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phone: +38 (044) 33 88 704, +38 (094) 910 17 04,
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¹ Bogomolets National Medical University, Kyiv, Ukraine

² Shupyk National Medical Academy of Postgraduate Education, Kyiv, Ukraine

³ Dnepropetrovsk Medical Academy of the Ministry of Health of Ukraine, Dnipro, Ukraine

⁴ Ukrainian Medical Stomatological Academy, Poltava, Ukraine

⁵ Kyiv Children's Clinical Hospital No 7, Kyiv, Ukraine

Волосовец А.П.¹, Бекетова Г.В.², Выговская О.В.¹, Кривопустов С.П.¹, Абатуров А.Е.⁴,
Крючко Т.А.⁵, Кузьменко А.Я.¹, Логинова И.А.¹, Щербинская Е.Н.³, Мозырская Е.И.¹,
Черный О.Ф.¹, Гнатенко Т.Н.²

¹ Национальный медицинский университет имени А.А. Богомольца, Киев, Украина

² Национальная медицинская академия последипломного образования имени П.Л. Шупика,
Киев, Украина

³ Днепропетровская медицинская академия, Днепр, Украина

⁴ Украинская медицинская стоматологическая академия, Полтава, Украина

⁵ Киевская городская детская клиническая больница № 7, Киев, Украина

The state of children's health in Ukraine: dynamics for the last 22 years

Состояние здоровья детей в Украине: динамика
за последние 22 года

Abstract

The article written by the group of scientists-pediatricians and organizers of pediatric health care of Ukraine, is devoted to studying of the main trends in state of health of children of Ukraine for the last 22 years.

The analysis of the morbidity and prevalence of diseases among children of Ukraine, the levels of infant death during the last decades demonstrates that they remain much higher than the average European indicators.

The state of health of children progressively worsens. In recent years the number of children in Ukraine decreased by 3.16 million persons. The prevalence of children's diseases grew by 41% for the last 22 years. In 1994, it was 1253.0, in 2016 – 1777.16 for 1000 children. The morbidity of children also grew by 36% – from 967.0 to 1316.07 for 1000 children, respectively.

During 1994–2016, there was the increase of morbidity and prevalence of neoplasms, diseases of the endocrine system, circulation system, urinary and skeletal-muscular system, congenital anomalies, deformations and chromosomal anomalies, diseases of the ear and mastoid process, and respiratory pathology.

For the last 20 years, the number of children's doctors decreased twice – from 18 259 to 8936 people with insufficient provision at the south-east of the country, Donetsk and Luhansk regions. It led to deterioration of medical care for children, including detectability of pediatric diseases.

The authors prove the need of restoration of the staff and material capacity of pediatric service, development and introduction of modern medical and diagnostic technologies, preservation of immunoprophylaxis, and prevention of disability, which is important part of the national health care system and safety of the country generally.

Keywords: children, morbidity, disability, education, pediatrics, prevalence of diseases.

Резюме

Статья коллектива ученых-педиатров и организаторов педиатрического здравоохранения Украины посвящена изучению основных трендов в состоянии здоровья детского населения страны за последние 22 года.

Анализ заболеваемости и распространенности болезней среди детского населения Украины, уровней младенческой смертности в течение последних десятилетий свидетельствует о том, что они остаются значительно выше среднеевропейских показателей.

Состояние здоровья детского населения страны прогрессивно ухудшается. За последние годы численность детей в Украине уменьшилась на 3,16 млн человек. Распространенность детских болезней за последние 22 года выросла на 41%. В 1994 г. она составляла 1253,0, в 2016 г. – 1777,16 на 1000 детей. Также на 36% выросла заболеваемость детей – с 967,0 до 1316,07 на 1000 детей соответственно.

В течение 1994–2016 гг. отмечается увеличение заболеваемости и распространенности новообразований, болезней эндокринной системы, органов кровообращения, мочевой и костно-мышечной системы, врожденных аномалий, деформаций и хромосомных аномалий, болезней уха и сосцевидного отростка и респираторной патологии.

За последние 20 лет количество детских врачей сократилось в 2 раза – с 18 259 до 8936 человек с крайне недостаточным обеспечением юго-востока страны, Донецкой и Луганской областей. Это привело к ухудшению медицинского обслуживания детского населения, в том числе и выявляемости детских болезней.

Авторы обосновывают необходимость восстановления кадрового и материально-технического потенциала педиатрической службы, разработки и внедрения современных лечебно-диагностических технологий, сохранения иммунопрофилактики и предупреждения инвалидности, что является важной составляющей национальной системы здравоохранения и безопасности страны в целом.

Ключевые слова: дети, заболеваемость, инвалидность, образование, педиатрия, распространенность болезней.

■ INTRODUCTION

Among the Global Millennium Development Goals by 2030, defined by the United Nations, there were health and well-being among the main directions. This was emphasized by the President of the European Congress of Pediatricians, Professor M. Burlea at Europaediatrics-2017 (Bucharest, Romania), speaking about the need to develop mutual understanding in the field of child health in Europe, improving the quality of medical care for the children of the continent. It was not by accident that Europaediatrics-2017 was held under the motto "Pediatrics builds bridges across Europe".

Doubtless, the preservation of children's life and health is a strategically important and priority task of the state in the field of public health. This requires a change in the attitude of society and government to childhood medicine and medical personnel serving children. The main criteria for achieving this global goal are the preservation of reproductive health, the health of newborns, a sufficient level of immunization, the prevention of maternal and infant mortality and the improvement of the health status of the children population of the country as one of the most important socioeconomic indicators of its development [1, 2, 3, 5, 19].

Modern trends in the development of European pediatrics are the standardization of medical care for children on the principles of evidence-based and personified medicine, measures to hold back antibiotic resistance, the introduction of innovations in pediatric practice.

The main directions of Ukrainian pediatrics correspond to the global strategy for the protection of children's health in Europe, developed by WHO (Anthony Costello, 2017). It is aimed at a systematic fight against socially significant and infectious diseases, obesity, pediatricians and family doctors promoting healthy lifestyles, widespread immunization and rational nutrition.

Today, there is no doubt about the principle of the formation of human health, beginning with the moment of conceiving, birth and childhood. The "healthy start in life" for every child that is closely connected with the state of health of parents, especially the mother, the peculiarities of the course of pregnancy and childbirth, the social status of the child, and the level of his medical care. Most adult diseases have roots in childhood, which subsequently determines the quality and life expectancy of a person [4, 20]. The lost quality of health in childhood, of course, affects the duration and usefulness of a person's future life, his intelligence, creativity and efficiency. Together, this can affect the socio-economic development of the whole country, in particular its defense capability, which is extremely important in the current conditions of the armed conflict in the Donbass.

■ BACKGROUND

Studying the regularities in the state of health of the children in Ukraine over the past 22 years to justify the development of an appropriate state program.

■ METHODS

Analysis of the incidence and prevalence of diseases in children, infant mortality, disability of children during the last two decades in the age aspect, the section of individual pathological conditions and territorial features. Methods of statistical estimation, epidemiological analysis are applied.

■ RESULTS

Analysis of the incidence and prevalence of diseases among Ukrainian above the average European indicators. In particular, the infant mortality rate in Ukraine in 2004 was 7.4 per 1000 live births, which is twice lower than in 1994 (Fig. 1), but 3 times higher than in Europe.

At the same time, it should be noted that in Ukraine, thanks to the introduction of modern perinatal technologies and the upgrading of doctors' qualifications, the rate of neonatal mortality is steadily declining year by year, and in 2016 it was 4.6 compared to 6.1 per 1000 born in 2000.

In addition, against the backdrop of the socioeconomic instability caused by the military conflict in the East of the country, forced internal migration, more than 1.6 million citizens from the anti-terrorist operation zone (of which more than 220,000 children), a number of social and

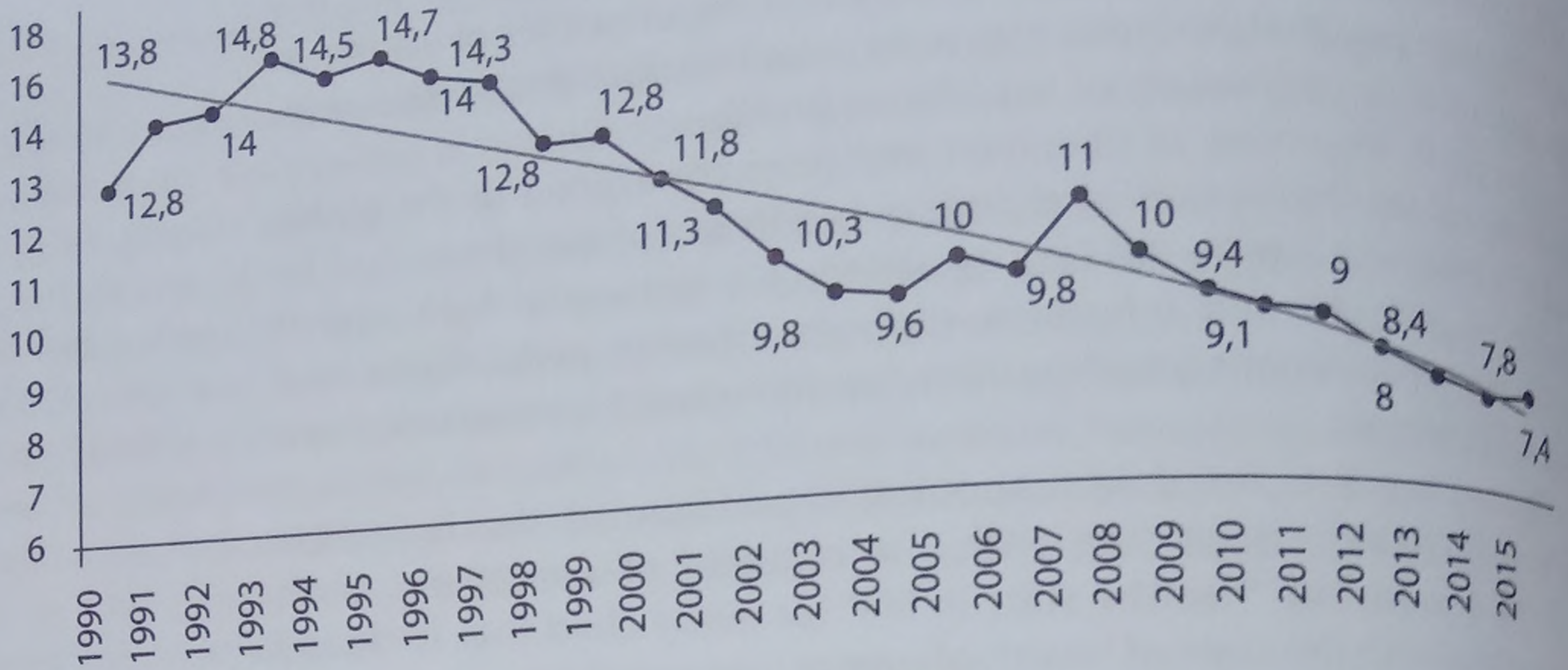


Fig. 1. Mortality of children under one year in Ukraine 1990–2016

medical-ecological problems remain negative affect on the health of children, namely:

- the weakening of the preventive orientation of medical activity, especially in the primary link;
- personnel shortage;
- a long reorganization of the public health system;
- insufficient level of planned immunization of the children's population and anti-vaccination campaigns;
- the preservation in time of the complex multifactorial impact of the consequences of the Chernobyl accident on the health status of the population living in radiation contaminated areas.

All indicated in the complex for 22 years led to an increase of 41% in the prevalence of childhood diseases. If in 1994 it was 1253.0, now it is 1777.16 for 1000 children of the corresponding age. In addition, the incidence increased from 36% to 961.0 to 1316.07 per 1,000 children, respectively (Fig. 2).

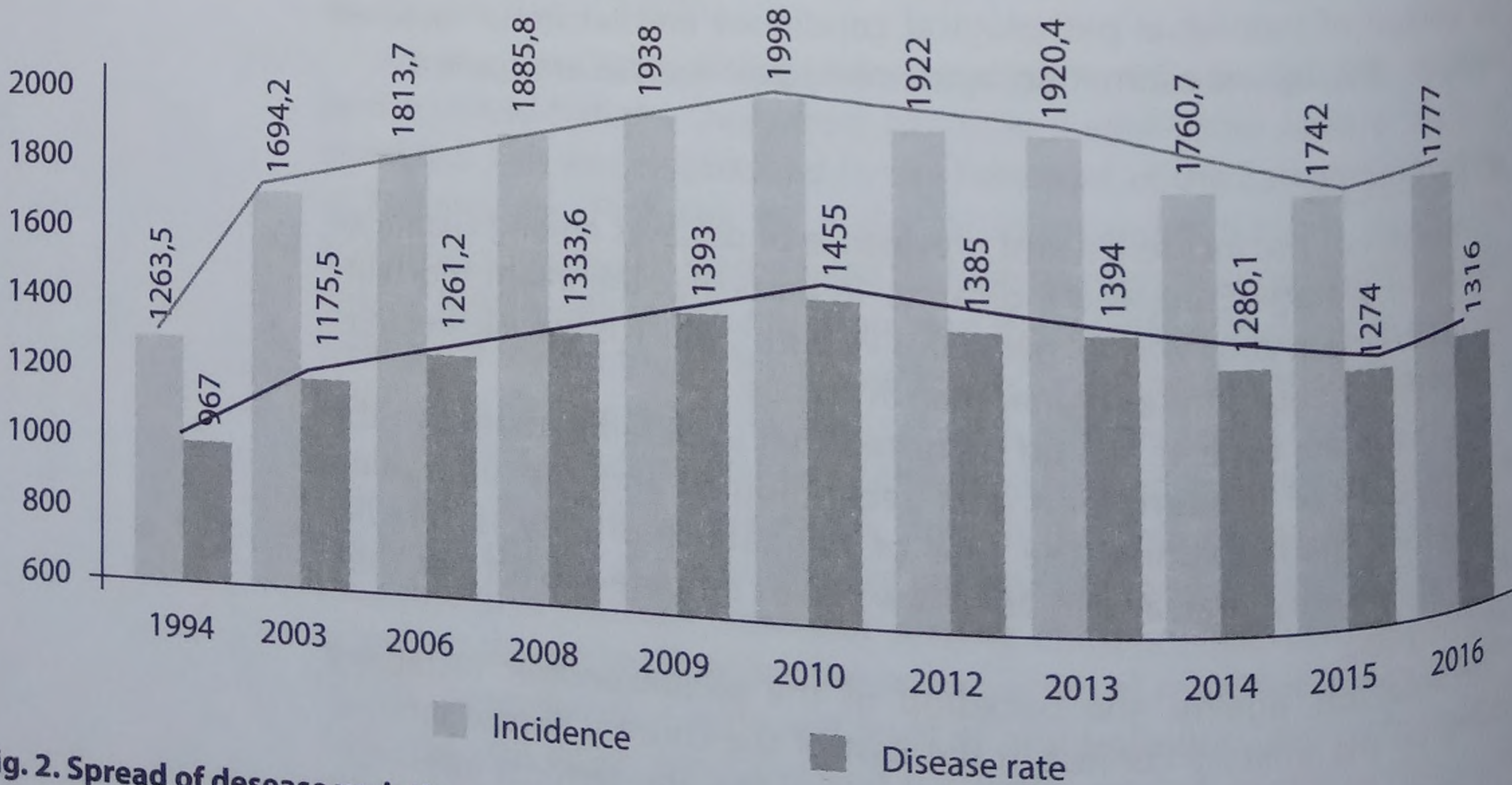


Fig. 2. Spread of disease variation and morbidity in children aged under 18 years in Ukraine (on 1000 children)

Until 2010, the incidence and prevalence of childhood diseases have steadily increased, however, starting in 2011, there has been a tendency to reduce them. At the same time, against a background of a moderate decrease in the prevalence of diseases among children aged 0–17 in 2016, Ukraine has seen an increase in these indicators in the following regions: Vinnytsia, Kiev, Zhytomyr, Cherkassy, Chernigov, Dnipropetrovsk, Kharkiv, Ternopil, Ivano-Frankivsk, Lviv regions and Kiev (Fig. 3).

The prevalence of diseases in children 0–17 years old in 2016 was 1777.16 cases of cases per 1000 children, whereas in 1994 – 1263.5. The increase in the prevalence of diseases was 40.6% over the last 2 decades, primarily due to respiratory diseases, congenital anomalies, neoplasms, endocrine, cardiovascular, trauma and poisoning diseases. Such dynamics of the prevalence of childhood illnesses testify to the influence of ecologically polluted environment, chemicalization, electromagnetic radiation, unhealthy lifestyle of most Ukrainian families, hereditary factors, irrational nutrition and the spread of bad habits.

The prevalence of diseases of the eye and its adnexa, the pathology of the blood and blood-forming organs, diseases of the urinary and digestive systems have slightly increased (Table 2). In the dynamics in recent years, the prevalence of diseases of the ear and mastoid process, diseases of the nervous system and skin has practically not changed. The prevalence of infectious and parasitic diseases, disorders of the psyche and behavior, symptoms, signs, deviations from the norm decreased somewhat.

The highest prevalence of childhood diseases is observed among adolescents aged 15–17 (2154.5 per 1000 children), then in the age group 7–14 years (1742.21 per 1000 of the corresponding population). The lowest prevalence rates were observed at the age of 0–6 years – 1189, 65 per 1000 children. In the age dynamics in the groups of children 7–14 and 15–17 years, the level of diseases of the endocrine system has progressively

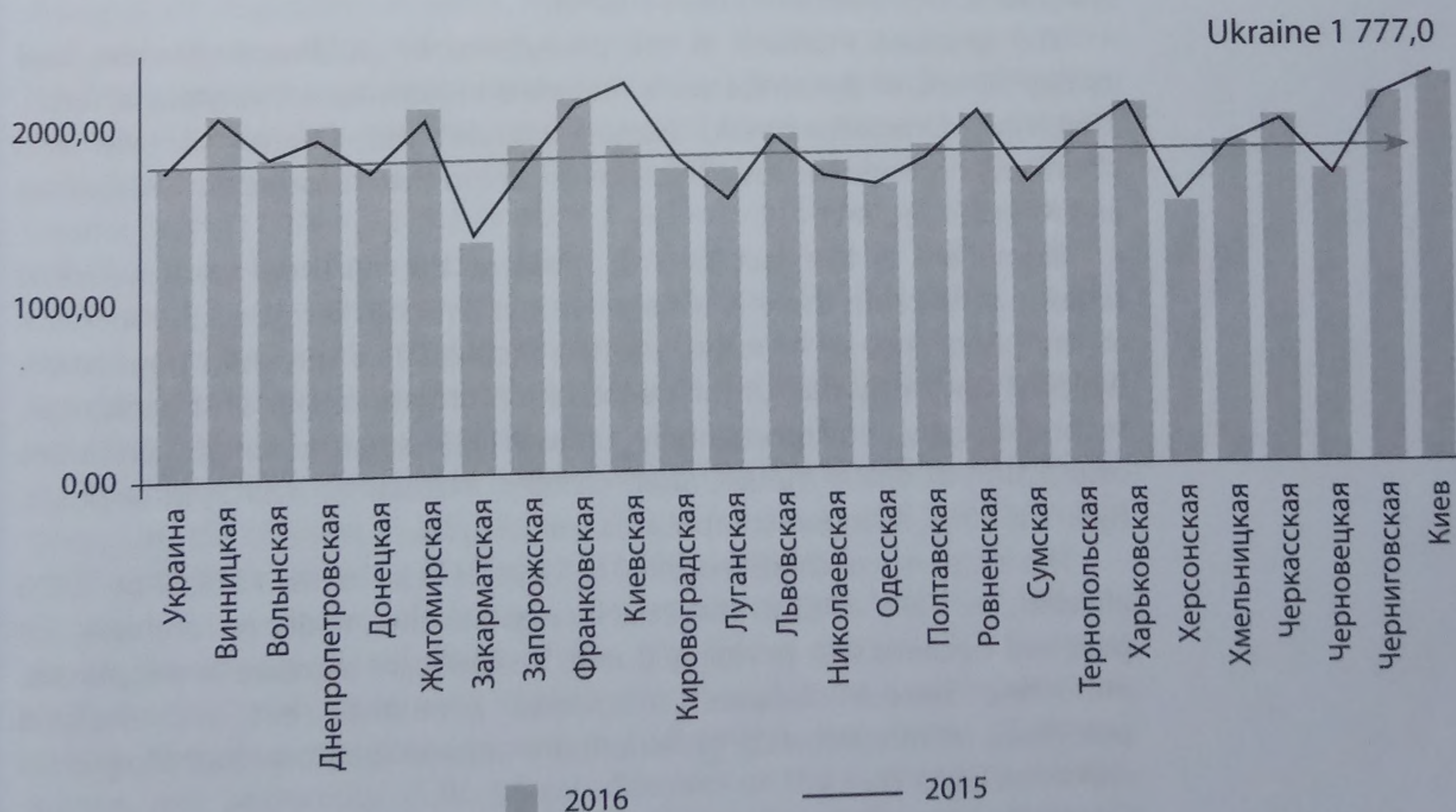


Fig. 3. Prevalence of disease in children aged 0–17 years, who are under the supervision of institutions of the Ministry of health

increased (by 7 times in comparison with the group of children aged 0–6 years), including diabetes (5 times), osseous (7.1 times), urogenital (3.4 times), digestive system (3.1 times), neoplasms (1.9 times), diseases of the eye and adnexa (4.1 times), mental disorders (2 times), diseases of the nervous system (2.8 times) and trauma (2 times).

At the same time, in children of early age, the prevalence of respiratory diseases, congenital anomalies, ear and mastoid diseases, blood diseases, in particular anemia, was increased.

The structure of the prevalence of diseases in children aged 0–17 years in recent years has changed dynamically: the first place continues to occupy respiratory diseases – 54.2% (in 1994 – 52.6%), in second place – diseases of the digestive system – 6.43% (in 1994 – 7.62%), III place – pathologies of the eye and its adnexa – 5.24% (in 1994 – 4.78%), in fourth place – diseases of the skin and subcutaneous tissue – 4.31% (in 1994 – 5.75%), V place – diseases of the musculoskeletal system – 3.97% (in 1994 – 3.97%), on the sixth place – endocrine diseases – 3.96% (in 1994 – 2.1%).

Attention is drawn to the transfer to the highest rank places of diseases of the digestive organs, skin and subcutaneous tissue, the eye and its adnexa and, especially, the endocrine pathology, which 22 years ago were only on rank 14, and now occupies the 6th position. To lower ranked places in comparison with 1994, the diseases of the nervous system (rank VIII) and some infectious and parasitic diseases (rank VII place), traumas and poisonings (rank IX place) have now moved along the prevalence level.

During the period 1994–2016 (+211.7%), endocrine system diseases (+164.4%), blood circulation (+116.3%), urinary system (+105.5%), congenital anomalies, deformities and chromosomal abnormalities (+96.5%), respiratory diseases (+44.8%).

Negative dynamics was observed in the prevalence of mental disorders and behavior (–11.23%), some infectious and parasitic diseases (–28.9%), symptoms, signs, abnormalities (–67%).

The greatest increase in the prevalence of childhood diseases and its high levels in dynamics were recorded in Kiev, Vinnytsia, Kharkiv, Zhytomyr, Dnepropetrovsk, Ivano-Frankivsk and Chernivtsi, Lviv and Cherkassy regions. The lowest indicators are in the Transcarpathian, Odessa and Kherson regions.

Significant is the fact that in most of the northern and industrial regions of Ukraine there is a negative dynamics in terms of the increase in the prevalence of diseases and the incidence of the child population, which is obviously due to the negative integrated impact of urbanization, technologically, environmentally unfavorable environmental conditions (the action of heavy metals, radionuclides, irradiation, hydrogen sulphide, hydrocarbons, nitrogen compounds, etc.) (Fig. 4).

The incidence of children from 0 to 17 years in 2016 was 1316.07 per 1000 children, in 1994 – 967.0. The 36% increase in the incidence rate over the past two decades was primarily due to a significant increase in neoplasms, endocrine system diseases, congenital anomalies, ear and mastoid processes, cardiovascular, genitourinary and respiratory pathologies in children (Table 1).

Analyzing the incidence rates of the Ukrainian children population over the past 22 years, it should be noted that the most numerous group of

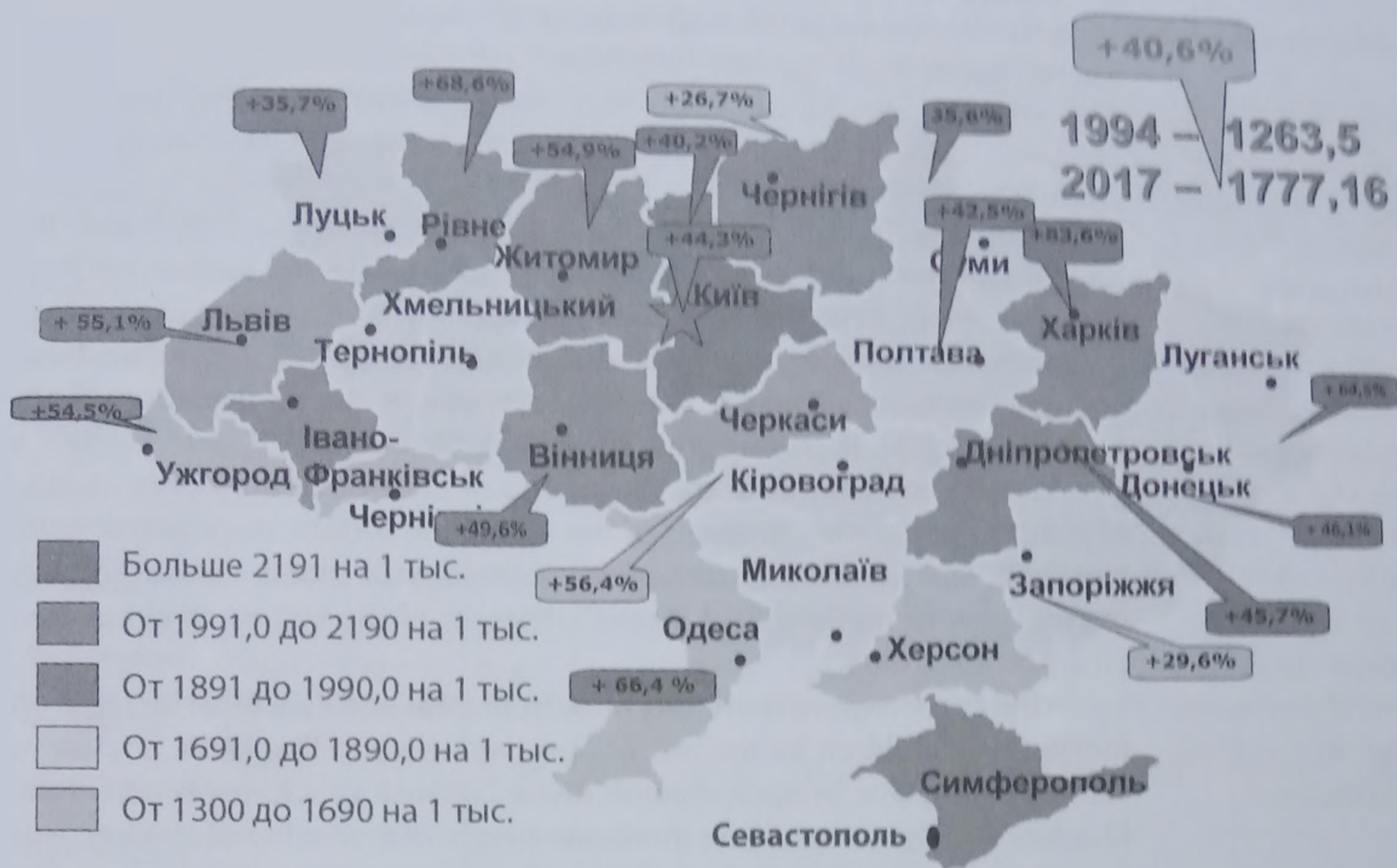


Fig. 4. Prevalence by classes of diseases of children in Ukraine

diseases are respiratory diseases, mainly due to acute respiratory diseases and pneumonia, with a maximum detection in children aged 0 to 6 years. The first place in the incidence rate, as in the past, is occupied by respiratory diseases 63.9% (1994 – 65.6%), on the second place – diseases of the skin and subcutaneous tissue – 5.6% (1994 – 5.3%), III place is occupied by trauma (3.8%) (1994 – 4.17%), IV place – diseases of the digestive system – 3.45%, V place infectious and parasitic diseases – 3.43% in 1994 – 6.86%), in the sixth place – diseases of the eye and adnexa (3.17%) (1999 – 3.3%). Attention is drawn to moving to the highest ranked place of injuries. Probably, this is due to parental indifference, risky and additive forms of behavior, especially in adolescence.

The highest incidence rate is observed at the age of 0–6 years (1465.3), then – at 15–17 years (1249.76 per 1000 children), in children 7–14 this indicator was the lowest – (1189.65 per 1000 children).

Among the classes of diseases, the incidence rate, which in the age aspect increases, are: diseases of the circulatory system (3.7 times as compared with children from 0 to 6 years), endocrine system diseases, eating disorders, metabolic disorders (2.5 times), neoplasms (2 times), injuries and poisonings (1.95 times), diseases of the eye and its adnexa (1.5 times), diseases of the digestive system (1.4 times), diseases of the skin and subcutaneous tissue (1.2 times).

With age morbidity of children diminishes illnesses of breathing organs, in particular by pneumonias, innate anomalies, in particular by congenital heart diseases, some infectious diseases, illnesses of blood, hematogenesis organs and by separate violations involving an immune mechanism, disorders of psyche and behavior, illnesses of ear and metapophysis.

During 1994–2016 pays attention on itself high increase of morbidity by new formations (+163.3%), illnesses of the urinary system (+116.3%), костно-мышечной system (+90.0%), circulation (+78.4%) of blood, endocrine system (+56.6%), ear and metapophysis (+52.2%), breathing (+47.4%) organs, innate anomalies, deformations and chromosomal anomalies (+44.35%).

Mildly the indexes of morbidity grew on illnesses of eye and his additional vehicle, illnesses of organs of digestion, nervous system, traumas and poisoning, illnesses of skin. A negative dynamics was observed on prevalence of disorders of psyche and behavior (-25.2%), some infectious and parasitogenic diseases (-31.9%), symptoms, signs, deviations from a norm (-54.8%). It corresponds to data Dudina A. (2015), that marked a considerable increase from the beginning of present century of morbidity of children population illnesses of the endocrine system, disorders of feed, metabolic (in 1.8 time) disturbances, pathology of blood, кровотворных organs, new formations (in 1.9 time), illnesses of the system of circulation (in 1.9 time) of blood.

In the cut of regions morbidity grew in all areas and Kyiv. Most increase on morbidity of children for the last 22 observed in Ivano-Frankivsk, Zhytomyr, Ternopil, Vinnytsya, Dnepropetrovsk, Rivne, Luhansk, Lviv, Kirovohrad, Odesa, Kharkov and Kyiv areas. More moderate height of morbidity of children was in Chernivtsi, Mykolaiv, Poltava, Sumy, Kherson and Khmelnytsk areas. The least increase was observed in the Transcarpathian area.

The highest levels of morbidity were in Kyiv (1675.66 cases of the first educed diseases on 1000 children), Kyiv (1665.25), by Ivano-Frankivsk (1606.14), Zaporizhzhya (1574.48), Zhytomyr (1534.8), Dnepropetrovsk (1532.64), Cherkasy (1529.93) and Chernihiv areas (1484.21 on 1000 children). We will mark that all indicated areas are characterized considerable ecological contamination of technogenic character.

Following on the high level of morbidity of child's population were the Kirovohrad area (1470.42 the first educed cases of diseases on 1000 children), Kharkov area (1470.17), Lviv area (1423.21), Rivne (1401.49), Vinnytsya area (1400.08). The most low level of morbidity was observed in the Transcarpathian area (938.1 on 1000 children), that in 1.8 there is less than time as compared to the Kyiv area. The not high levels of morbidity as compared to a national index were observed in Chernivtsi and Kherson areas.

According to the center for medical statistics of the Ministry of health of Ukraine there is an accumulation of chronic pathology (difference between registered and first in life by the set diseases), especially for teenagers. On the whole in Ukraine in 2016 this index was 461.09 at a considerable difference on separate territories of Ukraine – from 722.13 in Kyiv, 627.6 in Kharkov, 655.5 in Chernihiv, 612.1 in Rivne areas to 291.4 in the Zaporizhzhya area.

Disturbs the height of morbidity of children essential hypertension. In Ukraine 2821 (in 2012 – 4029) is registered patients with essential hypertension (0.37 on 1000 children). It also can be investigation of height of influence on the health of children of unhealthy way of life and feed, hypodynamia, pernicious habits.

The incidence of children under the age of 1 year for the period from 1994 to 2016 increased: in 2016 it was 1487.06, and in 1994 – 1577.8 per 1000 children (Fig. 5).

Table 1
Prevalence of separate classes of illnesses among children in age from 0 17 to in Ukraine in a dynamics for 1994–2016 (From data of Center of medical statistics of M3 of Ukraine)

Name classes of illnesses	On 1000 conformable child's population										Rate of change of index (in %) from 1994 to 2016
	1994**	1999**	2001**	2003	2005	2007	2010	2013	2015*	2016*	
In all the illnesses	1263.5	1581.4	1688.5	1694.62	1797.86	1879.50	1998.30	1920.34	1742.3	1777.16	+40.6
Are illnesses of breathing organs	664.9	778.8	850.63	783.92	847.18	912.94	1035.44	984.71	915.65	963.19	+44.8
Illnesses of organs of digestion	96.4	111.9	125.23	136.48	147.14	148.41	144.92	133.63	117.07	114.35	+18.6
Are illnesses of eye and additional vehicle	–	75.7	83.49	96.16	98.45	101.64	105.57	104.35	94.58	93.2	+22.41
Are illnesses of skin	72.7	77.7	79.51	79.34	83.32	86.44	86.75	86.22	77.19	76.63	+5.4
Are illnesses of the musculoskeletal system	34.4	51.5	60.08	81.39	85.29	85.50	86.40	84.57	71.57	70.64	+105.3
Are illnesses of the endocrine system	26.6	109.26	94.48	105.14	103.44	99.80	93.68	83.42	73.11	70.34	+164.4
Some infectious and parasitogenic diseases	74.7	72.1	69.96	60.74	65.10	64.92	59.73	65.48	53.36	53.11	–28.9
Are illnesses of the nervous system	–	38.9	44.07	56.68	60.41	62.43	62.72	59.94	53.53	52.35	+34.5
Are traumas and poisoning	41.6	46.7	45.67	49.34	50.69	53.97	55.21	57.05	50.96	51.58	+23.9
Are illnesses of the urogenital system	22.7	32.7	37.28	51.85	55.38	56.86	56.71	53.13	47.28	46.65	+105.5
Are illnesses of ear and metapophysis	28.5	41.2	43.32	40.24	42.90	45.03	46.70	47.13	43.1	42.02	+47.4
Are illnesses of blood and hematogenesis organs	27.5	44.0	49.36	41.84	43.59	44.82	43.25	39.56	36.31	35.81	+29.7
Are illnesses of the system of circulation of blood	15.6	22.1	26.1	31.41	33.35	33.62	36.75	38.78	34.44	33.75	+116.3
Are innate anomalies	14.6	19.5	21.4	21.04	22.96	24.54	27.60	30.10	28.37	28.69	+96.5
Are disorders of psyche and behavior	29.3	31.4	33.06	35.6	36.33	35.68	33.87	31.38	26.48	26.01	–11.23
Are new formations	2.9	4.3	5.02	6.16	7.14	7.91	8.56	9.21	9.02	9.04	+211.7
Are symptoms, signs, deviations from a norm	7.5	9.2	8.14	4.60	3.16	2.88	2.87	2.56	2.5	2.48	–67.0

Notes: * – case-insensitive data annexed ARE Crimea and parts of territory of the Donetsk and Luhansk area (zones of ATO);
 ** are indexes of children in age 0–14.

Table 2
The incidence of certain classes of children's illnesses in Ukraine in dynamics of the year 1994–2016
 (according to the center for Medical Statistics of the Ministry of Health of Ukraine)

The name of the classes of diseases	The incidence rate per 1000 corresponding children's population										The rate of change of the indicator (in %) from 1994 till 2016
	1994**	1999**	2001**	2003	2005	2007	2010	2013	2015*	2016*	
All of diseases	967.0	1173.88	1253.13	1175.46	1251.79	1326.33	1454.96	1394.0	1274.76	1316.07	+36.09
respiratory diseases	612.7	728.34	796.92	721.89	782.67	847.15	971.13	920.93	855.49	903.45	+47.4
skin diseases	63.3	67.92	69.81	68.42	71.81	74.74	74.69	74.0	65.47	64.76	+2.3
injuries and poisoning	40.4	45.27	44.2	47.17	48.62	51.96	54.44	55.29	49.36	50.06	+23.9
diseases of the digestive system	39.1	47.75	50.41	49.44	50.83	51.97	52.65	49.47	45.89	45.46	+16.2
some infection and parasitic diseases	66.4	65.64	64.53	53.25	55.28	54.99	51.13	56.52	45.58	45.21	-31.9
eye diseases	38.5	38.1	41.73	41.53	43.80	45.04	48.02	47.51	43.18	41.79	+9.6
diseases of the ear and mastoid	25.02	37.49	39.63	35.44	38.15	40.8	42.36	42.89	39.18	38.09	+52.2
diseases of the musculoskeletal system	13.7	23.39	25.07	30.57	31.06	30.02	31.65	30.74	26.04	26.03	+90
diseases of the genitourinary system	11.6	18.58	21.07	28.77	29.78	30.20	30.49	28.27	25.46	25.09	+116.3
nervous system diseases	–	14.71	15.09	19.26	20.68	21.48	22.00	20.29	18.45	17.8	+21
endocrinologic diseases	9.9	27.84	24.38	25.84	24.15	22.98	21.77	18.07	15.7	15.11	+52.66
diseases of blood and blood-forming organs	11.09	18.25	19.07	16.20	17.07	17.47	16.53	14.36	13.34	12.94	+16.7
diseases of the circulatory system	4.4	7.15	7.68	8.56	9.24	9.22	10.71	9.90	8.44	7.85	+78.4
congenital anomalies	3.9	5.49	5.7	4.82	5.18	5.33	5.86	6.24	5.75	5.63	+44.35
mental disorders and behavior disorders	5.4	5.98	6.01	6.18	6.18	6.04	5.81	5.26	4.28	4.04	-25.2
neoplasms	1.3	1.99	2.17	2.68	2.99	3.14	3.35	3.66	3.44	3.41	+163.3
symptoms, signs, abnormalities	4.4	5.95	5.58	3.30	2.46	2.25	2.19	1.58	1.97	1.99	-54.8

Notes: * – without taking into account the data of the annexed Crimea and part of the territory of Donetsk and Lugansk region (ATO zone);

** – indicators of children aged 0–14 years.

Of course, one of the main factors affecting the health of infants is breastfeeding. According to the official statistics of the Ministry of Health of Ukraine, the proportion of children who received breastfeeding for only three months decreased from 2010 to 2014 by 10.0% and amounted to 28.4% and 27.3%, respectively [3] with an increase in the proportion of

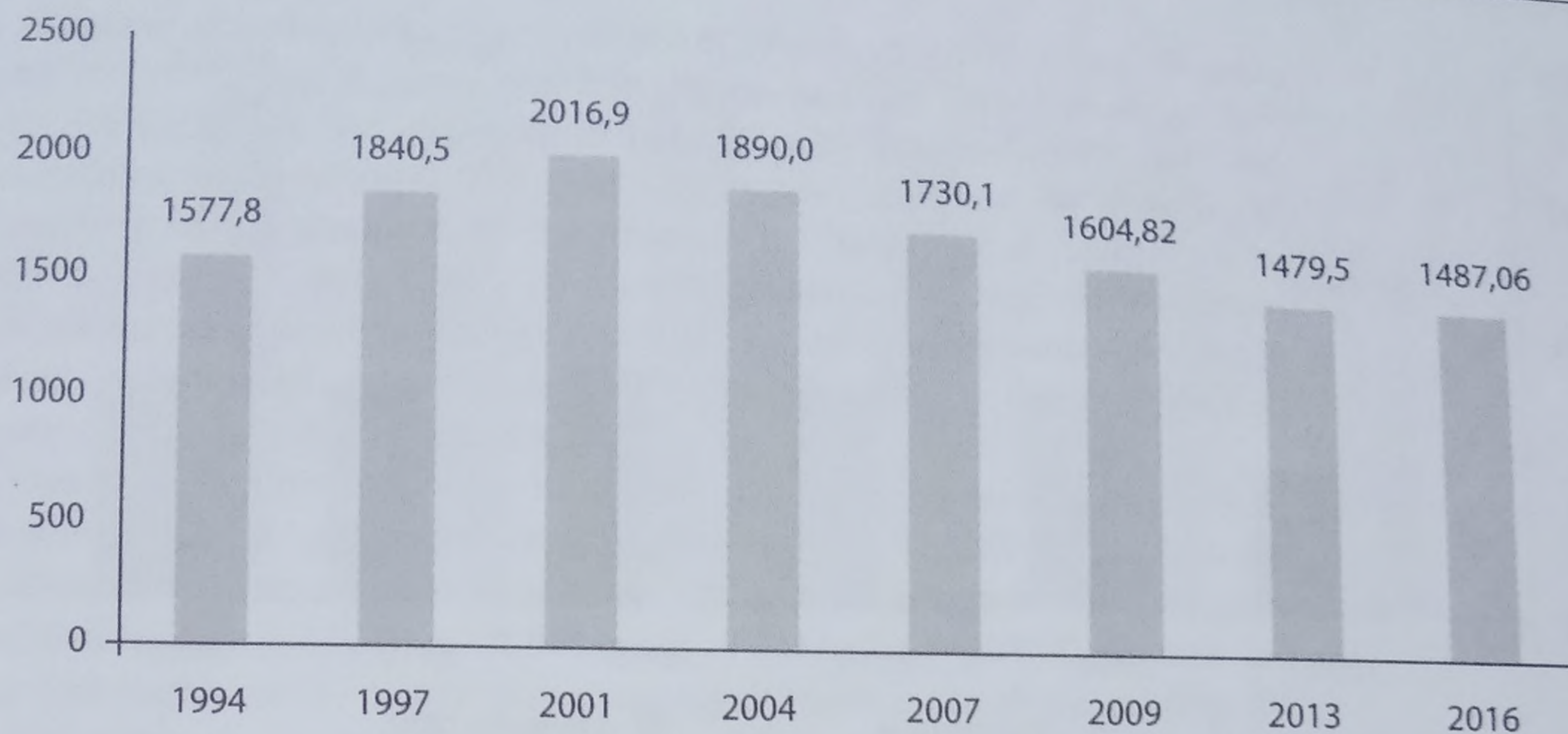


Fig. 5. Incidence of children under the age of 1 year for the period from 1994–2016 (per 1000 children)

infants, who are on breastfeeding for 6 or more months. This was facilitated by the widespread introduction of the WHO/UNICEF Extended Initiative on Support to Breastfeeding in the regions (International Strategy "Child Friendly Hospital").

Sufficient breastfeeding, using of modern perinatal technologies based on evidence-based medicine, the system of primary resuscitation and thermal protection, early neonatal screening, etc., led to a positive dynamics in the health of newborns [6–8].

Since 2001, due to a number of organizational measures to improve medical care, implementation of the pilot implementation of the international strategy for the integrated management of childhood illnesses, the incidence of children in the first year of life as a whole decreased by 26.3%. At the same time, the structure of the incidence of infants over the period since 1994 has practically not changed. Ranked places are distributed as follows: first place – respiratory diseases 57,54% (in 1994 – 52,6%), 2 – individual states of the perinatal period (9.16%) (in 1994 – 10.5%), 3 (4.71%) (in 1994 – 5.5%), on the 4th – diseases of the skin and subcutaneous tissue (4.35%), on the 5th – diseases of the nervous system (4.08%).

It is known that congenital malformations, conditions that have arisen in the perinatal period and diseases of the respiratory organs, as a whole, account for 76.9% of infant deaths worldwide. At the age of 1 to 15 years of life, external factors predominate among the causes of death: trauma, accidents, infectious and parasitic pathology, respiratory and digestive diseases. In general, the mortality rate among boys is one third higher than girls.

The above analysis of the dynamics of morbidity and prevalence of diseases by their main classes showed that a moderate decrease in both the incidence and prevalence of diseases in children from 0 to 17 years occurred in the last 5 years in virtually all classes, with the exception of neoplasms whose prevalence in children is "post-Chernobyl era" increased 1.94 times (!) to 68 800 cases in 2016 (Fig. 6). It is on this phenomenon that we wanted to pay special attention.

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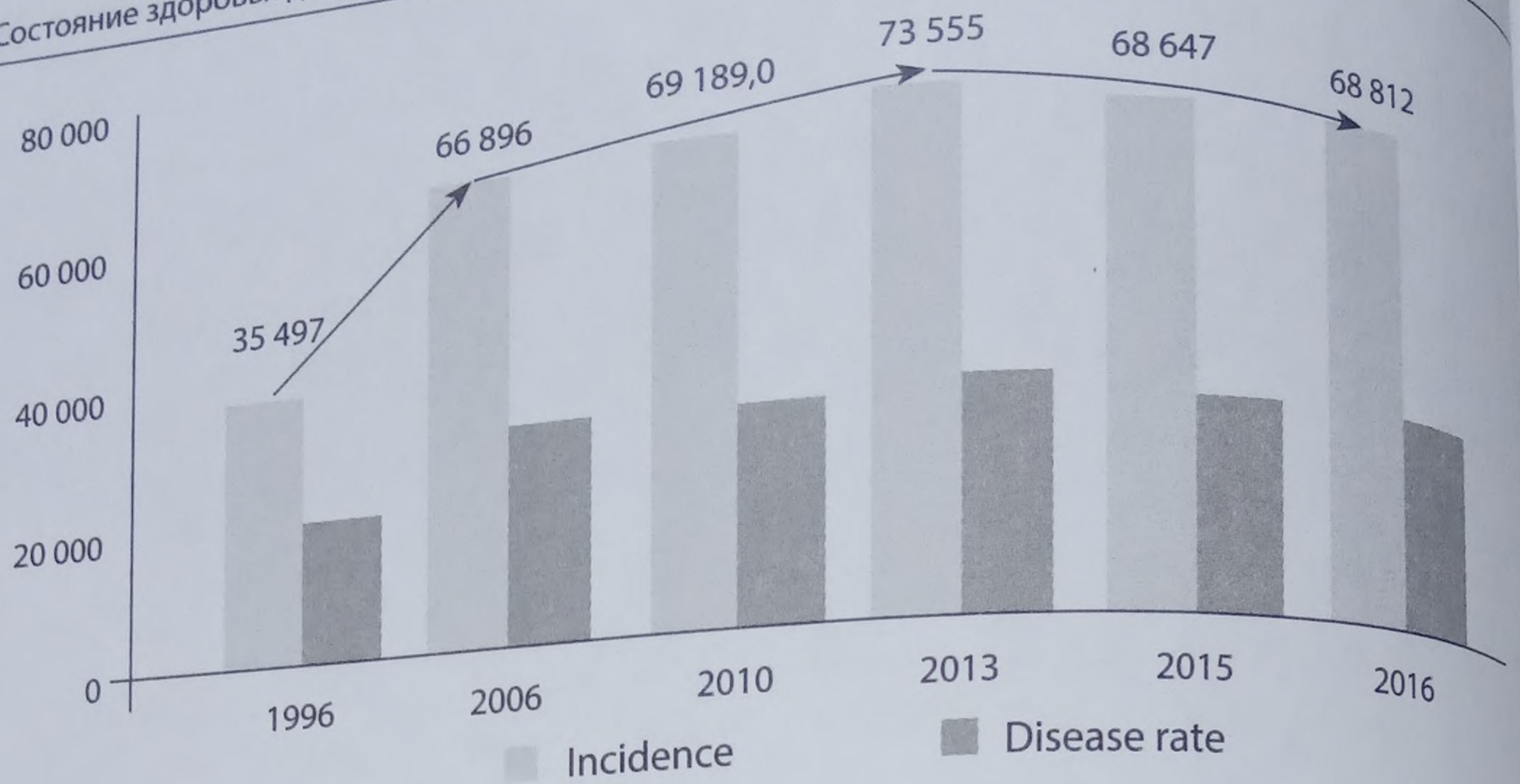


Fig. 6. Dynamics of growth of tumors in children of Ukraine

According to the data Golubchikov M. et al. (2017) in 2016, 25.9 thousand new cases of neoplasms were found, which is 3.41 per 1.000 children. Among the leaders – Sumy (9.6 per 1000), Kharkiv, Poltava, Cherkassy, Kirovograd, Zhytomyr, Zakarpattia, Rivne, Kiev, Volyn, Vinnytsia, Dnipropetrovsk region. Fewer cases of tumors were recorded in Kyiv, Chernivtsi, Ternopil, Chernigov, Zaporozhye, Odessa regions. Attention is drawn to the increase in the incidence of tumors in those regions that were contaminated as a result of the Chernobyl accident in 1986 and large industrial centers (Fig. 7).

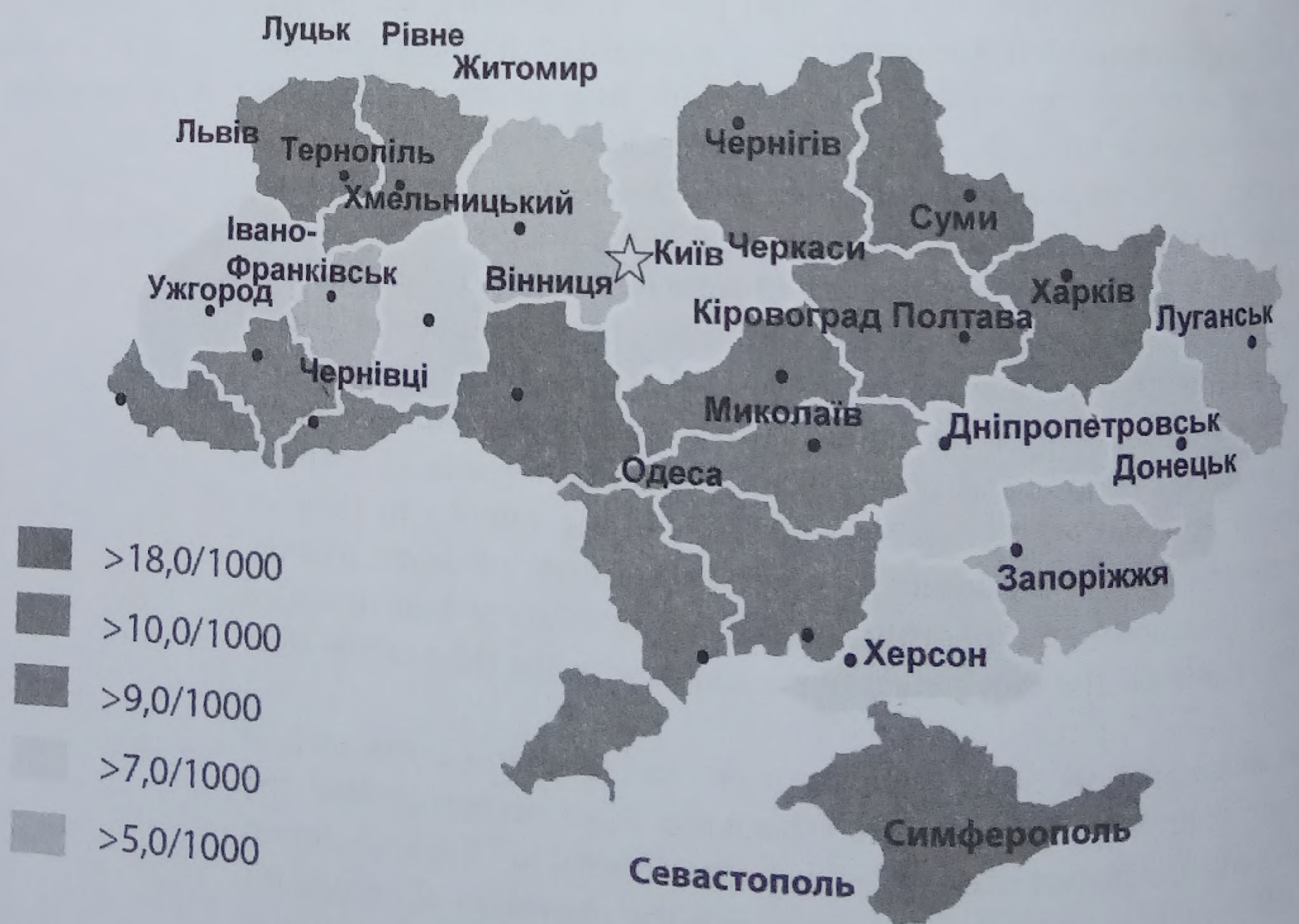


Fig. 7. Prevalence of neoplasms in children in regions of Ukraine

In terms of death rates from malignant neoplasms of children Ukraine ranks 5th in Europe (5 cases per 100 thousand population) (Pushkar LA, Klimnyuk GI, 2014). The structure of morbidity by neoplasms has its own peculiarities in childhood. The first places are occupied by malignant neoplasms of lymphatic and haematopoietic tissues and brain cancer, which account for more than half of all neoplasms. The highest incidence of hemoblastosis is observed in Kharkiv, Ivano-Frankivsk and Chernigov regions. Now malignant neoplasms of childhood occupy the 7th place in the structure of children's disability.

Over the past twenty years, there has also been an increase of 34% in the prevalence of congenital malformations (CM), registered in 218,469 children, which can also be considered a marker of ecotoxic effects on the children's body [10, 11]. Thus, 42 841 cases of CM or 5.6 per 1000 children are detected each year (17 514 of them among children up to the year) (Fig. 8).

In Ukraine, the congenital heart disease (10 134 cases, which is 23.65% of the total number of CM) is transmitted in the structure of the CM. Most of all CM in 2016 was first discovered in Kiev (15.10 per 1000 children), Kirovograd (11.6), Kharkov (9.04), Vinnitsa (7.96), Dnepropetrovsk (6.8), Zaporozhye (6.97) and Kiev (6.56) regions (Fig. 9). It is important that the geography of the incidence of CM almost coincides with the spread of neoplasms in large industrial regions.

Fewer cases of CM were observed in Chernivtsi (2.72), Poltava (2.8), Sumy (3.35), Ivano-Frankivsk (3.98), Ternopil (3.84), Odessa (4.08), Cherkasy (4.1), Lviv (4.12), Volyn (4.13), Chernigov (4.3), Kherson (4.77) areas. The prevalence of congenital anomalies of the circulatory system was 66391 (in 2015, 64.221) cases or 8.72 (in 2015 – 8.43) per 1000 children, and the incidence was 10442 (in 2015 – 10 134) or 1.33 per 1000 children, respectively. More congenital heart anomalies are revealed in Kharkov, Dnepropetrovsk, Zaporozhye, Kiev, Rivne, Kherson regions and Kiev.

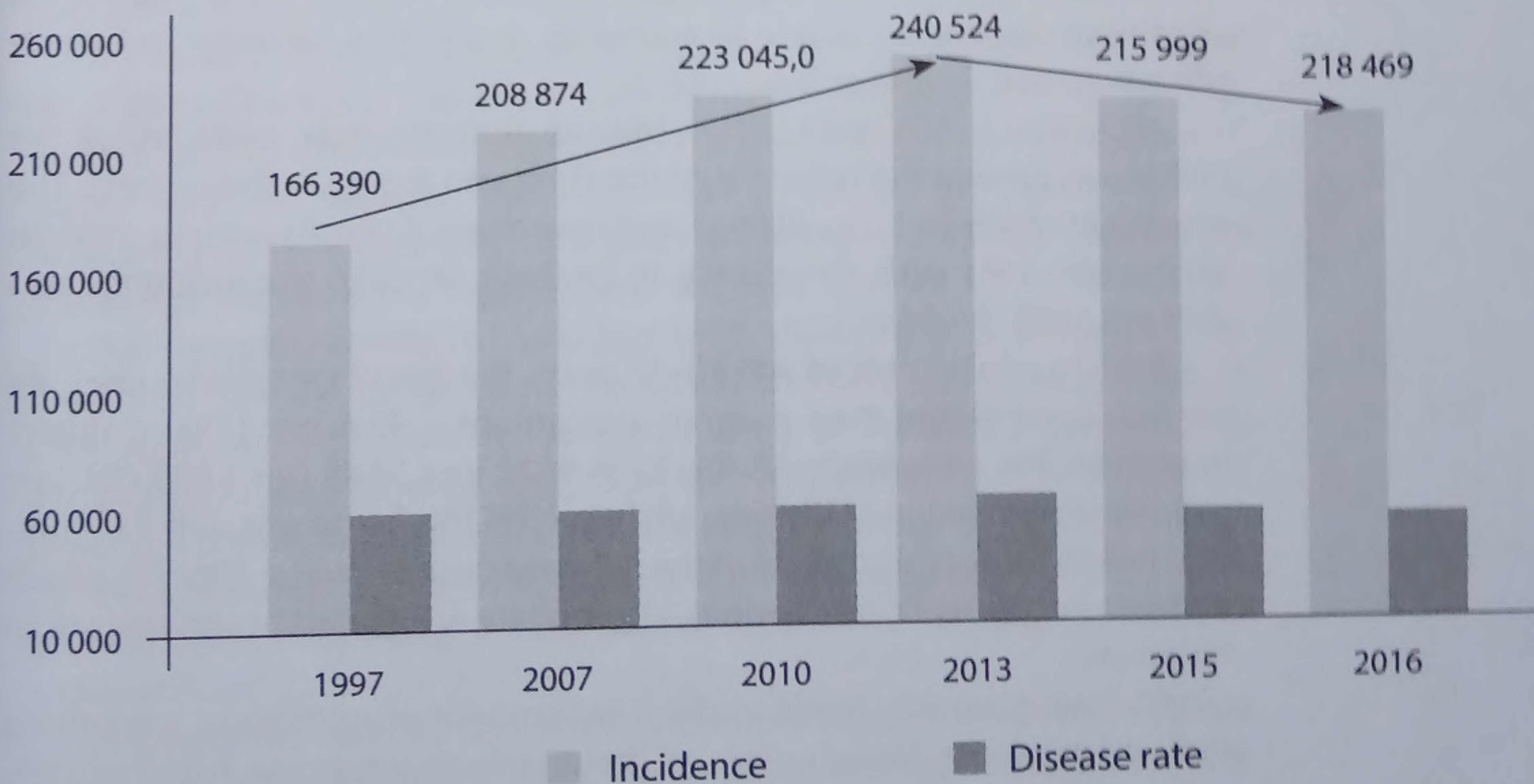


Fig. 8. Dynamics of growth in the prevalence of congenital malformations in children of Ukraine (per 1000 of the child population)

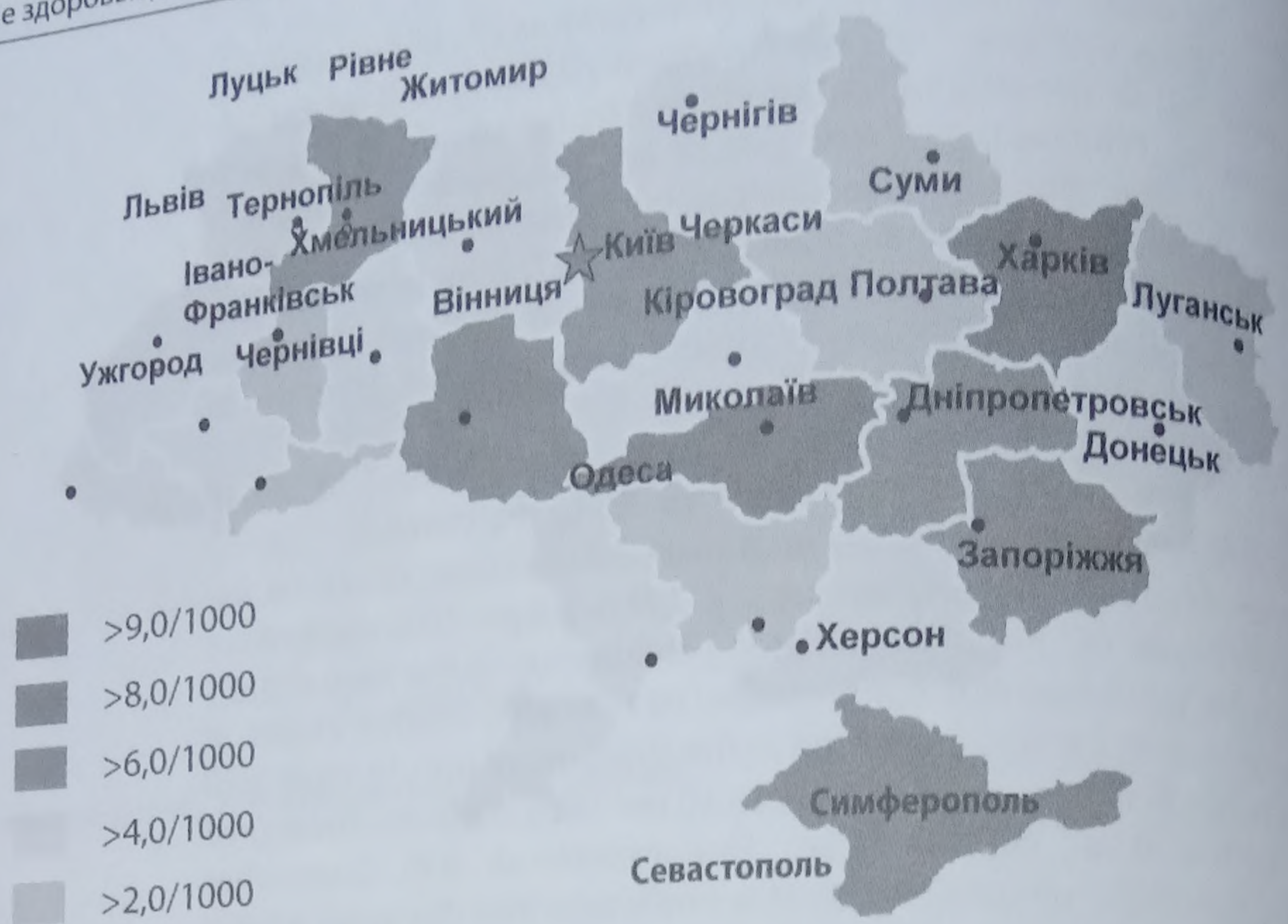


Fig. 9. Incidence of congenital anomalies in children in the regions of Ukraine

Today, obesity is recognized as a pandemic of the twentieth century. The rate of its distribution is 10 times higher than in the 1970s and 1980s. As Anthony Costello noted in his program speech on Europaediatrics-2017, obesity is observed in every third boy and every fifth girl between the ages of 6 and 9.

At the same time, the highest rates are observed in the countries of Southern Europe and the Mediterranean. Of particular concern is the fact that the epidemic is growing in Eastern Europe, where indicators have traditionally been lower. Despite constant efforts to combat the problem of childhood obesity, according to estimates, every third teenager in Europe still has an overweight or is obese [21].

According to the WHO (2017), Ukraine, unfortunately, takes one of the first places among the countries of the European region in this respect. The country annually fix up to 20 thousand new cases of obesity among children and adolescents with a tendency to increase (in 2016 the incidence was 2.94 per 1000 children).

Among adolescents of age 15–17 years, the obesity incidence rates are several times higher than in other age groups – 45.4 per 1.000 children. In general, the prevalence of obesity in 2016 was 14.45 per 1.000 children within the population of Ukraine, while in 1994 this figure was only 7.0. Thus, the growth rate of this disease in the past two decades was + 106% (!), which makes it necessary to take serious, appropriate integrated health and social measures.

Of course, obesity leads to the development of pathology, something that was previously found only in adults (metabolic syndrome, hypertension, coronary heart disease, fatty liver disease, diabetes type II), that is, non-infectious diseases that create a heavy burden for both the economy and the medical sector in any country. In Ukraine, there is a disturbing tendency of

increase in the prevalence of diabetes among children – from 5.138 children (0.5 per 1.000 children) in 1994 to 8.847 children (1.25 per 1.000 children) in 2016, which is a 1.7 times greater number of cases.

Countrywide strategic initiatives and interventions should be taken regarding young people of high-risk groups, both within families and in the school and social environments. Also, a high priority for such initiatives should be given to take measures that create the opportunity for small children and teenagers to follow a healthy diet, an active way of life, and to reduce the consumption of salt, sugar and carbonated drinks. It is also necessary to improve the psychological care for these patients; improve their habitat, particularly in metropolitan areas, in a way that physical activity becomes an integral part of their everyday life again [21].

That's why in 2014, Ukraine acceded to the implementation of WHO's Global Plan of Action for 2013–2020, with the support of the Swiss Agency for Development and Cooperation in Ukraine, on the prevention of noncommunicable diseases, and health promotion at population level [22].

Certainly, an increase can be seen in the prevalence of childhood diseases, with a maximum reached in adolescence. The accumulation of chronic diseases, comorbidity, a lasting impact left by environmental factors, the chronically stressful state of society, the syndrome of "school" and "family" maladjustment all result in the increase of both the incidence of disease, as well as the occurrence of illness and disability among children. In 2016, there were more than 156,000 children with disabilities in Ukraine.

The structure of disabilities in Ukraine's child population aged 0–17 years is the following: congenital malformations, deformations and chromosomal abnormalities are in the 1st spot (31.1% of the total number of children with disabilities); diseases of the central nervous system (16.6% – 2nd place); mental disorders and behaviors (14.4% – 3rd place); endocrine system disease, eating disorders, metabolic disorders (8.6% – 4th place); diseases of the ear and mastoid process (6.5% – ranked 5th); diseases of the musculoskeletal and connective tissue (4.3% – 6th); eye diseases and the subordinate apparatus (3.9% – 7th); neoplasms (3.5% – 8th position).

Compared to 1994, there are significant changes in the structure of disabilities. There is a two times increase in the prevalence of congenital malformations, deformations and chromosomal abnormalities; these were placed 2nd two decades ago. Disabilities connected to diseases of the nervous system shifted from first place to second. Disabilities related to diseases of the respiratory system have shown a decline.

The largest number of children with disabilities observed in the Chernihiv, Kyiv, Zhytomyr, Rivne, Vinnytsia, Cherkasy and Volyn regions. It once again confirms the increasing prevalence of childhood diseases and, accordingly, the number of disabilities are high in the zones of reinforced radiological control. These areas have the largest number of people affected by the Chernobyl accident, where children are subjected to long-term adverse effects caused by environmental factors like the large amount of radionuclides.

This requires the adoption of a country-level concept of social medicine, the further introduction of early intervention strategies, expanding the network of offices regarding follow-up, providing psychological support to affected families including education, making changes in the society

regarding children with special needs with respect to the maximum preservation of their life quality, and promote full participation in the society, especially their peer groups.

Data presented by Ukraine's Medical Statistics Center of Health indicators that for schooling there is a 1.5 times increase in the incidence of visual impairment; a 3 times increase in the pathology of the digestive system; a 2 times increase in disorders of the musculoskeletal system; and a 1.5 times increase in neuropsychiatric disorders [3, 8, 20].

Data by Ukraine's Institute of Strategic Studies of the Ministry of Health (2015) shows that during primary school education of children, there is an increased prevalence of diseases affecting the respiratory system and the endocrine system, there's an increase in mental disorders and behavior, and the prevalence of diseases affecting the eyes and the adnexa of uterus have also increased. During the transition to elementary school, the prevalence of endocrine pathology and it is in first place, mental and behavioral disorders are placed second, diseases of the respiratory system are in third place, and diseases of the musculoskeletal system are placed fourth [3, 13, 20]. At the same time, the prevalence of index incidence rate in adolescents was 1.76 times higher than in children of age 0–6 and 7–14 years, due to endocrine diseases, eating disorders and metabolic diseases, mental and behavioral disorders, congenital malformations, deformations and chromosomal abnormalities.

According to Moiseenko R. (2017), the presence of such dynamics in adolescence is associated with the insufficient discovery and registration of diseases in schoolchildren and, consequently, it results in further chronicity within both the younger and older populations [6, 16, 19]. This requires to develop the concept of a national school of medicine, as well as an effective implementation of the annual mandatory preventive examinations of students, to identify their adaptation possibilities. In addition, the country needs to continue with the WHO/UNICEF's implementation of providing medical and psychological assistance to adolescents on the basis of a friendly approach to the expansion of a network of clinics; be youth-friendly to help preserve physical, mental and reproductive health; provide an effective prevention regarding suicide attempts, risk-taking and addictive behaviors (alcohol, psychoactive drugs, smoking), unplanned pregnancy and sexually transmitted infections by creating an educational environment that promotes a healthy lifestyle for the entire family [17, 20].

Over the past 5 years, a reduction in the prevalence of diseases and mortality was observed regarding only the basic indicators of health among infants and young children, which in Ukraine can be associated with years of independence, as well as the reorganization of health services, including reproductive and prenatal care.

These tasks were carried out during the implementation of relevant national and targeted programs.

For the rest of the age groups among children, the overall poor state of health necessitates a countrywide introduction of pre-school and school education and health promotion techniques ("Learning movement"), in close collaboration with MoH and Ukraine's Ministry of Education, pediatricians, family doctors, teachers and parents. This will prevent the incidence of school exclusion, common mental disorders, functional disorders of the digestive

system, the cardiovascular system and the eyes, obesity and disorders of posture; and lead to a conscious formation of a healthy family life.

Improving the techniques of health maintenance among children and adolescents will contribute to the restoration of the field called "Pediatrics" (Resolution of the Cabinet of Ministers of Ukraine dated 2.1.2017 number 53). The latter was made possible thanks to the initiation of the Association of pediatricians in Kiev, supported by Ukraine's Ministry of Health, the Association of pediatricians and its regional offices (Zaporozhye, Odessa, Poltava region), as well as the Association of Family Physicians in the Odeskoy area.

Particular attention has to be paid to the development of modern standards regarding pre- and postgraduate training in the field of "Pediatrics", and the number of required pediatricians must be decided upon (at least 1000), due to negative trends in the country regarding children's health, as well as the overall deterioration of pediatric health care, especially in rural areas.

Scientific studies must be performed in the field of pediatrics within the framework of basic and applied research regarding Preventive and Clinical Medicine; the state's target programs should be aimed at the development of both new and improved existing methods, as well as means of prevention, diagnosis and treatment of the most common and socially significant diseases.

■ CONCLUSIONS

1. Thanks to introduction of modern perinatal technologies, reorganization of security service of reproductive health, introduction of the integrated management illnesses of children's age and to rising of qualification of children's doctors during the last 22 years managed practically to twice reduce an infant mortality to 7.4 on 1000 from that who had born alive and it is significantly reduce a neonatal mortality to 4.6 on 1000 from that who had born.
2. Since 2001, thanks to a series of organizational actions on to improvement of a medical care and the integrated maintaining of illnesses of children's age, the frequency of child's of the first year decreased on 26.3%. However, in general, prevalence of children's illnesses during the last 22 years grew on 36%, and morbidity grew on 41%.
3. During 1994–2016 attracts attention rising of morbidity and prevalence of neoplasms, illnesses of endocrine systems, circulations, urinary system, respiratory organs, skeletal-muscular system, ear and mastoid process, congenital anomalies, deformations and chromosomal anomalies.
4. Highest level of morbidity first of all respiratory pathology observed in babies and teenagers age. Because of problematic aspects of medical care, influence of ecological problems and bad habits, diseases with the transition to chronic type are prevalent of exactly in teenager's age.
5. The most unsatisfactory health indicators of the child's population are observed in Kiev, Ivano-Frankivsk and
6. Zaporizhya regions, large industrial regions and northern areas, which was undergone and continuing be subjected to the negative impact after Chernobyl disaster. The smallest indicators of morbidity and

prevalence of child's illnesses, there are in the Zakarpatskiy, Chernivtsi and Kherson regions what confirms the relation of child's morbidity with unfavorable social, ecological and economic factors.

7. For improving the health of the children are necessary next points: Implementation of a series of nationwide events for preservation of health and lives of mothers and children; significant investments from the state, private partnership and patrons of art; adequate staffing of pediatric health care and high level of their qualification; rational resource management and approximation of quality of delivery of health care in compliance with the international standards; eradication of outdated dogmas in medical practice and, especially, polypragmasia. Facts what was wrote early testify about necessity of constant attention to pediatric health care, as at the nationwide level, as at local authorities and territorial communities, considering regional features. Exactly, that's why are offered the following events and offers.

Materials of this work were reviewed and discussed by the pediatric public of Ukraine at a large national pediatric forum of the XIX All-Ukrainian scientific and practical conference «Relevant pediatrics questions» (Sidelnikovsky readings) in Poltava (20.09–22.09.2017) and entered to the adopted resolution.

Conflict of interests. The authors declare lack of the conflict interests during preparation of this article.

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Contacts/Контакты: docbeketova59@gmail.com