

ANALYSIS OF THE EFFECTIVENESS OF MANAGEMENT DECISIONS TO PREVENT IODINE DEFICIENCY AT THE LOCAL LEVEL IN ULYANOVSK REGION ¹**M. Sukhanov, E. Dubovitskaya**

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Abstract. The paper evaluates the efficiency of the management decisions to prevent iodine deficiency in Ulyanovsk Region.

Key words: social and hygienic monitoring, management decision, iodine deficiency

Introduction. The actuality of this paper is determined by the RF Product Safety Doctrine (the RF President's Decree № 120 of 30.01.2010) that makes provisions for a healthy diet based on the increase in production of enriched, healthy and functional food products; the RF 2020 Policy on Healthy Nutrition (the RF Government Decree № 1873-r of 25.10.2010) that provides for the increase in production of mass consumption product enriched with vitamins and minerals including common grades of bakery goods (up to 40-50 % of the total production volume); Order № 593H by the RF Ministry of Public Health and Social Development of 02.08.2010 On Adoption of Guidelines for a Rational Norm of Product Consumption that Meets the Healthy Nutrition Requirements [1, 2, 3]. Additionally, the actuality of this issue is described in a federal analytical document – a State Report on the Sanitary and Epidemiological Situation in the Russian Federation in 2010 – that suggests, in particular, that iodine deficiency disorders are still the biggest class of endocrine disorders. In the Report, Ulyanovsk is identified as a region with a high level of diffuse goiter incidence associated with iodine deficiency and referred to as 'risk area' [4].

Purpose of the Research. To evaluate the effectiveness of the management decisions to prevent iodine deficiency in the population at the local level in Ulyanovsk Region in 2009–2011.

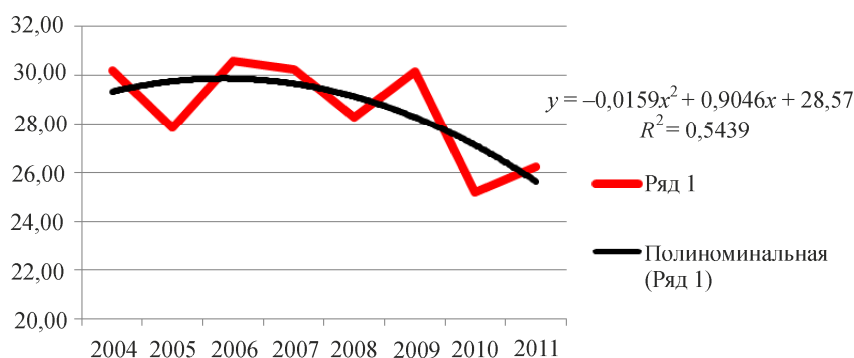
Materials and Methods. The analytical research studies were conducted with the use of an annual report form №63 "Information on the Incidence of Diseases Associated with Micronutritional Deficiencies" that provides complete data on the diseases associated with iodine deficiency, adopted by Decree № 28 of 29.03.2000 by Russia's Federal Statistics Committee. Form № 63 includes the following statistical disorders (based on ICD): congenital iodine deficiency syndrome (ICD-10 code – E00), diffuse goiter (hypothyroidism) associated with iodine deficiency, and other forms of nontoxic goiter (E01.1, E01.2, E04.0), multinodular goiter (hypothyroidism) associated with iodine deficiency, nontoxic single-node goiter, nontoxic multinodular goiter (E01.1, E04.1, E04.2 respectively), subclinical hyperthyroidism caused by iodine deficiency and other forms of hypothyroidism (E02, E03), thyrotoxicosis (hyperthyroidism) (E05), thyroiditis (E06). The analysis below is based on the summation of the ICD-10 codes of form E00, E01.1, E01.2, E02, E03, E01.1, E04.0, E04.1, E04.2 in the age categories 'total', 5–9 years old and 10-14 years old. The age range to assess the efficiency of the management decisions was selected in accordance with the reporting form № 63 "Information on the Diseases Associated with

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Micronutritional Deficiencies”. These age groups are most affected by iodine deficiency and serve as target groups for preventative activities (Memorandum № 13-16/42 of 23.06.2003 by the RF Ministry of Health “On Provision of Secondary Educational Institutions with Iodine-Treated Salt and Food Products Enriched with Micronutrients”). The assessment is conducted in accordance with the guidelines “Social and Hygienic Monitoring. Analysis of the Medico-Demographic and Socio-Economic Indicators at the Regional Level” adopted by the Decree № 34 of 20.09.2010 by the Federal Service on Customers' Rights Protection and Human Well-Being Surveillance [5]. In order to increase, the informational value, we selected for the comparative analysis the data from Section 1 “Diseases registered in ____” (Table 1000) of Form № 63. The analysis of the report forms was conducted for the territories of Ulyanovsk Region (including the municipal districts, towns of Ulyanovsk, Dimitrovgrad, Novoulyanovsk). Assessment of the effectiveness of the management decisions was conducted in the territories where they were taken (Karsun, Main, Pavlov, Novospasskoye, and Veshkaim districts).

In accordance with the guidelines, we built a polynomial using the approximation function and smoothing when analyzing the incidence of diseases associated with iodine deficiency [6].

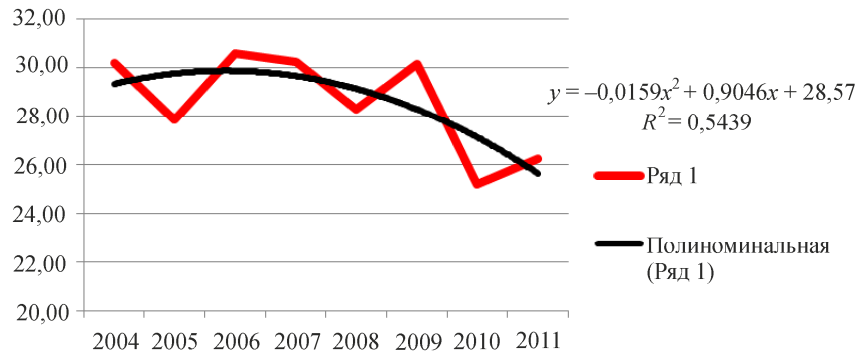
Results. Dynamic trend analysis of the prevalence of iodine deficiency disorders in the population of Ulyanovsk Region showed that in 2004-2011, the management decisions (described below) resulted in decreased incidence of diseases associated with iodine deficiency (Figure 1).



Row
Polynomial (Row 1)

Figure 1. Dynamics in the prevalence of diseases associated with iodine deficiency in 2004–2009, and a 2010–2011 forecast

Figure 1 shows that the prevalence of this type of disorder was growing until 2009 and that the estimated prevalence for 2010-2011 was higher than in the period under review of 2004-2009. The management decisions put into effect led to a continuous decrease in the incidence of the disease (Figure 2).

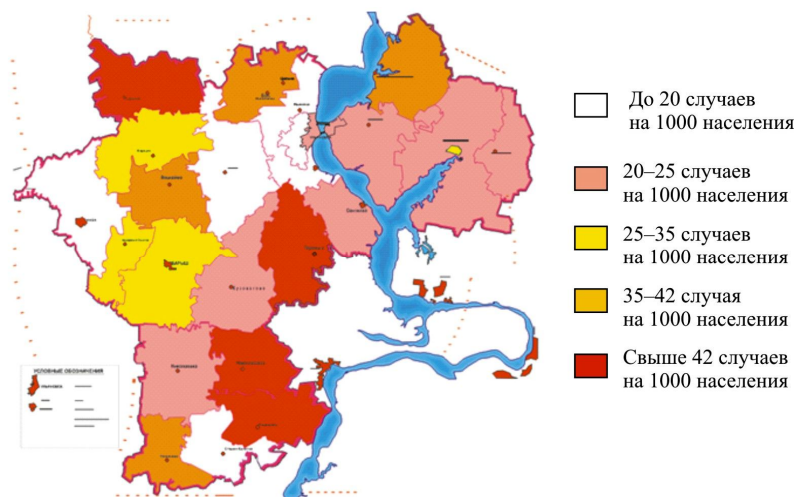


Row 1
Polynomial (Row 1)

Figure 2. Trends in the prevalence of diseases associated with iodine deficiency in 2004–2011 after a number of management decisions were put into effect in 2009–2011

The prevalence of iodine deficiency disorders went down from 30.19 cases in 2004 (39 959 patients) to 26.23 cases per 1000 population in 2011 (34 056 patients) with an average value of 28.59 cases for the period under review, median – 29.20, minimum – 25.21 (2010) and maximum – 30.58 (2006), and square deviation – 2.04.

The ranking of Ulyanovsk Region in terms of prevalence of iodine deficiency disorders as of 01.01.2012 including the summation of all the age groups showed that among the most disadvantageous districts with 5.8 % of the region’s population were Novospasskoye, Terenga, Surskoye, and Radischevo (Figure 3). The prevalence of disorders in those districts exceeds the region’s level by 13.8 %. The areas that had a higher prevalence as compared to the region’s level (Novospasskoye, Terenga, Surskoye, Radischevo, Pavlov, Tsilninskiy, Veshkaim, Staraya Maina, Barysh and Karsun districts, as well as the town of Dimitrovgrad) had 41.8 % of all the iodine deficiency disorders. Total population of those districts constitutes 27.3 % of the population of Ulyanovsk Region.

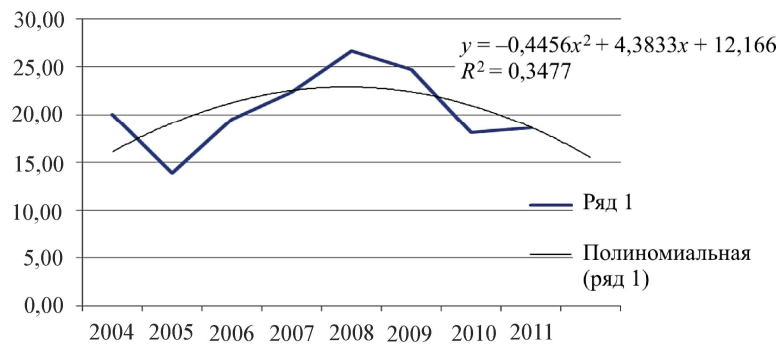


< 20 cases per 1000 population
20–25 cases per 1000 population
25–35 cases per 1000 population
35–42 cases per 1000 population
> 42 cases per 1000 population

Figure 3. Prevalence of iodine deficiency disorders in the population of Ulyanovsk Region as of 01.01.2012

The biggest growth rate of the prevalence of the disorders in the period under review took place in Pavlov (by 2.36 times), Novospasskoye (by 1.93 times), Tsilninskiy (by 1.66 times), Kuzovatovo and Sengiley (by 1.54 times) districts, and Barysh and Veshkaim districts (by 1.39 and 1.38 times respectively). In Radischevo district, the prevalence went up by 18 %, however due to a high base value in 2004 (37.51 cases per 1000 population), the district ranked 3rd in terms of prevalence in 2011 (44.29 cases per 1000 population) with an estimate of 49.87 ± 2.19 cases in 2012 (2 times higher than the region's forecast level).

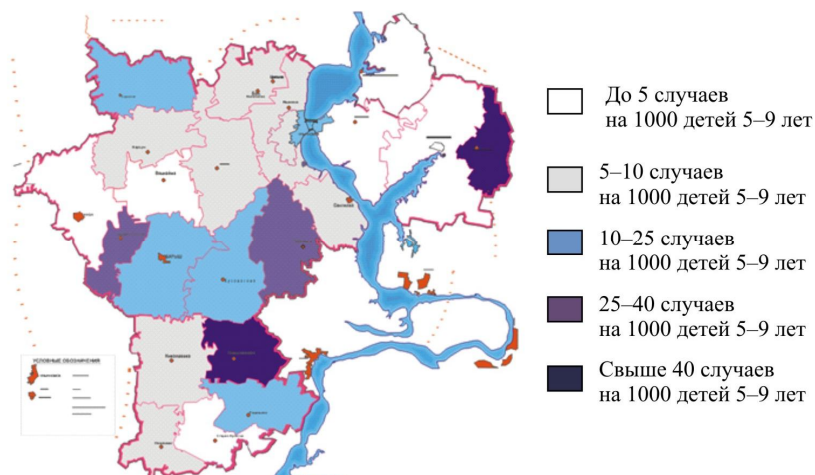
The prevalence of iodine deficiency disorders in children aged 5-9 decreased by 20.1 % in 2004-2011. In 2004, the prevalence of the disorder in this age group totaled 20.09 cases (1122 children) per 1000 children of the respective age, in 2011 – 18.69 cases (1044 children) with an average value for the 8 years of 20.53 cases, median – 19.85, minimum – 13,87 (2005), maximum – 26.64 (2008), standard deviation – 4.01 (Figure 4).



Row 1
Polynomial (Row 1)

Figure 4. Trends in the prevalence of iodine deficiency disorders in 2004–2011 in children aged 5–9 in Ulyanovsk Region

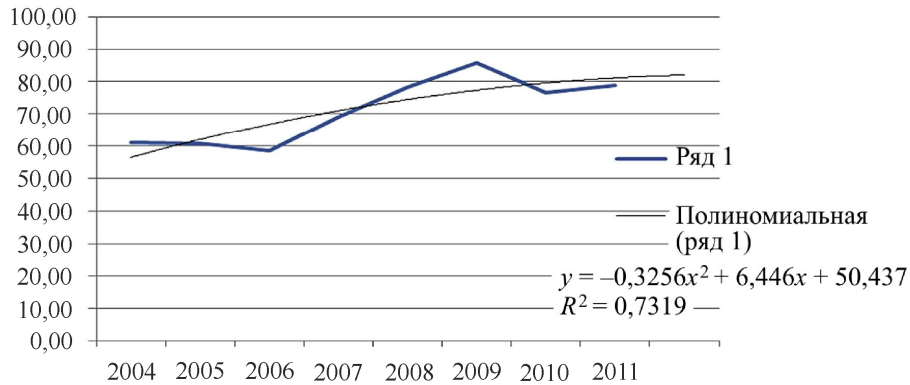
The ranking of the districts in terms of the prevalence of iodine deficiency disorders in this age group is shown in Figure 5.



< 5 cases per 1000 children aged 5–9
5–10 cases per 1000 children aged 5–9
10–25 cases per 1000 children aged 5–9
25–40 cases per 1000 children aged 5–9
>40 cases per 1000 children aged 5–9

Figure 5. Prevalence of iodine deficiency disorders in children aged 5–9 in Ulyanovsk Region as of 01.01.2012

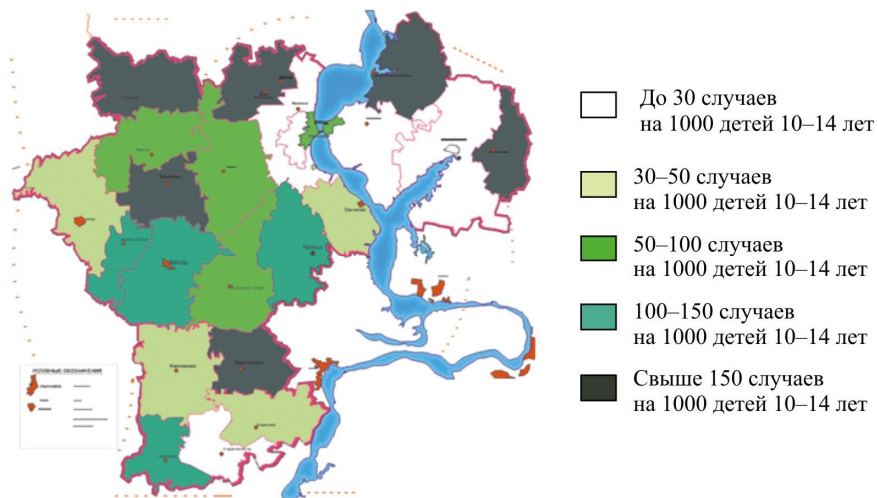
The prevalence of iodine deficiency disorders in children aged 10–14 totaled 76.26 cases in 2011 with an average value of 71.14 cases for the period of 8 years, median – 72.84, minimum – 58.50 (2006), maximum – 85.94 (2009), standard deviation – 10.24 (per 1000 children aged 10–14 (Figure 6).



Row 1
Polynomial (Row 1)

Figure 6. Trends in the prevalence of iodine deficiency disorders in children aged 1014 in Ulyanovsk Region in 2004–2011

The prevalence of iodine deficiency disorders in children aged 10–14 in various districts is shown in Figure 7.



- < 30 cases per 1000 children aged 10–14
- 30–50 cases per 1000 children aged 10–14
- 50–100 cases per 1000 children aged 10–14
- 100–150 cases per 1000 children aged 10–14
- > 150 cases per 1000 children aged 10–14

Figure 7. Prevalence of iodine deficiency disorders in children aged 1014 in Ulyanovsk Region as of 01.01.2012

The prevalence of iodine deficiency disorders in the city of Ulyanovsk was 8.5 % lower than the region’s average. The predicted values for 2012 are the following: “Total” – 22.46 ± 2.82 cases (in the range of 19.64 to 25.28 per 1000 population), in the age group 5–9 – 16.27 ± 5.06 cases (in the range of 11.20 to 21.33 per 1000 children in this age group) and in the age group 10–14 – 43.04 ± 18.44 cases (in the range of 24.60 to 61.49 per 1000 children in this age group).

The management decisions were the main tools used in the municipal districts to prevent iodine deficiency disorders. Action plans and programs have been developed and implemented in Novospasskoye, Surskoye, Pavlov, Tsilninskiy, Veshkaim, Main and Karsun districts of Ulyanovsk Region to stabilize and decrease the incidence of iodine deficiency disorders.

A course of actions timely implemented in Karsun district in 2009 (Prevention of Iodine Deficiency Disorders in 2009–2010 in Karsun District Municipal Entity) resulted in decrease in the incidence of the disorders under review from 51.36 cases per 1000 population in 2008 to 28.68 cases in 2011 (or by 1.79 times), a forecast level for 2012 is 24.28 ± 2.12 cases per 1000 population which is similar to the region's average (Table 1).

Table 1

Prevalence of iodine deficiency disorders in the districts of Ulyanovsk Region after the implementation of management decisions aimed at its prevention

Indicator	Year							
	2004	2005	2006	2007	2008	2009	2010	2011
Karsun district								
Actual level	43,13	40,67	48,88	60,10	51,36	40,74	36,46	28,68
Forecast level						54,82	53,63	
Decrease in 2008–2011, %							47.07	34.55
Main district								
Actual level	20.64	29.69	34.88	33.51	41.25	23.05	22.10	19.22
Forecast level						40.92	40.84	
Decrease in 2008–2011, %							84.78	77.54
Pavlov district								
	2004	2005	2006	2007	2008	2009	2010	2011
Actual level	17.17	19,01	20,73	32,20	45,62	44.63	47.21	40.60
Forecast level						64.43	87.89	
Decrease in 2008–2011, %							86.19	44.34
Novospasskoye district								
Actual level	53.67	53.90	89.37	102.92	93.95	102.18	79.10	103.59
Forecast level							97.33	88.40
Decrease in 2009–2011, %							23.05	–14.67
Veshkaim district								
Actual level	53.00	38.08	39.52	43.48	22.78	44.75	32.31	36.47
Forecast level							47.93	59.24
Decrease in 2009–2011, %							48.33	62.43

In Main district, The Action Plan to Prevent Iodine Deficiency Disorders in Population of Main district for 2010 (a Decree by Ulyanovsk Region Department of Education in 2009) led to a 2 time decrease in the incidence of disorders as of 01.01.2012 as compared to 2008. In 2008, the incidence totaled 41.25 cases per 1000 population, in 2011 – 19.22 cases, a forecast level for 2012 – 11.51 ± 5.39 cases per 1000 population. A similar positive effect after the implementation of a course of preventative actions was registered in Pavlov district in 2009 and in Veshkaim district in 2010. The management decisions implemented in Pavlov district included production of bakery products enriched in iodine.

No positive effect after the implementation of management decisions in 2009-2010 was registered only in Novospasskoye district. However there was a positive note – a 2-time decrease in the incidence of the disorder in children aged 5-9 (from 141.71 cases in 2008 to 72.18 cases in 2011 per 1000 children of respective age) and in children aged 10-14 (from 182.80 cases in 2008 to 159.58 cases in 2011 with a forecast level for 2012 in this age group of $r\ 118.27 \pm 35.08$ per 1000 children).

Prevention of iodine-deficiency disorders includes a series of activities such as supervisory and hygienic activities. 2011 monitoring showed that Ulyanovsk Region received 1053,356 tons of iodized salt (in 2010 – 1171.0 t; 2009 – 1259.16 t; 2008 – 1258.82 t; 2007 – 534.67 t). In addition to the use of iodized salt, other preventative activities implemented in the region included production of goods enriched in iodine by the local manufacturers. Food products enriched in iodine and other micronutrients are supplied to the local educational institution for children, medical institutions and social services organizations.

See Table 2 for the list of Ulyanovsk Region manufacturers and food products.

Table 2

List of manufacturers producing iodine-enriched products

Manufacturer	Product
Ulyanovskkhhlebprom, OJSC, Ulyanovsk	Bakery products enriched in iodine
Molochniy Zavod, OJSC, Ulyanovsk	Milk, buttermilk, curds enriched in iodine
Volzhanka, Mineral Water Manufacturer, Ulyanovsk Region, Undory	Milk, buttermilk, curds enriched in iodine
ALEV, CJSC, Ulyanovsk	Milk enriched in 8 minerals and iodine
NovMolDom, LLC, Novospasskoye district, Troitskiy Sungur	Milk enriched in iodinated casein
Krasnaya Zvezda, LLC, Ulyanovsk Region, Bolshiye Kluchitsi	Milk, buttermilk, curds enriched in iodine

To ensure sanitary and epidemiological supervision at trade organizations in 2011, 20 samples of iodized salt (8.55 %) were studied (2010 – 19.5 %; 2009 – 27.7 %; 2008 – 32.8 % of the total studies of iodized salt). At pre-schools and medical facilities, 213 samples of iodized salt (91 %) were studied in 2011: 2010 – 80.5 %; 2009 – 72.3 %; 2008 – 67.2 % (the total studies of iodized salt). The number of samples of iodized salt that did not meet the hygienic standards decreases as compared to 2009–2010 and totaled 2.14 % in 2011 (2010 – 3.26 %; 2009 – 4.52 %). Fewer samples of iodized salt were analyzed within the social and hygienic monitoring in 2011 – a 23.8 % decrease – of the total number of analyzed samples of iodized salt (from 307 samples in 2010 to 234 samples in 2011).

In 2011, in accordance with the guidelines of Ulyanovsk Region Department of the Federal Service on Customers' Rights Protection and Human Well-Being Surveillance developed on the basis of the social and hygienic monitoring that was conducted in Ulyanovsk Region, the following regional programs were in effect: On Prevention of Iodine Deficiency Disorders for 2011-2013 (Novospasskoye district, Tsilninskiy district, Veshkaim, Pavlov districts). In 2011, a municipal special target program “Prevention of Iodine Deficiency Disorders in a Municipal Entity “Surskoye District” for 2012-2013” was adopted by Decree № 648-P-A of 05.12.2011 of the Head of Administration.

Conclusions and Recommendations. Iodine deficiency disorders are an urgent issue for the population of Ulyanovsk Region and calls for management decisions aimed at their prevention.

The management decision implemented in the municipal entities of Ulyanovsk Region: Karsun district, Main district, Pavlov district, Veshkaim district – proved to be effective: the incidence of iodine deficiency disorders went down in the districts by 1.3-1.8 times. The management decisions implemented in Novospasskoye district proved to be ineffective.

Monitoring and assessment of the efficiency of supervisory, organizational and preventative activities to prevent the increase in prevalence of iodine deficiency disorders in municipal entities followed by adequate management decisions results in decrease in the prevalence of this disorder.

References

1. Doktrina prodovol'stvennoj bezopasnosti Rossijskoj Federacii [Russian Federation Food Security Doctrine]. Utverzhdeno Ukazom Prezidenta RF № 120 ot 30.01.2010. Available at: <http://www.mcx.ru/documents/document/show/12214.19.htm>.
2. Osnovy gosudarstvennoj politiki Rossijskoj Federacii v oblasti zdorovogo pitaniya naselenija na period do 2020 g. [The general principles of the Russian Federation state policy on healthy nutrition up to 2020]. Utverzhdeno rasporyazheniem Pravitel'stva Rossijskoj Federacii ot 25.10.2010 g. № 1873-r. Available at: <http://www.rg.ru/2010/11/03/pravila-dok.html>.
3. Rekomendacii po racional'nym normam potreblenija pishhevyyh produktov, otvechajushhim sovremennym trebovanijam zdorovogo pitaniya [Recommendations on sustainable food consumption standards which meet current healthy nutrition requirements]. Utverzhdeno prikazom Ministerstva zdavoohranenija i social'nogo razvitija RF ot 2 avgusta 2010 g. № 593 n. Available at: <http://base.garant.ru/12179471/>.
4. O sanitarno-jepidemiologicheskoj obstanovke v Rossijskoj Federacii v 2010 godu: gosudarstvennyj doklad [On the condition of health and epidemiological well-being of the population in the Russian Federation in 2010: a State Report]. Moscow: Federal'nyj centr gigieny i jepidemiologii Rospotrebnadzora, 2011. 266 p.
5. Social'no-gigienicheskij monitoring. Analiz mediko-demograficheskikh i social'no-jekonomicheskikh pokazatelej na regional'nom urovne: Metodicheskie rekomendacii [Social and hygiene monitoring. The analysis of medical, demographic and socioeconomic indicators at the regional level: methodical guidelines]. Moscow: Federal'naja sluzhba po nadzoru v sfere zashhity prav potrebitelej i blagopoluchija cheloveka, 2010, pp. 31–35.
6. Olejnikova E.V. Znachenie vybora adekvatnyh edinic nabljudenija dlja rascheta statisticheskikh pokazatelej v jepidemiologicheskikh issledovanijah [The significance of selecting adequate observational units to calculate statistical indicators in epidemiological studies]. *Zdorov'e naselenija i sreda obitanija*, 2005, no. 11, pp. 9.

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