# Ways to Optimize Medical Services for Covid-19 Patients

**J.A. Rizaev1, Z. B. B. Umirzakov1, S. E. Umirov2**
Samarkand State Medical Institute1
Center for Professional Development of Medical Personnel2

**Abstract:**

The timing of detection and hospitalization of patients with COVID-19 is an indicator of the quality and consistency of medical services, coordination and integration of the activities of various levels, specialties of the health care system and play an important role from a clinical and epidemiological point of view. In the Samarkand region Republic of Uzbekistan, 219 238 people were tested in 2020, of which 1,1% had SARS-COV-2 RNA. A positive result was observed in 1,4% of cases when taking samples at home from townspeople and in 1,07% when taking samples directly in laboratories for COVID-19, i.e. community sampling of patients did not adversely affect quality analysis. In patients treated in a hospital, COVID-19 proceeded from mild to moderate in 71,0% of cases and without pneumonia - in 33,0%. Consequently, it is necessary to rethink the organizational aspects of patient care, with an emphasis on the provision of outpatient care.

**Key words:** COVID-19, early diagnosis, laboratory diagnosis, outpatient treatment.

**Introduction.** The future dynamics of COVID-19 clinical manifestations in patients, the outcome, and the likelihood of transmission of the disease to others are events determined by many factors. Among these factors, early detection and correct diagnosis of the patient plays an important role, both clinically and epidemiologically [1, 5-8]. In particular, as in all infectious diseases, timely detection of disease in COVID-19 serves as a basis for the elimination of epidemiological risk, identification and implementation of appropriate measures by isolating the source of infection. It should be noted that due to the fact that COVID-19 is a completely new problem for the health system, the issue of proper organization of the process of diagnosis and treatment of this disease and the management of patients is recognized by experts as one of the priorities [2-4, 9-11].
Therefore, based on the assessment of the current state of diagnosis of COVID-19, scientific research should be conducted to improve the organizational aspects of this process and the results should be actively used in future laboratory tests, isolation, distribution and management of patients. is of great scientific and practical position.
Research materials and methods. In order to determine the optimal organizational solutions for the provision of qualified medical care to the population for the diagnosis of COVID-19, in Samarkand region in 2020, a total of 2506 registered patients "outpatient medical card" (025-h), "inpatient medical card" (003- h) analyzed the data on the diagnostic process, the duration of diagnosis and hospitalization of the patient, as well as the distribution of the clinical course of the disease according to the severity.
The diagnosis of COVID-19 in patients and its severity was made on the basis of patient complaints, objective clinical data, epidemiological anamnesis, specific laboratory analyzes and the results of additional examination (functional, equipment, laboratory methods). The diagnosis of all patients included in the study was formalized in accordance with the section "Codes used in emergencies" KHT-10, updated by the World Health Organization (WHO) in January 2020, and belongs to the special code rubric COVID-19 U07.1.
The diagnosis of COVID-19 was confirmed by detection of SARS-CoV-2 RNA by nucleic acid amplification method (NCAU) using polymerase chain reaction.

The severity of COVID-19 in patients was assessed in accordance with WHO guidelines, the Ministry of Health of the Republic of Uzbekistan "Recommendations for the management of patients with COVID-19 coronavirus infection." Diagnosis and assessment of pulmonary damage in COVID-19 patients was performed using radiography, ultrasound, computed tomography (CT) 6-7 days after the onset of the disease in moderately severe, severe and very severe cases. In this case, computed tomography of the chest organs was adopted as the main method, taking into account clinical and laboratory data.

Epidemiological, socio-hygienic, molecular-genetic, clinical-laboratory and statistical methods were used in the research.

**2. Findings and discussion**. Analysis of the timing of diagnosis (referral to a medical institution) in Samarkand region shows that on the first day of the disease, 3.0%, on days 2-3, 26.0% of patients were diagnosed / referred, the majority - 71.0% of patients detected after day (Figure 1).

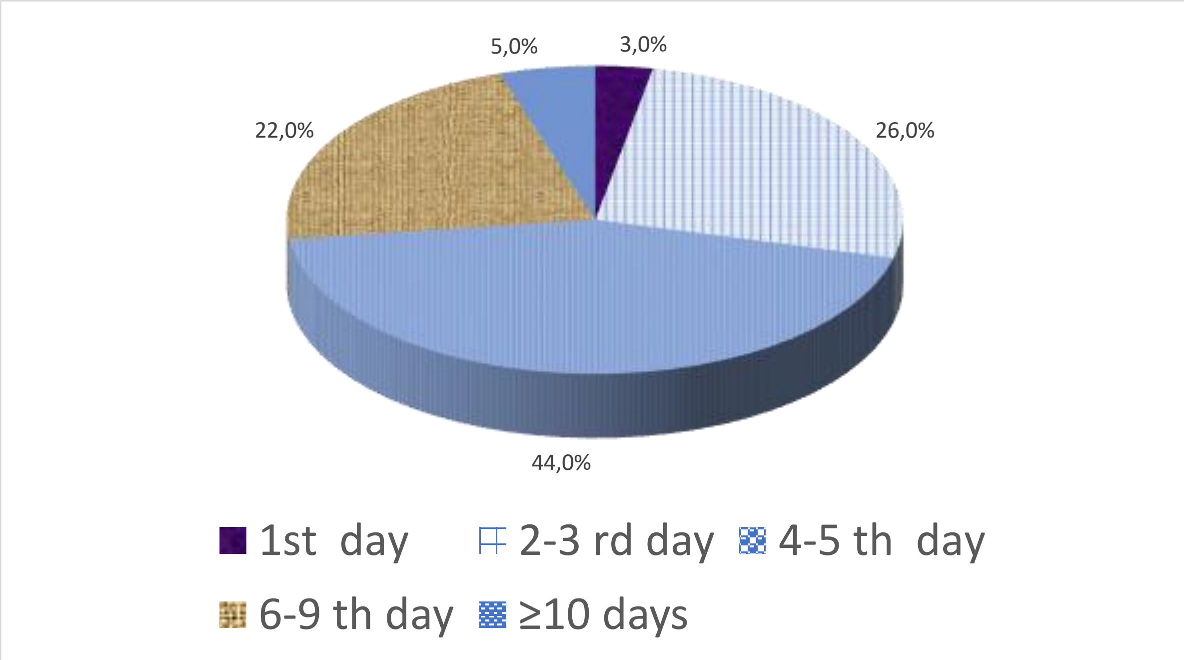


**Figure 1.** Terms of submission of COVID-19 patients to the medical institution (Samarkand region, 2020)

Lack of timely detection or late access to medical care for patients with COVID-19-specific clinical symptoms, lack of strict guidelines for the organization and provision of medical services to the population in the early stages of the disease (2020), as well as citizens This is due to the fact that the perception of the disease is not sufficiently formed, which in turn requires the development, implementation and further improvement of mechanisms for early detection of diseases in the population during a pandemic.

Analysis of hospitalization times of patients diagnosed with COVID-19 shows that 32.0% of patients were hospitalized on the day of diagnosis / diagnosis, 62.0% of patients on days 2-3 of diagnosis, and 6.0% of patients late - on day 4 (2 -picture).

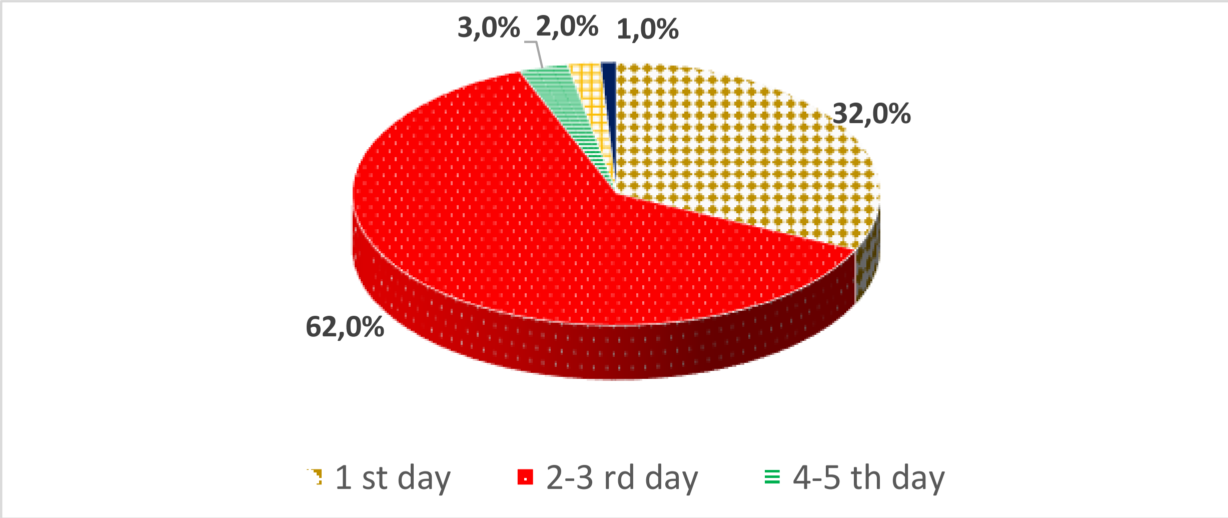


**Figure 2.** Terms of hospitalization of COVID-19 patients (Samarkand region, 2020)

The periods of hospitalization of patients with COVID-19 are an indicator of the quality and coherence of medical services, coordination and integration of activities of different links, specialties of the health system.

PCR analysis is a popular method used to confirm the diagnosis in a set of measures to reduce morbidity and mortality associated with COVID-19 infection. To ensure specific diagnosis of COVID-19, on March 16, 2020 in the (former) virology laboratory of the Regional Agency for Sanitary and Epidemiological Surveillance was launched detection of SARS-CoV-2 RNA by the method of nucleic acid amplification (NKAU) (Table 1). Based on the emerging epidemic situation and the growing need in the region, laboratories 2-COVID-19 (27.04.2020), 3-COVID-19 and 4-COVID-19 (16.08.2020) aimed at providing a specific diagnosis of the disease. activities have been launched. As of December 31, 2020, a total of 219,238 individuals had been tested for the presence of SARS-CoV-2 RNA in these 4 laboratories, with the majority of analyzes being 1-COVID-19 (58.8%) and 2-COVID-19 (39.2). %) in laboratories. In The 3rd laboratory of COVID-19 and 4-COVID-19, 0.8% and 1.2% of individuals were verified, respectively.

**Table 1**

Stream and operation of specialized laboratories for the diagnosis of COVID-19 (Samarkand region, 2020)

| № | Base of Laboratory | Period of activity | number of PCR machine | Number of doctors | Total amount of examined persons | |
|---|---|---|---|---|---|---|
| | | | | | Abs. | % |
| 1. | **The 1st laboratory of COVID-19** | 16.03.2020* → | 5 | 8 | 128964 | 58,8 |
| 2. | **The 2nd laboratory of COVID-19** | 27.04 -30.10.2020 | 4 | 7 | 85976 | 39,2 |
| 3 | **The 3rd laboratory of COVID-19** | 16.08.2020*→ | 2 | 3 | 1719 | 0,8 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **4** | **The 4th laboratory of COVID-19** | 16.08 -31.12.2020 | 1 | 2 | 2579 | 1,2 |
| **Total** | | | **12** | **20** | **219238** | **100,0** |

* → -laboratory continues its work.

As of December 31, 2020, a total of 2,506 (1.1%) individuals had SARS-CoV-2 RNA detected in laboratory tests (Table 2). In particular, a total of 128,964 people were tested in the laboratory 1-COVID-19, of which 1,225 people had a positive result, the detection rate of SARS-CoV-2 RNA was 0.95%. The detection rate of SARS-CoV-2 RNA was 1.3% in laboratory 2-COVID-19, 3.5% in laboratory 3-COVID-19 and 4.6% in laboratory 4-COVID-19. It can be seen that the detection rate of SARS-CoV-2 RNA differs significantly in these laboratories.

**Table 2**

Frequency of detection of SARS-CoV-2 RNA in the groups tested for COVID-19 (Samarkand region, 2020)

| **Serial number of COVID-19 laboratory** | **Total amount of examineed persons** | **SARS-CoV-2 РНК +** | | **Confirmation index** |
|---|---|---|---|---|
| | | **Abs.** | **%** | |
| **The 1st Laboratory** | 128964 | 1225 | 0,95±0,02 | 1:105 |
| **The 2nd Laboratory** | 85976 | 1102 | 1,3±0,04 | 1:78 |
| **The 3rd Laboratory** | 1719 | 60 | 3,5±0,4 | 1:28 (p<0,05)* |
| **The 4th Laboratory** | 2579 | 119 | 4,6±0,4 | 1:21 (p<0,05)* |
| **Total** | **219238** | **2506** | **1,14±0,02** | **1:87** |

* 1 laboratory, 2 laboratories and relative to the total

In order to clarify the reasons for the differences in the activities of laboratories specializing in laboratory testing for COVID-19 and to assess the frequency of detection of SARS-CoV-2 RNA, all participants were examined in 4 categories - quarantine facilities after returning to Uzbekistan from abroad, supposed COVID-19 were analyzed in groups of people who had been in contact with a COVID-19 patient, as well as in groups of health workers (Table 3).

**Table 3**

Occurrence of detection of SARS-CoV-2 RNA in the groups tested for COVID-19 (Samarkand region, 2020)

| **Serial number of COVID-19 laboratory** | **Groups tested for the presence of SARS-CoV-2 RNA** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Citizens coming back from abroad** | | | **Persons suspected of COVID-19** | | | **Individuals in contact with a COVID-19 patient** | | | **Medical Staff** | | |
| | **Exemined** | **SARS-CoV-2 RNA +** | | **Exemined** | **SARS-CoV-2 RNA +** | | **Exemined** | **SARS-CoV-2 RNA +** | | **Examined** | **SARS-CoV-2 RNA +** | |
| | | **Abs.** | **%** | | **Abs.** | **%** | | **Abs.** | **%** | | **Abs.** | **%** |
| **1st lab** | **11445** | **186** | **1,6** | **41212** | **372** | **0,9** | **74112** | **599** | **0,8** | **2195** | **43** | **1,9** |
| **2nd lab** | **13215** | **85** | **0,6** | **29713** | **137** | **0,5** | **42927** | **861** | **2,0** | **121** | **19** | **15,7** |
| **3rd lab** | **132** | **10** | **7,6** | **153** | **19** | **12,4** | **1347** | **28** | **2,1** | **87** | **3** | **3,4** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **4th lab** | **352** | **8** | **2,3** | **689** | **29** | **4,2** | **811** | **47** | **5,8** | **727** | **35** | **4,8** |
| **Total** | **25144** | **289** | **1,2** | **71767** | **557** | **0,8** | **119197** | **1535** | **1,3** | **3130** | **125** | **4,0** |

An over-all of 25,144 returning nationals were placed in quarantine zones, all of whom were screened for NARS for the presence of SARS-CoV-2 RNA, and 289 (1.2%) of them were found to have COVID-19. As a result of laboratory tests, positive results were observed in 557 (0.8%) of persons suspected of COVID-19, 1535 (1.3%) of persons in contact with patients and 125 (4.0%) of medical staff.

The results of the analysis show that the differences in the activities of laboratories, the fact that most of the tests performed in laboratories 1-COVID-19 and 2-COVID-19 were applied to citizens under medical supervision in quarantine facilities after returning from abroad and did not improve differentiation in the early stages of COVID-19. This is explained by the fact that the patients being treated and those who came in contact with them were involved in laboratory tests on a large scale. Naturally, at this time, when the spread of the disease around the world is now taking the form of a pandemic, the proportion of people infected with this infection was low among citizens returning to our country from abroad and those suspected of COVID-19 according to various clinical symptoms.

The 3rd laboratory of COVID-19 and the 4th laboratory of COVID-19 were set up in COVID-19 hospitals established after the outbreak of the disease among the population of the region. therefore, the frequency of detection of SARS-CoV-2 RNA was observed among them.

To evaluate the organizational aspects of conducting laboratory tests and their impact on the level of detection, the process of involving subjects in COVID-19, ie sampling, was analyzed (Figure 3).

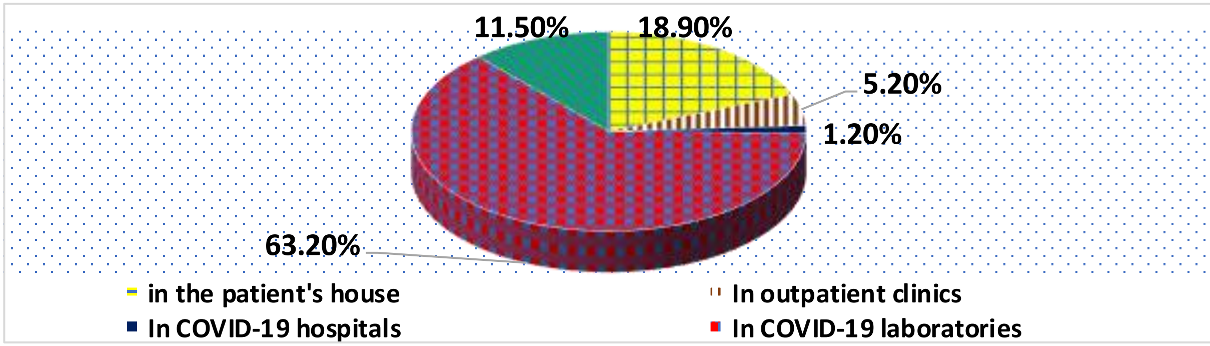


**Figure 3.** Distribution of tested samples with respect to SARS-CoV-2 RNA (Samarkand region, 2020)

Out of a total of 219,238 people who underwent specific laboratory tests for COVID-19 in March-December 2020, 41,407 (18.9%) were in their homes, 11,362 (5.2%) were in outpatient clinics, 2,632 (1 , 2%) in COVID-19 inpatient clinics, 138693 (63.2%) in direct COVID-19 laboratories and 25144 (11.5%) in quarantine facilities for analysis of SARS-CoV-2 RNA. From the data presented, it can be seen that the samples for analysis were obtained directly in COVID-19 laboratories in the vast majority of cases.

During the period of quarantine and restriction procedures, COVID-19 suspects, and persons in need of medical care for COVID-19 in general, should be referred to various treatment-and-prophylaxis facilities (DPMs), including COVID-19, for samples for specific diagnostic laboratory analysis. self-referral to laboratories leads to aggravation of patients' condition and increased epidemiological risk.

In this regard, the guideline assessed the impact of the location of sampling for laboratory analysis on existing individuals, i.e., the quality of the analysis - the results of sampling in the patient's home or DPM - on the detection rate of SARS-CoV-2 RNA (Figure 4).

A total of 2,506 (1.14%) of those involved in specific laboratory testing for COVID-19 were found to have SARS-CoV-2 RNA. In particular, samples for analysis were taken by 575 (1.4%) people in their homes, 129 (1.13%) people in outpatient clinics, 28 (1.06%) people in COVID-19 hospitals, COVID Positive results of SARS-CoV-2 RNA were observed in 1485 (1.07%) individuals in laboratory -19 and in 289 (1.15%) individuals in quarantine amenities.

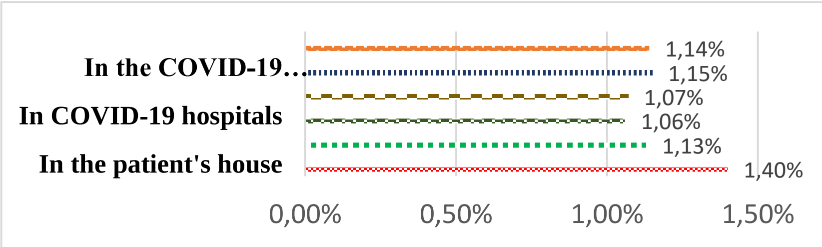


**Figure 4.** Degree of detection of SARS-CoV-2 RNA depending on the place of sampling (Samarkand region, 2020)

It can be seen that the samples taken for analysis by citizens in their own homes did not adversely affect the quality of the analysis. In contrast, the level of detection of SARS-CoV-2 RNA in samples taken by citizens in their homes is slightly higher than in samples taken in laboratories, various treatment and prevention facilities or in the quarantine facility COVID-19.

As a result of the analysis, 601 (24.0%) of 2506 COVID-19 patients had mild disease and 1178 (47.0%) had moderate disease (Figure 5). Severe and very severe cases of the disease were reported in 476 (19.0%) and 251 (10.0%) patients, respectively. It was found that COVID-19 disease was present in the majority of patients (71.0%) in mild and moderately severe clinical forms.

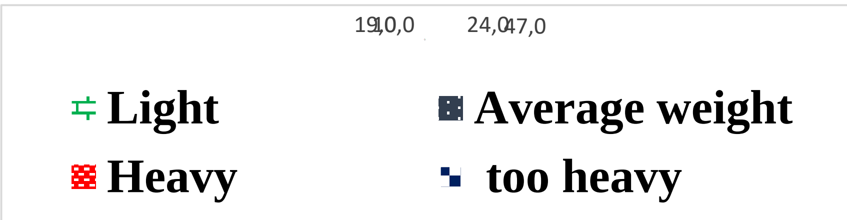


**Figure 5.** Severity of the disease in patients with COVID-19 (Samarkand region, 2020,%)

In addition to the fact that the presence of pneumonia in patients is considered one of the factors determining the clinical course of COVID-19, it is also an objective criterion for assessing the severity of the disease. In the mild form of the disease, no symptoms of pneumonia were observed. In this regard, the frequency of detection of urticaria was analyzed only in individuals with moderate severity, severe and very severe COVID-19 (Table 4). Because the development of COVID-19-associated sepsis varies according to the age of the patients, this condition has been studied separately in children under 18 years of age and in individuals over 18 years of age.

**Table 4**

Frequency of detection of COVID-19 depending on the severity (Samarkand region, 2020)

| **Categories of Patients** | **The severity and frequency of detection of COVID-19** | | | | | | | | | **Total** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Average severe** | | | **Severe** | | | **very severe** | | | | | |
| | **N** | **pneumonia** | | **N** | **pneumonia** | | **N** | **pneumonia** | | **N** | **pneumonia** | |
| | | **Abs** | **%** | | **Abs** | **%** | | **Abs** | **%** | | **Abs** | **%** |
| **≤18 years old** | 82 | 8 | 9,7 | - | - | - | - | - | - | 82 | 8 | 9,7 |
| **≥18 years old** | 1096 | 603 | 55,0 | 476 | 421 | 88,4 | 251 | 251 | 100,0 | 1823 | 1275 | 69,9 |
| **All patients** | 1178 | 611 | 51,8 | 476 | 421 | 88,4 | 251 | 251 | 100,0 | 1905 | 1283 | 67,3 |

The prevalence of COVID-19 in moderately severe, severe, and very severe patients was 67.3% on average, increasing in proportion to the severity of the clinical course of the disease, i.e., 51.8% in moderate and severe forms, respectively. observed in 88.4% and 100.0% of cases, respectively. In the group of patients under 18 years of age we studied, moderate to severe disease was reported in 82 children, of whom 8 (9.7%) were diagnosed with pneumonia. Severe and very severe forms of the disease have not been reported among children. In the group of patients over 18 years of age, an average of 69.9% of cases were registered, including 55.0% in moderate to severe disease, 88.4% in severe and very severe forms, and 100.0%, respectively.

## 4. Constraint

The timing of detection and hospitalization of COVID-19 patients is an indicator of the quality and coherence of medical services, coordination and integration of activities of different links, specialties of the health system.

**5. Conclusions.** The results of the study indicate the need for a differential approach to the organization of medical care for these patients (outpatient or inpatient), depending on the clinical course of COVID-19. The presence of COVID-19 in light and moderate weight in 71.0% of cases requires priority in the provision of medical care to these patients, and the main emphasis is on the excellent provision of outpatient services. In the current epidemic situation, the procedure for early detection of COVID-19 patients through "Online Patronage" and pre-hospital services should be organized and implemented on the basis of a certain algorithm in terms of economic feasibility and epidemiological safety.

The scope of target contingents involved in the application of COVID-19 specific laboratory testing and the logistics of sampling for specific laboratory testing, ie where and by whom sampling of patients should be performed, must be clearly defined. The best solution is to take samples from individuals who have instructions for laboratory tests for SARS-CoV-2 RNA, and to organize them at the place of residence of citizens as part of outpatient medical care for COVID-19.

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