



Pharmacoeconomic Analysis of the Use of Antiretroviral Drugs Based on Local Data of Real Clinical Practice and State Drug Provision of HIV-Infected People in the Russian Federation

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Introduction

- Infections caused by the human immunodeficiency virus (HIV infection) and acquired immunodeficiency syndrome (AIDS) are one of the most significant problems in the world and in the Russian healthcare.
- As of December 31, 2020, 1,492,988 people with confirmed HIV infection were registered among citizens of the Russian Federation.
- In 2020, 32,208 people with HIV infection died.
- According to preliminary personalized data for 12 months of 2020, 72,023 new cases of HIV infection were reported.
- According to official data, the number of people receiving therapy in 2020 amounted to 604,999 patients.
- The total cost of all purchases of ARV drugs in the Russian Federation in 2020 amounted to 27 billion 252 million rubles.
- In 2020 in the Russian Federation the new regulatory documents were adopted and approved - the State Strategy for Countering the Spread of HIV infection in the Russian Federation for the period up to 2030 and Clinical Recommendations "HIV infection in adults", which regulate the use of more expensive drugs in the treatment of this nosology.
- The widespread use of therapeutic approaches other than the usual clinical practice requires a clinical and economic assessment with the preferred use of local epidemiological data, as the most indicative from the point of view of analyzing the consequences of the introduction and changes in the treatment tactics used

Study Goal

The purpose of the study was to evaluate the economic consequences of changes in existing approaches in the treatment of HIV infection using the developed calculator model using mathematical modeling. Based on the developed model, an assessment of the financial consequences was carried out with the inclusion of new parameters - data on the share of the purchase of expensive ARVs, their cost and frequency of prescribing in accordance with the structure of drug provision for HIV-infected patients.

Materials and methods

The methodology consisted of statistical processing of the epidemiological data of ART patients and the subsequent mathematical modeling. More than 1,113 outpatient histories of HIV patients receiving ART were analyzed based on the data from the Center for HIV/AIDS Prevention and Control for 2011-2016. The following indicators were evaluated: age, gender, disease duration, pharmacotherapy throughout the observation period, the number of ART regimens changes and their causes, the treatment regimen cost. Modeling involved the automation of ART regime cost calculations, assessing the consequences of frequent changes in treatment and the additional costs associated with a particular drug use, and the economic role of genotyping. Additional parameters of the model were formed based on the assessment of data on centralized public procurement of ARVs in 2020-2021 and the frequency of prescribing schemes in real clinical practice.

Results

Due to the introduction of new standards and recommendations, the structure in the provision of medicines to patients on ART has changed. The total number of annual courses of ARV drugs purchased by the Ministry of Health in 2021 as part of centralized purchases increased by 44 thousand and amounted to 476 thousand annual courses in 2021. According to new standards and Russian recommendations for the treatment of HIV infection, 19,000 annual courses of RPV/TDF/FTC, ESV - 15,800, DTG - 102 702, RAL – 19 992, ETR - 56 084 were purchased (federal centralization) to provide the 1st and subsequent lines of ARVT. The share of expensive ARVs was at least 45%. The costs of the ART approaches preceding the new recommendations amounted to at least 848,979,644 rubles. Changes in the procurement structure are shown in Fig. 1.

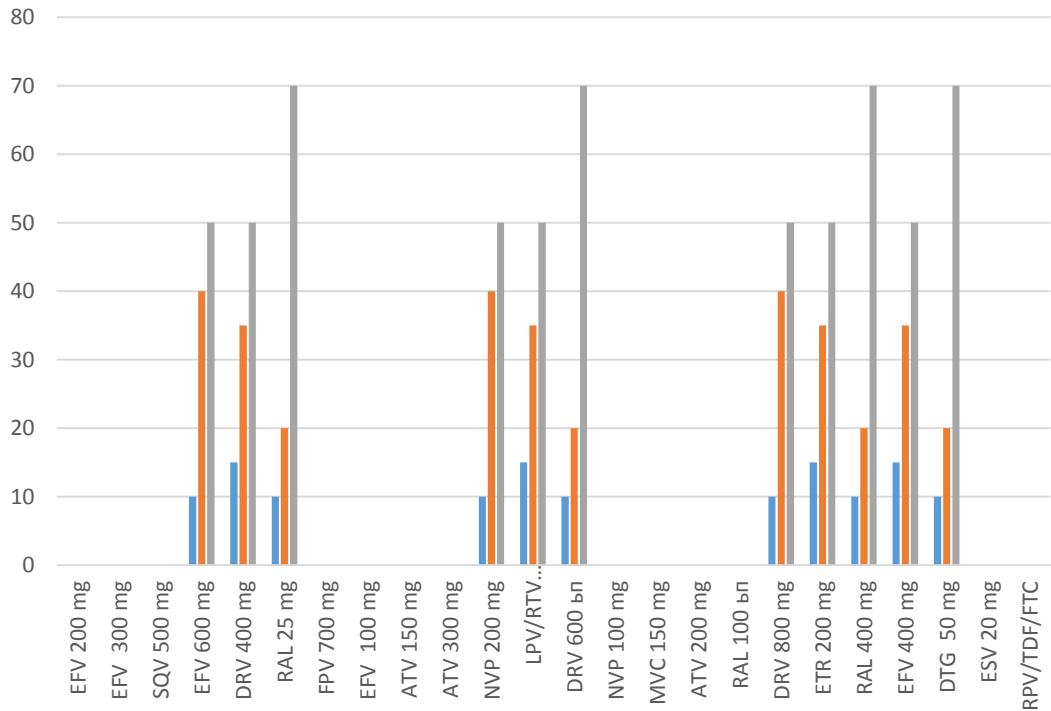


Fig. 1. Changes in the structure of ARVP purchases

The proportion of ARVs presented for inclusion in the model calculations was determined. The data source is information about ARVP purchases. Extrapolation of data to the included population in the model is shown in Fig. 2

Purchase of ARVs during 2021	The number of annual different courses to purchase	Total number of annual courses to purchase	The share of considered ARVs in providing patients with HIV infection
DTG	102 702	476 000	0,2158
RPV/TDF/FTC	19 000	476 000	0,0399
ESV	15 800	476 000	0,0332
RAL	19 992	476 000	0,0420
ETR	56 084	476 000	0,1178
Итого			0,4487

Fig. 2. The share of considered ARVs in providing patients with HIV infection

The modeling results are shown in Figures 3-4.

	Current application of ART	Costs for the expected option	Cost difference, rub.	% change in costs
Drug provision in accordance with the 2020 recommendations	848 979 644	936 244 883	87 265 239	10,3%

Fig. 3. ART costs for the population

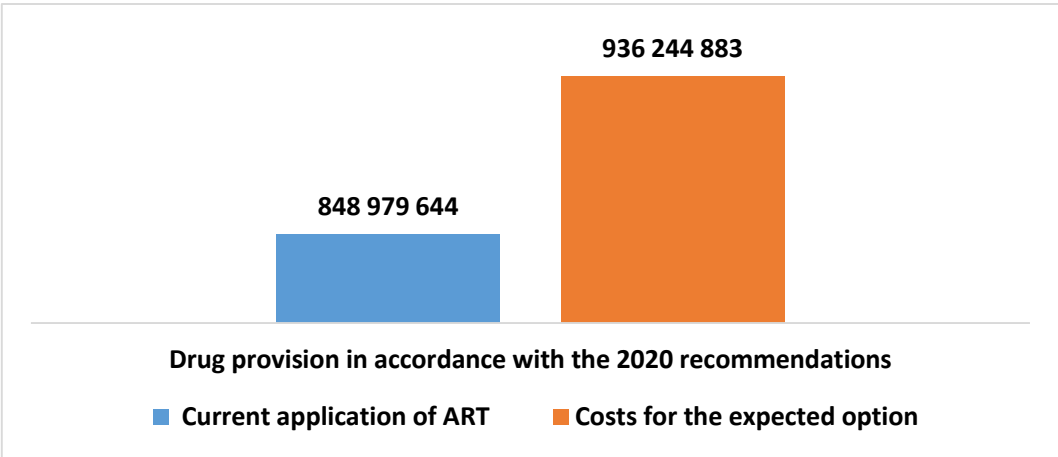


Fig. 4. Drug provision in accordance with the 2020 recommendations

Conclusion

- ✓ A retrospective analysis of real clinical practice based on the patients database of one of the regional centers providing medical care to patients with HIV was carried out
- ✓ A clinical and economic model has been built to assess the consequences of the introduction and expansion of various medical technologies in the treatment of HIV infection
- ✓ The planned structure of drug provision will lead to an increase in the costs of specific therapy for HIV-infected patients: in quantitative terms, the increase will be at least several tens of billions of rubles, in relative terms - at least 10%.
- ✓ Planned structure of drug provision for HIV patients extrapolation of the obtained results to the entire population of HIV-infected patients in the Russian Federation is possible if the model is supplemented with data from other centers for the prevention and control of AIDS.
- ✓ It is necessary to further study real clinical practice based on databases of other institutions involved in HIV treatment in order to determine ways to optimize the appointment of ART.
- ✓ The construction of clinical and mathematical models based on local epidemiological data of various administrative levels of medical care makes it possible to predict the level of costs, as well as to determine the most resource-saving ratios between purchased medicines