

MINISTRY OF HEALTHCARE OF THE REPUBLIC OF KAZAKHSTAN

NCJSC « SEMEY MEDICAL UNIVERSITY»



**MAUKAYEVA S.B., TRENINA V.A.,  
TOKAYEVA A.Z., ZHUNUSSOV E.T., PIVINA L.M.,  
BULEGENOV T.A., BATENOVA G.B.**

**TRIAGE / MEDICAL SORTING PROCEDURE FOR COVID-19 AT  
THE STAGES OF PROVIDING MEDICAL CARE  
(GUIDELINES)**

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These guidelines contain a description of the methods and algorithms for conducting medical sorting of patients, zoning of the territories of medical institutions at various stages of emergency medical care in the context of the COVID-19 pandemic in the Republic of Kazakhstan. Criteria for determining the severity of the condition of patients with coronavirus infection are presented, checklists are developed that make it possible to objectify the severity of the patient's condition and choose the optimal route for his evacuation.

**UDC: 614.446.3+578.834.1**

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## List of abbreviations, symbols

MERS	Middle Eastern Respiratory Syndrome
MV	Mechanical ventilation
ELISA	Enzyme-linked immunosorbent assay
BPC	Biological Protection Suit
CVI	Coronavirus infection
CQCSGS	Committee for Quality Control and Safety of Goods and Services
CT	Computed tomography
MI	Medical institution
ARVI	Acute respiratory viral infection
PHC	Primary Health Care
PCR	Polymerase chain reaction
PPE	Personal protective equipment
SARS	Severe acute respiratory syndrome
SpO2	Oxygen Saturation

## Introduction

Medical sorting of patients, both at the hospital and prehospital levels, requires the development of very accurate standard criteria for clinical and economic efficiency, safety, and the availability of timely medical care. Each of the triage systems known in the world has its own characteristic features, but almost all the sorting methods analyzed use the approach according to which all patients are divided into specific categories, depending on which the time of medical care is determined. Such a unified approach makes it possible to quickly determine whether a particular patient belongs to a risk group and provide emergency care in a timely manner [1].

The main problem when conducting medical triage and emergency care at the hospital stage is the fact that we are faced with a limited supply system with unpredictable fluctuations in demand. In extreme conditions, such as global pandemics, the health system can be weakened to such an extent that it cannot provide the necessary resources. To remain functional in conditions of extreme demand, hospital systems must increase available resources or find ways to effectively redistribute them [2].

COVID-19 is a new acute respiratory disease caused by coronavirus (CV). This disease first manifested itself in November 2019, when cases of SARS began to appear among sellers and market visitors in Wuhan (China). After a series of microbiological and virological studies in January 2020, it became clear that the disease is caused by a new HF, which was not previously seen among people. Horseshoe bats are considered to be a natural reservoir of HF, but the intermediate host is not known. The rapid spread of COVID-19 among the population of different countries of the world was facilitated by the active movement of people, which is why on March 11, 2020, WHO announced the status of a pandemic [3].

Since the beginning of the XXI century, this is the third outbreak of the disease caused by CV. The first outbreak was observed from November 2002 to July 2003 and was called the Severe Acute Respiratory Syndrome (SARS) [4]. The second outbreak began in April 2012 among the population of the Middle East, which is why the disease was called the Middle East Respiratory Syndrome (MERS). Unlike SARS, episodic cases of MERS are observed today [5]. All three CVs have great genetic similarities, which is why diseases differ in similar pathogenesis and clinical manifestations. Most people have mild to moderate symptoms, and fatigue, fever and dry cough are the main signs of the disease. Risk factors for severe course are old age and the presence of concomitant diseases such as diabetes, chronic respiratory diseases and pathology of the cardiovascular system [6].

COVID-19, like SARS and MERS, can be spread within the health system when the virus is transmitted from patients to health workers and back. The possibility of such a transfer means the need for sanitary-hygienic measures and the availability of an effective infection control service. In addition, the establishment of a triage system, in which patients are sorted according to the

severity of their disease or the risk of infection of other people, can counteract the nosocomial spread of infection [6].

The emergency department of a multidisciplinary hospital, ambulance stations and family medical outpatient clinics are currently the fundamental link in patient sorting for the detection of COVID-19. To create a barrier to the spread of this viral infection, it is necessary to create a triage system that uses clearly defined criteria for infectious alertness. The situation is aggravated by a very limited number of unified clinical guidelines or protocols for the medical classification of patients with coronavirus infection for all countries [7, 8].

World experience of recent days indicates the presence of features and differences in terms of demographic indicators, clinical signs, the course of this viral disease, affecting the severity and prognosis. If at the initial stages of the spread of COVID-19, one of the most important indicators of the presence of infection was the epidemiological history - the patient spent the last month in countries such as China, South Korea, Iran, Italy, France, Germany, Spain, Switzerland, Great Britain, Norway, USA, as well as contact with people returning from these countries, as the number of patients with a confirmed diagnosis or suspicion of it increases, the importance of this criterion decreases, which is caused by the presence of patients with no epidemiological history [9, 10].

The experience of Chinese doctors working in Wuhan showed the highest risk of poor prognosis in elderly patients (over 60 years old) with comorbid pathology (diabetes mellitus, chronic heart failure, etc.). At the same time, the situation with COVID-19 in Italy shows a significant proportion of young and even children in the structure of sick patients [9].

The successful use of triage for patients with HF infection was noted during the outbreaks of SARS and MERS, as there is some evidence. So, during the outbreak of SARS, a nosocomial spread of infection occurred in one of the largest clinics in Taiwan as a result of the hospitalization of a patient who returned from China. Over the next few days, his wife and son were hospitalized, as well as a resident anesthetist who intubated the trachea to the first patient. As a result of this incident, the clinic revealed another 7 cases of infection and 14 cases of suspected infection. The Taiwanese government has made an immediate decision to impose quarantine on 1,300 patients and healthcare providers. The development and implementation of the triage system helped prevent the further spread of infection [11].

Another example of the fight against outbreak of nosocomial infection is South Korea, where on May 22, 2015 a patient with MERS was hospitalized in one of the clinics in Seoul and where, due to initially incorrect tactics, several large multidisciplinary clinics were infected. In order to stop this outbreak, triage system was developed based on the differentiation of patients with fever and other signs of respiratory disease from all other patients. This triage system was tested in practice and brought to perfection as a result of a number of corrections and changes that were made based on feedback [12].

In March 2020, guide to the clinical management of patients with COVID-19 in resource-limited settings was published in Australia, authors of which offer

their vision of the triage system. The manual emphasizes the importance of distinguishing between patients with respiratory symptoms from other patients and the introduction of provisional clinics, where patients with mild manifestations of the disease will be hospitalized, without fever or signs of serious illness. In addition, this guide draws attention to the need to establish clear criteria for hospitalization, isolation and discharge of patients with COVID-19, as well as the opening of isolation wards in each clinic to minimize the spread of infection [8].

The clinical guideline COVID-19 pandemic: triage for intensive-care treatment under resource scarcity, published by Swiss researchers in March 2020, proposes to consider a short-term prognosis for a patient as a decisive criterion for sorting patients for admission to ICU. Age alone should not be used as a criterion, as this may cause discrimination against older people, but it should be taken into account according to the main criterion of “short-term prognosis,” since older people are more likely to suffer from concomitant diseases. In connection with COVID-19, age is a risk factor for mortality and should therefore be taken into account [13].

In China, the following diagnostic criteria were used to sort patients:

1. Epidemiological history (stay abroad, contact with patients with fever and respiratory symptoms)
2. Clinical manifestations: fever, respiratory symptoms;
3. Normal or reduced total white blood cell count or reduced lymphocyte count in the early stages of onset;
- 4) A case with one of the following three conditions is defined as critical: 1) shock state 2)  $NPV \geq 30$  beats per minute or  $SPO_2 \leq 93\%$  at rest, as well as the need for mechanical ventilation [14].

As predictors of disease severity, Chinese researchers examined:

- indicators of an increase in the level of lactate dehydrogenase above 365 U / L as an indicator of lung tissue damage, which determines the further development of fibrosis;
- C-reactive protein above 41.2 mg / l as an indicator of inflammation leading to the development of acute respiratory distress syndrome, followed by pulmonary edema;
- lymphopenia below 14% as an indicator of the severity of damage to the immune system caused by lymphocyte infiltration;
- reduction of oxygen saturation below 93% [14].

Persons with an unfavorable epidemiological history or having two clinical manifestations without an epidemiological history are identified as suspected cases. Suspected case goes into the category confirmed by a positive SARS-CoV-2 nucleic acid test in airway or blood samples detected by PCR [14].

In Italy, sorting of possible cases of infection was carried out in order to ensure continuous medical care and protect health workers from infection through a telephone interview conducted by a nurse. This phase focuses on identifying patients who may even have mild forms of COVID-19. The nurse asks each patient if, within

the previous 48 hours, there was: 1) fever, shortness of breath or cough; 2) he / she (or his / her relatives) have recently been to known areas of the outbreak; 3) he / she had direct contact with people who are known to have COVID-19; 4) he / she had direct contact with people who are currently in quarantine. The same questionnaire is addressed to the patient's relatives [15].

The current uncertainties and difficulties in the system of medical care for patients in the context of the COVID-19 pandemic have led to the need to develop medical sorting algorithms for COVID-19 at various stages of medical care.

To select diagnostic criteria that determine the severity of patients with coronavirus infection in the Republic of Kazakhstan during medical screening, we determined the following:

1) Epidemiological history (stay abroad, contact with patients with fever and respiratory symptoms)

2) Clinical manifestations: the presence of fever and signs of respiratory tract damage (ARVI, pneumonia) in accordance with the checklist

3) NPV 30 per min or more

4) SpO<sub>2</sub> <93%

5) Leukopenia, lymphopenia, aneosinophilia

6) CT signs of pneumonia, usually > 50% lung damage

7) heart rate of more than 120 beats / min

8) Positive test result for COVID-19

To objectify the obtained data, we developed a checklist for COVID-19 at the prehospital level for emergency doctors, doctors of a healthcare facility with a point count, which makes it possible to objectify the situation, determine the severity of the patient's condition and select the optimal route for evacuation.

In these methodological developments, we presented algorithms for sorting patients in the context of the COVID-19 pandemic at various stages of medical care. The basis for their development was the Decree of the chief sanitary doctor of the Republic of Kazakhstan No.33 "On strengthening quarantine measures" dated 04/14/2020 [16]; clinical protocol No. 90 of the Ministry of Health of the Republic of Kazakhstan "Coronavirus infection - COVID-19" dated 15.04.2020 [17]; internationally accepted guidelines for triage of patients at the prehospital and hospital stages, orders of the Ministry of Health of the Republic of Kazakhstan on emergency medical care [18-22].



## MAIN PART

### 1 The procedure for medical sorting at COVID-19 when calling the ambulance team

The triage algorithm for patients with probable COVID-19 when calling the ambulance team is presented in Figure 1.

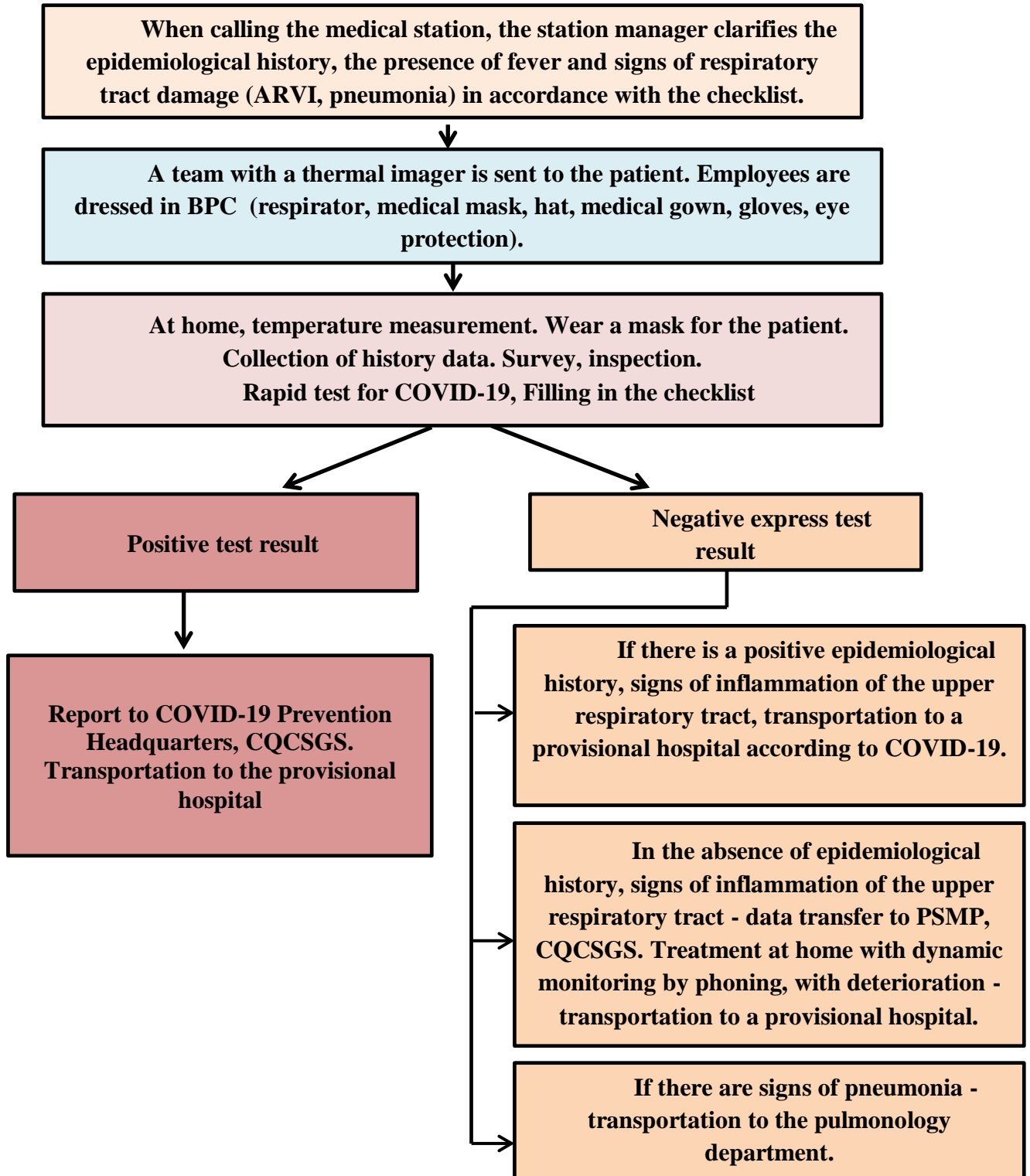


Figure 1 - Algorithm for triage of patients with probable COVID-19 when calling the ambulance team

At the ambulance station, the dispatcher, upon receiving a call, clarifies the patient's epidemiological history, the presence of fever, symptoms of respiratory tract infections (ARVI, pneumonia), conducts a survey in accordance with the checklist (figure 2), if the data are available, sends a call to the emergency team medical care (SMP).

**Attention:** the dispatcher notifies the KKKBTU and the COVID-19 prevention headquarters about the call.

Surname, name, patronymic \_\_\_\_\_  
 Age \_\_\_\_\_ Gender \_\_\_\_\_ IIN \_\_\_\_\_  
 Profession \_\_\_\_\_  
 Home address \_\_\_\_\_

Indicator	Evaluation
Epidemiological history	Yes
	No
Body temperature (the patient measures independently)	Above 37 degrees
	Normal
Cough	Yes
	No
Catarrhal phenomena (runny nose, tickling/sore throat)	Yes
	No
Shortness of breath	Yes
	No

Full name of dispatcher \_\_\_\_\_

Date \_\_\_\_\_

Figure 2 - Checklist for COVID-19 when receiving call on ambulance station (filled dispatcher)

Upon arrival, medical personnel perform thermometry with a thermal imager at least a meter away, put on a medical mask on the patient in the presence of respiratory symptoms / fever. Medical professionals conduct express test for COVID-19. In case of a positive result, information about a possible infection is communicated to the patient, then repeated testing is carried out.

While waiting for the result of the COVID-19 test, the medical worker collects the patient's epidemiological history, interviews, conducts a physical examination, and fills out the checklist (figure 3). The maximum number of points in accordance with the checklist may be 25.

Surname, name, patronymic \_\_\_\_\_  
 Age \_\_\_\_\_ Gender \_\_\_\_\_ IIN \_\_\_\_\_  
 Profession \_\_\_\_\_  
 Home address \_\_\_\_\_

Indicator	Evaluation	Number of points
Epidemiological history	Yes – 1 point	
	No – 0 points	
Body temperature	Above 37 degrees – 3 points	
	Normal - 0 points	
Cough	Yes – 3 points	
	No – 0 points	
Catarrhal phenomena (runny nose, tickling/sore throat)	Yes – 1 point	
	No – 0 points	
Shortness of breath	Yes – 3 points	
	No – 0 points	
RR	Above 25 per minute – 3 points	
	No – 0 points	
SpO2	Below 95% - 5 points	
	Above 95% - 0 points	
The presence of wheezing, weakened breathing in the lungs during auscultation	Yes – 3 points	
	No – 0 points	
Heart rate	90> per minute – 1 point	
	<90 per minute – 0 points	
Disorders of consciousness	Yes - 1 point	
	No – 0 points	
SBP below 90 mmHg.	Yes - 1 point	
	No – 0 points	
	Sum of points:	

Full name of doctor (paramedic) \_\_\_\_\_  
 Date \_\_\_\_\_

Figure 3 - Checklist for COVID-19 at the prehospital level  
 (doctor / paramedic ambulance)

If there are signs of inflammation of the upper respiratory tract (fever, cough, catarrhal phenomena), the number of points varies from 0-8. In this case, with a positive double result of the rapid test for IgM, the patient is sent by ambulance to the provisional hospital, if the result is negative – diagnosis of ARVI, treatment at home with a call 2 times a day by employee of the primary health care. If there are signs of pneumonia (fever, cough, shortness of breath, decreased oxygen saturation, wheezing and impaired breathing – 9-25 points), with positive test result of the rapid test, patient is sent by ambulance to infectious diseases hospital, if negative - to pulmonology department. The checklist must be attached to the accompanying sheet.

If the result of a repeated rapid test for COVID-19 is positive, the medical worker transmits the data to the dispatcher of the ambulance station, the dispatcher fills out an emergency notification and reports the detected case to the CQCSGS and the regional headquarters for the prevention of COVID-19. A patient with suspected COVID-19 is evacuated from his whereabouts and delivered to a provisional hospital, with preliminary informing the responsible hospital doctor about the upcoming hospitalization.

If the rapid test result is negative, but there is positive epidemiological history, fever, signs of upper respiratory tract damage, transportation to the provisional hospital is carried out using COVID-19. Patient data is transmitted to CQCSGS and the regional headquarters on COVID-19.

With negative result, an express test in the presence of signs of damage to the lower respiratory tract (pneumonia) is transported to the pulmonary department. Patient data is transmitted to the CQCSGS and regional headquarters on COVID-19.

In the absence of epidemiological history, signs of inflammation of the upper respiratory tract, patient data are transmitted to primary care. Treatment is carried out at home with dialing 2 times a day by a primary health care provider on checklist (figure 2). Patient data is transferred to the CQCSGS. In case of negative result of the PCR test for COVID-19, the patient is transferred to the pulmonology department, with positive result, he is transferred to the infectious diseases hospital by the ambulance team according to COVID-19 in special capsule.

An ambulance transport equipped with a capsule for transporting a patient suspected of having COVID-19 is used to transport patient from provisional hospital to infectious hospital in the case of COVID-19 confirmed by PCR diagnostics. Members of the ambulance team put on hospital bed and travel to the patient's location with suspected COVID-19. In infectious diseases hospital, vehicles drive up directly to the box allocated for the hospitalization of the patient.

Ambulance medical personnel must undergo PCR testing for COVID-19 once a month and subsequently for clinical and epidemiological indications.

The list of necessary resources at the stage of sorting at the ambulance level includes: 1) color tags (bracelets); 2) patient log; 3) call log; 4) accompanying sheet; 5) pulse oximeter; 6) BPC; 7) masks for patients; 8) express diagnostic test on COVID-19; 9) laptop computer+ printer; 10) liquid soap dispenser+ antiseptic

dispenser + paper towels; 11) stethoscope with blood pressure cuff; 12) thermal imaging camera; 13) phone, alarm button; 14) bactericidal lamp; 15) approved form of emergency notice in CQCSGS; 16) checklists for COVID-19.

## **2 The procedure for medical sorting at COVID-19 at the primary health care organization level**

Primary health care organizations are the first barrier to a potential patient with coronavirus infection. Given the large flows of patients and the high workload of the organization's employees, the need for quarantine to service a large number of calls at the patients' place of residence, first of all, it is necessary to create and implement a clear system for sorting potentially sick patients to prevent the spread of infection and cross-infection of both the patient's environment and medical staff.

The sorting algorithm (triage) patients with probable COVID-19 when contacting a primary care facility is shown in Figure 4. To ensure appropriate protective measures in all PHC organizations, zoning of the territory into "dirty" and "clean" zones is carried out. Potentially hazardous COVID-19 infections are rooms such as a filter and an isolation ward in which potentially infected persons are placed. The "clean" zone can be attributed to the rest of the premises of the medical institution. At the same time, it is mandatory to have sanitary inspection rooms (gateways) between these two zones: both from the "clean" zone to the "dirty" and from the "dirty" zone to the "clean" in order to prevent contact of probably infected persons with other patients or employees and spread infections. For this, also in the "dirty" zone, the availability of premises for removal and collection of PPE, shower cabins for the health care facility staff is provided.

Given the need for the movement of medical personnel between these zones, personnel should be provided with sufficient number of personal protective equipment, disinfectants and sanitizers. For this, also in the "dirty" zone, the availability of premises for removal and collection of PPE, shower cabins for the health care facility employees is ensured.

Allowed the work of medical staff in the isolator and filter for no more than three hours in the first class type of anti-plague suits. Two separate entrances should be equipped in each primary health care facility: the main entrance to the organization and the entrance to the filter, while the pointer about the location of the entrance to the filter should be placed outside in front of the main entrance.

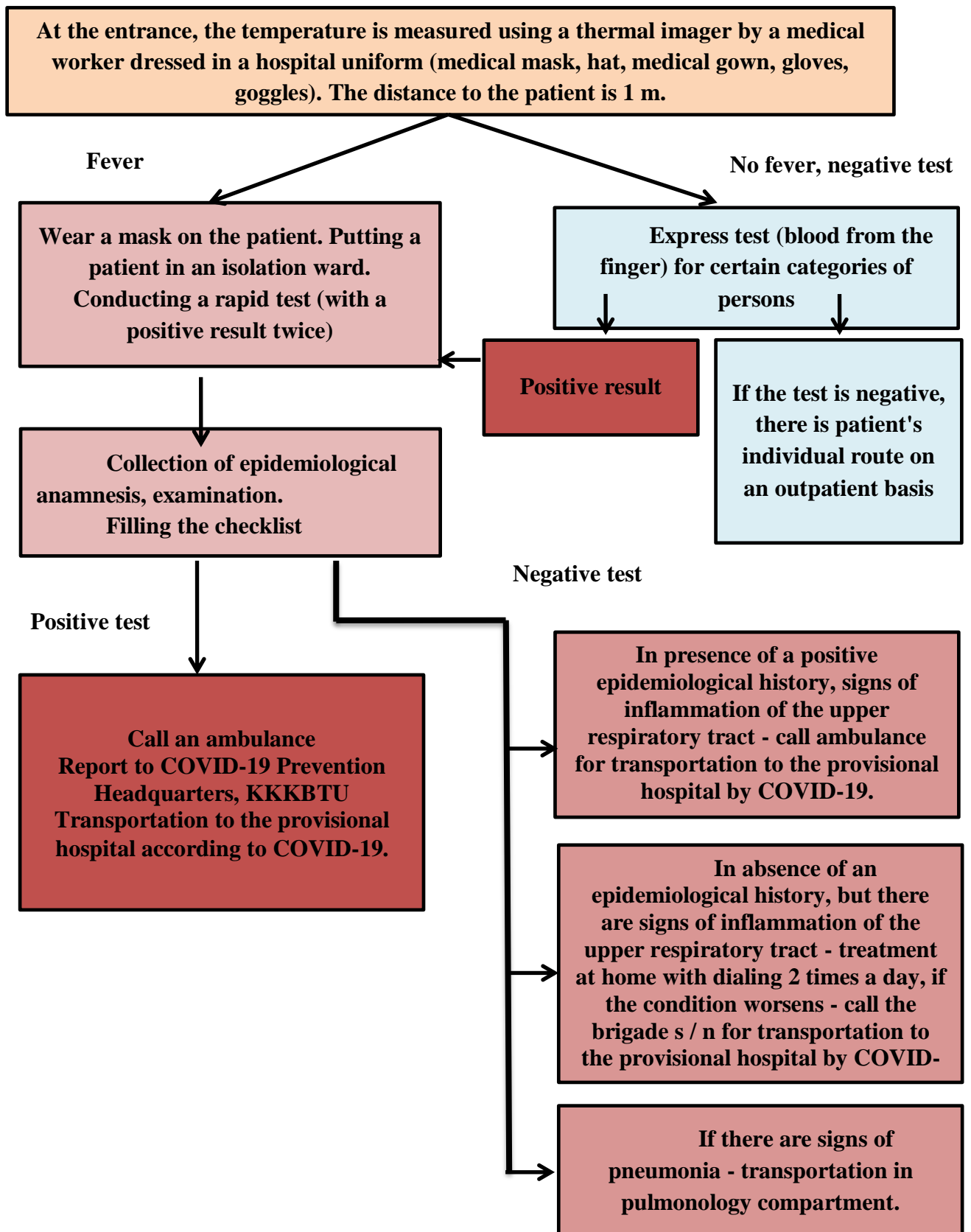


Figure 4 - Algorithm for triage of patients with probable COVID-19 when contacting a primary health care institution

Near the main entrance to all persons, including patients, accompanying persons and medical staff, temperature is measured using a thermal imager by an employee dressed in a hospital ward. The distance from the employee to the incoming person is at least 1 meter.

If there is no fever in a clean area in the designated room, an express test for COVID-19 by ELISA is performed for the following categories of the population: people with signs of acute respiratory diseases of the upper respiratory tract, patients with chronic respiratory diseases, citizens of Kazakhstan who have entered the country because of abroad, law enforcement officers taking part in measures to prevent the spread of coronavirus infection, people working in the livelihood quarantine regions of enterprises, atsienty with acute exacerbation of chronic diseases.

If fever is detected, the patient is transferred to a specially allocated room - insulator. In the isolation ward, a special medical worker puts on a medical mask on the patient, closes the windows and doors, notifies the head of primary health care and the epidemiologist about the detected case; without leaving the premises, requests and conducts an express test for COVID-19. A separate passage is needed to move infected objects: for this, an area is allocated for the unilateral transfer of objects from office premises (potentially infected zone) to the isolation chamber (infected zone).

While waiting for the result of the COVID-19 test, the medical worker collects the patient's epidemiological history, interviews, conducts a physical examination, and fills out the checklist (Figure 5). The maximum number of points in accordance with the checklist may be 25. If there are signs of inflammation of the upper respiratory tract (fever, cough, catarrhal phenomena), the number of points ranges from 0-8. In this case, with positive double result of the rapid IgM test, the patient is sent by ambulance to provisional hospital, if the result is negative – diagnosis of ARVI, treatment at home with a call 2 times a day by PHC employee. In the presence of signs of pneumonia (fever, cough, shortness of breath, decreased oxygen saturation, the presence of wheezing and weakened breathing - 9-25 points) with a positive result of the rapid test, the patient is sent by ambulance COVID-19 to the infectious hospital, with a negative - to department of pulmonology. The checklist must be attached to the cover sheet.

If the COVID-19 rapid test result is negative and there is no fever, the patient continues his route to primary health care to the necessary specialists.

If the test result is positive for COVID-19 (IgM), the test is repeated. If the second test is positive, the head of PHC and the epidemiologist are notified from the detention center, then the ambulance team is called by phone. 103 for transporting the identified patient to the provisional hospital. Epidemiologist (PHC manager) fills out an emergency notice and reports the detected case to KKKBTU and the regional headquarters for the prevention of COVID-19.

Surname, name, patronymic \_\_\_\_\_

Age \_\_\_\_\_ Gender \_\_\_\_\_ IIN \_\_\_\_\_

Profession \_\_\_\_\_

Home address \_\_\_\_\_

Indicator	Evaluation	Number of points
Epidemiological history	Yes – 1 point	
	No – 0 points	
Body temperature	Above 37 degrees – 3 points	
	Normal - 0 points	
Cough	Yes – 3 points	
	No – 0 points	
Catarrhal phenomena (runny nose, tickling/sore throat)	Yes – 1 point	
	No – 0 points	
Shortness of breath	Yes – 3 points	
	No – 0 points	
RR	Above 25 per minute – 3 points	
	No – 0 points	
SpO2	Below 95% - 5 points	
	Above 95% - 0 points	
The presence of wheezing, weakened breathing in the lungs during auscultation	Yes – 3 points	
	No – 0 points	
Heart rate	90> per minute – 1 point	
	<90 per minute – 0 points	
Disorders of consciousness	Yes - 1 point	
	No – 0 points	
SBP below 90 mmHg	Yes - 1 point	
	No – 0 points	
	Sum of points:	

Doctor's full name \_\_\_\_\_

Date \_\_\_\_\_

Figure 5 - Checklist for COVID-19 at the prehospital level  
(physician of PHC organization)



When interpreting the results of rapid testing, it must be taken into account that it can be positive for IgM (in this case, it is considered as an indicator of the acute period of COVID-19) and IgG (an indicator indicating an infection). In the case of a positive result for IgM and IgG, the stage of transition of the acute state during the convalescence period is considered.

After transportation of the patient with suspicion of COVID-19, the premises are disinfected by the type of final disinfection by an employee dressed in a type 1 anti-plague suit. All health care staff should change their personal protective equipment.

PCR testing is carried out in provisional hospital, upon receipt of a positive result, the patient is transferred to infectious diseases hospital, upon receipt of negative result, he is sent to home quarantine for 14 days and is subject to medical supervision at the place of residence by phone calls twice a day by PHC staff.

In the case of a positive IgG rapid test result, it is necessary to inform the patient about a possible transmitted viral infection, CQCSGS is notified of the test result. The general practitioner explains to the patient the need for isolation at the place of residence (stay) for 14 days and provides monitoring of his health by calling twice a day. The results obtained must be recorded in the information system of the Republican Center for Electronic Health of the Ministry of Health of the Republic of Kazakhstan.

If the rapid test result is negative, but there is a positive epidemiological history, fever, signs of damage to the upper respiratory tract, ambulance crew is being called by phone. 103 for transportation to the provisional hospital according to COVID-19. Patient data is transferred to CQCSGS.

If there is no epidemiological history, negative result of the rapid test, but there are signs of inflammation of the upper respiratory tract, treatment is carried out at home with dialing 2 times a day on the checklist (figure 6), if the condition worsens (appearance of shortness of breath), call for ambulance crew by phone. 103 for transportation to the provisional hospital according to COVID-19. Patient data is transferred to CQCSGS.

With a negative result of the rapid test in the presence of signs of damage to the lower respiratory tract (pneumonia), an ambulance team is called by phone. 103 for transportation to the pulmonology department with subsequent PCR testing. If the test result is positive, the patient is transferred to the infectious diseases hospital by the ambulance team according to COVID-19 in special capsule.

Medical staff of PHC organizations should undergo PCR testing for COVID-19 once a month and subsequently for clinical and epidemiological reasons.

Surname, name, patronymic \_\_\_\_\_  
 Age \_\_\_\_\_ Gender \_\_\_\_\_ IIN \_\_\_\_\_  
 Profession \_\_\_\_\_  
 Home address \_\_\_\_\_

Indicator	Evaluation
Epidemiological history	Yes
	No
Body temperature (the patient measures independently)	Above 37 degrees
	Normal
Cough	Yes
	No
Catarrhal phenomena (runny nose, tickling/sore throat)	Yes
	No
Shortness of breath	Yes
	No

Full name of nurse \_\_\_\_\_  
 Date \_\_\_\_\_

Figure 6 - Checklist on COVID-19 for dynamic monitoring by calling (filled out by nurse of the primary health care organization)

The list of necessary resources at the stage of sorting in PHC facilities includes: 1) color tags (bracelets); 2) patient log; 3) call log; 4) accompanying sheet; 5) pulse oximeter; 6) BPC; 7) masks for patients; 8) express diagnostic test on COVID-19; 9) laptop computer+ printer; 10) liquid soap dispenser+ antiseptic dispenser + paper towels; 11) stethoscope with blood pressure cuff; 12) thermal imaging camera; 13) phone, alarm button; 14) bactericidal lamp; 15) approved form of emergency notice in CQCSGS; 16) checklists for COVID-19.

### **3 The procedure for triage / medical sorting with COVID-19 when contacting the emergency department of a multidisciplinary hospital (self-referral or referral from health facilities)**

Multidisciplinary hospital is a medical institution in which medical care is provided to patients with various acute pathologies of the surgical and therapeutic profile by narrow specialists. Patients with probable COVID-19 may also need emergency and emergency medical care. In this regard, in a multidisciplinary hospital, the question of medical sorting of patients in order to prevent the spread of COVID-19 is most acute, since the lack of clear and understandable sorting rules or their non-observance carries the risk of closing the hospital and holding

quarantine measures, which will lead to the impossibility of providing medical care for patients even in emergency situations.

The principles of zoning of a multidisciplinary hospital correspond to those at the level of a pharmacy hospital and infectious hospitals and require the division of the territory into “clean” and “dirty” zones. A clean zone can be considered an entrance for medical personnel, residency rooms, rooms for nurses, offices of the department head, senior nurse, housewives and other rooms of staff, a sanitary unit, administrative rooms, as well as an emergency department, wards of specialized departments, operating rooms and resuscitation units for patients with a specified absence of COVID-19.

The “dirty” zone includes a filter, an isolator, as well as chambers of specialized departments, operating and intensive care units, sanitary facilities, shower cabins for patients with an updated diagnosis of COVID-19.

The laboratory room and the visual diagnostics department, the X-ray department should also be divided into clean and dirty areas. The flow of patients and employees from dirty and clean areas should not overlap.

The transition of employees from the dirty zone to the clean and in the opposite direction should be carried out through the gateway to remove and put on personal protective equipment and showers. Work with information systems, documents, food and rest of staff is carried out only in a clean area. Entrance and stay of employees and patients in a clean area in spent personal protective equipment is not allowed. Work in a dirty area is allowed for personnel no longer than three hours and only in a type 1 anti-plague suit. Dirty areas should be provided with internal communications for medical staff during the shift, as it is not permitted to use personal mobile phones there. Zoning in a hospital should be clearly separated by color or other visual signs (the red zone is “dirty”, the “clean” zone is green).

When entering or entering the territory of a multidisciplinary hospital, there must be a thermal imager with which to measure the body temperature of an employee dressed in a hospital ward. The distance from the medical staff to the patient is at least 1 meter. At the entrance to the hospital should be placed an information board that gives an idea of the distribution of the flow of patients. When a fever is detected, the patient is sent to the isolator through a separate entrance (gateway).

The flow of patients with a therapeutic and surgical profile is carried out through different hospital entrances. The tribune area should be taken out separately from the emergency department to avoid the spread of viral infection. Triage includes re-measurement of body temperature and rapid testing for COVID-19. While waiting for the result of the COVID-19 test, a medical worker dressed in a type 1 anti-plague suit collects the patient’s epidemiological history, interviews him, conducts a physical examination, and fills out the checklist (figure 7). The maximum number of points in accordance with the checklist can be 25.

Surname, name, patronymic \_\_\_\_\_

Age \_\_\_\_\_ Gender \_\_\_\_\_ IIN \_\_\_\_\_  
 Profession \_\_\_\_\_  
 Home address \_\_\_\_\_

Indicator	Evaluation	Number of points
Epidemiological history	Yes – 1 point	
	No – 0 points	
Body temperature	Above 37 degrees – 3 points	
	Normal - 0 points	
Cough	Yes – 3 points	
	No – 0 points	
Catarrhal phenomena (runny nose, tickling/sore throat)	Yes – 1 point	
	No – 0 points	
Shortness of breath	Yes – 3 points	
	No – 0 points	
RR	Above 25 per minute – 3 points	
	No – 0 points	
SpO2	Below 95% - 5 points	
	Above 95% - 0 points	
The presence of wheezing, weakened breathing in the lungs during auscultation	Yes – 3 points	
	No – 0 points	
Heart rate	90> per minute – 1 point	
	<90 per minute – 0 points	
Disorders of consciousness	Yes - 1 point	
	No – 0 points	
SBP below 90 mmHg.	Yes - 1 point	
	No – 0 points	
	Sum of points:	

Full name of the doctor \_\_\_\_\_

Date \_\_\_\_\_

Figure 7 - Checklist for COVID-19

(doctor of the emergency department of multidisciplinary hospital)

If there are signs of inflammation of the upper respiratory tract (fever, cough, catarrhal phenomena), the number of points ranges from 0-8. In this case, with positive double result of the rapid test for IgM, the patient is sent by ambulance

to the provisional hospital, with negative result - the diagnosis of ARVI, home treatment with dialing 2 times a day by PHC employee.

In the case of a positive test result or the presence of fever, information about a possible infection is transmitted to the patient, he is transferred to the isolation ward through a separate entrance, then repeated testing is carried out.

In the presence of signs of pneumonia (fever, cough, shortness of breath, decreased oxygen saturation, the presence of wheezing and weakened breathing - 9-25 points) with positive result of the rapid test, the patient is sent by ambulance COVID-19 to the infectious diseases hospital, with a negative - to department of pulmonology. The checklist must be attached to the accompanying sheet.

In the isolation ward, a special medical worker, dressed in a type 1 anti-plague suit, puts on a medical mask on the patient, closes windows and doors, notifies the head of the hospital and epidemiologist about the suspicion of COVID-19; conducts an express test for COVID-19. Separate passage is needed to move infected objects: for this, an area is allocated for the unilateral transfer of objects from office premises (potentially infected zone) to the isolation chamber (infected zone).

If there is fever, positive repeat result of the rapid test and the absence of acute therapeutic or surgical pathology requiring emergency medical intervention, an ambulance team is called up to transport the patient to a provisional hospital, where the PCR test for COVID-19 is then carried out. An emergency notice is filled out and reported to CQCSGS and the regional headquarters for the prevention of COVID-19. After transportation of the patient with suspicion of COVID-19, the airlock and isolation ward are disinfected according to the type of final disinfection by an employee dressed in a type 1 anti-plague suit.

If fever is detected, repeat test result is positive, and there is acute therapeutic or surgical pathology, the patient remains in the hospital and in the dirty zone (operating room, intensive care unit, followed by transfer to the dirty room ward). An emergency notice is filled out and reported to CQCSGS and the regional headquarters for the prevention of COVID-19. Remote consultation of infectious disease specialists, X-ray or CT monitoring of the chest organs and PCR in dynamics is carried out. The discharge of such a patient is carried out after a consultation of specialists with a decision to transfer to an infectious diseases hospital or further outpatient treatment in case of a negative result of the PCR test (in this case, it is necessary to issue instructions on home quarantine for 2 weeks).

For all patients without fever during triage, an express test for COVID-19 by ELISA is performed. Mandatory testing for COVID-19 is carried out for patients of the following groups: patients with clinical signs that do not exclude COVID-19; patients with chronic pathology of the respiratory system, endocrine system (diabetes mellitus, metabolic syndrome), and circulatory system; pregnant. If it is

necessary to provide emergency medical care until the patient is infected, all personnel involved in the medical care process will use PPE as a type 1 anti-plague suit.

In case of negative result of the COVID-19 rapid test, fever, epidemiological history, respiratory syndromes, the patient is sent to the emergency department for the diagnosis and treatment of the underlying disease.

If the rapid test result is negative, but there is a positive epidemiological history, fever, signs of damage to the upper respiratory tract, ambulance crew is being called a by phone. 103 for transportation to the provisional hospital according to COVID-19. Patient data is transferred to CQCSGS. In the absence of anamnesis, signs of inflammation of the upper respiratory tract - treatment at home with dialing of doctor (nurse) of PHC 2 times a day on the checklist (figure 6), if the condition worsens - call the ambulance team by phone. 103 for transportation to the provisional hospital according to COVID-19. Patient data is transferred to CQCSGS.

In case of a negative result of the rapid test in the presence of signs of damage to the lower respiratory tract (pneumonia), the patient is hospitalized / transported to the pulmonary department with subsequent PCR testing. If the test result is positive, the patient is transferred to the infectious diseases hospital by the ambulance team according to COVID-19 in special capsule. Patient data is transferred to CQCSGS.

In surgical and therapeutic units, dirty and clean areas should not overlap. Each case of COVID-19 is reevaluated every 2 hours. Food for patients from clean and dirty areas is provided at different times (12.30-13.00 - lunch in a clean area, 13.30-14.00 - in a dirty area) in a ward mode, dishes for these categories of patients should be separate. The discharge of patients from different zones is carried out at different times, through a separate exit.

Medical staff of multidisciplinary hospitals should undergo PCR testing for COVID-19 once a month and subsequently for clinical and epidemiological indications. The triage algorithm for patients with probable COVID-19 in a multidisciplinary hospital is presented in Figure 8.

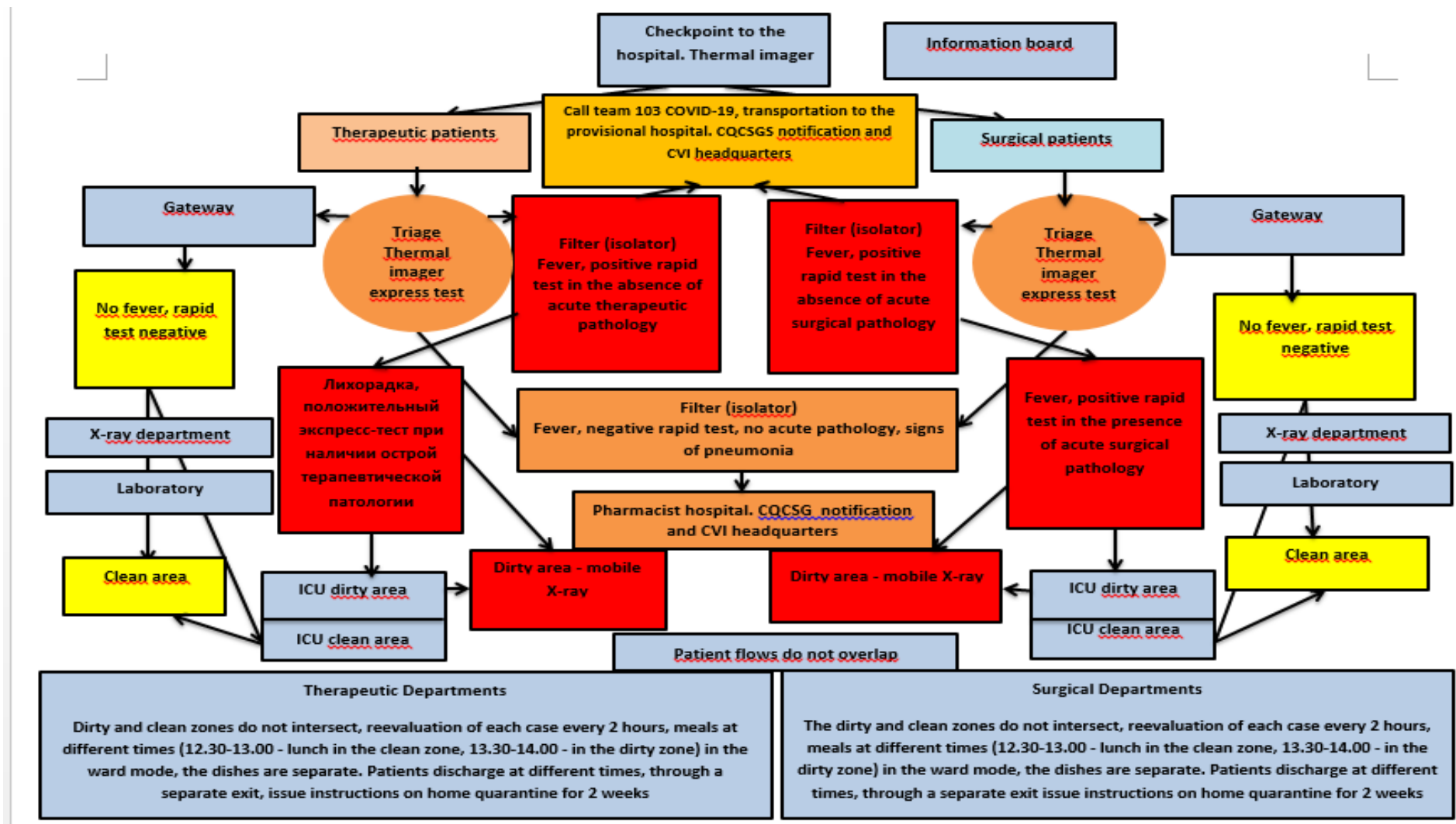


Figure 8 - Triage algorithm for patients with probable COVID-19 when contacting the emergency department of multidisciplinary hospital

The list of necessary resources at the stage of sorting at the hospital level includes: 1) color tags (bracelets); 2) log of patient admissions and hospital refusals; 3) medical card of inpatient patient (medical history); 4) direction, accompanying list; 5) pulse oximeter; 6) BPC; 7) masks for patients; 8) express diagnostic test on COVID-19; 9) laptop computer+ printer; 10) liquid soap dispenser+ antiseptic dispenser + paper towels; 11) stethoscope with blood pressure cuff; 12) thermal imaging camera; 13) phone, alarm button; 14) bactericidal lamp; 15) approved a form of emergency notice in CQCSGS; 16) checklists for COVID-19.

#### **4 Procedure for triage / medical triage at COVID-19 at the level of a provisional hospital**

Provisional hospital is intended for contact persons who are at risk according to COVID-19, persons with a positive result of an Express test using the ELISA method, with fever, signs of damage to the upper respiratory tract (ARVI) and lower respiratory tract (pneumonia), and a positive epidemiological history. Patients of these categories are delivered to the provisional hospital by SMP machines when the SMP team is called from home, from multi-specialty hospitals, and from primary health care facilities.

Zoning of the territory of the provisional hospital is carried out in "clean" and "dirty" zones. The clean zone includes an entrance for medical personnel, residents' offices, offices for secondary medical personnel, offices of the Department head, senior nurse, hostess and other staff offices, a sanitary unit, and administrative offices.

The "dirty" zone includes a filter, an isolation unit, as well as boxes and intensive care wards, sanitary units, showers for patients, a laboratory room, a visual diagnostics department, and X-ray department.

Employees moving from a dirty area to a clean one and in the opposite direction must pass through a lock for removing and putting on personal protective equipment and showers. Work with information systems, documents, food and rest of the staff is carried out only in a clean area. Employees and patients are not allowed to enter or stay in a clean area in used personal protective equipment. Work in a dirty area is allowed for staff no longer than three hours and only in a type 1 anti-plague suit. "Dirty" areas should be provided with internal communication for medical staff during the work shift, since they are not allowed to use personal mobile phones.

Differential diagnostics of COVID-19 infection with other diseases of the respiratory system using PCR diagnostics is performed in the provisional hospital. In case of a positive test result, regardless of the clinical signs, the team 103



COVID-19 is transported to the infectious hospital in a special capsule that prevents the spread of infection, with prior notification of the responsible doctor of the infectious hospital about the upcoming hospitalization. Is mandatory notification in CQCSGS and headquarters of CVI.

After transporting a patient with a confirmed diagnosis of COVID-19, the room is disinfected according to the type of final disinfection by an employee dressed in a type 1 anti-plague suit.

Upon receiving a negative result of PCR testing, a patient with fever or a positive epidemiological history is sent to a home quarantine for 14 days and is subject to dynamic medical monitoring at the place of residence by calling twice a day by PHC staff.

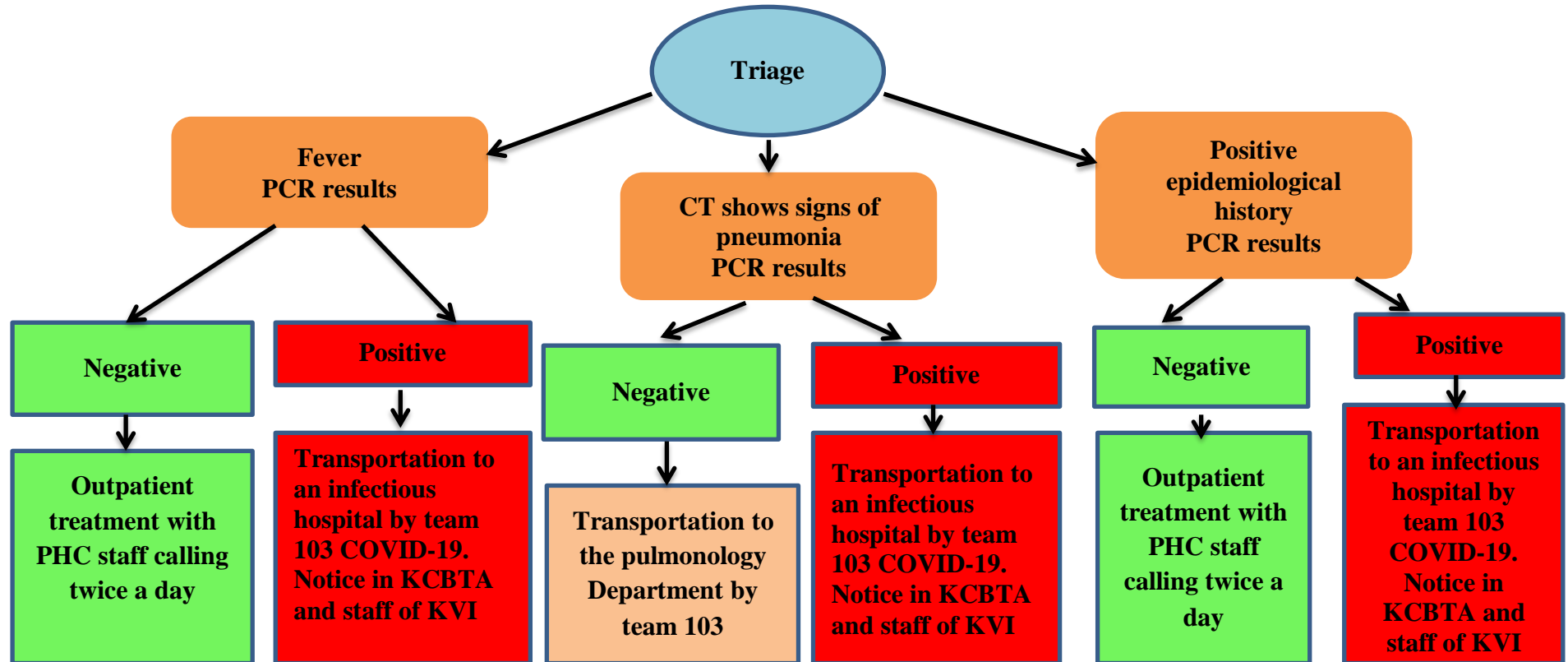
Patient with signs of pneumonia with a negative result of PCR testing is transported by team 103 to the pulmonology department of multispecialty hospital.

The following diagnostic procedures are mandatory in the provisory hospital: COVID-19 test by PCR (nasal smear, sputum in the presence of a productive cough); computed tomography and chest X-ray; detailed general blood analysis with the formula. Each case is re-evaluated every 2 hours.

Signs of the probable presence of COVID-19 in patients in provisional hospital include: positive epidemiological history, CT and X-ray-signs of pneumonia (2-sided peripheral areas of frosted glass, linear shadows, "cobblestone pavement"), positive rapid test, increased CRP level above 41.2 mg/l, lymphopenia below 14%, aneosinophilia, leukocytopenia, increased LDH > 365 U/l, troponin, D-dimer. Medical staff of dispensary hospitals should undergo PCR testing for COVID-19 1 every two weeks and thereafter for clinical and epidemiological indications.

The triage algorithm for patients with probable COVID-19 in provisional hospital is shown in figure 9.

The list of necessary resources at the stage of sorting at the hospital level includes: 1) color tags (bracelets); 2) log of patient admissions and hospital refusals; 3) medical card of inpatient patient (medical history); 4) direction, accompanying list; 5) pulse oximeter; 6) BPC; 7) masks for patients; 8) express diagnostic test on COVID-19; 9) laptop computer+ printer; 10) liquid soap dispenser+ antiseptic dispenser + paper towels; 11) stethoscope with blood pressure cuff; 12) thermal imaging camera; 13) phone, alarm button; 14) bactericidal lamp; 15) approved a form of emergency notice in CQCSGS; 16) checklists for COVID-19.



In a medical hospital, it is mandatory to conduct: COVID-19 test: PCR (nasal smear, sputum in the presence of a productive cough); CT of the thoracic segment and overview radiography; General blood analysis with the formula. The reevaluation of each case every 2 hours. Signs of the probable presence of COVID-19 in patients in a hospital include: positive epidemiological history, CT and x-ray - signs of pneumonia (2-stor. peripheral areas of frosted glass, linear shadows, "cobblestone pavement"), a positive rapid test, an increase in the level of CRP above 41.2 mg / l, lymphopenia below 14 %, an increase in LDH > 365 U/l, aneosinophilia, leukocytopenia, troponin, D-dimer.

Figure 9 - Triage algorithm for patients with COVID-19 in provisional hospital

## **5 Procedure for triage / medical triage in COVID-19 at the level of infectious diseases hospital**

In infectious diseases hospital during the COVID-19 pandemic, patients with a confirmed diagnosis are treated by PCR diagnostics.

Zoning of the territory of an infectious diseases hospital is carried out in "clean" and "dirty" zones. The clean zone includes entrance for medical personnel, residents' offices, offices for secondary medical personnel, offices of the department head, senior nurse, hostess and other staff offices, a sanitary unit, and administrative offices. The "dirty" zone includes filter, insulator, as well as boxes and intensive care wards, sanitary units, showers for patients, laboratory room, visual diagnostics Department, and X-ray department.

Employees moving from dirty area to a clean area and in the opposite direction must pass through a lock for removing and putting on personal protective equipment and showers. Work with information systems, documents, food and rest of the staff is carried out only in a clean area. Employees and patients are not allowed to enter or stay in a clean area in used personal protective equipment. Work in a dirty area is allowed for staff no longer than three hours and only in type 1 anti-plague suit. "Dirty" areas should be provided with internal communication for medical staff during the work shift, since they are not allowed to use personal mobile phones.

Reception of the patient COVID-19 is carried out by the responsible doctor of the department of emergency medicine of the hospital. Medical workers (doctor, nurse), nurses should be dressed in reinforced BPC. According to the notification scheme, an emergency notification of a patient is sent to the CQCSGS and the regional headquarters for prevention COVID-19.

Patients who are admitted to the emergency department of infectious diseases (provisional) hospital are subjected to medical sorting to determine the severity of the condition and distribution by zones. Severe (extremely severe) condition is determined if the patient has the following criteria (clinic of pneumonia with respiratory failure):

- Shortness of breath during light exercise or at rest
- RR 30 in 1 min or more
- SpO<sub>2</sub> < 93 %
- CT signs of pneumonia, usually > 50 % of lung damage
- Heart rate over 120 beats / min
- Disorders of consciousness
- Body temperature above 38 or below 36 degrees
- Shock condition
- Leukopenia, lymphopenia, aneosinophilia

In this case, the patient is in the red zone (the first level of severity of the condition). Treatment is carried out in the ICU, its staff is dressed in reinforced BPC. 5. The following criteria indicate a state of moderate severity (SARS or pneumonia clinic without severe respiratory failure):

- Shortness of breath during exercise
- RR 25-30
- SpO<sub>2</sub> < 95 %
- CT signs of pneumonia
- Increased body temperature (often febrile)
- Heart rate 90-120 beats / min
- Leukopenia, lymphopenia

The patient is in the yellow zone (the second level of severity of the condition). Treatment is performed in intensive care wards with constant monitoring of vital signs. Reassessment of the condition and triage is performed every two hours for 24 hours. After stabilization of the condition, the patient goes to the green zone (the third-fourth level of severity of the condition) and is transferred to the Department of infectious/pharmacological hospital. In the absence of positive dynamics and unstable condition, the patient goes to the red zone (the first level of severity of the condition) and is transferred to the ICU.

Criteria for mild severity of the condition (SARS clinic without pneumonia):

- no difficulty breathing
- RR less than 24 in 1 min.
- SpO<sub>2</sub> > 95 %
- the absence of changes on CT
- normal or subfebrile body temperature
- Heart rate within 60-80 beats / min in children over 5 years of age and adults
- mild catarrhal phenomena
- the content of white blood cells, neutrophils, platelets within the reference values

The patient is in the green zone (third-fourth level of severity of the condition). Treatment is carried out in the departments of infectious diseases hospital.

Medical staff of infectious diseases hospitals should undergo PCR testing for COVID-19 once every two weeks and thereafter for clinical and epidemiological indications. The triage algorithm for patients with confirmed COVID-19 in infectious diseases hospital is shown in figure 10.

The list of necessary resources includes: 1) color tags (bracelets); 2) log of patient admissions and hospital refusals; 3) medical card of inpatient patient (medical history); 4) direction, accompanying list; 5) pulse oximeter; 6) BPC; 7) masks for patients; 8) express diagnostic test on COVID-19; 9) laptop computer+ printer; 10) liquid soap dispenser+ antiseptic dispenser + paper towels; 11) stethoscope with blood pressure cuff; 12) thermal imaging camera; 13) phone, alarm button; 14) bactericidal lamp; 15) approved a form of emergency notice in CQCSGS.

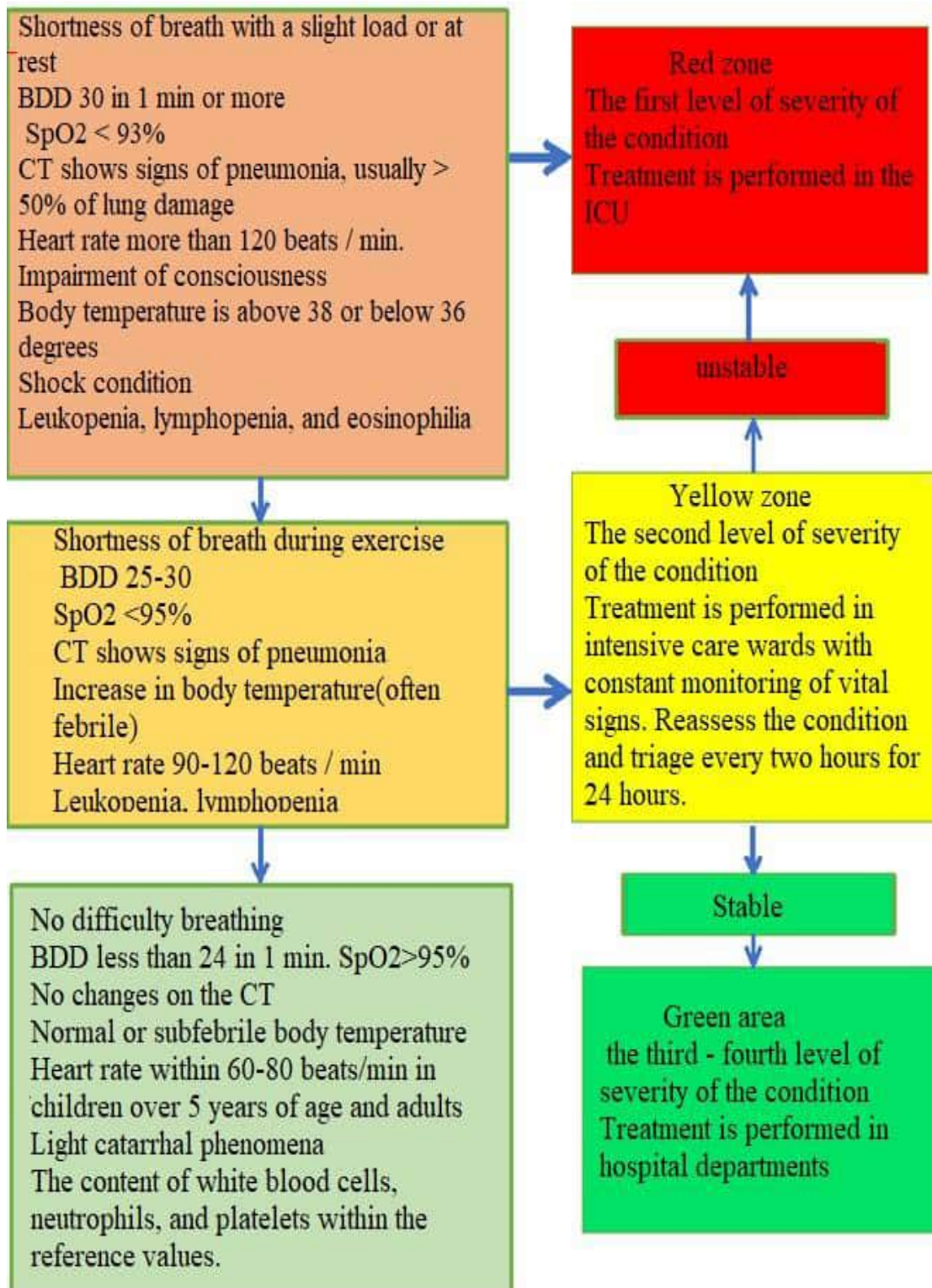


Figure 10 - Triage algorithm for patients with confirmed COVID-19 in infectious diseases hospital

## CONCLUSION

These guidelines provide evidence-based methods and algorithms for conducting medical triage of patients in the context of the COVID-19 pandemic at various stages of medical care: when calling an emergency medical team, when a patient goes to a PHC treatment facility, at the level of the emergency medicine Department of a multi-specialty hospital, pharmacological and infectious diseases hospitals of the Republic of Kazakhstan. The principles of zoning the territories of medical institutions to prevent the spread of viral infection are given. Criteria for determining the severity of the condition of patients with coronavirus infection are presented, and checklists are developed that allow to objectify the severity of the patient's condition and choose the optimal route of evacuation.

Implementation of algorithms for triage of patients at different levels of medical care in the context of the COVID-19 pandemic will prevent mass infection of citizens of Kazakhstan, ensure the fastest and highest quality care and reduce the expenditure of necessary resources of the health system.

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## TEAR SHEET

accounting for the use of methodological recommendations  
**«TRIAGE / MEDICAL SORTING PROCEDURE FOR COVID-19 AT  
THE STAGES OF PROVIDING MEDICAL CARE»**

To send to the address: 071400, East Kazakhstan region, Semey, st. Abay Kunanbayev, 103, E-mail: smu@nao-mus.kz, Chairman of the Board-Rector, d.m.s. Zhunussovu E.T.

«Triage / medical sorting procedure for COVID-19 at the stages of providing medical care»

Approved by the Academic Committee of the NCJSC «SMU».

Application Results

- positive \_\_\_\_\_  
number of observations
- indefinite \_\_\_\_\_  
number of observations
- negative \_\_\_\_\_  
number of observations

The observation was carried out from "\_\_\_" \_\_\_\_ 2020 to "\_\_\_" \_\_\_\_ 202\_.

4. Comments and suggestions (text): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Person responsible for implementation \_\_\_\_\_

Date of filling \_\_\_\_\_ Signature \_\_\_\_\_

To be completed by the institution applying the guidelines.

Maukayeva S.B., Trenina V.A., Tokayeva A.Z., Zhunussov Ye.T., Pivina L.M.,  
Bulegenov T.A., Batenova G.B.

### **Guidelines**

## **TRIAGE / MEDICAL SORTING PROCEDURE FOR COVID-19 AT THE STAGES OF PROVIDING MEDICAL CARE**

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