



**Medical and Social Portrait of Hiv Infection in the Republic of Mari El**  
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**ABSTRACT**

The present study deals with the analysis of the epidemic process among the population of the Republic of Mari El (RME) with a disease caused by the human immunodeficiency virus (HIV infection) with an assessment of the structure of the incidence by sex, age, social status and transmission routes. The medical and social parameters of HIV infection are given for the period from 2007 to 2016. The medical documentation (epidemiological chart form No. 357/U) of the patients of the state budgetary institution of the Republic of Mari El “Republican Center for the Prevention and Control of AIDS and Infectious Diseases” (Center for AIDS of RME) using clinical, analytical and statistical epidemiology methods was studied in this paper. As a result of the work performed, it was established that the epidemic process of HIV infection prevails among men, in a cohort of 31-40 years. In most cases, the transmission route is heterosexual; the infection is more common among the urban population.

**Keywords:** HIV infection, Republic of Mari El, epidemiological analysis, morbidity structure, risk groups.



## **1. INTRODUCTION**

HIV infection is a socially significant disease, the epidemic process of which, in addition to risk groups, involves socially sustainable segments of the population. Epidemiological monitoring makes it possible to draw up a "medical and social portrait of HIV infection", taking into account the sex, age, routes of transmission, and social characteristics of patients. The data of such an analysis can be used to correct preventive programs, as well as to predict the development of the epidemic [Gender-dependent characteristics of deaths in HIV infection ,2016;Sotnichenko S.A. 2007;Enhancing HIV prevention among young men who have sex with men: a systematic review of HIV behavioral interventions for young gay and bisexual men ,2016;How does sex trafficking increase the risk of HIV infection? An observational study from Southern India ,2013;Seroprevalence and correlates of herpes simplex virus type 2 infection among young adults in Arkhangelsk, 2016;Medico-social features of the "aging" of the HIV epidemic in St. Petersburg /2013].

In the Russian Federation (RF) there is a predominance of HIV infection in a cohort of the able-bodied population, which can negatively affect the economic development of the country. Following the results of 2016 in Russia, the highest level of morbidity of the population with this infection is observed in the age group of 30-39 years; there is also an increase in the role of sexual transmission and the reduction of HIV infection through injecting drugs. In the territory of the Russian Federation, an increase in the number of children infected by HIV infection during breastfeeding is recorded. In 2016, 50 children were infected this way (in 2014 - 41, 2011 - 27 children), which requires more detailed analysis and probably indicates unawareness of the ways of HIV transmission or ignorance of their mothers' HIV-status [Stekolshchikov L.V. 2013;On the state of sanitary and epidemiological welfare of the population in the Russian Federation in 2016: State report,2017;Timonova M.S. 2011].

Despite the fact that heterosexual transmission is prevalent at present in most countries and continents, one should not underestimate the risk that exists among men who have sex with men (MSM). This risk group is characterized by a more frequent change of sexual partners, which can contribute to the spread of HIV infection. There is evidence pointing to the reoccurrence of the HIV epidemic in economically developed countries in this cohort at the beginning of the 21st century, despite the existing prevention



programs in the MSM group and a relatively wide access to antiretroviral drugs [Beliakov N.A. 2011;Tursunov R.A. 2014;Baral S., Sifakis F., Cleghorn F., Beyrer C. 2007;van Griensven F., 2009 ;Baggaley R.F., White R.G., Boily MC. 2010;Beyrer C., Sullivan P., Sanchez J. et al. 2013 ;CDC. 2010 ;Sullivan P., Hamouda O., Delpech V. Geduld J.E., Prejean J., Semaille C., Kaldor J., Folch C., Op De Coul E., Marcus U., Hughes G., Archibald C.P., Czein F., McDonald A., Casabona J., Van Sighem A., Fenton K., 2009].

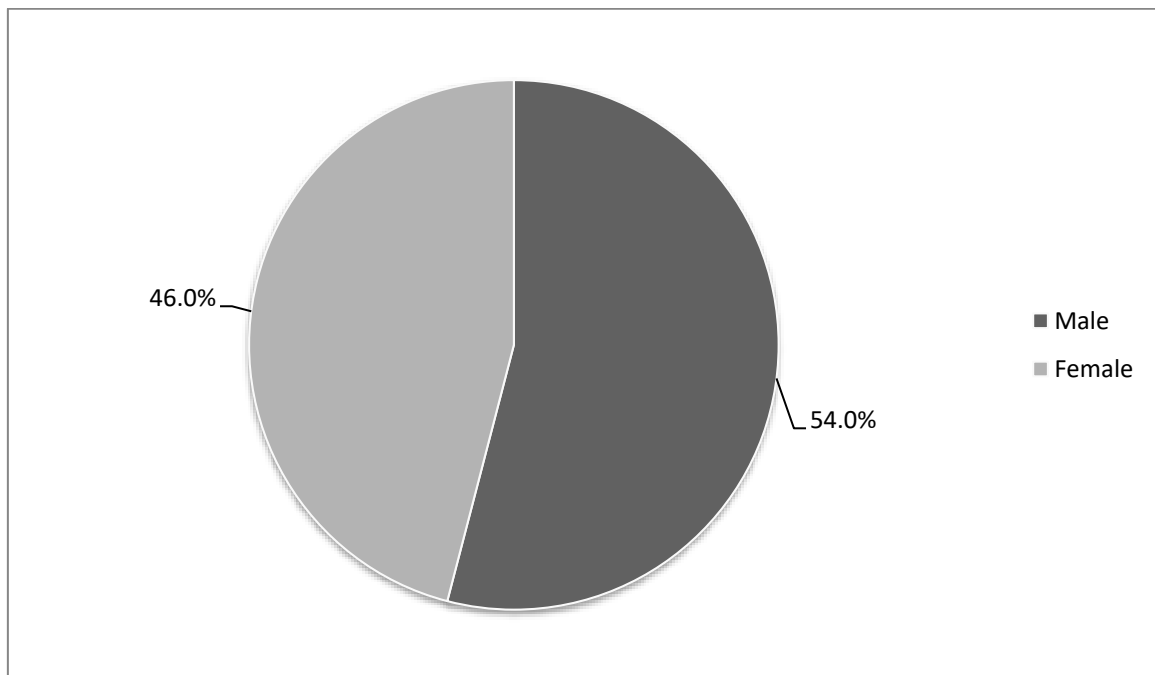
The literature analysis convincingly proves the necessity and practical importance of the conducted research with a view to predicting the epidemic process of HIV infection in the RME, which will help to set the preventive work of organs and organizations of the health sector of the republic against this socially significant infectious disease.

## **2. METHODS**

The study used data from the epidemiological history of medical documentation (form No. 357/U) of the Center for AIDS of RME with the use of methods of clinical, analytical and statistical epidemiology. For illustration of the epidemic process of HIV infection, graphoanalytical methods were used.

## **3. RESULTS AND DISCUSSIONS**

The present study analyzes the medical and social parameters of HIV infection in the RME for the period of 2007-2016. Cumulatively, the sexual structure shows the predominant epidemic process of HIV infection among the male population (men - 54%, women - 46%) (Fig. 1).



**Fig 1.** Cumulative sexual structure of HIV infection in the Republic of Mari El for the period 2007-2016

It was established that during this time period the sexual structure of HIV infection is mainly characterized by the predominance of the epidemic process of this socially significant disease in the male cohort, with a dynamic increase in the proportion of HIV cases among men. For example, by 2016 (men - 57.5%, women - 42.5%) compared to 2007 (men - 54%, women - 46%) there was an increase (+ 3.5%) in HIV incidence in the male cohort. The prevalence of HIV infection among men was recorded in all years analyzed, except for 2012 (men - 33.7%, women - 66.3%, Table 1).

**Table 1.** Sexual structure of HIV infection in the Republic of Mari El from 2007 to 2016 %

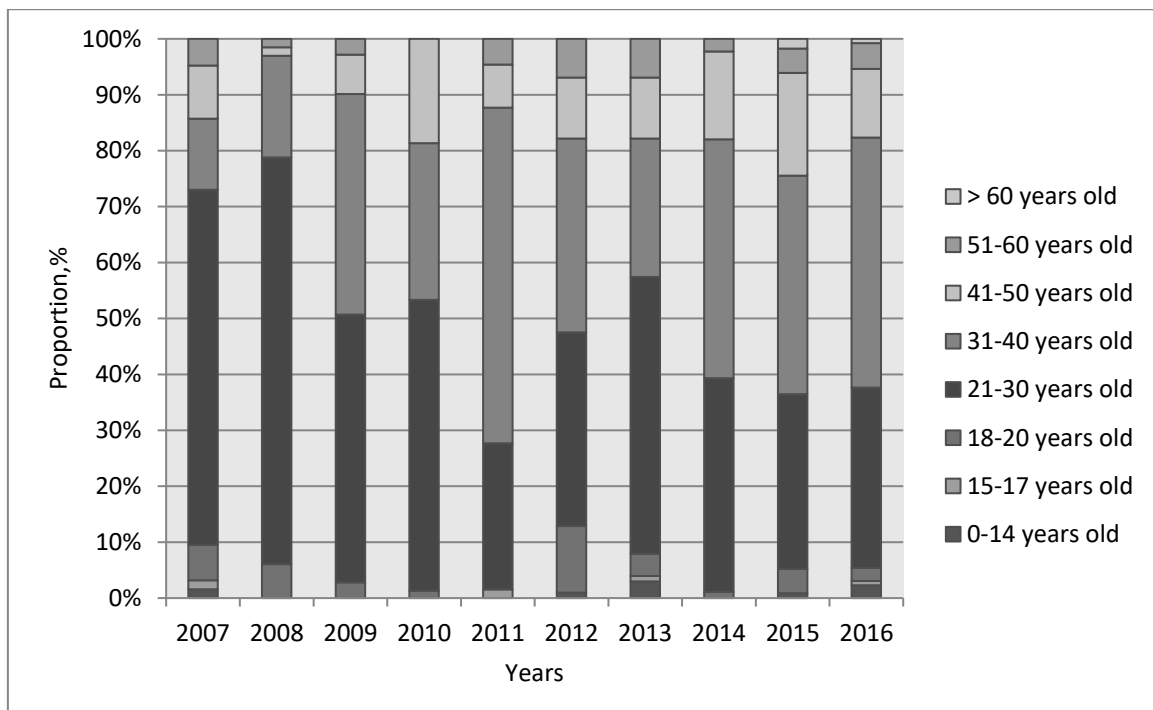
Year	Male	Female
2007	54.0	46.0
2008	66.7	33.3
2009	57.7	42.3
2010	50.7	49.3
2011	50.7	49.3
2012	33.7	66.3
2013	57.4	42.6
2014	55.1	44.9
2015	59.1	40.9
2016	57.5	42.5



The analysis of the age structure of HIV-infected in the RME shows the prevalence of the epidemic process of this disease in age cohorts of 21-30 and 31-40 years, and for the period 2007-2016 there is a shift of HIV infection from the age group of 21-30 years (2007 - 21-30 years - 63.5%, 31-40 years - 12.7%) to the age group of 31-40 years (2016 - 21-30 years - 33.1%, 31-40 years - 45.8%).

A statistically significant increase by 1.5 times was registered in HIV infection among children (0-14 years) ( $p < 0.05$ ), and by 1.3 times in the age group of 41-50 years ( $p < 0.05$ ). Since 2015, HIV cases have been registered for the first time in the age cohort over 60 years (2016 - 1 case or 0.8%, in 2015 - 2 cases or 1.7%) and this fact requires detailed epidemiological analysis, because, since the first registration of HIV infection in the RME (the first case of HIV infection was registered in 1990 on the territory of the republic), these cases are the first in this age group.

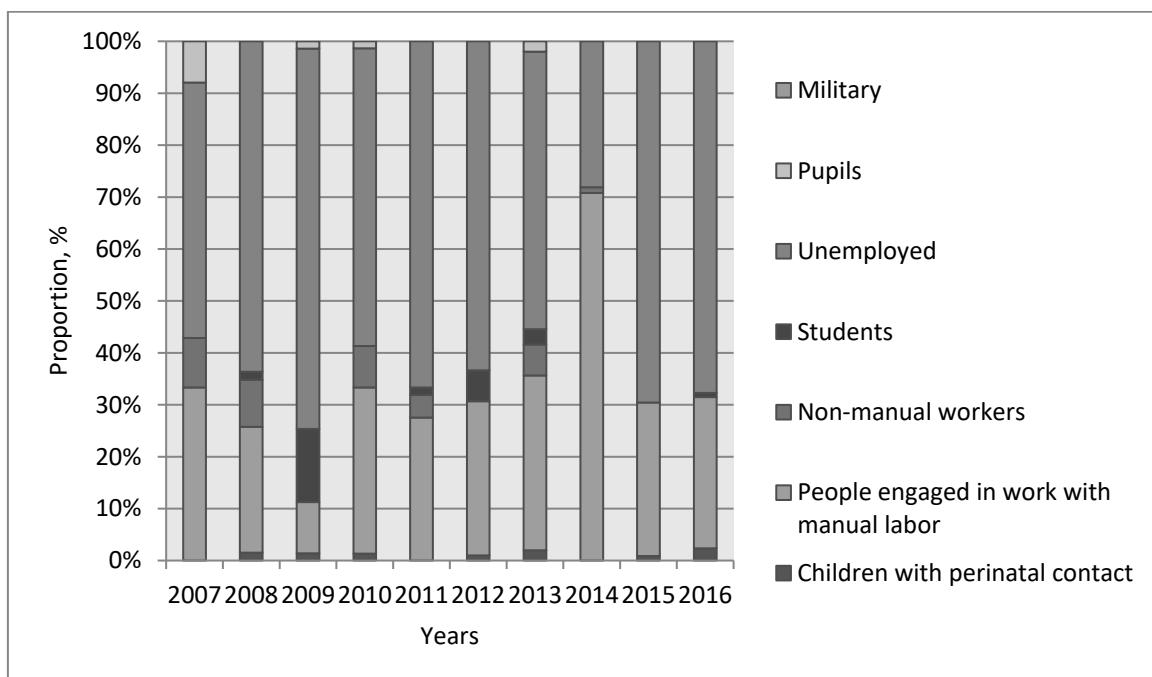
A significant decrease was observed in the age group of 15-17 years by 2 times (in 2007 - 1.6%, in 2016 - 0.8%,  $p < 0.05$ ), in a cohort of 18-20 years - by 2.6 times (2007 - 6.3%, 2016 - 2.4%,  $p < 0.05$ , Fig.2).



**Fig. 2.** Age structure of the incidence of HIV infection in the Republic of Mari El in 2007-2016



Over the period of 2007-2016, there was an increase in the proportion of HIV-infected students (0% in 2007, 0.8% in 2016), perinatally infected children (2007 0%, 2016 2.4%), and the unemployed (2007 - 49.2%, 2016 - 67.7%). An increase in the number of HIV-infected students indicates a model of riskier sexual behavior in this group. A decrease is observed in the cohorts of people engaged in physical labor (in 2007 - 33.3%, in 2016 - 29.1%), employees (in 2007 - 9.5%, in 2016 - 0%), secondary school students (2007 - 7.9%, 2016 - 0%). Among military personnel, the total number of HIV cases was not recorded (Fig.3).

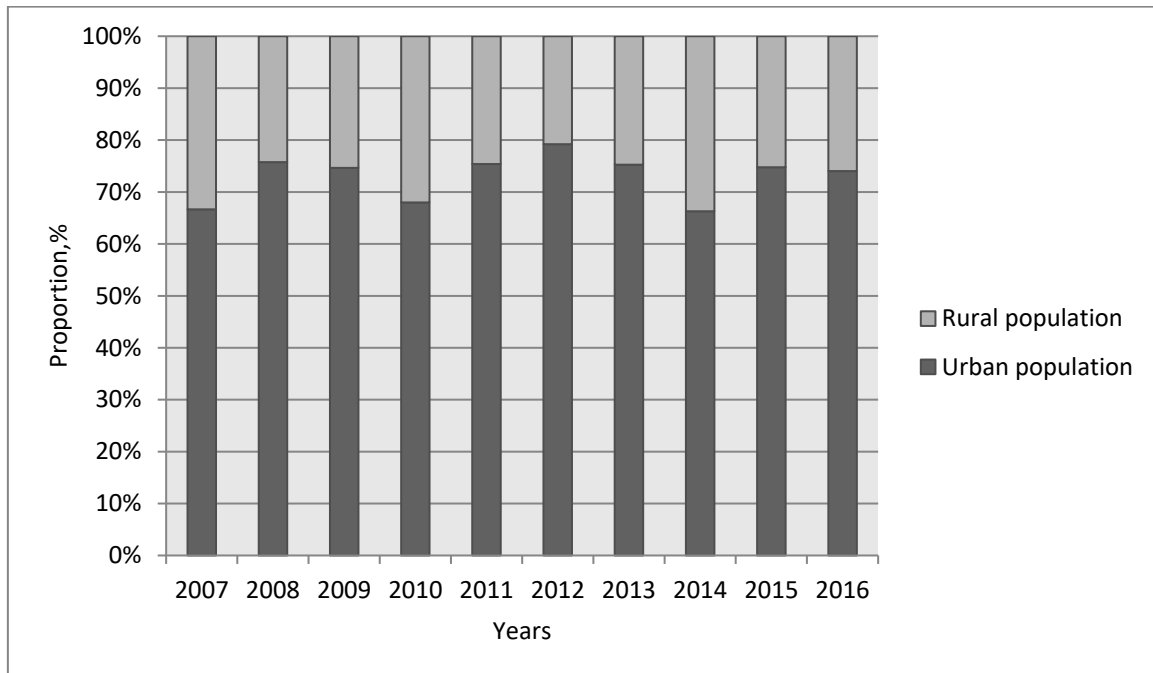


**Fig.3.** Social status of HIV-infected persons in the Republic of Mari El in 2007-2016 %

The epidemic process of HIV infection prevails among the urban population of the republic, with a tendency to increase in the cities of the RME (2007 - 66.7%, 2016 - 74.0%). However, this fact does not indicate a decrease in attention to the problem of HIV infection among the rural population, since although the urban environment assumes more accessible medical care and, correspondingly, more extensive screening for HIV and a greater frequency of registration of this infection, in rural areas there is a problem of access to the means of barrier contraception (fewer number of round-the-

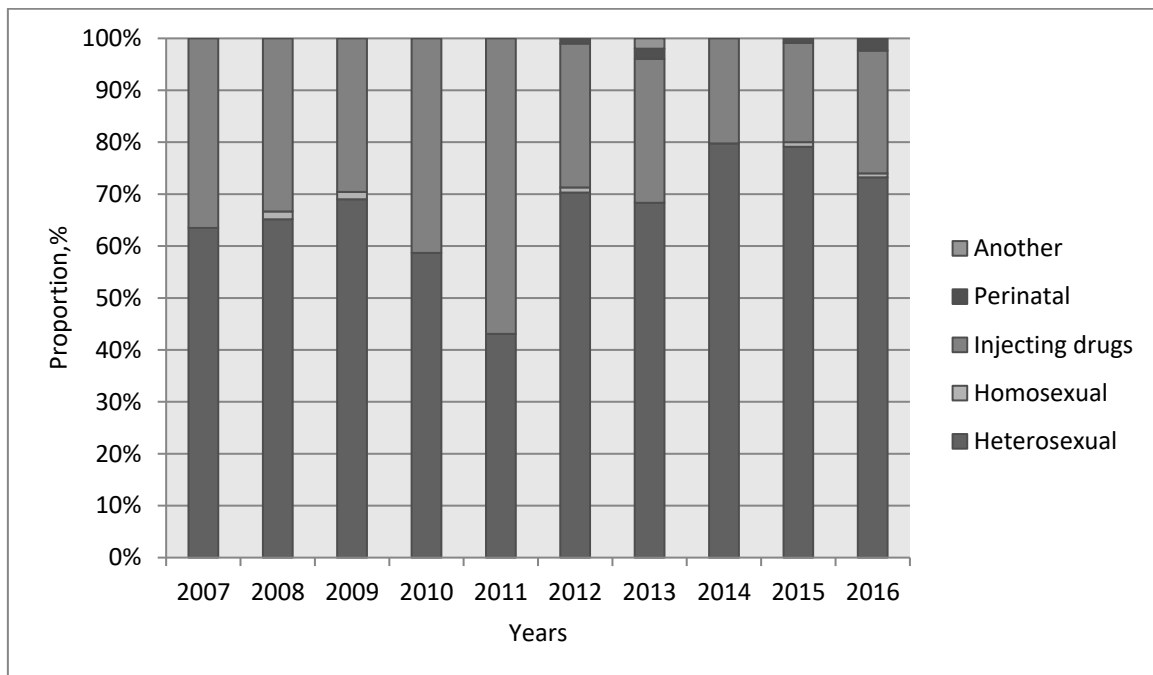


clock pharmacies), which can lead to a risky model of sexual behavior among rural residents (Fig.5). This fact requires the correction of preventive programs on the availability of barrier contraception in the rural environment not only at the national level, but throughout the Russian Federation (RF).



**Fig.5.** The proportion of HIV-infected people living in urban and rural conditions of the Republic of Mari El in 2007-2016

The leading among the transmission routes for the period 2007-2016 is the sexual heterosexual route (in 2007 - 63.5%, in 2016 - 73.2%). The second way to contribute to the spread of HIV infection among the population of the RME is the injection route, with a decline in 2016 compared to 2007 (36.5% in 2007, and 23.6% in 2016). The perinatal route of transmission in 2016 is 2.4% (2007 - 0%), which indicates the lack of awareness of nursing mothers about the ways of HIV transmission, neglect of the recommendations of doctors for feeding the child (subject to the known presence of a positive HIV-status in the mother) or ignorance of one's HIV status. There is also AIDS-dissidence, which has a very negative impact on the health of newborns. The share of the sexual homosexual route in the spread of HIV infection increased from 0% in 2007 to 0.8% in 2016 (Fig.6).



**Fig.6.** Ways of HIV transmission among the population of the Republic of Mari El for the period 2007-2016,%

For the period of 2007-2016, heterosexual sexual (69%) and injection routes (29.8%) predominate among the routes of transmission of HIV infection. Smaller shares are observed in perinatal (0.8%), sexual homosexual (0.6%) and others routes (0.2%). Other routes include cases where the transmission route is unknown.

#### 4. SUMMARY

The epidemic process of HIV infection among the population of the RME affects mainly the male population; there is a shift in the prevalence of infection from the age group of 21-30 years to 31-40 years. The obtained results testify to the positive results of the implementation of preventive programs among young people, but require the development of methods for the prevention of HIV infection among the population aged 31-40. Data from the epidemiological analysis showed that most HIV-infected patients are unemployed. HIV infection in the RME is more common among urban residents (2016 - urban population - 74%, rural - 26%).

Cumulatively, for the period of 2007-2016, sexual heterosexual (69%) and injection routes (29.8%) predominate among the transmission routes. The received data testify to the need to strengthen preventive work in the framework of hygiene education with a focus on the problems of models of sexual behavior, as well as of injection drug users,





since the injection route of HIV transmission makes a significant contribution to the spread of this socially significant disease in the territory of the RME (2016 - 23.6%). The results of this study will make it possible to purposefully correct the available prevention programs, as well as develop projects dealing with the epidemiologically significant characteristics of the epidemic process of HIV infection among the population of the RME.

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