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**Analysis of the Epidemiological Situation of HIV/AIDS among the Population of Ivano-Frankivsk Region and Ukraine in Dynamics over 2008-2014**

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**Abstract.** The data from statistical reports of the Ministry of Health of Ukraine were analyzed in the dynamics over 2008-2014 in order to study the epidemiological situation of HIV/AIDS among the population of the Ivano-Frankivsk region compared to the rest of Ukraine. The incidence of HIV/AIDS and AIDS mortality in Ivano-Frankivsk region was established to be lower than in Ukraine in general. However, the growth rates of these indicators were considerably higher determining poor prognosis for the future. HIV infection was detected to be more spread among male and urban residents. However, higher growth rate of the indices among women, especially rural residents, allow to develop a hypothesis that the formation of the peculiarities may be affected by the late detection of pathologies due to lower access (territorial, cultural, functional, etc.) to specialized medical care. HIV/AIDS was shown to affect almost definitely people of reproductive age. At the same time, a significant spread of HIV ( $\approx 20\%$  by the prevalence and  $12\%$  by the incidence) among teenagers and young people (15-24 years) on the background of steadily growing predominant sexual transmission ( $\approx 60-70\%$  in 2014) indicate the needs to mark this cohort as target population for primary prevention of disease through correction of their risk behavior.

**Keywords:** *HIV infection; AIDS; prevalence; incidence; epidemiology.*

**Problem statement and analysis of recent research**

The incidence of the HIV has become epidemic and has been an issue of humanity over the years. In Ukraine HIV infection continues to spread and on 01.01.2015 264,489 cases were officially recorded including 75,577 AIDS cases and 35,425 deaths from AIDS-related diseases [1]. By definition of international and national experts, Ukraine belongs to the category of countries with a concentrated stage of HIV infection epidemic [4-6]. However, HIV infection prevalence and incidence rates are different in various regions of the country. The western region is relatively safer, but the growth rate of morbidity is high [1, 3, 7].

According to research HIV is more spread among men and among the urban population [1]. The social importance of the problem is that mainly workable childbearing population gets infected [1-3, 8]. This imposes significant social and economic burden on society and determines urgency and priority of disease prevention at all levels.

Therefore, in order to develop targeted prevention continuous monitoring of the epidemiological situation is important to be conducted, trends of HIV infection and AIDS mortality, especially transmission to others should be studied.

**The objective of the research was** to analyze the epidemiological situation of HIV/AIDS among the population of Ivano-Frankivsk region compared to the rest of Ukraine in dynamic over 2008-2014.

**Materials and methods of the research**

The statistical data of Ivano-Frankivsk region health care facilities ("Annual report on individuals with conditions and diseases caused by the human immunodeficiency virus (HIV)", №2-HIV/AIDS form) and statistics handbook of MOH of Ukraine in 2008-2014 were used. Epidemiology descriptive and graphical methods were applied.

### Results of the research and their discussion

As shown in Fig. 1, HIV prevalence and incidence rates in Ivano-Frankivsk region were 3-5 times lower than in the rest of Ukraine, but the dynamic of these indexes was characterized by a clear upward trend.

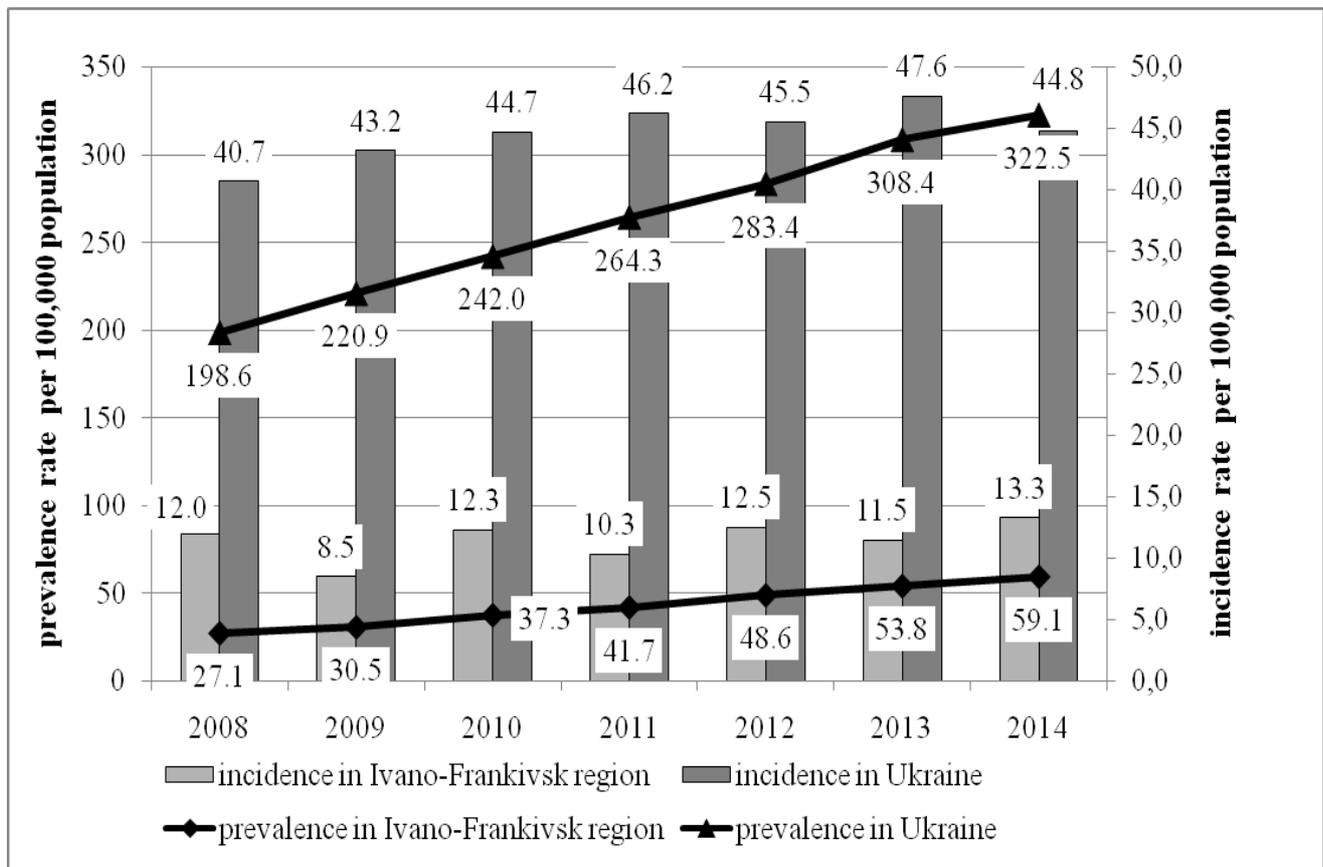


Fig. 1. HIV incidence and prevalence rates in Ukraine and Ivano-Frankivsk region over 2008-2014

Levels of HIV incidence rates in Ukraine during the same period increased from 40.7 new cases per 100,000 population in 2008 to 44.8‰ in 2014 (+10.1%). In Ivano-Frankivsk region, their levels also increased, namely from 12.0‰ to 13.3‰, and the growth rate was almost the same as in the whole country (+10.8%).

The study of gender-sensitive specifics revealed that HIV was more spread among men. In particular, during 2008-2014 in Ivano-Frankivsk region, HIV prevalence rates among men rose from 34.9 cases per 100,000 population to 72.7‰ (+108.3%). The corresponding indexes increased from 20.1‰ to 46.9‰ among women, showing an even higher growth rate (+133.3%).

Analysis of the age structure of HIV infection prevalence and incidence demonstrated the social importance of this infection. As can be seen from Table 1, the vast majority of HIV-positive (96.8-99.2%) and AIDS (92.2-97.0%) are registered among people of reproductive age, i.e. up to 50.

However, it is noteworthy that almost one in five HIV-positive was a teenager or a young person at the age of 15-24 years (22.7-19.0%) and among new cases this age group constantly constituted 12.7-12.0%.

Advanced study of the epidemiological situation based on patients' place of residence showed that the high prevalence of HIV was more typical for the urban population, where in 2008 it constituted 47.4 cases per 100,000 population in Ivano-Frankivsk region, and in 2014 - 92.0‰ (+94.1% of growth rate). Among the rural population levels of this index were three times lower (12.1‰ - 34.1‰ over the same period), but the growth rate was almost twice higher and amounted +181.8%.

Even more alarming was the dynamics of the considered indicators of AIDS (Fig. 2).

Thus, the prevalence of this disease during 2008-2014 in Ukraine increased more than by three times, from 22.5 to 77.8 cases per 100,000 population (+245,8% of growth rate) and incidence – from 9.5‰ to 22.9‰ respectively (+141,1%).

Table 1

The age structure of HIV and AIDS prevalence and incidence in Ivano-Frankivsk region in 2008 and 2014 (% of total)

Age groups	HIV				AIDS			
	Percentage of:							
	prevalence		incidence		prevalence		incidence	
	2008	2014	2008	2014	2008	2014	2008	2014
0-14 years	12.6	7.7	14.4	17.4	12.1	3.9	3.5	2.7
15-24 years	22.7	19.0	12.7	12.0	6.1	3.2	6.9	22.1
25-49 years	63.9	70.1	71.1	64.1	78.8	85.1	86.2	63.7
50 years and older	0.8	3.2	1.8	6.5	3.0	7.8	3.4	11.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

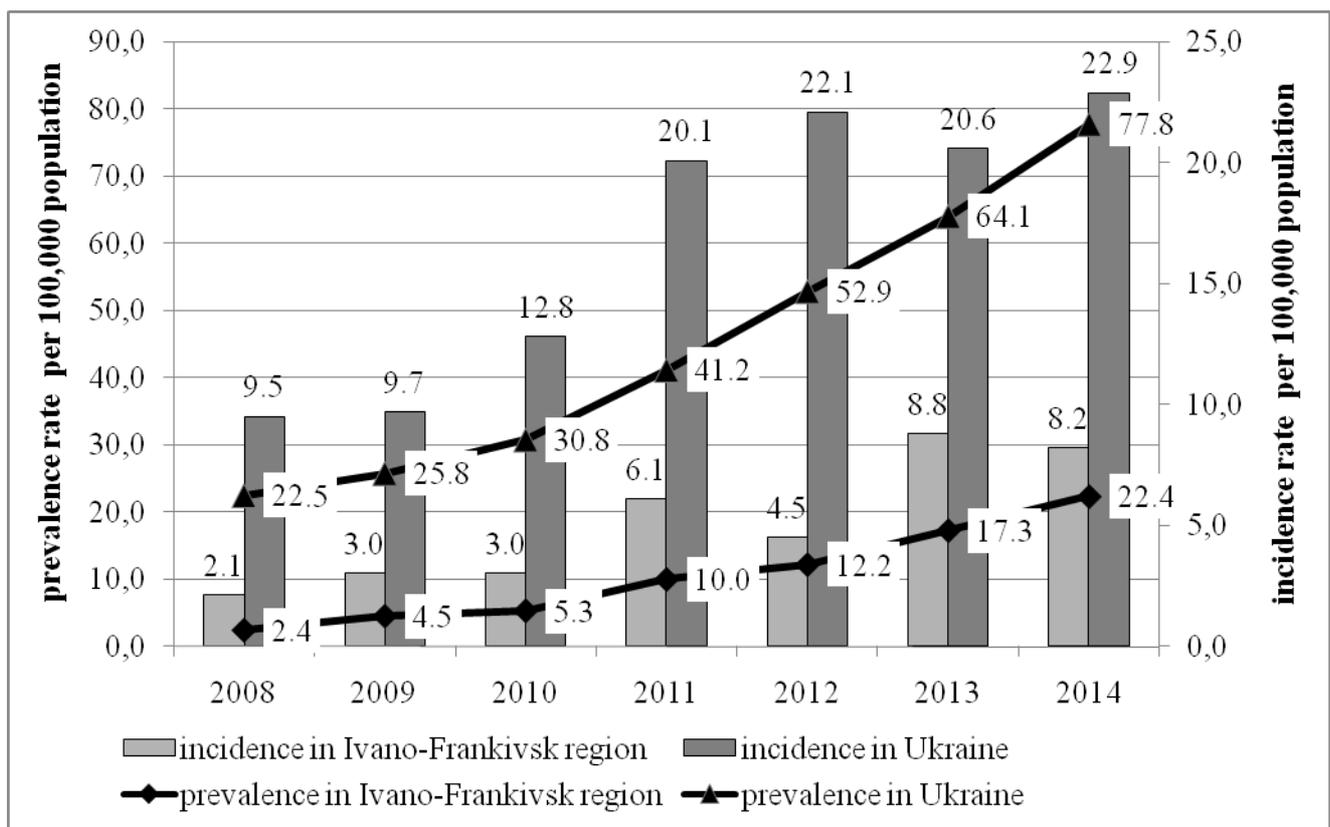


Fig. 2. AIDS incidence and prevalence rates in Ukraine and Ivano-Frankivsk region over 2008-2014

In Ivano-Frankivsk region levels of these indexes were also several times lower than in the rest of Ukraine, but their growth rates were significantly higher. In particular, the prevalence of AIDS in the region for 2008-2014 increased from 2.4 to 22.4 per 100 thousand population (+833.3%), and the incidence rate increased by 290.5% - from 2.1‰ to 8.2‰ respectively.

Death rates from AIDS were less intense, but steadily growing. As shown in Fig. 3, the death rates in Ukraine increased from 5.8 cases per 100,000 populations in 2008 to 8.0‰ in 2014 (+37.9%).

Despite lower levels than in the rest of Ukraine, deaths from AIDS in Ivano-Frankivsk region increased in the dynamics of this period of time much faster: from 1.0 to 2.9 per 100,000 populations, i. e. +190.0%. This trend indicated the existence of many health and social gaps, which affected the lifespan of HIV-positive people. These problems have to be timely identified and eliminated.

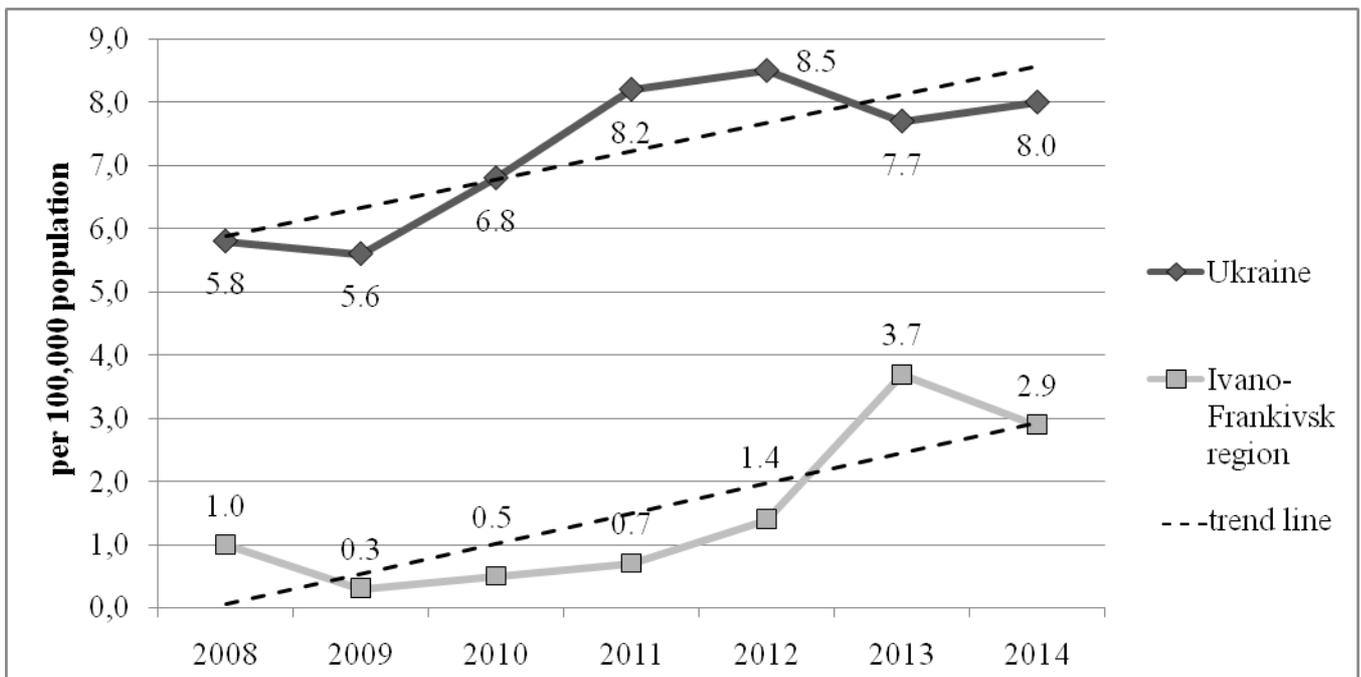


Fig. 3. AIDS death rates in Ukraine and Ivano-Frankivsk region over 2008-2014

Analyzing the epidemic situation of HIV the ways of infection are important. In their structure in Ukraine (Fig. 4) during 2008-2014 sexual way remained the leading, and its share grew from 41.9% in 2008 to 56.7% in 2014. The second most important way of infection remained parenteral one (mainly as a result of drug use), but its share in the same period decreased from 37.0% to 24.3% respectively. The percentage of children born by HIV-infected women also decreased slightly, but not significantly, from 19.2% to 18.7% for the period.

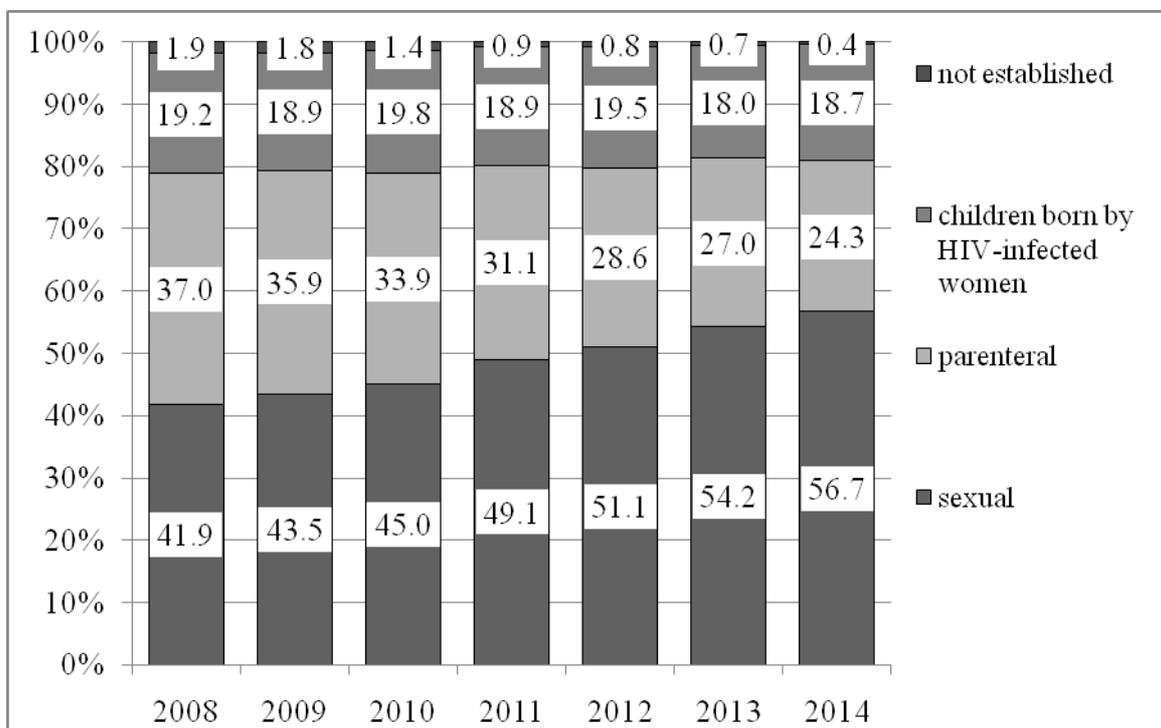


Fig. 4. Ways of HIV infecting in Ukraine during 2008-2014

Similar ways of infecting structure were observed in Ivano-Frankivsk region (Fig. 5). During 2008-2014 sexual way of infection significantly increased (from 54.8% in 2008 to 69.0% in 2014), and the proportion of parenteral way of

infection decreased more than twice (30.7% and 13.6% respectively). However, the percentage of children born by HIV-infected women, by contrast, rose (from 14.5% to 17.4%).

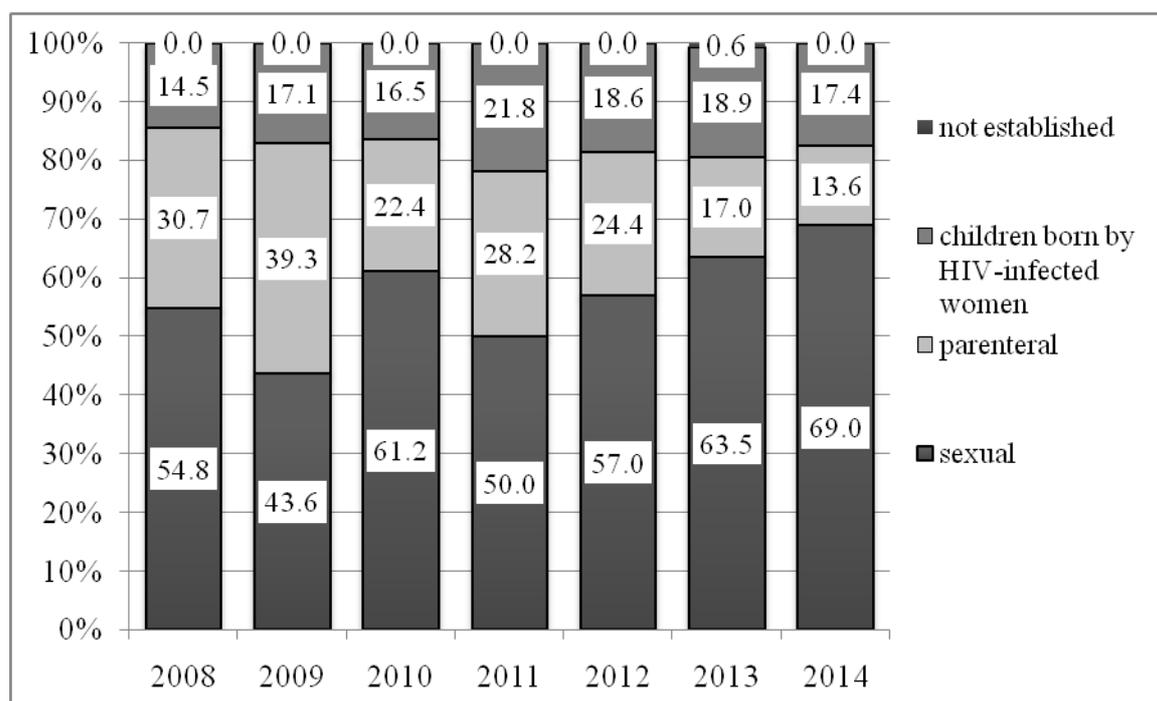


Fig. 5. Ways of HIV infecting in Ivano-Frankivsk region during 2008-2014

### Conclusions

1. The incidence of HIV/AIDS and AIDS mortality were established to be lower in Ivano-Frankivsk region than in the whole Ukraine, but the growth rates of these indicators were considerably higher determining adverse prognosis for the future.
2. HIV was revealed to be more spread among men and urban residents. However, the highest growth rate of considered indexes among the women, especially rural residents, allow to suggest a hypothesis about the possible impact on the formation of the peculiarities of pathologies late detection due to lower access (territorial, cultural, functional, etc.) to specialized medical care.
3. HIV/AIDS was shown to affect almost 100% people of reproductive age. At the same time, a significant spread of HIV infection among teenagers and young people on the background of steadily growing predominant sexual transmission indicate the needs of primary prevention of disease through correction of this target population risk behavior.

**Prospects for further research** lay in testing of suggested hypothesis and developing improved targeted measures for HIV/AIDS, especially among young people.

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