

1 357 9 2468 0
Stewardship
24681 5 379 1
Fair Financial Contribution
0257 9 6 7 3 6 3
Responsiveness
3 5 7 6 9 5 9 5 8 2
Creation of Resources
Service Delivery
9 5 6 4 8 7 420 8 4
Financing
3 5 7 9 2 796 1 7 5
Health Improvement
1 6 9 5 2 578 4 2 3
Access to Health Care Services
8 3 59 6 7 4 2 3 5
Quality and Safety
75 5 8 2 9 4 7 1 6 9
Financial Protection
5 6 8 3 9 3 7 1 6 4 1
Health Status
1 5 4 8 1 3 2 0 7 3
Noncommunicable diseases
2 3 6 7 1 0 9 4 1 2
Risk Factors



ARMENIA HEALTH SYSTEM PERFORMANCE ASSESSEMENT

2013

ARMENIA
HEALTH SYSTEM
PERFORMANCE ASSESSMENT

YEREVAN

2013

ՀՏԴ 614 (042.3)

ԳՄԴ 51.1

Ա 700 Armenia Health System Performance Assessment, 2013,

D. Andreasyan, S. Manukyan, S. Tsaturyan, N. Gharakhanyan, A. Potosyan, A. Bazarchayan, P. Zelveian

Ա 700 National Institute of Health of RA after S. Avdalbekyan MoH, Yerevan, Armenia

2013. 108 pages

The Health System Performance Assessment (HSPA) report presents an assessment of the performance of the health system against a number of key performance dimensions: equity in financing and financial protection, the general health status of the population with marz breakdown, biological and behavioral factors affecting human health; their prevalence and negative impact, obstetrical and gynecological care, as well as improvement of the policy on women's reproductive health and protection of rights.

Recommendations on improvement of the health system performance of Armenia are presented in each section of this report.

This report is designed for health system organizers, health experts, clinicians, as well as other specialists interested and involved in health system issues. Moreover, HSPA can contribute to improving effectiveness of efforts pursued by the Government of Armenia to strengthen the capacities of the Ministry of Health.

ՀՏԴ 614 (042.3)

ԳՄԴ 51.1

ISBN 978-99941-2-939-3

© National Institute of Health of RA after
S. Avdalbekyan MoH, 2013.

CONTENT

ABBREVIATIONS	5
FOREWORD	7
EXECUTIVE SUMMARY	9
Equity in financing and financial protection	9
Maternal and child health care	10
Risk factors	11
Population health	13
1. EQUITY IN FINANCING AND FINANCIAL PROTECTION	15
Fiscal context of Armenia health system performance, 2012-2013	15
Costs of medical assistance and services and control of shadow	17
Health insurance developments and challenges	19
Facts and policy recommendations	22
2. MATERNAL AND CHILD HEALTH CARE	23
Obstetrical and gynecological care	23
Problem of human resources	24
The quality of obstetrical and gynecological services	25
Pap smears,	28
Mammography screenings	29
Financing of obstetrical and gynecological services	32
Facts and policy recommendations	35
3. CHILD HEALTH CARE	36
Problem of human resources	37
Financing	40
Quality of and access to child health care services	40
Facts and policy recommendations	50
4 RISK FACTORS	51

Trends of prevalence of the risks factors of development of noncommunicable diseases	53
Prevalence of risk factors according to age groups	55
Risk factor co-relation analysis	58
Influence of risk factors on high arterial blood pressure	60
Dependence of hypertension on age and being overweight	63
Impact of secondary smoking	65
Facts and policy recommendations	67
5. POPULATION HEALTH	68
Population morbidity	68
Comparison of main morbidity groups according to marzes	72
Encounters with private and public primary healthcare facilities	77
Correlation of morbidity rate to proportion of relevant physicians	81
Conclusions	85
Population mortality	86
Mortality, nativity and natural growth dynamics across marzes between	87
Mortality according to causes-of-death	91
Recommendations	103
ANNEXES	104
REFERENCES	106

ABBREVIATIONS

AMI	Acute myocardial infarction
AP	Arterial pressure
AH	Arterial hypertension
ADHS	Armenia Demographic and Health Survey
APDSP	Armenia's Prospective Development Strategic Program
AMD	Armenian dram
BBP	Basic benefit package
BMI	Body mass index
CHC	State Child Health Certificate Program
CVD	Cardiovascular diseases
CIS	Commonwealth of Independent States
GDP	Gross domestic product
HSPA	Health system performance assessment
HFA-DB	European Health for All Database
ICD-10	International statistical classification of diseases and related health problems, 10 th revision
MCICQA	Maternal and child inpatient care quality assessment
MDGs	Millennium Development Goals
MTEF	Medium-term expenditure framework
MCH	Maternal and Child Health
MoH	Ministry of Health
NGO	Nongovernmental organization
NIH	National Institute of Health after academician S. Avdalbekyan
NHIAC	National Health Information Analytical Centre
NSS	National Statistical Service of Republic of Armenia

NC	Neonatal care
NCD	Noncommunicable disease
PC	Perinatal care
PHC	Primary health care
PRSP	Poverty Reduction Strategy Paper
QLI	Quality of Life Index' Survey
SMHV	State Maternal Health Voucher/Certificate Program
SHA	State Health Agency
SDP	Sustainable Development Program
USAID	United State Agency for International Development
WHO	World Health Organization
WVA	World Vision Armenia
YSMU	Yerevan State Medical University

FOREWORD

Improvement of health system performance is one of the priority challenges of the Government of the Republic of Armenia. It not only contributed to improvement and strengthening of the population health, but is also the integral part of the country's socioeconomic development.

The Ministry of Health of Armenia has been faithful to its commitments and continues assessment of the health system performance guided by the World Health Organization Health 2020, the new European Health and Development Policy Framework.

Areas including maternal and child health strengthening, reduction of the burden of noncommunicable diseases, promotion of healthy lifestyle, healthy family planning and strengthening undergo health reforms in the recent years. Implementation of these programs is supported by coordinated efforts geared at more effective system management at national and regional levels, as well as more targeted use of financial resources, improvement of public health services, continuing development of professional qualifications of human resources and other objectives.

This forth HSPA report covers key priorities of the health system, particularly the population health status, analysis of the policy on improvement of healthy lifestyle, obstetrical and gynecological care, women's reproductive health and protection of rights, as well as financing of the system and implementation of mandatory health insurance, which are targeted at the achievement of Millennium Development Goals and Health 2020 European Health and Development Policy.

Armenia is one of the few countries in the European Region that has started this process presenting achievements and gaps of the health system. HSPA is a helpful tool that can be used to collect necessary information to develop health policy and to implement progress monitoring. In addition, this is a critical process for which the country assumes full responsibility.

Attaching great importance to HSPA the Ministry of Health has institutionalized the process and provides full support to all phases of implementation.

We can record remarkable achievements by focusing our attention and efforts on improvement of health indicators. Our goal is to achieve health indicators that are no inferior to other countries, which translates to increase of life expectancy, reduction of noncommunicable disease prevalence, improvement of affordability of health services.

This requires improvement of the quality of and access to health services on the one hand, and significant reduction of illegal out-of-pocket payments and elimination of other barriers on the other hand. This cumbersome process should be monitored through reliable tools and indicators of regular assessment of final outcomes.

Today, one of the challenges faced by us is preparation of the RA Health System Development Vision defining responsibilities of all spheres for health promotion and strengthening, including ownership of one's health.

Derenik Dumanyan, professor

A handwritten signature in black ink, appearing to read 'D. Dumanyan', with a stylized flourish at the end.

Minister of Health of the Republic of Armenia

EXECUTIVE SUMMARY

The Armenia Health System Performance Assessment Report 2013 comprises of four chapters, namely 'Equity in Financing and Financial Protection', 'Population Health', 'Maternal and Child Health' and 'Risk factors', which reflect equity in financing of health system of Armenia and financial protection, general situation with population health on both national and regional levels, maternal and child health, obstetrical and gynecological care and services, analysis of the policy on improvement of women's reproductive health and protection of rights, as well as the prevalence of biological and behavioral health risk factors, their correlation and negative impact.

Feasible recommendations on improvement of the health system performance of Armenia are offered at the end of each section of this report.

Equity in financing and financial protection

The chapter on equity in financing of Armenia health system describes developments and trends covering the period from 2011 through issuance of this Report (November 2013). Special attention is paid to the efforts of the Government during 2012-2013 including introduction of co-payment in health, regulation of paid services and combating shadow and corruption, as well as analysis of the results. In addition, the chapter reflects on emergence of health insurance in Armenia particularly results of the first year of introduction of the social package and strengthening of the positive changes.

Findings of the analysis suggest that despite the annual increase of public allocations to health, this grows nonetheless yields to inflation rate and the allocated funds are not sufficient to fully cover some elements of the basic benefit package (BBP). However healthcare expenditures as percent of gross domestic product (GDP) and part of public budget expenses, continue remaining modest, due to which the population has to hold the main burden of total health expenditures.

During 2011-2012 the ratio of outpatient and inpatient services did not change, whereas in 2013 the share of inpatient services has relatively decreased, which is mainly due to the increase of funds under loan and grant programs. The draft budget 2014 envisages increase of the share of inpatient services to 43%.

One of the key indicators of Armenia health financing is the high share of private spendings in total health expenditures. In fact, in Armenia direct costs of population comprise main part of private spendings coupled with low receipts from health insurance. According to WHO data private spendings shared 59.5% of total health expenditures in 2010 and 64.2% in 2011. At that direct population costs during the said period covered 92.7% and 89.4% of private spendings correspondingly. These indicators continue being alarming in terms of financial protection of the population and particularly the vulnerable groups as regards financial fairness and healthcare expenditures.

Shadow financial flows in healthcare system continue being a problem in Armenia. Despite targeted activities of the Ministry of Health over the past years aimed at regulation of paid services and monitoring of revenues of healthcare facilities, the stereotype of illegal payments to healthcare workers by patients is still not finally eradicated.

The current health insurance mechanisms applied by private insuring companies within the framework of social packages fail contributing to effective spending of public funds. Armenia has not yet introduced a mandatory health insurance system.

Maternal and child health

Analysis of obstetrical and gynecological care issues and the policy on reproductive health improvement as well as protection of rights was implemented with the financial and technical assistance of the World Vision Armenia organization.

Chapters 2 and 3 of the Report reflect on challenges in obstetrical and gynecological care and services as well as analysis of the policy on improvement of women's reproductive health and protection of women's rights.

Data witness about tremendous progress in improvement of women's reproductive health during the recent years, including adoption and implementation of a number of targeted and strategic frameworks. However in terms of enforcement and localization, not all regulations are fully applicable.

Funds earmarked for financing of state-guaranteed free pre- and postnatal care, childbirth, as well as emergency care increase yearly. Yet a number of surveys show that the achievements due to introduction of SMHV are not maintained, but are diminishing instead.

One of the positive trends is the decline of the average maternal mortality rate which in 2010-2012 was 12.9 per 100.000 population. In terms of global trends the revised target for 2015 in accordance with the Millennium Development Goals (MDG) is 11.6 /100.000, which can be qualified as probable achievable, provided that the current progress trends are maintained.

The study of staffing with obstetricians, gynecologists, neonatologists and pediatricians revealed an uneven distribution of the workforce. According to the estimates of the Armenia Association of Neonatologists 73% of the country's maternity facilities lack in neonatologists. Yerevan maternities have adequate staffing, whereas in marzes this gap is usually bridged by hospital pediatric personnel, outpatient pediatricians, and in some places family physicians. Today, there are vacancies of family doctors as well, meaning that children and mothers-to-be of some areas or districts are partially deprived of the possibility to exercise their right to health protection.

It is apparent that in big cities of Armenia the institute of family medicine is not fully introduced and there is a need of revising the current outpatient service model.

According to official data published in 2012 the rate of congenital defects/deviations has increased during the last two years from 12.9 to 15.6 (per 1.000 births), which speaks of ill-timed diagnosis. Analysis of the 2010 Armenia Demographic Health Survey (ADHS) data also suggest of inadequate quality of prenatal care.

Poor counseling on women's reproductive health and use of contraceptives by outpatient services is evidenced by the DHS survey which revealed that 78% of women of 15-49 years of age is not aware of breast self-examination method and only 11% of women had performed self-examination during the 3 months preceding the survey.

Analysis of some indicators on inpatient and outpatient services speak of changes in patient flows between 2010 and 2012. After introduction of SMHV, part of women visited at home by PHC physicians as well as patients visiting PHC settings, preferred seeking care at hospitals. In terms of case management PHC gradually lags behind hospitals, which is confirmed by more than 50% reduction of home visits due to patient's illness.

The other problem was failure to comply with proper case management practices revealed within the framework of WHO Integrated Management of Childhood Illnesses (IMCI) program. Particularly, not all settings apply evidence-based guidelines and practices.

Healthcare workers expressed contradicting perceptions of appropriateness of State Maternal Health Vouchers/Certificates. Remuneration-wise their expectations were not met because of the maximal salary threshold which is not influenced by the number of treated children and healthcare worker's workload. In terms of contacts with patients the situation has not improved either, since patients started demonstrating a clear commanding position.

Introduction of the SMHV system has drastically increased the rate of hospitalization of under 7 children, who prior to that could not afford inpatient care.

The other argument is that during the first year of implementation of the program the number of hospitalizations has sharply increased (around 3 times) in under 1 children, which has objective reasons given the unpredictable development of diseases in that age group.

It is noteworthy that the increase of under-1 hospitalization in marzes comprised 20.4% versus 11.8% in Yerevan. This big difference was unexpected because majority of neonatal services are located in Yerevan. Judging from the figures it could be assumed that some of the hospitalizations were not justified (medically indicated). Yet it is obvious that 0-1 age group is most vulnerable and dangerous, hence unjustified referrals may be assigned to extra caution by parents and health workers. On the other hand, changing nosocomial mortality rates, including those of perinatal mortality, suggest of the effectiveness of SMHV Program.

This change of child nosocomial mortality rates in its turn means improved access and affordability directly leading to reduction of neglected cases which otherwise could become terminal.

The absolute number of home deaths shows stable decline since 2011, especially in 0-1 age group.

According to inquiries on appropriateness of SMHV healthcare workers believe that implementation of the program is particularly beneficial for socially vulnerable groups, to some extent also for healthcare workers, for who this is a matter of dignity. The population, especially the needy groups has definitely benefited from this program.

Risk factors

In Armenia, like elsewhere the growth of noncommunicable diseases (NCD) and prevalence of risk factors contributing to their development continue being a priority challenge faced by the health system.

In general, the prevalence of behavioral and biological risk factors in population of Armenia has expanded over 2007-2012, which in its turn brought about an increase of diseases stemming from those risk factors.

Although the overwhelming majority of the population is aware of the negative impacts of tobacco smoke and the secondary smoking, tobacco use is still prevalent in males. Moreover, smokers usually neglect the negative impact of their behavior on their surroundings. There is a need of strengthening tobacco use restrictions in public places, especially among public transport drivers. The rate of tobacco use in males has drastically climbed up in the 20-29 age group. Anti-tobacco activities should be targeted at young population groups and the number of young men and women involved in non-professional sports should be increased.

The rate for alcohol abuse is relatively high in males of 30-39 and 60-69 age groups. A deeper and more comprehensive study of these population groups is needed in order to reveal the reasons behind excess use of alcohol and to develop relevant strategy.

Despite the public awareness of the negative impacts of physical inactivity the latter shows radically increasing rates especially in the 15-19 age group. The situation requires initiation of activities promoting physical education, particularly facilitating access to existing stadiums and sports grounds, build new ones, regularly organizing mass sports events.

During 2007-2012 an increase in the rate of prevalence of being overweight was detected. Behavioral risk factors have resulted in sharp increase of the prevalence of high blood pressure.

It seems that the prevalence of risk factors is closely correlated with one's age. Hence prior to studying the relations of risk factors, it is worth observing the impact of the age on the prevalence of behavioral risk factors. At the same time, since men and women practice quite different lifestyles in Armenia, it should be assumed that the impact of age in the prevalence of risk factors will be different in male and female groups. As of risk factors, the survey studied their connection according to age and gender groups, with detailed analysis of connections of different risk factors.

The prevalence of arterial hypertension in men and women under 40 years of age is higher in men and the prevalence of being overweight according to age groups and gender shows an increase tendency in women above 40. Prevalence of physical inactivity is high in young women, which equals with men in the middle age and outnumbers again in older ages. Abuse of alcohol and daily use of tobacco is prevalent in men only.

Arterial hypertension has positive correlation with all other risk factors, meaning that any of the risk factors contributes to increase of arterial blood pressure or the likelihood of developing hypertension. Particularly, prevalence of arterial hypertension is higher in same age male and female groups who practice physical inactivity, abuse of alcohol or daily use of tobacco as opposed to those without mentioned risk factors.

Being overweight increases the likelihood of developing arterial hypertension particularly in 30-50 males, followed by gradual decrease of the impact. This difference was not detected in female age groups. Being overweight in women has even impact in all age groups.

Study of risk factor prevalence shows that one or two risk factors are available in more than half of studied women, whereas three and more risk factors are detected in one-third of men.

Thus, the study of age on risk factors witnesses that it has an impact on the prevalence of arterial hypertension and being overweight.

Population health

Morbidity trends

To study population health the total dynamics of registered incidences at PHC settings was studied on national and marz levels covering the period of 2007-2012.

According to the summarized data, an increase of the rate of first time diagnosed disease by 32% was recorded between 2007 and 2012. However the increase differs year to-year. If the rate has increased 10% in 2008 versus 2007 and in 2009 versus 2008, in 2010 and in 2011 no increase was recorded compared with the preceding years. Anyway, the general morbidity rate has increased 12% between 2011 and 2012.

What can be concluded from this general morbidity snapshot? If taken into consideration that the impact of global economic crisis on Armenia economy and economic situation of the population became evident from 2009, whereas during 2001-2008 Armenia had recorded both good economic growth and inflowing private transfers, it can be concluded that during 2007-2009 and 2011-2012 improvement of economic situation of Armenia population was among factors contributing to the increase of first time diagnosed diseases.

Armenia recorded tremendous increase of primary care service utilization by population between 2007 and 2009 which however does not mean actual increase of the incidence rate.

This statement does not exclude certain increase of the incidence rate among the population, which in its turn is due to better utilization, hence increase of registered diseases. Besides, it may be assumed that the increase of PHC utilization was the result of improved financial and/or physical access of outpatient services or changes in health behavior of the population.

Study of the utilization of services provided by PHC settings and private health facilities revealed a tremendous increase of primary care service utilization by population during 2007- 2009 and 2011-2012, which however is not due to actual increase of incidence among the population. It may be assumed that the increase of PHC utilization resulted from improved financial and/or physical access of outpatient services or changes in health behavior of the population.

In 2012 utilization level of private primary care clinics comprised significant share (around 25%) of the total PHC utilization rate. Hence the lack of data on population seeking care at private PHC clinics essentially distorts the real morbidity picture as regards both total morbidity and certain disease groups. Hence the studies of factors used for assessment of changing disease levels, which are based on registered statistical data on diseases may misrepresent the real picture. This requires collection of statistical data from private outpatient clinics as well. The number of patients seeking care at private

clinics is relatively high in Yerevan. It twice exceeds the rate in other urban settings (6.5%), and the latter in its turn is twice as high the rate in rural areas (3.6%).

The more well off the household the higher is the likelihood of utilizing services provided by private care facilities.

Utilization of private clinic services is comparatively high among 40-59 age groups, managerial staff of various organizations and well paid specialists.

Mortality trends

A total of 27,599 deaths were registered in Armenia in 2012 (912.64 per 1000 population) of which 48.3% due to blood circulatory system diseases. The six most common causes of death did not change over 2009-2012 (Table 37) and include blood circulatory system diseases sharing almost half of all deaths (48.3% in 2012), malignancies (20.4%), respiratory system diseases (5.8%), digestive system diseases (5.8%), injuries and poisonings (4.9%) and endocrine system diseases (4.8%). In fact the mortality burden due to NCD comprised around 80%.

Comparison of total mortality rates translated into the following trends. In 2011 the highest total mortality rates were recorded in Lori (10.3), Tavoush (10.0) and Shirak (9.9) marzes. Analysis of morbidity indicators suggest that morbidity rate was also high in Shirak (27.99) and Lori (28.17) marzes thus contributing to general high mortality figures.

Total mortality rate in all marzes showed rapid increase tendency between 2000 and 2011, except for Syunik and Vayots Dzor marzes, where an increased of relevant figures was detected until 2009, followed by slight decline during 2010-2011.

1. EQUITY IN FINANCING AND FINANCIAL PROTECTION

This part reflects on health financing developments and covers data collected from 2011 to issuance of this Report (November 2013). Data on public financing of health sector are based on actual figures of 2012 public budget, 2013 approved budget and 2014 draft budget. Special attention was paid to introduction of co-payment, regulation of paid services and government activities during 2012 and 2013 and analysis of the outcomes. In addition, the report reflects on emergence of health insurance in the country, particularly results of the first year activities within the social package and future developments.

Fiscal context of Armenia health system performance in 2012-2013

The Government Program 2008-2012 approved by the Republic of Armenia Government Decree 380-A of 28 April 2008 reads, '*Medium-term health sector financing will become the first priority for Government spending. increase of public expenditure in the sector will be on the Government agenda and it is planned to ensure a level of expenditure equal to at least 2.2 percent of the GDP in 2012*'.

Nonetheless, the global economic downturn that started after the approval of the Program essentially affected both the country economy and the Government programs. During 2010-2013 the share of health expenditures in GDP was smaller than in the crisis year of 2009 ranging within 1.5-1.6 %. The draft budget 2014 envisages raising the figure to 1.7 % (Table 1).

This situation and challenges are reflected also in the Republic of Armenia's Strategic Development Program (ASDP) developed in 2013 according to which '*public health expenditures during 2009-2011 were significantly lower compared with medium-term targets of the same period. This was primarily due to reduction of budget resources following financial and economic crises and significant narrowing of the total budget frame*'.

Comparison with international data shows that the public health expenditures–GDP ratio in Armenia is significantly behind not only EU countries where it makes 5.5% in average (excluding health insurance), but also the average CIS rates (4.8%)¹.

Table 1. Public health expenditures, 2011-2025

Indicator	2011	2012	2013 (approved budget)	2014 (draft budget)	2017	2021	2025
					According to ASDP		
Aggregated budget health expenditures (AMD billion.)	63.5	64.8	72.2	81.0	131.9	241.6	434.6
As percent of total aggregated budget expenditures	6.3	6.2	6.1	6.5	7.5	8.7	10.1
As percent of GDP	1.7	1.6	1.6	1.7	2.0	2.4	2.9

Source: APDSP 2013-2025

¹ Online WHO database 2010

Data on actual public budget allocations to health during 2011-2012 as well as funds earmarked in draft budget 2013-2014 are presented in below Table 1, which also demonstrates the 2025 target set by ASDP 2013-2025.

As the Table shows the share of health in aggregated budget was AMD 63.5 bln in 2011, 64.8 bln in 2012, 72,2 billion drams is approved for 2013 and 81.0 billion envisaged for 2014. The aggregated budget indicators include budget expenditures of the Ministry of Health and some other agencies. Percent-wise health funding shared 6.3 % of total budget expenditures in 2011, 6.2 % in 2012, 6.1 %, in 2013 and 6.5 % according to draft budget of 2014. Thus, it can be stated that public health financing during 2011-2014 as share of total public expenditures did not undergo any essential changes. Table 2 shows breakdown of public budget allocations to health according to main service groups.

Table 2. The ratio of main health expenditure groups envisaged by RA public budget as percent of total budget expenditures (%)

Type of service	2011	2012	2013 (approved budget)	2014 (draft budget)
Outpatient services	33	33	33	33
Inpatient services	42	42	38	43
Loan and grant programs	6	8	16	12
Other programs	19	17	13	12

Source: SHA MoH, 2013

As the table shows the ratio of inpatient and outpatient services was intact during 2011-2012, whereas in 2013 the share of inpatient services has relatively decreased, which is primarily due to increased loan and grant program funding. The share of inpatient services is planned to reach 43% according to draft budget 2014. The reason is that a total of 12% increase of health financing in 2014 is envisaged compared with the preceding year, and 11% increase for outpatient services, whereas for inpatient services an around 27% increase is planned. The increase of financing of outpatient services, like in the previous year is explained with the increase of salaries planned from 1st July 2014 (both minimal salaries and mean estimated salaries of healthcare workers). As for inpatient services, this is coupled with two additional factors stemming from the social policy of the Government. First is the expansion of the list of population groups entitled to free care to include beneficiaries with 30 and higher scores (versus current threshold of 36) in the family allowance system. As a result around 270 thousand new beneficiaries will be entitled to free inpatient care in 2014. For that purpose the draft budget 2014 provides for additional over 3 billion drams. Besides, nearly AMD 2,6 billion from social package of 2013 budget will be allocated in the 2014 health budget and directed at financing healthcare services delivered to military servants and their families (for details see the section on health insurance).

One of the important indicators of health financing in Armenia continues being the high ratio of out-of-pocket spendings in the total health costs. In the context of Armenia direct costs of population comprise basic part of private spendings, coupled with low level of health insurance revenues.

According to WHO estimates out-of-pocket expenditures shared 59.5% of total health expenditures in 2010 and 64.2% in 2011. At that, direct population costs during the said period made up 92.7% and 89.4% of private spendings correspondingly. These indicators continue being alarming in terms of financial fairness and financial protection of the population particularly the vulnerable groups.

The Government Program 2012-2017 approved by the Republic of Armenia Government Decree 730-A of 18 June 2012 does not define clear-cut targets for health financing. Instead the ASDP includes indicators which the Government will strive to achieve during the coming years. It is planned to increase public health spendings to 2% of GDP by 2017 and around 3% by 2025. To achieve these targets it is planned to ensure annual 0.1-0.2 percentage point increase of public expenditures-GDP ratio, which will result in increase of actual public expenditures as opposed to 2011 by 1.7 times in 2017 and nearly 4.2 times by 2025. During the projected period healthcare will stay a priority of public expenditures and the allocations to health will increase more rapidly than total expenditures of aggregated budget. As a result it is expected that the share of public health expenditures in total expenditures of the aggregated budget will make 7.5 % in 2017 and 10.1 % in 2025 versus actual 6.3 % recorded in 2011.²

Costs of medical assistance and services and control of shadow

One of the challenges of health financing that needs addressing are the costs of medical aid. Low prices not reflecting the real costs of care continue to be used for compensation for a number of services by the Ministry of Health within the framework of state order. These prices are based on the old principle of 'total means envisaged by public budget divided into expected number of cases'. In other words the prices do not reflect the cost of service delivery and fail ensuring adequate quality of care. In addition, the system of paid services is not regulated. Often different facilities charge essentially different prices for the same service thus confusing patients and making final prices of services unpredictable, which in its turn negatively reflects on access to care. The Government tried to partially regulate the field by creating a multidisciplinary commission in charge of regulation of prices of essential services and drugs included in social package health insurance (Government Decree N1692-N of 27 December 2012). The commission adopted the orientation price list of medical services to serve a basis for insurance companies when signing contracts with medical organizations and paying compensation to insured persons for delivered care. The study of prices approved by the multidisciplinary commission suggest a need of revision and amendments particularly inclusion of the costs of non-surgical (therapeutic) interventions.

Shadow fiscal flows in health sector continue being a topical challenge for Armenia. Despite the efforts of the Ministry of Health during the last years targeted at regulation of paid services and monitoring of health facility revenues, the practice of unofficial payments by patients is still not eliminated.

² Republic of Armenia's Strategic Development Program 2013-2025 (final revised draft, 6 August, 2013), §§403-404

Below Table 3 summarizes data from monthly reports submitted between 2011 and 2012 by around 450 health facilities providing services under state order, according to marzes. The data present indicators for paid services by health facilities, revenues from co-payments, compensations paid by insurance companies, as well as other paid services (including rent of premises, paramedical services, etc.).

Table 3. Volumes of paid services provided by health facilities performing state order according to marzes, 2011-2012

Marz		2011 (AMD mln)	2012	
			(AMD mln)	growth
TOTAL	including	19080.4	24933.5	31%
YEREVAN		16681.8	22275.0	34%
MARZES	including	2398.6	2658.5	11%
ARARAT		273.1	297.9	9%
SHIRAK		390.9	421.3	8%
KOTAYK		331.5	336.9	2%
LORI		538.4	583.7	8%
VAYOTS DZOR		45.2	47.1	4%
SYUNIK		143.1	185.8	30%
TAVOUSH		109.6	114.8	5%
ARMAVIR		269.0	316.9	18%
GEGHARKUNIK		177.9	200.6	13%
ARAGATSOTN		119.9	153.5	28%

Source: SHA MoH, 2013

As the data show the total volume of paid healthcare services in 2012 was nearly 25 billion drams, which exceeds the preceding year by 31 %. Growth was recorded in both Yerevan and all marzes of Armenia. Yerevan city health facilities demonstrated 34 % growth as opposed to the preceding year thus exceeding the average national level. This should be explained by the fact that inpatient facilities providing paid narrow specialized services (tertiary level) are mostly concentrated in the capital and charge higher prices. These services include cardiovascular surgery, ophthalmology, oncology, microsurgery, etc. In addition, the table speaks of the differences in social status of Yerevan and marz residents. Most solvent population groups reside in the capital. As for marz indicators main factors influencing the situation include the number of marz population, availability of renovated and re-equipped health facilities, as well as narrow specialized services, which are unevenly distributed across marzes.

SHA data on revenues from paid services provided during 2013 suggest that the high growth rate of revenue collection recorded in the previous year will be maintained during 2013 as well. Moreover,

according to prognosis in 2013 for the first time the total amount of paid healthcare services (primarily rendered in hospital sector) will exceed public financing of inpatient care.

This growth of paid services is directly impacted by the MoH co-payment expansion policy implemented during 2012-2013 as a tool to combat shadow in health system. In addition to previous budget programs envisaging co-payment (emergency care and gynecological services), in 2012 co-payment was introduced also in oncology and STI control programs. In 2013 the Ministry expanded also the list of medical organizations piloting co-payment.

Analysis of implementation of the co-payment system lead to the following conclusions.

- a. Expansion of co-payment programs helps essentially reducing shadow turnovers in healthcare system, but cannot ensure full eradication of unofficial payments.
- b. Increase of paid services due to co-payments should be contributed not only to the increase of revenues from co-payments (the share of which does not exceed 5% in the total volume of paid services), but mainly to the increase of prices of rendered paid services.
- c. Implementation of co-payment not always guaranteed expected results. Particularly introduction of co-payment in STI control program did not make any essential improvement in legalization of unofficial revenues. Same applies to non-surgical interventions of oncologic diseases (chemotherapy and radiotherapy).
- d. According to the WHO study of 2012 implementation of co-payments creates certain obstacles as regards access to healthcare services for socially vulnerable and insolvent population groups, since it leads to general price increase and mechanisms for exemption from co-payment are not always based on actual insecurity of the patient.³

Health insurance developments and challenges

Armenia does not have a mandatory health insurance system. Voluntary insurance programs cover as little as 1-1.5 % of the population. A number of activities were initiated by the Government since 2012. The RA Government, acting as an employer, ensured health insurance of its employees, within the framework of the social package, thus attempting to set certain rules of the game. It should be noted that the Government Program 2012-2017 approved by the Republic of Armenia Government Decree 730-A of 18 June 2012 as well as the Government Program 2013 approved by the Republic of Armenia Government Decree 515-A of 16 May 2013 include provisions stating that the Government will

³ "An evaluation of the impact of introducing patient co-payments on access to health services, financial protection, and levels of unofficial payments in Armenia", WHO report, Yerevan, 2012.

strive to implement new health financing mechanisms and approaches, and that health insurance institute will be gradually implemented for some disease types and socially vulnerable groups. In this regard results of the first year of implementation of the social package should be discussed firstly (this new public program was introduced from 1st January 2012 pursuant Government Decrees 1917-N and 1923-N issued 27 December 2011). The social package was designed to enable around 120 thousand public employees (regardless of position and salary size) and their families equally utilizing a number of social services.

According to the 'Report on Summary Results of Social Package 2012' (Report) implementation of the social package enabled nearly 110 thousand public employees enjoying services envisaged by the package. Given that the social package could be utilized also by families of public employees, the actual amount of services exceeds the said 110 000 beneficiaries (more than 150.000 persons). The budget of the social package for 2012 was AMD 132 thousand annually. In addition AMD 18 billion was earmarked in the public budget 2012 to facilitate utilization of the social package services, from which nearly 13 billion (12.165 billion drams) was spent. Main part of this amount (10.1 billion or 83 %) was spent on health insurance, 970.3 mln (8 %) on tuition, 957.7 mln (around 8 %) recreation and 77.4 mln (or less than 1%) on redemption of mortgage loan.

Health insurance service was a compulsory provision of the 2012 social package, except for cases when the employee is already utilizing a similar service. It is noteworthy that within the social package majority of employees preferred spending not only 52 thousand dram on health insurance to acquire mandatory health insurance but also the remaining 80 thousand or part of it for additional health insurance packages for themselves or their families. Insurance was carried by seven private companies.

Analysis of data presented in the Report helps highlighting a number of problems of health insurance revealed within the framework of the social package. The total amount of insurance compensations paid under health insurance was 3962.1 mln drams (or nearly 40% of total insurance fees), meaning that 60% of targeted public budget funds stayed with the said private insurance companies. Even if assumed that some 10-15 % of this money was spent to cover their operational costs, profitability of this type of activity is still quite high. This should make Government think about effective spending of public funds. Two reasons are seen behind this situation, i.e. definitions and exceptions set in the base health insurance part of the social package that were used in 2012, as well as the per capita annual insurance fee set for the base package (52.000 drams). According to the definition of base package approved by the Government exception of insurance compensation included all volumes of medical aid and assistance which the insured person could receive within the scope of state order. Thus, significant part of the healthcare volume needed by the insured person was left outside insuring companies' responsibilities. Actually the volumes of state-guaranteed healthcare services for the entire population cover a rather wide scope of services including outpatient care in full, childbirth, under-7 child care, treatment of a number of social diseases, emergency care, etc. In fact, all these services were considered an exception from insurance standpoint, in other words were not subject to compensation to insured persons within the social package. Besides, socially vulnerable and special population groups, who according to the acting regulations are entitled to nearly all types of healthcare (in addition to aforementioned ones), also had to use health insurance under the social

package if they were considered eligible for the social package. For these persons insurance companies in fact could reject almost all cases of insurance compensations, since they could utilize most of healthcare services free of charge under the state order.

The listed issues were partially addressed by the Government Decree 1691-N of 27 December 2012, which approved the order of issuance of 2013 social package and the content of services under it. According to this decree socially vulnerable persons were given an opportunity to choose between health insurance services and spending the entire amount of the social package on other purposes (utilizing health services within the framework of state order).

Within the base health insurance package type of healthcare services subject to compensation by insurance companies were clearly set out, their scope was expanded and the list of exceptions not entitled to compensation was revised.

The next step towards regulation of the health insurance system implemented under the social package was adoption of Government Decree 210-N of 28 February 2013, which defined that health insurance services are withdrawn from the social package for military servants and those equal to them, as well as rescue service employees who are beneficiaries of the social package and are transferred to the Ministry of Health to implement healthcare programs for the said categories.

This decision was aimed at ensuring more effective and targeted spending of public money, taking into consideration the fact that the share of insurance compensations to military servants and their families was significantly smaller than the average indicator of the social package. This is explained by various guarantees of free healthcare that the state has set for military servants and their families defined by the Law and Government decrees. According to the Law on Social Security of Military Servants and Their Families military servants are entitled to free healthcare services at departmental medical organizations (military polyclinics, hospitals), and if necessary also civil medical organizations if provision of adequate care is impossible at the departmental setting. In fact, the social package was an additional guarantee of needed healthcare for this population group, while the latter had limited opportunities for their utilization, because of the said reasons. By allocating the funds to the MoH and defining the order of medical care and assistance to military servants and their families (Government Decree 806-N of 25 July 2013) the Government not only improved effectiveness of public expenditures but also expanded the scope of beneficiaries of free healthcare services (military servants insured under social package were coupled with different categories of persons equaled to military servants and their families).

Also it should be noted that adoption of this program can be viewed as a pilot for various mechanisms for implementation of mandatory health insurance in Armenia, taking into consideration that MoH intends to fund health insurance of military servants and their families based on same prices and mechanisms that are applied by insurance companies.

According to MoH 2013-2014 activity programs, the Government will discuss the concept of implementation of Mandatory Health Insurance (MHI) in Armenia in 2014. If adopted this will be followed by development of a relevant draft law and a package of by-laws. It is important to realize that successful implementation of MHI requires a number of pre-conditions including an automated unified information system for registration of insured persons and compensations. To ensure smooth

transition to a MHI system nation-wide public awareness and community participation activities are needed in order to reduce possible financial risks and facilitate enrollment of different beneficiary groups with the MHI system.

Facts and policy recommendations

Situation	Policy recommendations
<p>Despite the annual increase of public allocations to health, this grows nonetheless yields to inflation rate and the allocated funds are not sufficient to fully cover the basic benefit package (BBP). Healthcare expenditures as % of gross domestic product (GDP) and part of public budget expenses also continue remaining modest, due to which the population has to hold the main burden of total health expenditures.</p>	<p>Essentially increase public health financing striving to bring them close to indicators of other CIS and EE countries with compatible to Armenia socioeconomic development in medium-term (3-5 years).</p> <p>Improve effectiveness and transparency of health spendings, ensuring public access to detailed information on implemented programs, and introducing measurable indicators for health providers' performance assessment.</p>
<p>Shadow financial flows in healthcare system continue being a problem in Armenia. This first of all affects access to health for socially vulnerable groups.</p>	<p>Gradually transit to unified prices of healthcare services, including revision of prices applied under state order, if necessary revising also the scope of BBP services. In addition, develop and enforce strict sanctions for prevention and elimination of unofficial payments, which will envisage also withholding state order at facilities with high rate of unofficial payments or cancellation of the medical license.</p>
<p>Current health insurance mechanisms within the social package (through private insurance companies) do not contribute to effective public spendings. Armenia does not practice mandatory health insurance.</p>	<p>Revise the order of organization of health insurance under the social package transferring these functions to the MoH.</p> <p>Take practical steps to ensure health insurance of persons employed in formal economy, also planning for state support mechanisms for other population groups (including socially vulnerable) to facilitate their enrollment with insurance system.</p>

2. MATERNAL AND CHILD HEALTH CARE

OBSTETRICAL AND GYNECOLOGICAL CARE

Improvement of women's reproductive health and protection of their rights

Recent years saw remarkable improvements in the sphere of women's reproductive health owing to adoption and enforcement of a number of public targeted and strategic papers.

Protocols, laws, regulations and guidelines on reproductive health and rights to reproductive health were developed, including the 'National Reproductive Health Program 2007-2015, the Strategy and Timetable'; the 'National Maternal and Child Health Strategy 2003-2015', the scope of tests for pregnant women in her early gestation periods (prior to 12 weeks of gestation), the Law on HIV Prevention, the induced abortion procedure, the WHO strategies on promoting effective perinatal (PN) and antenatal care (AC); emotional, psychological and physical preparedness of pregnant women to the childbirth, etc.

The procedure of reporting maternal deaths and conduct of professional analysis was adopted following the order of the Minister of Health. Emergency obstetrical and gynecological (ob-gyn) care is provided in four marzes of Armenia. The country has adopted the UNFPA strategy on improvement of reproductive health of young people, women and men, the program and action plan, the 2000-2005 and 2006 National Programs on Improvement of Reproductive Health of Adolescents. Main principles of organization and implementation of off-hospital and outpatient ob-gyn care and clinical guidelines on inpatient obstetrical and neonatology care were adopted. The order of hospital referral of pregnant women and medical indications and conditions for ante- and postnatal referrals according to medical organization and their admission were reapproved. In collaboration with international and non-governmental organizations a number of refreshment trainings were conducted for specialists of mostly rural areas. These efforts are in line with international requirements and standards and reflect developments within the country.

However not all regulations are fully applicable in terms of feasibility and adaption. Despite the yearly increase of financing of the annual targeted programs on state-guaranteed free PN and AN care and services, including childbirth and emergency care, a number of studies witness that the achievements gained after introduction of SMHV are not maintained. Instead they tend to diminish.

A total of eight maternity schools were opened and equipped in marzes to ensure equal /universal access to quality PN care for all pregnant women. The number of women's counseling centers in Armenia exceeds 100. Despite ongoing efforts aimed at improvement of AN care and the increased rate of early AN enrollment of pregnant women, international experts found a lot of work to be done to improve the quality of care.

One of the positive trends is the declining average maternity mortality rate. The average three-year (1999-2001) rate was 43.2/100000, followed by continuing drop. It reached 12,9/100000 in 2010-2012. The maternal mortality rate dropped particularly during the three years following introduction of

the State Maternal Health Voucher/Certificate Program (SMHV) in July 2008 (36.3 in 2008, 29.1 in 2009, 6.7 in 2010 and 9.2 in 2011).

In terms of global trends the revised target for 2015 in accordance with the Millennium Development Goals (MDG) is 11.6 /100.000, which can be qualified as probable achievable, provided that the current progress trends are maintained.

Problems with human resources

Recent assessments of healthcare system revealed extremely uneven distribution of healthcare workforce. Yerevan is overstaffed with specialists whereas regions have significant unmet demands. The ratio of physicians per 1000 population in Yerevan city is 86 versus 17.7 in marzes. Currently there are 259 vacant job places for doctors in marzes. There is lack in narrow specialists even in renovated medical facilities. Most demanded specialties in marzes include anesthesiologists, pediatricians, cardiologists, neurologists, emergency care doctors and obstetricians-gynecologists.

Currently, according to the WHO European Health for All Database 2009 the ob-gyn bed occupancy rate of Armenia is in line with the average European level.

Assessment of ob-gyn services should first of all dwell on a number of issues related to professional staffing, available capacities and the quality of delivered services. These are human resources, equipments, laboratory and diagnostic capacities, physical and financial access.

Staffing is good in urban areas and quite poor in rural ones. Lack of ob-gyn specialists, especially those authorized to perform surgical interventions is a rampant problem in a many regional maternities. The number of neonatologists employed in inpatient maternities went down. Some regional health facilities do not have anesthesiologists and resuscitation specialists. In addition just a few ob-gyns were seconded to work in regions during the last years.

Table 4. Vacancies of treating and operating obstetricians–gynecologists and neonatologists across marzes (as of 8 January 2013)

Marz	Specialty		
	Ob-gyn	Ob-gyn (operating)	Neonatologist
Armavir			
Ararat	2	1	
Aragatsotn		2	
Gegharkunik	3		
Kotayk			2
Lori	2	2	2
Shirak	2	1	2
Vayots Dzor			
Tavoush	1	1	
Syunik	4	2	1

Source: MoH, 2013

Table 4 shows the demand for ob-gyns (especially operating ones) and neonatologists in regions. Data are taken from information on health workforce vacancies published by MoH.

In marzes with no figures, there is probably either no vacancy so far or these positions are included in general pediatrician staff vacancies, or the demand was not considered at all. The reason behind may be simply underassessment of needs, because during some surveys and also according to the estimations of the Armenian Association of Neonatologists 73% of the country's maternities do not have neonatologists.

Yerevan maternities are in relatively better shape as regards availability of neonatologists. In regions the gap is usually bridged by pediatricians of inpatient and outpatient settings and in some places the function is assigned to family physicians.

The quality of obstetrical and gynecological services

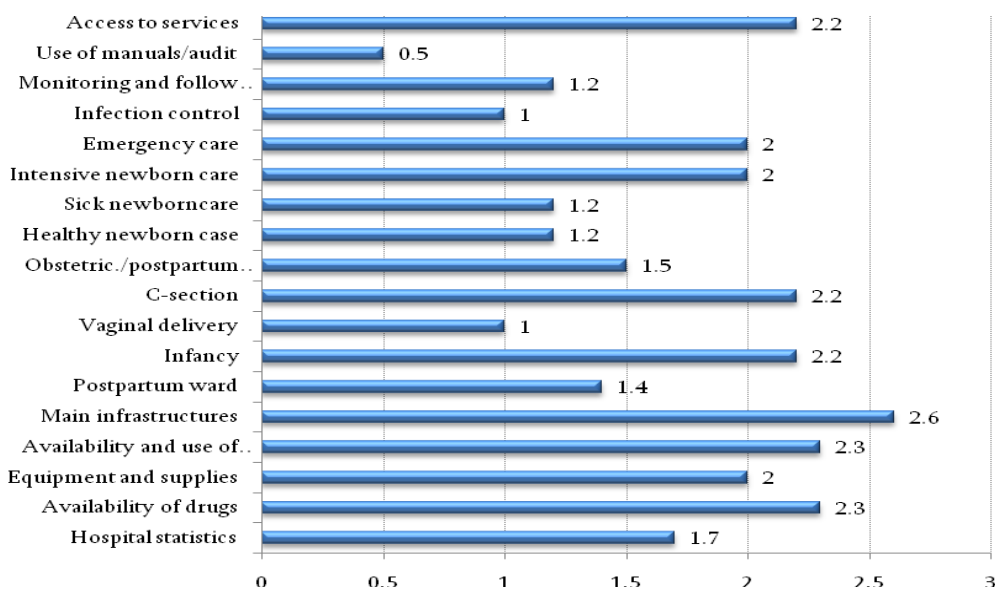
During the past years major overhaul and renovation of Yerevan and marz hospitals and maternities was carried with financial support of international organizations, the World Bank, and All-Armenian Fund, which enabled exercising open enrollment principle even with the Maternal Voucher at hand (until 1st May 2013 when the Decree 89-A of the Minister of Health 'On approving the order of referral of inpatient maternity services and the medical indications and conditions for antenatal and postnatal referral and admission of pregnant women according to levels of medical organizations' was enforced) and delivering their babies not only in Yerevan with better conditions and quality services, but also at marz maternities. Modernization of most marz hospitals made them no inferior to many Yerevan maternities. However equipping and renovating health facilities does not fully solve the problem of quality services.

On the other hand, addressing fragments of problems or only the staffing issue will not eliminate the problem of quality services because proper practices and standards to guide specialists are equally important.

The above-said is confirmed by the findings of the joint assessment of the quality of antenatal and post-partum care for mothers and newborn babies at hospitals conducted in four marzes jointly with the MoH, UNDP, UNICEF and World Vision Armenia (WVA) in September 2012 (Figure 1). The assessment was based on WHO methodology and conducted by local and WHO international experts. It revealed a number of system problems assessed against 12 practices defined as standards for maternal and child care.

The above table summarized opinions of different specialists showing general assessment of 12 basic practices, where 3 means good or standard care, 2 = suboptimal, needing for some improvement to reach standard care, 1 = need for substantial improvement to reach standard care and 0 = totally inadequate care and/or harmful practice with severe hazards to the health of mothers and/or newborns. Care at the infancy ICU was assessed at tertiary maternities only.

Figure 1. Data/results on assessment of the quality of maternal and newborn services at 4 maternities of Armenia conducted according to WHO methodology



Source: MCICQA, 2012

Problems revealed within the framework of this survey stem from both poor monitoring of the system and inadequate performance and awareness of local managerial and professional staff.

In particular, fundamental issues such as proper application of evidence-based guidelines, nosocomial infection control/prevention, human resource management and development of counseling skills of healthcare workers, as well as availability of patient-friendly services are far below the satisfactory level.

Antenatal and treatment-related problems are related to warm chain (from delivery room to postpartum ward). Participation of mothers in care of sick and low birthweight newborns is rather passive. In some places drugs withdrawn from circulation (contradicting evidence-based medicine) are still in place and there is no optimal use of antibiotics.

In most cases newborn care monitoring sheets are not populated with sufficient details and no laboratory micro-test tools are used.

Hand washing and other sanitary and hygiene functions aimed at infection control and general management are inadequately enforced. The number of patients in intensive care units (ICU) outnumbers the statutory number of paramedical staff. As a result some key practices such as the use of Vitamin K for prevention and treatment of vitamin-K-dependent hemorrhagic disease in infants is missing.

The problem should be addressed through bridging legislative gaps and ensuring proper communication and enforcement of adopted decrees and ministerial orders.

Assessment of the Quality of Antenatal and Postpartum Care for Mothers and Newborn Babies at Primary Health Care (PHC) level, conducted in November 2012 based on another WHO tool in collaboration with the above-mentioned organizations shed light on a number of problems related to the quality of the care.

The survey was implemented in seven PHC facilities of Shirak and Lori marzes and the city of Yerevan, covering ambulatories, maternal and child health centers and policlinics. Mothers and parents were questioned in addition to on-the-spot observations.

Women and families trust the primary health care centres and the staff but noticed that 'the environment (buildings, manipulation and procedures rooms) in which their are working, needs to be improved. Visits revealed that there are sites without continuous running water supply and many with inappropriate sanitation and there is lack of places for hand washing within facilities.

According to the 2010 Armenia Demographic and Health Survey (ADHS) (published in 2012) 99% of women receive AN care by qualified personnel, 80% of women made their first antenatal visit within the first trimester and 93% made 4 and more AN visits. The survey suggested that a lot of quality-related issues are still rampant.

In particular, with few exceptions, where management guidelines were in place, in most facilities there were no local protocols / algorithms for emergency obstetric care: eclampsia, anaphylactic shock, bleeding, early abortion risks and etc. So this leads to hypermedicalization, hyper diagnosis at everyday work and practices.

According to the 2012 Annual Yearbook published by the National Statistical Service (NSS) the past two years saw an increase of the number of newborns with congenital defects per 1000 live births. The rate increased from 12.9 to 15.6. In often cases congenital defects/anomalies such as the Down Syndrome, some cardiovascular defects, diaphragmatic rapture and some attritions of gastrointestinal system are detected after the baby is born whereas AN screenings enable detecting them on early stages. These obstacles are translated into waste of the precious time during which the personnel could prevent the problem or timely detect and safe the infant's life. Early detection of defects and combating related infant mortality is especially critical.

Inadequate quality of AN care was highlighted by 2010 ADHS, according to which iron-containing drugs included in the list of essential AN care interventions are prescribed and used by only 29% of patients. In addition, only 57% of women are aware of gestation risk signs and only 67% of women have undergone HIV testing. Analysis of inquiries and observations witness that most of pregnant women make at least six visits to ob-gyns or family doctors, however they do not receive counseling on nutrition and care of the future baby, postpartum care, use of contraceptives and other issues. Antenatal and maternity schools are either missing or underperforming (they are available mostly in facilities where international organizations used to implement or are currently implementing programs).

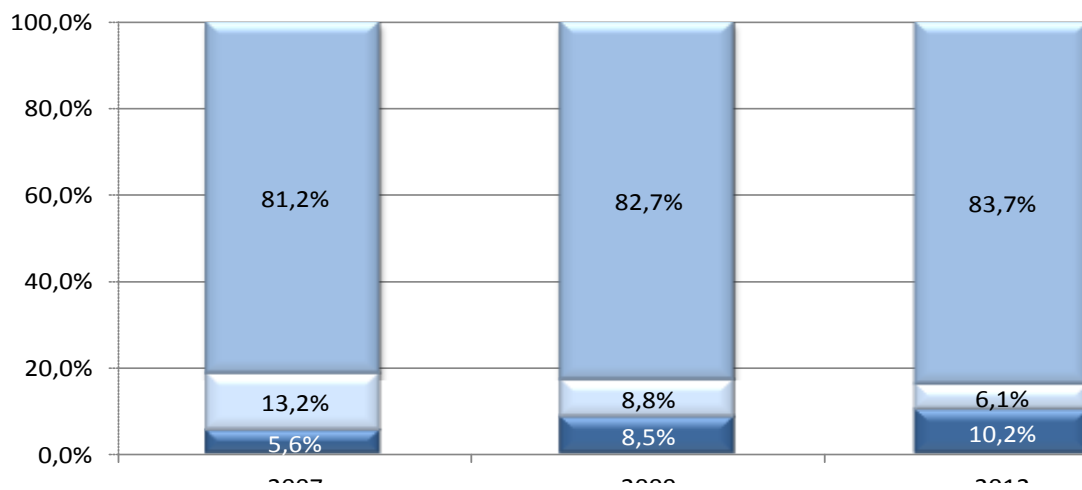
A number of qualitative surveys based on WHO tool as well as the ADHS 2010 also revealed poor counseling on women's reproductive health and prevention of various diseases by outpatient services.

Pap smears. HSPA

The WHO recommendation for Pap smears is that women age 30–60 should have at least one Pap smear every three years. The rate in Armenia has improved between 2007 and 2012 by climbing from 5.6% to 10.2% (Figure 2), but is still below the required levels.

Payment for Pap smear exam was made by 59.4% of surveyed women of 30-60 years of age, no payment was reported by 40.6% and 0.9% could not answer the question.

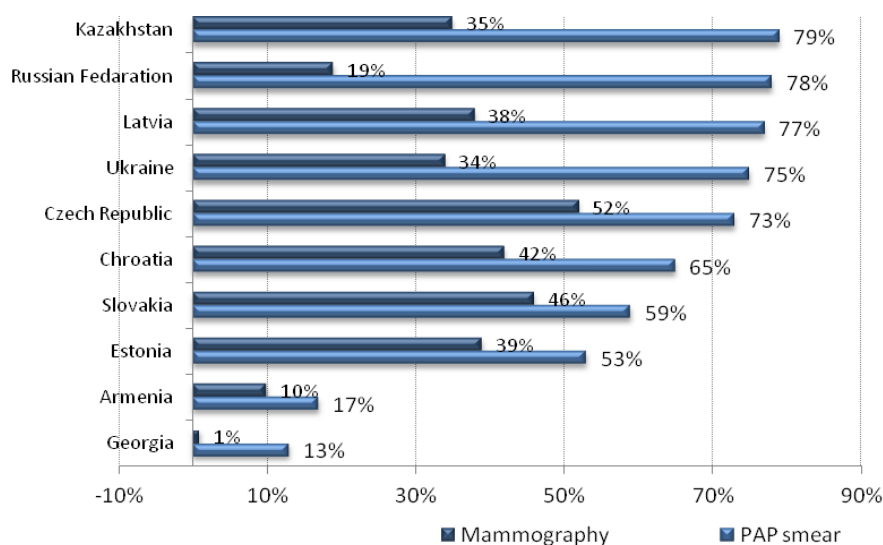
Figure 2. Percentage of age 30-60 women who have had Pap smears, 2007, 2009 and 2012



Source: HSPA, 2012

Selected international comparisons for mammography and Pap smear examination rates (although somewhat outdated) show that despite the improved situation in 2012 there is a need of expanding the coverage of these screenings (Figure 3).

Figure 3. Percentage of women who have had Pap smears and mammography, selected countries and country groups, 2000-2006

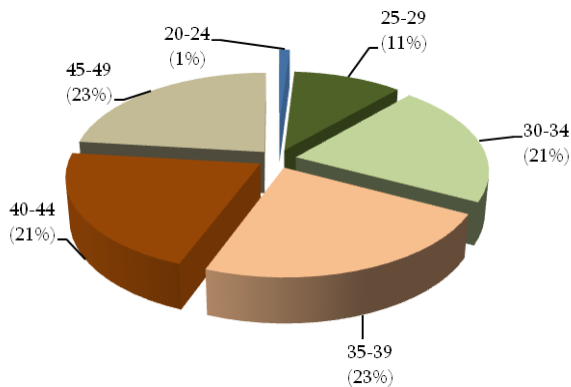


Source: WHO, 2008

Pap smears. ADHS

Armenia Demographic and Health Survey revealed that 78% of women of 15-49 age are not aware of breast self-examination methods and only 3% of women had performed breast self-examination during the 3 months preceding the survey. Moreover, 85% did not have breast examination by a medical specialist and only 10% had the examination using palpation method (Figure 4).

Figure 4. Percentage of women age 20-49 who reported having had Pap smear examination



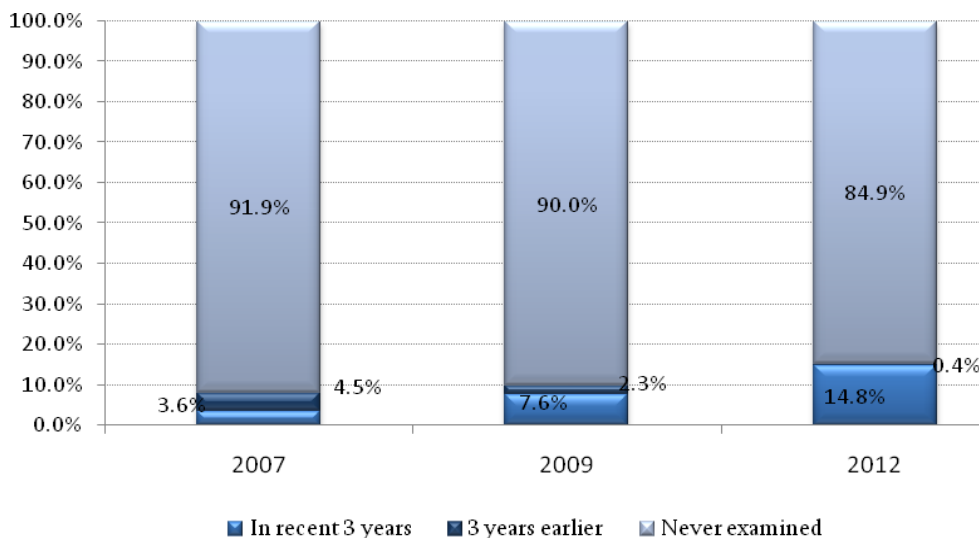
Source: ADHS, 2010

Mammographic screenings

For early detection of breast cancer in women WHO recommends that women of 30-60 years of age have mammography screenings every three years.

The proportion of Armenian women age 30-60 who have had mammography screening during the past three years has increased from 3.6% to 14.8% (Figure 5), though still well below the WHO recommended levels. However the progress in the rates for mammography screenings did not lead to improvement of early detection of breast cancer.

Figure 5. Women of 30-60 years of age who had mammography screenings

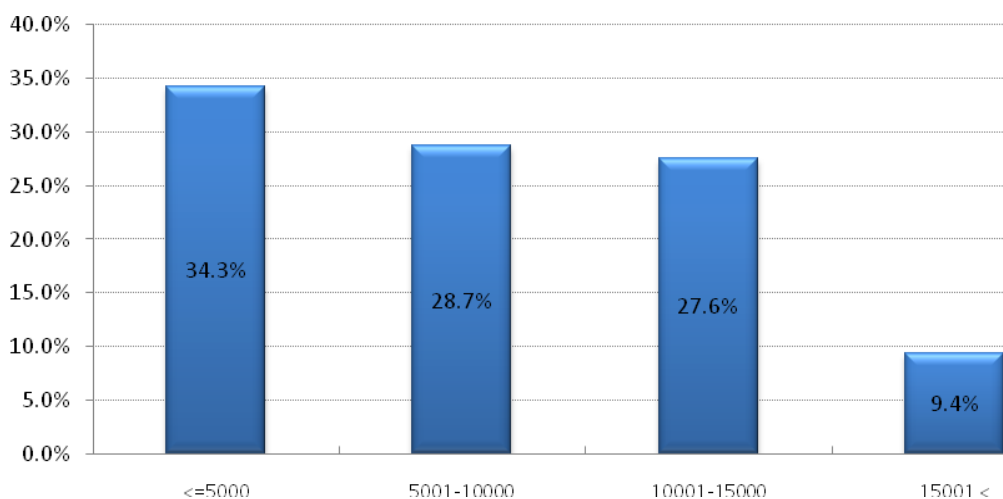


Source: HSPA, 2012

A number of factors keep Armenia from reaching the WHO required rates of mammography screenings. Among the reasons may be first of all limited capacities to perform mammography screenings on the one hand and their high costs for Armenia on the other hand.

The HSPA 2012 revealed that 77.6% of women who have had mammography screening have paid for the examination, 17.8% did not pay, and 4.6% found it difficult to answer the question. The breakdown of payments for mammography screenings is presented in Figure 6.

Figure 6. Payments for mammography screenings



Source: HSPA, 2012

Since the survey-detected number of cases is limited, a reliable assessment of below actual obstacles hampering increase of screening rates seems impossible.

- Technical limitations of mammography screenings (many patients vs. few providers),
- Financially not affordable,
- Physically inaccessible (far location),
- Poor access to information.

According to DHS the share of pregnancies ended with abortion has declined over the past years. Thus if in 2000 the rate was 55%, in 2005 it dropped to 45% and in 2010 went down to 29%. The accumulative abortion rate in 2010 was 0.8, which is significantly below the rates recorded in 2005 (1.8) and 2000 (2.6). This decline is visible in all age groups, but under-registration of abortions and improvement of the registration process continue being an urgent issue requiring ongoing efforts.

According to the survey in 2010 the rate of use of modern contraceptives among married women has climbed up reaching 27%, in particular due to more use of condoms versus 2000 (7%) and 2005 (8%). In 2010 this rate comprised 15%.

An important achievement is awareness on contraceptives. Despite certain improvements, access to some modern contraceptives (e.g. over-the-counter sales of cytotec) and their wide use without medical indication remains a serious problem.

The use of this drug for induced abortion without monitoring by a health professional and meeting defined norms, may lead to bleeding and other complications. The quantity and prevalence of use of this freely available drug is difficult to control, hence it may lead to unpredictable consequences and complications.

Though financing of inpatient settings (maternity, pediatric hospital) was improved during the past years, PHC level continued facing same unfavorable situation over the last five to six years, which affected the quality of primary care services. To address the problem additional financing mechanisms are needed.

One of key indicators of maternal and child health is the fertility rate. According to AHDS 2010 it was 1.5, and according to the national statistics 1.7. Despite the efforts of the Government to increase state family allowances for third and every next child (from 2014 the allowance for third child will be 1 million drams, for fifth and next child 1.5 million) demographic prognosis suggest unavoidable decline of natality due to nearly double reduction of natality in the 90s which led to reduction of the number of mothers-to-be (from 2010 on).

Given this situation, as well as the UNFPA analytical report on conformity of the 2012 State Budget with the Armenia Strategy on Demographic Policy, there is an acute need of pronatalistic programs to boost birthrate in the country. Provision of free care alone cannot guarantee solution of this problem.

Despite the overall maternal mortality decline trend in the country during the recent years, nonetheless implementation of MDG 5 by the UNDP is considered not achievable because of restriction of available resources.

The maternal mortality rate dropped during the 3 years following implementation of maternity vouchers in Armenia in 2008 (36.3 in 2008, 29.1 in 2009, 6.7 in 2010, 9.2 in 2011). According to preliminary data provided by MoH maternal mortality ratio in 2012 was 23.3 per 100000 population and 18.9 per 100000 population according to data published by NSS. Double decline of mortality was recorded between 2010 and 2012 (17 cases versus with 34 cases in 2008-2010) comprising 12.9 per 100000 population.

Over the past years extragenital diseases comprised main cause of mortality. A remarkable achievement was the drastic improvement of maternity accessibility and affordability after implementation of the SMHV program in 1st July 2008, leading to elimination of maternal deaths due to hemorrhage. This in its turn, contributed to reduction of neglected or complicated cases and related maternal mortality. Hence this systemic change had clear-cut positive impact, which however needs to be maintained carefully.

Current achievements create favorable conditions for the achievement of MDG5. However there are a number of problems which if not addressed may lead to unrecoverable and unsolvable problems.

After introduction of SMHV, taking into consideration that different prices were set for vaginal birth and cesarean sections in favor of the latter, an increase of the number of C-sections was recorded. This situation increased the public expenditure burden on the one hand and was not coupled with perinatal and neonatal mortality decrease on the other hand. In many cases C-sections is considered an unjustified surgical intervention.

The Table below shows trends of C-sections between 2008 and 2012. Given that the number of births during this period did not change much, the ratio of Cesarean sections went up by 53% expressed in absolute figures and if viewed %-wise it increased from 15% in 2008 to 22% in 2012.

Table 5. Trends of deliveries through Cesarean section, 2008-2012

Year	Total births attended	Through C-section	
		Absolute figures	Out of 1000 births
2008	41462	6234	150.8
2009	44554	7882	176.9
2010	44739	8439	188.6
2011	43301	9385	216.7
2012	42709	9558	223.8

Source: NHIAC, 2013

Financing of obstetrical and gynecological services

More than 3.5 times increase of financing of maternity programs was recorded during the past five years (6.48 billion drams in 2013 versus 1.99 billion drams under maternity program of 2006) (Table 6).

Table 6. Financing of ob-gyn services according to years

Year	Ob-gyn services		Maternity (thousand drams)	Inpatient gynecological care (thousand drams)
	Off-hospital gynecological care	Off-hospital antenatal and postnatal monitoring		
2008	350078.9		4093095.7	348856.3
2009	216796.5	141146.9	5872552.6	362009.4
2010	635610.0	42675.5	5974182.9	345889.8
2011	722939.3	519490.1	6558598.9	355273.4
2012	733921.7	499790.6	6412990.7	364482.6
2013*			6510059.0	366923.9

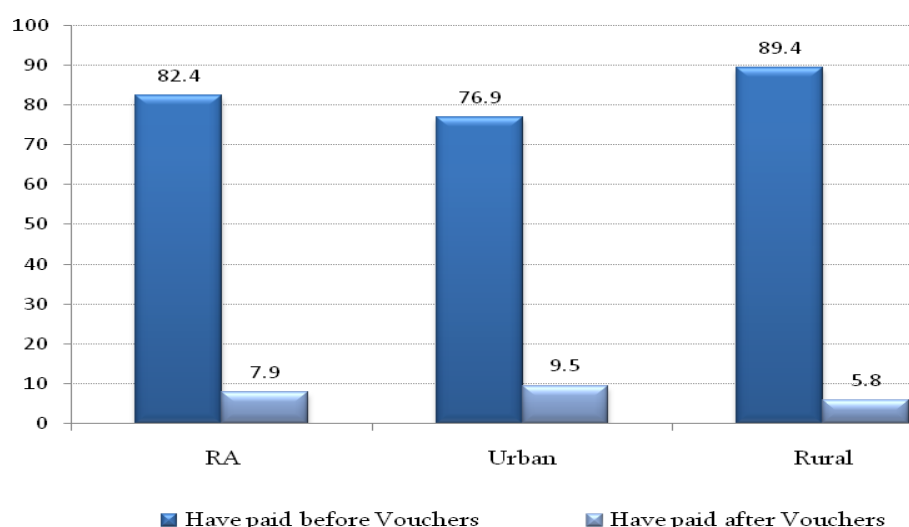
Source: SHA MoH, 2013

Financial access to maternity care is witnessed by surveys conducted within the framework of ADHS 2010, according to which general awareness of free maternity care in the country increased from 7.9% prior to introduction of SMHV in 2008 to 82% after the voucher system was implemented.

Household surveys conducted in 2009 by NOVA with financial support of USAID revealed drastic decline of unofficial payments for obstetrical services (from 91% to 21.5%).

The 2010 ADHS shows sharp differences among payers before introduction of the vouchers (prior to 1st July 2008) and after (2010).

Figure 7. Financial access before and after introduction of SMHV (paid for child birth, %)



Source: ADHS, 2010

In addition to the aforementioned surveys qualitative assessments were conducted through regular visits to health facilities and inquiries/questionnaires defined by the MCH department of the MoH. The visits were made by MoH specialists and NGO representatives, who also have confirmed the predominantly free-of-charge nature of maternity services.

Nonetheless, according to the ‘Quality of Life Index’ survey conducted by the IPSC - Institute for political and sociological consulting, financial access to all health facilities, except for rural ambulatories /health posts, has decreased between 2011 and 2012 (Table 7).

Table 7. Financial access to healthcare facilities

Type of facility	Financial access, 2011	Financial access, 2012	2012- 2011 difference
Health post /ambulatory only in rural areas	65.8%	69.3%	- 3.5%
Policlinic	63.2%	58.3%	- 4.9%
Dental clinic	39.4%	36.4%	- 3%
Private medical center	25.1%	20%	- 5.1%
Diagnostic center	27.4%	18.6%	- 8.8%
Hospital	29.2%	24.7%	- 4.5%
Maternity	64.2%	45.8%	18.4%

Source: QLI, 2012

Findings of the survey suggest a particularly big decline in financial access to maternities: in 2011 64.2% and in 2012 45.8% of respondents reported maternities to be affordable (18.4% decline).

According to the survey 79% of respondents while realizing the need of seeking care, nevertheless refrained from doing so due to restricted financial resources. Despite recent years efforts of the

Government to reduce illegal payments (co-payments, maternal and child voucher), 2-4 fold increase of the salaries in some facilities (according to SHA data), radical changes are seen in the first post-reform 6 months or the first years, followed by gradual increase of the waive of complains and grievances. In fact complains were expressed by not only beneficiaries, but also health workers, because there has been nearly no revision of wages. Coupled with multi-year inflations this brought to many negative consequences.

To ensure even development of marzes and promote inpatient services in regions, 10 thousand drams was topped up to per delivery (with no complications) cost thus bringing close to prices set at Yerevan maternities. At the same time there was an instruction to spend this money mostly on increasing salaries. This activity alone ensured an inflow of additional 115 million drams to regional maternities. Meanwhile ongoing increase of financing and development of a sound monitoring system are still in the agenda.

Facts and policy recommendations

Situation	Policy recommendations
Staffing in urban areas is high, while staying insufficient in rural ones. There is a lack of narrow specialists.	Amendments to the legal framework are needed to staff health facilities with relevant workforce.
Lack of case management guidelines (particularly algorithms for eclampsia, bleeding, management of early abortion risks, etc.), as well as improper use of adopted guidelines.	Develop and adopt case management guidelines and implement awareness and education programs among health care workers
Early detection of defects/abnormalities and reduction of related infant mortality	Expand the scope of performed screenings and implement new screening programs if possible.
Inadequate quality of antenatal care (underperformed or missing at all)	Promote establishment of antenatal and maternity schools, build AN care capacities of PHC settings and upgrade their knowledge and skills
Inadequate counseling of women on reproductive health and contraceptives by outpatient services Free access to some modern contraceptives and use at home (self-referral).	Strengthen the PHC level and women’s counseling services at both maternities and outpatient settings in order to ensure quality antenatal and reproductive care services and to improve educational level of healthcare workers, their working conditions as well as public awareness.
No progress in PHC financing during the past 5-6 years	Revise remuneration of PHC providers and implement performance based financing mechanisms.
Implementation of new financial mechanisms to boost even development of marzes and improve inpatient services at regional level	Conduct ongoing monitoring for customized approach to maternity issues and increase of public financing.

3. CHILD HEALTHCARE

Analysis of child healthcare policy

Recent years saw significant improvement in child healthcare owing to adoption and implementation of a number of state targeted and strategic papers.

Among them was introduction of the State Child Health Certificate program (CHC) which enabled improving access to and quality of inpatient services through compensation of inpatient costs and nearly doubling the salaries of healthcare workers.

Another positive spin-off of the CHC was reduction of illegal payments which finally led to the decline of infant/child mortality hospital rate (improvement of service quality and access) and general under-5 mortality.

Among system achievements is implementation of programs on early detection of diseases and congenital defects (screenings). It should be noted that all initiatives and system changes resulted in drop of under5 child mortality from 13.4‰ in 2010 to 12.1‰ in 2012.

Good progress was recorded in newborn mortality registration and improvement of recording of births and perinatal deaths.

Recent years saw legislative amendments in this field as well. The Government adopted the 'National Child and Adolescent Health and Development Program 2009–2013' and the 'National Strategy on Improvement of Child Hospital Care 2013-2015'. The draft law on 'Breastfeeding Promotion and Circulation of Formulas' has passed two parliamentary hearings. The Government draft decree on 'Approving the 2013-2015 Strategy of Improvement of Child Nutrition and the Action Plan' and Health Minister's draft decree 'On Defining Hygiene Requirements, Sanitary Rules and Norms Pertaining to Organization of Meals at Preschools and Secondary Educational Establishments' were elaborated. The Draft Law on Wheat Flour Fortification and the Technical Regulations on fortification with micronutrients were prepared in collaboration with international experts (UNICEF).

Around thirty graduates of Yerevan State Medical University (YSMU) were entitled to free education within the framework of state order from 2011 enrolled with pediatrics and neonatology clinical residency. However this is not an ongoing process and cannot fully cover the current sharp lack of pediatricians.

The Program on Improvement of Marz Child Resuscitation Services was developed and put into circulation. The program is included in the list of priorities of the Government. Pediatric resuscitation units of three health facilities were furnished with infant and emergency care equipments.

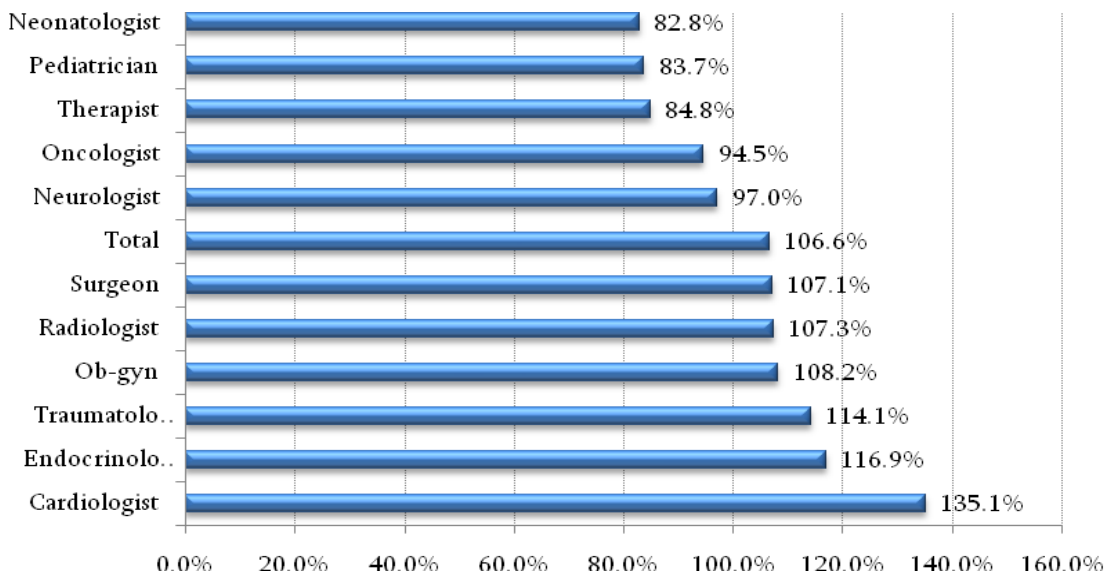
Seven regional health facilities of the country were renovated, mix-type (adults and children) resuscitation units furnished with modern equipment were opened, three interregional pediatric resuscitation units were established and equipped with necessary hardware.

The listed documents and action plans are in line with requirements of international frameworks affiliated by Armenia and fully reflect development of current pediatric services. However often there are no sufficient capacities and resources to enforce adopted documents.

Problem of human resources

Pediatric workforce has undergone significant changes during the past two decades. From mid 90s graduates of pediatric department of medical universities failed to continue their carrier as pediatricians due to the changes introduced in health system. The situation worsened with closure of the YSMU pediatric department and requalification of PHC pediatricians into family physicians. As a result the number of pediatricians employed in the system went down especially in regional facilities (total number of pediatricians shrank 1.4 times in Yerevan and 2.4 in regions). The reduction of practicing pediatricians applied mostly to hospital pediatricians (3.1 times in Yerevan and 4.7 times in regions). Figure 8 presents analysis of 2011 showing the trend of reducing number of pediatricians and neonatologists compared with the situation in 2001.

Figure 8. Changes of proportions of physicians in hospitals of Armenia between 2001 and 2006

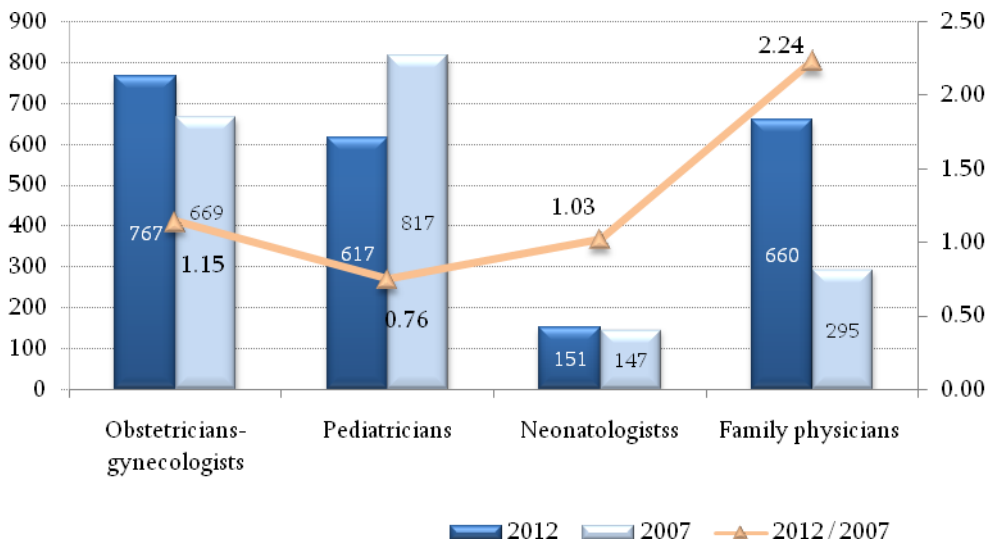


Source: NHIAC, 2012

As Figure 9 suggests the proportion of obstetricians- gynecologists and family physicians increased, that of pediatricians dropped between 2007 and 2012. The proportion of neonatologists did not change.

Reduction of the number of pediatricians was coupled with aging of the workforce. The 2011 survey conducted by WVA and Child and Adolescent Health Institute of Arabkir Medical Complex revealed that as of 2010 around half (46%) of hospital pediatricians in marzes are above-50 years of age.

Figure 9. Supply of population with physicians according to main specialties, 2012 vs. 2007 changes



Source: NHIAC, 2013

The analysis suggests that in ten years the number of pediatricians in regions of Armenia will be cut by two, especially given the recent years practice of education and training of pediatricians. During the past three years most of future pediatricians and neonatologists enrolled with free clinical residency (25 people as of today) are not eager to go to regions and continue their carrier in marz specialized hospitals. Table 8 shows vacancies of neonatologists.

Today there are vacancies of family doctors as well, which means that children and future mothers of some areas /districts will partially fail to properly exercise their right to health promotion and strengthening, including prevention, treatment and follow up of potential diseases.

Table 8 presents the most recent MoH analysis of vacant job positions of pediatricians and family physicians.

Table 8. Vacancies of pediatricians and family physicians according to marzes as of 8th January 2013

Marz	Specialty		
	Pediatrician	Family physician	Infant/child resuscitation specialist/ anesthesiologist
Armavir			
Ararat	2	1	
Aragatsotn			
Gegharkunik	1	2	
Kotayk	1	2	
Lori	7	6	2
Shirak	2	3	
Vayots Dzor			
Tavoush	1	1	
Syunik	2	2	4

Source: MoH, 2013

Like with assessment of workforce employed in maternal/reproductive services, here also an underestimation, hence wrong insight of the real need of human resources is possible.

Along with that, in some marzes pediatric services need optimalization (optimal location of pediatric ICUs). In Vanadzor for example the pediatric resuscitation unit was closed due to lack of specialists. A number of marzes have reported on their need of pediatric surgeons, neurologists and ENT specialists. In general the problem of pediatric narrow specialists is not addressed and in most cases children needing those services have to be seen by providers working with adults, who cannot provide adequate quality services to child population.

In 2012 responsibility for postgraduate education of physicians was shifted to the Ministry of Education and Science. There is need of cooperation with the Ministry and defining pediatrics not only as postgraduate education, but also to include it in the MA course.

Continuing education of pediatricians is critical. Today, it is predominantly implemented by international organizations or local professional NGOs and other structures and cover nutrition, IMCI, newborn resuscitation, and other specific issues (e.g. Pediatric School initiated by Child and Adolescent Health Institute of Arabkir Medical Complex).

A number of manuals on key pediatric issues were developed and published including 'Vitamin D-resistant Rickets in Children' and 'Periodical Disease in Children', etc. These are very progressive efforts but do not ensure wide coverage of all key topics (on professional gaps), healthcare levels (primary, secondary and tertiary) and geography. There is a need of development, publication and communication of relevant professional educational materials.

As for professional upgrading, respondents have highlighted the problem of long-term paid refreshment courses, which are not affordable and difficult-to-access geographically given the availability of only one pediatrician serving the entire area. PHC physicians reported on last time attending educational courses on development of relevant health workforce and upgrading of professional knowledge and skills within the scope of family medicine trainings.

It is apparent that in big cities of Armenia the institute of family medicine is not in place and there is a need of revising the current outpatient service model with special emphasis on the role of pediatricians. The model is currently under revision. Taking into consideration the recent reduction of child mortality and the increase of the livebirth rate, the number of infants with low birth weight or other perinatal problems, there is a need of implementing more robust monitoring at the PHC level which cannot be done by family doctors alone.

It is noteworthy that today many European countries arrange outpatient pediatric services based on the so-called mix model where pediatric care is provided by both family doctors and pediatricians. This pattern has some age specifics. The overwhelming share (90%) of the total number of under-2 children in these countries is followed up by pediatricians. In Italy, for example 85% of children under the age of six are seen by pediatricians. Unlike this, according to the survey on maternal, newborn and child care infrastructures and human resources in Armenia conducted by WVA and Child and Adolescent Health Institute of Arabkir Medical Complex in 2011, former general practitioners (therapists) *'do not want to serve children, so some internal arrangements are made on referring infants and children of their catchment area to their ex-pediatrician colleagues'*.

Financing

The National Child and Adolescent Health and Development Strategy 2009-2013 envisaged for annual 11.6 billion drams public funding of outpatient and inpatient, which is not reflected in budget items. In addition, all said allocations were geared at reimbursement of costs related to health services, sanatorium treatment of disabled children, purchase of drugs and child health follow up, and no money was spent on healthcare workers' capacity building and monitoring of practices as well as encouraging use of evidence-based practices, promotion of breastfeeding and nutrition in general or funding of public health programs. This gap was filled by international organizations and donors, but after termination of their financing the continuity of these activities will suffer if the Government fails institutionalizing them.

Double increase (from AMD 3.4 bln in 2010 to AMD 6.59 bln in 2011) of budget funding of child hospital care program guaranteed implementation of the CHC system. Allocations continued after introduction of CHC however showing slower rates (6.74 bln in 2013 and 7.14 bln is planned for 2014).

Funding of child hospital care went up drastically. Currently financing of PHC pediatric services shares almost half of that earmarked for hospitals (Table 9).

Table 9. Financing of child healthcare services according to services, 2008-2012

Year	Child healthcare service	
	PHC	Hospital care
2008	AMD 771.491,4	2.969.253,6
2009	2.557.768,7	3.446.930,3
2010	2.482.507,9	3.434.146,5
2011	2.630.268,4	6.591.931,3
2012	2.666.308,4	6.648.226,6
2013*		6.774.870,5

Source: SHA MoH, 2013

The annual increase of financing of hospital services however fails matching improvement of below-discussed.

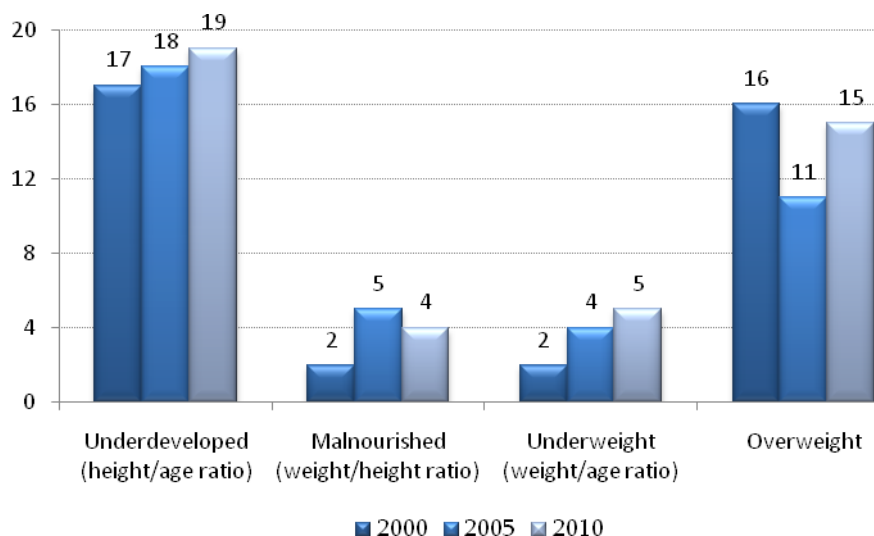
Quality of and access to child healthcare services

Over five years PHC settings of Armenia implement the Healthy Child Monitoring practice as part of their functions. A number of international and local organizations have assessed effectiveness of PHC monitoring, revealing underperformance and problems with child screenings, nutrition and development.

The nine screenings including assessment of the nutrition status, detection of vision, hearing, dislocations, cryptorchism, anemia and arterial hypertension, in often cases are not done in timely manner or at all. This omission leads to many negative consequences affecting the child's future health condition.

Continuing monitoring of child sponsorship program by WVA witnesses that often anthropometric screening of under-2 children is viewed as a formality and passed by. Child monitoring cards are not always completed and often do not correspond to the real nutrition state of the child. Though in some areas under-2 child growth assessment monitoring system was developed through the MIDAS system and piloted in 46 health facilities of Armenia, there is no clear and complete nation-wide insight of child nutrition (Decree 2100-A of the Minister of Health issued 26 October 2011) and only the ADHS enabled summarizing child nutrition data (see Figure 10).

Figure 10. Nutrition of under-5 children (%)



Source: ADHS, 2010

Armenia is getting close to countries with the worst indicators given the recorded 19% underweight under-5 children and the trend of increase of overweight children. Alarming is the almost steady figure for exclusive breastfeeding of under-6 infants (33% in 2005 and 35% in 2010).

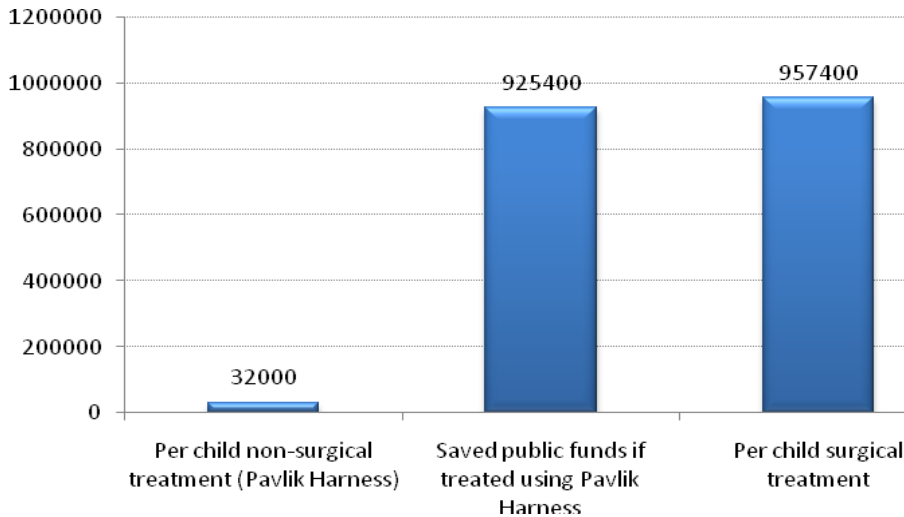
An indicator speaking of poor counseling and monitoring by PHC staff is the necessary supplementary nutrition received as little as 32% of 6-23 months of age. Of course one should not underestimate the role of parents and caregivers, particularly their knowledge, education and other social factors impacting the child nutrition and mortality rates. As revealed by UNICEF assessment both health workers and parents possess poor skills and knowledge of new nutrition approaches and practices.

Implementation of phenylketonuria and hypothyroid screenings are among key problems of infant screenings. From 2013 the screening is fully public funded and shows 100% coverage. Ultrasound screening of congenital dislocations is also not very common, though according to international practices this screening is proved to be extremely sensitive and fundamental.

Hip dislocation and immature joint was detected in 560 (6.7%) out of over 8400 children screened within the framework of Jinishian Memorial Foundation survey, which diagnosed 37 newborns with various dislocations.

Below table shows cost differences of early detection of congenital dislocation (“Pavlik Harness” method) and surgical treatment. The per case cost of inpatient surgical correction of the defect is 957,400 drams.

Figure 11. Comparison of congenital defect treatment costs (AMD)



The survey suggests that late detection of congenital dislocation leads to sharp increase of costs, hence Jinishian Memorial Foundation recommended increasing the number of retrained specialists (currently 23) by training physicians performing ultrasound screenings at all maternities and PHC settings of Armenia.

Another important screening program is the Infant Hearing Screening which is currently implemented in 10 maternities of the country. From October 2013 the program was expanded and with support of WVA covers additional 6 maternities of Lori, Tavoush, Syunik, Gegharkunik and Shirak marzes. Given the total number of maternities functioning in the country (64) tangible resources are required to purchase necessary equipment and train the staff.

An assessment by the AUA Center for Health Services Research and Development (CHSR) of the CHC program was conducted after six months of implementation of CHC in Armenia (August-October 2011). Key findings included reduction of unofficial payments (the rate dropped from 64% to 21% in Yerevan and from 47% to 9% in marzes). Average payments according to baseline data ranged from 18000 to 20000, reaching 64000 for transportation of children from regions. These unofficial payments dropped in six months to AMD 3600 and AMD 13000 correspondingly.

The survey showed increase of both family satisfaction and inpatient care utilization rates. But in many cases parents pass by the PHC level and self-refer to a hospital. Among reasons behind the increase of not medically indicated hospital referrals are:

- Remuneration of PHC personnel is based on the number of patients enrolled with the physician and not the ones treated.
- Remuneration of PHC personnel is smaller compared with payment of inpatient staff.
- PHC workers are not incentivized materially to increase their workload.

All these facts have gradually increased the workload of hospitals thus giving birth to grievances among PHC and inpatient specialists.

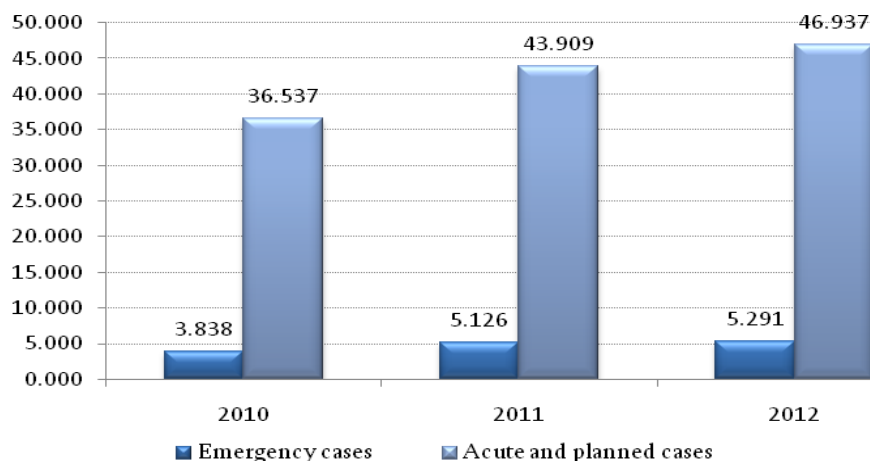
In June-October 2013 WVA, in collaboration with the Ministry of Health conducted an assessment of CHC results and the quality of outpatient and inpatient child care services, which enabled getting a better understanding of ways of improving satisfaction in service-users, the quality of rendered service as well as the challenges faced.

Within the scope of the survey a number of national indicators were collected and analyzed. The survey studied the quality of inpatient services at randomly selected settings, appropriateness of hospital referrals by PHC, the structure of at home deaths. Also interviews were conducted with inpatient and outpatient health workers, as well as with mothers/caregivers of children who received hospital care with the purpose to understand their perceptions and level of satisfaction.

Analysis of national statistical data by the expert group led to the following conclusions:

Inpatient care utilization changed drastically after implementation of CHC. In 2010 for example only 40375 children under 18 years of age received hospital care whereas after implementation of CHC the rate increased to 49035 and 52228 in 2011 and 2012 correspondingly. According to prognosis the hospital service utilization rate will exceed 60000 by late 2013 (Figure 12). During the first year of implementation of CHC system the number of children who received emergency care increased by 33.6%, whereas acute and planned admissions went up by 20.1%. During the second year of implementation the rates made up 3% and 7% correspondingly.

Figure 12. Hospitalization of under 18 children (planned and emergency)



Source: SHA MoH, 2013

Comparison of the increased rate of under-18 hospitalization (8.1%) in Armenia with that of same age group of Moscow area, Russian Federation (19%)⁴ shows that even against increased hospitalization the Armenian figure is far from similar Russian rate.

⁴ Age indicators of child population need of specialized inpatient care on the example of Moscow area, 1st December 2010, V. Semyonov, L. Rugol, Electronic academic periodical, Social aspects of population health'

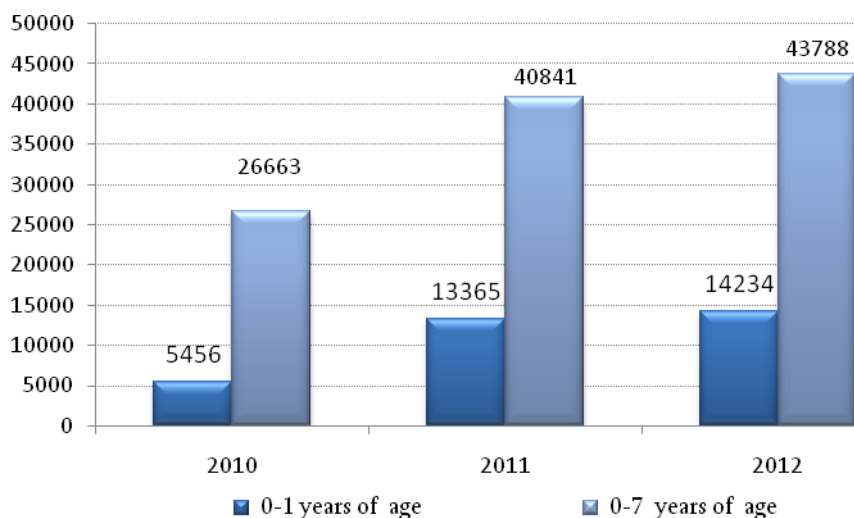
At the same time, the rate of child hospitalization in Armenia includes also those receiving paid and insured services. In US the child hospitalization ratio for 0-15 age group is 5%, in UK 6.4% with well-developed PHC level and institute of pediatricians.

According to NSS⁵ in 2011 the poverty and extreme poverty rates in under-5 age group were the highest compared with other age groups (45.3% and 4.4% correspondingly). Same publication suggests that households with 3 and more children of 0-5 age face two times higher risk of poverty (78%) as opposed to the average national level (35.0%) and households with less number of children (e.g. 1.8 times compared with households with one child and 1.6 times with households with two children).

Taking into consideration the aforementioned it can be stated that implementation of CHC revealed an unmet demand of under-7 hospitalization, which prior to that was not addressed because of low financial access.

The other argument is that during the first year of CHC implementation the hospitalization rate went up sharply for under-1 age group (around 3 times) which is due to unpredictable development of diseases in this age group. Figure 13 shows hospitalization rates according to age groups.

Figure 13. Child hospitalization rates according to age groups



Source: SHA MoH, 2013

The rate of hospitalization in marz hospitals went up in 2011 by 64.1%, followed by another 9.8%, whereas in Yerevan hospitals the rate was 46.6% and 5.3% correspondingly.

There was a two times increase of under-1 hospitalization in marzes, whereas in Yerevan the rate climbed up 18%. This big difference was unexpected because majority of neonatal services are located in Yerevan. Judging from the figures it could be assumed that some of the hospitalizations were not

⁵ Social snapshot and poverty in Armenia, 2012

justified (medically indicated). Yet it is obvious that under-1 age group is most vulnerable and dangerous, hence unjustified referrals may be assigned to extra caution by parents and health workers.

On the other hand, changing annual mortality rates, including those of perinatal mortality, suggest of the effectiveness of CHC. The under-1 child mortality rate which showed stable growth (438-500) between 2007 and 2011, climbed down in 2012 reaching 412. A decrease from 77 to 15 of perinatal mortality rate was recorded during the said period (81% reduction, Table 10).

Table 10. Under-1 hospital deaths, absolute figures

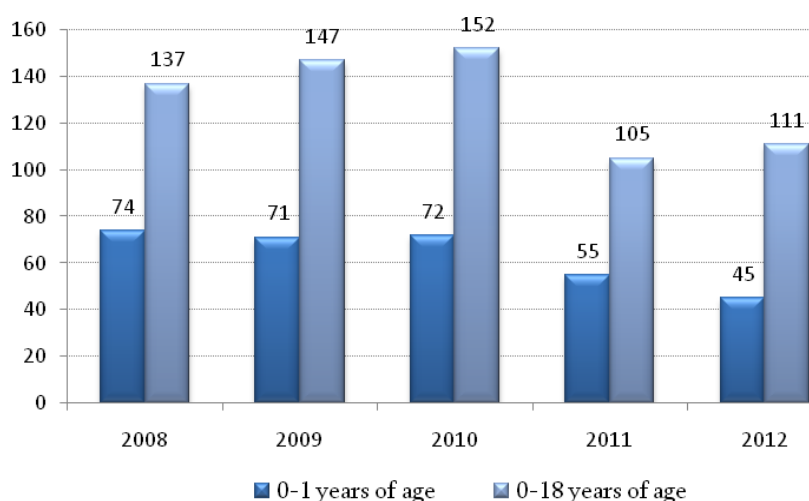
	Absolute figure of under 1 hospital deaths	Of which perionatal deaths
2007	438	110
2008	440	75
2009	462	71
2010	500	77
2011	464	47
2012	412	15

Source: NHIAC, 2013

This change in child hospital mortality rate once again confirms that improved access to care had direct impact on reduction of neglected cases which otherwise could become terminal.

The rate of death at home also showed decrease tendency since 2011 particularly in under-1 age group. Figure 14 presents those trends according to years before and after CHC introduction.

Figure 14. Trends of death at home according to 0-1 and 0-18 age groups

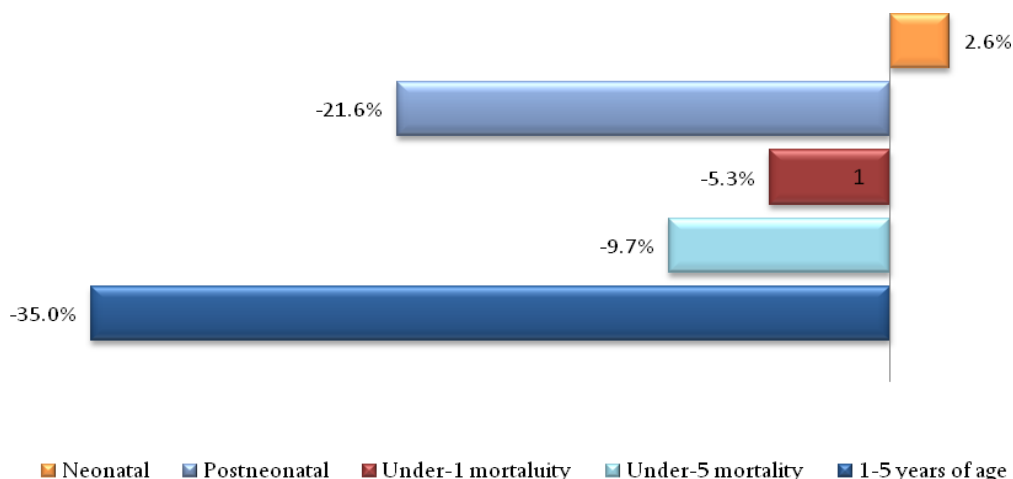


Source: NHIAC, 2012

Though a wide range of factors influence under-5 child mortality from environmental and social factors to quality of and access to healthcare, it cannot be clearly stated that all factors with exception

of access to services, have undergone essential changes between 2010 and 2012. During the past two years the infant and under-5 child mortality rates have improved particularly in CHC target age groups (postneonatal and 1-5 years old). This tendency is described in below figure.

Figure 15. Child mortality rate trends, 2012 versus 2010

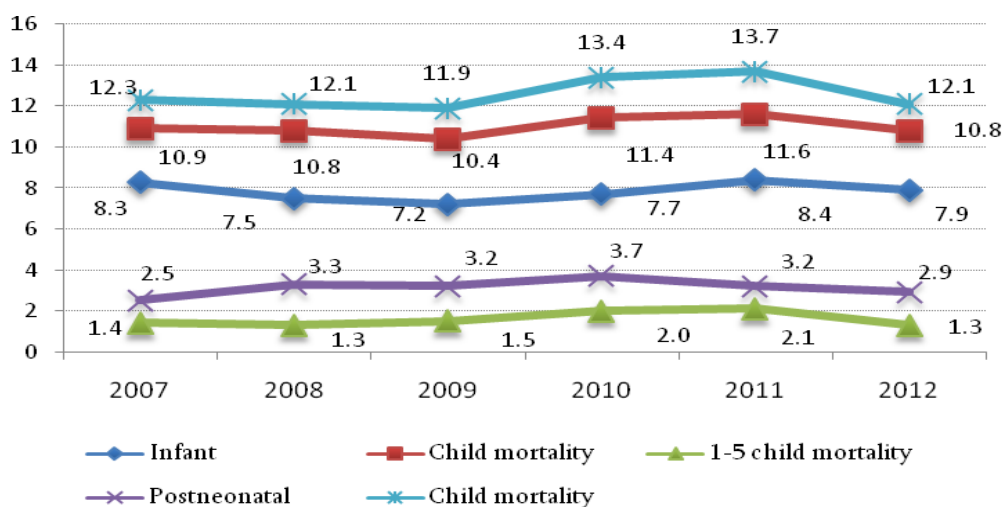


Source: NSS, 2013

Figure 16 gives a vivid picture of reduction of under-5 child mortality per 1000 live births from 13,4 to 12,1.

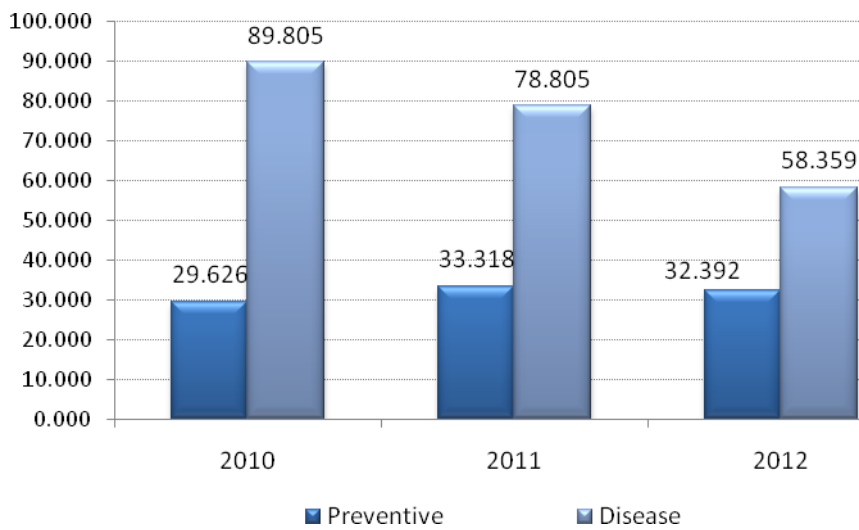
Analysis of some PHC- and inpatient- sensitive indicators suggests change of patient flows. After implementation of CHC most of cases previously visited at home by PHC providers or treated at PHC settings, started seeking care at hospitals, so PHC gradually yielded the case management function to the secondary level of care. This is confirmed by 50% reduction of PHC home visits.

Figure 16. Mortality trends in under-5 children



Source: NHIAC, 2013

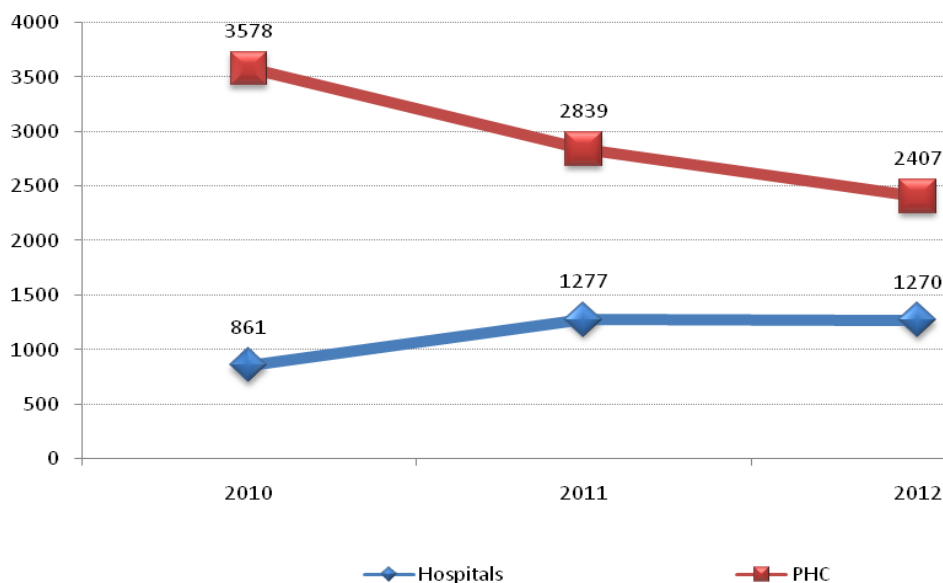
Figure 17. Home visits



Source: NHIAC, 2013

To assess appropriateness/validity of hospitalizations the number and trends of under-7 children treated for pneumonia at inpatient and outpatient facilities was studied. Twenty-one percent reduction of treated cases of pneumonia at PHC level during the first year and additional 15% reduction during the second year of implementation of CHC was detected, whereas in hospitals the rate went up by 48% in 2011 as opposed to the preceding year and stayed intact during 2012.

Figure 18. Breakdown of pneumonia cases in under-7 children managed at inpatient and outpatient health facilities (absolute figures)



Source: SHA, 2013

Visits to marz and Yerevan hospital under this survey during the same period revealed that great number of children under hospital treatment, in fact did not receive any targeted care at primary level, whereas earlier interventions could prevent disease complications and the further need of hospitalization.

If this process continues and mild and middle-severity cases are referred to hospitals, further worsening of already visible decline of qualification of PHC providers, deepening of the problem, less trust towards PHC level and unreasonable increase of hospital workload will become inevitable. The latter will deepen the break of parent-PHC-hospital connections, and will complicate relationships between levels of healthcare, to say nothing about negative financial and quality consequences.

The other problem revealed was failure to adequately perform case management practices approved by WHO IMCH program. In particular, not all facilities apply evidence-based algorithms, thus leading to frequent hyperdiagnosis, polypragmasy and redundant use of antibiotics. Hence, not only primary care, but also secondary and tertiary settings need to revise their practices.

Though hospitals in most cases are equipped with essential devices, machinery and drugs to manage paediatric cases, in some settings the personnel is not ready to properly use provided equipment. There are also cases of unreasonable prescription of infusion therapy, especially that often this treatment is based on empirical and approximate estimations.

Similar phenomena were detected during visits to PHC sites in regions and Yerevan, including unjustified diagnosis, redundant referrals for management of smallest and simple cases, which once again hint about inadequate quality of PHC services.

The survey assessed also the PHC performance by revealing cases speaking of incomplete assessment and monitoring of child health. Anemia, for example may be diagnosed, but counseling on therapy and nutrition not provided. Counseling on supplementary nutrition covers wide range and is not standardized, Vitamin D prescription periods vary (6 months, 1 year).

Some hospitals showed quite progressive practices, among them counseling on prevention of rachitis during treatment of all infants (prescription of Vitamin D).

Among problems revealed were:

- Not all cases imply hospitalization (allergies, urinary tract issues, etc).
- A referral document from the PHC setting is required after hospitalization of the patient (post factum) (often the catchment area doctor may refer the patient without examination).
- There is no reliable feedback between primary and secondary care settings.
- Hospital discharge epicrisis is not issued on discharge of the patient thus hampering proper follow up by the policlinic and free provision of drugs.
- Specialized centers not always give the patient management plan to the primary case setting.
- In case of not hospitalization of the patient, the reason for refusal is not indicated in the referral form.

Focus group discussions with inpatient and outpatient facility providers were conducted within the framework of the WVA survey to understand their perception of implemented reforms and identify problems with an attempt of ensuring better management.

According to other surveys on appropriateness of State Child Health Certificates, healthcare workers believe that implementation of the program is particularly beneficial for socially vulnerable groups, to some extent also for healthcare workers, for who this is a matter of dignity. The population, especially the needy groups has definitely benefited from this program. PHC providers noted that in sever cases there is no need of convincing the parent to take the child to the hospital and the hospital providers assured that admission of late or complicated cases have become quite rare during the past 3 years.

Healthcare workers expressed contradicting perceptions of the program. Remuneration-wise their expectations were not met because of the maximal salary threshold which is not influenced by the number of treated children and healthcare worker's workload. In terms of contacts with patients the situation has not improved either, since patients started demonstrating a clear commanding position (*'whoever steps in first of all shows the Certificate in a demanding tone'*):

Inpatient providers complained that PHC doctors do not possess full information and often make unnecessary referrals thus contributing to conflicts between hospital physicians and parents. In addition, they complained of poor knowledge of financing mechanisms, calculation of per case allocations, rationale of distribution, costing mechanisms, which makes them feel that their salaries are less than they expected.

Asked about public awareness healthcare workers reported that people know only their rights but have vague knowledge of details and often demand free delivery of officially paid services.

They also reported on some increase of their salaries in the beginning, which inspired them and was very positively perceived. However the salary went down again staying within certain limits regardless of the number of patients and the level of efforts. All hospital units have their maximal thresholds, which when exceeded the doctor is not paid for treated patients. This is a dangerous tendency and may lead to corruption.

Healthcare workers especially suffered because of the recent tax changes, since net payment of salaries went down and the workload increased. Salaries of nurses did not grow much (from AMD 65 thousand to 70 thousand), whereas the workload is extremely high, hence there is no incentive for good performance. Salaries of child resuscitation specialists are small despite their big workload and broad responsibilities.

Respondents talked about worsening doctor-patient relationships explaining it with most possibly the negative attitude kindled by mass media, *'Patients do not even thank the doctor. We see terrible anti-agitation campaign against physicians by mass media. Yet nobody speaks of unpaid work of physicians'*.

Also, respondents reported that now PHC physicians are not afraid of keeping serous cases in the catchment area and work with higher confidence. Inpatient physicians expressed an opinion that part of PHC doctors are not authorized to handle more serious cases, whereas others noticed that

outpatient providers are not financially motivated to treat certain diseases at home, because it implies additional workload and active visits.

Yerevan hospital providers complained of having to provide nearly 50-60 consultations per day. They also mentioned about weakening primary care level, lack of incentives, as well as inadequate skills to manage sick children.

In general, all providers were happy with availability of equipment and supplies at hospitals, but mentioned about some limitations as regards selection of drugs, which is due to tender-based purchase practices. According to them quite often poor quality drugs are procured, because the tender is won by companies bringing generic names and cheap drugs are given preference.

Facts and policy recommendations

Situation	Policy recommendations
Gradual reduction of pediatric specialists in the system.	Refreshment of pediatric staff, development of new human resources policies.
Inadequate continuing education of pediatricians.	Discussion of additional mechanisms.
No development of relevant professional publications and nationwide communication.	Develop and publish periodical professional materials and conduct awareness activities ensuring wide coverage.
Insufficient financing of primary care and lack of motivation. Absence of mass coverage and proper performance of screenings	Revise financing of primary care applying bonuses and other incentives. Ensure continuing education on child growth and development, nutrition, management of childhood illnesses, screenings, optimal use of drugs for both PHC and hospital providers. Implement new and expand the scope of currently performed screening programs.
Lack of satisfaction with remuneration of hospital healthcare workers	Revise the scope and financing mechanisms of inpatient services. Increase public financing.
Hospitals practice different treatment protocols. Professional associations are not actively involved.	Create new manuals and guidelines on management of various diseases. Increase the role of pediatric association. Organize annual conference on most common errors of inpatient and outpatient physicians. Organize pediatric schools. Ensure continuing education for nurses.

4. RISK FACTORS

Prevalence of risk factors contributing to development of noncommunicable diseases

Population morbidity and mortality rates reflect the population health status and are directly linked to various factors, including hereditary, gender, age (30%); lifestyle, including risk behavior factors such as substance abuse, physical inactivity, hypertension (40%), socioeconomic: wellbeing, education, stress (15%), environment (5%) and health system performance (10%).

Mid-20th century saw epidemiological revolution in population morbidity and mortality structure resulting in pandemic growth of noncommunicable diseases (NCD) outnumbering the communicable ones.

According to WHO most common noncommunicable diseases include circulatory system (cardiovascular) diseases (CVD), cancers, diabetes, injuries and poisonings, which kill more than 36 million people each year. NCD burden shares 87% of the general morbidity structure. Nearly 80% of NCD deaths (i.e. 20 million deaths per year) occur in low to middle – income countries.

CVDs account for the most NCD deaths ranging from 35% (15 developed countries European Region) to 65% (CIS countries) in various countries of the European region, followed by cancers (7-30%), chronic respiratory diseases (5-11%) and diabetes (2-3.3%).

According to WHO estimates deaths cause by NCD are projected to reach 41 million by 2015 if adequate prevention activities are not taken or fail. WHO studies suggest that the following three causes attribute to 151.4 million healthy years lost in the European Region: NCDs (77%), injuries and poisoning (14%) and communicable diseases (9%).

The structure of most common NCD deaths in Armenia is similar to that in the European Region. NCD deaths comprise nearly 80% of the general morbidity structure. CVDs are main killers (48%), followed by malignancies (19.8%), diabetes (4.9%) and injuries and poisoning (4.8%) [5]. Eight out of ten causes of death and disability adjusted life years (DALYs) among the population of Armenia are attributed to NCDs, including 4 CVDs (ischemic heart diseases, cerebrovascular diseases, arterial hypertension and other cardiac conditions), 3 cancers (trachea, bronchus/lungs, breast and stomach) and one endocrine system disease (diabetes).

It is noteworthy that scientific technical revolutions, urbanization, digital technologies, and huge growth of information flows from 1950 to present have largely contributed to drastic changes of population living conditions and lifestyle. Developments in science and technologies have fundamentally changed not only population lifestyle but also public health and quality of life indicators.

Taking into consideration global concerns around the problem of NCDs, the WHO, European and international professional associations and organizations of cardiologists, control of atherosclerosis, control of arterial hypertension, family medicine and behavioral medicine recognize prevention of CVDs, cancers and diabetes a priority healthcare target. Therefore many countries around the world have revised their NCD policies, concepts and focused on more aggressive implementation of prevention activities implying prevention and control of risk factors causing development of NCDs for the benefit of population health improvement and strengthening.

Data suggest that NCD development is associated with lifestyle specifics and related risk factors, as well as hereditary factors, that may accelerate development of the disease. Surveys conducted in Russia, for example revealed the following key factors contributing to premature mortality: arterial hypertension (35%), high cholesterol levels (23%), tobacco use (17.2%), poor consumption of vegetables and fruits (12.9%), being overweight (12.5%), abuse of alcohol (11.9%) and physical inactivity (9%) [6, 7]. A number of creditable international surveys evidence that the risk of cerebrovascular stroke can be prevented by controlling the said risk factors, in particular arterial hypertension.

Today a number of effective tools preventing NCDs effectively mitigate the risk of serious consequences and complications. In Finland 80% reduction of ischemic heart diseases between 1972 and 1992 was mostly due to control of risk factors. In Ireland nearly half (48.1%) of reduced ischemic heart diseases in persons of age 25 to 84 between 1985 and 2000 should also be attributed to reduction of risk factors.

There are evidences that activities targeting more than one risk factor at the same time may mitigate their impact may essentially reduce NCD mortality rates on population level. According to projections, in UK, for example reduction by 1% of blood cholesterol may lead to 2-4% reduction of deaths due to ischemic heart diseases, and 1% reduction of diastolic arterial pressure may prevent 1500 ischemic heart disease-related deaths per year.

Considering the importance of public awareness of the prevalence of risk factors and determinants, as well as their negative spin-off on human health, community education on healthy lifestyle can help preventing diseases, promoting and strengthening public health. Imposing additional tax on tobacco products or reduction of fat, sodium and sugar in ready food stuff are believed to be effective efforts minimizing the prevalence of risk factors.

The negative impact of risk factors on population health does not happen immediately but within relatively long time. Reduction of the prevalence of risk factors helps improving health indicators, particularly increasing life expectancy and reducing prevalence and mortality of noncommunicable diseases.

The aforementioned trends are fully relevant to Armenia as well, where upturn of NCDs remains a priority healthcare challenge requiring urgent regulation.

A number of expanded surveys on NCD risk factors and their prevalence were conducted by the National Institute of Health after academician S. Avdalbekyan (NIH) within the framework of HSPA with an aim to assess the prevalence of behavioral and biological risk factors in 15 and above population of Armenia, as well as their change trends and correlations.

This Chapter presents comparative analysis of key findings of HSPA surveys of 2007, 2009 and 2012.

Trends of prevalence of risk factors contributing to development of noncommunicable diseases

Survey methodology

The survey was based on stratified cluster self-weighted sampling method, which was representational for the entire country and Yerevan-urban-rural breakdown. The survey involved 1600 residents, of which 34% in Yerevan, 31.8% marz urban settlements and 34.2% in rural areas (maximal sampling error - $p=0,95$ level of confidence /LOC/).

The survey was supported by additional instrumental (arterial pressure (AP) measuring) and anthropometric (height, weight) examinations. Arterial oscillometry measuring of AP was done according to international guidelines (in total 4 measurements were made, 2 on each arm with 2-5 minutes intervals).

Risk factor prevalence was studied and analyzed according to demographic, wealth quintiles, education and residence. Wellbeing of respondents was assessed based on the household income and utilization /access to/ of health services. This survey method and the questionnaire was used in Armenia (2000, 2005 ADHS and 2007, 2009, 2012 HSPA) and other countries [12-15].

According to wellbeing groups the survey sample (households) was divided into wealth quintiles each comprising around 20% of respondents.

Distribution of respondents and households according to groups helped to reveal population risk groups per highest risk factor prevalence and observe risk factor correlations.

HSPA 2007, 2009 and 2012 surveys focused on a number of behavioral and biological risk factors in 15 and above population of Armenia. Particularly the following indicators were assessed:

1. Arterial hypertension
2. Daily use of tobacco
3. Being overweight
4. Physical inactivity
5. Abuse of alcohol

Presence of risk factors was defined based on below criteria and methodology.

- **Arterial hypertension.** When readings of two measurements of each arm show systolic level equal or exceeding 140 mmHg and/or diastolic equal or exceeding 90mmHg.
- **Daily use of tobacco.** Defined through simple question in the questionnaire.
- **Being overweight.** Was defined through anthropometric measurements of respondents /height and weight/ to calculate their body mass index (BMI) according to the formula: $BMI=W/H^2$ [kg/m²]. WHO has defined the following BMI categories: underweight, when $BMI \leq 18.5$ kg/m², normal weight, when BMI ranges from 18.5 to 25.0 kg/m², being overweight, when BMI varies between 25.0 and 30.0 kg/m² and obesity = $MBI \geq 30.0$ kg/m². In cases when reference is made to BMI classification, respondents with underweight and normal BMI are grouped in the category 'not overweight' and those overweight and obese are put under category 'overweight'.

- **Physical inactivity.** Was defined in those who engage in light physical activity less than 30 minutes continuously per week.
- **Abuse of alcohol.** Was defined as percentage of those who consume the daily equivalent of 20 g or more of pure alcohol, according to WHO methodology.

These surveys enabled observing and assessing the prevalence of risk factors and change of indicators over 2007, 2009 and 2012. The survey shed light on the following picture.

- Number of male who consume tobacco every day did not change much (similar rates for 2012 and 2007, though in 2012 it decreased 2.6% as opposed to 2009 and equaled 55.4%).
- Number of males who consume the daily equivalent of 20 g or more of pure alcohol increased between 2007 and 2009, but increased 4.0% in 2012 as opposed to 2009 (from 17.0% to 13.0%).
- Number of people abusing salt in their daily diet increased 8% over 2007 – 2012 reaching 20%
- Number of inactive people increased from 33.9% to 49.9%.
- Number of overweight population climbed up to 56.5% in 2012.
- Number of population with hypertension increased in 2012 reaching 36.8%.

The survey suggests that prevalence of behavioral and biological risk factors among Armenia population has increased between 2007 and 2012 contributing to development of NCD.

Prevalence of risk factors in 15 and older population is described in relevant sections, which also show prevalence of some factors according to sociodemographic groups (gender, age, education, wealth quintile, type of residence /Yerevan, urban, rural).

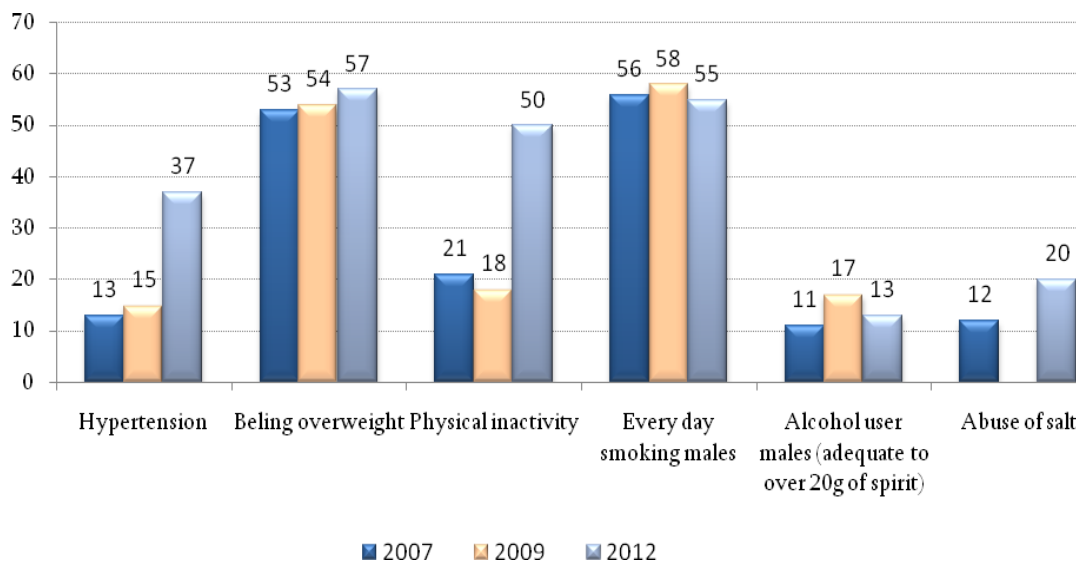
Figure 19 presents prevalence of risk factors in 20 and older population according to HSPA 2007, 2009 and 2012. The 2012 HSPA data were collected in December 2012 within the framework of mass surveys conducted in Armenia.

According to Figure 19 overweight is the most prevalent risk factor in Armenia followed by daily use of tobacco and physical inactivity in males. Arterial hypertension is also quite common. According to 2012 HSPA every third 20 and older respondent reported having arterial hypertension.

This drastic increase may be explained by technical reasons. During 2007 and 2009 surveys measurements were made by auscultations and in 2012 electronic tonometers were used and oscillometric method was used for measurements.

All three surveys (HSPA 2007, 2009 and 2012) suggest very low rates of daily tobacco use (1.6% in 2007, 1.6% in 2009, 1.3% in 2012) and abuse of alcohol (1.0% in 2007, 2.1% in 2009 and 0.5% in 2012) among 20 and older females. For that reason data on daily use of tobacco and excess use of alcohol in women were not included in the analysis or were not studied because of being statistically not significant.

Figure 19. Prevalence of risk factors in 20 and older population of Armenia, 2007, 2009 and 2012



Source: NHIAC 2007, 2009, 2012

Figure 19 shows that being overweight and physical inactivity are most prevalent in Armenia. Alarming is the fact that 37% of 15 and older population reported suffering from arterial hypertension.

Prevalence of risk factors according to age groups

Behavioral risk factors imply 'unhealthy habits' which accumulate throughout the lifetime perniciously affecting one's health. Prevalence of risk factors is correlated with the age.

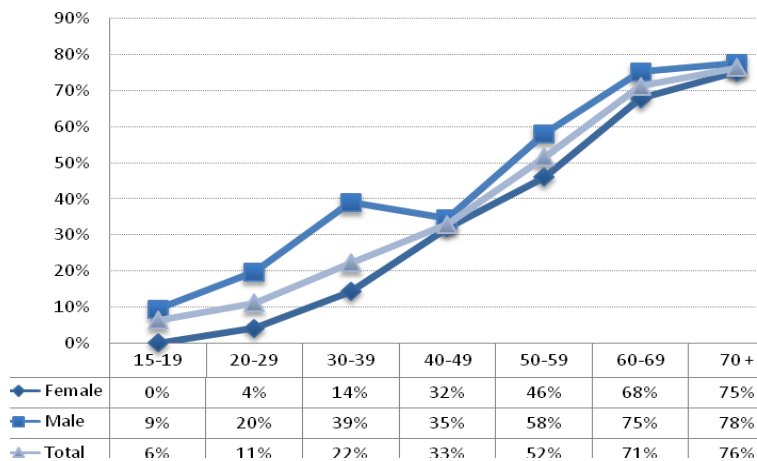
Prior to studying corrections between risk factors it is worth observing the impact of the age on prevalence of some factors. Also since Armenian men and women practice different lifestyles it is assumed that the impact of age on prevalence of risk factors in male and female groups will also be different.

Prevalence of risk factors in male and female age groups is presented in Figures 20-25.

The difference of high arterial blood pressure in male and female age groups is found from the youngest age (Figure 20). HSPA 2012 detected high AP in 9% of 15-19 males and no deviations from standards in same age females. Intergender difference was 16% in 20-29 age male and female, reaching its maximal point (25%) in 30-39 age groups.

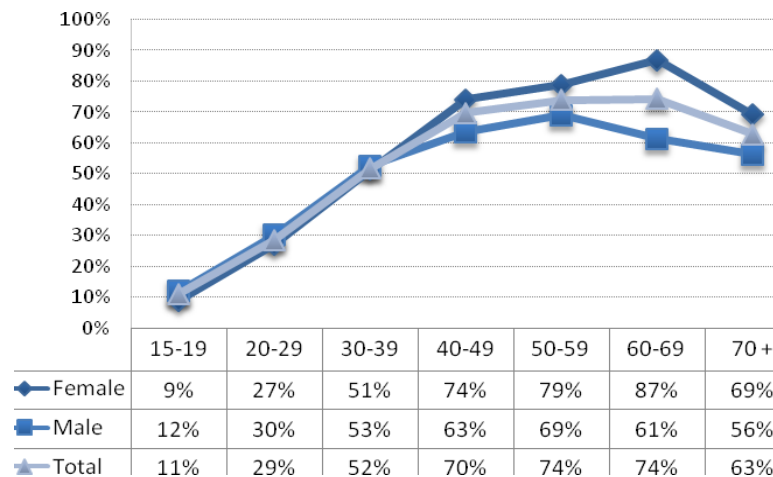
Prevalence of being overweight according to age and gender groups also ranged (Figure 21), however showing a different nature. In 15-19, 20-29 and 30-39 male and female groups relative numbers of overweight people were in fact almost similar. The differences occurred in over 40 age groups, where the proportion of overweight women increased essentially. In women of 40-49 and 50-59 age groups the relative number of women with extra weight was 10% higher than that in male groups reaching 26% in 60-69 age group, followed by gradual decrease in those 70 and older.

Figure 20. Prevalence of high arterial blood pressure according to gender and age groups



Source: HSPA 2007, 2009, 2012

Figure 21. Prevalence of being overweight according to gender and age groups

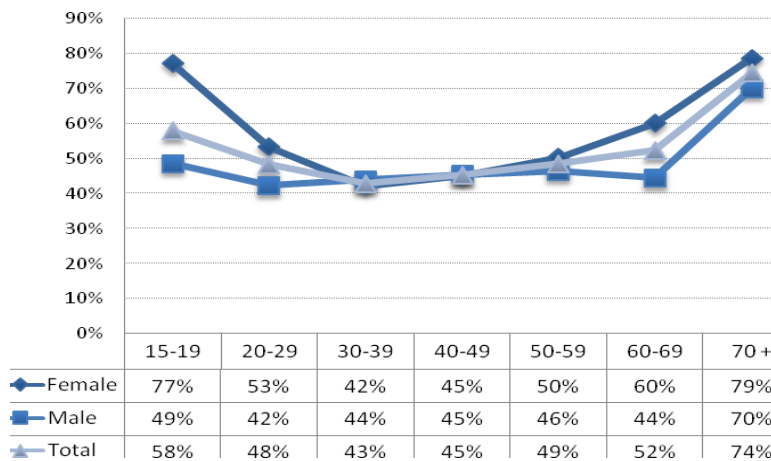


Source: HSPA 2007, 2009, 2012

Distribution of the prevalence of physical inactivity according to age groups essentially differs from that of the prevalence of high AP and being overweight (Figure 22). If the two latter indicators have increased along with the age (with exception of being overweight in 60-69 and above 70 age groups), age breakdown of the proportion of physically inactive people had U-shape. In particular, the rate was higher in 15-19 age group and dropped with age reaching the lowest level in 30-39 and 40-49 age groups, followed by an upturn with the age, where it shows a brisk jump in 70 and older group. In these distribution parts where proportions of inactive male and female were different a higher rate found seen in females.

Especially big difference in physical inactivity was evident in young men and women of 15-19 age group. The rate of physical inactivity in females was 28% higher as opposed to males. The rate of males increased with the age. With age the gender differences decreased and finally evened out in 30-39, 40-49 and 50-59 age groups. Gender-based differences in physical inactivity occurred again after 60 with females taking over.

Figure 22. Prevalence of physical inactivity in different age groups according to gender



Abuse of alcohol (Figure 23) and daily use of tobacco in male age groups suggests difficulties in assuming linear components.

Figure 23. Prevalence of abuse of alcohol in different age groups, males

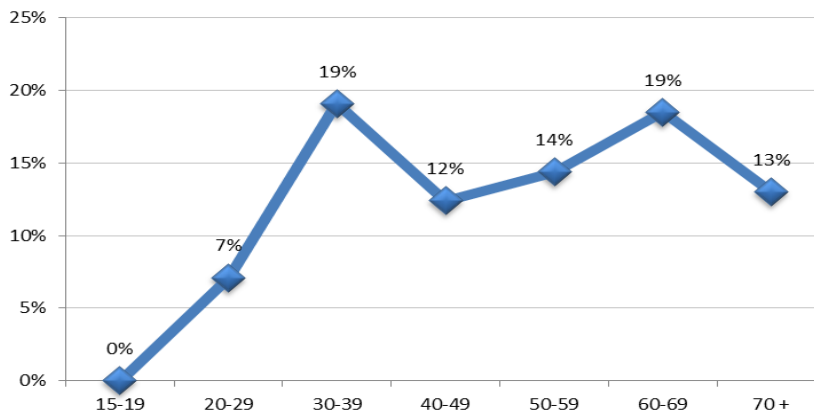
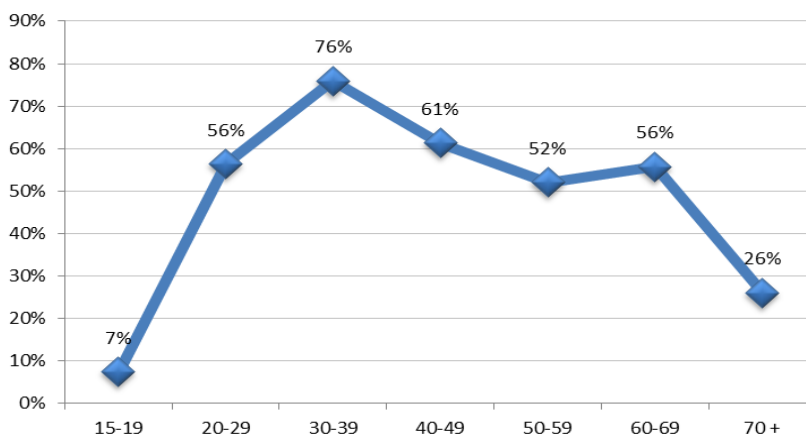


Figure 24. Prevalence of daily use of tobacco in different age groups, males



Source: HSPA 2007, 2009, 2012

The study of the influence of age on risk factors suggests that age has significant linear influence on the prevalence of

- The most dangerous risk factor, i.e. hypertension (symptom of various diseases), and
- Being overweight.

This influence hints that the risk factor correlation analysis should take into consideration not only the influence of gender but also that of the age.

Risk factor correlation analysis

Correlation patterns between the five risk factors were studied for men (Table 11) and women (Table 12) separately using the Pearson correlation coefficient. Besides, tables show first intra-class correlations (ICC), when the influence of the age is excluded ('0' or 'common' correlations across each risk factor matching with 'none' matrix line, and first intra-class correlations in the 'age' line, when the manageable value is the age). Correlations with LOC $\alpha \leq 0.05$ are presented in italic.

Correlation of high AP with remaining four risk factors is critical, because hypertension is not only a risk factor but also symptom of a number of diseases. Nonetheless the analysis gave the insight of the correlation with remaining 4 risk factors, but this time cause-and-effect links between risk factors are not expected.

Table 11. Risk factor correlation matrix (males, N=699)

	Manageable value	Hypertension	Obesity	Abuse of alcohol	Physical inactivity	Daily use of tobacco	Age
Hypertension	None	1000	<i>0.249</i>	<i>0.121</i>	<i>0.105</i>	<i>0.064</i>	<i>0.450</i>
	Age	1000	<i>0.141</i>	<i>0.062</i>	<i>0.069</i>	0.045	-
BMI categories	None	<i>0.249</i>	1000	<i>0.069</i>	<i>0.063</i>	<i>-0.129</i>	<i>0.283</i>
	Age	<i>0.141</i>	1000	0.029	0.038	<i>-0.150</i>	-
Abuse of alcohol	None	<i>0.121</i>	<i>0.069</i>	1000	<i>-0.092</i>	<i>0.169</i>	<i>0.148</i>
	Age	<i>0.062</i>	0.029	1000	<i>-0.108</i>	<i>0.163</i>	-
Physical inactivity	None	<i>0.105</i>	<i>0.063</i>	<i>-0.092</i>	1000	<i>-0.152</i>	<i>0.096</i>
	Age	<i>0.069</i>	0.038	<i>-0.108</i>	1000	<i>-0.158</i>	-
Daily use of tobacco	None	<i>0.064</i>	<i>-0.129</i>	<i>0.169</i>	<i>-0.152</i>	1000	0.053
	Age	0.045	<i>-0.150</i>	<i>0.163</i>	<i>-0.158</i>	1000	-
Age	None	<i>0.450</i>	<i>0.283</i>	<i>0.148</i>	<i>0.096</i>	0.053	1000
	Age	-	-	-	-	-	-

Source: HSPA, 2012

Correlation analysis in males revealed the following:

- All risk factors are statistically significantly correlated, in some cases showing positive correlation and in some cases negative.
- Hypertension is positively correlated to all remaining risk factors, meaning that existence of any of the factors increases the likelihood of hypertension. Particularly strong is the correlation of hypertension to being overweight, followed by alcohol abuse, physical

inactivity and the weakest correlation is to daily smoking, which however is statistically significant.

- Strong positive correlation regardless of age is seen in daily smoking and abuse of alcohol ($\rho=0.176$), though on the other hand physical inactivity ($\rho=-0.152$) and being overweight ($\rho=-0.129$) are relatively less prevalent in daily smokers.
- Physical inactivity and being overweight are positively correlated.
- If ignoring the age factor, part of the impact of risk factors is changed essentially and in some cases the correlation is no more statistically significant ($\alpha>0.05$)
- The age factor is statistically significantly correlated to all risk factors. The age has the biggest impact on hypertension.
- Age and hypertension show the strongest correlation $r=0.450$. In fact this link is stronger than the net influence of being overweight (excluding age influence). When age is neutralized the correlation of being overweight to hypertension drops from 0.249 to 0.141 (76%).
- Age significantly strengthens the influence of alcohol abuse and physical inactivity on hypertension (age decreases the correlations). When age factor is neutralized, the impact of daily use of tobacco on hypertension stops being statistically significant.
- The age influence (significantly stronger influence of other risk factors on hypertension) simply reflects the ‘cumulative’ nature of risk factors.
- Age is strongly correlated to being overweight as well: $r=0.283$:

Statistically significant correlations are less than insignificant ones in women’s risk factor correlation matrix (Table 12), because as mentioned earlier the prevalence of daily smoking and excess consumption of alcohol in women is as little as 1%. Hence, the sample size was too small to come up with statistically significant conclusions on this and other correlations of risk factors.

Table 12. Risk factor correlation matrix (females, N=849)

	Manageable value	Hypertension	Obesity	Abuse of alcohol	Physical inactivity	Daily use of tobacco	Age
Hypertension	None	1000	0.345	0.024	0.061	0.016	0.528
	Age	1000	0.180	0.005	0.028	-0.004	-
BMI categories	None	0.345	1000	0.063	-0.024	-0.007	0.386
	Age	0.180	1000	0.053	-0.055	-0.023	-
Abuse of alcohol	None	0.024	0.063	1000	0.040	-0.007	0.037
	Age	0.005	0.053	1000	0.038	-0.008	-
Physical inactivity	None	0.061	-0.024	0.040	1000	0.034	0.069
	Age	0.028	-0.055	0.038	1000	0.031	-
Daily use of tobacco	None	0.016	-0.007	-0.007	0.034	1000	0.036
	Age	-0.004	-0.023	-0.008	0.031	1000	-
Age	None	0.528	0.386	0.037	0.069	0.036	1000
	Age	-	-	-	-	-	-

Source: HSPA, 2012

Taking this into consideration, the following was highlighted in risk factor correction matrix of female respondents:

- High arterial pressure is strongly influenced by only being overweight which is stronger in females (0.345) than in males (0.249).
- The influence of the age is also stronger compared with men. The correlation of age to hypertension is 0.528.
- The influence of remaining risk factors is either statistically not significant at all or stops being such after the age is neutralized, as it was with physical inactivity.
- When compared with similar matrix in males, the influence of age is stronger in case of being overweight. In males it was 0.283, in females 0.386.
- There are no grounds to clearly state that being overweight is correlated to physical inactivity ($r=-0.024$, statistically not significant).

Influence of risk factors on high arterial blood pressure

The survey studies the influence of other risk factors on high arterial blood pressure.

Tables 13-16 present relative proportion of respondents with hypertension in male and female groups according to existence or absence of risk factors. These data enrich the content of the first column of risk factor correction matrix (correlation of hypertension to other risk factors).

The proportion of respondents with hypertension increases in the groups by 38.2% (Table 13) with transition of BMI from ‘normal’ to ‘obesity’ in females. This indicator is almost similarly visible in males. The relative proportion of respondents with hypertension among obese males (62.7%) is 32.9% higher as opposed to those in ‘normal’ weight groups (29.8%).

Table 13. Dependence of hypertension on body mass index

Gender of respondent	Number of respondents with hypertension				‘Obese’ – ‘Normal’
	BMI classification				
	Underweig ht BMI≤18.5	Normal 18.5≥BMI≤2 5	Overweight 25≥BMI≤30	Obesity BMI≤30	
Female	8.8%	12.7%	32.8%	50.9%	38.2%
Male	29.4%	29.8%	45.6%	62.7%	32.9%
Total	15.7%	21.5%	38.5%	54.9%	33.4%

The influence is statistically significant in the entire sample of both males and females: $\chi^2=0.000$

Source: HSPA, 2012

The ratio of hypertension in those abusing alcohol is 19.1% higher compared with those not abusing alcohol drinks (Table 14, last column).

Table 14. Dependence of hypertension on alcohol abuse

Gender of respondent	Number of respondents with hypertension		'Abused'- 'Not abused'
	Consumption of alcohol (over 20 gr of pure spirit)		
	Not abused	Abused	
Female	28.7%	33.3%	4.6%
Male	37.9%	57.0%	19.1%
Total	32.6%	56.1%	23.5%

In females the influence is statistically not significant: $\chi^2=0.638$
 In males the influence is statistically significant: $\chi^2=0.001$
 The influence is statistically significant for the entire sample: $\chi^2=0.000$

Source: HSPA, 2012

The proportion of physically inactive men with hypertension exceeds those physically active by 10.4% (Table 15, last column), whereas in women the difference is 5.5% (statistically significant).

Table 15. Dependence of hypertension on physical inactivity

Gender of respondent	Number of respondents with hypertension		Physically inactive - Physically active
	Level of physical activity		
	Physically active	Physically inactive	
Female	25.8%	31.3%	5.5%
Male	35.1%	45.5%	10.4%
Total	30.3%	37.3%	7.0%

In females the influence is statistically significant: $\chi^2=0.043$
 In males the influence is statistically significant: $\chi^2=0.003$
 The influence is statistically significant for the entire sample: $\chi^2=0.002$

Source: HSPA, 2012

Proportion of males with hypertension among daily smokers is 6.3% higher as opposed to non-smoker or not daily smoker men (Table 16, last column).

Table 16. Dependence of hypertension on daily use of tobacco

Gender of respondent	Number of respondents with hypertension		Total
	Smoking tobacco		
	Non-smokers or occasional smokers	Daily smokers	
Female	28.7%	36.4%	7.7%
Male	37.0%	43.3%	6.3%
Total	31.2%	43.1%	11.9%

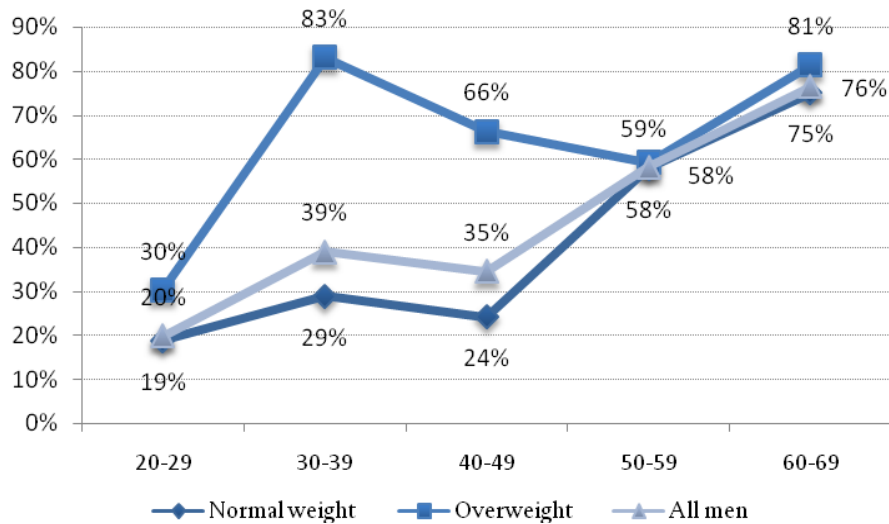
In females the influence is statistically not significant: $\chi^2=0.395$
 In males the influence is statistically significant: $\chi^2=0.051$
 The influence is statistically significant for the entire sample: $\chi^2=0.000$

Source: HSPA, 2012

Joint influence of both factors (age and being overweight) on hypertension in males and females is presented in Figures 25 and 26.

As Figure 25 shows the risk factor of being overweight strongly increases the likelihood of hypertension in 30-39 and 40-49 age groups of male respondents. The influence disappears in 50-59 and 60-69 age groups. Hence activities targeted at reducing the risk factor of being overweight in men will prove to be more effective in 30-39 and 40-49 age groups.

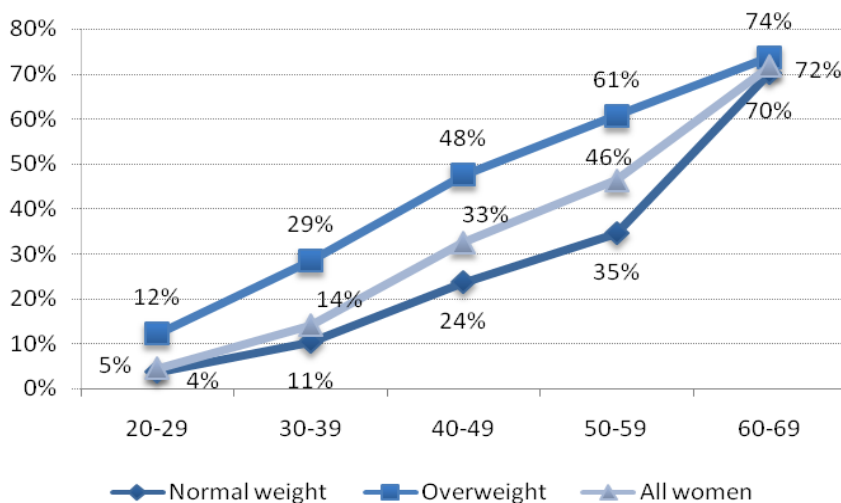
Figure 25. Dependence of hypertension on age and being overweight in males



Source: HSPA, 2012

Figure 26 shows that in women the risk factor of being overweight also essentially increases the likelihood of developing hypertension. The impact is seen not in 30-39 and 40-49 age groups (like it was in case of men) but among women of 50-59 years of age. Here the influence of this risk factor on the first two age groups is not as strong as it was in men.

Figure 26. Dependence of hypertension on age and being overweight in females



Source: HSPA, 2012

Dependence of hypertension on age and being overweight

Table 17 presents 15 and older population of Armenia grouped according to risk factors. Four factors are taken into consideration, namely hypertension, being overweight, physical inactivity and daily use of tobacco.

The Table suggests all possible combinations of risk factors and the number of population exposed to them. To make it simple the data are rounded up/down (e.g. 3% of population of Armenia have no hypertension, are overweight, physically inactive and non-smokers).

Table 17. Breakdown of 15 and older population of Armenia according to the number of 4 risk factors (hypertension, being overweight, physical inactivity and daily smoking)

		Physically active		Physically inactive	
		Non-smokers or occasional smokers	Daily smokers	Non-smokers or occasional smokers	Daily smokers
Do not have hypertension	Normal	14%	5%	16%	3%
	Overweight	12%	3%	11%	2%
Have hypertension	Normal	2%	3%	3%	2%
	Overweight	8%	2%	11%	2%
Color scale of the number of risk factors					
Risk factors found	0	1	2	3	4

Source: HSPA, 2012

The observed 4 risk factors are not present in 14% of 15 and older population of Armenia, whereas 2% is affected by all risk factors.

Similar data with gender breakdown are presented in Table 18 where the summary of each sub-table for males and females is equal to 100%. Data on daily tobacco use are missing in the female part of Table 18. They read 0% because the total proportion of daily smoking women is 1.3% and they are shown in sub-table part on daily smoking respondents whose data are rounded up (0%).

Data summarized in the table show that males not exposed to any of the 4 risk factors comprise 11% of total male and 17% female population (15 and older women). All four risk factors are present in 4% of males and 0% of females (or 0.2% if decimal fractions are included).

Similar table with all five risk factors with gender breakdown and decimal precision is presented in Annex 3.

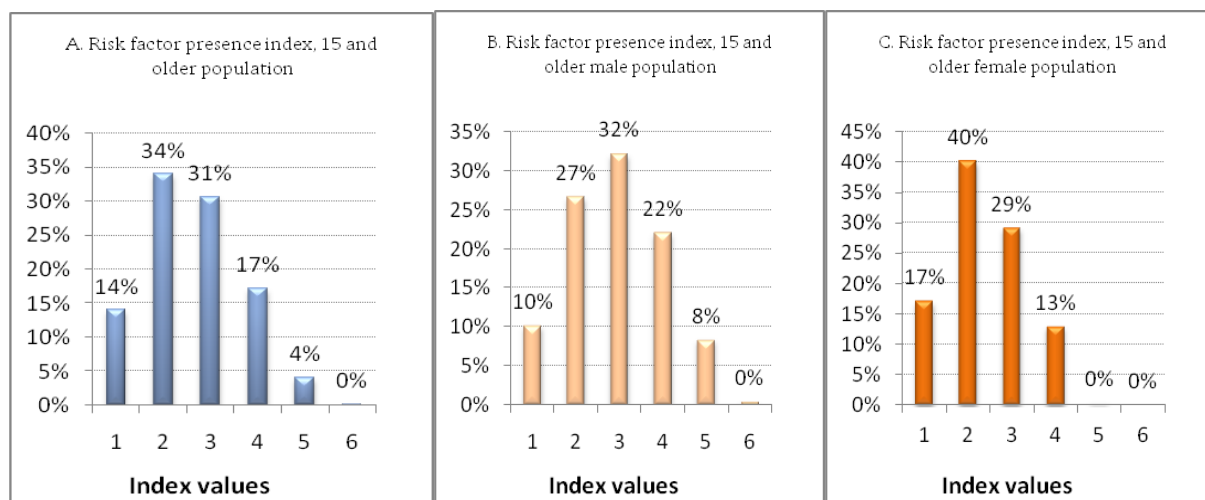
Table 18. Breakdown of 15 and older male and female population of Armenia according to the number of 4 risk factors (hypertension, being overweight, physical inactivity and daily smoking)

Males		Non-smokers		Daily smokers	
		Physically active	Physically inactive	Physically active	Physically inactive
Do not have hypertension	Normal weight	11%	10%	11%	7%
	Overweight	6%	6%	6%	3%
Have hypertension	Normal weight	2%	3%	7%	4%
	Overweight	5%	10%	5%	4%
Females		Non-smokers		Daily smokers	
		Physically active	Physically inactive	Physically active	Physically inactive
Do not have hypertension	Normal weight	17%	21%	0%	0%
	Overweight	18%	15%	0%	0%
Have hypertension	Normal weight	2%	3%	0%	0%
	Overweight	10%	13%	0%	0%
Color scale of the number of risk factors					
Risk factors found	0	1	2	3	4

Source: HSPA, 2012

To make it more comprehensible, tables in Annex 3 showing population groups affected by various risk groups, present the per capita risk factor existence index, showing the number of observed five risk factors affected by the person. The value of the index ranges from 0 (not affected by risk factor) to 5 (all risk factors are present). Breakdowns of risk factors among 15 and older male and female population of Armenia are presented in Figures 27-A, 27-B and 27-C, and show the differences in prevalence of risk factors across male and female population. For example if 40% of women are affected by only one and 13% by 3 and more risk factors, 30% of men are exposed to 3 and more risk factors.

Figure 27. Breakdown of risk factor presence coefficient



Source: HSPA 2012

The impact of secondary smoking

Although the overwhelming majority (96,0%) of the population is aware of the negative impacts of tobacco and secondary smoking on their surroundings (Figure 28). Relatively poor is awareness of the harm of secondary smoking among 15-19 and 60 and older age groups, the most well-off according to wealth quintiles (those in the 1st quintiles) and those with lower-secondary and surprisingly incomplete higher (students) educational attainment.

Figure 28. Awareness of the harm of secondary smoking

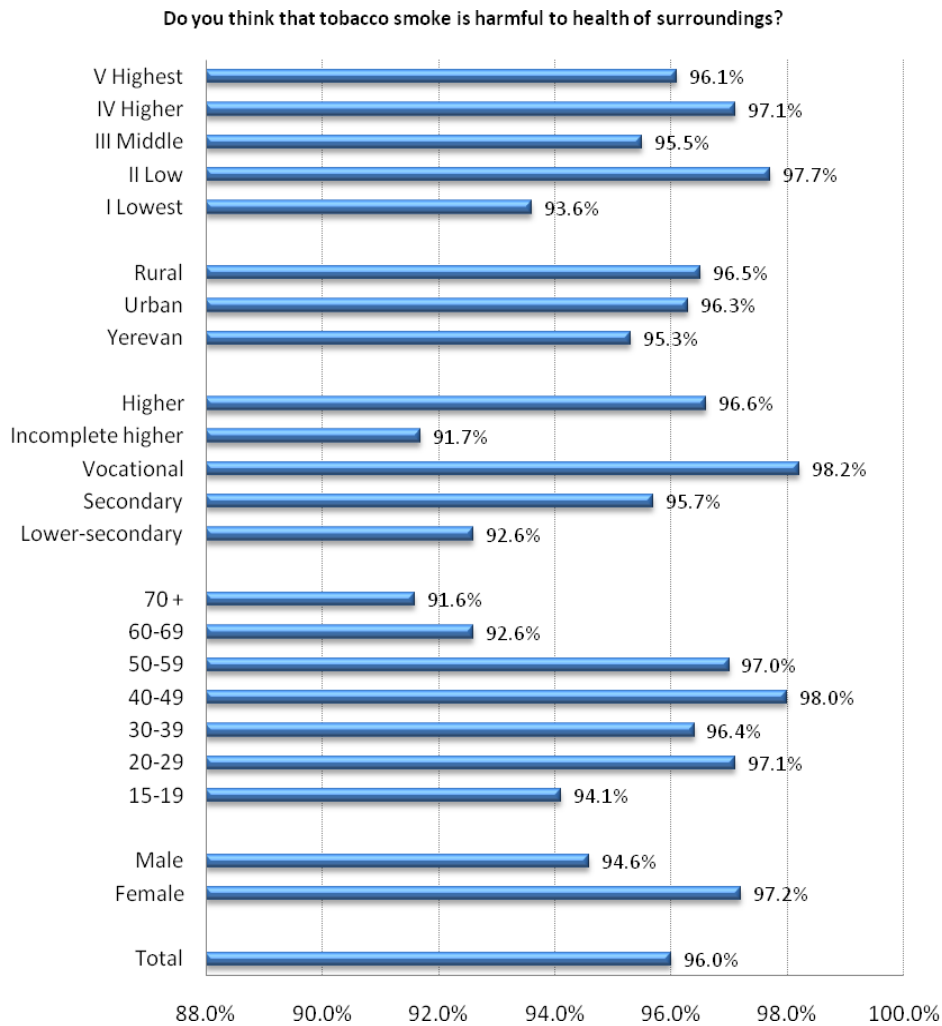
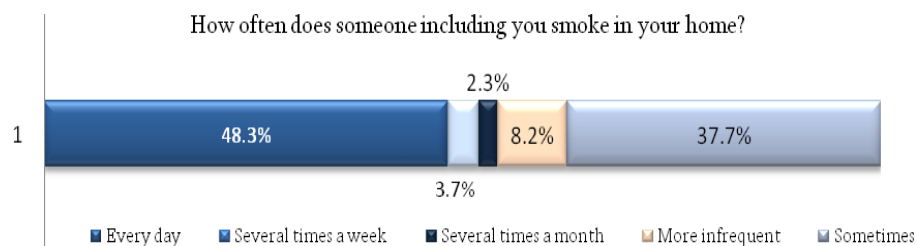


Figure 29. People exposed to secondary smoking at home, 2012



Source: HSPA, 2012

Despite the nearly widespread awareness of the harm of secondary smoking about half (48.3%) of the population of Armenia is affected by secondary smoking in their homes on daily basis (HSPA, 2012). In fact awareness of the harmful influence of secondary smoking is equally high in both smokers and non-smokers (Table 19).

Table 19. Awareness of the negative impact of secondary smoking among smokers and non-smokers

Do you think that tobacco smoke is harmful to the health of surrounding people?	Non-smokers and occasional smokers	Daily smokers	Total
Yes	96.7%	93.9%	96.0%
No	1.3%	4.1%	2.0%
Don't know (DK)	2.0%	2.1%	2.0%
Total	100.0%	100.0%	100.0%

Source: HSPA, 2012

Table 20. People exposed to secondary smoking among smokers and non-smokers

How often does someone, including you, smoke in your home?	Non-smokers and occasional smokers	Daily smokers	Total
Sometimes	44.4%	12.5%	36.7%
Less than several times a month	7.8%	9.0%	8.1%
Several times a month	2.7%	1.5%	2.4%
Several times a week	4.3%	1.4%	3.6%
Every day	40.6%	75.7%	49.1%
DK	0.2%	0.0%	0.2%
Total	100.0%	100.0%	100.0%

Source: HSPA, 2012

Some 75% of daily smokers smoke at home (in a closed space) meaning that family members of 75% of smokers are exposed to secondary smoking every day (Table 21). Only 12.5% of daily smokers do not smoke at home.

Forty percent of non-smokers are sometimes exposed to secondary smoking in their home and only 44% answered negatively to this question.

Table 21. People exposed to secondary smoking among non-smokers

How often does someone, including you, smoke in your home?	Non-smokers and occasional smokers (%)	
	Female	Male
Sometimes	39.3	58.4
Less than several times a month	6.8	10.7
Several times a month	3.2	1.3
Several times a week	4.3	4.0
Every day	46.3	25.1

Source: HSPA, 2012

Pacts and policy recommendations

Situation	Policy recommendations
<p>Prevalence of hypertension in under-40 men and women is high in men and the prevalence of being overweight according to age groups and gender goes up in women above the age of 40. The prevalence of physical inactivity is high in young women, then it evens out in middle age and exceeds again in older ages. Abuse of alcohol and daily smoking is prevalent only in men.</p>	<p>Since lifestyle-related (behavioral) risk factors start developing and strengthening still from young age, implement programs promoting healthy lifestyle and preventing development of unhealthy habits among school-age children.</p> <p>In cooperation with mass media implement awareness and educational programs involving celebrities who are especially reputable among school age children, who would highlight the importance of healthy lifestyle and will promote healthy habits making them the integral part of our life.</p>
<p>Hypertension is positively correlated to all risk factors, meaning that any risk factor will increase the likelihood of elevated arterial pressure. In particular, prevalence of hypertension is high in men and women who live sedentary life, abuse alcohol or smoke every day as opposed to men and women of the same age who practice healthy lifestyle.</p>	<p>Make recommendations on improving quality control in food production, and promote production of healthy food with low fat, no preservatives and/or other additives.</p>
<p>Being overweight increases the likelihood of developing hypertension especially in 30-50 males, followed by decline of the influence in older ages. A similar difference was not recorded in women, where being overweight has even impact on hypertension in all age groups.</p>	<p>Taking into consideration that presence of risk factors like being overweight, daily smoking, and alcohol abuse increases the risk of hypertension which is especially well-articulated in males of 30-50 age, implement more aggressive and targeted activities by PHC level to detect and prevent hypertension in this age group.</p>
<p>The study of the risk factor indicator suggests that more than half of women are exposed to one or more risk factors and one-third of men are exposed to three and more risk factors.</p>	<p>Implement annual mass surveys to identify actual prevalence of most common NCD risk factors. This will enable comparing trends of risk factors and looking for new ways of public health promotion and strengthening.</p>

5. POPULATION HEALTH

Population morbidity

General morbidity dynamics

Observation of population health dwells on analysis of morbidity and mortality rates which directly reflect population health status.

The study of population morbidity in Armenia was based on state statistical data. The purpose of the analysis was to present population morbidity dynamics across marzes, with an attempt to reveal problems faced by regions. For that purpose general and primary (first-time-in-life) morbidity indicators were assessed (their definitions are presented in Annex 3).

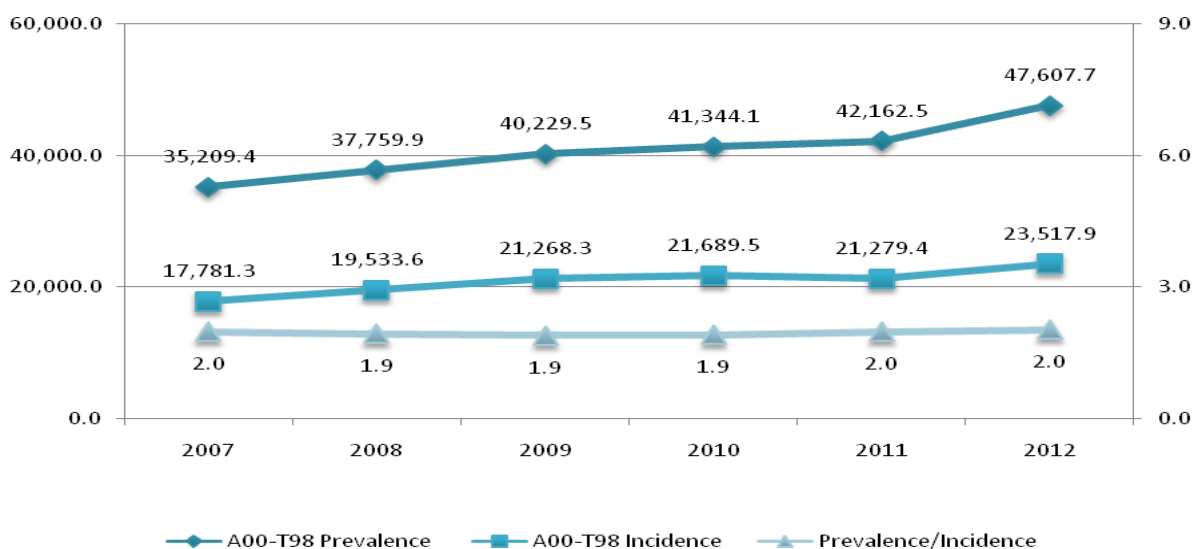
Analysis was based on cases registered by primary care settings of Armenia between 2007 and 2012. The general dynamics of registered cases is presented in Figures 30 and 31.

Figure 30 reflects on:

- Total number of prevalence (general morbidity) per 100000 population
- The number of first time in life diagnosed diseases (incidence) per 100000 population
- The ratio of prevalence/incidence (shows the average number of encounters for the same disease by one person during the year).

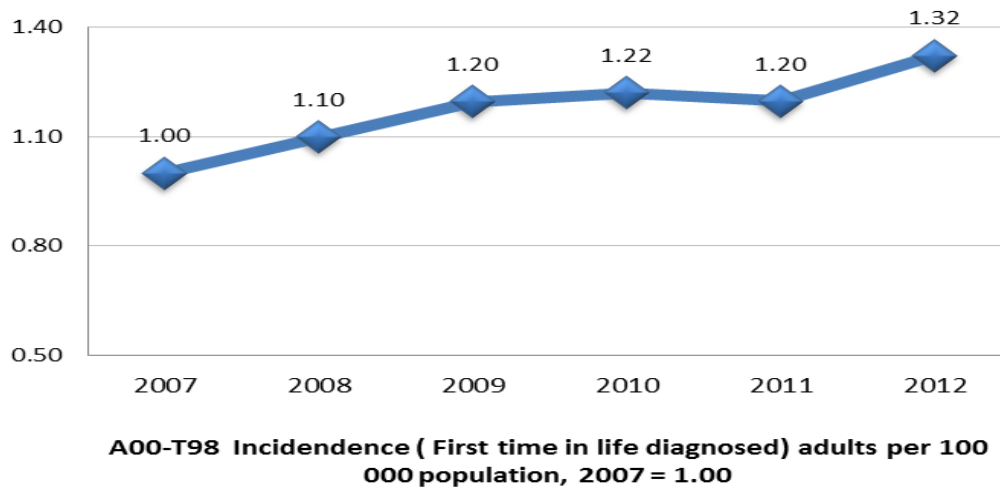
Figure 30 presents the dynamics of incidence taking 2007 index as 100%. Data summarized in the figure suggest 32% increase of first time in life diagnosed diseases between 2007 and 2012. At the same time it shows that the increase varies year-to-year. If 10% increase was recorded in 2008 versus 2007 and in 2009 versus 2008, no changes were recorded between 2010 and 2011. However the general level of morbidity in 2012 climbed up again by 12% as opposed to 2011.

Figure 30. General morbidity dynamics in Armenia, 2007-2012



Source: NHIAC, 2012

Figure 31. First time in life diagnosed (Incidence) dynamics among adults per 100 000 population, 2007 = 1.00



Source: NHIAC, 2013

If taken into consideration that the impact of global economic crisis on Armenia economy and economic situation of the population was felt in 2009, whereas during 2001-2008 Armenia had recorded both good economic growth and inflowing private transfers, it can be concluded that during 2007-2009 and 2011-2012 improvement of economic situation of Armenia population was among factors contributing to the increase of first time diagnosed diseases.

This observation is supported by data of Table 22 reflecting on dynamics of first time in life diagnosed diseases according to disease groups during 2007-2012, where indicators of 2007 are taken as 100% (except for category 000-075, 081-099 ‘Pregnancy, childbirth and the puerperium’).

According to the Table dynamics for some categories of diseases matches with the ones presented in Figure 31, i.e. significant increase of the number of registered incidences during 2007-2009, slight changes over crises and post-crises years of 2009-2011, followed by significant increase of registered cases between 2011 and 2012.

Hence, it can be stated (grounded logically but not statistically) that Armenia saw an increase of the rate of utilization of PHC services during 2007-2009 and 2011-2012 which is not connected to the actual growth of morbidity rate in population.

This does not exclude actual growth of morbidity rate among the population, which in its turn resulted in improved utilization of services, thus increasing the proportion of registered incidences. So it can be assumed that increased utilization of primary care services in Armenia was stimulated by improved physical and/or financial access to PHC care or public health behavioral patterns. In any case, the last supposition requires support by a statistical trial.

To analyze morbidity rates and dynamics in Armenia diseases classified according to ICD-10 were grouped per their prevalence and presented in Table 22. Below seven groups were formed:

- Very prevalent diseases – prevalence exceeding 2.501 per 100000 population

- Highly prevalent diseases – prevalence rate 1.501-2.500 per 100000 population
- Higher-moderate prevalence -1.001-1.500 per 100000 population
- Moderate prevalence -601-1000 per 100000 population
- Lower-moderate prevalence - 301-600 per 100000 population
- Low prevalence - 150-300 per 100000 population
- Very low prevalence – less than 150 per 100000 population

Very highly prevalent disease group includes only block J00-J99 – ‘Diseases of the respiratory system’ (prevalence 7.195 per 100000 population).

Table 22. Dynamics of diseases according to disease groups, 2007-2012. First time in life diagnosed diseases in adults, per 100,000 population (colored according to disease group downturn)

Disease group	2007	2008	2009	2010	2011	2012	Category
J00-J99 Diseases of the respiratory system	5,776.8	6,344.3	7,773.9	7,380.0	6,710.9	7,195.1	I very high 2501 <
I00-I99 Diseases of circulatory system	1,699.9	1,891.4	1,913.8	1,971.6	2,170.0	2,380.1	II high 1501-2500
A00-B99 Certain infectious and parasitic diseases	1,440.9	1,500.0	1,630.0	1,786.3	1,758.8	2,008.1	
N00-N99 Diseases of the genitourinary system	1,331.0	1,598.5	1,606.0	1,652.1	1,688.7	1,901.0	
O00-O75, O81-O99 Pregnancy, childbirth and the puerperium	-	-	1,716.1	1,586.8	1,708.4	1,848.5	
S00-T98 Injury, poisoning and certain other consequences of external causes	1,412.0	1,494.7	1,530.7	1,509.5	1,499.7	1,645.8	
H00-H59 Diseases of the eye and adnexa	1,026.1	1,113.4	1,101.6	1,298.4	1,385.2	1,471.1	III higher-average 1001-1500
L00-L99 Diseases of the skin and subcutaneous tissue	853.5	946.7	982.4	1,096.9	1,091.3	1,266.1	
K00-K93 Diseases of the digestive system	965.7	1,030.8	1,014.1	1,040.8	1,018.9	1,154.9	
M00-M99 Diseases of the musculoskeletal system and connective tissue	487.7	582.5	583.2	701.2	702.6	832.5	IV average 601-1000
G00-G99 Diseases of the nervous system	585.7	680.6	696.6	682.1	682.8	802.9	
H60-H95 Diseases of the ear and mastoid process	472.7	564.2	609.5	632.3	628.0	716.9	
E00-E90 Endocrine, nutritional and metabolic diseases	358.6	390.2	400.1	421.5	424.8	486.9	V lower-average 301-600
C00-D48 Neoplasms	329.6	334.0	352.2	335.8	363.4	415.9	
F00-F99 Mental and behavioral disorders	233.3	240.4	249.6	319.4	285.0	286.4	VI low 150-300
D50-D89 Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	151.9	171.9	183.3	183.7	189.6	205.3	
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	58.1	46.1	43.0	132.5	102.1	129.3	
Q00-Q99 Congenital malformations, deformations and chromosomal abnormalities	12.8	17.7	19.5	17.4	17.8	20.7	VII very low < 150
P00 - P96 Certain conditions originating in the perinatal period	-	-	-	-	-	-	

Source: NHIAC, 2013

Highly prevalent diseases include

- I00-I99 ‘Diseases of circulatory system’, prevalence 2.380,1 per 100000 population
- A00-B99 ‘Certain infectious and parasitic diseases’ - 2.008,1 per 100000 population

- N00-N99 ‘Diseases of the genitourinary system’ -1.901,0 per 100000 population
- O00-075, 081-099 ‘Pregnancy, childbirth and the puerperium’ - 1.848,5 per 100000 population
- S00-T88 ‘Injury, poisoning and certain other consequences of external causes’ - 1.645,8 per 100000 population

Diseases of **higher-moderate prevalence** included the following groups:

- H00-H59 ‘Diseases of the eye and adnexa’ - 1.471, per 100000 population
- L00-L99 ‘Diseases of the skin and subcutaneous tissue’ - 1.266,1 per 100000 population
- K00-K95 ‘Diseases of the digestive system’ - 1.154,9 per 100000 population

Given the 32% growth of morbidity rate between 2007 and 2012, Table 23 enables singling out disease groups with the highest and lowest growth rates.

Highest relative growth was detected in

- R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified - growth of 2.23 between 2007 and 2012
- M00-M99 Diseases of the musculoskeletal system and connective tissue - 71% growth

Table 23. Dynamics of diseases according to disease groups, 2007-2012. First time in life diagnosed diseases in adults, per 100,000 population (colored according to time dynamics)

Disease groups	2007	2008	2009	2010	2011	2012
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	100	79	74	228	176	223
M00-M99 Diseases of the musculoskeletal system and connective tissue	100	119	120	144	144	171
Q00-Q99 Congenital malformations, deformations and chromosomal abnormalities	100	138	152	136	139	162
H60-H95 Diseases of the ear and mastoid process	100	119	129	134	133	152
L00-L99 Diseases of the skin and subcutaneous tissue	100	111	115	129	128	148
H00-H59 Diseases of the eye and adnexa	100	109	107	127	135	143
N00-N99 Diseases of the genitourinary system	100	120	121	124	127	143
I00-I99 Diseases of circulatory system	100	111	113	116	128	140
A00-B99 Certain infectious and parasitic diseases	100	104	113	124	122	139
G00-G99 Diseases of the nervous system	100	116	119	116	117	13%
E00-E90 Endocrine, nutritional and metabolic diseases	100%	109	112	118	118	136
D50-D89 Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	100%	113	121	121	125	135
C00-D48 Neoplasms	100%	101	107	102	110	126
J00-J99 Diseases of the respiratory system	100%	110	135	128	116	125
F00-F99 Mental and behavioral disorders	100%	103	107	137	122	123
K00-K93 Diseases of the digestive system	100%	107	105	108	106	120
S00-T98 Injury, poisoning and certain other consequences of external causes	100%	106	108	107	106	117
O00-075, 081-099 Pregnancy, childbirth and the puerperium			100	92	100	108

Source: NHIAC, 2013

Actually the relative proportion of cases under R00-R99 group is the lowest (20.7/100000) (2012, Table 23), diseases under M00-M99 group show moderate prevalence (832.5/100000) (2012).

Significant relative growth in diseases of **higher-moderate prevalence** was recorded over 2007-2012 in the following disease groups:

- Q00-Q99 Congenital malformations, deformations and chromosomal abnormalities - 62% (2012)
- H60-H95 Diseases of the ear and mastoid process - 52% (2012)
- L00-L99 Diseases of the skin and subcutaneous tissue - 48% (2012)

Comparison of main disease groups across marzes

Table 24 presents comparison of morbidity rates across regions of Armenia. Diseases first time in the life diagnosed at primary care level during 2012 are assessed per 100000 population. The higher regional rates are colored in red and lower-moderate national rates in green shades. Colors are compatible across the lines (disease groups). The Table gives a good insight of marz population health status as per disease groups. As palette of the table suggests in regions where red color dominates the situation is worse compared with the average national rates, whereas in cells with shades of green the situation is more favorable.

Block A00-T98 is presented in dark red color in Lori and Shirak marzes. The rates of first time in life diagnosed diseases are 28.167,1/100000 and 27.992,7/100000 correspondingly, which are higher than the national average rate (23.517,9). In Aragatsotn (20.964,1/100000), Tavoush (20.527,7/100000), Vayots Dzor (21,379.7/100000) marzes and Yerevan city (21.752,4/100000) the rates are lower and the cells are colored in green.

Table 25 presents data of the previous table (Table 24) fixed according to national values of each diseases group. Here colors are compatible for the entire table, which visibly demonstrated marz profiles of first time diagnosed diseases. The levels of first time diagnosed diseases are relatively higher in Armavir, Shirak and Lori marzes (red-color shares dominating in columns) and lower in Aragatsotn, Gegharkunik, Vayots Dzor and Tavoush marzes.

Cluster analysis of data of Table 25 was performed for more grounded comparison of marz morbidity profiles.

Table 24. First time in life diagnosed diseases per 100000 population, per marz, 2012, adults. Color shades compatible according to lines. Red shades mean higher average national and green shades – lower average national rates

Disease groups	RA	Aragatsotn	Ararat	Armavir	Gegharkunik	Yerevan	Lori	Kotayk	Shirak	Syunik	Vayots Dzor	Tavoush
A00-T98 Total	23,517.9	20,964.1	26,524.8	24,599.5	23,935.4	21,752.4	28,167.1	21,213.7	27,992.7	22,469.8	21,379.7	20,527.7
J00-J99 Diseases of the respiratory system	7,195.1	8,462.1	9,703.2	5,370.3	9,735.8	5,493.2	7,963.9	7,148.5	9,660.3	8,871.8	7,476.4	6,190.6
N00-N99 Diseases of the genitourinary system	1,901.0	1,248.5	1,421.1	2,316.3	1,964.9	1,798.8	1,761.2	2,633.2	2,652.5	1,149.3	2,243.2	1,394.5
S00-T98 Injury, poisoning and certain other consequences of external causes	1,645.8	1,318.4	2,349.8	2,808.4	1,653.1	1,071.8	1,242.6	1,818.4	2,436.0	1,461.5	1,273.0	2,219.3
I00-I99 Diseases of the circulatory system	2,380.1	2,091.8	1,849.8	2,957.9	2,010.2	2,504.3	3,267.1	1,775.5	2,209.7	1,488.1	3,533.5	2,477.5
L00-L99 Diseases of the skin and subcutaneous tissue	1,266.1	1,019.0	1,373.1	870.8	508.5	1,272.4	1,992.8	1,261.8	1,912.0	1,226.2	1,037.2	915.0
K00-K93 Diseases of the digestive system	1,154.9	1,940.1	1,515.2	1,841.6	1,294.2	621.9	1,550.2	1,178.0	1,246.5	1,196.9	1,665.0	1,283.8
H00-H59 Diseases of the eye and adnexa	1,471.1	1,009.0	2,987.9	1,287.6	1,003.4	1,505.7	1,751.2	1,070.9	1,693.4	468.9	784.1	979.5
A00-B99 Certain infectious and parasitic diseases	2,008.1	497.0	1,200.2	1,720.8	1,137.2	2,958.5	1,934.5	914.1	1,677.4	3,522.9	508.7	968.2
M00-M99 Diseases of the musculoskeletal system and connective tissue	832.5	897.2	955.5	1,300.0	710.9	727.3	1,520.3	612.5	699.1	250.0	615.4	815.6
G00-G99 Diseases of the nervous system	802.9	691.6	793.7	1,157.4	1,482.4	521.5	1,067.7	569.1	1,001.6	1,044.9	414.4	840.2
E00-E90 Endocrine, nutritional and metabolic diseases	486.9	489.0	497.0	570.3	392.9	438.1	719.6	565.4	343.3	463.4	813.9	453.9
C00-D48 Neoplasms	415.9	268.5	205.3	406.4	344.1	501.2	440.3	529.2	379.6	289.4	233.3	410.9
F00-F99 Mental and behavioral disorders	286.4	90.8	96.1	436.1	128.7	383.5	279.3	269.5	383.2	158.4	94.3	77.9

Table 25. First time in life diagnosed diseases per 100000 population, per marz, 2012, adults. Average national brought to 1.0 values. Values of marz indexes are matched with average national of the disease group. Color shades compatible according to lines. Red shades mean higher average national and green shades – lower average national rates

Disease groups	RA	Aragatsotn	Ararat	Armavir	Gegharkunik	Yerevan	Lori	Kotayk	Shirak	Syunik	Vayots Dzor	Tavoush
A00-T98 Total	1,00	0,89	1,13	1,05	1,02	0,92	1,20	0,90	1,19	0,96	0,91	0,87
J00-J99 Diseases of the respiratory system	1,00	1,18	1,35	0,75	1,35	0,76	1,11	0,99	1,34	1,23	1,04	0,86
N00-N99 Diseases of the genitourinary system	1,00	0,66	0,75	1,22	1,03	0,95	0,93	1,39	1,40	0,60	1,18	0,73
S00-T98 Injury, poisoning and certain other consequences of external causes	1,00	0,80	1,43	1,71	1,00	0,65	0,76	1,10	1,48	0,89	0,77	1,35
I00-I99 Diseases of the circulatory system	1,00	0,88	0,78	1,24	0,84	1,05	1,37	0,75	0,93	0,63	1,48	1,04
L00-L99 Diseases of the skin and subcutaneous tissue	1,00	0,80	1,08	0,69	0,40	1,00	1,57	1,00	1,51	0,97	0,82	0,72
K00-K93 Diseases of the digestive system	1,00	1,68	1,31	1,59	1,12	0,54	1,34	1,02	1,08	1,04	1,44	1,11
H00-H59 Diseases of the eye and adnexa	1,00	0,69	2,03	0,88	0,68	1,02	1,19	0,73	1,15	0,32	0,53	0,67
A00-B99 Certain infectious and parasitic diseases	1,00	0,25	0,60	0,86	0,57	1,47	0,96	0,46	0,84	1,75	0,25	0,48
M00-M99 Diseases of the musculoskeletal system and connective tissue	1,00	1,08	1,15	1,56	0,85	0,87	1,83	0,74	0,84	0,30	0,74	0,98
G00-G99 Diseases of the nervous system	1,00	0,86	0,99	1,44	1,85	0,65	1,33	0,71	1,25	1,30	0,52	1,05
E00-E90 Endocrine, nutritional and metabolic diseases	1,00	1,00	1,02	1,17	0,81	0,90	1,48	1,16	0,71	0,95	1,67	0,93
C00-D48 Neoplasms	1,00	0,65	0,49	0,98	0,83	1,21	1,06	1,27	0,91	0,70	0,56	0,99
F00-F99 Mental and behavioral disorders	1,00	0,32	0,34	1,52	0,45	1,34	0,98	0,94	1,34	0,55	0,33	0,27

Table 26 presents results of cluster analysis, when marzes are divided into 2, 3, 4 and 5 clusters correspondingly. Hierarchic cluster analysis and Euclid's algorithm were applied.

Table 27 reflects on disease group profiles length matrix in marzes, where 10% of cells in red show the highest and those in green - the lowest distance. The marz profile distance 'from itself' is 0. The distances are not recorded. Figure 32 presents the cluster analysis dendrogram.

Table 26. Classification of marzes of Armenia (clustering) per disease groups, per first time in life diagnosed disease rates, per 100000 population, 2012

Marzes	5 clusters	4 clusters	3 clusters	2 clusters
Aragatsotn	1	1	1	1
Gegharkunik	1	1	1	1
Vayots Dzor	1	1	1	1
Tavoush	1	1	1	1
Ararat	2	2	1	1
Armavir	3	3	2	1
Lori	3	3	2	1
Yerevan	4	3	2	1
Kotayk	4	3	2	1
Shirak	4	3	2	1
Syunik	5	4	3	2

Table 27. Disease group distance matrix. Euclidean squared distance is calculated. Ten percent of cells showing the highest distance are colored in red and cells showing the shortest distance are in green. Marz profile distance 'from itself' is equal to 0 and is not recorded.

	Aragat.	Ararat	Armavir	Geghar.	Yerevan	Lori	Kotayk	Shirak	Syunik	Vayots Dzor	Tavoush
Aragatsotn	-	2.63	4.03	1.90	4.70	3.40	2.13	3.86	3.76	1.42	0.99
Ararat	2.63	-	4.52	3.59	5.17	3.49	3.68	2.95	5.59	4.48	2.64
Armavir	4.03	4.52	-	3.46	4.08	2.56	2.93	2.34	5.82	4.92	2.95
Gegharkuni	1.90	3.59	3.46	-	4.53	4.25	2.53	3.07	2.76	3.59	1.33
Yerevan	4.70	5.17	4.08	4.53	-	3.36	2.13	2.70	3.03	4.97	3.42
Lori	3.40	3.49	2.56	4.25	3.36	-	3.34	2.81	5.46	4.15	3.45
Kotayk	2.13	3.68	2.93	2.53	2.13	3.34	-	1.68	3.64	2.15	1.44
Shirak	3.86	2.95	2.34	3.07	2.70	2.81	1.68	-	3.92	4.89	2.95
Syunik	3.76	5.59	5.82	2.76	3.03	5.46	3.64	3.92	-	4.97	3.02
Vayots Dzor	1.42	4.48	4.92	3.59	4.97	4.15	2.15	4.89	4.97	-	2.03
Tavoush	0.99	2.64	2.95	1.33	3.42	3.45	1.44	2.95	3.02	2.03	-

Figure 32. Dendrogram of cluster analysis of Armenia marz distance group profiles

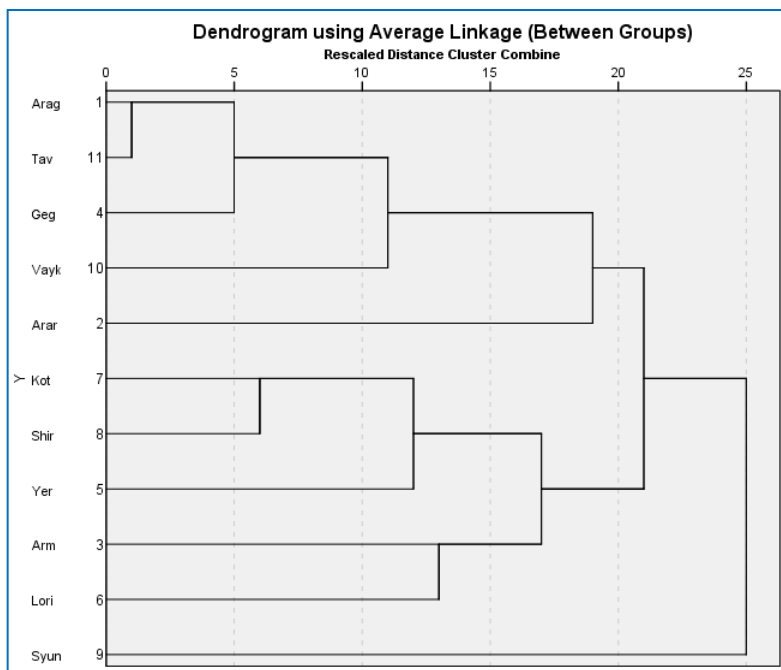


Table Date of Table 27 and Figure 32 lead to a number of conclusions. In terms of distance of disease group profiles the most ‘outstanding’ marz is Syunik. When marz profiles are broken into two clusters, all marzes are united under one cluster, whereas Syunik marz alone comprises the second cluster.

Armenian marzes (with exception of Syunik) when grouped into three clusters according to disease group prevalence suggest two clusters:

- The first cluster includes Aragatsotn, Tavoush, Gegharkunik, Vayots Dzor and Ararat marzes (similarly of the first four was highlighted in Tables 24 and 25 as well).
- The second covers Kotayk, Shirak, Lori and Armavir marzes and the capital of Yerevan.

The following happens when the number of clusters continues increasing under 5-cluster classification:

- Ararat marz separates from Aragatsotn, Tavoush, Gegharkunik, Vayots Dzor forming a separate cluster.
- The above-said second cluster breaks into two clusters with one including Kotayk, Shirak and Yerevan and the other Armavir and Lori.

‘The best’ clustering is the 5-cluster solution with first containing Syunik, second Ararat, the third Aragatsotn, Tavoush, Gegharkunik and Vayots Dzor and the fifth Armavir and Lori marzes.

Observation of disease profiles after clustering helps understanding the situation and criss-crossing marzes. Table 28 presents morbidity profiles after division into five clusters.

Table 28. Breakdown of morbidity according to groups and clusters

Disease groups	Aragatsotn Tavoush, Gegharkunik, Vayots Dzor	Yerevan, Kotayk, Shirak	Armavir, Lori	Ararat	Syunik
A00-B99 Certain infectious and parasitic diseases	882	2.435	1.822	1200.2	3522.9
C00-D48 Neoplasms	331	486	422	205.3	289.4
E00-E90 Endocrine, nutritional and metabolic diseases	471	443	641	497	463.4
F00-F99 Mental and behavioral disorders	104	366	362	96.1	158.4
G00-G99 Diseases of the nervous system	1.036	604	1.115	793.7	1044.9
H00-H59 Diseases of the eye and adnexa	978	1.467	1.506	2987.9	468.9
I00-I99 Diseases of the circulatory system	2.288	2.343	3.104	1849.8	1488.1
J00-J99 Diseases of the respiratory system	8.373	6.409	6.593	9703.2	8871.8
K00-K93 Diseases of the digestive system	1.484	808	1.704	1515.2	1196.9
L00-L99 Diseases of the skin and subcutaneous tissue	779	1.371	1.400	1373.1	1226.2
M00-M99 Diseases of the musculoskeletal system and connective tissue	771	705	1.404	955.5	250
N00-N99 Diseases of the genitourinary system	1.684	2.064	2.055	1421.1	1149.3
S00-T98 Injury, poisoning and certain other consequences of external causes	1.669	1.404	2.070	2349.8	1461.5

Source: NHIAC, 2013

Prior to in-depth analysis of morbidity rates the following important fact should be taken into consideration. Today a big number of private clinics practice in Armenia and not all of them submit statistical reports to NHIAC. This puts under question the relevance and validity of statistics on diseases recorded by public PHC sites vis-à-vis to what extent do these data present the actual morbidity rates in Armenia.

An attempt was made to understand the situation exploring data of HSPA 2012. First of all it should be noted that today citizens of Armenia can seek healthcare services at medical organizations with which they have an agreement.

Encounters with private and public primary healthcare facilities, 2012

Figure 34 reflects on utilization of public (health post, ambulatory, policlinic, family physician) and private (private clinic, private provider, traditional medicine center) PHC services by 15 and older population of Armenia during 2012. Analysis suggest that 22.6% of 15 and older population sought care at public sites during the 12 months preceding the survey and only 7.7% had applied to private clinics, which comprises 25.4% of utilization of public and private health services (Figure 34). In fact 17.8% of all respondents encountered with PHC sites have applied to private clinics only.

The presented figures provide somewhat crude picture since the mass survey revealed only cases when the services delivered by private and public settings were utilized during the past 1 year by respondents who needed care. More than one visit to the public and/or private health facilities during the year by the same patient was not considered. If assumed that patients have stable health behavior the assessment may be considered quite adequate.

Visits to private PHC clinics in 2012 cover significant share of all visits to primary care facilities (25%).

Visits to private PHC clinics are not recorded in Armenia, which essentially changes (reduces) the picture for both general morbidity and certain disease groups.

The study of the factors used to assess disease level changes, which are based on recorded statistical data on diseases, may distort the actual picture.

Statistical data from private primary care clinics should be collected as well.

An initial assessment of both absolute(Figure...) and relative number (per 100000 population) of patients who have utilized PHC services according to disease groups can be made.

According to analysis of 2012 NHIAC and HSPA data encounters with public PHC facilities comprised 47.608/100000, and to private clinics 15.368/100000, i.e. 62.973/100000 in total.

Figure 33. Ratio of encounters with public and private PHC clinics, 2012

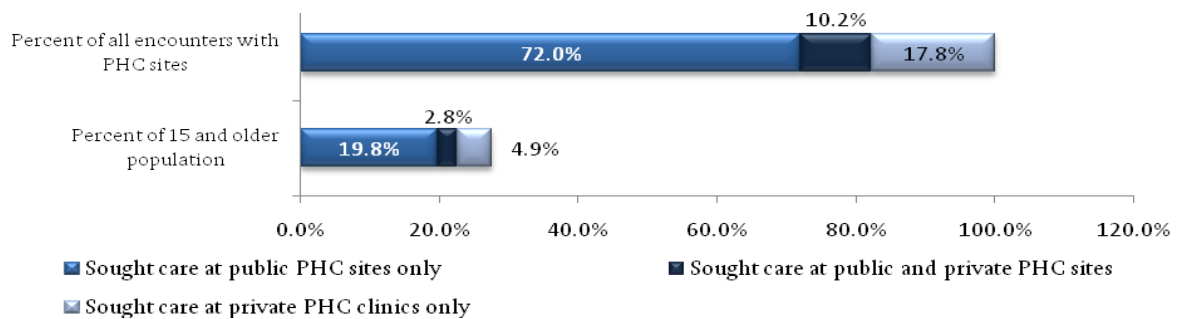


Figure 34. Encounters with private PHC clinics, HSPA 2012

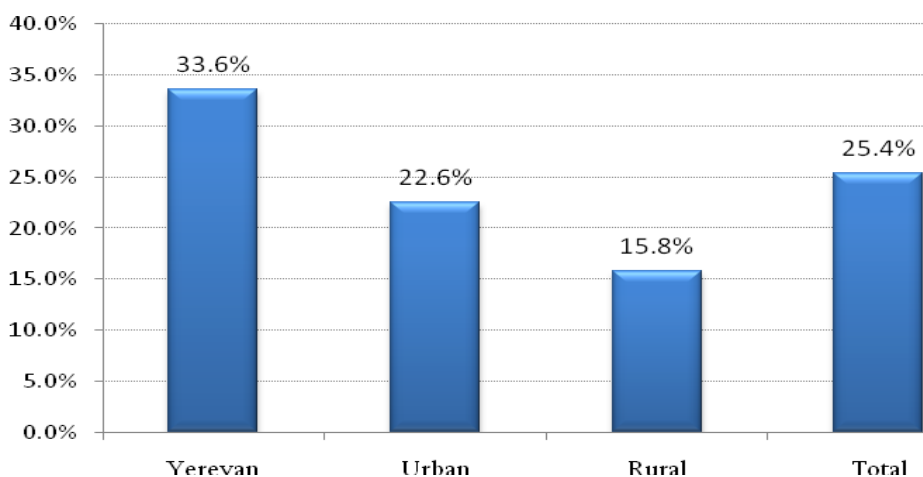
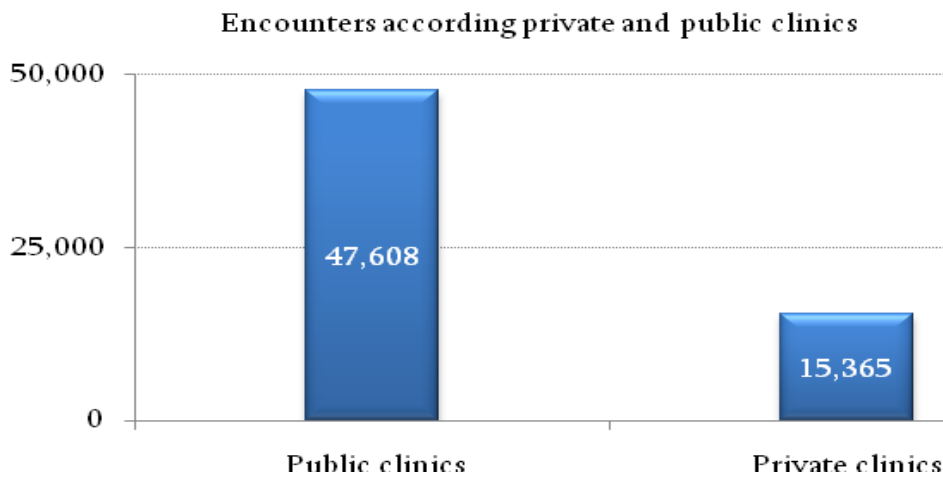


Figure 35. Encounters with private and public PHC clinics, 2012



Source: NHIAC, 2013

Table 29. Assessment of population morbidity rates according to data of public and private clinics, 2012

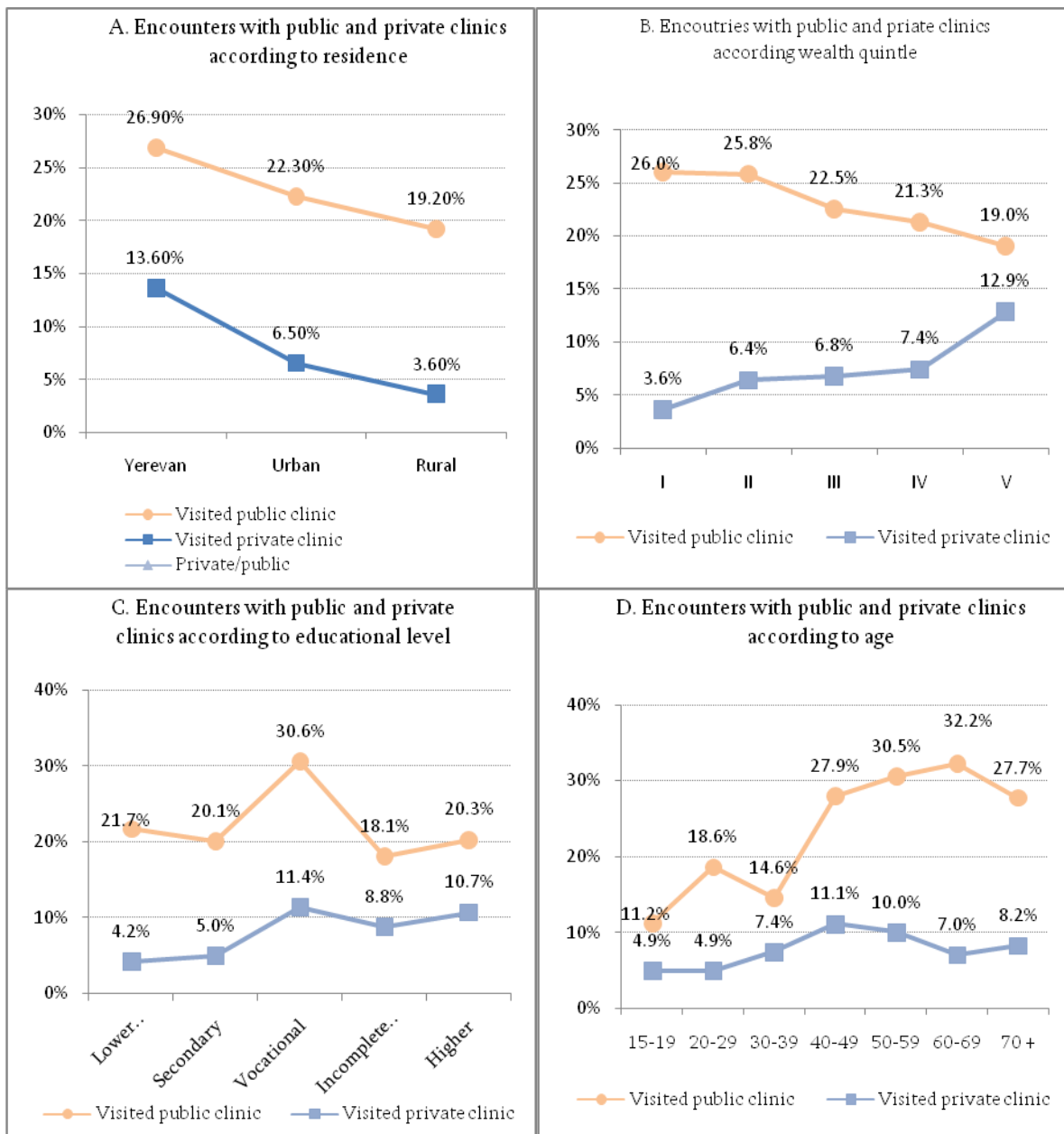
Disease groups	NIH NHIAC, 2012	HSPA 2012
J00-J99 Diseases of the respiratory system	7,195.1	9,517.3
I00-I99 Diseases of the circulatory system	2,380.1	3,148.3
A00-B99 Certain infectious and parasitic diseases	2,008.1	2,656.2
N00-N99 Diseases of the genitourinary system	1,901.0	2,514.6
O00-O75, O81-O99 Pregnancy, childbirth and the puerperium	1,848.5	2,445.1
S00-T98 Injury, poisoning and certain other consequences of external causes	1,645.8	2,177.0
H00-H59 Diseases of the eye and adnexa	1,471.1	1,945.9
L00-L99 Diseases of the skin and subcutaneous tissue	1,266.1	1,674.7
K00-K93 Diseases of the digestive system	1,154.9	1,527.6
M00-M99 Diseases of the musculoskeletal system and connective tissue	832.5	1,101.2
G00-G99 Diseases of the nervous system	802.9	1,062.0
H60-H95 Diseases of the ear and mastoid process	716.9	948.3
E00-E90 Endocrine, nutritional and metabolic diseases	486.9	644.0
C00-D48 Neoplasms	415.9	550.1
F00-F99 Mental and behavioral disorders	286.4	378.8
D50-D89 Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	205.3	271.6
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	129.3	171.0
Q00-Q99 Congenital malformations, deformations and chromosomal abnormalities	20.7	27.4
P00 - P96 Certain conditions originating in the perinatal period	-	

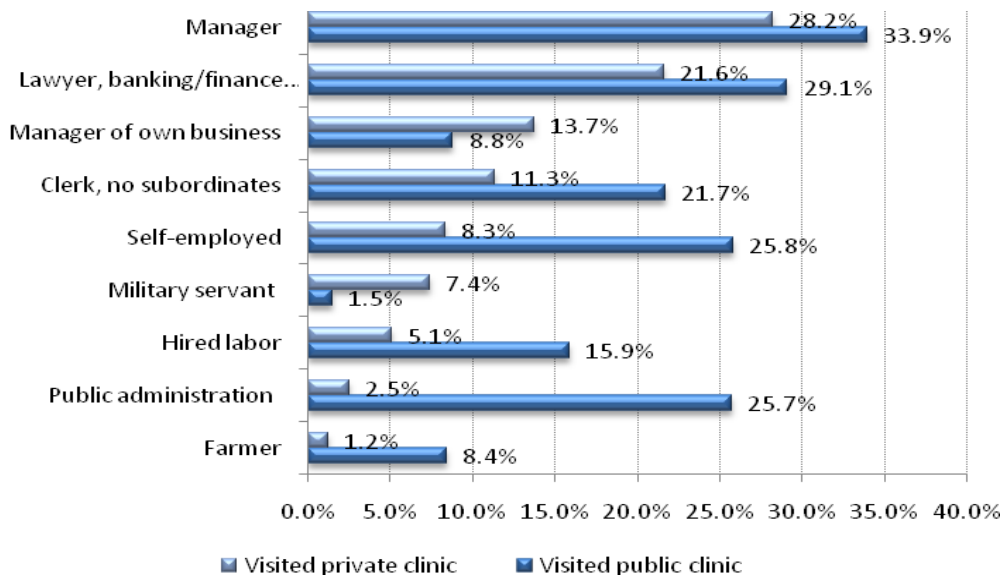
Source: HSPA, NHIAC, 2012

Trends of utilization of public and private primary care services by certain population groups are presented in Figure 36. The number of patients visiting private PHC sites in Yerevan is nearly twice higher the rate in other urban settings (6.5%), and the latter in its turn is twice higher than in rural

areas (3.6%). Encounters with Yerevan private outpatient clinics share one-third (33.6%) of all visits to PHC level, followed by 22.6% in other urban areas and 15.8% in rural ones. The more well-off and educated the household the higher is the likelihood of utilizing services provided by private care facilities. Utilization of private clinic services is comparatively high among 40-59 age groups, which is also linked to the employment status of the person. The rate of private PHC care utilization is the highest among managerial staff (28.2%), lawyers, banking and financial sector, accountants and medical doctors (21.6%).

Figure 36. Public and private PHC encounters according to sociodemographic indicators





Source: HSPA, 2012

Correlation of morbidity rate to proportion of relevant physicians

The next question discussed in this section is dependence of morbidity rate on the proportion of physicians specialized in treatment of those disease groups.

Understanding the correlation will help revealing a possible positive correlation between the said two indicators, suggesting that certain diseases within the disease group are not detected because of limited number of relevant physicians. Hence, if the latter is increased the morbidity rate for these diseases will increase as part of the latent cases will be detected.

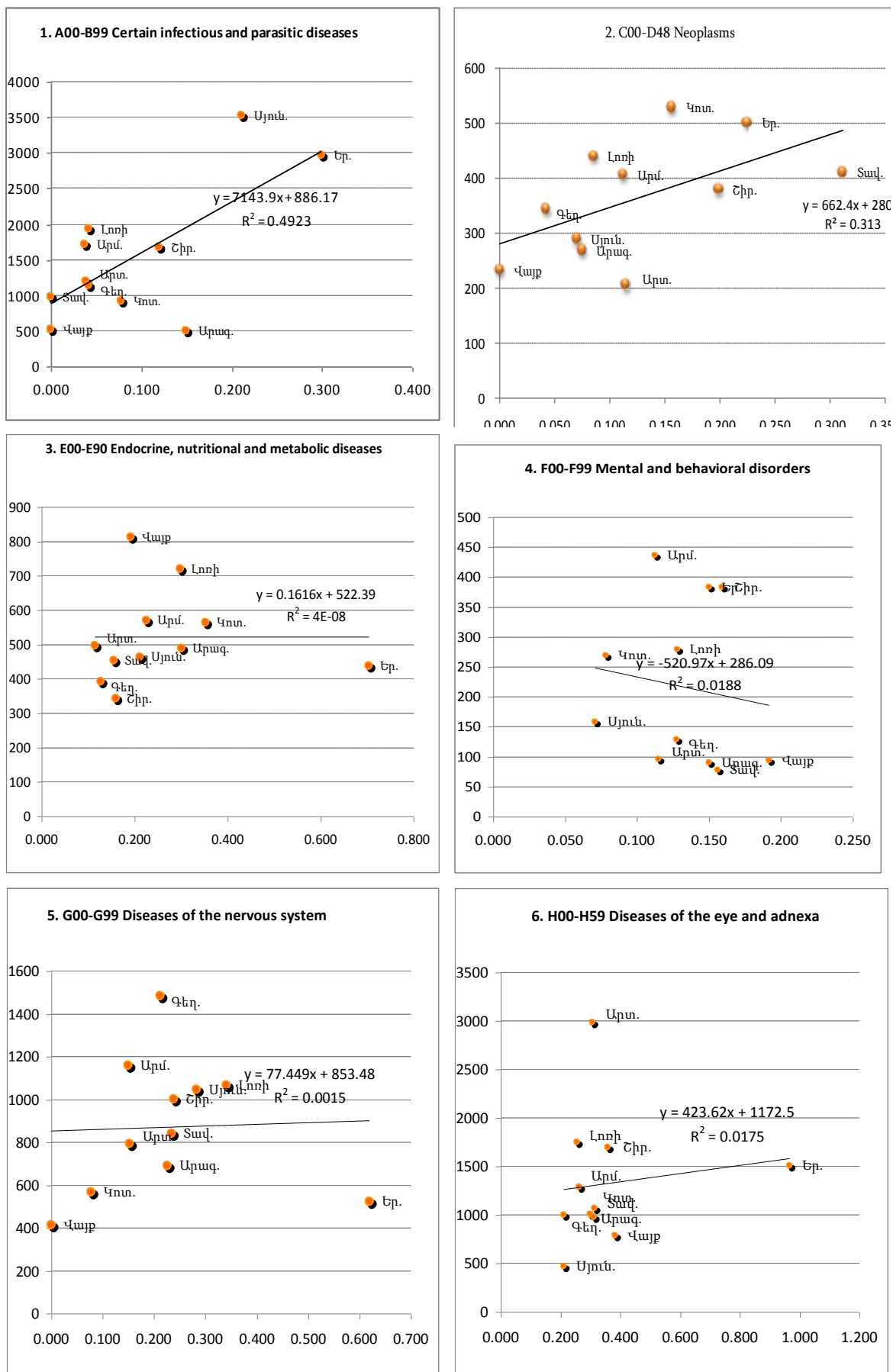
To identify this correlation, dispersion diagrams for per disease group per marz morbidity rate (per 100000 population) and proportion of corresponding physicians (per 10000 population) were build. Figure 37, 1-11 shows the slope ratio of linear regressions (BETA) and regression-based dispersions (R²).

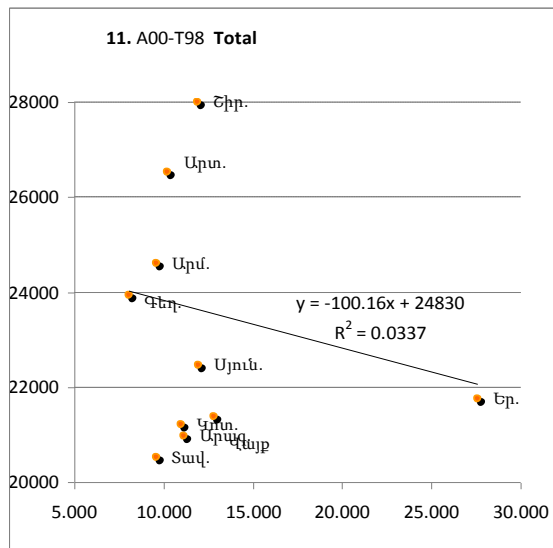
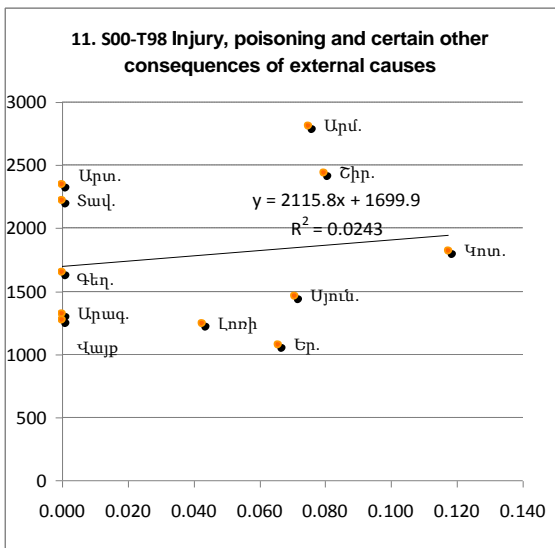
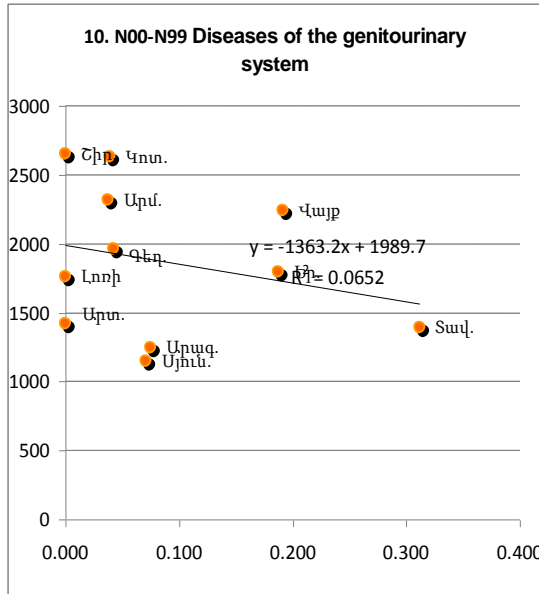
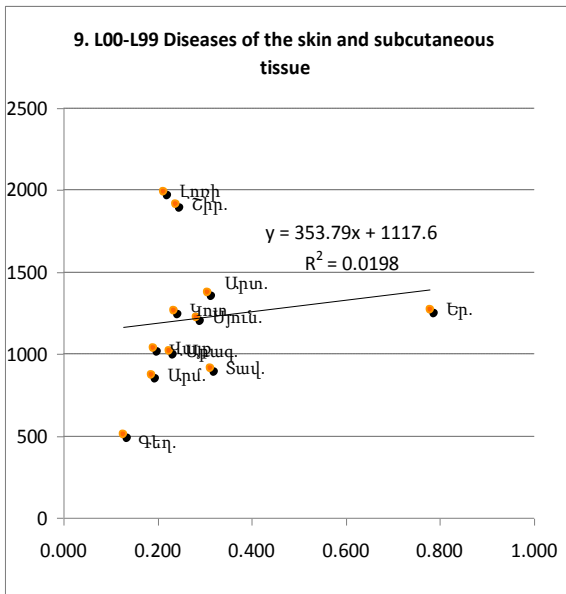
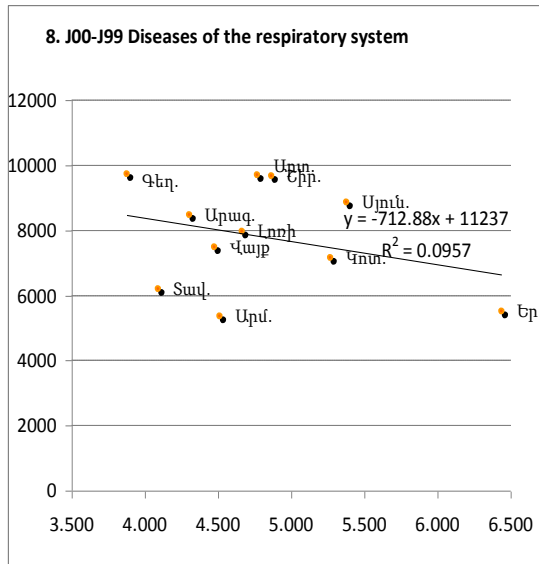
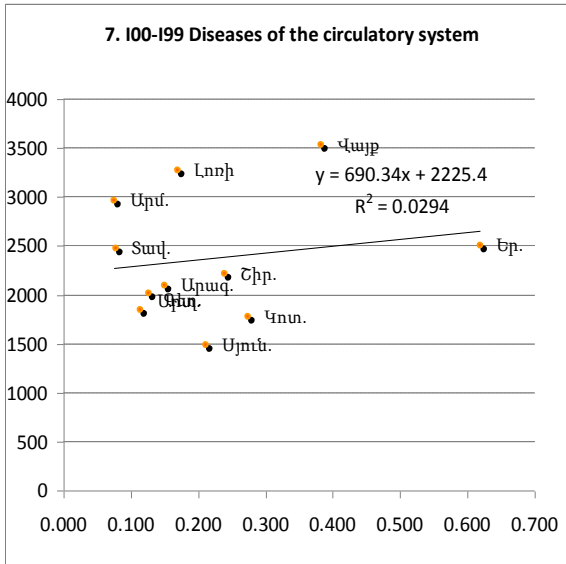
Table 30. Beta and R² of morbidity rate according to disease groups (100000 population) and proportion of corresponding medical specialists (per 10000 population)

Disease groups	Beta	R ²
A00-B99 Certain infectious and parasitic diseases	7143	0.492
C00-D48 Neoplasms	622	0.313
E00-E90 Endocrine, nutritional and metabolic diseases	0	0.000
F00-F99 Mental and behavioral disorders	-520	0.018
G00-G99 G99 Diseases of the nervous system	77	0.001
H00-H59 Diseases of the eye and adnexa	423	0.017
I00-I99 Diseases of the circulatory system	690	0.029
J00-J99 Diseases of the respiratory system	-712	0.095
L00-L99 Diseases of the skin and subcutaneous tissue	353	0.019
N00-N99 Diseases of the genitourinary system	-1363	0.065
S00-T98 Injury, poisoning and certain other consequences of external causes	2115	0.024
A00-T98 Total	-100	0.033

Source: NHIAC, 2012

Figure 37. Dispersion diagrams of morbidity rate and proportion of relevant physicians according to marzes





Source: NHIAC, 2013

According to above data the increase of the proportion of doctors may contribute to the growth of morbidity rate only for blocks A00-B99 Certain Infectious and Parasitic Diseases ($R^2=0,492$) and C00-D48 Neoplasms ($R^2=0.313$). In the first case addition of one doctor will increase the detection rate to 7143/100000 and in case of the second doctor - to 622/100000. Failure to identify linear connection with other disease groups does not necessarily mean absence of the linkage. They may be not detected due to combined impact of other factors.

Conclusions

The increase of the rates of utilization of primary healthcare services between 2007 and 2009 as well as 2011 and 2012 does not reflect the actual growth of morbidity rate in Armenia.

Among factors contributing to better utilization of PHC services are improved financial and/or geographic access or changes in population health behavior.

The biggest relative growth of morbidity was recorded for the following blocks:

- R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified - 2,23 times between 2007 and 2012
- M00-M99 Diseases of the musculoskeletal system and connective tissue - 71%.

In terms of prevalence of morbidity groups the ten marzes of Armenia and Yerevan city can be classified into the following groups:

- Syunik marz
- Ararat marz
- Aragatsotn, Tavoush, Gegharkunik and Vayots Dzor marzes
- Kotayk, Shirak and Yerevan
- Armavir and Lori marzes

Encounters with private PHC clinics during 2012 comprise a notable share of all visits to primary care facilities (25%). Visits to private PHC clinics are not recorded in Armenia, which essentially changes (reduces) the morbidity and incidence picture for both general morbidity and certain disease groups.

The study of the factors used to assess the changes of disease levels, which are based on recorded statistical data on diseases, may distort the actual picture. Statistical data from private clinics providing primary care services should be collected as well.

The proportion of patients visiting private PHC sites in Yerevan nearly twice exceeds that in other urban settings (6.5%), and the latter in its turn is twice higher the rate in rural areas (3.6%). The more well-off and educated the household the higher is the likelihood of utilizing services provided by private care facilities. Utilization of private clinic services is comparatively high among 40-59 age groups. In addition, the rate of encounters with private PHC care settings is higher among various managers, well-paid specialists, including lawyers, banking and finance sector employees, accountants and medical doctors.

The increase of the relative number of doctors may contribute to increase of morbidity rates for latent diseases under A00-B99 Certain Infectious and Parasitic Diseases and C00-D48 Neoplasms. In fact an increase by one doctor leads to the increase of detected diseases by 7.143/100000 and 622/100000 correspondingly.

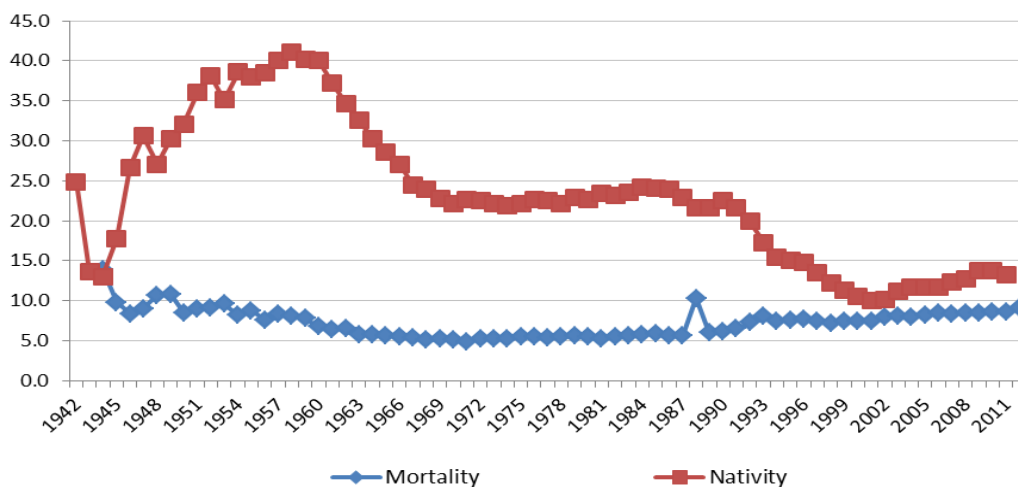
Population mortality

General mortality dynamics between 2000 and 2011

The total mortality rate in Armenia for the period covering 1949-1989 showed decline trends connected with year-to-year improvement of socioeconomic situation and wellbeing of the population as well as development of the healthcare system (Figure 38). The total mortality rate per 1000 population dropped from 10.9 to 6.0 between 1949 and 1989. The sharp increase of mortality (10.3) in 1988 was due to natural disaster (Spitak earthquake).

During post-soviet years the total mortality rate showed steady increase tendency (from 6.5 in to 9.5 in 2012). One sharp jump (8.1 in 1993 compared to 7.3 in 1992 and 7.5 in 1995) was recorded attributed to the losses suffered during the heaviest period of the Karabagh war in 1993.

Figure 38. Total mortality and nativity rates in Armenia, 1942-2012



The total natality rate showed steady growth tendency until 1958 (41.1 births per 1000 population) explained by brisk development of healthcare system in soviet Armenia. Cumulative natality rate declined to 22.1 during 1958-1973, which should be attributed to cultural changes in industrialized society typical for all industrial economies. This was followed by slight improvement of the total natality rate (from 22.1 to 24.2) followed by improved social conditions of families such as opening new nurseries and kindergartens, improvement of housing, increasing number of child camps and recreation sites as well as benefits for employed women.

Mortality, nativity and natural growth dynamics across marzes between 2000 and 2011

Tables 31 through 34 present dynamics of total mortality, natality, natural growth and infant (under-1) mortality rates across marzes of Armenia over the past twelve years (2000-2011).

The higher the rates in mortality tables (negative content) the darker shades of red are applied and correspondingly the lower the rate the darker is the shade of green. In natural growth and natality tables the higher the rates (positive content) the darker are the shades of green and the lower the rates, the darker are the shades of red.

In every table colors of any two cells are compatible thus helping to easily assess marz dynamics within time (shades per line) and marz differences within every year (shades per column).

Criss-crossing total mortality rates in marzes (Table 31) revealed the following trends:

- In 2011 the highest total mortality rates were recorded in Lori (10.3), Tavoush (10,0) and Shirak (9.9) marzes. Analysis of morbidity rates point at the highest levels in Shirak (27.99) and Lori (28.17) marzes which implies high mortality rates.
- The highest total mortality rates in these marzes were recorded in the beginning of the reference period (2000) and were 9.2, 8.5 and 8.1 correspondingly.
- The total mortality rate in Aragatsotn (8.8) exceeded the total national level (8.6).
- The other marzes had lower levels compared with the national rate ranging from 7.9 (Kotayk) to 8.4 (Syunik).
- Total mortality rates between 2000 and 2011 in all marzes showed an increase tendency, with exception of Syunik and Vayots Dzor, where the rate increased until 2009, followed by slight decrease during 2010-2011.

Observations of the cumulative natality rate dynamics (Table 32) lead to the following conclusions.

- An increase of natality rate was detected all over Armenia including all marzes between 2000 and 2009 or throughout 2010. However in 2012 the country felt the impact of the acute and ongoing decline of natality that had started in 1993. This means that every following year this impact will become more and more apparent.
- In terms of cumulative birth rate the situation is relatively good in Yerevan (14.0 in 2011) and close regions including Aragatsotn (13.9), Armavir (13.8), Kotayk (13.6). The most unfavorable situation was recorded in Syunik (10.4), Tavoush (11.3), Vayots Dzor (11.6) and Lori (12.0).

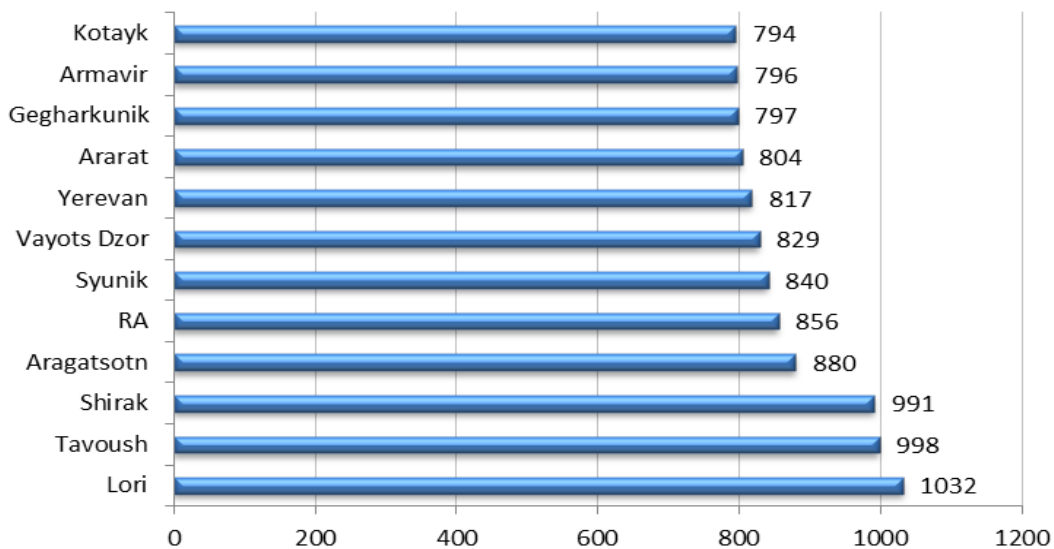
The situation with natural growth has improved in Armenia between 2000 and 2011, since the growth of the cumulative birthrate took over the very weak growth of mortality. The cumulative natural growth rate climbed up from 3.1 to 4.7 between 2000 and 2011.

- In 2011 a higher-average cumulative natural growth rate was recorded in Armavir (5.8), Yerevan (5.8), Kotayk (5.7), Gegharkunik (5.4), Aragatsotn (5.1) and Ararat (5.1).
- The most unfavorable situation in terms of natural growth was detected in three marzes - Tavoush (1.3), Lori (1.7) and Syunik (2.0).
- Lower-national rates were recorded in Vayots Dzor (3.3) and Shirak (3.3).

Cumulative infant mortality rates presented in Table 34 pinpoint at the following tendencies.

- Cumulative infant mortality rate in the country went up between 2009 and 2011 reaching 11.6 in 2011.
- In terms of infant mortality the worst situation was revealed in Shirak marz where twice higher rate (23.3) was recorded compared with the average national level. Next marz to follow is Aragatsotn (16.9). In fact Aragatsotn and Syunik (16.2) compose the next infant mortality group after Shirak.
- Infant mortality cumulative rates were higher than the national average also in Lori (13.3), Kotayk (13.2) and Gegharkunik (13.1).
- As regards infant mortality cumulative rates the situation is more favorable in Vayots Dzor (6.1), Yerevan (7.5) and Tavoush (7.8).

Figure 39. Mortality in marzes per 100000 population, 2011



Source: NSS

Table 31. Total mortality rates in marzes, 2000-2011

Marz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Lori	9.2	8.9	9.3	9.5	9.3	9.5	9.9	10.2	10.3	10.3	10.4	10.3
Tavoush	8.5	9.0	9.5	9.7	9.4	9.5	10.2	10.1	10.3	10.6	10.0	10.0
Shirak	8.1	8.5	9.0	8.5	8.9	9.0	9.3	9.4	9.3	9.8	10.0	9.9
Aragatsotn	7.3	6.9	7.7	8.1	8.1	7.9	8.3	8.5	8.5	9.0	8.7	8.8
RA	7.5	7.5	8.0	8.1	8.0	8.2	8.5	8.3	8.5	8.5	8.6	8.6
Syunik	7.1	7.5	7.6	7.7	8.0	8.3	8.9	8.1	8.0	8.7	8.3	8.4
Vayots Dzor	7.6	7.3	7.9	7.9	7.7	8.8	9.0	8.4	8.4	8.9	8.8	8.3
Yerevan	7.6	7.7	8.1	8.2	8.1	8.2	8.3	7.9	8.2	8.0	8.2	8.2
Ararat	6.5	6.6	7.2	7.4	7.2	7.5	7.4	7.7	7.9	7.9	8.1	8.1
Gegharkunik	6.8	6.6	7.5	7.5	7.1	7.6	7.9	7.5	7.9	7.9	8.0	8.0
Armavir	6.6	6.6	7.0	7.6	7.2	7.4	7.7	7.5	7.9	7.7	8.0	8.0
Kotayk	6.3	6.2	6.7	7.2	7.0	7.3	7.5	7.9	8.0	8.0	7.8	7.9

Source: NSS

Table 32. Total natality rates in marzes, 2000-2011

Marz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Yerevan	9.5	9.3	9.5	10.2	10.9	11.1	11.2	12.1	12.6	13.8	13.9	14.0
Aragatsotn	12.4	10.8	11.1	12.1	12.6	12.7	12.8	13.3	13.5	14.3	15.2	13.9
Armavir	11.0	10.1	10.0	10.9	12.2	12.2	12.0	12.7	12.6	14.0	14.2	13.8
Kotayk	10.8	10.1	10.0	11.5	12.2	12.1	12.4	13.6	13.3	14.7	14.0	13.6
Gegharkunik	11.5	10.5	10.5	12.2	12.9	13.2	12.7	13.1	13.5	14.2	14.3	13.4
RA	10.6	10.0	10.1	11.2	11.7	11.7	11.7	12.4	12.7	13.7	13.8	13.3
Ararat	10.5	9.6	10.0	11.1	11.8	11.7	11.7	12.8	12.9	13.6	14.1	13.2
Shirak	10.7	10.0	9.9	11.4	12.0	11.8	11.9	12.4	13.6	14.2	13.7	13.2
Lori	11.7	10.7	10.6	12.2	11.8	11.4	11.2	11.3	12.0	12.3	13.1	12.0
Vayots Dzor	12.3	11.8	10.8	12.1	11.9	11.9	11.3	12.3	13.1	12.5	12.4	11.6
Tavoush	12.0	11.0	11.3	12.4	12.5	11.6	12.0	12.4	11.4	13.4	12.6	11.3
Syunik	11.4	10.1	10.3	11.5	10.9	10.5	10.7	11.4	11.5	11.5	11.3	10.4

Source: NSS

Table 33. Total natural growth rates in marzes, 2000-2011

Marz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
RA	3.1	2.5	2.1	3.1	3.7	3.5	3.2	4.1	4.2	5.2	5.2	4.7
Armavir	4.4	3.5	3.0	3.3	5.0	4.8	4.3	5.2	4.7	6.3	6.2	5.8
Yerevan	1.9	1.6	1.4	2.0	2.8	2.9	2.9	4.2	4.4	5.8	5.7	5.8
Kotayk	4.5	3.9	3.3	4.3	5.2	4.8	4.9	5.7	5.3	6.7	6.2	5.7
Gegharkunik	4.7	3.9	3.0	4.7	5.8	5.6	4.8	5.6	5.6	6.3	6.3	5.4
Aragatsotn	5.1	3.9	3.4	4.0	4.5	4.8	4.5	4.8	5.0	5.3	6.5	5.1
Ararat	4.0	3.0	2.8	3.7	4.6	4.2	4.3	5.1	5.0	5.7	6.0	5.1
Shirak	2.6	1.5	0.9	2.9	3.1	2.8	2.6	3.0	4.3	4.4	3.7	3.3
Vayots Dzor	4.7	4.5	2.9	4.2	4.2	3.1	2.3	3.9	4.8	3.6	3.6	3.3
Syunik	4.3	2.6	2.7	3.8	2.9	2.2	1.8	3.3	3.5	2.8	3.0	2.0
Lori	2.5	1.8	1.3	2.7	2.5	1.9	1.3	1.1	1.7	2.0	2.7	1.7
Tavoush	3.5	2.0	1.8	2.7	3.1	2.1	1.8	2.3	1.1	3.1	2.6	1.3

Source: NSS

Table 34. Total infant mortality rates in marzes, 2000-2011

Marz	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
RA	15.6	15.4	14.0	12.0	11.6	12.3	13.9	10.9	10.8	10.4	11.4	11.6
Shirak	15.6	22.3	17.4	14.6	15.2	17.4	22.2	21.6	18.8	19.1	19.8	23.3
Aragatsotn	16.1	9.3	8.5	7.3	6.3	5.7	12.8	8.1	6.9	12.6	10.4	16.9
Syunik	11.3	14.0	11.6	7.5	14.8	11.2	14.7	14.4	9.1	8.0	15.1	16.2
Lori	17.6	14.4	16.2	15.9	14.8	15.0	16.9	15.9	18.8	17.1	16.1	13.3
Kotayk	17.8	15.3	12.4	10.4	9.4	8.1	13.8	13.7	8.3	10.6	9.6	13.2
Gegharkunik	16.3	17.8	15.6	12.8	6.6	12.1	17.1	10.0	11.8	7.7	16.8	13.1
Armavir	11.5	12.6	14.5	8.7	9.4	9.2	14.3	11.1	9.3	11.1	10.9	11.3
Ararat	14.8	19.0	9.3	5.9	7.2	7.5	11.2	9.1	12.3	12.4	11.7	11.0
Tavoush	11.8	16.8	16.0	15.0	11.3	11.9	16.2	12.0	14.3	13.3	9.9	7.8
Yerevan	16.1	14.0	15.0	13.7	13.6	14.5	10.5	6.9	7.3	5.8	7.2	7.5
Vayots Dzor	24.2	12.1	4.8	12.4	10.6	13.6	14.2	4.4	12.4	15.8	18.7	6.1

Source: NSS

Table 35. Dynamics of mortality age rates in Armenia, 1999-2011 (for comparison of ratio profiles)

Year	0	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
1999	15.4	3.4	0.2	0.2	0.5	0.5	0.7	1.1	1.5	2.5	4.4	6.6	11.8	19.3	30.9	72.0
2000	15.6	3.4	0.2	0.2	0.4	0.6	0.7	1.1	1.8	2.5	4.0	6.4	9.9	18.7	28.8	69.0
2001	15.4	3.1	0.1	0.2	0.4	0.5	0.9	1.3	1.8	2.6	4.0	6.1	10.7	17.6	27.3	67.3
2002	14.0	2.7	0.2	0.2	0.4	0.4	0.6	1.2	1.6	2.6	3.8	6.9	10.1	17.0	28.8	75.5
2003	12.0	2.6	0.2	0.2	0.3	0.5	0.7	1.0	1.6	2.5	4.1	6.6	10.5	16.5	28.7	75.9
2004	11.6	2.7	0.2	0.2	0.3	0.5	0.6	1.0	1.6	2.4	4.1	6.4	10.2	17.1	28.0	73.3
2005	12.3	2.9	0.2	0.2	0.4	0.4	0.6	1.1	1.6	2.5	3.8	6.7	10.4	16.1	27.1	75.4
2006	13.9	3.3	0.2	0.2	0.4	0.6	0.8	1.1	1.6	2.7	4.0	6.6	10.3	16.8	27.0	75.4
2007	10.9	2.7	0.2	0.2	0.4	0.5	0.7	0.9	1.5	2.6	4.0	6.4	10.0	15.7	24.9	74.0
2008	10.7	2.6	0.2	0.2	0.4	0.6	0.6	1.0	1.6	2.8	3.9	6.3	10.3	16.0	25.1	73.4
2009	10.2	2.7	0.2	0.2	0.5	0.5	0.7	1.0	1.5	2.5	3.7	6.2	10.0	16.5	23.5	72.9
2010	11.4	3.0	0.2	0.2	0.5	0.5	0.6	0.9	1.4	2.5	3.8	6.0	9.3	15.3	23.7	73.3
2011	11.7	2.9	0.2	0.2	0.5	0.6	0.6	0.8	1.5	2.3	3.7	5.8	9.1	15.4	22.0	72.6

Source: NSS

Table 36. Dynamics of mortality age rates in Armenia, 1999-2011 (for comparison of age ratio dynamics rows)

Year	0	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70+
1999	15.4	3.4	0.2	0.2	0.5	0.5	0.7	1.1	1.5	2.5	4.4	6.6	11.8	19.3	30.9	72.0
2000	15.6	3.4	0.2	0.2	0.4	0.6	0.7	1.1	1.8	2.5	4.0	6.4	9.9	18.7	28.8	69.0
2001	15.4	3.1	0.1	0.2	0.4	0.5	0.9	1.3	1.8	2.6	4.0	6.1	10.7	17.6	27.3	67.3
2002	14.0	2.7	0.2	0.2	0.4	0.4	0.6	1.2	1.6	2.6	3.8	6.9	10.1	17.0	28.8	75.5
2003	12.0	2.6	0.2	0.2	0.3	0.5	0.7	1.0	1.6	2.5	4.1	6.6	10.5	16.5	28.7	75.9
2004	11.6	2.7	0.2	0.2	0.3	0.5	0.6	1.0	1.6	2.4	4.1	6.4	10.2	17.1	28.0	73.3
2005	12.3	2.9	0.2	0.2	0.4	0.4	0.6	1.1	1.6	2.5	3.8	6.7	10.4	16.1	27.1	75.4
2006	13.9	3.3	0.2	0.2	0.4	0.6	0.8	1.1	1.6	2.7	4.0	6.6	10.3	16.8	27.0	75.4
2007	10.9	2.7	0.2	0.2	0.4	0.5	0.7	0.9	1.5	2.6	4.0	6.4	10.0	15.7	24.9	74.0
2008	10.7	2.6	0.2	0.2	0.4	0.6	0.6	1.0	1.6	2.8	3.9	6.3	10.3	16.0	25.1	73.4
2009	10.2	2.7	0.2	0.2	0.5	0.5	0.7	1.0	1.5	2.5	3.7	6.2	10.0	16.5	23.5	72.9
2010	11.4	3.0	0.2	0.2	0.5	0.5	0.6	0.9	1.4	2.5	3.8	6.0	9.3	15.3	23.7	73.3
2011	11.7	2.9	0.2	0.2	0.5	0.6	0.6	0.8	1.5	2.3	3.7	5.8	9.1	15.4	22.0	72.6

Source: NSS

Dynamics of mortality age indicators in Armenia between 1999 and 2011 is presented in Tables 35 and 36. As the first table shows the mortality age indicator profile during the reference period did not change much. However the second Table revealed the following:

- Under-1 infant mortality dropped (observed in Table 34).
- Mortality of 1-4 children also decreased (from 3.4 in 1999-2000 to 2.9 in 2011).
- Mortality in 15-16 age group showed certain growth tendency.
- Certain decline tendency was detected in mortality in 65-69 age group.

Mortality according to causes-of-death

Mortality according to cause-of-death in Armenia, 2012

A total of 27,599 deaths were registered in Armenia during 2012 (912.64 per population), of which 48.3% was due to diseases of circulatory system. The most common killers did not change over 2009-2012 (Table 37) and include cardiovascular diseases sharing almost half of all causes (48.3% in 2012), malignancies (20.4%), respiratory system diseases (5.8%), digestive system diseases (5.8%), injuries and poisonings (4.9%) and endocrine diseases (4.8%). NCDs cover lion's share of all causes (80%).

Table 37. Causes of death in Armenia, 2009-2012

Cause of death	2009	2010	2011	2012
Diseases of circulatory system	49.1%	48.9%	47.6%	48.3%
Neoplasms	19.6%	19.8%	19.9%	20.4%
Diseases of the respiratory system	6.5%	5.9%	6.1%	5.8%
Diseases of the digestive system	5.9%	5.8%	6.3%	5.8%
Injury, poisoning and certain other consequences of external causes	4.4%	4.5%	4.9%	4.9%
Endocrine, nutritional and metabolic diseases	5.2%	5.2%	5.0%	4.8%
Diseases of the genitourinary system	2.6%	2.9%	2.8%	2.9%
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	2.9%	2.9%	3.2%	2.8%
Congenital malformations, deformations and chromosomal abnormalities	1.1%	1.5%	1.7%	1.6%
Certain infectious and parasitic diseases	1.0%	1.1%	0.9%	1.0%
Certain conditions originating in the perinatal period	0.7%	0.7%	0.8%	0.7%
Diseases of the nervous system	0.5%	0.6%	0.4%	0.5%
Duodenal ulcers	0.3%	0.3%	0.3%	0.3%
Diseases of the musculoskeletal system and connective tissue	0.2%	0.2%	0.2%	0.2%
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0.1%	0.1%	0.1%	0.1%
Diseases of the skin and subcutaneous tissue	0.1%	0.1%	0.0%	0.1%
Pregnancy, childbirth and the puerperium	0.0%	0.0%	0.0%	0.0%
Mental and behavioral disorders	0.0%	0.0%	0.0%	0.0%

Source: NHIAC

The shares of deaths caused by circulatory system diseases are presented in Table 38. Their shares did not change much over 2009-2012. The highest ratios include deaths due to ischemic heart diseases, other chronic conditions, which in 2012 covered 30.5% of all causes of death. Cerebrovascular diseases and acute cardiac infarction (ACI) equally account for causes of death - 10.2% and 9.4% correspondingly.

Table 38. Mortality due to circulatory system diseases according to nosologies

Cause of death	2009	2010	2011	2012
Ischemic heart diseases, chronic and other conditions	29.1%	29.4%	29.5%	30.5%
Cerebrovascular diseases	11.5%	10.6%	10.4%	10.2%
Acute cardiac infarction	9.7%	10.0%	9.1%	9.4%
Diseases associated with elevated arterial blood pressure	3.6%	3.9%	3.2%	2.8%

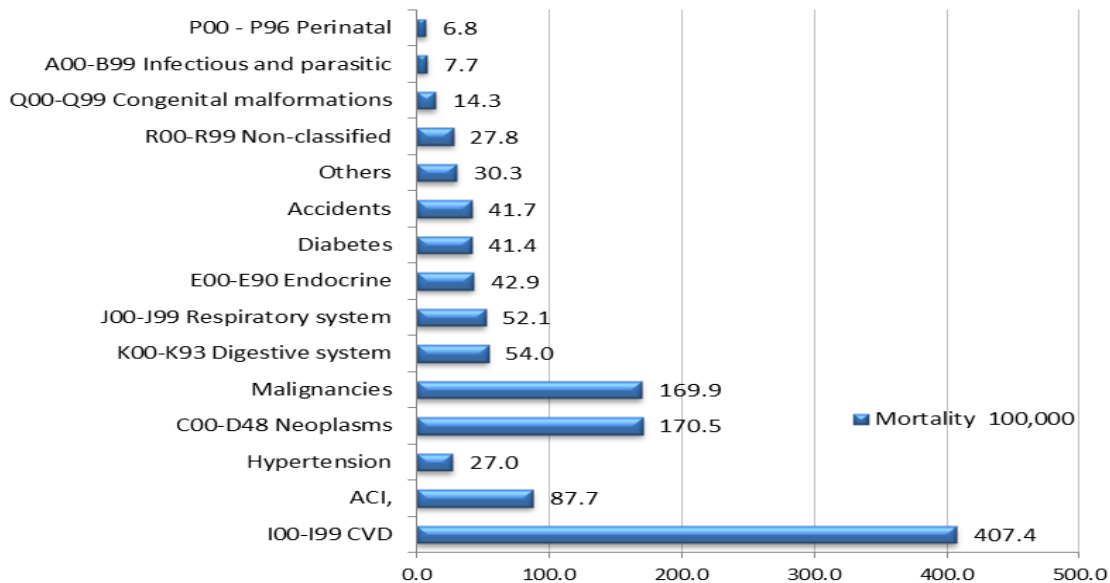
Source: NHIAC

Diabetes remains the main cause of death in endocrine diseases group and mortality due to other endocrine system diseases share as little as 0.1-0.2%.

Malignancies account for nearly all neoplasm-related deaths leaving only 0.1% to benign tumors.

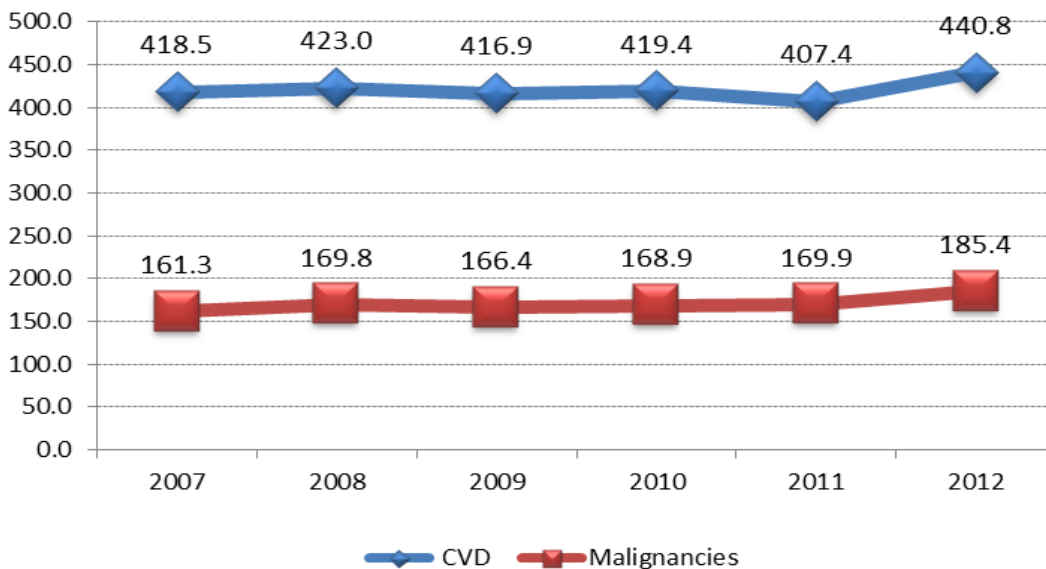
Mortality per 100000 population due to most prevalent causes in Armenia is presented in Figure 40 and the dynamics of most common causes per 100000 population in Figure 41, A and B.

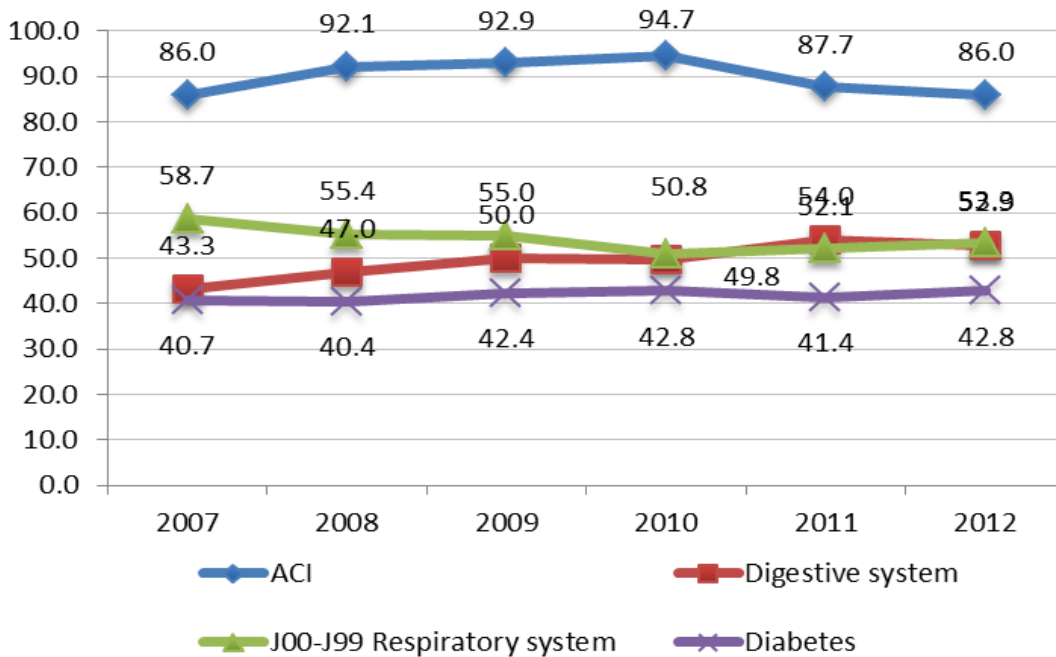
Figure 40. Mortality according to causes of death, 2012, absolute figures



Source: NHIAC

Figure 41. Dynamics of most prevalent causes of death 2007-2012





Source: NHIAC

Mortality according to causes in marzes, 2011

Table 39 presents the 2011 mortality rates in Armenia per 100000 population according to causes, thus enabling comparisons across marzes.

Data give good insight of changing sequence of causes of death as opposed to the national data.

For example the table shows nearly similar progression of the causes of death in all marzes matching with the national picture. However there are some essential exceptions, most important of which are listed below.

- Not classified causes account for much bigger proportion in Vayots Dzor, Lori and Shirak. To understand the reasons behind a targeted study is required. The rate in Vayots Dzor is 4 times higher (649.6) the national level (125.8), in Yerevan 20 times lower (34.2) compared with Vayots Dzor. In Lori the ratio of not classified causes is 422.4 and in Shirak 354.9.
- Causes of death in Vayots Dzor account for either circulatory system diseases or those not classified elsewhere. They are followed by malignancies and ICD, which are easy to diagnose as cause of death. The rates of mortality due to digestive system diseases (85.9) and respiratory system diseases (132.5) are significantly lower compared with the national average level (244.1 and 272.0 correspondingly) and other marzes. The question is to what extent are registered and actual causes of death adequate, particularly in Vayots Dzor, Lori and Shirak.

Table 39. Mortality according to main causes in marzes, per 100 000 population, 2011, cross-marz comparisons

Cause of death	Arg.	Arm.	Gegh.	Syu.	VD	Kot.	RA	Yer.	Shir.	Ar.	Lor.	Tav.
A00-T99 Total,	4349.7	3910.5	3918.2	4155.6	4273.2	3975.2	4241.8	4046.6	4840.6	3968.9	5154.6	5064.1
I00-I99 CSD,	2506.6	2193.0	2389.2	2264.8	2205.7	1845.8	2085.2	1735.7	2222.5	1989.6	2446.4	3167.8
Hypertension	230.8	188.8	160.6	133.3	134.2	132.2	140.2	114.0	73.2	19.7	179.4	457.9
C00-D48 Neoplasms,	729.9	694.3	542.5	833.3	628.2	807.7	838.8	939.4	925.6	805.2	945.9	778.8
Malignancies	726.3	693.5	540.5	705.1	622.9	802.7	836.3	936.4	924.0	802.6	943.7	778.1
ACI	367.8	480.8	401.9	402.9	302.6	515.8	453.4	560.1	390.4	374.8	203.2	501.8
J00-J99 Respiratory system	196.0	190.3	288.6	213.9	132.5	291.1	272.0	293.6	371.5	297.4	249.3	185.4
K00-K93 Digestive system	134.4	149.8	119.3	167.4	85.9	202.5	244.1	259.0	305.9	352.8	435.2	147.4
E00-E90 Endocrine	241.3	217.3	165.8	141.9	184.4	193.5	216.5	312.1	139.2	67.9	102.2	280.0
Diabetes	226.4	207.4	156.2	133.4	170.1	214.6	207.7	304.3	128.3	63.2	96.0	269.6
Accidents	192.3	164.8	147.1	220.4	168.4	237.9	197.4	190.4	202.2	201.4	245.7	199.5
Other	133.0	99.5	121.5	114.9	134.2	133.4	139.6	170.5	153.3	88.0	188.7	124.4
R00-R99 Not classified, 100000	121.6	112.0	43.1	68.7	649.6	62.5	125.8	34.2	354.9	59.7	422.4	81.1
Q00-Q99 Congenital malformations	34.6	27.7	34.4	42.5	23.4	90.1	47.4	47.6	39.9	29.1	79.4	39.6
A00-B99 Certain infectious and parasitic diseases	38.8	35.3	29.4	47.2	26.9	51.7	41.8	43.1	48.6	45.4	36.9	26.7
P00 - P96 Perinatal	21.2	26.5	37.3	38.6	34.0	29.0	33.2	21.0	77.0	32.4	47.8	33.4

Table 39 enables assessing the size of causes of death across marzes and making inter-marz comparisons. Analysis of presented data leads to a number of key conclusions:

- Among most prevalent causes of death in Yerevan versus other marzes are malignancies, ICD, diabetes and the lowest rates are those for circulatory system diseases and perinatal conditions. This fact may be attributed to bigger number of specialized healthcare facilities, particularly hospitals and better quality of services in Yerevan.
- In Ararat, as opposed to other marzes, the ratio of deaths related to digestive system diseases, is higher and the ratio of diabetes and hypertension is the lowest.
- The ratio of deaths due to accidents is relatively higher in Lori (probably because of big number of employees involved in industrial, particularly mining companies, which is confirmed by the fact that the rate of deaths due to accidents is high also in Syunik and Kotayk with bigger share of urban population and developed mining), malignancies, digestive system diseases and congenital malformations. Lower is the mortality rate related to ICD and diabetes.

Similar cross-matches can be done for other causes of death as well. Nonetheless identification of causes of death in marzes needs further improvement, taking the Yerevan rate of 'deaths due to not-classified causes' as a standard.

Mortality according to causes, dynamics in marzes, 2007-2011

Tables 40 through 50 present the dynamics of causes of death in marzes between 2007 and 2011.

Tables cast a quick glance at dynamics of the causes of death during the period covering 2001-2011, which can guide national and regional health authorities on future improvements on marz level.

Two aspects are critical when interpreting data of the tables.

1. The coloring of table cells is based on highest and lowest values of the line (the higher the value the deeper the red color and the lower the value the deeper the blue color). So first of all lines (causes of death) with relatively big differences between highest and lowest values require priority attention.
2. Greater focus should be put on table lines showing monotone growth or decline, since this trend shows similar change of the situation during five years.

General observation of Tables 40-50 suggest below conclusions on changing mortality causes in marzes during 2007-2011.

Aragatsotn marz

Increasing mortality caused by

- Infectious and parasitic diseases
- Decrease trend of deaths caused by diabetes (if data of 2007 are excluded)
- Congenital malformations

Declining mortality caused by

- Hypertension

Ararat marz

Increasing mortality caused by

- Infectious and parasitic diseases
- Circulatory system diseases
- Digestive system diseases

Declining mortality caused by

- Respiratory system diseases
- Not classified causes

Armavir marz

Increasing mortality caused by

- Malignancies
- Digestive system diseases
- Diabetes
- Respiratory system diseases
- Congenital malformations

Declining mortality caused by

- Accidents

Gegharkunik marz

Increasing mortality caused by

- ICDs (compared with 2007)
- Congenital malformations
- Accidents

Apparent decline of mortality caused by any group/disease is not detected.

Lori marz

Increasing mortality caused by

- Congenital malformations
- Digestive system diseases
- Other

Declining mortality caused by

- Diabetes
- Circulatory system diseases
- Hypertension
- ICDs
- Respiratory system diseases
- Perinatal conditions

Kotayk marz

Increasing mortality caused by

- Malignancies
- Respiratory system diseases
- Digestive system diseases
- Congenital malformations
- Accidents

Declining mortality caused by

- Diabetes
- Circulatory system diseases

Syunik marz

Increasing mortality caused by

- Hypertension
- Congenital malformations
- Perinatal conditions
- Accidents

Declining mortality caused by

- Malignancies
- Respiratory system diseases
- Other

Shirak marz

Increasing mortality caused by

- Infectious and parasitic diseases
- Hypertension
- ICDs
- Respiratory system diseases
- Digestive system diseases
- Perinatal conditions
- Not classified causes
- Accidents

Declining mortality caused by

- Malignancies

Tavoush marz

Increasing mortality caused by

- Other causes

Declining mortality caused by

- Infectious and parasitic diseases
- Malignancies
- ICDs
- Respiratory system diseases

Yerevan

Increasing mortality caused by

- Digestive system diseases
- Congenital malformations
- Other

Declining mortality caused by

- Infectious and parasitic diseases
- Circulatory system diseases

Vayots Dzor marz

Increasing mortality caused by

- Malignancies
- Diabetes
- Hypertension
- Digestive system diseases
- Not classified causes

Declining mortality caused by

- Circulatory system diseases
- ICDs
- Congenital malformations

Table 40. Dynamics of mortality causes, Aragatsotn, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	855.2	848.6	896.7	869.7	879.5
A00-B99 Certain infectious and parasitic diseases	4.3	8.5	6.4	7.0	12.6
C00-D48 Neoplasms	134.8	158.5	143.0	140.1	153.5
Malignancies	134.8	157.1	141.5	139.4	153.5
E00-E90 Endocrine, nutritional and metabolic diseases	44.2	56.9	47.4	46.5	46.3
Diabetes	39.2	50.5	46.7	44.4	45.6
I00-I99 Diseases of circulatory system	507.1	469.1	522.3	517.6	490.5
Hypertension diseases	71.3	43.4	38.2	42.9	35.0
Acute myocardial infarction	72.0	73.9	75.0	76.8	70.1
J00-J99 Diseases of the respiratory system	49.9	38.4	38.2	28.2	41.3
K00-K93 Diseases of the digestive system	26.4	19.2	34.0	26.8	28.0
Q00-Q99 Congenital malformations	3.6	5.7	8.5	4.9	11.9
P00 - P96 Certain conditions originating in the perinatal period	3.6	4.3	3.5	6.3	3.5
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	30.0	22.7	22.6	20.4	25.9
Accidents	33.5	42.6	37.5	42.3	36.4
Other causes	17.8	22.7	33.3	29.6	29.6

Table 41. Dynamics of mortality causes, Ararat, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	772.3	793.1	785.8	813.7	804.0
A00-B99 Certain infectious and parasitic diseases	7.6	10.8	6.0	10.0	11.0
C00-D48 Neoplasms	162.0	175.1	153.5	155.6	159.0
Malignancies	161.3	174.7	153.1	155.2	158.3
E00-E90 Endocrine, nutritional and metabolic diseases	15.2	10.1	14.4	14.3	13.9
Diabetes	14.1	9.4	12.6	13.2	13.9
I00-I99 Diseases of circulatory system	372.2	352.3	406.9	434.9	423.3
Hypertension diseases	11.2	3.2	1.1	2.1	2.1
Acute myocardial infarction	89.9	77.3	50.0	78.3	79.3
J00-J99 Diseases of the respiratory system	79.4	86.3	51.4	51.1	29.2
K00-K93 Diseases of the digestive system	56.5	73.3	66.5	69.0	87.5
Q00-Q99 Congenital malformations	3.3	5.8	6.5	8.2	5.3
P00 - P96 Certain conditions originating in the perinatal period	6.9	5.8	7.2	6.1	6.4
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	17.4	16.2	9.0	10.0	7.1
Accidents	39.1	41.9	41.3	37.2	41.9
Other causes	12.7	15.5	23.1	17.3	19.4

Table 42. Dynamics of mortality causes, Armavir, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	754.3	784.8	770.6	804.6	796.2
A00-B99 Certain infectious and parasitic diseases	9.3	6.7	4.6	7.7	7.0
C00-D48 Neoplasms	131.1	135.1	140.5	136.5	151.1
Malignancies	131.1	135.1	140.1	136.1	151.1
E00-E90 Endocrine, nutritional and metabolic diseases	33.5	38.3	44.8	46.3	54.4
Diabetes	29.9	37.2	41.3	45.6	53.4
I00-I99 Diseases of circulatory system	436.9	459.8	423.9	454.4	418.0
Hypertension diseases	23.1	35.8	42.4	43.2	44.3
Acute myocardial infarction	83.3	112.7	107.0	96.5	81.3
J00-J99 Diseases of the respiratory system	33.8	36.5	36.0	41.1	42.9
K00-K93 Diseases of the digestive system	27.8	29.8	27.5	28.4	36.3
Q00-Q99 Congenital malformations	2.8	4.6	6.7	6.7	6.9
P00 - P96 Certain conditions originating in the perinatal period	7.5	4.6	5.3	4.2	4.9
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	21.7	17.0	20.8	26.7	25.8
Accidents	35.3	34.0	34.6	30.9	30.0
Other causes	14.6	18.4	25.9	21.7	18.9

Table 43. Dynamics of mortality causes, Gegharkunik, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	746.5	791.7	786.9	796.2	796.9
A00-B99 Certain infectious and parasitic diseases	4.2	7.9	7.8	4.5	5.0
C00-D48 Neoplasms	107.1	103.1	109.9	112.4	110.0
Malignancies	106.7	102.7	109.5	112.4	109.2
E00-E90 Endocrine, nutritional and metabolic diseases	29.6	30.4	34.8	36.0	35.0
Diabetes	27.1	29.9	33.6	33.5	32.1
I00-I99 Diseases of circulatory system	461.0	495.6	477.6	482.8	472.2
Hypertension diseases	19.2	24.5	32.3	48.4	36.2
Acute myocardial infarction	64.2	73.6	76.3	96.3	91.5
J00-J99 Diseases of the respiratory system	70.0	56.1	56.8	51.3	54.4
K00-K93 Diseases of the digestive system	18.3	23.7	28.6	21.5	27.2
Q00-Q99 Congenital malformations	2.5	7.9	4.6	7.9	11.5
P00 - P96 Certain conditions originating in the perinatal period	9.6	5.4	5.4	8.7	8.2
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	4.6	10.0	6.6	12.8	9.1
Accidents	14.6	29.1	33.2	33.1	37.1
Other causes	25.0	22.5	21.6	25.2	27.2

Table 44. Dynamics of mortality causes, Lori, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	1024.4	1033.0	1029.5	1036.2	1031.5
A00-B99 Certain infectious and parasitic diseases	6.4	9.2	7.8	8.5	5.0
C00-D48 Neoplasms	165.1	175.6	204.5	200.1	200.6
Malignancies	164.0	175.6	204.1	199.7	200.3
E00-E90 Endocrine, nutritional and metabolic diseases	22.7	23.1	24.1	21.3	11.0
Diabetes	19.8	22.7	22.7	20.2	10.6
I00-I99 Diseases of circulatory system	507.3	503.4	469.0	488.5	478.2
Hypertension diseases	36.1	35.5	45.8	35.1	26.9
Acute myocardial infarction	45.3	44.7	44.7	36.2	32.3
J00-J99 Diseases of the respiratory system	60.9	47.2	49.7	55.0	36.5
K00-K93 Diseases of the digestive system	75.4	83.4	89.5	95.1	91.8
Q00-Q99 Congenital malformations	7.1	11.7	17.7	16.7	26.2
P00 - P96 Certain conditions originating in the perinatal period	11.3	11.7	11.4	7.4	6.0
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	97.8	86.2	76.7	67.4	94.3
Accidents	42.5	51.4	48.3	53.2	50.3
Other causes	27.9	30.1	30.8	23.0	76.9

Table 45. Dynamics of mortality causes, Kotayk, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	793.1	802.0	802.6	783.2	794.3
A00-B99 Certain infectious and parasitic diseases	7.9	11.1	11.8	11.4	9.5
C00-D48 Neoplasms	154.2	155.6	159.1	168.4	170.4
Malignancies	153.1	155.2	158.4	166.7	169.3
E00-E90 Endocrine, nutritional and metabolic diseases	46.9	50.7	45.0	10.9	40.0
Diabetes	44.8	46.4	44.0	40.2	39.2
I00-I99 Diseases of circulatory system	401.1	395.2	376.1	331.6	341.8
Hypertension diseases	22.4	26.9	32.9	31.3	18.7
Acute myocardial infarction	103.2	100.9	101.5	109.8	100.4
J00-J99 Diseases of the respiratory system	48.0	52.5	64.4	59.7	66.5
K00-K93 Diseases of the digestive system	32.1	38.1	39.0	49.8	43.5
Q00-Q99 Congenital malformations	10.5	7.2	16.4	23.1	32.9
P00 - P96 Certain conditions originating in the perinatal period	8.7	4.3	5.7	3.9	6.4
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	10.8	16.5	12.2	12.4	10.6
Accidents	47.6	45.3	44.7	50.1	50.2
Other causes	25.3	25.5	28.2	31.9	22.5

Table 46. Dynamics of mortality causes, Syunik, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	812.3	801.8	866.6	834.5	840.4
A00-B99 Certain infectious and parasitic diseases	15.0	9.2	4.0	10.5	8.5
C00-D48 Neoplasms	164.2	175.3	177.9	163.5	152.4
Malignancies	163.5	175.3	177.9	163.5	24.9
E00-E90 Endocrine, nutritional and metabolic diseases	26.8	32.0	26.2	34.0	22.9
Diabetes	24.9	29.4	24.2	32.0	22.9
I00-I99 Diseases of circulatory system	447.4	421.8	482.7	449.9	463.0
Hypertension diseases	18.9	20.3	29.4	28.8	35.9
Acute myocardial infarction	75.9	79.1	89.6	81.1	77.2
J00-J99 Diseases of the respiratory system	33.4	35.9	50.4	48.4	45.8
K00-K93 Diseases of the digestive system	36.0	35.9	36.0	28.1	31.4
Q00-Q99 Congenital malformations	5.2	7.2	7.2	9.8	13.1
P00 - P96 Certain conditions originating in the perinatal period	7.8	5.9	4.6	8.5	11.8
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	11.1	10.5	15.7	17.0	14.4
Accidents	40.5	43.2	39.9	42.5	54.3
Other causes	24.9	24.9	22.0	22.3	20.8

Table 47. Dynamics of mortality causes, Shirak, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	938.4	933.8	980.1	997.2	991.1
A00-B99 Certain infectious and parasitic diseases	8.5	7.8	10.3	11.0	11.0
C00-D48 Neoplasms	193.9	183.9	184.7	184.2	178.9
Malignancies	193.9	182.9	184.4	184.2	178.6
E00-E90 Endocrine, nutritional and metabolic diseases	21.0	25.6	26.0	35.1	31.5
Diabetes	19.6	22.8	22.7	34.1	29.1
I00-I99 Diseases of circulatory system	433.6	426.2	454.9	462.0	445.8
Hypertension diseases	10.0	11.4	17.8	16.3	17.7
Acute myocardial infarction	88.6	62.9	80.0	77.0	81.9
J00-J99 Diseases of the respiratory system	78.9	69.4	73.2	71.7	78.3
K00-K93 Diseases of the digestive system	56.6	61.9	61.5	58.2	67.7
Q00-Q99 Congenital malformations	7.5	6.4	10.0	7.1	8.9
P00 - P96 Certain conditions originating in the perinatal period	16.7	14.9	14.2	13.5	17.7
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	60.1	66.5	72.9	73.5	81.9
Accidents	35.6	37.4	42.0	41.5	45.7
Other causes	26.0	33.8	30.4	39.4	23.7

Table 48. Dynamics of mortality causes, Tavoush, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	1008.9	1029.1	1029.8	998.5	997.8
A00-B99 Certain infectious and parasitic diseases	5.9	2.2	8.2	6.7	3.7
C00-D48 Neoplasms	169.2	165.5	149.0	149.6	145.5
Malignancies	169.2	164.8	149.0	149.6	145.5
E00-E90 Endocrine, nutritional and metabolic diseases	58.9	51.5	61.1	52.8	55.7
Diabetes	55.9	49.9	60.4	49.9	53.5
I00-I99 Diseases of circulatory system	604.3	642.1	659.5	625.7	636.2
Hypertension diseases	78.2	93.2	105.1	84.1	97.3
Acute myocardial infarction	114.0	93.9	116.2	110.1	67.6
J00-J99 Diseases of the respiratory system	41.0	43.3	40.2	35.7	25.2
K00-K93 Diseases of the digestive system	28.3	34.3	25.3	31.3	28.2
Q00-Q99 Congenital malformations	7.5	7.5	9.7	6.7	8.2
P00 - P96 Certain conditions originating in the perinatal period	8.9	8.9	5.2	4.5	5.9
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	20.9	9.6	15.0	15.6	20.0
Accidents	40.2	43.3	33.5	42.4	40.1
Other causes	23.8	20.9	23.1	27.5	29.1

Table 49. Dynamics of mortality causes, Yerevan, per 100 000 population, 2007-2011,

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	795.4	816.7	800.6	817.2	816.7
A00-B99 Certain infectious and parasitic diseases	7.5	8.9	9.4	10.5	6.8
C00-D48 Neoplasms	178.5	195.0	183.4	191.5	191.0
Malignancies	177.9	194.6	183.0	191.1	189.8
E00-E90 Endocrine, nutritional and metabolic diseases	64.7	59.3	63.8	63.1	61.2
Diabetes	63.8	57.9	61.9	61.4	59.3
I00-I99 Diseases of circulatory system	356.4	366.9	336.5	343.9	332.0
Hypertension diseases	15.1	19.3	24.6	34.6	20.4
Acute myocardial infarction	96.2	116.9	118.5	117.8	110.7
J00-J99 Diseases of the respiratory system	62.3	59.3	60.3	51.3	60.4
K00-K93 Diseases of the digestive system	47.0	47.8	54.4	53.2	56.6
Q00-Q99 Congenital malformations	3.6	4.3	8.9	16.1	14.7
P00 - P96 Certain conditions originating in the perinatal period	4.2	4.7	3.4	4.1	4.6
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	5.7	4.7	9.1	6.8	7.9
Accidents	42.5	41.6	33.6	32.6	40.1
Other causes	23.0	24.2	37.8	44.1	41.4

Table 50. Dynamics of mortality causes, Vayots Dzor, per 100 000 population, 2007-2011

Cause of death	2007	2008	2009	2010	2011
A00-T99 Total	838.7	835.1	890.7	880.1	828.6
A00-B99 Certain infectious and parasitic diseases	5.4	3.6	5.4	5.4	7.1
C00-D48 Neoplasms	123.6	125.4	116.5	123.4	139.3
Malignancies	121.9	125.4	114.7	121.6	139.3
E00-E90 Endocrine, nutritional and metabolic diseases	35.8	44.8	34.1	28.6	41.1
Diabetes	30.5	41.2	32.3	26.8	39.3
I00-I99 Diseases of circulatory system	417.6	469.5	496.4	450.8	371.4
Hypertension diseases	16.1	23.3	30.5	32.2	32.1
Acute myocardial infarction	77.1	62.7	59.1	55.5	48.2
J00-J99 Diseases of the respiratory system	34.1	28.7	35.8	14.3	19.6
K00-K93 Diseases of the digestive system	17.9	7.2	23.3	12.5	25.0
Q00-Q99 Congenital malformations	3.6	1.8	9.0	7.2	1.8
P00 - P96 Certain conditions originating in the perinatal period	3.6	8.9	7.2	8.9	5.4
R00-R99 Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	125.4	95.0	109.3	159.2	160.7
Accidents	39.4	30.5	30.5	39.4	28.6
Other causes	32.3	19.7	23.2	30.4	28.6

Recommendations

For more comprehensive study of the causes of death the National Institute of Health should have access to anonymous mortality data maintained in the databases of Civil Registration agencies. This can be achieved upon joint consent of the Ministry of Health and the Ministry of Justice. The database does not include identification data of the dead, but the remaining information registered in the Act (Certificates) of Death, including the marz and residence is available. It is desirable to have the databases for preceding years (at many as possible).

Since the presented analysis made it clear that registration of the causes of death requires improvement, the databases can serve as a tool to monitor effectiveness of targeted efforts.

At the same time availability of the databases will enable studying connections between the main and immediate causes of deaths thus adding value to HSPA activities in this field.

Also access to databases on natality data is highly recommended.

ANNEXES

Annex 1. Breakdown of males and females according to combination of existence of risk factors
 Breakdown of 15 and older male and female population of Armenia according to the number of existing 5 risk factors (hypertension, being overweight, physical inactivity, daily use of tobacco, alcohol abuse)

		Do not abuse alcohol				Abuse alcohol			
		Non- smokers or occasional smokers		Daily smokers		Non- smokers or occasional smokers		Daily smokers	
Female		Physicall y active	Physicall y inactive	Physicall y active	Physicall y inactive	Physicall y active	Physicall y inactive	Physicall y active	Physicall y inactive
No hypertension detected	Normal	17.2%	20.5%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%
	Overweight	17.5%	15.1%	0.1%	0.2%	0.0%	0.1%	0.0%	0.0%
Hypertension is present	Normal	1.9%	3.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
	Overweight	10.0%	12.8%	0.1%	0.2%	0.0%	0.2%	0.0%	0.0%
Male									
No hypertension detected	Normal	10.4%	9.5%	9.0%	6.2%	0.6%	0.0%	1.5%	0.8%
	Overweight	6.0%	5.8%	5.3%	3.0%	0.3%	0.2%	1.2%	0.3%
Hypertension is present	Normal	1.4%	3.2%	5.9%	3.8%	0.2%	0.1%	1.0%	0.5%
	Overweight	4.4%	8.2%	3.0%	3.8%	0.4%	1.4%	2.3%	0.4%
		Color scale of the number of existing risk factors							
Existing risk factors		0	1	2	3	4	5		

Annex 2. ICD-10

Chapter I Certain infectious and parasitic diseases	A00 - B99
Chapter II Neoplasms	C00 - D48
Chapter III Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50 - D89
Chapter IV Endocrine, nutritional and metabolic diseases	E00 - E90
Chapter V Mental and behavioral disorders	F00 - F99
Chapter VI Diseases of the nervous system	G00 - G99
Chapter VII Diseases of the eye and adnexa	H00 - H59
Chapter VIII Diseases of the ear and mastoid process	H60 - H95
Chapter IX Diseases of the circulatory system	I00 - I99
Hypertensive diseases	I10-I13
Ischemic heart diseases	I20-I25
Angina pectoris	I20
Acute myocardial infarction	I21
Subsequent myocardial infarction	I22
Certain current complications following acute myocardial infarction	I23
Other acute ischemic heart diseases	I24
Cerebrovascular diseases	I60-I69
Chapter X Diseases of the respiratory system	J00 - J99
Chapter XI Diseases of the digestive system	K00 - K93
Chapter XII Diseases of the skin and subcutaneous tissue	L00 - L99
Chapter XIII Diseases of the musculoskeletal system and connective tissue	M00 - M99
Chapter XIV Diseases of the genitourinary system	N00 - N99
Chapter XV Pregnancy, childbirth and the puerperium	O00 - O99
Chapter XVI Certain conditions originating in the perinatal period	P00 - P96
Chapter XVII Congenital malformations, deformations and chromosomal abnormalities	Q00 - Q99
Chapter XVIII Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00 - R99
Chapter XIX Injury, poisoning and certain other consequences of external causes	S00 - T98
Chapter XX External causes of morbidity and mortality	V01 - Y98
Chapter XXI Factors influencing health status and contact with health services	Z00 - Z99
Chapter XXII Codes for special purposes	U00 - U89

Annex 3. Definitions

Total morbidity is the total number of acute and chronic cases registered in a single year, including first time in life diagnosed and formerly registered diseases in connection with which the patient has sought care during the reference calendar year.

Primary or initial morbidity is the total of diseases first time in life diagnosed during the reference year and not registered elsewhere in the past.

REFERENCES

1. D. Andreasyan. Epidemiology analysis of morbidity and mortality of noncommunicable diseases in population of RA., Armenian Journal of Medical Annotations. 2006; 5; 30
2. National Health Accounts, Armenia, 2007, PIU MoH, Yerevan 2007
3. National Health Accounts, Armenia, 2009: WHO: Copenhagen, 2009
4. National Health Accounts, Armenia, 2010: PIU MoH, Yerevan, 2010
5. National Health Accounts, Armenia, PIU MoH, Yerevan, 2011
6. National Health Accounts, Country Health Information. Geneva, World Health Organization: (<http://www.who.int/nha/country/en/>), 2008
7. Health and healthcare, Armenia 2012, Yearbook, NHIAC MoH, 2013 (<http://www.health.info.am>)
8. P. Zelveian, D. Andreasyan, S. Manukyan: The prevalence and changes of the risk factors of noncommunicable diseases among Armenian population. Scientific Medical Journal, NIH, MoH, Armenia, 2013, 8:1
9. Armenia demographic and health survey 2005, NSS, MoH, Armenia, 2006
10. Armenia demographic and health survey 2010, NSS, MoH, Armenia, 2011
11. RA Government Decree N246-N on State-Guaranteed Medical Aid and Services in 2003, 6 February, 2003
12. RA Government (2008). Sustainable Development Program. Approved by RA Government Decree N1207-N, 30 October 2008
13. Republic of Armenia Prospective Development Strategic Program 2013-2025 (revised last version, 6 August 2013), §403-404, Armenia, 2013
14. The European Strategy for the Prevention and Control of Noncommunicable Diseases. Gaining Health. 56th session of the WHO Regional Committee for Europe, Copenhagen, 2006
15. RA Government Annual Public Budget Performance Reports
16. European Health for All database [online database]. Copenhagen, WHO Regional Office for Europe, 2013 (<http://data.euro.who.int/hfadb>, accessed 21 June 2013).
17. Evaluation of the health system performance assessment. Health systems performance assessment: A tool for governance for health in the XXI century. World Health Organization 2012.
18. Health 2012. A European policy framework and strategy for the 21st century. WHO, 2013.
19. Health System Performance Assessment, Armenia, 2007. Armenia, Yerevan, MoH RA, 2007
20. Health System Performance Assessment, Armenia, 2009. WHO, Copenhagen, 2009.
21. Health System Performance Assessment, Armenia, 2012. Armenia, Yerevan, NIH, MoH, 2013
22. Health Systems, Health and Wealth: WHO European Ministerial Conference on Health Systems:

23. Tallinn, Estonia, 25–27 June 2008: report. Copenhagen, WHO Regional Office for Europe, 2009 (http://www.euro.who.int/__data/assets/pdf_file/0006/78918/E92150.pdf, accessed 21 June 2013).
24. Joseph Kutzin, Cheryl Cashin, Melitta Jakab. (2010). Implementing Health Financing Reform. World Health Organization: Copenhagen 2012.
25. Kotseva K., Wood D., De Backer G., et al. EUROASPIRE Study Group. EUROASPIRE III. Management of cardiovascular risk factors in asymptomatic high-risk patients in general practice: cross-section survey in 12 European countries. *Eur J cardiovasc Prev Rehabil* 2010;17(5):527-30.
26. Pathways to health system Performance assessment a manual conducting health system Performance assessment at national or sub-national level. World Health Organization 2012.
27. Practical experience of performance assessment. The long-term process in the European region. A long –standing development in Europe. World Health Organization 2012.
28. Preventing chronic diseases a vital investment. Overview, WHO, 2005, http://www.who.int/chp/chronic_disease_report/en/
29. Poletti, T, et al. (2007). The desirability and feasibility of scaling up community health insurance in low-income settings: lessons from Armenia. *Social Science and Medicine*, 64(3): 509-520.
30. The European Health Report 2009. Health and health systems. WHO, 2009. (p. 13-30. <http://www.euro.who.int/2009/european-health-report-2009>)
31. The European health report 2012: charting the way to well-being. Copenhagen, WHO Regional Office for Europe, 2013 (<http://www.euro.who.int/en/what-we-do/data-and-evidence/european-health-report-2012>, accessed 21 June 2013)
32. World Bank. (2003). Armenia: public expenditure review. Washington, DC. World Bank Europe and Central Asia Region
33. World Bank. (2004). World Development Report: making services work for poor people. Washington, DC, World Bank
34. Evidence-based medicine. Annual reference book, part 1, pages 162-184, Moscow, 2003
35. R. Oganov, G. Maslennikov. Stopping epidemic of cardiovascular diseases through prophylaxis. *Preventive Medicine* 2009;12(6):3-6
36. National clinical recommendations. All-Russian Scientific Society of Cardiologists, 4th edition.-M 2011:19-24

