% of the population expenditure, in the case of pediatric services, 96-57.8%, and in the case of obstetrician-gynecologist services 73.2-64.8% % was paid to one of the staff according to the price list

If the share of payments in the form of gifts in all services were 1-1.1%% (max 2.7% in 2015), then in the case of pediatric services were 1-3.4% (maximum 26.7% in 2013), and in case of obstetrician-gynecologist services were 0.8-2.4%: The 45-39% of expenditure on pediatric services and the 61-33% of expenditure on obstetrician-gynecologist services were paid for consultation (X-ray / laboratory services).

When applying to the hospital for treatment the allocation of payments per patient by specialist and by type represent the same picture. Most of the expenditure, 68-53%, were paid to the hospital cashier, 19-23 % paid to medical staff, 5-3.3 % paid in the form of gifts or provided services and 20.3-14% paid for laboratory services and medication.

In case of discharging payments to the hospital cashier, we can state that the amount of informal payments made for obstetrician-gynecologist services makes up about 24-28% of overall payments.

Two Facts are noteworthy: Firstly, in 2012-2014, the proportion of the amount paid to the hospital cashier has decreased (in comparison with 2012, the indicator has decreased by 6.7 percentage points in 2014), the share of payments in the form gifts and/or provided services has reduced (in comparison with 2012 the indicator has decreased by 1.3 percentage points in 2014) and the share of payments paid to one of the medical staff and for laboratory services and medication has increased. The second important fact is that the proportion of payments to the hospital cashier in the terms of obstetrician-gynecologist services is lower than the average for all services, while the share of payments on other components exceeds the average by several times.

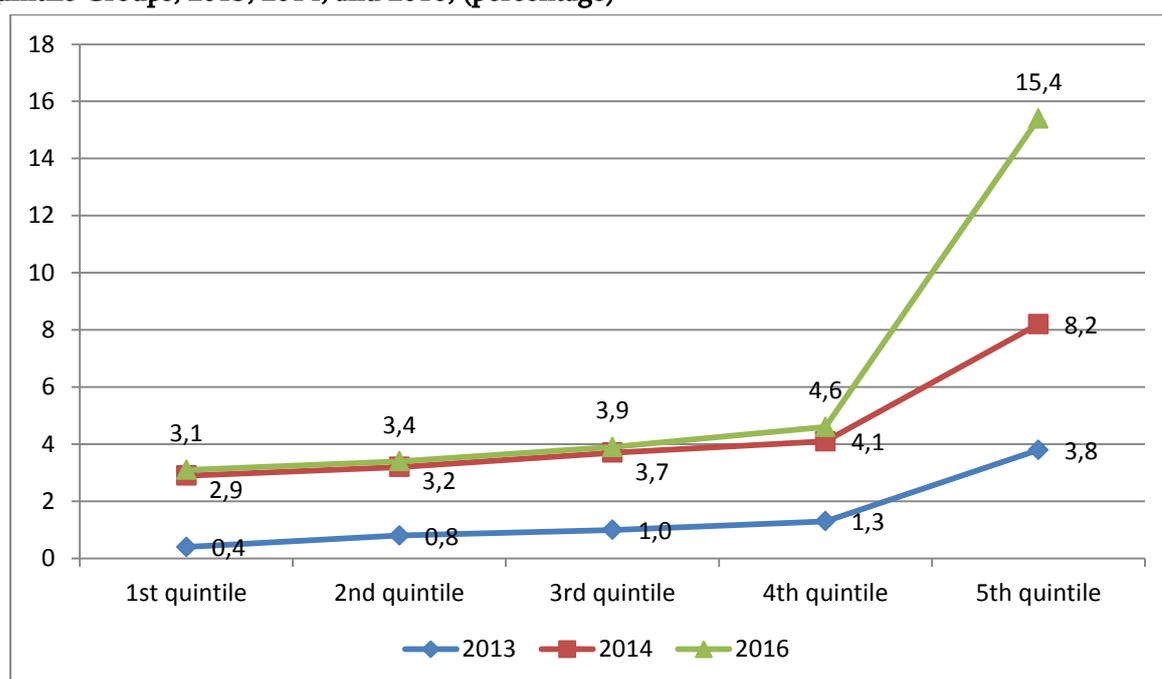
The results of the structure of the households' healthcare expenditure based on ILCS report prepared by NSS, one can also picture the use of mother and child health services and expenditure on it, according to the living standards.

In case of illness for medical advice or treatment population apply to primary care services on average 1.56 times in a month, of which: non-poor 1.63 times, poor (without extremely poor) 1.27 times, extremely poor 1.18 times. According to the ILCS results, the proportion of people applying to the

hospital for treatment in 2016 differs by poverty level. In case of illnesses the 42.3% of non-poor people, 27.3% of the poor (without extreme poverty) and 17.4% of extremely poor applied for medical consultation or treatment.⁸ Distribution of healthcare expenditures by total quintile groups in total consumption shows that the poorest quintile expenditures on healthcare services are 6 times lower (in 2014, 3.7 times), and the highest quintile expenditure on healthcare services (in 2014, 2.9 times) is 4 times more than the average expenditure on these services.⁹

The share of expenditure on Healthcare Services to total population consumption aggregate is higher in the richest quintile than in the poorest quintile (15.4% compared to 3.1%).

Figure 4: The share of Expenditure on Healthcare Services to Total Population consumption aggregate by Quintile Groups, 2013, 2014, and 2016, (percentage)



Source: ILCS 2014, 2015 to 2016:

Analyze of the recent dynamics of the share of health expenditure by quintile groups, it is possible to conclude that the consumption and health expenditure of 1-4 quintile remained almost at the same level. According to the results of this research in 2013-2016, the living standards of the population and access to health care services remain unchanged. Moreover, according to official statistics, in 2014 and 2015, even the physical volume of indicators of health care services have been reduced by 0.7 and 3.7 percent respectively, which was replaced by a 1.4 percent increase in 2016, even reducing and even not reestablishing the level of 2015. In the context of using health care services, in the background of the poor condition of the four quintile groups, the sharp increase in the share of health care services in the fifth quintile is extremely impressive and alarming. The presented evidence shows the deepening of disproportionate consumption of health services among groups with different levels of income.

Comparative analysis of expenses and health indicators

The combination of the health indicators and the dynamics of the expenditure on health allow assuming

⁸ Social Snapshot and Poverty in Armenia 2015 and 2017, Statistical analytical report, Armstat, 2017, page 157:

⁹ Same place, 2015, page 145 to 161:

that most expenditure has post factum nature, which is the result of the planning of the public expenditure based on the budget opportunities and trends of the previous years. Moreover, the state determines the prices of the services, which, as a rule, are much lower than the market values of services. In the framework of the state order, due to fact that the prices offered by the state is lower than in prices in market the state-financed revenues are compensated by mandatory households' payments

The first important interrelationships are the reduction of "burden" of the expenditure on the mother and child healthcare services and the budget due to the increase in public funding. As shown in the chart below, the share of households' expenditure in the total expenditure structure decreased by 7.5 % from 2013 to 2016. This fact, on the one hand, indicates a positive effect of the growth of state targeted policies, programs and funding, and on the other hand, it can be a result of reduction of services accessibility.

The reason for such assumption is ILCS data on the reasons for not using health services is, according to which first of all, the lack of financial resources was mentioned as a secondary cause in all places of residence, and secondly, more than half of the population gave preference to self-treatment.

Figure 5: Share of the state and households' in total expenditure structure, 2012-2016, percentage

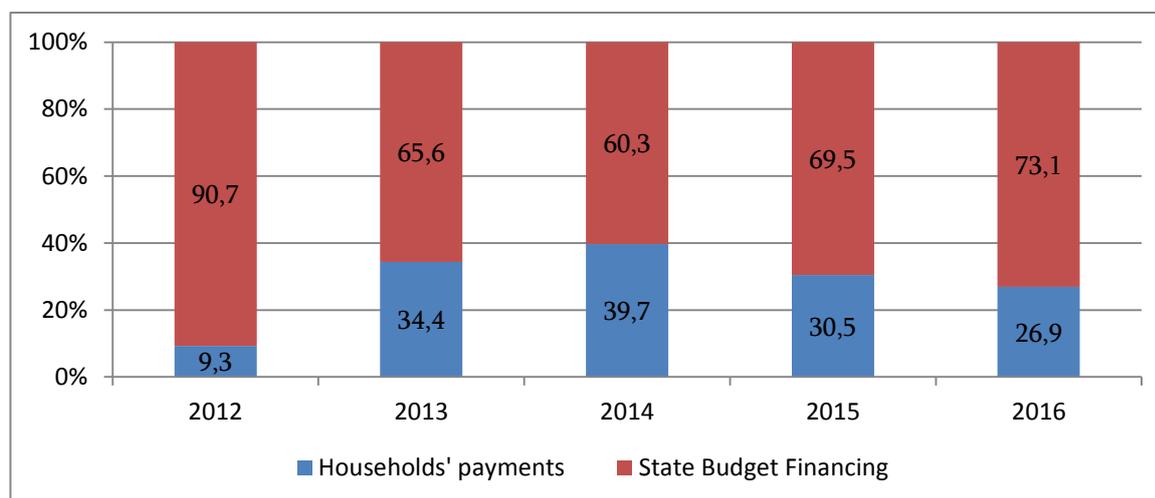


Table 13: State and households' expenditure for mother and child health services, 2012-2016, million AMD

	2012	2013	2014	2015	2016
Households' Payments	1,602.05	8,311.50	11,145.96	8,327.82	7,220.46
State Budget Financing	15,699.60	15,864.90	16,916.40	19,015.60	19,634.70
Total	17,301.65	24,176.40	28,062.36	27,343.42	26,855.16

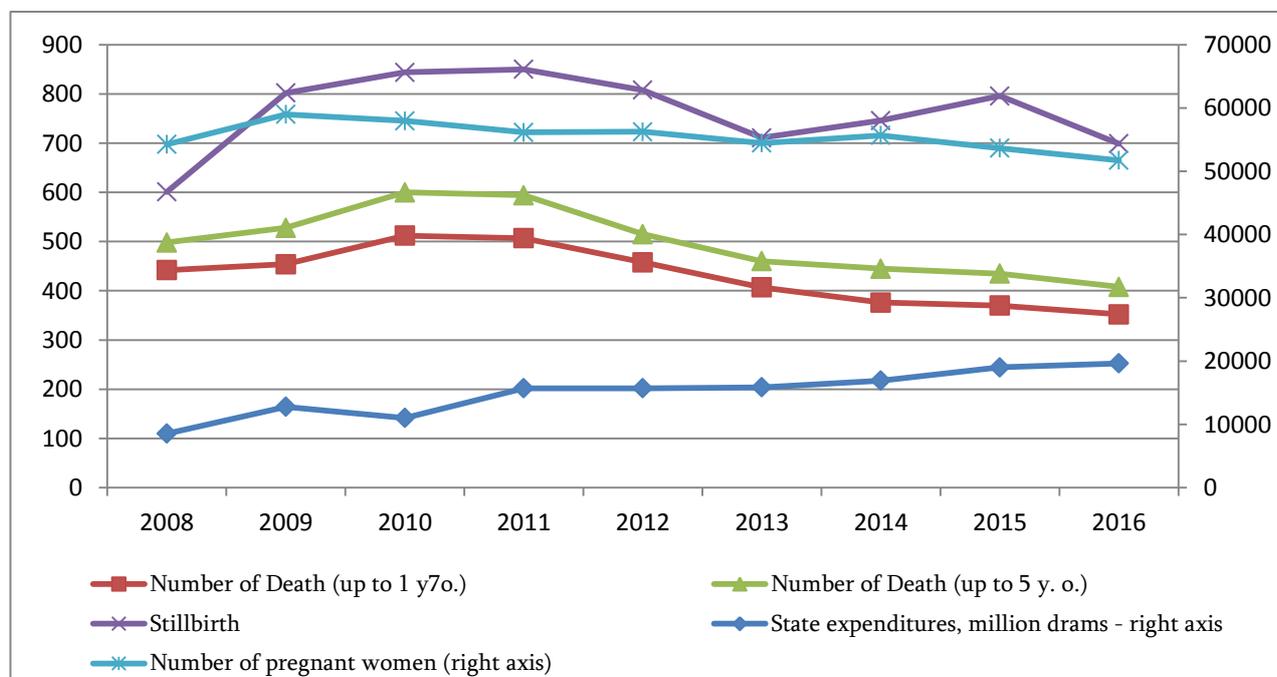
The second important combination that needs to be considered is the interaction between the expenditure of the state and households and the dynamics of mother and child health indicators.

First and foremost it is important to find out how much the state program and funding contribute to the improvement of mother and child health status, such as infant mortality, maternal mortality, reproductive health, etc., which are also vital in terms of assessment of the demographic state of the country.

The dynamics of the curves reflected in the figure clearly indicate a clear indirect dependency of the

increase of state funding and child and infant mortality. Moreover, based on the changes that took place between 2009 and 2010, one can be assured that the introduction of the "State Program of Birth Assistance Certificate" since 2008 has already had and has a significant impact on mother and child health. Maternal mortality is not considered in this case; as it is shown above, its dynamics is extremely situational and more dependent on the number of risk cases that occur during pregnancy in a specific year

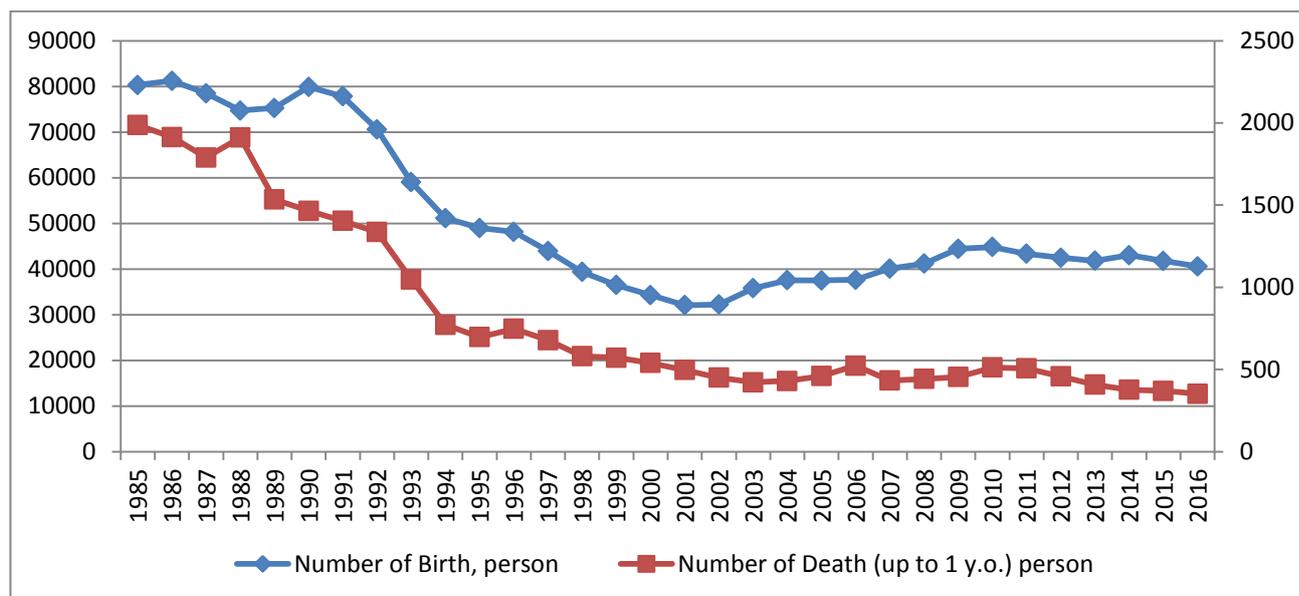
Figure 6: The dynamics of public expenditure and demographic indicators, 2008-2016



On the other hand, the combination of child mortality rates with the number of pregnant women and the fact that during the 1990-1999 deaths of children aged 0-5 years dropped by 44%, and only by 3% during 2000-2006, and compared with the previous one, with 6 % in 2008-2016, indicates that other factors are having more significant impact. It is assumed that the likelihood of child mortality is likely to depend on the change in birth rates. The combination of curves that reflects the dynamics of births and infant mortality cases makes it possible to conclude that there is some dependence between them (Figure 7).

In order to identify the potential dependence, we have made a regression analysis of the two indicators for 1985-2016 years. The regression model allows identifying what type of dependencies exists between the number of births and infant mortality and can be used to make high reliable predictions.

Figure 7: Dynamic series of number of births and infant deaths during 1985 – 2016



Source 'Demographic Handbook of Armenia 2017, NSS:

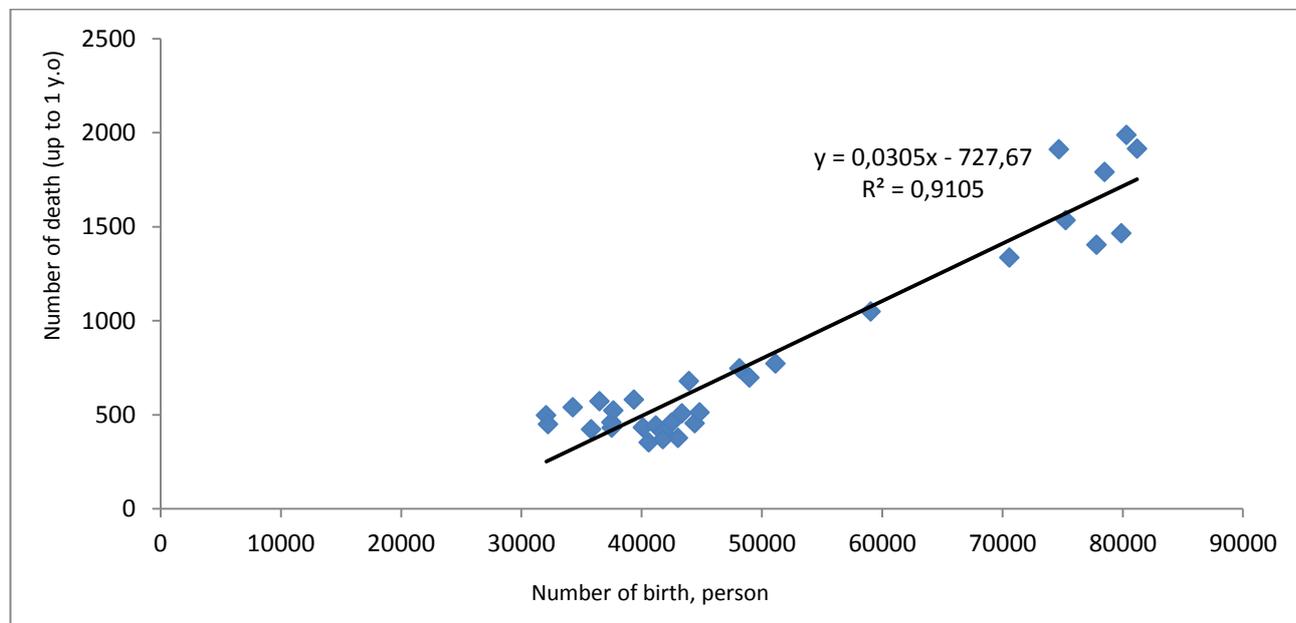
A simple linear regression analysis model with one independent variable is defined by the following equation: $\hat{Y}_i = b_0 + b_1 X_i$ and the dependence (determination) coefficient R^2 is determined by general variation (SST – total sum of squares), explanatory variable size (SSR – the sum of squared residuals).

Table 14: Simple regression analysis of number of Birth and infant mortality indicators

Simple Linear Regression Analysis								
Regression Statistics								
Multiple R	0.95							
R Square	0.91							
Adjusted R Square	0.91							
Standard Error	162.2							
Observations	32							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	8034046.2	8034046.2	305.2	0.0000			
Residual	30	789739.3	26324.6					
Total	31	8823785.5						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-727.7	92.8	-7.8	0.0000	-917.2	-538.1	917.2	538.1
Birth	0.0	0.0	17.5	0.0000	0.0	0.0	0.0	0.0

The results of the regression analyzes and the regression coefficient presented in Table 14 as well as the scatter of indicators presented in Figure 8, which shows that there is a clear dependence between the number of births and infant mortality, accordingly $R^2 = 0.910$ regression coefficient means that 91% change in infant mortality can be explained by the change in the number of births.

Figure 8: Scatter of simple regression analysis of number of Birth and infant mortality



On the other hand, however, only the dependence characterized by the regression coefficient is still insufficient to claim that the simple linear regression angle describing the dependency between two variables or the regression model equation is statistically significant and can be used for conclusions and further predictions. For this purpose, an angle F test method is used, which is the ratio of the dispersion of this regression (error variable) model or scatter to errors or dispersion conditioned by other factors. F test is performed using null (H_0) and alternative (H_1) hypothesis.

$H_0: \beta_0 = 0$ – there is no linear dependence

$H_1: \beta_j \neq 0$ – there is linear dependence.

F statistical measure is equal to the ratio of the mean square regression ($MSR = SSR / p$) and statistical average squared error ($MSE = SSE / n-p-1$) and describes F- distribution with p and n-p-1 degrees of freedom. $F = MSR / MSE = 305.2$: The critical significance of the F-distribution (with 1 and 30 degrees of freedom), in terms of 0.05 significance level, according to calculated table¹⁰ is equal to 4.08. *Since $F = 305.2 > F_{U(0.05,1,30)} = 4.08$, it appears in the statistically rejected range, thus H_0 hypothesis is rejected and we conclude that the impact of the number of births change is significant in infant mortality cases.*

The child mortality forecast based on dependence between births and deaths is presented in Table 15. In a statistically significant dependence, the minimum and maximum values of deaths are not taken the

¹⁰ David M. Levine, Timothy C. Krehbiel, Mark L. Berenson, Business Statistics: A first Course, 2nd ed. New Jersey 2000, Appendix E, Table E.5 “Critical Values of F”, p. A-18.

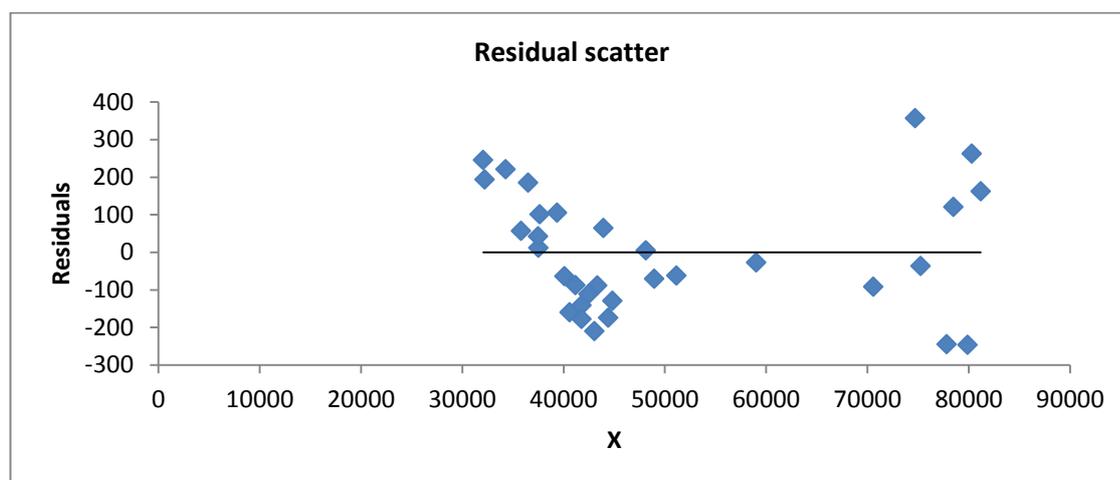
mean of the Y but are taken each separate (individual) value of the Y. In our example, the prediction made by the Interpolation method in 95% accuracy range, the average of predicted cases of child mortality for 60,000 live births was 1 105 cases, with 766 and 1 443 minimal and maximum values.

Table 15: Mortality prediction

Confidence Interval Estimate	
Data	
X Value	60000
Confidence Level	95%
Intermediate Calculations	
Sample Size	32
Degrees of Freedom	30
t Value	2.042272
XBar, Sample Mean of X	50495.47
Sum of Squared Differences from XBar	8.61E+09
Standard Error of the Estimate	162.2487
h Statistic	0.04174
Predicted Y (YHat)	1104.924
For Average Y	
Interval Half Width	67.6969
Confidence Interval Lower Limit	1037.2267
Confidence Interval Upper Limit	1172.62
For Individual Response Y	
Interval Half Width	338.2007
Prediction Interval Lower Limit	766.7229
Prediction Interval Upper Limit	1443.124

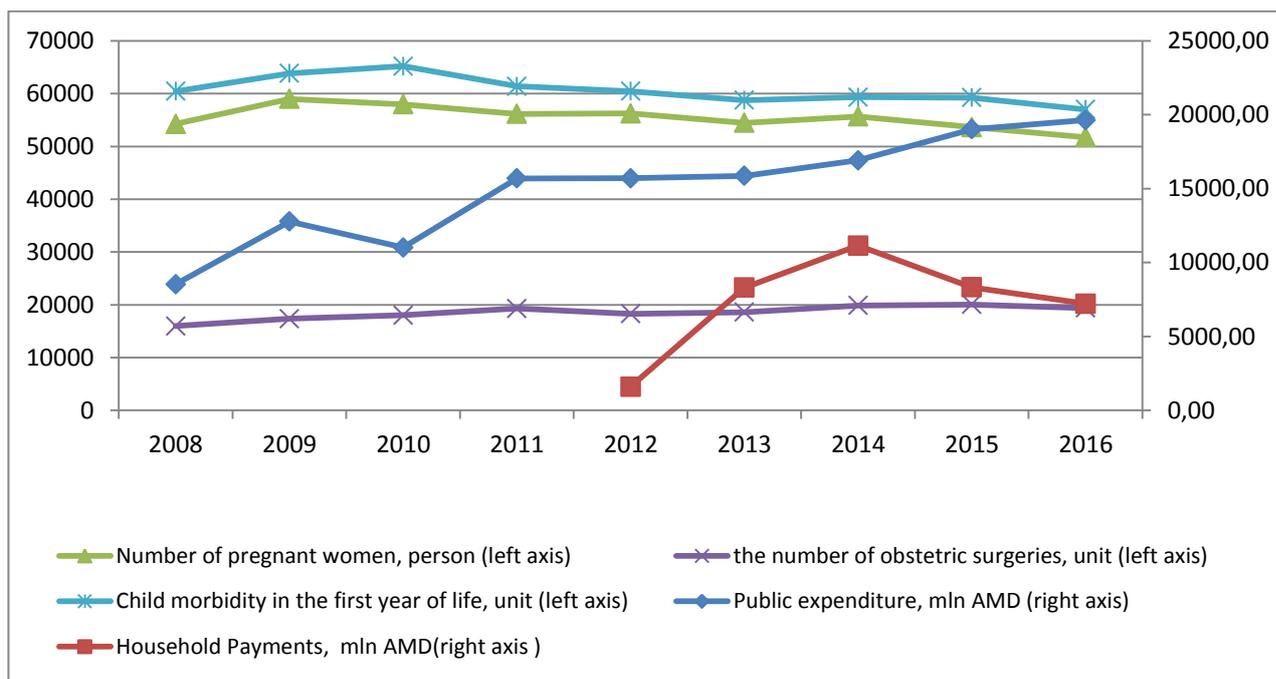
The Regression model can be surely used to make predictions, as the scattering of the residual analysis presented in Figure 9 indicates the minimal or non-significant impact of other factors.

Figure 9: Residual scatter



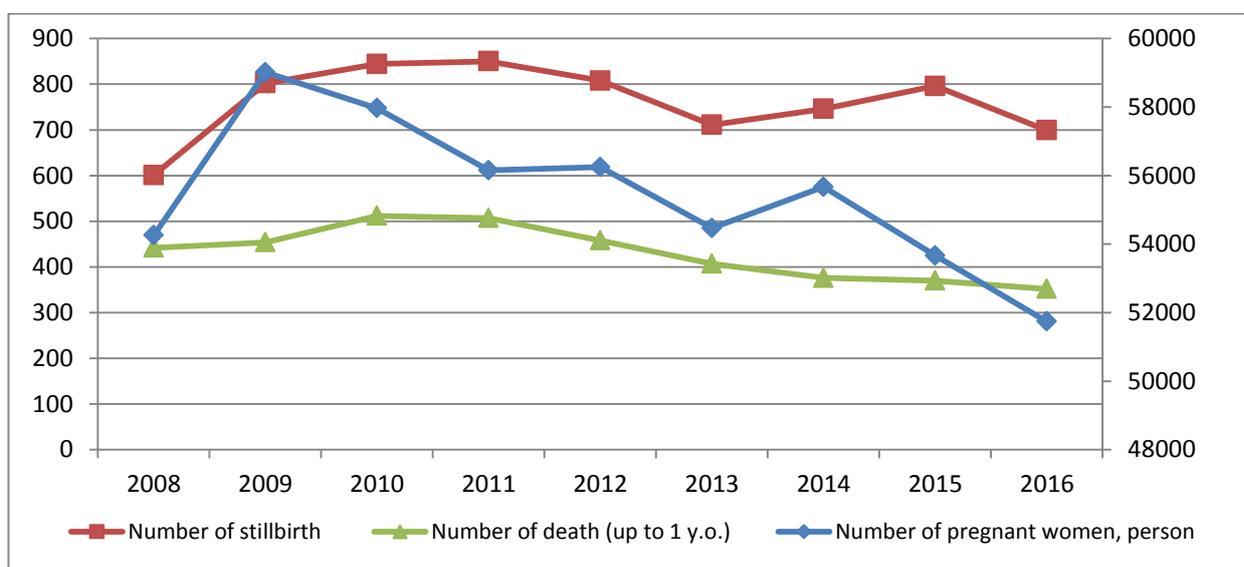
However, the following figure shows that the increase in public spending has been accompanied by a reduction in children's illness in the first year of life and, on the other hand, the number of obstetric surgeries has increased.

Figure 10: Combination of the dynamics of some public and private expenditure and health indicators



In recent years, regardless of the expenses and the number of pregnant women, there has been a dynamic change in the mortality rate, which means there are still serious problems in reproductive health.

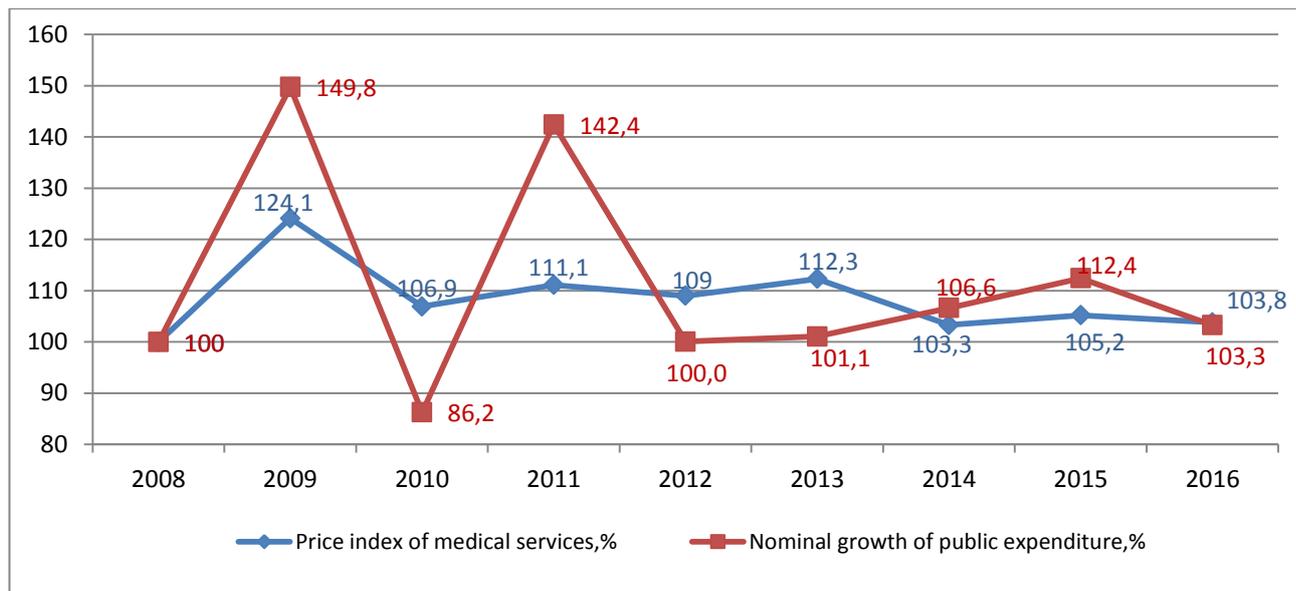
Figure 11: Dynamics of number of the pregnant women, infant mortality and stillbirth rate, 2008 –2016



From the point of view of real impact assessment on the change of public and private expenditure and the increase of accessibility of health care services, it is no less important to compare the increase of expenditure with the rise of prices of medical services.

It is clear from Figure 12 that each year there has been a steady increase in prices for medical services since 2009, which, in general, has been higher than the nominal growth of public expenditure on maternal and child health.

Figure 12: Dynamics of nominal growth of public expenditure and price index of medical services



Consequently, it turns out that in the context of the decrease of the demographic indicators and the relatively constant level of maternal and child health indicators, the increase of public spending actually indexed the rise in the cost of medical services.

Conclusions and recommendations

The current study of mother and child health state and private expenditure enabled to make some conclusions and introduce some recommendations to help improve the effectiveness and usefulness of further analyses in this area and to have practical significance in the development of the strategies and policies.

Conclusions

- ✓ The current social and economic situation in country and its development trends still do not provide adequate conditions to ensure progressive improvement of the mother and child health status.
- ✓ The level of accessibility and especially affordability of health care services is not satisfactory. Though the share of health expenditures in the structure of households' consumption expenditures is being reduced, however, it is also apparent that inequality is also deepening, as a result of which a substantial part of the services is "consumed" by middle and high income households'.
- ✓ Compared with 2013, the burden of mother and child health expenditure on households' budgets has dropped nearly twice in 2016 - from 4% to 2%.
- ✓ In the context of using health care services, in the background of the poor condition of the four-quintile population, the sharp increase in the share of health care services in the fifth quintile is extremely impressive and alarming. The presented evidence shows the deepening of disproportionate consumption of health services among groups with different levels of income. **The conclusion is that the problem of accessibility of healthcare is becoming more and more aggravated annually for larger groups of population, which is a consequence of the formation of market relations at the progressive pace. Indicators indirectly prove the violation of the principle of equality of health care services, which should be a priority issue in state policy programs and strategies.**
- ✓ On the other hand, the results of households' Living Standards Surveys, based on insufficient representation sample, do not allow to have a better understanding of the volume, direction, structure and content of the population's direct health payments, both in terms of healthcare and maternal and child health care.
- ✓ The ongoing deterioration of the demographic situation, and in particular the natural movement, has resulted in "improved" mother and child health indicators (child and infant mortality). According to the results of regression analyzes of live births and infant mortality from 1985 to 2016, the 91 percent of decline in infant mortality is conditioned by a reduction in births.
- ✓ Mother and child and reproductive health are under special care and attentions of the state, as maternal mortality, stillbirth, abortion, childhood morbidity and so on are still serious challenges.
- ✓ Targeted and global strategies and programs aimed at maintaining, rehabilitating and improving health care services since 2008 are mostly provided with the necessary financial resources, mainly on health rehabilitation services.
- ✓ Annually, the amount of state funding increases, as a result of which the direct payments of households and their share are reduced in the total expenditure structure. On the other hand,

however, the reduction of the household's expenditure in the background of the decreased use of health services creates grounds for assumptions about the reduction of accessibility of services.

- ✓ As a result of increasing targeted funding in the state budget, the mother and child health expenditures in 2017 exceeded the 2008 figure by 2.3 times, mainly due to an increase of the volume of hospital services by 2.1 times.
- ✓ Over the last ten years, almost all the major accounts of mother and child health expenditure have recorded a considerable increase in funding, which is amounted to 19,361.9 million AMD in 2017, exceeding the 2008 figure by 2.3 times, mainly due to the increase in volumes of hospital services funding by 2.1 times.
- ✓ During the same period, about 80% of the state funding of the outpatient service was allocated to the "Obstetrician-gynecological medical services", and 99 % of state finding of the hospital services provided to "Services by mother and child healthcare facilities". There are two significant changes in this service group. First, if more than half of the funding has been provided to "Obstetric medical services" in 2011, then "Child medical care services" has bigger share in 2012. Secondly, about 79 million AMD have been allocated for "Reproductive medical care services for infertile couples" in 2015-2017
- ✓ Immunization is one of the most economically effective strategies for public health. Starting from 2015, about 1.9 billion AMD will be provided from the state budget for this purpose, thanks to which more than 90 percent of the targeted children receive vaccination, which is an adequate indicator of international standards.
- ✓ The increase of the state funding on mother and child health sector had a direct impact on the dynamics and structure of household expenditures. Since 2014 the households' expenditure has decreased and was 7.220.5 million AMD in 2016 (which is 1.1 billion AMD less than in 2013 and 2015, and about 3 billion AMD less than in 2014).
- ✓ More than 60% (4,548.8 million AMD) of households' expenditures on mother and child health services still directed to maternal hospitals and gynecological services (hospital), more than 20% (1,526.5 million AMD) are payments for obstetrician gynecologist services (PHC), and as a result of the expenditure growth over the past three years, more than 11% (816.9 million AMD) are payments to the private services of midwives and nurses.
- ✓ In the recent years the payments for pediatric services are prevailing in the structure of hospital services. This circumstance and the content of expenditure indicate that so far the majority of expenditures had and have post factum nature that is why it is difficult to estimate the expenditure effect from the point of view of improvement of the situation.
- ✓ From the point of view of reducing further expenditure, it is vital to prioritize the objectives of disease prevention and health promotion and improvement among the priorities of public policy.
- ✓ Almost all indicators of mother and child health are demonstrating stable dynamics, with slight variations, and in some cases separate indicators of morbidity even have a tendency to increase.
- ✓ The positive outcomes from the expenditure are most noticeable in terms of several indicators such as child mortality, reduced infertility, the highest levels of child involvement in

vaccination, and the reduction of morbidity and mortality related to manageable infectious diseases.

Recommendations

Based on the obtained results, it is expedient and necessary to include the function of the collection and analysis of economic and financial indices of the activities of medical facilities in the administrative and state statistical work conducted by the RA Ministry of Health, which will enable to have a sufficient information basis for analysis, monitoring and evaluation system development and evaluation and measurement of the policy outcomes.

The results of the report substantiate the need for continued state support in mother and child health and reproductive health, the need and urgency of effective current and capital expenditures.

The availability of economic and financial information will enable to implement a comprehensive diagnosis of mother and child and reproductive health financing, to evaluate the full range of services in terms of accessibility, affordability and dynamic change of demand, and to guide health financing strategies that ensure equality for all national stakeholders.

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