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# CLINICAL AND ECONOMIC ASSESSMENT OF THE IMPORTANCE OF SUPPORTIVE THERAPY IN ONCOLOGY

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## BACKGROUND

- ✓ More than 10 million new cases of malignant neoplasms are detected annually in the world. About 27,000 people are diagnosed with cancer daily.
- ✓ Chemotherapy is one of the most commonly used and effective methods of systemic treatment of cancer.
- ✓ The progressive development of anticancer drug therapy has not solved the toxicity problem.
- ✓ Toxicity is the major reason for reducing the dose of drugs, lengthening the intervals between courses, and cancelling therapy.
- ✓ Failure to complete the treatment regimen due to the development of this type of hematological toxicity leads to a decrease in the effectiveness of therapy and an increase in cancer mortality.
- ✓ Neutropenia is the most frequent and dangerous manifestation of myelotoxic effects associated with a high risk of developing febrile neutropenia (FN).
- ✓ FN is associated with the risk of developing serious infectious complications and death from them, as well as with a forced violation of treatment protocols.

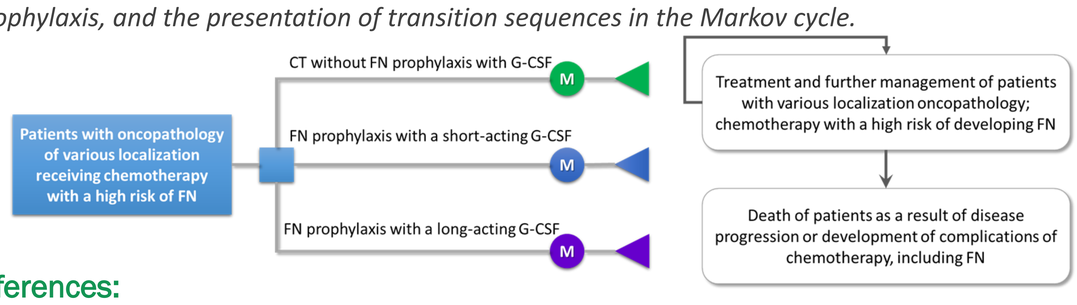
## OBJECTIVES

- ✓ To determine the pharmacoeconomic feasibility of using colony-stimulating factors (G-CSF) in supportive therapy, and to assess the economic consequences of following the guidelines for febrile neutropenia prevention.
- ✓ The study is based on the hypothesis of an increase in the cost-effectiveness of chemotherapy (CT) due to the use of G-CSF - adherence to the protocols of supportive treatment of cancer patients.

## MATERIALS AND METHODS

- ✓ The study was based on modelling (Fig. 1). Types of analyses used: cost of illness (COI), cost-effectiveness analysis (CEA) with cost-effectiveness ratio (CER), and budget impact analysis (BIA). The study was considered from the public health system perspective.
- ✓ COI for patients with oncological pathology and a high risk of developing chemotherapy-induced FN implied the modelling of costs associated with chemotherapy, as well as FN prophylaxis and treatment. Patient groups: (1) without FN prophylaxis with a G-CSF, (2) FN prophylaxis with a short-acting G-CSF, (3) FN prophylaxis with a long-acting G-CSF.
- ✓ CEA determined the cost-effectiveness of chemotherapy, including FN prophylaxis, and, as a consequence, maintenance of the recommended chemotherapy protocol, which affects the survival of oncology patients. Based on BIA, analysis of the COI dynamics was provided for patients with a high risk of developing CT-associated FN when using various drugs from the G-CSF group in the target population.
- ✓ The following costs were estimated: cost of CT, FN treatment in case of its development, medical assistance for the development of infectious complications associated with FN, medical care due to the development of emergency conditions associated with FN; medical care in the terminal state due to the disease progression or the development of complications, including those associated with FN; FN prophylaxis with G-CSF and associated costs.

*Fig. 1. A decision analysis model for assessing the clinical and economic effectiveness of FN prophylaxis, and the presentation of transition sequences in the Markov cycle.*




## RESULTS

- ✓ Chemotherapy without FN prophylaxis is associated with the highest cost of 1,028,120 RUB (€13,903). Adoption of G-CSF for FN prevention leads to the total cost reduction of 349,423 RUB (€4,726) - 152,084 RUB (€2,057) per patient depending on the drug used. Empegfilgrastim prophylaxis results in the lowest total cost (34% lower than in the absence of FN prevention). Figure 2 shows the structured direct costs; results of the cost-effectiveness analysis are presented in Table 1 and Fig. 3.

*Fig. 2. Direct costs and their structure.*

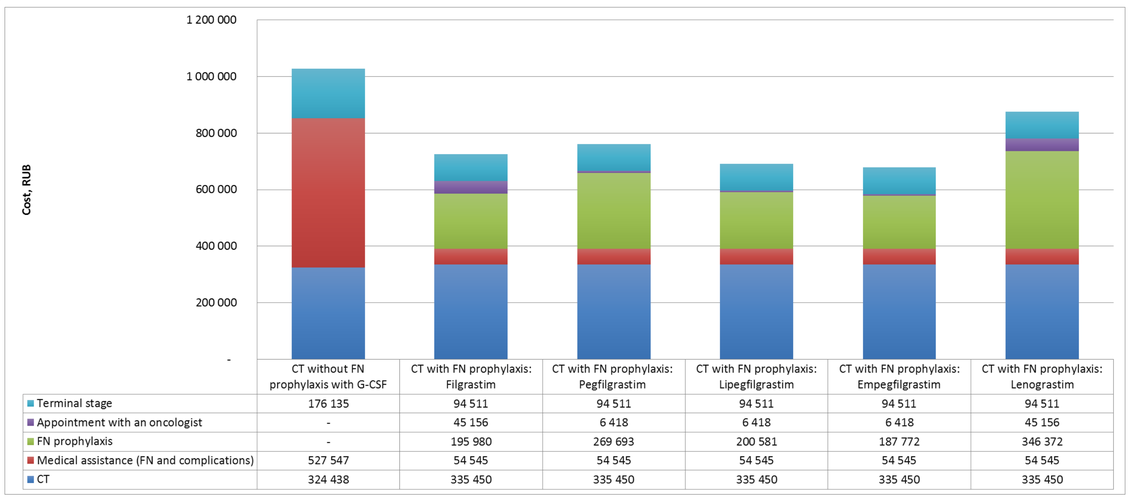
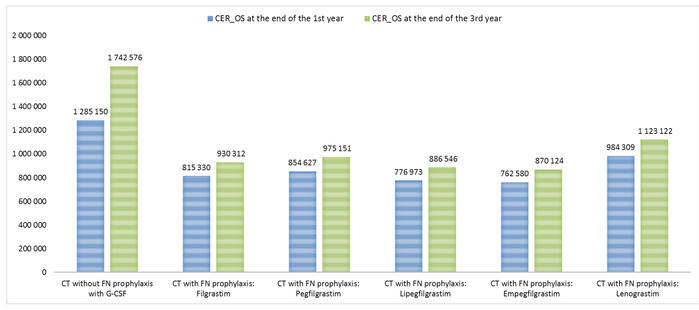



*Table 1. Results of cost-effectiveness analysis.*

| Effectiveness | Without FN prophylaxis | With FN prophylaxis |
|---|---|---|
| Overall survival (%) at the end of the first year of modeling | 80% | 89% |
| Overall survival (%) at the end of the second year of modeling | 68% | 84% |
| Overall survival (%) at the end of the third year of modeling | 59% | 78% |

*Fig. 3. Results of cost-effectiveness analysis.*

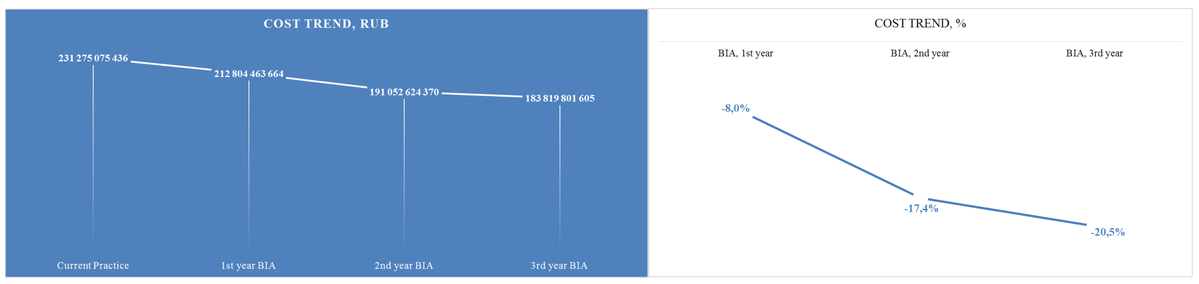



- ✓ An estimated target population size for the COI and BIA was 242,915 patients (newly identified cancer patients in the Russian Federation). The absence of FN prevention in this population imposes the socioeconomic burden ranging from 36.9 to 84.9 billion rubles (499.5 – 1147.8 million euros). BIA showed a reduction in the COI for oncological pathology in case of a decrease in the number of patients without prophylaxis and an increase in the number of patients receiving G-CSF therapy with the most resource-saving potential (Table 3, Figure 4). Moreover, the use of recommended G-CSF drugs significantly increases the effectiveness of chemotherapy and thus cancer patient survival.

*Table 2. Current and expected practice of the target patient population management.*

| Therapy | Prescribing Frequency | | | |
|---|---|---|---|---|
| | Current Practice | BIA, 1st year | BIA, 2nd year | BIA, 3rd year |
| CT without FN prophylaxis with G-CSF | 0,73 | 0,46 | 0,19 | 0,10 |
| CT with FN prophylaxis: Filgrastim | 0,05 | 0,11 | 0,12 | 0,13 |
| CT with FN prophylaxis: Pegfilgrastim | 0,05 | 0,11 | 0,12 | 0,13 |
| CT with FN prophylaxis: Lipegfilgrastim | 0,05 | 0,11 | 0,23 | 0,26 |
| CT with FN prophylaxis: Empegfilgrastim | 0,05 | 0,11 | 0,23 | 0,27 |
| CT with FN prophylaxis: Lenograstim | 0,05 | 0,11 | 0,12 | 0,12 |
| *TOTAL* | *1,0000* | *1,0000* | *1,0000* | *1,0000* |

*Fig. 4. Results of the COI dynamics analysis for patients with a high risk of developing CT-associated FN.*




## CONCLUSION

The use of G-CSF as a preventive measure for the development of chemotherapy complications is economically viable from CEA and COI perspectives. Although the expansion of FN prophylaxis in cancer patients increases drug costs for the FN prevention, it also reduces the total cost of cancer patient treatment.

## References:

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