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RETROSPECTIVE ANALYSIS OF THE MAIN EPIDEMIOLOGICAL INDICATORS OF TUBERCULOSIS IN IVANO-FRANKIVSK REGION DURING 2011-2021

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Abstract. The diagnosis and treatment of tuberculosis have changed over the past few years. Tuberculosis remains the leading infectious cause of death worldwide, while drug-resistant tuberculosis poses a significant threat to the population. The epidemiological situation on tuberculosis in Ukraine has experienced stabilization of some indicators in recent decades. It remains, however, tense and predictably unfavorable as the indicators are continuously exceeding the epidemic threshold.

The aim of the research: to analyze the epidemiological situation on tuberculosis in Ivano-Frankivsk region during 2011-2021.

Materials and Methods. When writing this article, official sources, including the assessment of the indicators in Ukraine from the analytical and statistical reports of the Public Health Center of the Ministry of Health of Ukraine were analyzed and studied. We performed a retrospective cohort analysis. Data regarding the region were obtained from the annual reports of the Ivano-Frankivsk Regional Phthisiopulmonological Center of Ivano-Frankivsk Regional Council.

Results. Despite the reduction in all key epidemiological indicators, the situation on tuberculosis in Ivano-Frankivsk region remains tense. During 2011-2021, the incidence of pulmonary tuberculosis (new cases + recurrent cases) gradually reduced by 59%. Tuberculosis mortality rate reduced from 10.9 cases per 100,000 population in 2011 to 3.3 cases per 100,000 population in 2021. We share the leading Ukrainian scientists' opinion that the indicators of TB incidence exceed the epidemic threshold despite the reduced number of new cases. Considering the global Covid-19 pandemic and the martial law in Ukraine, one should not expect positive epidemiological changes in the next few years [3, 12, 13]. The identification of destructive TB forms, indicating late diagnosis and more advanced disease stage, helps us to understand this situation. From 2016 to 2021, the incidence of destructive TB forms increased from 34.3% to 56.0% of all pulmonary TB cases, while the proportion of cavity formation was almost the same (24-27%) during 2011-2015.

During 2011-2021, the incidence of tuberculosis among the rural population ranged from 2% to 20%, being higher as compared to urban residents. During 2011-2014, the incidence of tuberculosis and HIV/AIDS co-infection increased from 2.2 to 4.1 cases per 100,000 population, reducing to 1.0 case per 100,000 population by 2021. The incidence of extrapulmonary tuberculosis reduced from 5.4 to 2.7 cases per 100,000 population, possibly due to inadequate diagnosis, reforms, and the coronavirus infection. During 2014-2021, the incidence rate of tuberculosis among all the healthcare workers in Ukraine reduced from 6.7 to 1.47 cases per 10,000 healthcare workers. However, during 2014-2018, the indicators ranged from 6.7 to 5.6 cases per 10,000 healthcare workers. During 2013-2020, the incidence rate of newly diagnosed multidrug-resistant tuberculosis, including extensively drug-resistant tuberculosis, reduced by 177 cases, or from 260 to 49 patients.

Conclusions. Over the past 10 years, there has been a slight reduction in the incidence of all active tuberculosis forms. However, they remain above the epidemic threshold, i.e., the tuberculosis epidemic has stabilized. Assessing the situation in our country, no positive changes in the tuberculosis epidemic in the coming years should be expected. The awareness of TB knowledge among all the population segments and control of TB situation during the period of healthcare reforms in Ukraine, according to which the anti-tuberculosis service is being reorganized, restructured, and reformed, are advisable.

Keywords: tuberculosis, incidence rate, mortality, co-infection.

Introduction. Despite a downward trend in the incidence of tuberculosis (TB), global challenges, and emerging diseases, this infectious disease remains a threat to public health. For a number of reasons, TB control and health sector reforms over the past 10 years have failed to

achieve their goals. According to the dynamics of TB indicators in 2021, it will, predictably, be difficult to achieve an 80% reduction in the number of new TB cases and a 90% reduction in TB deaths by 2030 [1]. However, some positive changes have taken place over the past decade:

modern diagnostic methods and changes to the treatment of drug-resistant TB have yielded successful outcomes and a shorter treatment duration [4, 8].

According to the Ministry of Health of Ukraine, in 2021, the incidence of TB among children at the age of 14 years or younger increased by 25.4%, while the cumulative incidence of newly diagnosed TB (including recurrent TB) cases was 44,000 per 100,000 population [5-7, 9-11]. Despite the reduction in TB indicators, the epidemiological situation on TB in Ukraine remains tense.

The aim of the research: to analyze the epidemiological situation on TB in Ivano-Frankivsk region during 2011-2021.

Materials and Methods. When writing this article, official sources, including the analytical and statistical reports of the Public Health Center of the Ministry of Health of Ukraine and the annual reports of the Ivano-Frankivsk Regional Phthisiopulmonological Center of Ivano-Frankivsk Regional Council were studied and analyzed.

Results. The analysis of the incidence of active TB, including recurrent TB, during 2020-2021 showed that it has not almost changed: in 2020, the rate was 29.2 cases per 100,000 population and in 2021, it was 30.0 cases per 100,000 population.

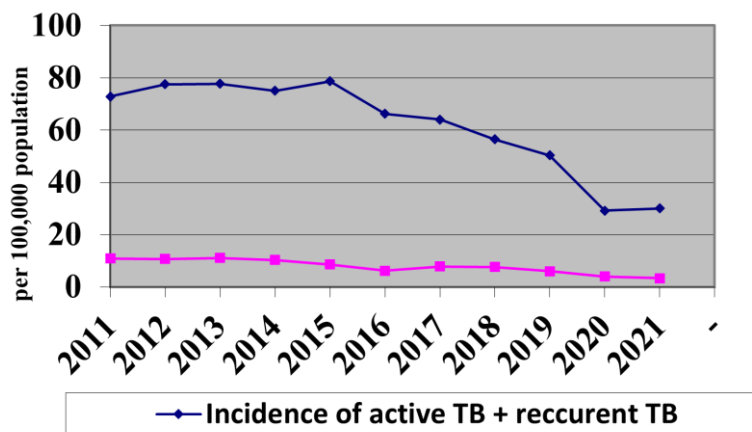


Figure 1 reflects TB incidence and mortality.

During 2011-2021, TB mortality rate reduced from 10.9 to 3.3 cases per 100,000 population. Significant changes were observed in the incidence rate of active and recurrent TB – it reduced by 59.0%, or from 72.8 to 30 cases per 100,000 population.

We share the leading Ukrainian scientists' opinion that the indicators of TB incidence exceed the epidemic threshold despite the reduced number of new cases. Considering the global Covid-19 pandemic and the martial law in Ukraine, one should not expect positive epidemiological changes in the next few years [3, 12, 13].

The identification of destructive TB forms, indicating late diagnosis and more advanced disease stage, helps us to understand this situation. From 2016 to 2021, the incidence of destructive TB forms increased from 34.3% to 56.0% of all pulmonary TB cases, while the proportion of cavity formation was almost the same (24-27%) during 2011-2015.

The analysis of changes in the indicators of TB incidence among the rural and urban populations demonstrated a downward trend in the number of cases.

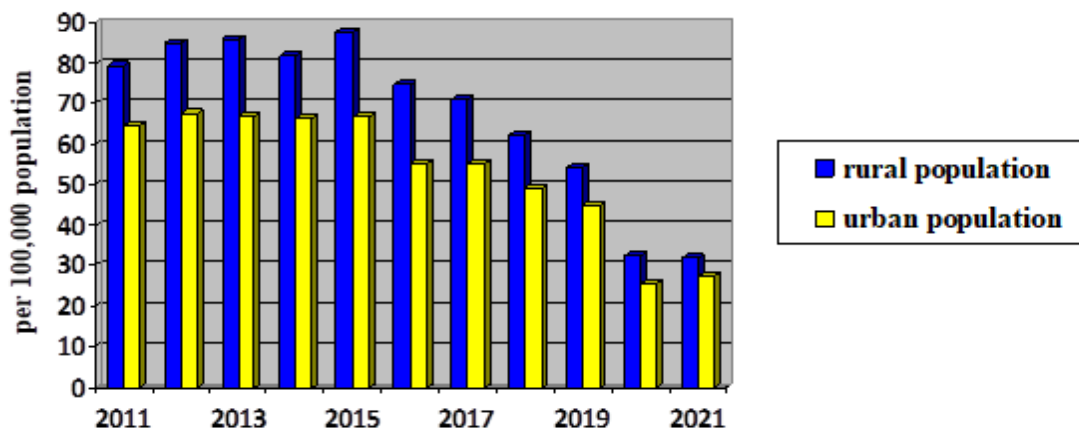


Fig. 2. Incidence of active and recurrent TB among the rural and urban populations.

In 2021, however, the incidence of TB among the urban population increased from 25.5 to 27.5 cases per 100,000 population, or by 7.8% (Figure 2).

Higher TB incidence among the rural population is due to various factors, including limited access to healthcare services because of the remoteness of villages,

the impossibility of complete medical examination at the place of residence, and lack of awareness about TB.

Extrapulmonary TB accounts for 10-15% of all TB cases. According to the reforms, narrow specialists in diagnosis and treatment focus on this TB type. The complex diagnostic process requires significantly wider range of detection methods to be involved, including biopsy,

which is sometimes the only way to verify the diagnosis. Accurate X-ray analysis allows for studying the features of visualizing the process in patients at high risk, even with no locus morbi in the lungs. The lymphatic system, central nervous system, kidneys, and musculoskeletal system are most common sites affected.

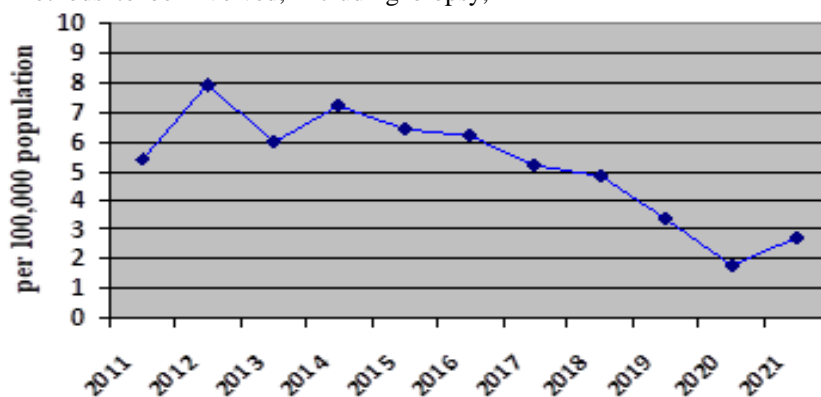


Fig. 3. Incidence of extrapulmonary TB.

Reduction in extrapulmonary TB incidence rate from 5.4 to 2.7 cases per 100,000 population (Figure 3) may be due to really reduced number of cases, as well as to some other reasons, including inadequate diagnosis and the coronavirus infection, with its policy of neglecting other diseases. Improving awareness level about TB and its diagnosis by narrow specialists and general physicians may enhance the level of detecting extrapulmonary TB among high-risk groups.

TB remains one of the leading causes of death among people living with HIV/AIDS. As there is a significant proportion of smear-negative TB cases and an increase in the incidence of extrapulmonary TB among people with HIV/AIDS, diagnosis of co-infection remains difficult. The World Health Organization (WHO) End TB Strategy aims to end the global TB pandemic by 2050, using modern rapid detection methods. However, not all patients with HIV/AIDS have access to modern molecular diagnostic methods.

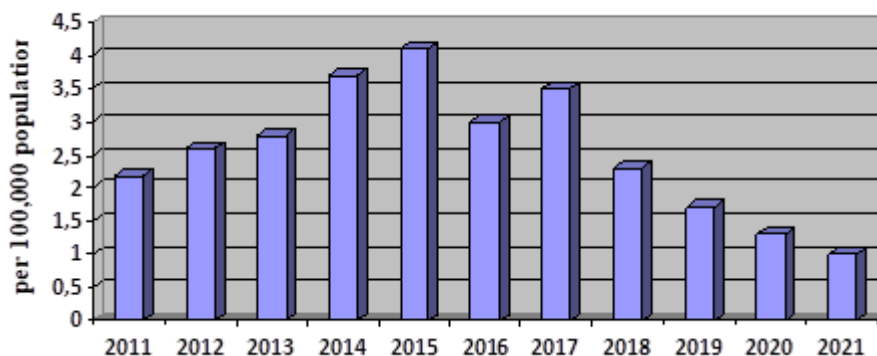


Fig. 4. Incidence of active TB and HIV/AIDS co-infection per 100,000 population.

According to the diagram, the incidence of TB and coexistent HIV/AIDS reduced. During 2011-2014, the incidence of TB and HIV/AIDS co-infection increased from 2.2 to 4.1 cases per 100,000 population, while by 2021, it reduced to 1.0 case per 100,000 population. HIV/AIDS co-infection, however, remains one of the major public health problems worldwide. Having analyzed international authors' publications, we can say that there is an urgent need for highly sensitive tests, search for new biomarkers and their implementation in practice.

The incidence rate of TB among healthcare workers should be considered as well. There are no stable indicators as data fluctuate significantly. During 2014-2021, the incidence rate of TB among all the healthcare workers in Ukraine reduced from 6.7 to 1.47 cases per 10,000

healthcare workers. However, during 2014-2018, the indicators ranged from 6.7 to 5.6 cases per 10,000 healthcare workers. TB incidence among healthcare professionals may be due to direct contact with patients who have still undiagnosed TB and lack of TB prevention measures among healthcare workers.

A significant proportion of Ukrainian scientists believe that multidrug-resistant TB develops for a number of reasons: free sale of antibiotics, no confidence in the quality of anti-TB drugs, imperfect strategy for TB control, late diagnosis and treatment of TB, failure to follow infection control procedures. Moreover, the patient's social status, bad habits, and adherence to treatment should be considered as well.

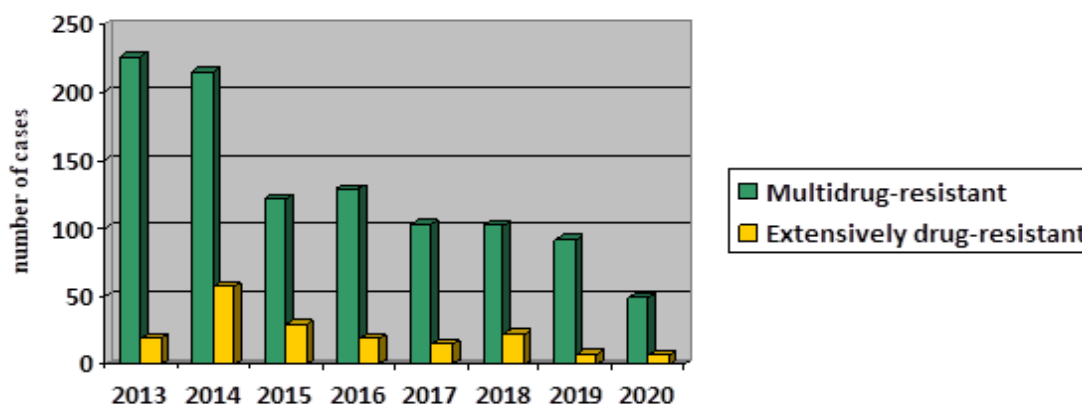


Fig. 5. Incidence rate of newly diagnosed multidrug-resistant TB (including extensively drug-resistant TB) cases.

Figure 5 shows that during 2013-2020, the incidence rate of newly diagnosed multidrug-resistant TB, including extensively drug-resistant TB, reduced by 177 cases, or from 260 to 49 patients.

Conclusions. Over the past 10 years, there has been a slight reduction in the incidence of all active TB forms. However, they remain above the epidemic threshold. The TB epidemic has stabilized, but we expect the Covid-19 pandemic and the processes associated with introducing the martial law in Ukraine on February 24, 2022 to leave their mark. Positive changes in the epidemiological situation on TB in Ivano-Frankivsk region may occur only in case of improved funding, further implementation of modern diagnostic and therapeutic methods. The awareness of TB knowledge among all the population segments and control of TB situation during the period of healthcare reforms in Ukraine, according to which the anti-tuberculosis service is being reorganized, restructured, and reformed, are advisable.

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РЕТРОСПЕКТИВНИЙ АНАЛІЗ ОСНОВНИХ ЕПІДЕМІОЛОГІЧНИХ ПОКАЗНИКІВ ПО ТУБЕРКУЛЬОЗУ В ІВАНО-ФРАНКІВСЬКІЙ ОБЛАСТІ В РОЗРІЗІ 2011-2021 РР

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Резюме. Мета. Аналіз епідеміологічної ситуації в Івано-Франківській області у 2011-2021 рр.

Матеріали і методи. При написанні наукової статті нами було проведено ретроспективний когортний аналіз, опрацьовані дані ресурсів аналітично-статистичних матеріалів Центру громадського здоров'я МОЗ України, річних звітів КНП «Івано-Франківський

обласний фтизіопульмонологічний центр Івано-Франківської обласної ради».

Результати. На території Івано-Франківської області ситуація з туберкульозом продовжує залишатись доволі складною, незважаючи на позитивну динаміку зниження всіх основних епідеміологічних показників. Захворюваність на туберкульоз легень (нові випадки + рецидиви) характеризується поступовим зменшенням на 59 % за період 2011-2021 рр, а показники смертності знизились з 10,9 у 2011 р. до 3,3 на 100 тис. населення у 2021 р. Відмічалось зростання захворюваності на деструктивну форму туберкульозу з 2016 по 2021 рр – з 34,3 до 56,0 % до всього захворювань на туберкульоз легень. По області захворюваність на туберкульоз серед жителів села вища, ніж серед міських жителів та коливається в межах 2–20%. У період з 2011 по 2014 захворюваність на ко-

інфекцію зросла з 2,2 до 4,1, а до 2021 року знизилася до 1,0 на 100 тис. населення.

Висновки. Останні 10 років спостерігається незначне зниження показників захворюваності на всі форми активного туберкульозу. Однак, вони залишаються вищими від епідемічного порогу, тобто епідемія туберкульозу стабілізувалася. Якщо оцінити ситуацію в нашій країні та у світі, позитивної динаміки епідемії туберкульозу у найближчі роки не варто очікувати. Доцільно проводити інформування про туберкульоз усіх прошарків населення, взяття під контроль ситуації з туберкульозу в період реформування охорони здоров'я в Україні, відповідно до якої відбувається реорганізація, реструктуризація та реформування проти-туберкульозної служби.

Ключові слова: туберкульоз, захворюваність, смертність, ко-інфекція.

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