



MEDICAL-GEOGRAPHICAL ZONES OF THE REPUBLIC OF ARMENIA AND CERTAIN ASPECTS OF SOMATIC PATHOLOGY FORMATION IN CHILDREN

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Abstract

In certain geographic zones the environment has a relatively similar impact on human organism reflecting typical features of the given locality.

Using principles of medical-geographical ranking Professor A.P. Hayriyan, Corresponding Member of the Academy of Medical Sciences of the Russian Federation, was the first to divide the territory of our country into 5 zones: Central, Shirak, Sevan, North-Eastern and Syunik. Each of these zones has relatively similar impact on human organism.

The aim of this research was to study some aspects of children's somatic pathology through attributing it to the medical-geographical zones of Armenia.

Case histories of children (n=7349) examined and treated at the University pediatric hospital over a period of 2003-2009 were studied. Survey data has shown a decrease in hospitalization rates in 2004 (8.5%), and higher hospitalizations rates in 2007 (15.9%), 2008 (17.5%) and 2009 (18.4%), respectively.

Analysis of pediatric hospitalization rates based on medical-geographic division of Armenia has shown a significant increase of an intensive index in comparison with 2003 in all medical-geographical zones, as well as higher hospitalization rate to Intensive Care Unit (ICU) in the following survey groups: neonatal (0-28 days), infants, and schoolchildren.

Data signify to certain pediatric service gaps that require both further investigation aimed at structural rearrangements and professional development.

Keywords: Republic of Armenia, medical-geographical zones, children's somatic pathology, sickness rate.

INTRODUCTION

Investigation on the burden of environmentally determined diseases presented by WHO in June 2004 was the first attempt to estimate the summary environmental impact on children's health in the European region. Its results convincingly showed that 1/3 of the whole child and adolescent sickness rate since birth to 19 years old can be referred to hazardous and unhealthy conditions of the environment [WHO, 2006].

Among 102 principal diseases, groups of diseases

and traumas that are considered in a report on world public health care for 2004, factors of environment hazards have their contribution to the general disease burden in 82 categories. On the global scale, according to estimations, 24% disease burden (lost years of healthy life) and 23% mortality cases (early mortality) are referred to ecological factors.

Among children at the age of 0-14, the share of deaths referred to ecological factors composes 36%. Globally the number of healthy years lost (rated per capita) as a result of ecological impact is 5 times higher among children than among the general population overall. For all that, on average, in developing countries children lose 8 times more healthy years due to morbidity rated per 1 child than chil-

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Table 1.

Hospitalization on children's somatic pathology for 2003-2009 (per 1000 people)

Indicators	Years						
	2003	2004	2005	2006	2007	2008	2009
Population under 18	853940	915477	884345	853088	862504	876636	893631
Number of cases	715	626	1107	1094	1171	1285	1351
P±m	0.84±0.031	0.68±0.027*	1.25±0.038*	1.28±0.039*	1.36±0.040*	1.47±0.041*	1.51±0.041*

Note: * - difference since 2003 is significant as compared to 2003

dren in developed countries. However, even these statistical data are not able to reflect long-term consequences of these factors at the early age; adverse effects might manifest as a disease in many years [SuRF, 2004].

In opinion of Professor A.P. Hayriyan, Corresponding Member of the Academy of Medical Sciences of the Russian Federation, the environment in particular zones affects the human organism in a relatively uniform manner and has its local regional specific features [Hayriyan A., 1970; 1998; Hayriyan A., Atabekyan A., 1983]. Applying the principles of medical-geographical zoning, Prof. Hayryan was the first to divide the territory of Armenia into 5 regions: Central, Shirak, Sevan, North-Eastern, and Syunik. Each of these regions has relatively homotype impact on human organism.

The aim of this research was to study some aspects of children's somatic pathology through attributing it to the medical-geographical zones of Armenia.

MATERIAL AND METHODS

We studied 7349 medical reports of children examined and treated for somatic pathology at the Children's University Clinic in a period of 2003-2009.

We applied sociohygienic, statistical, medical-geographical, clinical methods, as well as computer analysis to obtain objective and reliable data.

Medical report was the unit of observation in our study. The sum of observation units composed the statistical pool of data in this research.

To relieve the process of data elaboration and analysis of obtained results, models of statistical charts (mainly: group and combined) were primarily compiled. The obtained data were classified according to age, gender, medical-geographical zones of Armenia, nosologies, etc.

Research results were processed using variation-statistical method according to Student's criteria. The package of computer programs (MS EXCEL 7.0) was applied.

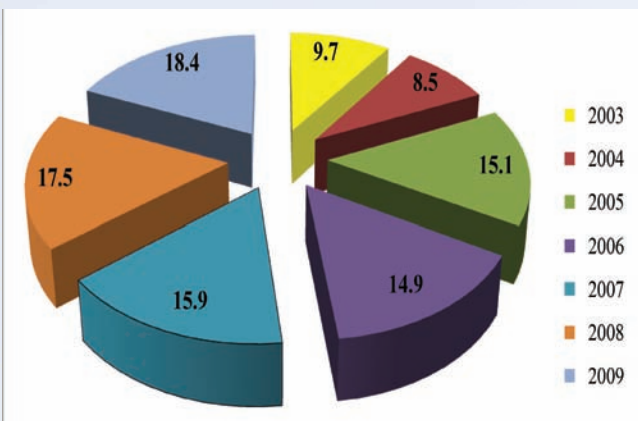


Figure 1. Hospitalization structure on children's somatic pathology for 2003-2009, %.

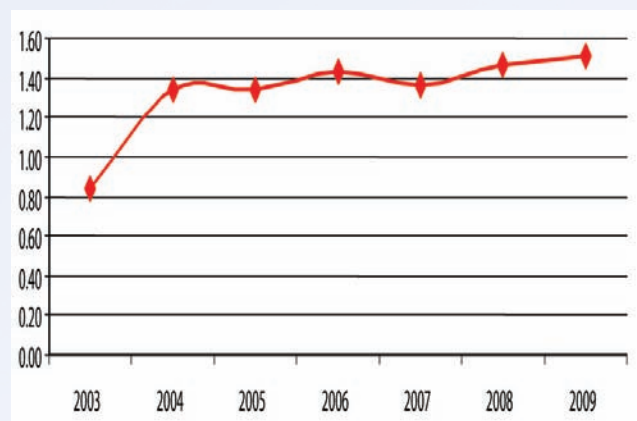


Figure 2. Dynamics of hospitalization on children's somatic pathology for 2003-2009.

Results

The analysis of hospitalization structure on children's somatic pathology for 2003-2009 (Figure 1) showed:

- Sharp changes in hospitalization structure on children's somatic pathology were not found.
- The least specific weight had the year 2004 (8.5%).
- According to values of specific weight at the first three places should be ranked 2007 (15.9%), 2008 (17.5%), 2009 (18.4%), correspondingly.

Table 1 and Figure 2 present hospitalization structure on children's somatic pathology for 2003-2009.

The analysis showed that hospitalization on children's somatic pathology for 2003-2009 was subject to changes. As compared with 2003, the intensive indicator:

- was significantly increased during all years;
- in 2006 and 2008 its increase was slightly sharp;
- in 2009 the considerable increase of its value was noticed.

The above-mentioned phenomenon is clearly presented in Figure 2: the curve of hospitalization, having some changes, keeps its steady and ever-growing rise.

The analysis of both specific weight of hospitalization for 2003-2009 and diverse fluctuations of its intensive indicator leads to the following conclusions:

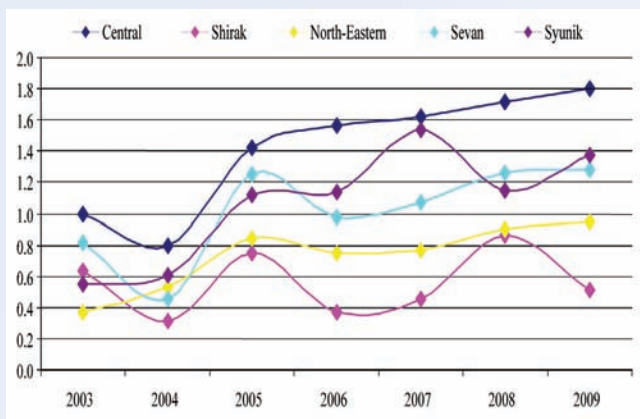


Figure 3. Dynamics of hospitalization on children's somatic pathology with account of medical-geographical zones for 2003-2009.

- firstly, most probably it is determined with some improvements of situation in Armenia and medical service for children during the last years;
- secondly, there are good reserves for hospitalization decrease on children's somatic pathology;
- thirdly, all necessary reserves are to be searched not only in a study on children's somatic pathology structure but also in rearrangements of the pediatrics service system in Armenia. Moreover, not only socioeconomical changes in Armenia, but peculiarities of children's somatic pathology formation, their medical-geographical and ecological aspects should be also taken into account;
- fourthly, the currently existing administrative system of this service in Armenia fails to reflect the in-depth processes taking place in the system, whereas simple extrapolation of other systems might have a negative influence.

Table 2 and Figure 2 present hospitalization data on children's somatic pathology considering medical-geographical zones of Armenia for 2003-2009.

The analysis shows that as compared to 2003 the intensive indicator was as follows:

1. in the Central zone

- significantly decreased in 2004;
- significantly increased since 2005;

2. in Shirak zone:

- significantly decreased in 2004 and 2006;
- had a tendency to increase in 2005 and 2008;
- had a tendency to decrease in 2007 and 2009.

3. in North-Eastern zone:

- had a tendency to increase in 2004;
- significantly increased since 2005.

4. in Sevan zone:

- significantly decreased in 2004;
- significantly increased in 2005, 2007-2009 by statistics;
- had a tendency to increase in 2006.

Table. 2.

Hospitalization on children's somatic pathology with account of medical-geographical zones for 2003-2009(per 1000)

Medical-geographical zones	Indicators	Years						
		2003	2004	2005	2006	2007	2008	2009
Central	Children	548173	588182	568643	547880	552259	565591	575471
	Number of cases	1176	1050	966	1299	1052	1230	1078
	P±m _p	0.99±0.04	0.8±0.04*	1.42±0.05*	1.57±0.05*	1.62±0.04*	1.72±0.06*	1.80±0.06*
Shirak	Children	75597	80427	77468	74852	78810	76241	78224
	Number of cases	84	56	708	42	42	84	42
	P±m _p	0.63±0.09	0.31±0.06*	0.75±0.10	0.37±0.07*	0.46±0.08	0.87±0.11	0.51±0.08
North-Eastern	Children	111481	119358	115033	111135	111850	112696	116021
	Number of cases	84	140	117	126	101	130	114
	P±m _p	0.37±0.06	0.53±0.07	0.84±0.09*	0.75±0.08*	0.77±0.08*	0.91±0.09*	0.95±0.09*
Sevan	Children	63680	67973	65753	63680	64282	65213	65836
	Number of cases	52	31	82	62	69	82	84
	P±m _p	0.82±0.11	0.46±0.08*	1.25±0.14*	0.97±0.12	1.07±0.13	1.26±0.14*	1.28±0.14*
Syunik	Children	55009	59537	57448	55541	55303	56895	58079
	Number of cases	84	68	98	94	81	104	87
	P±m _p	0.55±0.1	0.6±0.11	1.11±0.14*	1.13±0.14*	1.54±0.17*	1.14±0.14*	1.38±0.15*
Total		715	1226	1181	1224	1171	1285	1351

Note: * - significant difference as compared with 2003

5. in Syunik zone:

- during the period of research, except 2004 (it had a tendency to rise), there was a significant increase.

Thus, resuming the above mentioned the following conclusions can be made:

- On the whole, for most medical-geographical zones of Armenia a direction of hospitalization intensive indicator's fluctuation was characterized with rising of it values as compared to 2003.
- Insignificant deviation of intensive indicator in certain years might be considered an exception for some medical-geographical zones; moreover: they mainly had a rising tendency.

We also studied the involvement share of each medical-geographical zone in formation of hospitalization structure on children's somatic pathology (Figure 4).

The analysis showed:

- Specific weight of the Central zone prevailed during all years and composed from 72.8% (2005) up to 78.4% (2006);
- Shirak zone had the least values: its share composed from 2.6% (2006) up to 6.7% (2003).
- Specific weight fluctuations of other zones had almost equal values. This phenomenon shows that situation with children's hospitalization from these zones seems to be similar.

Some health problems of children are encountered in all age groups, but there are diseases, which directly depend upon age. Therefore, we studied the structure of hospitalization for two age groups: a) neonatal (0-28 days) and b) infant and school age (Figure 5).

In Table 3 hospitalization data are presented by years and departments, where examination and treatment

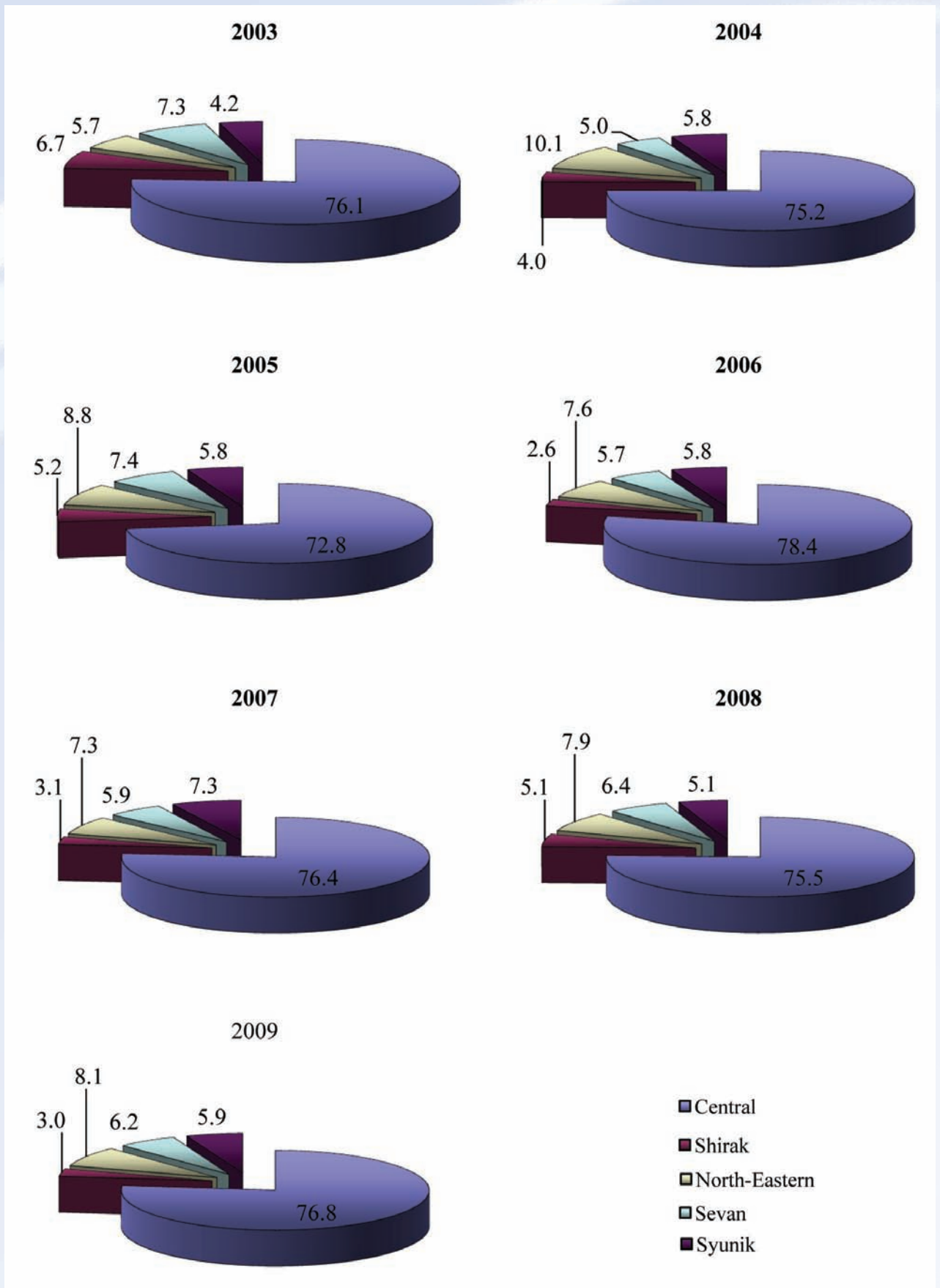


Figure 4. Hospitalization structure on children's somatic pathology with account of medical-geographical zones for 2003-2009, %.

Table 3

Hospitalization on children's somatic pathology by departments for 2003-2009
(per 1000)

Departments	Indicators	Years						
		2003	2004	2005	2006	2007	2008	2009
Infants and elder age	children	853940	915477	884345	853088	862504	876636	893631
	number of cases	290	292	314	411	427	528	541
	P±m _p	0.34±0.02	0.32±0.02	0.36±0.02	0.48±0.02*	0.50±0.02*	0.60±0.03*	0.61±0.03*
Newborns pathology	children	853940	915477	884345	853088	862504	876636	893631
	number of cases	129	109	221	153	205	208	264
	P±m _p	0.15±0.01	0.12±0.01	0.25±0.02*	0.18±0.01	0.24±0.02*	0.24±0.02*	0.30±0.02*
Reanimation	children	853940	915477	884345	853088	862504	876636	893631
	number of cases	296	225	572	530	539	549	546
	P±m _p	0.35±0.02	0.25±0.02*	0.65±0.03*	0.62±0.03*	0.62±0.03*	0.63±0.03*	0.61±0.03*
Total	children	853940	915477	884345	853088	862504	876636	893631
	number of cases	715	626	1107	1094	1171	1285	1351
	P±m _p	0.84±0.03	0.68±0.03*	1.25±0.04*	1.28±0.04*	1.36±0.04*	1.47±0.04*	1.51±0.04*

Note: * - significant difference with 2003

of patients took place.

The analysis showed:

- on the whole those children, who needed treatment at ICU, prevailed;
- patients from department of infants and elder age were on the second place;
- patients from department of newborns pathology were on the third place.

The analysis of hospitalization structure by years (Figure 6) showed:

- Specific weight fluctuations of patients admitted to department of infants and elder age composed 28.4-46.6%;

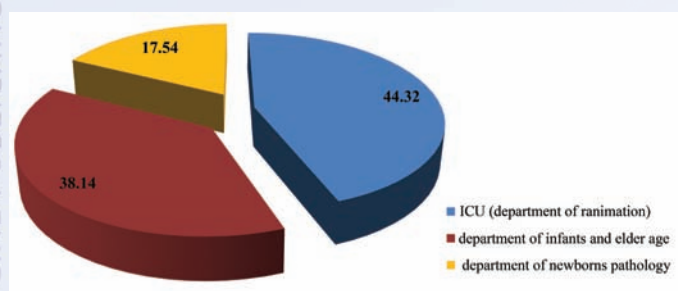


Figure 5. Hospitalization structure on children's somatic pathology by departments for 2003-2009, %.

- Specific weight fluctuations of patients admitted to department of newborns pathology composed 14.1-20.0%;
- Specific weight fluctuations of patients admitted to ICU (department of reanimation) made 35. 9-51.7%.

The analysis showed that in comparison with 2003 the intensive indicator of patients was as follows:

1. in department of infants and elder age:

- insignificant fluctuations in 2004-2005;
- significant increase since 2006;

2. in department of newborns pathology:

- decreasing and rising tendency in 2004 and 2006, correspondingly;
- significant increase in 2005 and 2007-2009.

3. in ICU (department of reanimation):

- significant decrease in 2004;
- significant almost 2-fold increase since 2005.

4. on the whole in all departments:

- significant decrease in 2004 ;
- significant increase since 2005.

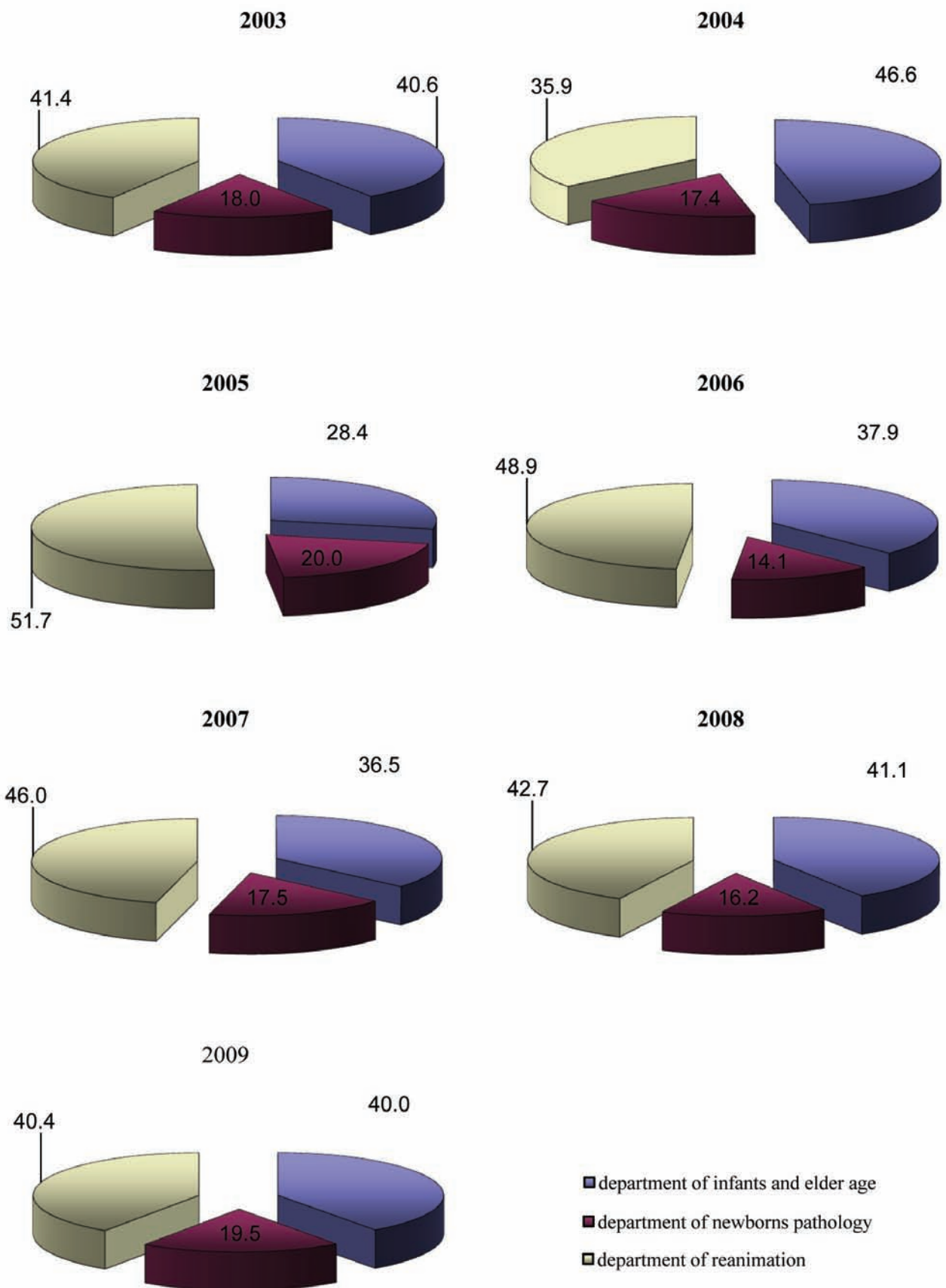


Figure 6. Hospitalization structure on children's somatic pathology by departments for 2003-2009 (%).

Summarizing the above mentioned it can be stated as follows:

- Overall, there is a definite tendency for increase of hospitalization at all departments with the exception of 2004, when a definite decrease of intensive indicator was observed;
- For all departments 2004 was notable for a decrease of intensive indicator.
- The above-mentioned shows that:
 - hospitalization structure itself with some exceptions is relatively steady;
 - high specific weight of patients in ICU (department of reanimation) signifies to obvious imperfection of pediatrics service system;
 - the trend of fluctuations in intensive indicator's values is characterized by an increase;
 - there are available reserves to decrease the specific weight of ICU (reanimation department) patients.
 - further research is required to specify the tendency of rearrangements within pediatrics service. It concerns both structure, functioning and training of personnel.

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