Introduction

On December 31, 2019, an outbreak of coronavirus disease (COVID-19) coronavirus infection was reported for the 1st time in Wuhan, China. Then, the prevalence of this disease took on a global scale, and on March 11, 2020, the World Health Organization (WHO) assigned COVID-19 the status of a pandemic. As of the beginning of 2021, the Russian Federation ranks fourth in terms of the prevalence of coronavirus infection. Over the period from March 2020 to February 2021, more than 84,000 fatal cases of the disease were recorded in Russia [1].

However, the information available at the moment about the results of therapy with existing medications does not allow us to draw an unambiguous conclusion about their effectiveness and safety for the treatment of COVID-19 novel coronavirus infection [2]. Therefore, it is required to assess the feasibility of using the medications proposed for the treatment of the disease from the standpoint of pharmacoeconomics and pharmacoepidemiology.

The purpose of our work is to conduct a pharmacoeconomic analysis of medications recommended by the Ministry of Health of the Russian Federation for the treatment of COVID-19 novel coronavirus infection on an outpatient basis and in an inpatient setting.

Materials and Methods

In the course of the study, the analysis of the cost of illness including complete treatment regimens in outpatient and inpatient settings was carried out, and...
the analysis of the cost-effectiveness of medications for etiotropic therapy recommended by the Ministry of Health in clinical guidelines (version 10, dated February 8, 2021).

We identified the following cost categories: Direct medical, direct non-medical, and indirect.

Direct medical costs include the cost of medication therapy, the cost of diagnostic procedures, and the cost of providing services by medical professionals.

Direct non-medical costs are determined only for inpatients: Cost of a bed-day (excluding medication therapy costs).

In terms of indirect costs, payments for temporary incapacity for work were calculated.

On an outpatient basis, the cost of individual medications was estimated based on the average prices of pharmacies in the city of Moscow [3].

Since medications are presented on the pharmaceutical market in different forms and dosages, it is recommended to perform calculations based on the active ingredient (AI). However, it should be borne in mind that on an outpatient basis, a patient, as a rule, buys medicines for their own money, and in a pharmacy, medications are sold in whole packages, even if the consumer does not need the full number of units of the particular dosage form. Therefore, a calculation based on the number of packages is also necessary. We took most medications of a low price category and, if possible, with a minimum difference between the required number of units of a dosage form and their number in a real package [4], [5], [6].

The required amount of AI or packages for a full course for a specific medicinal product was determined based on the dosage regimens recommended by the Ministry of Health of Russia [2].

The cost of individual medications recommended for use in a hospital setting was calculated based on the state register of maximum selling prices (except for remdesivir, which is not included in it). At the same time, the marginal wholesale mark-up allowed for Moscow and the Moscow region, and the value-added tax was added to the indicated prices [7].

The price for remdesivir was obtained from the Rustekhprom distributor.

Since medications from the Vital and Essential Drugs list are presented in different forms and dosages, the calculation was carried out based on the AI [4], [5], [6].

If the treatment regimen assumed relatively equivalent alternative solutions for the medications of symptomatic, pathogenetic, and antibacterial therapies, then the price calculated based on the arithmetic mean was taken for them.

We made a complete list of direct non-medical costs based on the information provided in the temporary clinical guidelines for the diagnosis, prevention, and treatment of COVID-19 coronavirus infection [2].

The cost of each medical intervention was estimated under Appendices 11, 8.2, 6 to the Tariff Agreement for 2020 dated December 30, 2019 [7], [8], [9].

The required number of visits to a medical specialist or diagnostic procedures was also determined based on clinical guidelines and consultation with health professionals. In particular, to assess the length of stay of patients in a hospital, we proposed the following gradation depending on the severity of the disease:

- Mild: 7 days;
- Moderate: 10 days;
- Severe, cytokine storm: 16 days, then the patient switched to another form of the disease;
- Extremely severe: 5 days on a ventilator, then the patient goes into a serious condition.

Direct non-medical costs, in particular, the cost of a bed (excluding the cost of medication therapy), which amounted to 1500 rubles/day, were estimated based on the average value of the price lists of clinics in the Moscow region.

We also assumed that on average:

- With outpatient treatment and mild therapy in a hospital, the period of temporary disability (TD) will last 14 days;
- With a moderate form it will last 17 days;
- In severe or extremely severe forms, or with cytokine storm, it will last 30 days.

The further calculation was carried out according to the formulas presented in Table 1.

### Table 1: Formulas

| Formula | Description |
|---------|-------------|
| 1) The costs due to TD | Cost (TD) = (GDPP + TD) * n |
| 2) The average per capita GDP per year | GDP = GDPP |
| 3) The average per capita GDP per day | GDPP = GDP |
| 4) Per capita income | D = D/30 |
| 5) Payments on TD sheets | TD = D * (80/100) |

The effectiveness criterion for cost-effectiveness analysis was determined based on the results of data
from clinical trials of medications for etiotropic therapy (umifenovir, remdesivir, and favipiravir) on the Internet, in particular, in PubMed, Clinical Trials, Cline Line, Cochrane and Library databases.

Hydroxychloroquine, which is used in Russia as a medication for etiotropic therapy, was recognized as ineffective against coronavirus infection in the framework of the Solidarity study initiated by the WHO. Therefore, it is not advisable to further evaluate it [12].

The main condition for inclusion in the analysis of clinical trials was the completeness of the data provided according to the following criteria: Study design, comparison medications, conditions of randomization, characteristics of participants, presented results, and at least complete information on the primary endpoint.

The list of clinical trials for the above medications with their brief characteristics is presented in Tables 2–4.

The cost-effectiveness ratio was calculated using the following formulas:

Comparative effectiveness research (CER) = Cost/Ef

where CER is the cost-effectiveness ratio of the technology;

Cost is the costs associated with technology in monetary terms;

Ef is the clinical effectiveness of the technology, expressed in the appropriate units [11].

CER = ((DC1 + IC1) – (DC2 + IC2))/(Ef1 – Ef2) (9)

Where, CER is an indicator of an increase in cost-effectiveness (demonstrating what additional investments are required to achieve one additional unit of effectiveness when using a more efficient technology);

DC1 is the direct costs when using technology 1;

IC1 is the indirect costs when using technology 1;

DC2 and IC2 are the direct and indirect costs for technology 2, respectively;

Ef1 and Ef2 are the treatment effects when using technologies 1 and 2, respectively [11].

Evaluation of the medications was carried out for a specific form of coronavirus infection, that is, for a

Table 2: List of clinical trials for the medication with the international non-proprietary name (INN) remdesivir

| Source | Number of patients, age | Design of the study | Duration of the study | Comparison alternative | The severity of the disease | Primary endpoint |
|--------|-------------------------|---------------------|----------------------|------------------------|-----------------------------|-----------------|
| [13]   | 237 (158, 79), ≥18 years | Randomized, double-blind, placebo-controlled, multicenter trial | 28 days | Remdesivir + lopinavir-ritonavir, interferons, corticosteroids, placebo + lopinavir-ritonavir, interferons, corticosteroids | Severe form | Time of clinical improvement up to 28 days on a 6-point scale of clinical status (21 – remdesivir, 23 – placebo) |
| [14]   | 596 (197, 199, 200), ≥18 years | Phase 3 randomized open-label trial | 28 days | Remdesivir for 5 days, remdesivir for 10 days, CT for 10 days | Moderate form | Clinical status on the 11 th day on a 7-point scale: 68%: Remdesivir for 10 days, 74%: Remdesivir for 5 days, 64%: CT Recovery time: 10: Remdesivir, 15: Placebo |
| [15]   | 1062 (521, 541), ≥18 years | Randomized, double-blind, placebo-controlled, multicenter trial | 29 days | Remdesivir, placebo | Mild, moderate, severe | |
| [16]   | 61, ≥18 years | Uncontrolled prospective observational study | 28 days | Remdesivir | Severe | Clinical status on day 18 (improvement): 68% |

Table 3: List of clinical trials for the medication with INN favipiravir

| Source | Number of patients, age | Design of the study | Duration of the study | Comparison alternative | The severity of the disease | Main endpoints |
|--------|-------------------------|---------------------|----------------------|------------------------|-----------------------------|----------------|
| [17]   | 89 (44, 45), ≥16 years | Multicenter open-label randomized trial | 45 days | Favipiravir (immediate and delayed intake) | Mild | Virus elimination by day 6: 66.7%, 56.1%, elimination by day 10: 86.1%, 83.1% Elimination of the virus on day 4: 22.86%, 17.78% Day 9: 58.25%, 35.55% Day 14: 91.43%, 62.22% |
| [18]   | 80 (35,45), ≥16 years | Multicenter open-label randomized trial | 28 days | Favipiravir+Interferon (IFN) alpha, CT, Lopinavir/ritonavir + IFN-alpha, CT | Severe | Clinical recovery rates on the seventh day: 71/116, 62/120 |
| [19]   | 236 (116, 120), ≥18 years | Prospective, randomized, controlled, open-label, multicenter study | 17 days | CT+Favipiravir | Mild, moderate severity | The median time to achieve elimination of the virus on day 3 is 71.40%, 57.10% On the 9 th day: 81.20%, 67.90% |
| [20]   | 168 (112; 56) | Multicenter, open, randomized, Phase III clinical trial with active control in outpatients and inpatients | 28 days | Favipiravir+INF-alpha/ Hydroxychloroquine+INF alpha | Mild, moderate severity | |

Table 4: List of clinical trials for the medication with INN umifenovir

| Source | Number of patients, age | Design of the study | Duration of the study | Comparison alternative | The severity of the disease | Main endpoints |
|--------|-------------------------|---------------------|----------------------|------------------------|-----------------------------|----------------|
| [19]   | 236 (116, 120), ≥18 years | Prospective, randomized, controlled, open-label, multicenter study | 17 days | CT+Favipiravir | Mild, moderate severity | Clinical recovery rates on the seventh day: 71/116, 62/120 |
| [21]   | 86 (34, 35, 17), ≥18 years | A single-center randomized controlled trial | 21 days | Lopinavir+Ritonavir, Umifenovir | Mild, moderate severity | Elimination of the virus on day 7: 35.3%, 37.1%, 41.2% On day 14: 85.3%, 91.4%, 76.5% |
| [22]   | 50 (34, 16), ≥18 years | Single-center randomized controlled trial | 38 days | No therapy Lopinavir/Ritonavir, Arbidol | Moderate severity | Elimination of the virus on day 14: Arbidol: 100%, Lopinavir/Ritonavir: 56.4% |
mild degree, a comparison of umifenovir and favipiravir is required, and for moderate and severe forms, favipiravir is compared with remdesivir.

Results and Discussion

The cost of illness analysis

The cost of medication therapy on an outpatient basis and in a hospital setting is indicated in Tables 5 and 6, respectively.

As can be seen from Table 5, in most cases, the cost of complete medication therapy is higher when calculated by the number of packages, which justifies our estimate of costs by the number of packages. Exceptions can be explained by the fact that there is a significant difference between the minimum and maximum prices for medications.

Direct medical costs (except for medication therapy) included in the outpatient setting included: Blood draw from a vein, bleeding; study of the erythrocyte sedimentation rate; study of the level of platelets in the blood; blood processing, including registration, an appointment with the district general practitioner (diagnostic, primary, and at home); an appointment with the district general practitioner (diagnostic, repeated, and outpatient visit); test of a blood smear for the analysis of abnormalities in the morphology of erythrocytes, platelets, leukocytes, performing the blood count, pulse oximetry, and polymerase chain reaction (PCR) diagnostics. In addition, for treatment regimens with hydroxychloroquine, electrocardiogram and determination of aspartate transaminase and alanine aminotransferase were taken into account. Furthermore, with a moderate degree, as a rule, an ambulance was called, and computed tomography of one anatomical region was performed in adults (without contrast).

In the hospital setting, for all forms, we took into account the ambulance visit, PCR diagnostics, pulse oximetry, computed tomography, general blood analysis, and consultation with a general practitioner in a hospital. For the moderate form, a coagulogram study is additionally carried out, and a study of the level of protein C, ferritin in the blood, and a biochemical blood test (11 indicators) are performed; for a severe form, consultations of narrow specialists are needed, for an extremely severe form, membrane oxygenation is taken into account.

The level of direct non-medical costs was calculated depending on the severity of the disease:

Mild form: 1500 * 7 = 10,500 rubles.
Moderate form: 1500 * 10 = 15,000 rubles.
Severe form: 1500 * 21 = 31,500 rubles.

Based on statistical data, it was found that the working-age population was 82,264 thousand people, the total GDP per year amounted to 185,534 billion rubles, and the monthly income per capita was 24,381.1 rubles [21].

Therefore, GDP = 85,534 * 10^9 / 82,264 * 10^3 = 2,255,348.63 rubles.

GDP_d = 2,255,348.63/365 = 6179.04 rubles.
D_d = 24,381.1/30 = 812.70 rubles.
TD = 812.70 * 0.8 = 650.16 rubles.
650.16 * 14 = 9102.24 rubles.
650.16 * 17 = 11,052.72 rubles.
650.16 * 30 = 19,504.80 rubles.

Thus, the total costs of outpatient and inpatient therapy are presented in Tables 7 and 8, respectively.

Thus, it can be concluded that, in an outpatient setting, for all forms of the disease, treatment regimens with hydroxychloroquine will be the most beneficial from the economic point of view. The most expensive medication from the consumer’s point of view is favipiravir.

Table 5: Costs for a full course of medication therapy per one person on an outpatient basis

| Form                        | Medications                             | Costs-1 (by number of packages) | Costs-2 (by AI) | The difference in the value of costs (1 vs. 2), % |
|-----------------------------|-----------------------------------------|---------------------------------|-----------------|-----------------------------------------------|
| Mild                        | Faviopiravir, INF-alpha (intranasal), paracetamol | 11,476.50                      | 10,360.00       | 10.78                                         |
| Treatment regimen 1         |                                         | 12,702.38                      | 13,080.00       | -2.89                                         |
| Treatment regimen 2         | Hydroxychloroquine, INF-alpha (intranasal), paracetamol | 1401.45                        | 1440.00         | -2.68                                         |
| Treatment regimen 3         | Umifenovir, INF-alpha (intranasal), paracetamol | 2153.27                        | 2352.00         | -8.45                                         |
| Moderate (without pneumonia)| Faviopiravir, INF-alpha (intranasal), paracetamol, Rivaroxaban OR Apixaban | 14,841.81                      | 13,080.25       | 13.47                                         |
| Treatment regimen 1         | Hydroxychloroquine, INF-alpha (intranasal), Paracetamol, Rivaroxaban OR Apixaban | 16,067.69                      | 15,800.25       | 1.69                                          |
| Treatment regimen 2         |                                         | 4766.76                        | 4160.25         | 14.58                                         |
| Antibacterial therapy       | Amoxicillin + clavulanic acid OR amoxicillin OR azithromycin OR levofloxacin OR moxfloxacin OR clarithromycin | 812.68                        | 803.85          | 1.00                                          |
| (according to indications) |                                         |                                 |                 |                                               |
| Moderate with pneumonia     | Faviopiravir, rivaroxaban OR apixaban, dexamethasone OR prednisolone OR methylprednisolone | 14,574.09                      | 12,467.15       | 16.90                                         |
| Treatment regimen 1         | Hydroxychloroquine, rivaroxaban OR apixaban, dexamethasone OR prednisolone OR methylprednisolone | 15,799.97                      | 15,187.15       |                                               |
| Treatment regimen 2         |                                         | 4499.04                        | 3547.15         | 10.44                                         |
| Antibacterial therapy       | Amoxicillin + clavulanic acid OR amoxicillin OR azithromycin OR levofloxacin OR moxfloxacin OR clarithromycin | 812.68                        | 803.85          | 26.84                                         |

Open Access Maced J Med Sci. 2021 Oct 16; 9(E):1182-1189.
In a hospital setting, for mild-to-moderate forms, the use of hydroxychloroquine is also the least expensive alternative. The most expensive medication is the medication with INN remdesivir.

For severe and extremely severe forms, only one treatment regimen with INN is presented (favipiravir).

Regimens for the treatment of cytokine storms cannot be unambiguously compared, since their use is largely determined by the individual characteristics of the patient.

**Cost-effectiveness analysis**

To evaluate favipiravir and umifenovir, study No. 3 from Table 3 was selected since there is a direct comparison of these medications. The criterion of effectiveness is the frequency of complete elimination of the virus on day 7 (Tables 9 and 10).

The effectiveness coefficient is calculated according to formula 8, presented in the Materials and methods section.

If we focus only on the CER value, then the use of umifenovir is the most profitable in terms of cost-effectiveness ratio, since fewer costs are required to treat one person. However, the study found that the favipiravir contributed to the complete elimination of the virus in a larger number of people, therefore, incremental analysis is required to assess the increment of the cost-benefit unit according to formula 9:

CER = \( \frac{(986,000 - 119,381)/(61 - 52)}{96,291} \)

The resulting number is, therefore, the added cost of increasing the number of recoveries per 100 people/week using favipiravir.

To evaluate favipiravir and remdesivir, no studies were conducted that were completely identical in design and endpoints, therefore, based on the maximum possible similarity of endpoints, study No. 2 and No. 2 from Tables 2 and 3, respectively, were selected.

The effectiveness criterion is the frequency of complete virus elimination on day 11 in the remdesivir group and the frequency of complete virus elimination on day 9 in the favipiravir group (Tables 11 and 12).

The effectiveness coefficient is calculated according to formula 1 presented in section 2.1.

### Table 6: Costs for a full course of medication therapy per one person in a hospital setting

| Form          | Medications                  | Costs       |
|---------------|------------------------------|-------------|
| Mild          | Treatment regimen 1          | 14,234.37   |
|               | Hydroxychloroquine, INF-alpha (intranasal), enoxaparin sodium | 16,654.37 |
|               | Treatment regimen 2          | 5965.01     |
|               | Treatment regimen 3          | 6958.17     |
| Moderate      | Treatment regimen 1          | 47,714.80   |
|               | Remdesivir, baricitinib OR tofacitinib, enoxaparin sodium | 50,134.80 |
|               | Treatment regimen 2          | 149,244.80  |
|               | Treatment regimen 3          | 39,445.44   |
|               | Treatment regimen 4          | 65,645.00   |
|               | Treatment regimen 5          | 167,175.00  |
|               | Treatment regimen 6          | 57,375.64   |
| Severe (pneumonia with respiratory insufficiency (RI) or acute respiratory distress syndrome (ARDS)) | Treatment regimen 1 | 163,981.46 |
|               | Treatment regimen 2          | 155,733.18  |
|               | Treatment regimen 3          | 2,403,397.23|
|               | Treatment regimen 4          | 2,404,046.43|
|               | Treatment regimen 5          | 5370.18     |
|               | Treatment regimen 6          | 155,511.46  |
| Cytokine storm| Treatment regimen 1          | 163,981.46  |
|               | Methylprednisolone, tocilizumab OR sarilumab, enoxaparin sodium | 156,382.38 |
|               | Treatment regimen 2          | 155,733.18  |
|               | Treatment regimen 3          | 2,403,397.23|
|               | Treatment regimen 4          | 2,404,046.43|
|               | Treatment regimen 5          | 5370.18     |
|               | Treatment regimen 6          | 155,511.46  |

### Table 7: The results of the cost of illness analysis per one person in an outpatient setting

| Form          | Medications                  | Costs       |
|---------------|------------------------------|-------------|
| Mild          | Treatment regimen 1          | 14,234.37   |
|               | Hydroxychloroquine, INF-alpha (intranasal), enoxaparin sodium | 16,654.37 |
|               | Treatment regimen 2          | 5965.01     |
|               | Treatment regimen 3          | 6958.17     |
| Moderate      | Treatment regimen 1          | 47,714.80   |
|               | Remdesivir, baricitinib OR tofacitinib, enoxaparin sodium | 50,134.80 |
|               | Treatment regimen 2          | 149,244.80  |
|               | Treatment regimen 3          | 39,445.44   |
|               | Treatment regimen 4          | 65,645.00   |
|               | Treatment regimen 5          | 167,175.00  |
|               | Treatment regimen 6          | 57,375.64   |
| Severe (pneumonia with RI, ARDS) | Treatment regimen 1 | 163,981.46 |
|               | Treatment regimen 2          | 155,733.18  |
|               | Treatment regimen 3          | 2,403,397.23|
|               | Treatment regimen 4          | 2,404,046.43|
|               | Treatment regimen 5          | 5370.18     |
|               | Treatment regimen 6          | 155,511.46  |
| Cytokine storm| Treatment regimen 1          | 163,981.46  |
|               | Methylprednisolone, tocilizumab OR sarilumab, enoxaparin sodium | 156,382.38 |
|               | Treatment regimen 2          | 155,733.18  |
|               | Treatment regimen 3          | 2,403,397.23|
|               | Treatment regimen 4          | 2,404,046.43|
|               | Treatment regimen 5          | 5370.18     |
|               | Treatment regimen 6          | 155,511.46  |

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Table 8: The results of the cost of disease analysis in a hospital setting for one person

| Form          | Treatment regimen                                      | Cost category         | Costs, rubles | Total costs, rubles |
|---------------|--------------------------------------------------------|-----------------------|---------------|---------------------|
| **Mild**      | Treatment regimen 1 (with favipiravir)                 | Direct medical        | 24,123.35     | 55,103.47           |
|               |                                                        | Direct non-medical    | 10,500.00     |                     |
|               |                                                        | Indirect             | 9102.24       |                     |
|               | Treatment regimen 2 (with hydroxychloroquine)         | Direct medical        | 14,839.29     | 34,441.53           |
|               |                                                        | Direct non-medical    | 10,500.00     |                     |
|               |                                                        | Indirect             | 9102.24       |                     |
|               | Treatment regimen 1 (with umifenovir)                 | Direct medical        | 15,637.15     | 35,239.39           |
|               |                                                        | Direct non-medical    | 10,500.00     |                     |
|               |                                                        | Indirect             | 9102.24       |                     |
| **Moderate**  | Treatment regimen 1 (with favipiravir + kinase inhibitor) | Direct medical        | 62,507.42     | 88,560.14           |
|               |                                                        | Direct non-medical    | 15,000.00     |                     |
|               |                                                        | Indirect             | 11,052.72     |                     |
|               | Treatment regimen 2 (with remdesivir + kinase inhibitor) | Direct medical        | 162,827.42    | 188,880.14          |
|               |                                                        | Direct non-medical    | 15,000.00     |                     |
|               |                                                        | Indirect             | 11,052.72     |                     |
|               | Treatment regimen 3 (with hydroxychloroquine + kinase inhibitor) | Direct medical        | 53,223.36     | 79,276.08           |
|               |                                                        | Direct non-medical    | 15,000.00     |                     |
|               |                                                        | Indirect             | 11,052.72     |                     |
|               | Treatment regimen 4 (with favipiravir + monoclonal antibodies [MA]) | Direct medical        | 81,647.62     | 107,700.34          |
|               |                                                        | Direct non-medical    | 15,000.00     |                     |
|               |                                                        | Indirect             | 11,052.72     |                     |
|               | Treatment regimen 5 (with remdesivir + MA)            | Direct medical        | 180,757.62    | 206,810.34          |
|               |                                                        | Direct non-medical    | 15,000.00     |                     |
|               |                                                        | Indirect             | 11,052.72     |                     |
| **Severe**    | Treatment regimen 1 (with favipiravir)                 | Direct medical        | 199,114.86    | 250,119.76          |
|               |                                                        | Direct non-medical    | 31,500.00     |                     |
|               |                                                        | Indirect             | 19,504.80     |                     |
|               | Treatment regimen 6 (with hydroxychloroquine + MA)    | Direct medical        | 623,137.09    | 674,141.89          |
|               |                                                        | Direct non-medical    | 31,500.00     |                     |
|               |                                                        | Indirect             | 19,504.80     |                     |
| **Extremely severe** | Treatment regimen 1 (with favipiravir)            | Direct medical        | 188,322.67    | 239,327.47          |
|               |                                                        | Direct non-medical    | 187,673.47    | 238,678.27          |
|               |                                                        | Indirect             | 31,500.00     |                     |
| **Cytokine storm** | Treatment regimen 1                                   | Direct medical        | 2,435,337.52  | 2,486,342.32        |
|               |                                                        | Direct non-medical    | 2,435,866.72  | 2,486,991.52        |
|               |                                                        | Indirect             | 31,500.00     |                     |
|               | Treatment regimen 2                                   | Direct medical        | 2,435,784.72  | 2,486,890.32        |
|               |                                                        | Direct non-medical    | 31,500.00     |                     |
|               |                                                        | Indirect             | 19,504.80     |                     |
|               | Treatment regimen 3                                   | Direct medical        | 187,451.75    | 238,456.55          |
|               |                                                        | Direct non-medical    | 187,673.47    | 238,678.27          |
|               |                                                        | Indirect             | 31,500.00     |                     |
|               | Treatment regimen 4                                   | Direct medical        | 2,436,115.80  | 2,486,120.60        |
|               |                                                        | Direct non-medical    | 2,435,986.72  | 2,486,991.52        |
|               |                                                        | Indirect             | 31,500.00     |                     |
|               | Treatment regimen 5 (in case of contraindications to genetically engineered medications) | Direct medical        | 2,436,115.80  | 2,486,120.60        |
|               |                                                        | Direct non-medical    | 2,435,986.72  | 2,486,991.52        |
|               |                                                        | Indirect             | 31,500.00     |                     |
|               | Treatment regimen 6 (in case of contraindications to hyaluronic acid (HA)) | Direct medical        | 2,436,115.80  | 2,486,120.60        |
|               |                                                        | Direct non-medical    | 2,435,986.72  | 2,486,991.52        |
|               |                                                        | Indirect             | 31,500.00     |                     |
|               | Treatment regimen 6 (in case of contraindications to hyaluronic acid (HA)) | Direct medical        | 2,436,115.80  | 2,486,120.60        |
|               |                                                        | Direct non-medical    | 2,435,986.72  | 2,486,991.52        |
|               |                                                        | Indirect             | 31,500.00     |                     |

Table 9: Required information on the clinical trial for the umifenovir and favipiravir medications

| Medication | Number of people | Observed effect, % | The cost of the medication for one person, rub |
|------------|------------------|--------------------|---------------------------------------------|
| Favipiravir| 116              | 71/116, 61.2%      | 9860.00                                     |
| Umifenovir | 120              | 62/120, 51.67%     | 1193.81                                     |

Therefore, in this case, the cheapest and most effective alternative is favipiravir. Therefore, incremental analysis is not required.

Table 10: Results of the cost-effectiveness analysis for umifenovir and favipiravir

| Medication | Number of people | Observed effect (out of 100 people) | CER   |
|------------|------------------|-------------------------------------|-------|
| Favipiravir| 100              | 61                                  | 986,000/61 = 16,163.93 |
| Umifenovir | 100              | 52                                  | 119,381/52 = 2295.79 |

Conclusion

In the course of the cost of illness analysis, calculations and estimates of direct medical, direct non-medical, and indirect costs were carried out. As a result of this study, it was found that the most appropriate from an economic point of view is the use of hydroxychloroquine for the treatment of mild and moderate forms of infection.

Table 11: Required information on the clinical trial for remdesivir and favipiravir

| Medication | Number of people | Observed effect, % | The cost of the medication for one person, rub |
|------------|------------------|--------------------|---------------------------------------------|
| Remdesivir | 199              | 49.24%             | 110,000                                     |
| Favipiravir| 80               | 56.21%             | 9860.00                                     |

However, the cost-effectiveness analysis found that the use of this medication as an etiotropic therapy is not justified. Therefore, according to the results of the study, the most effective medication for the treatment of moderate and severe forms is favipiravir. When conducting a similar analysis for the...
References

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