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## Peculiar features of planning and medical support for major sporting events

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**ABSTRACT. Introduction.** To provide medical support for the 2018 FIFA World Cup in Samara (2018 World Cup), the project management team, and a special working group of the Ministry of Health of the Samara Region, dealt with the problems of creating medical infrastructure at sports facilities, preparing authorized hospitals and forming a team of specialists answering the highest standards of international health care. **The purpose** of the work is to evaluate the effectiveness of the developed program for training medical personnel to work at major international sports events. **Materials and methods.** The entire period of training of the medical team took 2 years 9 months, when the following events were carried out: counting of numbers, facilities and means; recruitment and subsequent selection of specialists; creating a schedule for their preparation; creating a concept and efficient plan; formation of groups with the appointed leaders and managing stuff; professional retraining of key participants; cycles of improvement and advanced training; training to provide medical care actual for existing sports facilities. The following preparatory actions were organized: psychological trainings, teaching information security rules, intellectual games, photo documentation, regular media coverage, joint attendance of the Confederations Cup football match in 2017, sports training, practicing interdepartmental interaction. Uniform design was developed. **Results.** The total staffing level of the team is 249 specialists. At the same time, 133 specialists were part of more than one team of different formats. During the entire period of work, 2685 requests were registered. **Conclusion.** The experience of creating and training a medical team to work at the 2018 World Cup venues subsequently formed the basis for medical support for all major public and sporting events in the Samara region.

**KEYWORDS:** medical support for sporting events, education of medical personnel, World Championship

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## Особенности подготовки и медицинского обеспечения крупных спортивных соревнований

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**РЕЗЮМЕ. Введение.** Для обеспечения медицинского сопровождения Чемпионата мира по футболу (FIFA) 2018 в г. Самара (ЧМ-2018) управленческая команда проекта совместно со специальной рабочей группой Министерства здравоохранения Самарской области решали задачи по созданию медицинской инфраструктуры на спортивных объектах, подготовке уполномоченных больниц и формированию команды специалистов, отвечающей самым высоким стандартам международного здравоохранения. **Цель работы** — оценить эффективность разработанной программы подготовки медицинских кадров для работы на крупных спортивных мероприятиях международного уровня. **Материалы и методы.** Весь период подготовки медицинской команды занял 2 года 9 месяцев. В течение этого времени проведены: определение численности, сил и средств; набор и последующий отбор специалистов; создание графика их подготовки; создание концепции и операционного плана; формирование групп с выявлением лидеров и управленческого звена; профессиональная переподготовка ключевых участников; циклы усовершенствования и повышения квалификации; тренировки по оказанию медицинской помощи на существующих спортивных объектах. Организованы: психологические тренинги, обучение правилам информационной безопасности, интеллектуальные игры, фотодокументирование, регулярное освещение в средствах массовой информации, совместное посещение футбольного матча Кубка конфедераций в 2017 году, спортивная подготовка, отработка межведомственного взаимодействия. Разработан дизайн униформы. **Результаты.** Итоговая штатная численность команды — 249 специалистов. При этом 133 специалиста вошли в состав более чем одной бригады разного формата. За период работы зарегистрировано 2685 обращений. **Заключение.** Опыт создания и подготовки медицинской команды для работы на объектах ЧМ-2018 впоследствии лег в основу медицинского обеспечения всех крупных массовых и спортивных мероприятий региона.

**КЛЮЧЕВЫЕ СЛОВА:** медицинское обеспечение спортивных мероприятий, обучение медицинского персонала, чемпионат мира

## INTRODUCTION

Medical support for major international sporting events is one of the main organizational areas that ensures the safety and well-being of a large number of people involved in the preparation and holding of the event [1, 2]. The primacy and importance of this issue determine the development and continuous improvement of individual requirements for procedures for the provision of medical care, taking into account characteristics of sport, season, scale of event, number and capacity of facilities and many other factors [3, 4]. The variability of conditions for holding events virtually eliminates the possibility of standardized or templated approach [5, 6]. At the same time, two main sections — providing emergency and urgent care to all categories of event participants and sports injury care — remain unchanged and are carried out in accordance with generally accepted current standards and recommendations [7–9].

The largest international sporting events are the Summer and Winter Olympic Games held by the International Olympic Committee (IOC) and FIFA World Cups, organization of which is entrusted to the International Football Federation (FIFA). It is at these sporting events that the requirements for medical support are among the most well-developed, precise and resource-intensive [10]. The creation of medical infrastructure at sports facilities, training of authorized hospitals and formation of a team of specialists that meet the highest standards of international healthcare have become the main tasks for the Ministry of Health of the Samara Region. These measures were aimed at preparing and implementing medical support for the events of the 2018 FIFA World Cup in Samara (2018 World Cup).

## AIM

The aim of the study is to evaluate the effectiveness of developed program for training medical specialists to work at major international sporting events.

## MATERIALS AND METHODS

The main conceptual and regulatory provisions for medical support for the 2018 FIFA World Cup were set out in the FIFA Guidelines

on Medical Care and Doping Control (edition 8, November 2015) and the Regional Concept for Organizing Medical Support During the Preparation and Hosting of the 2018 FIFA World Cup and the 2017 FIFA Confederations Cup in Samara Region. The Ministry of Health of the Samara Region was determined to be the main organiser of medical support and manager of budgetary funds at regional level. A special working group chaired by the Minister was created within it. In addition, to manage the project, it was necessary to form a team of 8 people: the chief physician of the competition, three deputies in areas, responsible physician for doping control, medical psychologist and two senior nurses. The selection and appointment to these positions was carried out according to such criteria as professional knowledge and competence in emergency life-threatening conditions, proficiency in a foreign (English) language, and full understanding of the infrastructure of healthcare system of the Samara Region. In addition to competency criteria, the first and most important condition was teamwork with elements of mutual assistance, mentoring, and friendship. Basic specialties and positions at the main place of work in management group were presented as follows: physician — thoracic surgeon/head of department — 1, physician — critical care anesthesiologist/head of department — 1, traumatologist/head of department — 1, therapist/chief physician — 1, obstetrician-gynecologist — 1, medical psychologist — 1, nurse/senior nurse — 2.

The entire period of preparation of medical team took 2 years and 9 months and lasted from September 2015 to May 2018. We formulated and designated three main stages of preparation: 1) determining the need for forces and resources; 2) forming a medical team; 3) training and preparing of specialists. Consistent implementation of the presented stages contributed to the formation of a stable, motivated team of professionals and like-minded people ready to represent the host country and host city to world public.

Management of information and training processes was carried out on the VKontakte platform, where a closed group of the FIFA 2018 Medical Team participants (<https://vk.com/club115996770>) was created. The group administrator was a medical psychologist with social media skills. Information, orientation and evaluation meetings for the entire team were held regularly once a month.

From June 1 to July 10, 2018, medical team entered an exclusive period (FIFA exclusive use

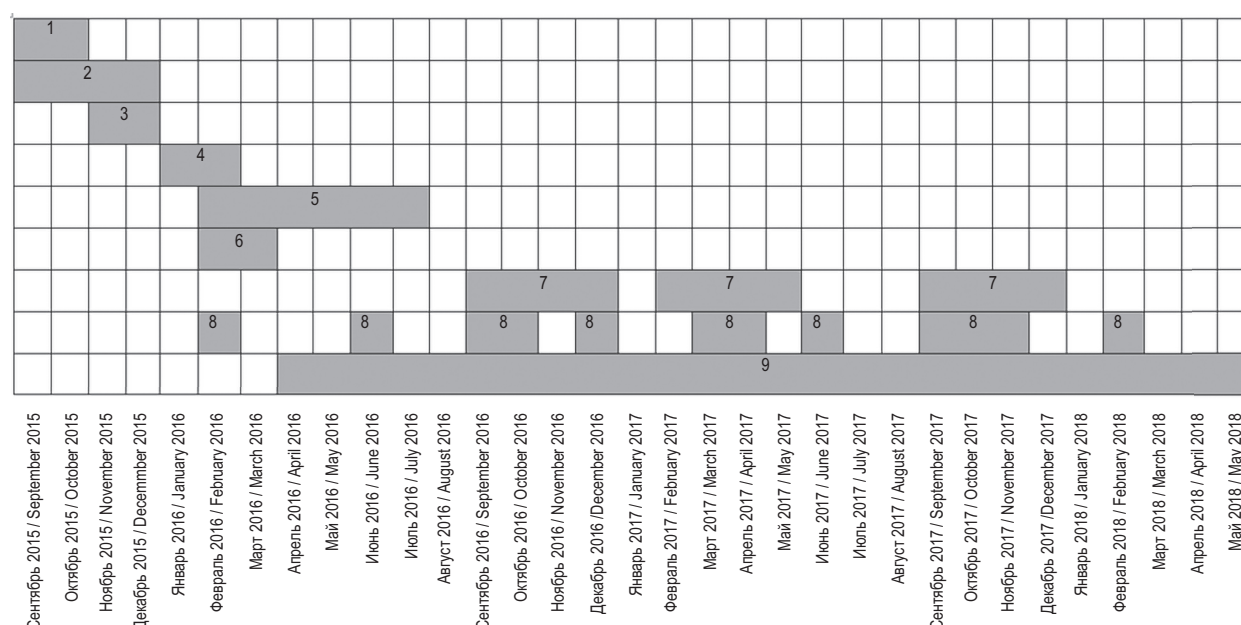


Fig. 1. Schedule for training the medical team of the 2018 World Cup

Рис. 1. План-график подготовки медицинской команды ЧМ-2018

period), during which all teams were distributed across 10 2018 World Cup venues to provide medical care and continue training directly at future work sites. The list of medically responsible facilities included: Samara Arena stadium, FIFA Fan Fest area, 2 training grounds, 3 hotels for team delegations and FIFA representatives, 1 team accommodation base, 2 authorized hospitals to provide inpatient care to all client groups. The main tournament was held from June 14 to July 15, 2018, with 6 matches held in Samara.

The expanded characteristics of all 3 stages of training, presented below, filled the partially sequential, partially parallel courses of training of specialists (Fig. 1).

### 1. Determining the need for forces and resources

1. Determination of the number of forces and resources (time period: September 2015 — October 2015). Based on the number of facilities, their work schedules, duration of all events at these facilities, duration of parallel activities, and specific requirements of sports organization or host city, the following were calculated: a) number of stationary medical centers; b) number of ambulances; c) number and list of authorized hospitals; d) number of medical kits for emergency medical care set; f) number of medical personnel with higher and secondary medical education to work in multidisciplinary teams.

Based on the final calculation of optimal number of teams of different formats at facilities, the following ratio was determined: 1 mobile medical team (MMT) per 2,500–5,000 people (including competition participants, spectators at facility, organizational staff, volunteers and security personnel), 1 medical center (MC) per 5,000–10,000 people, 1 emergency medical team (EMT) per 10,000 people. At the same time, reserve number of EMT, taking into account replacement of one team with another when transporting a patient, should be 20%.

2. Recruitment of specialists (time period: September 2015 — December 2015). In determining the need for staff resources, we primarily proceeded from specified requirements for medical support. 20% was initially added to the calculations of the required number of medical workers, taking into account the need for a reserve and assessing the risks of employees leaving or being expelled from the team during preparation process. The information agenda began with a three-fold sending information letters about the start of recruitment for the 2018 World Cup medical team to health care institutions (HCI) of state and private ownership. At the same time, orientation information meetings were planned and held with the chief physicians of 12 large HCI, and then with their teams, including necessary specialists. Interaction with educational organizations was expressed in at-

tracting resources of 2 medical universities and 3 medical colleges, both in terms of recruiting members of the medical team and in subsequent organization and conduct of training courses and workshops. A total of 24 faculty teaching staff and 38 students were involved, from whom a unit of medical volunteers was formed.

3. Selection of specialists (time period: November 2015 — December 2015). The initial selection for inclusion in the medical team did not involve determining the level of knowledge, as it was planned to train personnel with control over the level of proficiency in theoretical knowledge and practical skills. All medical workers provided valid certificates in their specialties. Medical work experience was also not taken into account. It is interesting to note that during training, employees with less work experience, demonstrated faster acquisition of the necessary practical skills. Proficiency in a foreign language is a desirable, but not determining criterion for selection, provided that the candidate meets other criteria.

Team management group developed: a) structured interview that took into account biographical data, work experience in the healthcare system, ambitions to acquire new skills, presence of soft skills (relational skills, self-presentation, empathy) in the form of communication skills, ability to cope with stress, commitment to teamwork, motivation to participate in a medical team; b) a questionnaire that allows, based on 40 test questions on emergency and urgent care medicine, sports medicine, and healthcare organization, to determine the initial level of knowledge and skills of each candidate. Subsequently, such regularly updated questionnaires became one of the tools for assessing the dynamics of theoretical training of specialists and were used with a frequency of at least once every 6 months. In total, 6 testing sessions were conducted with a positive trend in growth of the proportion of correct answers from 34.6% during the first testing to 92.5% at final testing stage. In addition, during interview that followed questionnaire analysis, various psychological tests were used, and the basic level of knowledge of a foreign language was determined.

## ***II. Forming a medical team***

The ideology of this stage was based primarily on universal, patriotic, deontological

and other formative principles that contribute to the unity of specialists and their transformation into a clear, well-coordinated “automatic mechanism with a human heart”.

4. Creation of schedule for training specialists (time period: January 2016 — February 2016). The initial general training plan included certification cycles and courses at educational institutions, as well as classes with personnel during after-hours and on weekends on a voluntary basis. The distribution of activities was carried out with high frequency and regularity at least 1–2 times a week for each specialist. The goal of such intensity was the maximum involvement of all team members and formation of a commitment to continuous improvement.

5. Creation of concept and operational plan (time period: February 2016 — July 2016). The main provisions reflected in the concept and development of operational plan allowed for a clear spatiotemporal view of upcoming work to be created from the beginning. Individual participants in team process were involved in development of these basic documents, and information was communicated to everyone in full as it was approved.

6. Formation of groups with determination of leaders and management of the entire sports and medical team (time period: February 2016 — March 2016). Eleven groups of 20 to 25 people were formed. The composition of groups was mixed, included equivalent numbers of doctors and mid-level health workers, taking into account the future formation of medical and nursing teams of different formats: mobile medical team, stationary medical center team, ambulance team. This implied compliance with the principle of universality of teams, which consists in the possibility of changing point of application.

In managing groups with a large number of people, it was necessary to include not only the vertical type of management from leader to team members, but also horizontal interaction. Members of management group, after observing the staff, noted the most proactive employees and those committed to the values of medical team, and selected leaders to solve this problem. Five main qualities were identified, assessed on a five-point scale: responsibility, communication skills, compliance, management competencies, involvement. Results

of social and psychological testing, “Sociometry” (Fig. 2) were taken into account when choosing. As a result, within each of the 11 groups was determined a leader — a headman. Headmen interacted directly with members of the management team and members of their group. They were responsible for attendance at training and also identified current and potential difficulties. In addition, feedback from members of the medical team was actively requested through them for a prompt response to emerging issues.

### *III. Training and preparing of specialists*

The methodological basis for training specialists was mastering the principles of organizing and providing medical care in accordance with the requirements of the FIFA Guidelines on Medical Care and Doping Control (edition 8, November 2015) and generally accepted international clinical guidelines. The FIFA Medical Committee held 3 seminars with chief physicians of the competition and 2 inspections in each of the host cities. During each of these events, requirements were updated, the level of readiness of healthcare system and medical team of region was assessed, and best practices were analyzed with the possibility of replicating them.

An important aspect and condition in training of team members was that all members of management group, in addition to their main occupation, were also staff of educational organizations. These are the Federal State Budgetary Educational Institution of Higher Education “Samara State Medical University” of the Ministry of Health of the Russian Federation and the State Budgetary Professional Educational Institution “Samara Medical College named after N. Lyapina”. Thus, the teaching skills of project managers were used in organizing the educational processes. This contributed significantly to the coordination of staff (promoted cohesion) and formation of management hierarchy.

7. Professional retraining of key team members (time period: September 2016 — December 2016, February 2017 — May 2017, September 2017 — December 2017). After determining the team affiliation of each team member and main point of application at the 2018 World Cup venues, professional retraining courses were planned and conducted for a number of specialists: “Therapeutic physical education and sports

medicine” — 9 people, “Organization of health care and public health” — 2 people, “Anesthesiology and critical care” — 2 people. Furthermore, an additional 18-hour educational program “Methodology for training personnel involved in medical support of the 2018 FIFA World Cup events” was implemented, held at the Federal State Budgetary Institution “All-Russian Center for Disaster Medicine “ZASCHITA” of the Ministry of Healthcare of the Russian Federation — 5 people.

8. Cycles of improvement and advanced training (time period: February 2016 — February 2018). In collaboration with higher and secondary educational institutions, following educational programs were developed for all team members: “Organization and provision of emergency and urgent medical care during mass international sports events” — 144 hours, “Disaster medicine” — 72 hours, “Improving the language skills of medical personnel to work at international sports events” — 72 hours. Particular attention in these cycles was paid to issues of providing first aid in life-threatening conditions, external influences (injuries, burns, frostbite, poisoning, heat stroke), regulations of actions in case of suspected infectious diseases, training in the rules of working with radio communications. Five regional conferences on topic “Medicine as one of the key functions of ensuring security at the FIFA World Cup in Samara” were organized and held as part of educational weeks, specialist days, and meetings of professional communities.

9. Training medical care at existing sports facilities (time period: April 2016 — May 2018). Training on desmurgy, cardiopulmonary resuscitation, management external bleeding, caring for acute and chronic wounds, and intravenous injections was conducted to master the specifics of providing care outside a medical organization in conditions of various sports facilities. The team included all the necessary specialists with relevant competence, who voluntarily conducted classes according to schedule approved within the team. The frequency of training for each group was at least once a week, with regular alternation of classes and repetition of the most important skills. Twice during the entire training period, in 2016 and 2017, key team members participated in regional competitions of rescue services, practicing the skills of providing medical care in emergency situations, man-made disasters and natural disasters (Fig. 3). In addition,

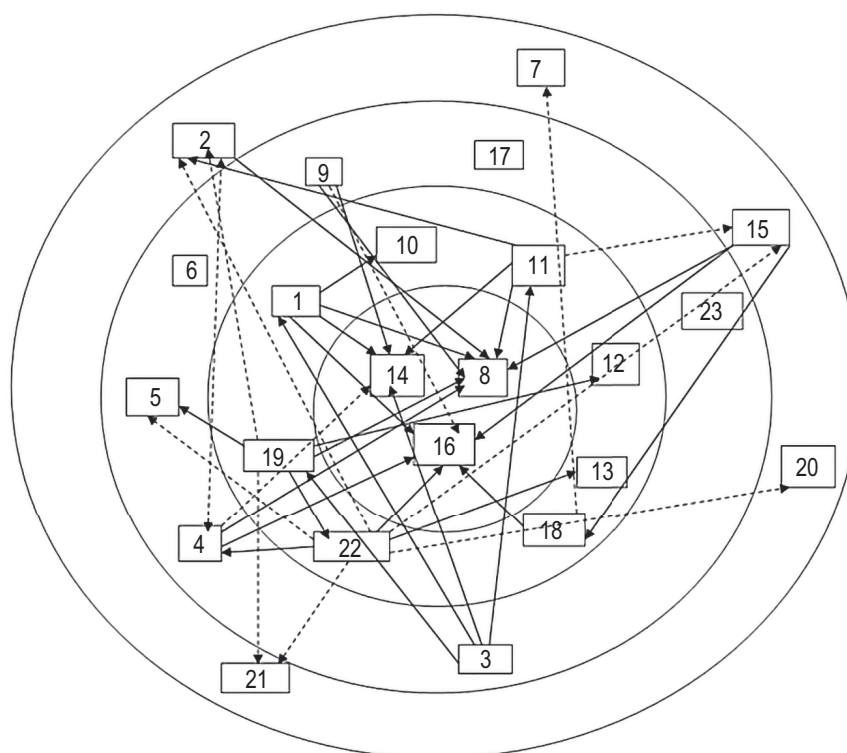


Fig. 2. Sociogram of the appointment of a group leader

Рис. 2. Социограмма формирования лидера группы

for better adaptation to work in conditions of a mass event, starting in 2016, medical support for all major social events (Victory Day Parade on May 9, Grushinsky Festival, May Day demonstration, etc.) was carried out by the future medical team of the 2018 World Cup.

A medical psychologist developed a psychological skills training program, the key goals of which were: a) group cohesion; b) improving communication skills between specialists within the team, between specialists and potential client groups; c) identifying maladaptive stress coping skills and teaching adaptive behavior in stressful situations, as well as mental hygiene skills.

We designed the medical staff training program in such a way that it included not only a set of best practices, but also maximum possible activities for constant involvement and motivation of staff. These included psychological skill training, training in information security rules, mind games once a quarter, pictures on facilities and during trainings, regular media coverage, joint attendance of the Confederations Cup football match in 2017 as spectators. Sports training was also carried out — dancesport for all team members and strength training for mobile medical

team at the edge of the field. The unique design for the medical team uniform was developed, including elements of medical signs and the symbols of the 2018 World Cup. At the beginning of exclusive period, each employee received a uniform set consisting of 8 elements, which subsequently remained for his personal use (Fig. 4).

In addition to units blocks of medical team training, interdepartmental interaction was regularly practiced. 22 training seminars on first aid were held with volunteers, law enforcement personnel, and matchday stewards. The Order No. 477n of the Ministry of Health and Social Development of the Russian Federation dated May 4, 2012, “On Approval of the List of Conditions Requiring First Aid and the List of First Aid Measures” was distributed to the specified teams, revised in the form of pocket algorithm and illustrated cards.

## RESULTS

From the beginning, more than 260 health workers from 42 health institutions in the Samara region were involved in the project. An important part of motivation to participate in

the project we considered love for football and our country, dream of becoming a part of FIFA World Cup 2018 while formal attitude “work is work” could seem more logical. As a result, our assumptions were true — most of the “fans” of football remained on the team until the end of the event, passed all way through training, formed the core of medical function. They made a significant contribution to team’s work and, understanding the importance of creating the festive atmosphere, provided high-level medical care regardless of complexity and unusual tasks that were presented to them. At the same time, 46 specialists (18.5%) were expelled from the team or voluntarily left the project during preparation. They were replaced by doctors and mid-level health workers necessary for the team, who completed formation of final composition of medical personnel. Medical support was represented by three formats of assistance: mobile medical teams, medical stations, emergency medical care. The final iteration of team’s staffing was equal to 249 specialists, including 131 doctors, 117 paramedics and nurses, 1 medical psychologist. Of these, 41 mobile medical teams, 47 medical station teams, 48 emergency medical teams were formed. At the same time, 133 specialists (53.4%) were part of more than one team of different formats, which emphasizes universal nature of the training.

The quantitative calculation of forces was made for each facility and competition day,

taking into account federation’s requirements. If necessary, patients were hospitalized in FIFA-authorized hospitals. Thus, on match days, 12 medical stations, 22 mobile teams, 18 ambulances were involved at the stadium, and at the Fan Festival site — 2 medical stations, 5 mobile teams, 3 ambulances. Reserves for emergencies included the forces and resources of the All-Russian Centre for Disaster Medicine, as well as an 80% increase in mobile medical teams from the outpatient and polyclinic link and emergency medical teams (EMTs).

Mobile medical teams (MMT) either provided onsite care in case of life-threatening conditions (cardiac arrest, respiratory arrest, external bleeding) or provided consultations and first aid in case of minor injuries. MMT equipment included: spinal shield, portable automated external defibrillator (AED), Ambu bag with anesthetic face masks of different sizes, airway management kits, dressings, immobilization and hemostatic agents, razor, intravenous catheters, cricothyrotomy kit, infusion solution, antihistamine, nitrospray, adrenaline, salbutamol, analgesics, stethoscope, penlight, surgical marker, and other medical instruments. The medical station could perform instrumental diagnostics: electrocardiogram (ECG), thermometry, blood glucose testing, pulse oximetry, blood pressure measurement. All medical stations were contained medications and equipment for intensive care of emergency conditions.



Fig. 3. Conducting cardiopulmonary resuscitation training

Рис. 3. Проведение тренингов по сердечно-легочной реанимации

As a result of the medical team training, the personnel's knowledge of emergency treatment was updated, new skills and competencies were acquired. These include: features of working on sports and mass events, knowledge of the specifics of providing assistance to various client groups, skills of working in emergency situations, on camera, mastering medical English, and basics of radio communications.

Over the entire period of work at the World Cup facilities, including the exclusive period, 2,685 calls were registered. The average number of calls per day was  $59.6 \pm 71.6$ , while on match days it increased to  $214.7 \pm 68.9$  per day. The distribution of requests by client groups was as follows: spectators — 1231 (45.8%), personnel of 2018 World Cup venues — 1056 (39.3%), volunteers — 233 (8.7%), FIFA and Organizing Committee personnel — 70 (2.6%), entertainment program participants — 67 (2.5%), media and broadcasters — 23 (0.9%), athletes — 3 (0.1%), VIPs — 2 (0.1%).

The average response time to incidents was  $3.4 \pm 1.8$  minutes. The full scope of necessary medical care at the 2018 FIFA World Cup venues was provided to 2,528 applicants, evacuation to authorized hospitals was carried out in 157 cases, 35 patients were hospitalized. Among those hospitalized, 22 were surgical diagnoses, 13 were medical diagnoses, surgical interventions were performed on 12 patients. In the structure of reasons for visiting medical hospital, acute trauma was diagnosed in 70 people (50.4%), sudden acute illness — in 53 (38.1%), exacerbation of a chronic disease — in 14 (10.1%), third-party actions — in 2 applicants (1.4%). Emergency medical teams (EMTs) provided medical care to 210 patients, including calling EMTs to medical station, providing assistance to patients transported by mobile medical teams, as well as self-referrals to EMTs. The leading symptoms/syndromes for calling EMTs were pain of various localizations — 141 patients (67.1%), skin damage — 24 (11.4%), fainting/weakness — 17 (8.0%). In total, 10 cases of patient requests in serious condition were registered during the 2018 World Cup. Of these, in 4 cases (40%), the initial request and response was carried out at the MMT level. The full scope of medical care was provided at the place of MMT call in 6 cases (4.3%). 11 requesters (7.9%) were directly accompanied to the EMTs. 122 patients were provided with necessary care in medical stations



Fig. 4. Uniform of the Samara medical team of the 2018 World Cup

Рис. 4. Униформа Самарской медицинской команды ЧМ-2018

(87.8%). There were no complications, adverse outcomes or incidents during provision of medical care. In outcomes of all reported cases, 1,536 patients achieved full recovery (57.2%), 1,149 showed clinical improvement (42.8%), and there were no deteriorations or fatalities. No complaints about the availability and quality of medical care were registered during the entire 2018 World Cup. The medical team became an integral part of a great sporting event, ensuring prevention and timely elimination of risks to health and well-being of citizens through its participation. The medical team uniform was included in brand book of host city and became a symbol of timeliness, efficiency, and reliability. The Russia 2018 Local Organizing Committee, FIFA, the Ministry of Health of the Russian Federation, and the Government of the Samara Region highly praised the work of the medical team. In recognition of their service, healthcare workers who participated in the 2018 World Cup were honored with various departmental and state awards.

## CONCLUSION

1. Taking into account the experience of preparation and work in previous periods is a basic component of all operational processes in

organizing medical support for large mass and sporting events.

2. It is recommended to include continuing medical education (CME) modules on organization and provision of medical care at major international sports and mass events in the curricula of educational institutions in the region. This will allow the formation and regular training of a team of medical workers.

3. At the level of medical organizations, there should be functional units for work in sports facilities with a relatively permanent staff from among trained health workers.

4. In terms of the regulatory framework for medical support of sports and public events, taking into account the need for interdepartmental cooperation, we recommend that all developed regulations be consolidated by relevant decrees at the level of the regional government.

## ADDITIONAL INFORMATION

**Author contribution.** Thereby, all authors made a substantial contribution to the conception of the study, acquisition, analysis, interpretation of data for the work, drafting and revising the article, final approval of the version to be published and agree to be accountable for all aspects of the study.

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