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## Regional morbidity profile of the Sumy region population by diseases of the musculoskeletal system and connective tissue

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**Abstract.** Analyzed the level of primary morbidity of population and prevalence of the osteo-muscular system diseases and of the connective tissue diseases among the residents of the Sumy region. It is established that nosologies of this class are occupy a prominent place in the overall structure of disease's prevalence among the inhabitants of the Sumy region. The percentage of above mentioned nosologies in total structure of

Sumy region population morbidity has been exceed 5 %. The dynamics of primary morbidity and prevalence of diseases was separately examined during 2005–2016. Moreover, it was revealed that the situation with the morbidity by nosologies of this group during 2005–2016 has been deteriorating. For example, the primary morbidity of population of the Sumy region by diseases of osteo-muscular system and of the connective tissue decreased by 6.5 %, but the prevalence of orthopedics pathologies among inhabitants of the Sumy region for the above indicated period increased by 11.0 %. It is established that in the structure of prevalence of the osteo-muscular system diseases and of the connective tissue diseases on the first place are arthrosis diseases, which demonstrated the high levels of primary morbidity's growth during 2005–2016, which in some regions exceed 50–80 %. The morbidity of population by the arthritis diseases in the Sumy region for the same period increased by 30.8 %, and their prevalence by 34.4 %, but the highest tempo of growth in the rates of primary morbidity and prevalence are characteristic for saline arthropathies – 25.7 % and 12.0 % respectively. The benefit of this study is analyses of the geographical patterns of morbidity of the population as well as prevalence of the osteo-muscular system diseases and of the connective tissue diseases among the inhabitants of the region. With help the quantitative analysis methods, the groups of districts with different rates of morbidity of population, prevalence of diseases of the skeleton/muscular apparatus and connective tissue and different level of provision of the Sumy region population by medical institutions and specialists of the appropriate profile were identified. The geographical discrepancies between the level of the morbidity of population and the level of specialized medical-orthopedically care is revealed. It has been established that in many administrative districts of the region there are no orthopedist at all among the specialists providing medical assistance, and beds for orthopedic patients (or both) are absent in medical and preventive institutions. Consequently the population is not provided with the proper level of orthopedic care.

**Keywords:** primary morbidity, prevalence of diseases, diseases of the musculoskeletal systems, diseases of the connective tissue, Sumy region.

## Регіональний профіль захворюваності населення Сумської області на хвороби кістково-м'язової системи та сполучної тканини

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**Анотація.** Проаналізовано рівень первинної захворюваності населення та поширеності хвороб кістково-м'язової системи і захворювань сполучної тканини серед мешканців Сумської області. Встановлено, що нозології цього класу входять до основних у загальній структурі поширеності хвороб серед населення Сумської області та посідають друге місце у структурі причин, що зумовлюють інвалідизацію її мешканців. Ортопедичні захворювання займають п'яте місце у структурі поширеності захворювань серед мешканців України (їх частка 5,4%), причому жінки частіше страждають від цього класу хвороб, ніж чоловіки. Так, у 2015 році поширеність цієї групи патологій серед чоловіків складала 8 257,7, а серед жінок – 10 021,1 випадків на 100 тисяч осіб, первинна захворюваність серед жінок також була вищою – 2 287,8 і 2 986,1 випадків на 100

тисяч жителів відповідно. Окремо розглянуто динаміку захворюваності та поширеності хвороб кістково-м'язової системи й захворювань сполучної тканини протягом 2005–2016 років. Незважаючи на те, що протягом цього періоду поширеність ортопедичних нозологій серед населення України в цілому зменшилась на 7,67%, у Сумській області за розповсюдженістю цього класу захворювань навпаки збільшилася 11%. Ця проблема є особливою гострою для городян, серед яких поширеність ортопедичних нозологій вища, ніж серед жителів сільської місцевості. На 100 тис. осіб у містах діагностується 9 601, а у сільській місцевості – лише 8 640,8 випадків таких захворювань. Така сама ситуація спостерігається і при первинній захворюваності: на 100 тисяч людей у містах було діагностовано 3 102,2, а у селах – лише 2 490,1 нових випадків ортопедичних хвороб. Проаналізовано структуру названих нозологій у Сумській області, схарактеризовано географічні відмінності захворюваності населення та поширеності зазначених хвороб серед мешканців регіону. За допомогою методів кількісного аналізу виділено групи районів, які об'єднали адміністративні одиниці, що мають схожі показники захворюваності населення, поширеності хвороб кістково-м'язової системи та захворювань сполучної тканини й рівня забезпеченості населення лікувальними закладами і фахівцями ортопедичного профілю. Виявлено географічні невідповідності між рівнями захворюваності населення та спеціалізованого медико-ортопедичного обслуговування.

*Ключові слова:* первинна захворюваність, поширеність хвороб, кістково-м'язові хвороби, хвороби сполучної тканини, Сумська область.

**Introduction** The high prevalence of diseases among the population of Ukraine, the tendency to an increase of the morbidity rate by some nosologies, as well as the lack of comparative data about morbidity and insufficient knowledge of the factors causing it are determine the importance of studying the regional health profile of residents of any region of Ukraine. The analysis of trends of the morbidity and prevalence of diseases among the population is an important component of planning the strategic directions of medical services development, the ground for developing an effective and scientifically based system for maintaining and promoting of populations health. Therefore, the social-geographical study of the regional morbidity of the population is very relevant on the current stage of Ukraine development.

Pathologies of the musculoskeletal system and connective tissue are quite common among the population of Ukraine and occupy the second place in the structure of the reasons for the disability of its citizens. The diseases of this nosological class are occupy the fifth place in the structure of diseases prevalence of the Ukraine's inhabitants (5.4 %), and besides a women are suffer by them more often than men. So in 2015, the prevalence of this group of pathologies among a men was 8,257.7, and among a women – 10,201.1 cases per 100 thousands of people, the primary morbidity of a women was also higher – 2,827.8 and 2,986.1 cases per 100 thousands of inhabitants respectively.

In addition to the differences by gender, the differentiation of diseases prevalence of the musculoskeletal system and connective tissue there is among urban and rural residents of Ukraine. This problem is especially acute for townspeople, among whom the prevalence of this group of nosologies is higher than among residents of the countryside. Per 100 thousands of population in cities are 9,601 cases, but in rural areas only 8,640.8 cases of such diseases. The same situation is observed with the primary morbidity: per 100 thousands of people in cities were diagnosed 3,102.2 new cases, while in

the villages there are only 2,490.1 new cases of orthopedic diseases.

Most of the scientific articles and papers on this subject are devoted to methods of diagnosis and treatment of the above-mentioned diseases and the development of measures to reduce the morbidity. A relatively small amount of articles are devoted to the geographical aspects of the population morbidity and establishment of the territorial differences of prevalence of the musculoskeletal system and connective tissue diseases. Among them, it is worth noting the works of such scholars as N. Mezentseva and S. Batychenko (Mezentseva, 2009), T. Pogrebskyi (Pogrebskyi, 2014), who consider this issues at the Ukrainian level, or the work by S. Sonko and D. Shiyan (Sonko, 2015), who explore it at the level of old industrial regions. Part of scientific articles is devoted to the geography of road injuries; their review is given in the work of A. Kornus et al (Kornus, 2017). Regarding the geography of the morbidity of diseases of the musculoskeletal system and connective tissue in the Sumy region of Ukraine, these issues are partially covered in the works by A. Kornus et al (Kornus, 2015) and V. Shyshchuk (Schyschuk 2013, 2014). Despite the fact that for the years of 2005–2016 the prevalence of orthopedic nosologies among the population of Ukraine as a whole decreased by 7.67 % (Zaklady, 2016), in the Sumy region over the same period the prevalence of it was increased by 11 % (Dovidnyk, 2017), which also caused the choice of the aim of our study.

The purpose of the study is to analyze of the geographical differences of the population morbidity and prevalence of diseases of the musculoskeletal system and connective tissue among the residents of Sumy region as well as the grouping of administrative units of the region according to the level of morbidity of the inhabitants by the nosologies of this class.

**Material and research methods.** The observation covers the period from 2005 to 2016. This study analyzed the data of annual statistical reports of

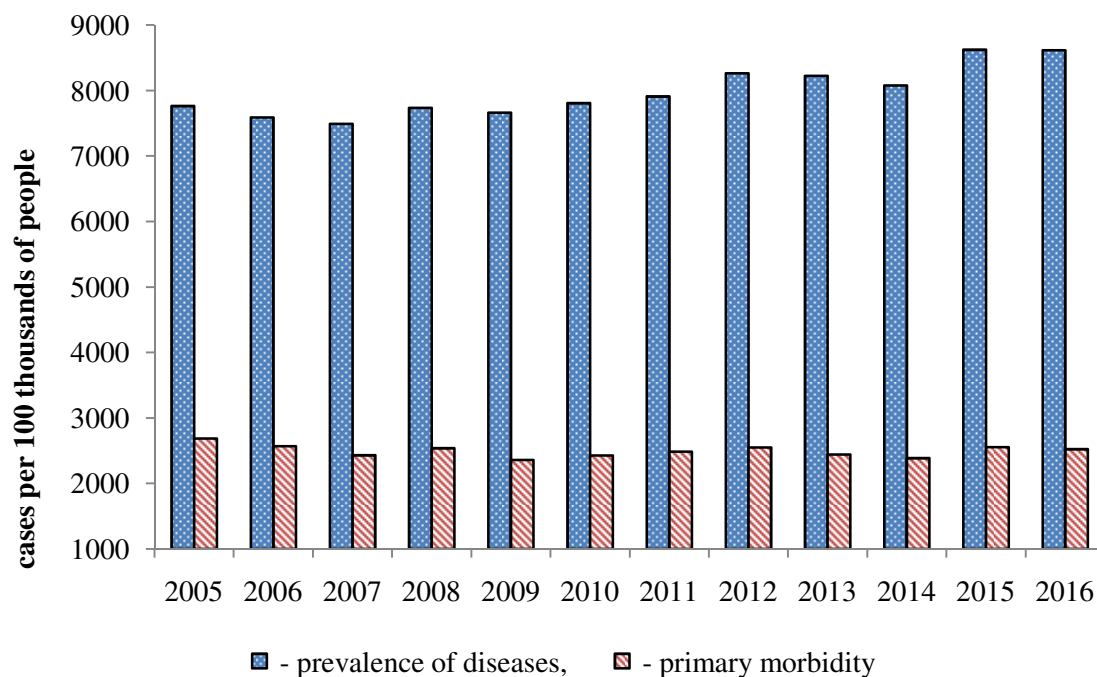
medical institutions of the Sumy region, which subordinate to the Ministry of Public Health of Ukraine. The dynamics of the morbidity rates and prevalence rates of the major diseases of musculoskeletal system and connective tissue have been studied in the geographical aspect. Among the above-mentioned diseases a rheumatoid arthritis and other inflammatory arthropathies, saline arthropathies, including gouty arthritis, arthrosis, including deforming arthrosis, ankylosing spondylitis, damage of the intervertebral discs, other dorsoopathies and spondylopathies, systemic lupus erythematosus, osteo-articular tuberculosis were considered.

To assess the quality of medical-orthopedic services in the region were clarified the regularities of placement of inpatient medical orthopedic departments and the number of orthopedic beds in hospitals. The provisions of hospitals by orthopedists also have been clarified. These indicators allow not only to establish the level and geographical features of population morbidity and the prevalence of diseases, but also provide an opportunity to evaluate the effectiveness of medical health care and prevention. They are also the basis for creating the programs for the development of medical and orthopedic care system for inhabitants of the region.

In this paper a systematic approach, comparative-geographical, statistical, cartographic, analytical, and other methods of scientific geographical research are applied. All calculations as well as the graphic images and figures were obtained using SPSS Statistic 17.0 computer software by SPSS Inc., Microsoft Excel 2010 and Statistica 10 by StatSoft Inc.

**Results and discussion.** In the world, 25 % of adults are suffer from pathologies of the musculoskeletal system. In Europe, their share in the structure of non-communicable diseases is more than 3/4 and during recent years has increased by 25 %. Orthopedic diseases such as osteoarthritis and rheumatoid arthritis are the main causes of disability and account for half of all chronic diseases among a people over 65 years of age (Kuprinenko, 2015). There are about 63 million people with orthopedic nosologies, which are recorded in all European regions. The average annual morbidity by orthopedic diseases in the world's population is about two cases per 10 thousands of people (0.02 %), but in different regions it ranges from 1 % to 40 %, and affecting mainly a people of working age. In Ukraine, the total number of such patients is about 125 thousands of people, or 34 cases per 10 thousand adults, which is much higher than the world average.

Among the regions of Ukraine, the Sumy region ranks 18th in terms by the level of population morbidity by nosologies of the musculoskeletal system and connective tissue. These diseases are difficult to treat, and some, such as rheumatoid arthritis, are incurable. The rheumatoid arthritis is the most dangerous and often leads to disability. At the end of 2016, the primary morbidity of inhabitants by the nosologies of musculoskeletal system and connective tissue in Sumy region was 2,523.98 cases per 100 thousands of people, and prevalence of these diseases reached 7,620.63 cases per 100 thousands of population (Fig. 1) (Dovidnyk, 2017).



**Fig. 1.** Dynamics of primary morbidity and prevalence of diseases of the musculoskeletal system and connective tissue among the population of Sumy region during 2005–2016.

The highest prevalence of diseases of the musculoskeletal system and connective tissue was observed among the residents of the city of Sumy (10,043.82 cases per 100 thousands of peoples), as well as in Okhtyrka (10,104.28), Lypova Dolyna (12,115.79) and Buryn' (13 859.96) districts, as while the residents of Yampil' (5,250.72 cases per 100 thousand people), Sumy (5,414.17), and Velyka Pysarivka (5,953.36) districts had its lowest values. As for the primary morbidity of population by the pathologies of this group, its highest rates are observed among the residents of Shostka (3,053.86), Lypova Dolyna (3,163.16), Krolevets (3,374.82) districts and among the residents of the city of Sumy (3,130.47 cases per 100 thousands of people). The least amount of cases of diseases of the musculoskeletal system in 2016 were registered in Lebedyn (1,105.01), Sumy (1,106.46) and Yampil' (1,397.7 cases per 100 thousands of population) districts (Fig. 2).

Although during the years 2005–2016 in the Sumy region as a whole there was an increase in the prevalence of diseases of the musculoskeletal system among the population, but at the level of

individual administrative units of the region, these processes has largely different directions. The most intensively diseases of this group “accumulated” among the residents of Putyvl' (an increase by 50.23 %) and Buryn' (by 65.9 %) districts. At the same time, in other districts of the region, over the specified period, there was a decrease of the orthopedic nosologies prevalence among their population. The best situation was in the Sumy (a decrease by 31.21 %) and Yampil' (by 12.27 %) districts (Fig. 2). The two main criteria that characterize the morbidity of the population behaved in different directions: if the prevalence of diseases increased, then the primary morbidity on diseases of the musculoskeletal system and connective tissue during the above-mentioned period among the population of Sumy region was contrary decreased. The declined was most significantly in Sumy (60.8 % reduction), Yampil' (40.9 % reduction) and Velyka Pysarivka (36.3 % reduction) districts. Although in some districts and the primary morbidity also is growing, sometimes very significant, as, for example, in the Seredyna-Buda (33.4 % increase) or Okhtyrka (53.6 % increase) districts.

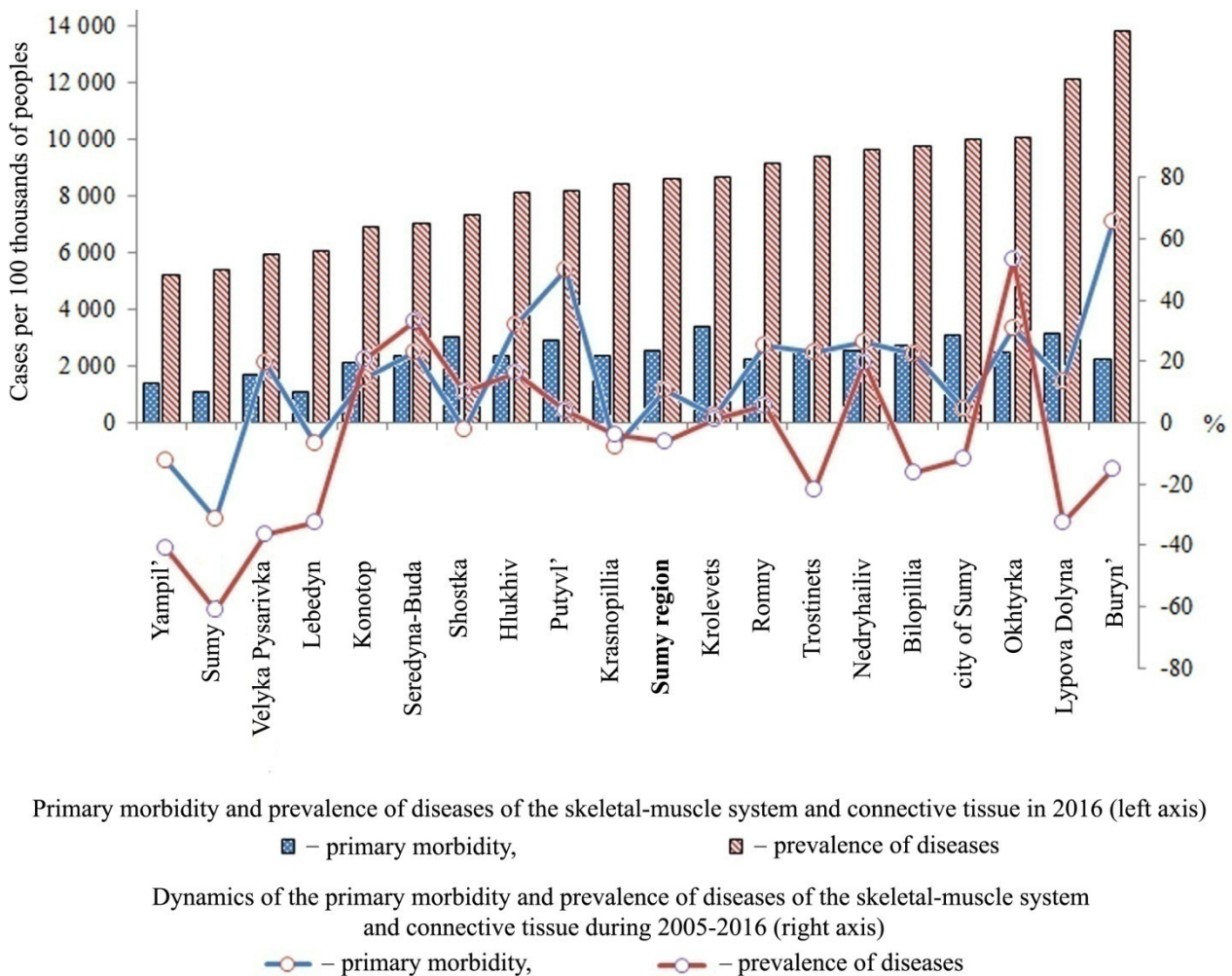


Fig. 2. Primary morbidity and prevalence of diseases of the skeletal-muscle system and connective tissue among the population of administrative units of the Sumy region in 2016 and their dynamics during 2005–2016 (Source: Dovidnyk, 2017)

In accordance with the international classification of diseases ICD–10 (Classification, 2017), diseases of the musculoskeletal system include arthropathies, systemic diseases of the connective tissue, dorsopathies, and diseases of the soft tissues. Among of them, the most common are pathologies of the joints, osteoporosis, and skeletal injuries. Ukraine is not an exception; here also the most common disease in the structure of the musculoskeletal nosologies is an arthrosis – complex progressive chronic joint diseases of a degenerative-dystrophic nature. The first signs of joints disorders are found among a people, who over the age of 30 years. Further, during a period of life from 30 to 65 years, the frequency and prevalence of arthrosis increases from 2 to 10 times. This pathology detected among the majority of people over 65 years of age, and almost every person, who over the age of 75–80 years (Chystyk, 2017). The main causes of arthrosis are injuries and their consequences, dysplasias, infections and intoxications, as well as hereditary factors.

In the Sumy region in 2016, the percentage of arthrosis among of all orthopedic pathologies was also the largest – 31.7 %. Compared to 2005, their prevalence among the region's population

increased from 2,160.93 to 2,733.51 cases per 100 thousands of peoples (by 26.49 %). Most often the arthrosis is occurs among the residents of Buryn' (3,554.76), Romny (3,954.19) and Lypova Dolyna (4,363.16 cases per 100 thousands of peoples) districts. At the same time this pathology is the least common among the residents of Sumy (1,558.31) and Yampil' (1,999.09 cases per 100 thousand of the population) districts. The primary morbidity of arthrosis in the region is 432.55 cases per 100 thousands of people, reaching the highest rates in Lypova Dolyna (610.53) and Shostka (654.18 cases per 100 thousands of people) districts. In 2016, the population of Yampil' (128.57) and Lebedyn (154.14 cases per 100 thousands of peoples) districts was the least affected by this pathology.

By the analyzing the dynamics of primary morbidity and prevalence of arthrosis among the population of the Sumy region during 2005–2016 (Fig. 3) was found that only in Sumy district the prevalence of this pathology decreased (by 24.8 %), while in all other administrative units its growth was observed. It was especially significant among the inhabitants of Velyka Pysarivka (82.9 % increase), Romny (80.9 % increase) and Putyvl' (78.7 % increase) districts.

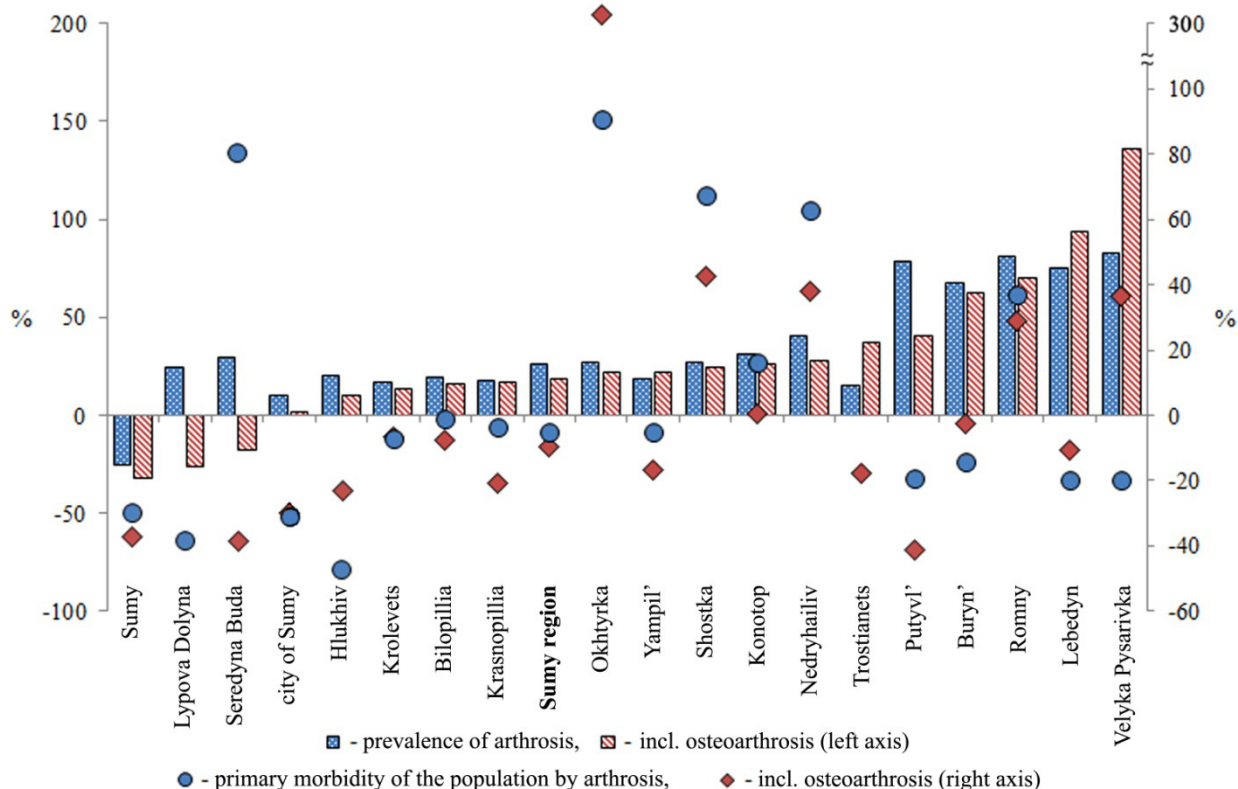


Fig. 3. Growing (decreasing) of the diseases prevalence and primary morbidity of population of the administrative units of Sumy region by the arthrosis during 2005–2016 (%) (Source: Dovidnyk, 2017)

Among of all arthrosis, osteoarthritis is the most common, which is one of the main causes of premature loss of ability to work and disability, and accompanied by chronic pain syndrome, signifi-

cantly reducing the quality of human life due to damage of large joints: knee-joint (gonarthrosis), hip-joint (coxarthrosis) and shoulder-joint. The appearance of primary or idiopathic osteoarthritis,

when there are a violation of development of the components of articular cartilage, the membrane and the biochemical structure of cartilage tissue, is significantly influenced by a hereditary factor. Mechanical factors (joint injuries, intraarticular fractures of the bones, which lead to disruption of the normal structure of the joint, permanent microtrauma of the joint and heavy load on him, various anomalies of skeletal development, which lead to uneven load on the joints) also resulting lead to the fact that the articular surfaces are overloading and destroying. The causes of osteoarthritis can be obesity (joint overload), inflammatory joint diseases (acute and chronic arthritis), hemophilia, in which even minor injuries result to blood flow into the joint (hemarthrosis), primary aseptic necrosis of bone tissue, metabolic disorders. Osteoarthritis can also occur as a complication of some systemic diseases such as gout, chondrocalcinosis, hemochromatosis, psoriasis, rheumatoid arthritis, diseases of the endocrine system (violations of calcium metabolism in hypo- or hyperparathyroidism, diabetes, impaired of sex hormones production as well as the hormone of growing – the somatostatin), as well as the violation of blood supply to joint tissues (atherosclerosis of lower extremities vessels, endarteritis obliterans, varicose veins)(Osteoartoz, 2017).

In the Sumy region in 2016, the overall prevalence of osteoarthritis was 2,342.26, and its primary morbidity was 297.37 cases per 100 thousands of people. During 2005–2016 the prevalence of the deforming arthrosis among the region's population increased by 19.15 %, and the primary morbidity decreased by 15.6 %. Among the administrative units, the best situation observed in the Putyvl', Seredyna-Buda and Lypova Dolyna districts, where the primary morbidity of population has decreased almost threefold. However, in Okhtyrka district there is a diametrically opposite (worst) situation – here the morbidity by this pathology has increased by 4 times. With regard to the dynamics of prevalence of this nosological form, then during 2005–2016 only in three districts of the region its decrease were observed: Sumy (by 32 %), Lypova Dolyna (by 25.9 %) and Seredyna-Buda (by 177 %); in other areas, the morbidity by osteoarthritis is increasing, especially in Velyka Pysarivka, where in 2005–2016 it more than doubled.

As of January 1, 2017, the largest distribution of osteoarthritis was diagnosed in Buryń (3,123.88) and Romny (3,545.7 cases per 100 thousands of people) districts, while among the inhabitants of Seredyna-Buda (1,267.04) and Sumy (1,314.02 cases per 100 thousands of people) districts this pathology is less common. The highest primary morbidity by osteoarthritis among the population is observed in Okhtyrka (400.46 cases

per 100 thousands of people), Bilopillia (410.46) and Shostka (547.19) districts, and the lowest rates are in Lebedyn (71.64) and Yampil' (74, 65 cases per 100 thousands of people) districts.

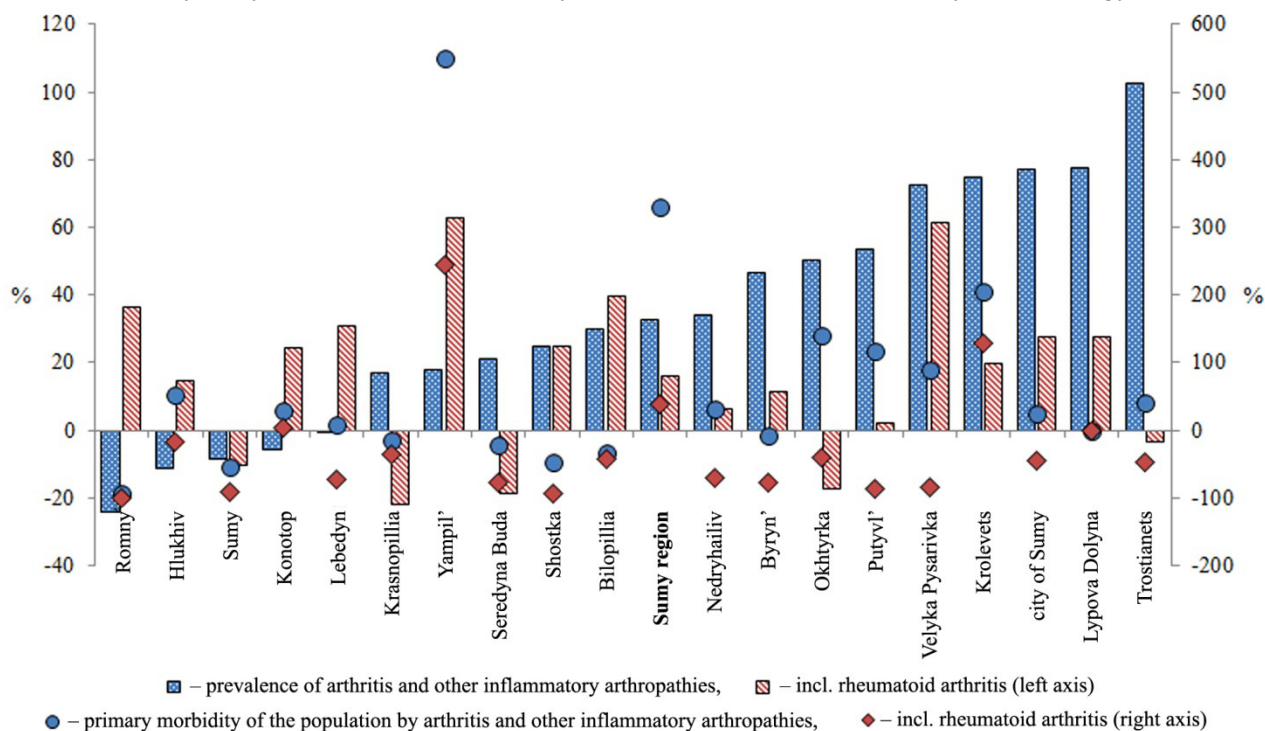
As well as an arthrosis, arthritis is a significant medical and social problem. Today arthritis is common among people of all ages, including children and adolescents, but it is still more often observed among women aged 40–50 years, who generally get sick more often than men (the ratio of sick women to men is 3:1). A special place in this group is occupied by rheumatoid arthritis, which is the second highest prevalence among the population of Sumy region as well as the level of primary morbidity, second only to osteoarthritis. With age, the prevalence of rheumatoid arthritis increasing (Neyko 2009; Revmatoidnyi, 2001).

For the period 2005–2016, the primary morbidity by arthritis in the region increased by 30.8 %, but in such districts as Romny, Velyka Pysarivka and Putyvl' it increased more than 5 times. The prevalence of arthritis and other inflammatory polyarthropathies among the residents of the region also increased by 34.38 % over the study period, especially in the same Romny and Velyka Pysarivka districts, as well as in Lypova Dolyna, Lebedyn and Buryń (Fig. 4).

In 2016, an arthritis and other inflammatory polyarthropathies were most common among the residents of Shostka (779.51) and Buryń (793.94 cases per 100 thousands of people) districts. Least of all affected by these diseases are the inhabitants of the Krasnopillia (323.46) and Bilopillia (406.5 cases per 100 thousands of people) districts. High rates of primary morbidity of population by arthritis are also among the residents of the Buryń (239.38), Lypova Dolyna (247.37) and Shostka (292.45) districts, while the inhabitants of the Lebedyn (17.37), Seredyna-Buda (24.02) and Bilopillia (27.76 cases per 100 thousands of people) districts fell got sick the least in this year.

As for the most common and dangerous form of arthritis – the rheumatoid arthritis, the primary morbidity of the population for it in the Sumy region in 2016 was 22.23 cases per 100 thousands of people, that is by 72.19 % higher than in 2005. In 2016, the rheumatoid arthritis was most often diagnosed among the residents of Yampil' (41.47) and Sumy (65.46 cases per 100 thousands of people) districts. The prevalence of this disease over the study period was also increased by 16.4 % and amounts to 313.66 cases per 100 thousands of people. Such a progression of morbidity by rheumatoid arthritis is due to the lack of preventive measures aimed at early detection of this disease, the slow introduction of modern methods of the diagnosis and treatment of this pathology, an insuf-

efficient number of medications and equipment in medical institutions. During the 2005–2016, the most common rheumatoid arthritis was among the residents of Velyka Pysarivka (412.71) and Putyvl' (412.73) districts, while the inhabitants of Krasnopillia (250.42), Krolevets (281.24) and Hlukhiv (284.15 cases per 100 thousands of people) districts were the least affected by this nosology.



**Fig. 4.** Growing (decreasing) of the diseases prevalence and primary morbidity of population of the administrative units of Sumy region by the arthritis and other inflammatory polyarthropathies during 2005–2016 (%) (Source: Dovidnyk, 2017)

For the period 2005–2016 primary morbidity of rheumatoid arthritis was decreased in three districts: Bilopillia (by 47.58 %), Lypova Dolyna (by 22.32 %) and Trostianets (by 21.28 %). In general, opposite trends were observed for various administrative districts of the Sumy region. For example, in 2005 in the Seredyna-Buda district per 100 thousands of people there were 15.71 cases of primary morbidity by rheumatoid arthritis, and in 2016, according to medical statistics, not a single case of this disease was diagnosed here. While if in 2005, in the Buryn' district there were no patients registered with this diagnosis, in 2016, per 100 thousands of people already had 11.97 cases of rheumatoid arthritis. During the study period, the primary morbidity of population in the Lebedyn district has been increased the most of all. Among the main causes of arthritis should be called an infection, injuries, diseases of the nervous system, prolonged physical strain, etc. According to WHO (Global, 2017), rheumatic diseases have third rank among the causes of temporary disability of the population. More than 50 % of patients with a diagnosis of rheumatoid arthritis become incapacitated 10 years after the onset of the disease, and about 90 % of patients constantly experience severe pain, which significantly worsens the quality of life.

With regard to the dynamics of prevalence of the rheumatoid arthritis from 2005 to 2016 (Fig. 4), in five administrative districts of the Sumy region there was a decrease of this indicator: Krasnopillia (–21.87 %), Seredyna-Buda (–18.59 %), Okhtyrka (–17.2 %), Sumy (–10.35 %) and Trostianets (–3.29 %) districts. But in other areas of the region, the prevalence of rheumatoid arthritis grew at a much higher rate, especially among the residents of Velyka Pysarivka (by 61.58 %) and Yampil' (by 63.07 %) districts.

In addition to arthrosis and arthritis, a significant place in the morbidity structure of population of the Sumy region is occupied by salt arthropathies – the diseases resulting from disorders of salt metabolism in the joints. These diseases are often a secondary manifestation of another disease, and it can be caused by a violation of the general metabolism, infection, inflammation, and the like.

During the selected observation period, both the primary morbidity and the prevalence of saline arthropathy among the residents of the region were increased, incl. primary morbidity – by 96.63 %, and prevalence – by 100.44 %. If in 2005 in four districts of the region (Krolevets, Lebedyn, Putyvl', Seredyna-Buda) these pathologies were not recorded at all, then in 2016 they were already identified in all districts of the region, except the Buryn' dis-

tract. The rates of primary morbidity by saline arthropathies were increased highest in the Romny, Okhtyrka and Velyka Pysarivka districts; for these same districts, as well as for Lebedyn, the fastest increase of the prevalence of saline arthropathies are also characteristic (Fig. 5).

In 2016, the salt arthropathies were most common among the residents of the Romny district (310.45 cases per 100 thousands of people), whereas among the residents of the Krasnopillia district they were the least prevalenced (59.13 cases per 100 thousands of people), that is, the "best" and "worst" by morbidity districts were differed more than five times. The highest rates of primary morbidity for 2016 by nosologies of this group recorded among the population of Yampil' district (53.92 cases per 100 thousand people).

The leading place in the structure of saline arthropathies is the gouty arthropathy. The gout is inflammatory arthritis resulting from the accumulation of sodium monourate crystals in synovial fluid and other body tissues and is associated with hyperuricemia (elevated serum uric acid levels up to 408 mmol/l), as well as limited dissolution of this acid at physiological temperature and pH levels (Podagra, 2017). In various regions of the world, from 0.3 to 4.2 % of the population are suffering

from gout. The morbidity by gout is 5–50 cases per 1,000 men and 1–9 per 1,000 women, that is, the ratio of men and women with gout is 7:1. In Ukraine, the prevalence of gout is 0.4 % of the all adult population, and hyperuricemia – 15–20 %. The number of new cases of gout per year is 1–3 per 1,000 men and 0.2 per 1,000 women.

In 2016, in the Sumy region the most patients with gout were registered in Konotop (203.63 diseases per 100 thousands of people), Hlukhiv (227.67) and Romny (310.45) districts; suffered less from it in Putyvl' (50.25) and Krasnopillia (59.13 cases of disease per 100 thousands of people) districts. For the years 2005–2016, the greatest increase of the primary morbidity by this nosological form was noted in Krasnopillia, Konotop and Okhtyrka districts. If in 2005 the inhabitants did not sick by gout in the Krolevets, Lebedyn, Putyvl' and Seredyna-Buda districts, in 2016 only in one district (Buryn'). In the six districts of the region, during the study period, there was a decrease of the primary morbidity by gouty arthritis, however, in most administrative units of the region there are a significant increasing of the population morbidity by gout, which reached by 3.5–5 times in Yampil', Krasnopillia, Konotop and Okhtyrka districts (Fig. 5).

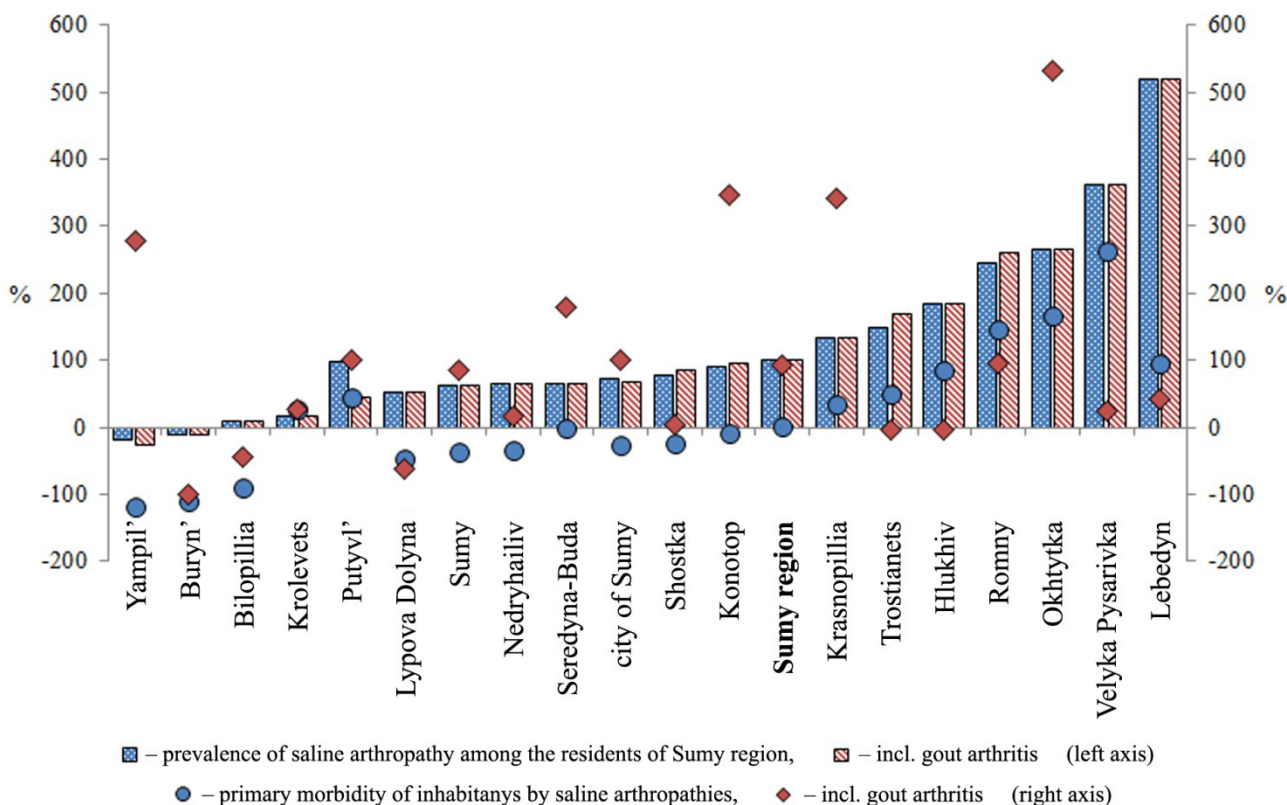


Fig. 5. Growing (decreasing) of the diseases prevalence and primary morbidity of population of the administrative units of Sumy region by saline arthropathies during 2005–2016 (%) (Source: Dovidnyk, 2017)

A significant place in the structure of diseases of the musculoskeletal system is occupied by dorsopathies and spondylopathies, which are un-

derstood to mean degenerative-dystrophic diseases of the spine or paravertebral spinal tissues (kyphosis, lordosis, scoliosis, osteochondrosis of the spine,



spondylylosis, torticour, etc.). Dorsopathies are diagnosing among people of different age groups and have a steady tendency to increase of their prevalence.

According to the international classification, there are three types of spinal dorsopathy (Classification, 2017, Dorsopatija, 2017): a) the deforming dorsopathy, which begins with changes in the height and shape of the intervertebral discs. This affects to the state of the vertebrae, the shape of which changes (deforms), as a result of which is formed the curvature of the spine with pinching of the roots of the spinal cord; b) the vertebrogenic dorsopathy (spondylopathy) – pathological changes directly in the vertebrae, without involving the intervertebral discs, accompanied by inflammatory changes in the paravertebral tissues (ligaments and muscles); c) the discogenic dorsopathy – is characterized by pronounced changes in the properties of the cartilage of the intervertebral disc with the formation of protrusions and hernias. According to its localization, there are dorsopathies of different parts of the spine: cervical, thoracic, lumbar and polysegmental dorsopathy, when the disease affects all parts of the spine. The latter is the most severe form of this pathology.

The percentage of lesions of the intervertebral discs is 1.2 % of the total nosological class the diseases of the musculoskeletal system and connective tissue. During 2005–2016 both the prevalence of diseases and primary morbidity of these lesions increased from 40.6 and 6.62 cases per 100 thousands of people to 104.04 and 11.61 cases per 100 thousands of inhabitants respectively. Among districts, the highest prevalence of lesions of the intervertebral discs are observed among the residents of Buryn' – 686.22 cases per 100 thousands of people (and this pathology was not recorded in this district in 2005), Okhtyrka (420.62) and Konotop (324.97) district. Among the population of Krasnopillia (34.78), Konotop (35.74) and Seredyna-Buda (42.03) districts the highest primary morbidity of the population by this disease are observed.

As an example of the geographical differences of spread of the spondylopathies among the residents of Sumy region, we studied the prevalence and primary morbidity of population of the region by one of them – ankylosing spondylitis. During the study period, the primary morbidity and prevalence of this disease among the residents of region increased from 1.31 and 18.63 cases per 100 thousands of people in 2005 to 3.69 and 42.3 cases per 100 thousands of inhabitants in 2016 respectively. The morbidity by ankylosing spondylitis has a significant geographical polarization. In 2016, among the residents of Bilopillia, Buryn', Krolevets, Nedryhailiv, Putyvl', Seredyna-Buda and Trostianets

districts, this pathology was not detected at all, while in other areas of the region this disease was diagnosed, and most of all in Sumy district (15.97 cases per 100 thousands of people) (Fig. 6). Ankylosing spondylitis is the most common among the population of Nedryhailiv (60.81) and Romny (64 diseases per 100 thousands of inhabitants) districts, and the least among the residents of the Seredyna-Buda district (12.01 cases per 100 thousands of people).

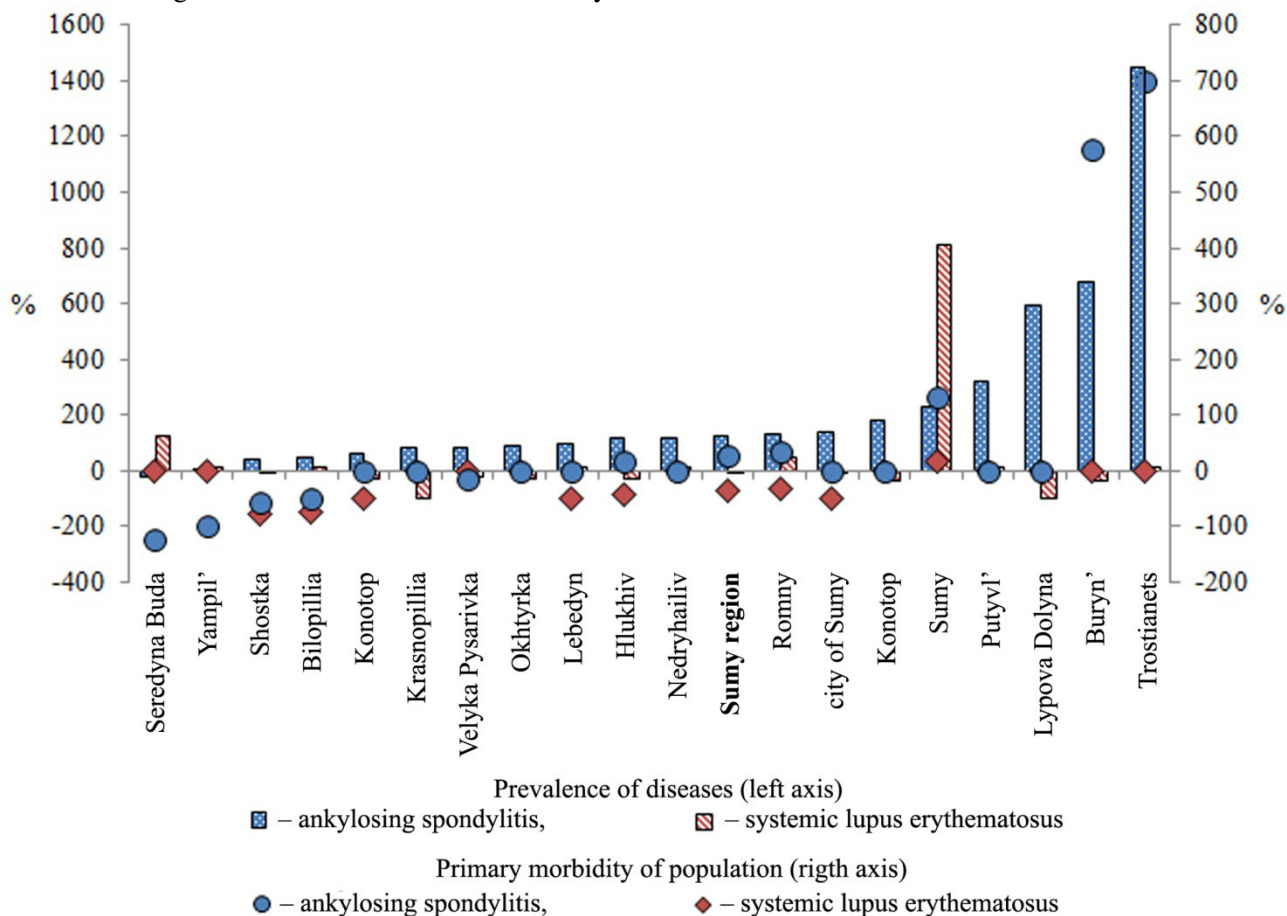
Another pathology, that affecting the musculoskeletal system of residents both Ukraine and the Sumy region is osteo-articular tuberculosis (OAT), the prevalence of which is growing. The lack of specialists in the field for its treatment complicates not only the early diagnosis, but also the tactics of further qualified treatment of already found the OAT (Golka, 2005). Because of this, the percentage of patients with OAT in the overall morbidity structure of the population of Ukraine with tuberculosis reached to 17.1 % (Dolynska, 2015). If we consider only extrapulmonary tuberculosis in the CIS countries, bone and joint lesions in its structure are ranged from 20.8 to 48.6 %, and the proportion of newly diagnosed, neglected and complicated forms reaches to 52.7–80.0 %. This pathology is diagnosing extremely poorly (for it there is no method like that used for timely detection of patients with respiratory organs tuberculosis – fluorography). This leads to long and difficult, and most often – surgical treatment and high patient disability (Golka 2013). In recent years, a shift of the maximum morbidity rate to a younger age has occurred – people of working age are often suffering from OAT. In Ukraine, among the extrapulmonary localizations of tuberculosis, the tuberculosis of bones and joints with a percentage of 45.5 % takes the first place. In this case, is most often affected the spine (45 % of cases), hip and knee joints (20 % each).

In the Sumy region during 2010–2017 there are 169 cases of osteo-articular tuberculosis were registered. Most often, this pathology affects the residents of Shostka district (51 cases) and the inhabitants of the city of Sumy (36 cases). In 2017, only in 6 districts of the region, there were no new cases of morbidity by OAT (Lebedyn, Krasnopillia, Putyvl', Romny, Seredyna-Buda and Trostianets).

Another group of diseases belonging to the nosologies of the musculoskeletal system is systemic connective tissue diseases. Among these diseases, the systemic lupus erythematosus (SLE) is most often diagnosed among the population of Sumy region. It is a disease that develops on the basis of the genetically determined imperfection of immunoregulatory processes, which leads to formation of a multitude of antibodies to its own cells and their

components, and the emergence of immunocomplex inflammation. The consequence of this inflammation is the defeat of many organs and systems. In addition to the genetic factor, SLE can be caused by

chemical and physical factors (drug use, hair staining, exposure to UV-radiation, smoking; dietary and infectious factors) (Kovalenko, 2010).



**Fig. 6.** Growing (decreasing) of the diseases prevalence and primary morbidity of population of the administrative units of Sumy region by the ankylosing spondylitis and the systemic lupus erythematosus during 2005–2016 (%) (Source: Dovidnyk, 2017)

In the EU countries, the annual morbidity by lupus erythematosus is 3.3–5 cases per 100 thousands of people, and in the United States from 1.6 to 7.6 cases per 100 thousands of people (Kovalenko, 2010); a women of reproductive age most often suffering from it. It is worth noting that in 2016 in the Sumy region, cases of newly registered the SLE were recorded only in the city of Sumy and Shostka district, although for the period 2005–2016 in the city of Sumy, the primary morbidity of lupus erythematosus decreased by 30.19 %. In general, in the region during the study period the primary morbidity of the population by this pathology was also decreased (by 67 %) and in most regions it is not diagnosed today. But the prevalence of the lupus erythematosus among the population of the region decreased by only 0.5 %, while in Bilopillia, Lebedyn, Nedryhailiv, Putyvl', Romny, Seredyna-Buda, Sumy, Trostianets and Yampil' districts it increased. The leader in the growth of the prevalence of this pathology among residents is the Sumy district (from 1.58 in 2005 to 14.37 cases per 100 thousands of population in 2016). The top five administrative units with the highest

prevalence of the SLE include Trostianets (14.16), Sumy (14.37), Nedryhailiv (16.22), Lebedyn (19.54) districts and the city of Sumy (20.39 cases per 100 thousands of inhabitants).

Summing up, we can be said, that the analysis of the prevalence of diseases and primary morbidity of the population of Sumy region by diseases of the musculoskeletal system and connective tissue is showed a significant polarization of these indicators in the context of administrative units of the region. Moreover, for the same nosologies, the morbidity rates of population and the prevalence of diseases rates in the same districts may differ significantly (Fig. 7, 8). For example, in Okhtyrka district there is a very high level of primary morbidity of the population by deforming arthrosis, however, the prevalence of this disease (Fig. 8) among local residents is at the average level for the Sumy region. On the other hand, among the residents of the Nedryhailiv district there is the high prevalence of ankylosing spondylitis (the highest in the region), but at the same time the lowest primary morbidity by this nosology is according at the end of 2016.

	Primary morbidity (cases per 100 thous. of people)	arthritis and other inflammatory polyarthropathies of them rheumatoid arthritis	Saline arthropathies of them gouty arthropathies	Arthrosis of them deforming arthrosis	Systemic lupus erythematosus Ankylosing spondylitis	Defeats of intervertebral discs of the cervical and other departments	Other dorsopathies and spondylopathies				
Okhtyrka	2502,22	71,22	22,85	16,13	16,13	454,22	400,46	0	2,69	21,5	1001,16
Shostka	3053,86	292,45	19,36	18,34	18,34	654,18	547,19	1,02	5,09	9,17	557,38
Konotop	2142,66	100,57	30,75	24,1	24,1	303,36	221,08	0	4,16	35,74	671,55
city of Sumy	3130,47	70,8	17,79	17,05	15,57	497,09	353,64	0,74	4,08	2,97	971,58
Lypova Dolyna	3163,16	247,37	21,05	5,26	5,26	610,53	278,95	0	5,26	0	878,95
<b>Sumy region</b>	<b>2523,98</b>	<b>94,68</b>	<b>22,23</b>	<b>15,75</b>	<b>15,39</b>	<b>410,33</b>	<b>297,37</b>	<b>0,27</b>	<b>3,69</b>	<b>11,61</b>	<b>736,32</b>
Yampil'	1397,7	161,75	41,47	53,92	53,92	128,57	74,65	0	4,15	24,88	663,6
Krasnopillia	2365,05	38,26	20,87	13,91	13,91	441,71	271,29	0	3,48	34,78	716,47
Sumy	1106,46	81,43	65,46	17,56	17,56	231,51	110,17	0	15,97	17,56	471,01
Trostanets	2555,1	110,48	19,83	17,00	17,00	164,3	133,14	0	0	14,16	1260,55
Bilopillia	2756,24	27,76	11,9	7,93	7,93	519,52	410,46	0	0	0	555,21
Buryn'	2246,16	239,38	11,97	0	0	343,11	307,2	0	0	11,97	1025,33
Romny	2271,21	42,21	19,06	17,7	17,7	416,66	375,81	0	4,08	0	302,28
Seredyna-Buda	2389,96	24,02	0	18,01	18,01	510,42	90,07	0	0	42,03	234,19
Krolevets	3374,82	39,06	5,21	2,6	2,6	434,87	320,3	0	0	5,21	1083,28
Nedryhailiv	2546,01	32,43	24,32	4,05	4,05	518,93	340,55	0	0	12,16	624,34
Putyvl'	2917,85	50,25	21,53	10,77	10,77	330,19	107,67	0	0	14,36	556,29
Velyka Pysarivka	1728,23	41,27	15,48	10,32	10,32	325,01	288,9	0	5,16	0	665,5
Hlukhiv	2379,06	90,01	21,18	10,59	10,59	240,02	146,49	0	1,76	0	594,77
Lebebyn	1105,01	17,37	13,03	4,34	4,34	154,14	71,64	0	0	4,34	429,85

Fig. 7. Territorial differentiation of primary morbidity of population of the Sumy region by diseases of the osteo-muscular system and connective tissue (Source: Dovidnyk, 2017)

	Prevalence of diseases (cases per 100 thous. of people)	arthritis and other inflammatory polyarthropathies of them rheumatoid arthritis	Saline arthropathies of them gouty arthropathies	Arthrosis of them deforming arthrosis	Systemic lupus erythematosus Ankylosing spondylitis	Defeats of intervertebral discs of the cervical and other departments	Other dorsopathies and spondylopathies				
Nedryhailiv	9636,75	522,99	332,4	166,2	166,2	3348,7	2691,96	16,2	60,81	60,81	3433,88
Romny	9185,6	663,12	332,2	310,5	310,5	3954,2	3545,7	6,81	64	0	846,94
Buryn'	13860	793,94	327,2	63,83	63,83	3554,8	3123,88	3,99	47,88	686,22	6606,82
city of Sumy	10043,8	521,19	311,4	155,3	150,5	2633,7	2307,54	20,4	50,04	47,45	4182,11
Konotop	6900,88	576,8	324,1	203,6	203,6	2963,8	2667,1	7,48	40,73	324,97	1588,29
Okhtyrka	10104,3	560,38	307,7	196,2	196,2	2659,5	2347,68	8,06	24,19	420,62	2869,08
Trostanets	9438,56	623,19	348,4	170	170	2022,6	1665,63	14,2	42,49	17	3733,5
<b>Sumy region</b>	<b>8617,24</b>	<b>567,11</b>	<b>313,7</b>	<b>168,5</b>	<b>166,4</b>	<b>2733,5</b>	<b>2342,26</b>	<b>11,9</b>	<b>42,3</b>	<b>104,04</b>	<b>2653,31</b>
Lypova Dolyna	12115,8	647,37	300	89,47	89,47	4363,2	2410,53	0	31,58	0	3105,26
Shostka	7347,82	779,51	303,7	189,5	189,5	2770,6	2466,93	12,2	47,89	27,51	1498,91
Hlukhiv	8153,76	571,82	284,2	227,7	227,7	3072,7	2364,94	3,53	40,59	0	2045,5
Velyka Pysarivka	5953,36	619,07	412,7	154,8	154,8	2703,3	2512,38	10,3	15,48	0	1207,18
Krolevets	8661,01	575,49	281,2	114,6	114,6	2515,5	2197,8	7,81	26,04	44,27	2739,44
Lebedyn	6067,78	462,41	301,8	165	165	2424,9	2066,73	19,5	26,05	17,37	1597,81
Putyvl'	8200,84	513,23	412,7	68,19	50,25	2515,9	1894,99	10,8	39,48	39,48	1607,87
Sumy	5414,17	463,02	306,6	159,7	159,7	1558,3	1314,02	14,4	52,69	22,35	2618,47
Yampil'	5250,72	584,8	290,3	211,5	190,8	1999,1	1725,35	4,15	37,33	24,88	1613,37
Krasnopillia	8468,98	323,46	250,4	59,13	59,13	2744,2	2264,19	0	52,17	90,43	2865,89
Seredyna-Buda	7055,79	666,55	294,2	96,08	96,08	2305,9	1267,04	12	12,01	96,08	1074,88
Bilopillia	9789,61	406,5	305,4	63,45	63,45	2296,2	2127,66	7,93	15,86	11,9	1957,13

Fig. 8. Territorial differentiation of the prevalence of diseases of the musculoskeletal system and connective tissue among the residents of the Sumy region (Source: Dovidnyk, 2017)

**Conclusions.** The study of primary morbidity and prevalence of diseases of the osteo-muscle system and connective tissue among the inhabitants of Sumy region during 2005–2016 showed an increase the prevalence of diseases of this nosological class by 11 % and a decline of primary morbidity of the population by 6.5 %. Among the factors contributing to the prevalence of diseases of the musculoskeletal system and connective tissue, are an increase of the percentage of people who older than workable age, genetic factors, reducing of motion activity, low quality of life. Also, they include malnutrition (with scarce of calcium, silicon, aminoacids), trauma, obesity, mistakes of diagnosis of the diseases, untimely treatment and rehabilitation.

The most common nosological forms in the structure of diseases of the osteo-muscle system and connective tissue among the population of Sumy region are arthrosis, dorsopathies and spondylopathies, arthritis, including rheumatoid arthritis. For the year 2005–2016, the primary morbidity of the inhabitants has grown in nine administrative units. This is a rather negative trend, given that the pathology of the musculoskeletal system and the connective tissue in the structure of disability are occupy the second place and affecting to the working-age population. It does not contribute to the socio-economic development of the region. Studying the factors of morbidity, as well as the tendencies of diseases prevalence and the complex approach to the active detection and treatment of residents with diseases of the musculoskeletal system will reduce the level of primary morbidity and prevalence of diseases and reduce the degree of further disability of the population.

However, the comparison of our results and calculations with the results of investigations of level of the orthopedic and traumatic health care services for population of the region (Schyschuk, 2016) showed the geographical imbalances between the level of morbidity of the population by diseases of the osteo-muscle system and connective tissue, and the level of organization of the specialized medical and orthopedic services. The largest number of primary patients with the nosologies of orthopedic profile are recorded in Okhtyrka, Shostka and Konotop districts; the highest prevalence of diseases of this class we observe among the inhabitants of Nedryhailiv, Romny and Buryń districts, however, the best providing by orthopedic hospital beds is in Trostianets (5.56), Hlukhiv (5.22) and Bilopillia (4.91 beds per 10 thousand people) districts. Moreover, there are no orthopedist doctors in the many administrative units of the region. For example, in the Seredyna-Buda, Velyka Pysarivka, Nedryhailiv and Yampil' districts in the state of the medical staff is no orthopedists. The average re-

gion's providing of population by the hospital beds of this profile is 2.76 per 10 thousands of people, that is lower than the general Ukrainian figure – 2.91. There are no orthopedic hospital beds in some areas, in particular in the hospitals of Velyka Pysarivka, Krasnopillia, Lypova Dolyna, Nedryhailiv, Seredyna-Buda and Yampil' districts, and consequently their population is not provided with the proper level of specialized orthopedic health care.

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