

ОПЫТ РАБОТЫ ЕДИНОГО ЦЕНТРА ДИСПЕЧЕРИЗАЦИИ, МОНИТОРИНГА И МЕДИЦИНСКОЙ ЭВАКУАЦИИ В СОСТАВЕ ТЕРРИТОРИАЛЬНОГО ЦЕНТРА МЕДИЦИНЫ КАТАСТРОФ СВЕРДЛОВСКОЙ ОБЛАСТИ

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Резюме. Цель исследования – на основании изучения и анализа опыта работы единого центра диспетчеризации, мониторинга и медицинской эвакуации (ЕЦД) в структуре территориального центра медицины катастроф (ТЦМК) Свердловской области показать эффективность деятельности единой диспетчерской службы, работающей на функциональной основе в одном информационном поле со службой скорой медицинской помощи (СМП) области.

Материалы и методы исследования. Источники информации и материалы по теме исследования: нормативные и методические документы, регламентирующие порядок и организацию работы Службы медицины катастроф (СМК), скорой медицинской помощи; публикации в журналах «Медицина катастроф», «Скорая медицинская помощь»; отчеты и доклады руководителей объединенных центров и самостоятельных ТЦМК. Методы исследования: аналитический, статистический, метод непосредственного наблюдения, метод логического и информационного моделирования.

Результаты исследования и их анализ. Проанализирована работа трех отделов ЕЦД: оперативно-диспетчерского отдела, отдела консультирования и мониторинга реанимационных пациентов, отдела мониторинга вызовов СМП. Сделан вывод: данная модель единой диспетчерской службы – финансово малозатратна, эффективна и может быть рекомендована регионам Урала, Сибири и Дальнего Востока, где имеются сильные ТЦМК и профильные реанимационно-консультативные центры.

Ключевые слова: единое информационное поле, единый центр диспетчеризации, мониторинга и медицинской эвакуации, медицинская эвакуация, мониторинг, служба скорой медицинской помощи, территориальный центр медицины катастроф Свердловской области

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PRACTICAL EXPERIENCE OF THE UNIFIED CENTER FOR DISPATCHING, MONITORING AND MEDICAL EVACUATION FUNCTIONING AS A PART OF THE SVERDLOVSK REGIONAL CENTER FOR DISASTER MEDICINE

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Summary. The goal of the study is to show, on the basis of analysis of the experience of the unified center of dispatching, monitoring and medical evacuation in the structure of the Territorial Center for Disaster Medicine of Sverdlovsk region, the efficiency of unified dispatching service, operating on the functional basis in the same information field as the regional emergency medical service.

Materials and research methods. Sources of information and materials on the research theme: normative and methodological documents regulating order and organization of the Disaster Medicine Service and emergency medical aid; publications in "Disaster medicine", "Emergency Medical Aid" journals; reports of heads of joint centers and independent territorial disaster medicine centers. Research methods: analytical, statistical, method of direct observation, method of logical and informational modeling.

Research results and their analysis. The work of three departments of unified center of dispatching, monitoring and medical evacuation was analyzed: operative-dispatching department, department of consultation and monitoring of intensive care patients, department of monitoring of ambulance calls.

It is concluded that this model of a single dispatch service is financially inexpensive, efficient and can be recommended to the regions of Urals, Siberia and the Far East, where there are strong territorial disaster medicine centers and specialized resuscitation and consultative centers.

Key words: ambulance service, medical evacuation, monitoring, monitoring and medical evacuation center, Sverdlovsk Regional Center for Disaster Medicine, unified dispatching, unified information field

Conflict of interest. The authors declare no conflict of interest

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Introduction

Since 2011 the three-tier system of medical assistance has been introduced in the Russian Federation's health care.

During the specified period certain work on the optimization of various links of health care has been carried out. In particular, its work was positively influenced by the implementation of the National Project for the development of the outpatient and polyclinic network, by development of feldsher-midwife stations, of general practitioner services and air ambulance.

With this model, healthcare entered a "Covid period", in which medical institutions operated with an increased workload under the conditions of covidial morbidity of medical workers. The conversion of many medical treatment organizations to Covid hospitals changed the traditional routing of patients and casualties. At the same time, the provision of not only routine, but also emergency medical care to patients of other profiles became more complicated.

The staffing problem became important not only due to the morbidity of medical specialists, but also due to the retirement of elderly doctors for reasons of personal safety. At the same time, no additional physician resources have been added.

Relevance of the study. At the present time against the background of COVID-19 morbidity decrease the problems aroused in connection with the special military operation in Ukraine: temporary migrants, sanctions, price increase, which is expected to lead to the fall of living standards, increase of morbidity, increase of risks of man-made and bio-social emergencies.

Assessing today's challenges as very serious, we believe that at present the need for further development of the Disaster Medicine Service of the Russian Ministry of Health is greater than ever. We believe that improvement of the work of the EMS is necessary at the federal and regional levels, both in terms of organization and in terms of building up forces and resources. It should be noted that discussions about the optimal model for the regional level are still ongoing.

For example, in the journal "Disaster medicine" 1 of 2022 there is an analysis of organizational models of Disaster Medicine Service functioning at the regional level [1]. As of January 1, 2022 in the Russian Federation there were 35 territorial disaster medicine centers with the status of legal entity; 16 in regional, republican, and territorial hospitals; 34 territorial disaster medicine centers integrated with emergency medical aid stations. And not all of the integrated centers have air ambulance.

The order of the Ministry of Health of Russia No. 1202n¹, which approved all available organizational models for territorial disaster medicine centers, brought some clarity to this issue, allowing each center to develop in accordance with local peculiarities.

The territory of the Russian Federation is vast and varied: from large cities — subjects of the Russian Federation (hereinafter referred to as subjects) to sparsely populated areas, mountainous and northern regions.

We think we will not be mistaken if we try to rank the subjects according to the generality of their medical and tactical characteristics into about 5 types:

- large cities — subjects — Moscow, St. Petersburg, Sevastopol;

- small medium-sized subjects — Tula, Kaluga, Pskov Regions, Republic of Chuvashia, etc;

- large regions with urban and rural population, including sparsely populated areas — subjects of Urals and Western Siberia;

- large sparsely populated and unpopulated territories of Siberia, Far East, regions of the Far North [3].

We believe it would be advisable to distinguish another type — type of mountain republics — Chechen Republic, Kabardino-Balkaria, Ingushetia, Mountain Altai.

It is difficult to find a general model of territorial disaster medicine center for subjects with such different medical and tactical characteristics. It must be stated that, at this point, there is still no exhaustive analysis on this issue. The most advanced in this respect was the article by M.V. Bystrov, in which the author makes very cautious conclusions that it is too early to talk about the advantages of this or that model, and it is necessary to study this issue in more depth [4].

The purpose of the study — on the basis of the study and analysis of the experience of organization and work of the single center of dispatching, monitoring and medical evacuation in the structure of the Sverdlovsk region territorial disaster medicine center to show the effectiveness of the single dispatcher, service working in the same information field with the service of the regional EMT service on a functional basis.

Materials and research methods. Sources of information and materials on the subject of research: normative and methodic documents regulating the procedure and organization of the Disaster Medicine Service and emergency medical aid; publications in the journals "Disaster medicine" and "Emergency Medical Aid"; reports and speeches of heads of joint centers and independent emergency medical aid centers. Research methods: analytical, statistical, method of direct observation, method of logical and informational modeling.

Research results and their analysis. Sverdlovsk region is typical for Urals and Western Siberia: the area of the territory is 194307 km², the length from north to south is 660 km, from west to east — 560 km. Four federal highways pass through the oblast.

¹ On Approval of the Procedure of Organization and Provision of Medical Aid by the All-Russian Disaster Medicine Service in Emergency Situations, including Medical Evacuation: Order of the Ministry of Health of Russia No. 1202n of November 6, 2020

Cities with a population of over 100 thousand people: Yekaterinburg — 1,468 thousand, Nizhniy Tagil — 361 thousand, Pervouralsk, Kamensk-Uralsky, Serov (from 100 to 200 thousand) The share of small and medium-sized cities in the total number of cities in the Sverdlovsk Region is 84%. The region ranks fifth in Russia in terms of population — 4315.7 thousand people).

As of January 1, 2022, there were 55 medical organizations providing emergency medical care to the population in the Sverdlovsk region, of which:

- 8 ambulance stations (EMS);
- 42 EMS departments within city, central regional and district hospitals;
- 4 departments of emergency consultative medical care as part of Sverdlovsk Regional Clinical Hospital No 1, Regional Children's Clinical Hospital No 1, City Clinical Hospital No 40, Ekaterinburg Clinical Perinatal Center and Territorial Center of Disaster Medicine.

The hospital period of the region includes 80 medical treatment organizations, including 42 Level 1, 31 Level 2 and 7 Level 3 hospitals.

There are 398 ambulance crews of different profiles that are on the line 24 hours a day. Most of the teams are located at a distance of 100 km or more from the regional center. The furthest team is located in the North of the region in the settlement of Pelym at a distance of 623 kilometers from Ekaterinburg.

During the year there were 1339308 calls received by ambulance teams and 1251636 calls were fulfilled. Calls from population are accepted by 60 dispatching posts, 601 employees on a regular post of the dispatcher, 418 main employees — dispatchers on receiving calls. The specialists of Yekaterinburg territorial disaster medicine center and Yekaterinburg ambulance station analyzed the work of the regional emergency medicine dispatch service and modeled the possibility of creating a unified dispatch service.

According to the order of the Ministry of Health of Russia from June 20, 2013 № 388n², one dispatcher post is organized for 20 thousand calls.

If we go the way of uniting all dispatch services, we would need premises for about 70 dispatchers. At the same time, each dispatcher's workplace must be equipped with a modern automated software system for receiving calls and the GLONASS system.

Even if such a unified control room is created, the direction and substation dispatchers (who are responsible for the distribution of calls between the teams, issuing medicines and consumables, transmitting information about completed calls to the central control room) will have to remain in their places. In sparsely populated territories and in remote municipalities, when the population applies directly to the emergency medicine department, the emergency medicine dispatcher will also be responsible for providing emergency care when the only team has left for a call, i.e. it is impossible to completely abandon the dispatchers in small and medium-sized cities.

The Ministry of Health in the Sverdlovsk region decided not to create a single dispatcher's office, but to organize a common information space for all institutions that provide emergency medical care to the region's residents. In accordance with the order of the Ministry of Health of the Sverdlovsk Region³ in December 2020, a Unified Dispatching, Monitor-

ing and Medical Evacuation Center (hereinafter - the Unified Center) was organized at the territorial disaster medicine center.

The purpose of creating the Unified Center was to increase accessibility and quality of emergency, including specialized emergency, medical care through centralized resource management of the Disaster Medicine Service and emergency medical care at the stages of emergency medical care.

The following tasks were set before the specialists of the Unified Center:

1. to unite specialists of different medical organizations in solving issues of emergency patients;
2. to establish interaction between prehospital and hospital emergency medical aid periods.
3. to provide round-the-clock monitoring of intensive care patients in medical treatment organizations of 1st and 2nd level, with active detection of severe patients and their subsequent evacuation to the therapeutic window in the higher level, working in various modes of operation.
4. to organize monitoring and control of emergency calls to the Emergency Medical Service in emergencies, road traffic accidents (RTAs) and other crisis situations.
5. to provide, if necessary, an operative response and practical assistance from the territorial disaster medicine center to the region's ambulance teams.

The name of the Unified Center reflects all these tasks, and in order to solve them, three departments have been allocated in the structure of the Unified Center.

1. Operations and Dispatch Department acts as a classical dispatch and is responsible for the interhospital stage of medical evacuation.
2. Intensive Care Consultation and Monitoring Unit is responsible for the hospital period.
3. Department of Monitoring of EMS calls throughout the region supervises the prehospital period.

The Operations and Dispatch Department has been functioning as part of the territorial disaster medicine center since the foundation of the center. A physician and 2 paramedics work in the operations and dispatch department around the clock to receive calls and to transfer them to specialists.

Functionality of the department:

- receiving calls and requests from area physicians;
- transmission of this information to the relevant specialists and making management decisions: telephone consultation, telemedicine consultation, on-site visit for medical evacuation, performing surgery or conducting a consilium;
- selection of team and mode of transport (ground or helicopter) for each visit;
- reception and registration of information about the threat of emergencies and about emergencies that have occurred;
- transmission of information in accordance with the approved algorithm, execution of documentation and its recording in the program.

All territorial disaster medicine center ground and air ambulance vehicles are equipped with the GLONASS system, using which dispatch department specialists can track the location of an ambulance or an aircraft.

In 2021, over 10,000 calls were made through the dispatch department. About 3,000 medical evacuations were performed.

² On Approval of the Procedure for Providing Emergency Medical Care, including Specialized Emergency Medical Care: Order of the Ministry of Health of Russia No. 388n of June 20, 2013

³ Organization of the Single Center for Dispatching, Monitoring and Medical Evacuation of the Sverdlovsk Oblast State Budget Healthcare Institution "Territorial Center for Disaster Medicine": Order of the Sv

Intensive Care Consultation and Monitoring Unit (ICU) has been open since February 2018.

A physician anesthesiologist and a paramedic (nurse/nurse anesthetist) work in the ICU around the clock. ICU specialists are responsible for the hospital period, and their responsibilities include: obtaining information about patients in the intensive care units of Level 1 to Level 2 medical organizations. Inpatient resuscitators enter data about all patients in the intensive care unit into a specific program in online mode. Territorial disaster medicine center physician on duty analyzes the information about these patients and agrees on further tactics of their management. Particular attention is paid to severe patients of medical treatment organizations of Level 1.

In this monitoring, up to 10-15% of patients are transferred to the operative dispatcher room for their consultation by specialized doctors, telemedicine and face-to-face consultations, as well as for medical evacuations to a higher level.

In 2021 about 5 thousand intensive care patients' records were entered into the database, and more than 4 thousand of them were monitored.

While the two above-mentioned departments have been operating for quite a long time and their functionality is clear, the third area — the department for monitoring of emergency medical care calls — is a new one. On the scale of the Russian Federation, such units do not yet have sufficient experience. The creation of a single information field has made it possible to monitor all ambulance calls in the region and Yekaterinburg online. The staff of the Medical Information and Analytical Center helped with the program, using the ADIS software package. The monitoring program for the following calls is already in operation:

- accidents, fires, emergencies;
- emergency calls to patients with acute stroke and acute coronary syndrome (ACS), children and pregnant women;
- waiting for calls from the number 112;
- calls waiting more than 20 min;
- uncovered calls.

Problem calls are colored red on the monitor. The doctor or paramedic can contact the dispatcher of the ambulance where such calls are made, get information and coordinate further tactics.

When an unfulfilled call is detected, a specialist in this department can help his/her colleagues and redirect the hung call to the team of the route unit of disaster medicine or to a free ambulance team of another municipality. We already have this experience. During the COVID-19 pandemic, territorial disaster medicine center route unit teams came to the aid of emergency medical teams in Yekaterinburg, Per-

vouralsk, Krasnoufimsk and Achita. In 2021, up to 40 hanged calls per day were transferred to route unit teams through active monitoring.

Due to the timely receipt of reliable information through a single control room, it became possible to more effectively use our operational developments and technologies — to use modern Bell, Ansat light-class helicopters, as well as to use the mobile complex for simultaneous evacuation of several (4-5) severe patients in need of intensive care with oxygen support.

Sum up

In our opinion, the organization of the Unified Center allows to observe equal right of all residents of our region to receive specialized medical care — article 19 of the federal law No. 323⁴.

Every medical treatment organization, especially of level 1, has the opportunity to contact the operational department of the Unified Center, all patients in the resuscitation unit, are actively monitored and evacuated to a higher level organization mainly during the day by ambulance or by air ambulance brigade. Emergency calls are monitored, and all regional EMT units and stations can receive support and assistance from the territorial disaster medicine center or nearby medical treatment organization teams. All services are interconnected and reinforce each other. A unified information field makes it possible to resolve issues promptly.

The results of working in this format show that it makes no sense to create a large single control room to receive all ambulance calls from the entire region. In our region, this model would be cumbersome, difficult to manage, technically vulnerable and, therefore, ineffective.

We support the idea of organizing operative dispatcher offices on the basis of intermunicipal stations on the principle of medical districts, the work of which will be supported and controlled by the unified dispatcher center on the basis of territorial disaster medicine center.

Conclusion

The organization of a unified dispatch center on the basis of the territorial disaster medicine center, consisting of three operational departments, has shown its effectiveness both in the daily operation mode and in the emergency preparedness mode (pandemic COVID-19). This model is financially inexpensive and quite effective and can be recommended to the regions of Urals, Siberia and Far East, where there are large territorial disaster medicine centers and functioning specialized resuscitation and consultative centers.

⁴ On Fundamentals of Public Health Protection in the Russian Federation: Federal Law No. 323-FZ of November 21, 2011

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