

## TREND IN THE DEVELOPMENT OF HIV EPIDEMIC IN OSH REGION OF THE KYRGYZ REPUBLIC

### MAMAEV TUGOLBAY MAMAEVICH,

Department of Public Health, Osh State University, 723500, 331 Lenin Str., Osh, Kyrgyz Republic. E-mail: mamaev\_tugolbay@mail.ru

### ABDYRAEVA BAKTYGUL RAKHMATILLAEVNA,

Department of Epidemiology, Microbiology with the Course of Infectious Diseases, Osh State University, Osh, Kyrgyz Republic. E-mail: abdyraevab@mail.ru

### BUGUBAEVA MAHABAT MITALIPOVNA,

Department of Therapeutic Disciplines, Osh State University, Osh, Kyrgyz Republic. E-mail: maha100881@mail.ru

### MUYDINOV FAZLIDIN FAYOZIDINOVICH,

Department of Public Health, Osh State University, Osh, Kyrgyz Republic. E-mail: fmuidinov@oshsu.kg

### KUBANYCHOVA ASEL KUBANYCHOVN,

Department of Epidemiology, Microbiology with the Course of Infectious Diseases, Osh State University, Osh, Kyrgyz Republic. E-mail: asel.kubanychova91@mail.ru

### DURUSBEKOV ASAN DURUSBEKOVICH

Department of Public Health, Osh State University, Osh, Kyrgyz Republic. E-mail: durusbekov.kg@gmail.com

### ABSTRACT

**Summary.** The aim of this work was to study the gender characteristics of human immunodeficiency virus (HIV) infection epidemiological process in the Osh region for the period from 2001 to 2021 years. **Methods.** Epidemiological, statistical and analytical research methods were used to evaluate trends in the development of HIV epidemic in Osh region. **Results.** In the dynamics of the HIV infection incidence, there are three interrelated and interdependent periods of HIV infection epidemic process development, which are characterized by their own epidemiological features have been identified. Women are actively involved in the epidemic process. The influence of age and gender factors on the nature of epidemic process in different periods of the HIV epidemic development has been established. **Conclusion.** New approaches to preventive measures are needed, considering the government gender policy, and should be one of the priority areas in the prevention of HIV infection.

**Keywords:** HIV infection, epidemic, epidemic process, risk factors, gender and age characteristics.

### INTRODUCTION.

According to UNAIDS for 2022 year, more than 38.4 million (33.9 million to 43.8 million) people in the world are infected with HIV, more than half (54%) of them were women, In Eastern Europe and Central Asia, the number of people living with HIV by early 2022 is estimated to have reached 1.8 million (1.7 to 2.0 million) people [1].

HIV infection in its medical and social significance occupies one of the leading places in public health. Currently, HIV infection is being branded as a global problem of mankind. The highest rate of HIV epidemic spread is observed in the commonwealth of independent state (CIS) countries [2-5].

The problem of HIV infection in recent years has affected women and children. It is known that women are especially vulnerable to HIV infection due to existing socio-economic factors and biological characteristics of women's bodies [6-8]. In modern conditions, one of the characteristic features of the HIV epidemic development has become an active involvement in the epidemic process of women, especially of reproductive age, and an increase in the number of children born to them. In addition, the heterosexual route of HIV infection transmission is becoming an increasingly dominant factor in the epidemic process development with a possible transition of epidemic from a concentrated to a generalized stage [9-15].

A tense epidemiological situation is also observed in the territory of Kyrgyzstan, where, according to the Republican AIDS Center, as of January 1, 2022, 11153 cases of HIV infection were registered in the Kyrgyz Republic (KR) territory, of which 10535 (94.5%) were among citizens of Kyrgyzstan and 618 (5.5%) from the republics of far and near abroad. The rate of HIV infection per 100000 population increased from 2.6 in 2001 to 12.3 in 2021 years.

In Osh oblast, as one of the large regions, the rate of epidemic spread among reproductive age women is not decreasing, which contributed to the birth of HIV infected children [13].

In this regard, there is a need to assess and monitor the development of HIV epidemic and study the risk factors for its spread among population in modern conditions.

**The purpose** of this work was to study the gender characteristics of HIV infection epidemiological process in Osh region for the period from 2001 to 2021 year.

### **Materials and methods.**

The study materials were: statistical data obtained after registration of HIV infection according to forms No. 4a "Report on HIV infected", No. 4 "Report on the HIV infection study results", No. 4B "Information on HIV-infected pregnant women and children born". Osh regional center for prevention and control of AIDS for 1998 to 2021 year. To calculate the incidence rates per 100 thousand population ( $\frac{0}{10000}$ ), data from the National Statistics Committee of Kyrgyzstan for the period from 2000 to 2021 year were used.

The method of epidemiological analysis of HIV infection incidence among population for period from 1998 to 2021 years was used. The epidemiological analysis took into account the level of HIV infection among population, the long-term trend in incidence, as well as the involvement in the epidemic process of various categories in the population by gender and age composition, place of residence, assessment of structure, routes and factors of

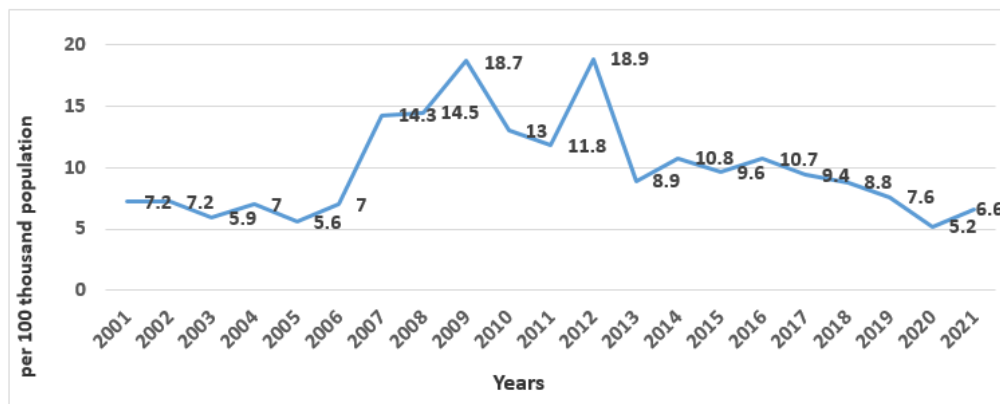
HIV transmission. Analysis was made on factors that determine epidemiological features of the HIV infection spread in the territory of the region under study.

Collected material on HIV infection was subjected to statistical processing according to the generally accepted methodology using computer programs MS Excel and Epi-Info.

Results of the study and their discussion. As of January 1, 2022, 2879 cases of HIV infection were officially detected in the Osh region and prevalence per 100000 population was 171.3 (the figure for republic is 162.1).

Among the Osh region citizens, first two HIV-infected were identified in 1998 to 2000 years. Since 2001, an increase in the incidence among injecting drug users begins and the intensive rate was 7.2 <sup>0</sup>/<sub>0000</sub>. In the future, this indicator remained within the range of 6-7.0 <sup>0</sup>/<sub>0000</sub> until 2007 year. There is increase in the intensive incidence rate to 18.9<sup>0</sup>/<sub>0000</sub> in 2012 year, followed by a decrease in this indicator to 6.6 <sup>2</sup>/<sub>0000</sub> in 2021 year (Fig. 1).

Figure 1 shows that in the HIV infection incidence dynamics in the Osh region, three interrelated and interdependent periods of the HIV epidemic development can be observed, which differ in their epidemiological features.



**Fig.1. Long-term trend in the incidence of HIV infection in the Osh region (per 100 thousand population).**

The initial period of the epidemic (1998 to 2006 years) is characterized by a gradual rise in the epidemic and spread among male injecting drug users (86%), and among women, there were only 14% of cases. An unfavorable epidemiological situation was observed in the Osh region territory and the Karasu district.

The period of maximum rise in the epidemic (from 2007 to 2012 years). During this period, there is an increase in the incidence up to 18.9<sup>0</sup>/<sub>0000</sub> in 2012 year. In this period, HIV infection cases began to be registered in other districts of the Osh region. There is an increase in the share of HIV-infected people up to 45.0% in 2012 year against 28% in 2007 year.

The period of decline and stabilization of epidemic begins in 2013 with an incidence rate of 8.9<sup>0</sup>/<sub>0000</sub>, which decreased to 6.6 in 2021 year. There is increase in the proportion of

women with HIV infection in the structure of HIV-infected people up to 44%, the dominance of the heterosexual route HIV infection and against this background there is a decrease in the parenteral route of infection.

As of January 1, 2022, 2879 people with HIV infection were identified in Osh region, of which 61.3% (765) were men and 38.7% were women. The intensive prevalence rate was 213.3 per 100 thousand men and 157.0 per 100 thousand women, with an average regional rate of 209.3 per 100 thousand population

Table 1 shows dynamics of official HIV infection registration among population by sex in Osh region for 1998 to 2021 years as shown in Table 1.

**Table 1: Dynamics of HIV infection registration in Osh region by sex for 1998 to 2021 years.**

Years	Total, abs. number	Per 100 thousand population	Gender				Incidence rate	
			Male, abs. number	%	Female, abs. number	%	Male	Female
							Per 100 thousand males	Per 100 thousand females
<b>1998-2000</b>	2		2	100			0,3	
<b>2001</b>	86	7.2	83	96.5	4	4.5	10.0	0.5
<b>2002</b>	87	7.2	83	96.5	3	4.5	10.0	0.5
<b>2003</b>	72	5.9	66	91.6	6	8.4	7.8	1
<b>2004</b>	75	7.0	64	85.3	11	14.7	8	2.1
<b>2005</b>	71	5,6	49	69	22	31	6.1	3.6
<b>2006</b>	92	7.0	79	85.9	13	14.1	9.8	2.4
<b>2007</b>	189	14.9	136	71.9	53	28.1	16.4	8.3
<b>2008</b>	192	14.5	112	58.3	80	41.7	13.5	12
<b>2009</b>	254	18.7	162	63.8	92	36.2	19.5	13.8
<b>2010</b>	170	13.0	98	57.6	72	42.4	11.8	11.1
<b>2011</b>	172	11.8	96	55.8	76	44.2	11.5	10.7
<b>2012</b>	248	18.9	137	55.2	111	44.8	16.5	15.4
<b>2013</b>	121	8.9	58	47.9	63	52.1	6.9	8.8
<b>2014</b>	149	10.8	73	48.9	76	51.1	8.8	10.5
<b>2015</b>	137	9.6	72	52.5	65	47.5	8.8	9.6
<b>2016</b>	153	10.7	72	47	81	53	8.9	12.1
<b>2017</b>	148	9.4	73	49.3	75	50.7	8.9	9.7

<b>2018</b>	139	8.8	78	56.1	61	43.9	9.3	7.2
<b>2019</b>	122	7.6	64	52.5	58	47.5	7.6	6.9
<b>2020</b>	96	5.2	48	54.5	48	54.5	4.8	5.7
<b>2021</b>	104	6.6	60	53.7	44	39.3	8	5.2
<b>Bcero</b>	<b>2879</b>	<b>209.3</b>	<b>1765</b>	<b>61.3</b>	<b>1114</b>	<b>38.7</b>	<b>213.3</b>	<b>157.1</b>

Table 1 shows that every year there is a growing trend in the number of HIV-infected women, the proportion of which increased by 8.7 times and amounted to 39.3% in 2021, against 4.5% in 2001, and the indicator incidence increased from 5.2 ‰ and 0.5 ‰ respectively. Against this background, there is a tendency to reduce the proportion of HIV-infected men to 53.7% in 2021. An epidemiological analysis of HIV-infected people by age structure and its impact on the nature of the HIV infection epidemic process over the study period was carried out as shown in the Table 2.

**Table 2: Distribution of HIV-infected men and women by age groups for 2000 to 2021 years (in%).**

Age group in years	Total		Gender			
			Male		Female	
	Abs. number	in %	Abs. number	in %	Abs. number	in %
0-14	469	16.3	243	13.8	226	20.3
15-19	67	2.3	32	1.8	35	3.1
20-29	738	25.6	366	20.7	372	33.4
30-39	949	32.9	573	32.5	376	33.8
40-49	517	17.9	427	24.2	90	8.1
50 and older	139	4.8	124	7.0	15	1.3
<b>Total</b>	<b>2879</b>	<b>100.0</b>	<b>1765</b>	<b>100.0</b>	<b>1114</b>	<b>100.0</b>

Table 2 shows the highest proportion of HIV infection cases were observed at the age from 30 to 39 years (32.9%), and from 20 to 29 years (25.6%). A significant proportion of HIV-infected women were observed at the age from 20 to 29 and from 30 to 39 years old (67.2%), and in men from 30 to 39 and from 40 to 49 years old (56.7%).

We have revealed a change in the age structure of HIV-infected people in different periods of the epidemic (Table 3). Table 3 shows that as HIV epidemic develops, the age structure of HIV-infected people changes. So, in the initial stage of the epidemic development for 2000 to 2006 years in the structure of infected people, the ratio of men and women was 6.9:1. During the second and third periods of epidemic, the proportion of people living with HIV is significantly higher among women aged from 20 to 29 years, among men in age groups from 30 to 39 and older than 40 years old.

**Table 3: The ratio of HIV-infected people by sex and age in different periods of the epidemic development in Osh region (in %).**

Age group in years	Abs. number	Gender, %		Share in % of the total number of HIV-infected cases					
		Male	Female	2000 to 2006 years		2007 to 2012 years		2013 to 2021 years	
				Male	Female	Male	Female	Male	Female
0-14	469	51.8	48.2	57.2	42.8	64.3	35.7	56.8	43.2
15-19	67	47.8	52.8	90.0	10.0	30.0	70.0	44.5	54.5
20-29	738	49.6	50.4	81.0	19.0	36.0	64.0	27.0	73.0
30-39	949	60.4	39.6	93.0	7.0	71.0	24.0	50.0	50.0
40-49	517	82.6	17.4	94.0	6.0	66.0	34.0	52.0	48.0
Older than 50	139	89.2	10.8	80.0	20.0	93.0	7.0	77.0	23.0
<b>Total</b>	<b>2879</b>	<b>61.3</b>	<b>38.7</b>	<b>87.4</b>	<b>12.6</b>	<b>60.0</b>	<b>40.0</b>	<b>48.0</b>	<b>52.0</b>

The data obtained indicate the decisive role in maintaining the epidemic process of HIV infection of people aged from 20 to 39 years of both sexes, there is also an increase in the influence of persons from 40 to 49 and 50 and older men, the epidemic process can be influenced by risk factors of sexual and injecting behavior of HIV infection of these age groups of HIV-infected, the role of infection vertical transmission is also increasing. In this regard, preventive measures should be aimed specifically at the population of this age category.

From an epidemiological point of view, it is of interest to assess the routes of transmission and risk factors for contracting HIV infection. Our studies have established the presence of various ways and factors of HIV transmission (Table 4).

Table 4 shows that in the HIV infection structure, the heterosexual (sexual) route of infection is of greatest importance (45.7%), at the same time, the parenteral route share of infection among injecting drug users is decreasing (35.9%). Among HIV-infected men, the parenteral route of transmission predominates (56.3%), while in women dominates the sexual route (77.2%).

**Tab. 4: Structure of HIV infection factors for 2000 to 2021 years (in%).**

No.	Transmission routes	Total		Gender			
		Abs. number	%	Male		Female	
				total	%	total	%
1	Parenteral route in use of injecting drugs	1034	35.9	993	56.3	41.0	3.7
2	Sexual route	1317	45.5	490	27.8	827	74.2
3	Interhospital route (parenteral)	329	11.4	173	9.8	156	14.0
4	Perinatal route (from mother to child)	140	4.9	70.0	3.9	70.0	6.3
5	Undefined routes	59.0	2.0	39.0	2.2	20.0	1.8
	<b>Total</b>	<b>2879</b>	<b>100.0</b>	<b>1765</b>	<b>100.0</b>	<b>1114</b>	<b>100.0</b>

A change in the structure of the main factors in HIV infection and their role in the epidemic process development in its different periods was revealed (Table 5).

**Table 5: The ratio of main factors in HIV infection in different periods of the epidemic development (in %).**

No.	Transmission factors	Share in % of total HIV infections number					
		2000 to 2006 years		2007 to 2012 years		2013 to 2021 years	
		Male	Female	Male	Female	Male	Female
	Parenteral route in use of injecting drugs	98.3	16.9	58.2	2.4	24.1	3.4
2	Sexual route	0.5	75.4	12.6	65.7	64.8	82.2
3	Interhospital route (parenteral)	0.5	3	20.2	23	4	6
4	Perinatal route (from mother to child)	0.2	4.8	6.4	6.9	3.8	5.8
5	Undefined			2.6	1.9	3.3	1.9
	<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

From Table 5 it follows that during the study period the ratio of HIV infection transmission main factors has changed. There is an increase in proportion of sexual infection route among both men and women. At the same time, there is a decrease in the number of

people who inject drugs (PWID) involved in epidemic process. Despite this, PWID remains as dominant factor in the development of epidemic process at the present stage.

In modern conditions, the proportion of children infected with HIV from mothers (vertical path) is increasing, which is associated with an increase in HIV infection epidemic among reproductive age women.

## CONCLUSIONS

1. As of January 1, 2022, 2879 people with HIV infection were identified in Osh region, from which 61.3% (765) were men and 38.7% were women. The intensive prevalence rate was 213.3 per 100000 men and 157.0 per 100000 women, with an average regional rate of 209.3 per 100000 population.

2. In the HIV infection incidence rate dynamics in Osh region, three interrelated and interdependent periods of HIV infection epidemic process development can be observed.

3. In Osh region, women are intensively involved in the HIV infection epidemic process as evidenced by increase in the incidence from 0.5 per 100 thousand women in 2001 to 5.7 in 2021 years, and in the structure of HIV-infected women, proportion of women increased from 4.5% to 39.3% respectively.

4. In modern conditions, both men and women play significant role in the development and maintenance of HIV infection epidemic process, most of whom can serve as a factor in HIV infection through unsafe sexual intercourse, as well as through the joint use of injecting drugs by parenteral route.

## References:

1. Fact sheet on the AIDS epidemic (translated from English). - Geneva: UNAIDS, -2022, p.43.
2. Ladnaya N.N. The spread of infection caused by the human immune deficiency virus in the territory of the Russian Federation in 2021 / N.N. Ladnaya, V.V. Pokrovsky, E.V. Sokolova et al. // Epidemiology and infectious diseases. Topical issues. -2022.- T.12.-No. 3, pp. 12-18.
3. Ryndich A.A. Tendency and factors in the development of the epidemic process of HIV infection in the south of Russia / A.A. Ryndich, A.G. Sukhova, A.G. Suladze et al. // HIV infection and immunosuppression, - 2019. -T. 11, No. 2, pp. 48-57.
4. Ruziev M.M. Features of the spread of HIV infection in pregnant women in the Republic of Tajikistan / M.M. Ruziev // Bulletin of the Academy of Medical Sciences of Tajikistan. -2018. - T.8. No. 2, pp. 243-248.
5. Belyakov N.A. The COVID-19 pandemic and its impact on the course of other infections in the North-West of Russia / Belyakov, E.V. Boeva, O.E. Simakina et al. // HIV infection and immunosuppression. - 2022.-№ 1 (14), pp. 7-24.
6. Leshchenko O.Ya. Clinical features of reproductive health disorders and sexual behavior of women with HIV infection / O.Ya. Leshchenko, E.V. Genich // HIV infection and immunosuppression. - 2022.- № 2 (14), pp. 32-39.



7. Latypov A.B. HIV infection among pregnant women in the Republic of Bashkortostan. / A.B. Latypov, D.A. Valishin, R.G. Yapparov // *Journal of Infectology*. - 2019, - V.11. No. 1, pp. 46-52.
8. Erofeev L.G. Features of HIV infection in women of the Trans-Baikal Territory / Erofeev L.G., Mochalova M.N., Akhmetova E.S. // *Trans-Baikal Medical Bulletin*. - 2014.- No. 2, pp. 105-110.
9. Kobyakova O.S. Epidemiology of HIV infection: the realities of clinical practice / O.S. Kobyakova, I.A. Deeva, L.V. Lukasheva et al. // *HIV infection and immenosuppression*, - 2020. - V. 12, No. 1, pp. 113-121.
10. Pasechnik O.A. Clinical and epidemiological characteristics of HIV infection in the Omsk region / Pasechnik O.A. // *Modern problems of science and education*. -2015.- No. 3, pp. 88-94.
11. Tabakov V.A. Dynamics of the development of the epidemic process of HIV infection at the present stage of its development at the regional level / Tabakov V.A. // *Public Health of Chuvashia*. - 2015. - No. 4, pp. 23-29.
12. Belyakov N.A. Directions of scientific activity of research teams in the field of HIV infection in the Russian Federation / Belyakov N.A. // *HIV infection and immunosuppression*. - 2016.-No. 8 (2), pp. 7-16.
13. Mamaev T.M. Retrospective analysis of the HIV epidemic in children in the Osh region / Mamaev T.M., Narmatova E.B., Abdyaeva B.R., Bugubaeva M.M. // *Bulletin of Osh State University*. -2018.-No. 3, pp.168-172.
14. Leshchenko O. HIV infection in men and women of reproductive age. / Leshchenko O., Marianian A., Timofeeva E., Atalyan A., Balochova T., Plotnicova Y., et al. // *Alcoholism: Clinical and Experimental Research*. 2017; 41(6):150A.
15. Marianian A. Alcohol use, pregnancy planning, and reproductive health concerns in people living with HIV/AIDS in Russia / Marianian A., Timofeeva E., Atalyan A., Leshchenko O. // *Alcoholism: Clinical and Experimental Research*. 2018; 42(6):76.