

**IRRATIONAL NUTRITION AS POPULATION HEALTH RISK FACTOR
IN IRKUTSK REGION****I.G. Zhdanova-Zaplesvichko^{1,2}**¹Federal Service for Surveillance over Consumer Rights Protection and Human Well-being, Irkutsk Regional Office, 8 Karl Marks Str., Irkutsk, 664003, Russian Federation²Irkutsk State Medical Academy for Post-graduate Studies, a branch of Russian Medical Academy for Continuous Occupational Education, 100 Yubileyniy district, Irkutsk, 664049, Russian Federation

Insufficient and unsafe nutrition causes a lot of diseases. The article contains assessment of long-term (2006–2016) dynamics describing food products consumption by Irkutsk region population, and food substances contents in consumed food products. The author analyzed population morbidity in Irkutsk region in terms of basic alimentary-dependent diseases, groups of diseases, and specific nosologic forms, and compared it with average country and regional morbidity; she also assessed prevalence of "irrational nutrition" factor among adult population.

It was detected that there was a deficiency in basic food products consumption by Irkutsk region population; basic food products were consumed in smaller quantities than in the country on average. Taken in dynamics over 2006–2012, consumption of proteins, fats, hydrocarbons, as well as caloric value of consumed food tended to grow. But then, taken in dynamics over 2012–2016, all these parameters decreased.

The author analyzed alimentary-dependent population morbidity in Irkutsk region over 2012–2016 and detected more negative trends in it in comparison with the average country levels. Morbidity with most analyzed categories and groups of diseases and specific alimentary-dependent diseases were higher in Irkutsk region than in the country on average. There were negative trends detected in dynamics of morbidity caused by such a risk factor as unhealthy nutrition (blood diseases; endocrine system diseases, including obesity; thyroid gland diseases; thyrotoxicosis; diseases related to increased blood pressure; digestive organs diseases).

Key words: population nutrition, basic food substances, caloric value, alimentary-dependent morbidity, diseases categories, nosologic forms, irrational nutrition

Healthy nutrition is one of the state policy priorities in the field of public health. Prevention of diseases caused by inadequate and unbalanced nutrition, preservation and strengthening of public health are the main goals of the state policy in the field of healthy nutrition¹. It's been established that as a result of a complex of activities in which nutrition plays a leading role, it is realistic and quick enough to im-

prove public health [1, 2].

Disturbances in the structure of nutrition largely determine high morbidity and mortality from cardiovascular and other non-infectious diseases. Therefore, the problem of food safety in the region is viewed both from the standpoint of food consumption adequacy to physiological needs of a human, and from the standpoint of sanitary and epidemiological safety, that

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¹ Ob osnovakh gosudarstvennoy politiki Rossiiskoi Federatsii v oblasti zdorovogo pitaniya naseleniya na period do 2020 goda: Rasporuyazhenie Pravitel'stva RF № 1873-r ot 25.10.2010 g. [On the fundamentals of the Russian Federation state policy in the field of healthy nutrition of the population for the period up to 2020: Order of the Russian Federation Government of 25.10.2010 No. 1873-r]. *Kosul'tantPlyus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_106196/ (30.01.2018) (in Russian).

is, protection of an organism internal environment from ingesting various xenobiotics of chemical and biological nature. In view of the above, providing the population of our country with safe agricultural products, fish and other products from aquatic resources and food is a strategic goal of food safety. To assess food safety status, the following indices which includes: food consumption per capita; daily human nutrition caloric intake; amount of proteins, fats, carbohydrates, vitamins, macro- and microelements consumed by a person per day, and others² are in use.

Studies of the actual nutrition of the population, carried out in recent years in various regions of the country, showed presence of both general and specific problems that depend on socioeconomic, environmental and production factors, as well as on the traditions of nutrition [3]. In most countries, there is a distinct tendency to increasing prevalence of alimentary-dependent pathology [2, 4, 5]. Unhealthy diet, overweight and obesity contribute to the development of many non-infectious diseases, including cardiovascular diseases, type II diabetes, and certain types of cancer, which together are the main causes of death. In most countries, examinations of population indicate an excessive consumption of calories, saturated fats, transfats, sugar and salt, inadequate consumption of vegetables, fruits and whole grains, and an

increase in the number of obese people. It is established that these factors not only reduce the prospective life expectancy, but also worsen the quality of life [4, 6–12].

Nutrition of the Irkutsk region population is characterized by a sharp imbalance in its structure, a lack of micro and macronutrients, eating disorders, which can lead to the development of diseases associated with the influence of alimentary factor [13].

The purpose of this study is to analyze the dynamics and levels of food products consumption and the main nutritional diseases in the Irkutsk region population, to give a comparative description in relation to the average Russian and regional indices.

Materials and methods. To study the population nutritional status we used Rosstat data over the period 2005–2016 [14, 15]. The norms of food consumption are given in accordance with the Order of the Ministry of Health of Russia, ddt. 19.08.2016, No. 614 "On approval of recommendations on rational norms for consumption of food that meet modern requirements for healthy eating"³. Prevalence of "improper nutrition" factor was estimated according to the statistical report form No. 131 «"Information on clinical examination of certain adult population groups"⁴ for 2014–2016. Analysis of the alimentary-dependent incidence in the population was

² Ob utverzhdenii Doktriny prodovol'stvennoi bezopasnosti Rossiiskoi Federatsii: Ukaz Prezidenta RF № 120 ot 30.01.2010 g. [On approval of the Food Security Doctrine of the Russian Federation: Presidential Decree of 30.01.2010 No. 120]. *Konsul'tantPlyus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_96953/ (30.01.2018) (in Russian).

³ Ob utverzhdenii rekomendatsii po ratsional'nym normam potrebleniya pishchevykh produktov, otvechayushchikh sovremennym trebovaniyam zdorovogo pitaniya: Prikaz Minzdrava Rossii № 614 ot 19.08.2016 g. [On approval of recommendations on rational norms for consumption of food that meet modern requirements for healthy nutrition: Order of the Ministry of Health of Russia ddt. 19.08.2016 No. 614]. *Konsul'tantPlyus*. Available at: http://www.consultant.ru/document/cons_doc_LAW_204200/ (13.03.2018) (in Russian).

⁴ Svedeniya o dispanserizatsii opredelennykh grupp vzroslogo naseleniya: obrazets (forma) № 131 [Data on clinical examination of certain groups of adults: Form No.131]. *KODEKS: elektronnyi fond pravovoi i normativno-tekhnicheskoi dokumentatsii*. Available at: <http://docs.cntd.ru/document/493676665> (13.03.2018) (in Russian).

carried out for the period 2012–2016, according to the Ministry of Health of Russia [16–18]. Data were statistically processed using classical methods.

Results and discussion. It was established that in Irkutsk region there is a deficit (comparing to the recommended consumption norms) in a number of important groups of food products (Table 1). It should also be noted that Irkutsk region belongs to the Russian Federation group of subjects with a lower level of consumption of staple foods comparing to the average Russian indices, except for vegetable oil

and potatoes (32nd and 28th, respectively), and ranks 51st–73rd among 85 subjects of the Russian Federation.

Following the data in Table 1, the consumption of meat and meat products in 2016 was 68 kg per capita, per year in Irkutsk region (at a standard value of 73 kg/year) and was below the recommended norm of 5 kg (by 6.8 %). In the dynamics for the period 2005–2016, there is a significant increase in meat consumption (+28.3 %). At the same time, in the recent 3 years there has been a decrease in consumption of meat products by 3 %.

Table 1

Consumption of basic food products by the population of Irkutsk region
(per capita, per year, kg)

Product groups (rating for 2016)*	2005	2010	2011	2012	2013	2014	2015	2016	Recommended consumption, kg/ person/year
Meat and meat products (51)	53	62	66	69	70	70	68	68	73
Milk and dairy products (64)	184	190	198	202	199	200	197	193	325
Eggs, pcs. (58)	174	203	208	213	219	224	230	232	260
Vegetables and cucurbits crops (73)	63	77	82	84	83	84	85	86	140
Sugar (67)	29	32	34	34	33	32	31	32	24
Vegetable oil (32)	11,8	11,7	12,7	13,4	13,0	13,0	12,7	12,9	12
Potatoes (28)	130	123	127	125	125	127	126	126	90
Bread products (64)	120	109	113	113	108	105	106	106	96

Note: * – Rating among 85 subjects of Russian Federation (in descending order)

Consumption of milk and dairy products in Irkutsk region in 2016 was 193 kg per capita, per year, which is lower than the recommended norm by 132 kg (1.7 times). According to the consumption of milk and dairy products among 85 subjects of Russian Federation, Irkutsk region held 64th rating position. Evaluation of the dynamics in this index for the period 2005–2016 shows presence of multidirectional trends, including growth of dairy products consumption in the period 2005–2012 (growth rate + 9.8 %), and decline trends for this index in the following period 2012–2016 (decline rate is 4.5 %). In 3

years dynamics, there is a decrease in consumption of dairy products by 3.5 %.

Consumption of eggs in Irkutsk region in 2016 was 232 pcs. per capita, per year, which is below the recommended value by 28 pcs. (by 10.8 %). By the consumption of eggs among 85 subjects of Russian Federation, Irkutsk region ranked 58th. In the dynamics for 2005–2016, there is a significant increase in consumption of this type of products (+ 33.3 %).

Consumption of vegetables and cucurbits crops in Irkutsk region was 86 kg per capita, per year, which is below the recommended norm by 54 kg (1.6 times).

In 2016, Irkutsk region held 73rd rating in the consumption of this product per capita. In the dynamics for 2005-2016, there is a significant increase in consumption of vegetables and cucurbits crops (+ 36.5%).

Consumption of potatoes, sugar, bread products and vegetable oil in Irkutsk region exceeded the recommended standards.

The consumption of potato was 126 kg, which is 36 kg higher than the recommended value (1.4 times). Among 85 subjects of Russian Federation, Irkutsk region ranked 28th. In the dynamics for 2005–2016, potato consumption significantly decreased (-3.1 %), over the recent 3 years, the consumption level is characterized by a tendency to stabilization of this index (126–127 kg/year).

Consumption of sugar was 32 kg, which is higher than the recommended norm by 8 kg (by 33 %). Evaluation of this indicator in dynamics for the period 2005-2016 shows presence of multidirectional trends, including a growth trend in sugar consumption for 2005–2011 (+ 17.2 %), stabilization of consumption in 2011-2012, and the decline trend in this index in the following period: the decline for the period 2012–2016 made 5.9 %.

Consumption of bread products made 106 kg/person per year, which is higher than the recommended norm by 10 kg (by 10.4 %). In dynamics, for the period 2005–2016, there is a significant decrease in bread products consumption (-11.7 %).

Consumption of vegetable oil in 2016 was 12.9 kg, which is 7.5% higher than the recommended norm (0.9 kg). Evaluation of this index in dynamics for the period 2005–2016 speaks for multidirectional trends. Thus, in the period 2005-2012, there was an increase in vegetable oil consumption (+ 13.6 %), and the trend of

decline in this index in the following period (the decline for the period 2012–2016 made 3.7 %).

Caloric intake of food products by the population in Irkutsk region in 2000 was 2,757.8 calories per consumer, per day, which is 3.1 % higher than the Russian average (2674.8 kcal) (Figure).

Excess in food ration caloric content in Irkutsk region relative to the Russia's average level is due to a higher carbohydrate intake (in 2016: by 6.3 %), fat (by 0.6 %). Consumption of protein in Irkutsk region population diet for 2016 was lower than the average Russian index by 2.3 %. The dynamics for the period 2006-2016 in Irkutsk region observes two different trends: in the period of 2006–2012, the growth tendency in consumption of proteins, fats, carbohydrates and calories content of the diet was 19.1 %, 29 %, 8.1 %, 15.9 %, respectively. In the period 2012-2016, the decrease tendency in the dietary intake of protein, fat, carbohydrate and caloric intake itself – by 5.6 %, 5.9 %, 9.9 % and 8 % respectively (Table 2).

Thus, nutrition of the population in Irkutsk region is unbalanced; there is a significant gap between the recommended norms for the consumption of vegetables and fruits, milk and dairy products (more than 1.5 times), eggs, meat products, which causes deficit in protein and fiber in a diet. At the same time, an excessive consumption of carbohydrates is noted, among other things, due to potatoes, sugar, grain products.

The high prevalence of "improper nutrition" factor in the adult population is confirmed by the medical examination data. According to the data for 2016, this risk factor was registered in 30.1% of persons who passed medical examination (2013: 22.7 %, 2014: 30.1 %, 2015: 29.4 %).

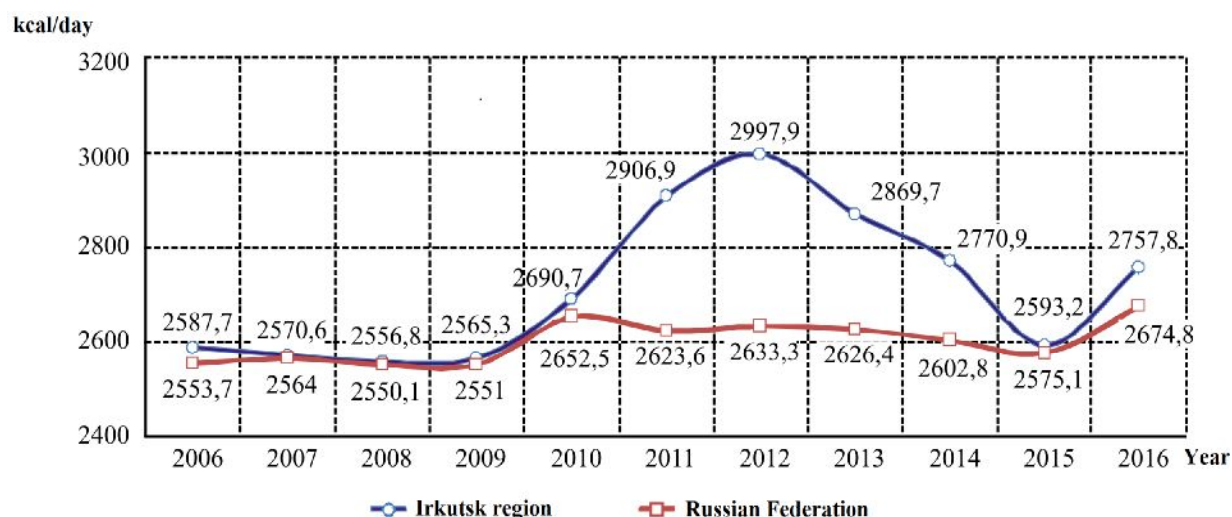


Figure. Caloric intake of food products by the population of Irkutsk region (on average, per household member, per day)

Table 2

Composition of nutrients in the consumed food products in Irkutsk region and Russian Federation for 2006–2016

Year	Quantity of nutrients (per consumer, per day)							
	Proteins, g		Fats, g		Carbohydrates, g		kcal	
	Irkutsk region	RF	Irkutsk region	RF	Irkutsk region	RF	Irkutsk region	RF
2006	69,5	70,7	90,1	95,2	372,2	350,8	2587,7	2553,7
2007	69,1	71,7	90,4	97,4	367,5	347,4	2570,6	2564,0
2008	70,7	72,8	92,3	98,5	358	340,4	2556,8	2550,1
2009	71,5	73,3	95,2	99,3	352,9	338,2	2565,3	2551,0
2010	75,3	76,6	101,5	104,5	366,4	348,4	2690,7	2652,5
2011	81,0	76,7	109,3	104,7	396,8	340,6	2906,9	2623,6
2012	82,8	77,5	116,2	105,3	402,3	341	2997,9	2633,3
2013	80,1	78,1	114,2	106,2	377,6	336,5	2869,7	2626,4
2014	78,4	77,7	110,7	105,3	362,3	333	2770,9	2602,8
2015	73,5	77,1	103,2	104,6	339,9	328,4	2593,2	2575,1
2016	78,2	80,0	109,3	108,7	362,6	341,1	2757,8	2674,8

The diet imbalance leads to an increased level and growth in the incidence rates of endocrine system diseases (thyroid diseases, thyrotoxicosis, type 2 diabetes, obesity, blood diseases, including anemia, cardiovascular system) and other alimentary-dependent diseases.

Analysis of the alimentary-dependent morbidity of the entire population in Irkutsk region, for the period 2012-2016, testifies that the average long-term levels of this pathology in Irkutsk region for most of the analyzed classes, groups of diseases, and certain diseases were higher than the average Russia's values (Table 3).

Table 3

Morbidity in the whole population, per classes, groups of diseases, and certain diseases diagnosed first time in life for the period 2014–2016 (per 100 th. people of the population)

Region	2012	2013	2014	2015	2016	Long-term annual average for 2012–2016
<i>In total</i>						
Irkutsk region	92057,1	94560,2	95607,4	95218,9	99980,3	95484,8
Siberian Federal District	84611,4	86943,7	86041,9	84796,6	85056,4	85490,0
Russian Federation	79390,4	80030,3	78615,7	77815,7	78602,1	78890,8
<i>Blood diseases</i>						
Irkutsk region	529,3	558,4	588	602,6	607,4	577,1
Siberian Federal District	520,5	525,8	521,8	510,4	515,5	518,8
Russian Federation	471,2	466,1	470,5	472,4	469,5	469,9
<i>incl. anemia</i>						
Irkutsk region	481,9	511,8	544,5	547,8	548,5	526,9
Siberian Federal District	483,8	491	481,1	463,3	476,5	479,1
Russian Federation	429,2	424,8	427,2	433,9	433,1	429,6
<i>Diseases of endocrine system</i>						
Irkutsk region	1784,7	1760,6	1882,9	1841,7	2017	1857,4
Siberian Federal District	1382,8	1405,9	1479,6	1700,9	1910,5	1575,9
Russian Federation	1061	1065	1118,4	1333,8	1390,4	1193,7
<i>incl. thyroid gland diseases</i>						
Irkutsk region	664,1	607,9	690	671,2	730,1	672,7
Siberian Federal District	463,4	465,4	466,4	486,1	501,2	476,5
Russian Federation	354,3	339,5	346,9	357,7	355,1	350,7
<i>incl. thyrotoxicosis</i>						
Irkutsk region	23,4	20	19,4	24,1	25,8	22,5
Siberian Federal District	19,7	17,6	18,2	20,9	21,6	19,6
Russian Federation	15,2	14,5	15	16,6	17,2	15,7
<i>incl. obesity</i>						
Irkutsk region	250,4	312,3	336,1	344,9	367,7	322,3
Siberian Federal District	301,4	353,2	368	458,3	483,5	392,9
Russian Federation	172,9	206,4	228,3	314,8	317,3	247,9
<i>incl. type 2 diabetes mellitus</i>						
Irkutsk region	224,5	224,7	212,1	202,2	205,7	213,8
Siberian Federal District	219,5	211,3	214,9	217,7	204,4	213,6
Russian Federation	220,2	218,4	216,9	221,8	212,8	218,0
Irkutsk region	3223,2	3407,1	3445,6	3257,9	3376,1	3342,0
Siberian Federal District	3373,7	3676,5	3536,1	3537,7	3641,3	3553,1
Russian Federation	2663,1	2989,1	2874,9	3116,7	3172,1	2963,2
<i>Diseases characterized by high blood pressure</i>						
Irkutsk region	735,4	942,8	1047,7	915,2	1027,7	933,8
Siberian Federal District	900,9	999,5	1074	1155,1	1209,1	1067,7
Russian Federation	587,5	617,4	690,7	898,3	954,9	749,8
<i>Diseases of digestive system</i>						
Irkutsk region	4153,7	4315,2	5466,7	5497,7	5859,5	5058,6
Siberian Federal District	5613,2	5722,8	5801,6	5664,4	5420,6	5644,5
Russian Federation	3478,9	3526,6	3652,4	3526,6	3568	3550,5
<i>incl. gastric ulcer and duodenal ulcer</i>						
Irkutsk region	129,0	140,8	127,2	105,8	112,5	123,1
Siberian Federal District	131,2	127	122,6	119,4	120,2	124,1
Russian Federation	86,9	83	79,3	85,6	83,5	83,7

As it follows from the data in Table 3, the incidence of blood diseases, for the period 2012–2016, made 577.1, which is 22.8 % higher than the Russia's average index, and 11.2 % higher than the regional index for Siberian Federal District (SFO). The blood diseases incidence dynamics of the Irkutsk region population is characterized by a pronounced growth trend. The growth rate for 5 years made 14.8 %. The index increased from 529.3 in 2012 to 607.4 in 2016.

91.3 % in the structure of blood diseases morbidity belong to anemia. The incidence of anemia in Irkutsk region in the average for the period 2012–2016 was 526.9, which is 22.6 % higher than Russia's average and 10.0 % higher than the regional index for Siberian Federal District. The anemia incidence dynamics of the population in Irkutsk region is also characterized by a pronounced growth trend. The growth rate for 5 years made 13.8 %. This index increased from 481.9 in 2012 to 548.5 in 2016.

The long-term annual average level of endocrine system primary incidence in Irkutsk region for the period 2012–2016 was 1857.4, which is 55.6 % higher than Russia's average, and 17.9% higher than the regional index. The incidence dynamics of the Irkutsk region population with endocrine system diseases is characterized by a growth trend. The growth rate for 5 years was 13.0 %. The incidence rate increased from 1784.7 in 2012 to 2017.0 in 2016.

In the structure of "endocrine system" class, a significant proportion (36.2 %) belongs to thyroid disease. The incidence rate of the Irkutsk region population with the given pathology over the period 2012–2016 averaged to 672.7, which is 91.8 % higher than the national average, and 41.2 % higher than the regional index. The incidence dynamics of Irkutsk region's popula-

tion with thyroid gland diseases is characterized by the emerging tendency of growth. The growth rate for 5 years made 9.9 %. This index increased from 664.1 in 2012 to 730.1 in 2016.

Thyrotoxicosis makes 1.2 % in the endocrine system diseases incidence. The long-term annual average level of thyrotoxicosis primary incidence in Irkutsk region for the period 2012–2016 was 22.5, which is 43.6 % higher than Russia's average, and 15 % higher than the regional index. Thyrotoxicosis incidence dynamics of the Irkutsk region population in 2012–2014 was characterized by a downward trend; in 2014–2016 the growth in this index was registered from 19.4 to 25.8. The growth rate for 3 years was 13.0 %.

In the structure of endocrine system diseases incidence, 17.4 % is obesity. The incidence rate of the Irkutsk region population with this pathology averaged 322.3 over the period 2012–2016, which is 30 % higher than the Russia's average, and 18 % lower than the regional index. It should be noted that the morbidity dynamics in the Irkutsk region population is characterized by a pronounced growth trend. The growth rate for the analyzed period was 46.8 %. This index increased from 250.4 in 2012 to 367.7 in 2016.

The incidence of type 2 diabetes mellitus is 11.5 % in the endocrine system diseases morbidity structure. The long-term annual average level of type 2 diabetes mellitus primary incidence in the Irkutsk region population for the period 2012–2016 was 213.8, which is 1.9 % lower than the Russia's average. The dynamics of type 2 diabetes mellitus morbidity in Irkutsk Region was characterized by a downward trend. The decrease rate for the period under study was -8.4 %.

The long-term annual average level of circulatory system diseases primary inci-

dence in the population of Irkutsk region, for the period 2012–2016, was 3342.0, which is 12.8 % higher than the Russia's average, and 5.9 % lower than the regional index. The incidence dynamics of circulatory system diseases in the Irkutsk region is characterized by an emerging tendency of growth. The growth rate for the analyzed period was 4.7 %. This index increased from 3223.2 in 2012 to 3376.1 in 2016.

In the incidence structure of circulatory system diseases, 27.9 % are the diseases characterized by high blood pressure. The incidence rate of the Irkutsk region population with this pathology averaged 933.8 over the period 2012–2016, which is 24.5 % higher, than the Russia's average and 12.5 % lower than the regional index. The incidence dynamics of the Irkutsk region population with the diseases characterized by high blood pressure featured a pronounced growth trend. The growth rate for the analyzed period was 39.7 %. This index increased from 735.4 in 2012 to 1027.7 in 2016.

The long-term annual average level of primary incidence of digestive organs diseases in the Irkutsk region population for the period 2012–2016 was 5058.6, which is 42.5 % higher than the Russia's average, and 10.4 % lower than the regional index. The incidence dynamics of the Irkutsk region's population with digestive organs diseases was characterized by a pronounced growth trend. The growth rate for the analyzed period was 41.1 %. The index increased from 4153.7 in 2012 to 5859.5 in 2016.

In the incidence structure of the digestive system diseases, 18.3 % is gastritis and duodenitis, 2.4 % belong to gastric ulcer and duodenal ulcer. The morbidity rate among the Irkutsk region's population with gastritis and duodenitis over the period

2012–2016 averaged 927.3, which is 88.3 % higher than the Russia's average index and 30.4 % than the regional index. The incidence dynamics of the Irkutsk region population with gastritis and duodenitis was characterized by a pronounced growth trend. The growth rate for the analyzed period was 31.9 %. The index increased from 794.4 in 2012 to 1047.7 in 2016.

The incidence rate of the Irkutsk region's population regarding to stomach ulcer and duodenal ulcer over the period 2012–2016 averaged 123.1, which is 47.1 % higher than the national average. The morbidity dynamics of this pathology in the Irkutsk region's population was characterized by a downward trend. The decrease rate in this index for the analyzed period made -12.8 %. The incidence rate declined from 129.0 in 2012 to 112.5 in 2016.

Thus, our findings testify the deficit in consumption of the main groups of food products formed in the residents of Irkutsk region due to unbalanced nutrition. In the region, health disorders manifested in the development of alimentary-dependent types of pathology are registered. The indices of such incidence, comparing to the Russia's average, are higher. Unhealthy diet is a risk factor for a number of diseases. In particular, the blood diseases, endocrine system diseases (obesity, thyroid disease, thyrotoxicosis) can be noted, as well as the diseases characterized by high blood pressure, digestive system disorders.

All of the above indicates the need for taking measures to improve the nutrition quality of the population. One of the important components is the implementation of measures aimed at improving the food products mix in retail, catering enterprises, as well as increasing the economic accessibility and attraction of healthy foods [4, 5].

The study findings were used to conduct a comprehensive assessment of the risk factors effect on public health. Information and proposals on the problem of improper diet in Irkutsk region, and the need to adopt prevention programs for alimentary-dependent diseases were submitted to the Governor of Irkutsk region, local

authorities, other interested bodies and organizations with a view to make relevant management decisions.

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