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PROBMODERN METHODS OF RESISTANCE TO THE INFLUENCE OF PATHOGENOUS FACTORS ON THE PERSON AND BIOSPHERIC PROCESSES

Peer-reviewed materials digest (collective monograph) published following the results of the XCIX International Research and Practice Conference and I stage of the Championship in Medicine and Pharmaceutics, Biology, Veterinary Medicine and Agriculture (London, March 24 - March 30, 2015)

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MEDICAL AND SOCIAL ANALYSIS OF CHILDREN' MORBIDITY IN THE SEPARATE RURAL DISTRICTS ON THE TERRITORY OF DNEPROPETROVSK REGION, BY AVERAGE ANNUAL INDICATORS

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We carried out medical and social analysis of children' morbidity at 14 y.o. age, by average annual indicators, in the separate rural districts on the territory of Dnepropetrovsk region during 2007 – 2012 years. Level of children' morbidity was analyzed in accordance with ICD - X classes by the following indicators: average annual, intensive, extensive; growth rates of the disease.

Keywords: *medico-social analysis, morbidity, rural districts, children, classes of diseases by ICD - X, growth rate.*

Проведён медико-социальный анализ показателей заболеваемости среди детского населения в возрасте до 14 лет, по уровням среднемноголетних показателей в отдельных таксонах Днепропетровской области в течение 2007 – 2012 гг. Анализировали уровень заболеваемости по классам МКБ – Х среди детей по показателям: среднемноголетним, интенсивным, экстенсивным; рассчитывали темпы прироста заболеваний.

Ключевые слова: *медико-социальный анализ, заболеваемость, таксоны, детское население, классы болезней по МКБ – Х, темпы прироста.*

Foreword. On the recent years in Ukraine demographic situation worsened on a background of negative trends as well as genetic processes flow in the population [1]. Patients' amount in Ukrainian population increased on 25 %, totally population decreased by 4 million people. Non-infectional, i.e. oncological incidence among the population has tendency to growth on (2.6-3) % annually [2, 3]. National hygienic issue today is to estimate economic losses due to deteriorating of the population health indicators [4]. One of the national problems in modern medicine is complex demographic situation, which is implemented on a background of negative trends, caused by genetic processes flow in the population and increasing cases of genetic hereditary diseases [5-7]. Most mortality is related to cardiovascular diseases (60 %), followed by cancer (12 %), and external causes including accidents and poisonings (9.7 %); these three causes account for 81.8 % of all deaths in Ukraine. Health – adjusted life expectancy (HALE) is not routinely calculated; international research conducted in 2003 found that in 2002 HALE was 54.9 years for men and 63.6 years for women in Ukraine [8]. Infant mortality rose between 1991 and 1995, but then fell by a third between 1995 and 2006 [9]. Research conducted by the Ministry of Health and National Institute for Strategic Studies also revealed that the number of neonates weighing between 500 g and 999 g decreased by half in the 2006 – 2007 period. Analyses also showed a significant increase in the survival rate of these infants (from 36.4 to 50.3 per 1000 live births), despite continued problems with access to neonatal intensive care equipment. The early neonatal death rate and maternal mortality have both halved since independence [10].

Materials and methods. According to the distribution 22 territorial districts of Dnepropetrovsk region were classified into 6 types of rural districts, according to the Scheme of settlements planning in the Dnepropetrovsk region. The first type of rural districts covers the following settlements (Kryvorozskyi and Novomoskovskyi); second type of rural districts (Nikopolskyi and Pavlogradskyi); the third type of rural districts covers (Dnepropetrovskyi rural area); the fourth type (Vasylkivskyi, Krynychanskyi and Synelnikovskyi districts); the fifth type (Verchnedneprovskyi, Mezewskyi, Petrikovskyi, Piatykhatskyi, Sofiivskyi and Shyrokivskyi districts); the sixth type (Apostolivskyi, Mahdalynivskyi, Petropaulivskyi, Pokrovskyi, Solonianskyi, Tomakivskyi, Tsarychanskyi and Yuriivskyi rural districts). Medical and social analysis of children' morbidity at 14 y.o. age, by average annual indicators, in the separate rural districts on the territory of Dnepropetrovsk region during 2007 – 2012 years, according to the statistical reports of Dnepropetrovsk regional health care center.

Results and discussion. In the structure of children population morbidity, 14 years old, diseases at whole occupy the first rank place (100 %). While morbidity at the children – living in 1 rural districts of Dnepropetrovsk region significantly determined on the level (11024.76±305.57) cases per 10.000 children, by an average annual indicator since 2007-2012 years ($p < 0.001$). Growth rates of whole diseases at 1st district carried out on the level +2.9 % on average in all districts and -16.8 % in Dnepropetrovsk region. The highest level of all diseases was significantly observed at 2nd rural district: 11910.33±393.92 cases per 10.000 children population ($p < 0.05$), with typical positive growth rate per average amount in all rural districts +11.1. The lowest level of all diseases was significantly observed in 6 rural district: 9482.96±399.20 cases per 10.000 children population ($p < 0.05$), with negative growth rates in both whole districts -11.5 % and in Dnepropetrovsk region -28.4 %.

Second rank position in the structure of morbidity among population of children living in 1 district, probably occupy respiratory system diseases (7205.40±204.73) $\%_{00}$ ($p < 0.001$), with typical positive growth rate in average whole districts as well as +6.2 % and negative growth rate -16.3 % per region. The highest prevalence among children population X class of diseases occurred in 3rd district and was significantly revealed on the level (7735.50±188.12) $\%_{00}$ ($p < 0.05$), with a high growth rate per rural settlements +14.1, and negative growth rate per region -10.2. Percent for X class of diseases in 1 district was carried out as 65.36 %, whereas in 3 district varied as well as 66.29 %.

Third rank place in 1 district carried out diseases of the skin and subcutaneous tissue, i.e. was on the level 4.85 %. Primary morbidity level towards XII class of diseases (1 district), by average annual indicator, was significantly mean 534.29±44.07 $\%_{00}$ ($p < 0.05$), with negative growth rates in both the whole districts -3.1 %, and in Dnepropetrovsk region -26.2 % (Fig. 1).

Moreover, our study have been shown that the highest rate of incidence XII class of diseases in 2 rural district was positive (+31.6 %), at the morbidity level (726.02±89.13) $\%_{00}$ ($p > 0.05$). Positive growth rate for this class of diseases among children was observed in the region up to +0.3. Analysis levels of children morbidity in 2 district shows the highest growth towards diseases of the endocrine (+130.9 %), nervous (+56.5 %), musculoskeletal system (+75.9 %), genitourinary system (+22.9 %), congenital anomalies (malformations) (+25.2%), and congenital anomalies of the circulatory system (+55.2 %), with a high growth rates on average by districts.

Our interest have been focused on reduction of the children morbidity in 2 district with a negative growth rate, which was observed for the following diseases as well as blood and hematopoiesis system (growth rate -13.5 %), anemia (-12.6 %), digestive system (-25.1 %). However, the low decrease of neoplasm's incidence (-6.8 %) was revealed in 2 district during 2007-2012 years.

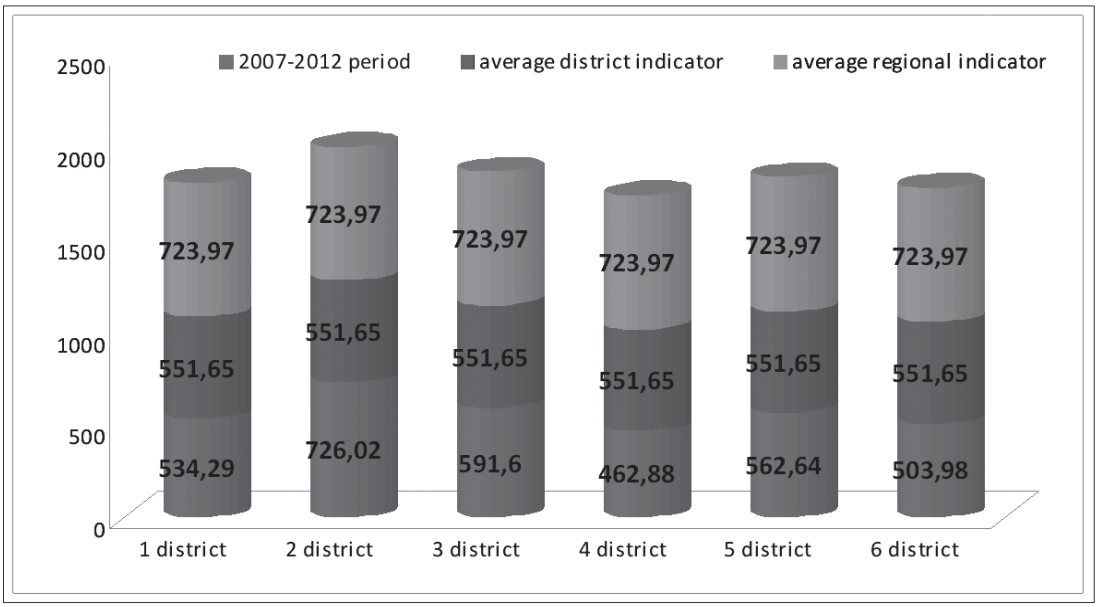

Fig. 1. Incidence of 14 y.o children population on skin and subcutaneous tissue diseases, by levels of annual indicators, in the rural districts of Dnepropetrovsk region during 2007 - 2012 period (cases per 10.000 children).

We were able to show that among the children population – inhabitants of 3 district until 2007-2012 years was carried out a positive rate incidence of diseases such as respiratory system (+14.1 %), digestive (+2.3 %), skin and subcutaneous tissue (+7.2 %). In 3 district has a great importance tendency of negative growth these diseases as well an infectious and parasitic (-39.3 %), neoplasm's (-31.1 %), blood and hematopoiesis system (-20.0 %), anemia (-19.5 %), endocrine system (-29.6 %), nervous (-28.7 %), circulatory (-35.4 %), musculoskeletal (-48.0 %), genitourinary (-5.9%) systems, congenital anomalies (malformations) (-32.0 %) and congenital anomalies of the circulatory system (-33.7 %).

However, it is becoming clear that an incidence rates some classes of diseases among children at 14 years old in all rural districts showed the lowest level characterized for the infectious and parasitic diseases during 2007 - 2012 years in 3 district, should be on the level (246.72±15.55) $\%_{00}$ ($p < 0.05$), while the highest level I class of diseases was observed in 2 district (549.27±52.90) $\%_{00}$. As shown in (Fig. 2), an average annual level this class of diseases exceeded the average regional level of incidence (533.10±38.75) $\%_{00}$ in 1.03 times and average district level (410.68±31.68) $\%_{00}$ in 1.34 times.

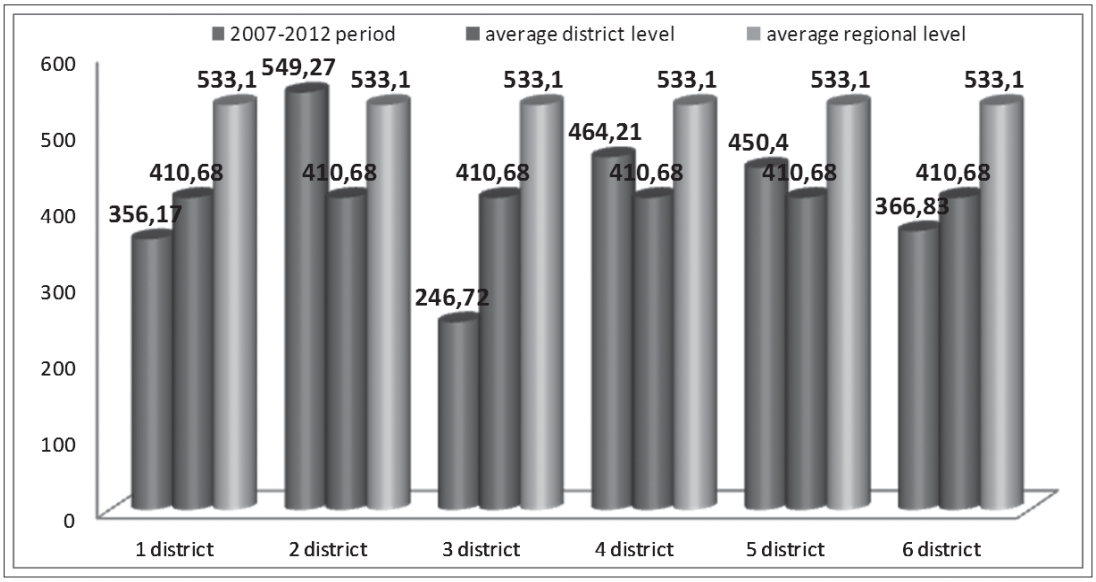

Fig. 2. Incidence of 14 y.o children population on the infectious and parasitic diseases, by levels of annual indicators, in the rural districts of Dnepropetrovsk region during 2007 - 2012 period (cases per 10.000 children).

Incidence of tumors among children under the age of 14 years was significantly highest by an annual indicators in 1 district: 19.92±1.81 $\%_{00}$ ($p < 0.05$) and 5-district: 19.59±3.04 $\%_{00}$ ($p < 0.001$). In this case, II class of disease exceeded meaning of an average district level 16.92±0.48 $\%_{00}$ in 1.78 times (1 district) and in 1.02 times (5 district), with a positive growth rates by districts: from + 17.7 to +15.8 %. Generally, II class of disease incidence among children population shouldn't exceed an average level of morbidity (25.20±0.39) $\%_{00}$ by the whole districts in Dnepropetrovsk region ($p < 0.001$) (Fig. 3).

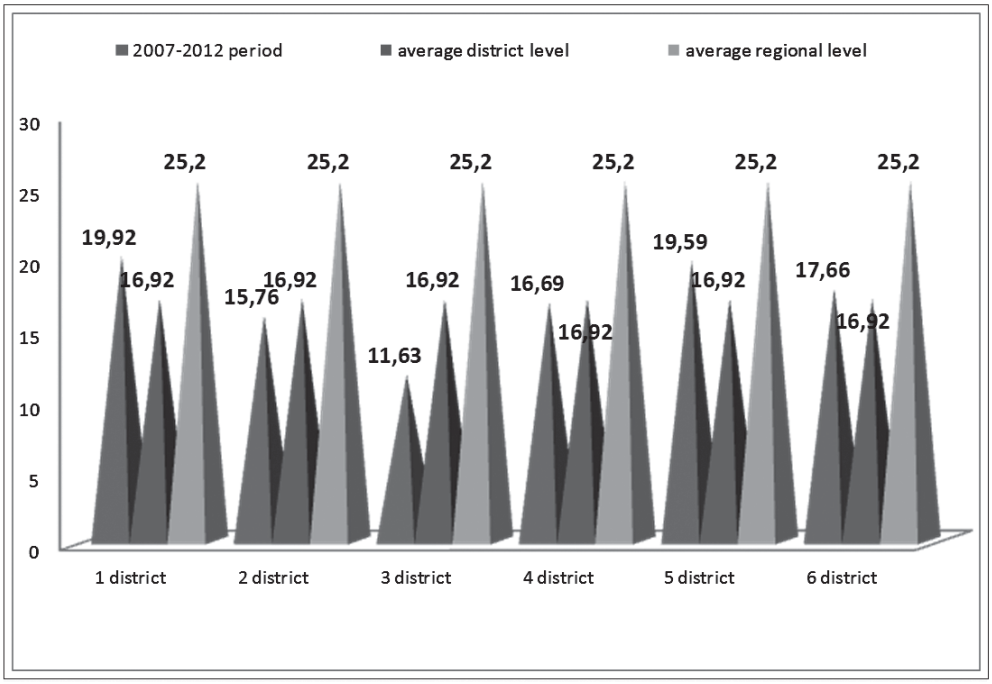

Fig. 3. Incidence of 14 y.o children population on tumors, by levels of annual indicators, in the rural districts of Dnepropetrovsk region during 2007 - 2012 period (cases per 10.000 children).

During 2007 - 2012 years has been carried out a negative growth rate of tumors at the following settlements as well as in 1 rural district (- 20.9 %), 2 district (-37.5 %), 3 district (-31.1%), 4 district (-33.8 %), 5 district (-22.3 %), 6 district (-29.2 %) (Fig. 3). Structure of tumors among 14 y.o. children in some of Dnepropetrovsk region districts was the following: from 0.09% in the 3rd-district to 0.21% in the 4th district.

Dynamics of morbidity considered significant increasing of blood and hematopoiesis system diseases in the territory of Dnepropetrovsk region among children population: from 156.90±11.76 cases in 1 district ($p < 0.05$) to 289.71±32.72 cases per 10.000 children in 6 district. Proportion of intensity this pathology in some districts of the region increases from 1.42 % in the 1 rural settlement to 3.05 % in the 6 district. Primary, there is a positive growth rate has been shown on average by some of the districts covered III class of diseases, as well as in the 5 district (+3.3 %) and 6 district (+24.9 %), which incidence exceeds average level for this class of pathology by whole districts in 1.03 - 1.25 times. Positive growth rate typical for III class of diseases, carried out for average regional levels correspond as +24.5% in 5 district and +50.6 % in 6 district, with exceeding of an average regional meaning in 1.25 - 1.51 times.

Tendency of significant increase cases of anemia at 14 y.o. children was revealed: from 155.12±11.42 $\%_{00}$ ($p < 0.05$) cases in the 1 district to 286.68±32.59 $\%_{00}$ cases in the 6 district. Trend of negative growth anemia occurs in the following rural settlements: on 32.2% in 1 district; 12.6% - 2 district; -19.5 % - 3 district; -20.9 % - 4 district. Positive growth rate towards III class (D50-D53) of diseases was typical in the 5 and 6 districts, respectively, from +2.5 to +25.2 % (by the whole districts) and from +25.2 to +52.9 % (by the region) (Fig. 4). In both Dnepropetrovsk region districts, incidence of this class of diseases exceeded average level of morbidity: in 1.02 - 1.25 times (in the whole districts) and in 1.25 - 1.53 times (in the region).

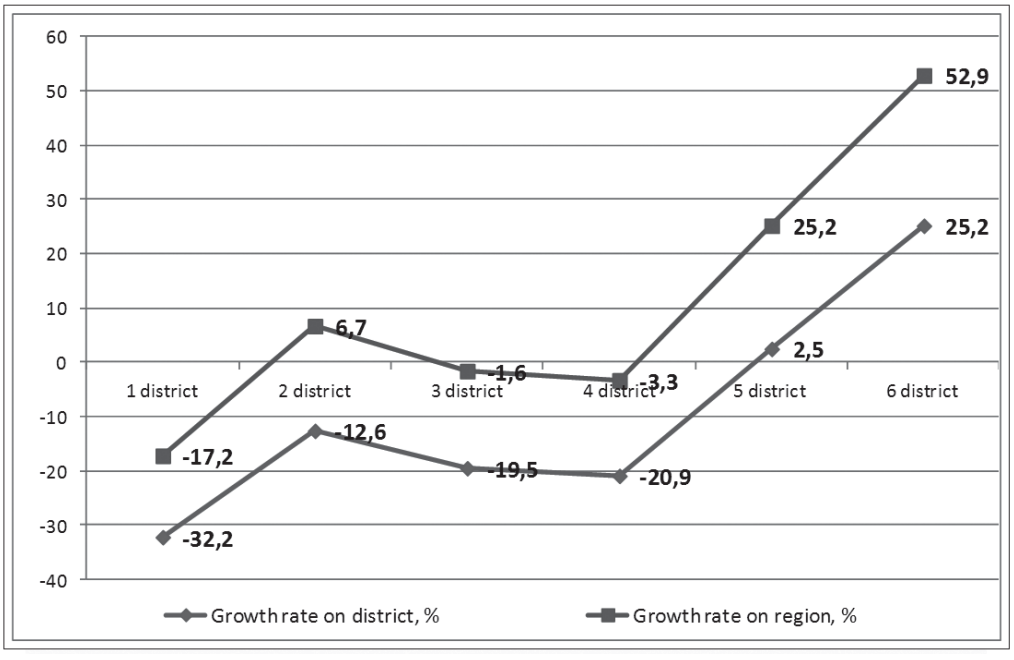

Fig. 4. Growth rates of anemia among 14 y.o. children in the rural districts of Dnepropetrovsk region during 2007 - 2012 period.

Proportion of genitourinary system diseases in the whole structure of diseases among children at the age of 14 years old was varied in some rural districts: 1.73 % (1 district); 2.29 % (2 district); 1.80 % (3 district); 2.86 % (4 district); 2.35 % (5 district); 2.47 % (6 district). The lowest level XIV class of diseases was registered in the 1 district: 190.84±20.75 $\%_{00}$, with negative growth rates in both settlements -14.4 %, and in the region -32.1 %. The highest level this class of diseases among children was observed in the 2 district: 273.89±23.72 $\%_{00}$, with positive growth by the districts +22.9% and negative growth rate by the region -2.6 %. Finally, diseases of the genitourinary system exceeded it correspond level (in the whole districts) in 2 district (1.23 times); 4 district (1.0 times); 5 district (1.18 times); 6 district (1.05 times).

Incidence of children at 14 years old in a case of congenital circulatory system anomalies was the highest in the 2, 4 and 6 districts, which should exceed both average district – region levels of morbidity by some rural settlements: 2 district (1.55 – 1.73) times; 4 district (1.26 – 1.41) times; 6 district (1.26 - 1.41 times). The highest growth rate diseases of XVII class (Q20-Q28) were observed: by districts average levels – in the 2 district (+55.2 %), by regional average level (+73.1 %); in the 4 district - by districts average levels (+26.0 %), by regional average level (+40.6 %); in the 6 district - by districts average levels (+26.4 %), by regional average level (+41.0 %). For other districts were experienced negative growth rates during 2007 – 2012 years: in the 1 district - by districts average levels (-16.2 %), by regional average level (-6.5%); in the 3-district - by districts average levels (-33.7 %), by regional average level (-26.1 %); in the 5 district - by districts average levels (-22.2%), by regional average level (-13.2%).

Conclusions. We have found out that the structure of morbidity among children in different rural districts differs on some classes of diseases. Moreover, in the 1 district the largest proportion was confirmed for the following classes of diseases as well as X (65.36 %), XII (4.85 %), XI (4.42 %), I (3.23 %) and class IV (2.01 %); in the 2 district: X (58.89 %), XII (6.09 %), XIII (5.01 %), I (4.61 %) and IV class (5.21 %); in the 3 district: X (66.29 %), XII (5.07 %), XI (3.94 %), I (2.11 %) and IV class (1.62 %); in the 4 district: X (56.27 %), XII (5.91 %), XI (5.02 %), I (5.93 %), IV class (2.80 %); in the 5 district: X (64.63 %), XII (5.02 %), XI (4.02 %), I (4.02 %), III (2.14 %) and IV class (2.29 %), in the 6 district: X (59.81 %), XII (5.31 %), XI (5.11 %), I (3.86 %), III class (3.05 %), i.e. anemia (3.02%). It is noteworthy that distribution of rural children on separate districts in a structure of whole diseases has been shown the higher incidence for respiratory system, skin and subcutaneous tissue, digestive, musculoskeletal system, infectious and parasitic diseases, endocrine system, blood and hematopoiesis system, anemia – in the whole rural districts of the Dnepropetrovsk region.

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ЭКОЛОГО-ГИГИЕНИЧЕСКИЕ АСПЕКТЫ УТИЛИЗАЦИИ ОСАДКОВ ГОРОДСКИХ СТОЧНЫХ ВОД

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Участники конференции

Статья посвящена комплексной эколого-гигиенической оценке осадков городских сточных вод станций аэрации г. Днепропетровска. Представлена динамика основных показателей осадков с увеличением сроков их хранения на иловых площадках. Предложен новый перспективный способ извлечения тяжелых металлов из осадков сточных вод.

Ключевые слова: *тяжелые металлы, осадки городских сточных вод.*

The article presented ecological and hygienic evaluation sediment of urban sewage stations of Dnipropetrovsk, made the evaluation of basic characterological figures residues with increased shelf life, developed a way to remove the heavy metals from sediment of urban sewage.

Keywords: *sediment of urban sewage, heavy metals.*

Актуальность. В современных условиях экологической и гигиенической проблемой является вопрос утилизации осадков городских сточных вод (ОГСВ), которые накапливаются в особо крупных объемах в населенных пунктах с централизованными системами водоснабжения. Фактически существующие технологии очистки стоков на станциях аэрации г.. Днепропетровска (Южной, Левобережной и Центральной) реализуют традиционную схему, которая включает механическую, биологическую очистку, обеззараживание стоков и обработку осадка. На всех станциях при переработке осадка первичных отстойников и избыточного ила отсутствует этап их предварительного сбраживания в метантенках, что способствует увеличению объемов ОГСВ, повышению их эпидемической и токсикологической опасности и значительно снижает технико-эко-