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Training of Emergency Medical Specialists in Contemporary Realities

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RELEVANCE In accordance with Federal Law No. 323-FZ [17], emergency medical assistance, including emergency specialized medical care, is provided in emergency form outside a medical organization, as well as on outpatient and inpatient basis. An ambulance is an emergency medical service that travels to those whose lives and health are in danger. Emergency medical assistance, including emergency specialized medical care, is provided in case of diseases, accidents, injuries, poisonings and other conditions requiring urgent medical intervention.
The reasons for calling an ambulance in an emergency form are sudden acute diseases (conditions) and (or) sudden exacerbations of chronic diseases without obvious signs of a threat to life, requiring urgent medical intervention. In the training of doctors, including in postgraduate education, these factors are taken into account.

AIM OF THE STUDY Improvement of the quality of theoretical and practical training of emergency medical specialists, as well as clinical residents and practical doctors of various specialties, taking into account issues of emergency and military medicine.

MATERIAL AND METHODS A review of official documents of the Ministry of Healthcare of the Russian Federation and the literature on postgraduate education of doctors with subsequent primary specialized accreditation for 2018-2022 was carried out. The literature on modern approaches to the provision of emergency medical care to victims was studied, taking into account the specifics of military (tactical) medicine for 2020–2022.

CONCLUSION The training of emergency medical professionals, taking into account the realities of the present, should include issues of tactical medicine and be practice-oriented using simulation equipment. It is necessary to know and be able to work with modern means of protection and medical care available in the troops; be prepared to work in medical institutions of various levels with the mass flow of injured and wounded.

Keywords: ambulance, emergency medicine, postgraduate education, primary specialized accreditation, tactical medicine
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ACS - acute coronary syndrome
AED - automated external defibrillator
ASC - accreditation subcommittee
CPR - cardiopulmonary resuscitation
ES - emergency situation
FSES - Federal State Educational Standards
MASC - multidisciplinary accreditation and simulation center
MBI - mine blast injuries
MBT - mine blast trauma
NC – non-compressible
NT - “not tourniquet”
OSCE - Objective Structured Clinical Examination
PPE - personal protective equipment
PRT - professional retraining
PSA - primary specialized accreditation
REBOA - resuscitative endovascular balloon occlusion of the aorta
TB - “tourniquet” bleeding

A significant number of natural and environmental disasters, large-scale terrorist attacks and local military conflicts have convincingly shown that in the modern world a person cannot feel sufficiently protected from emergency situations (ESs). The services of disaster medicine, ambulance and emergency medical care, and military medicine have accumulated extensive practical experience. This leads to the improvement and strengthening of the material, technical, scientific, methodological and legal bases. It becomes important to train nursing and medical personnel capable of making appropriate (responsible) decisions, organizing work in extreme conditions in the presence or arrival of a large number of victims, rationally and effectively using available equipment.

In addition, the level of development of modern biological, chemical and radiation weapons allows only highly advanced medical and biological defense systems to win. Thus, healthcare must be considered as the basis of national security and economic development of the country.

The requirements for the level of training of graduates of medical universities become stricter, especially with regard to practical skills enabling them to independently provide primary medical care. This is reflected in the state educational standard and the qualification characteristics of graduates. Simulation-based learning technologies are being actively introduced into the educational process. The effectiveness of training is assessed at the stage of primary accreditation of a graduate of the educational institution, and later, after clinical residency or professional retraining (PRT) cycles, during primary specialized accreditation (PSA).

Objective structured clinical examination (OSCE) station passports for the second stage of PSA are a document that includes the necessary information on station equipment, a briefing (a short task before entering the station), scenarios, evaluation sheets (hereinafter referred to as the checklist), sources of information, reference material, etc. They are intended as methodological and reference material for assessing the accredited person's proficiency in a specific practical skill, and can be used to measure the level of readiness of healthcare professionals for professional activities. Assessment of the characteristics of practical skills in a specific specialty is carried out through the selection of specific scenarios

Basic cardiopulmonary resuscitation (CPR) is included for medical workers of all specialties, and advanced CPR – for anesthesiologists and resuscitators. There is some disagreement here with clinical approaches and the content of checklists.

How can you assess (detect) the presence of cardiac function — heartbeat? In the clinic, the doctor determines the pulsation of the carotid, brachial or other arteries. Or, as an option, he performs auscultation of the heart by placing his head on the patient's chest, or using a phonendoscope. Measures blood pressure. The same techniques are used to determine the effectiveness of resuscitation measures. But in the evaluation sheets compiled before June 1, 2023, this was defined as an unregulated action, and when performed, the doctor lost points. In the latest edition of the evaluation sheet, it is necessary to check breathing according to the principle: "hear-feel-see" and then determine the pulsation in the carotid arteries.

The website of the Methodological Accreditation Center (fmza.ru) presents the updated passport for the CPR station for 2023, "Basic cardiopulmonary resuscitation of adults and maintenance of airway patency." The ability to perform respiratory resuscitation is extremely important. If a patient has asphyxia, the doctor has only 5 minutes to help. Beyond them, everything is useless. There are 4 scenarios in this direction.

Scenario 1. Complete obstruction of the upper respiratory tract in the victim, caused by a foreign body, followed by cessation of breathing and blood circulation. Heart rhythm subject to defibrillation (The equipment includes an automated external defibrillator - AED); and Scenario 2: heart rhythm not subject to defibrillation.

Scenario 3. Respiratory and circulatory failure of the victim followed by restoration of breathing and blood circulation after resuscitation measures, accompanied by lack of consciousness. Heart rhythm subject to defibrillation. An AED is available; and Scenario 4: heart rhythm not subject to defibrillation.

Using an AED during CPR. If previously the accredited person, after receiving a telephone call to the emergency medical service station, immediately picked up and started the AED, now the following setting is in effect: when he tries to use the AED, a member of the accreditation subcommittee (ASC) immediately notifies: "The AED is currently not available to you." He has to ask for the defibrillator. After 2 minutes from CPR start, the ASC member says: "The AED is available. You can use it."

After successful first aid or primary medical care, when the patient has survived but been still unconscious, it is extremely important to place him in the lateral stable position. In the dorsal position, tongue retraction,

vomiting with aspiration of gastric contents, and, accordingly, death are possible. In this regard, from June 1, 2023, an action of patient placement in the stable lateral position after successful CPR has been introduced.

Execution technique. Place the victim's near arm at right angles to his body. Place the victim's far hand by the back of the palm on the opposite cheek, holding it with your hand. Bend the victim's far leg at the knee and place it with support on the foot. Turn the victim towards yourself by pressing on the knee of the bent leg. Pull the leg lying on top closer to the victim's stomach. Slightly tilt the victim's head back to open the airways. Check the victim's breathing signs using the "hear-feel-see" principle, counting out loud to 10.

A survey of specialists showed that practical manipulations, when fully mastered, evoke a strong positive reaction from the listeners. They find this training very useful.

Since 2020, 10 out of 13 scenarios have been left in the emergency medical care section: 1. Acute coronary syndrome (ACS1), cardiogenic shock. 2. Acute coronary syndrome (ACS2), pulmonary edema. 3. Anaphylactic shock (AS). 4. Gastrointestinal bleeding (GIB). 5. Broncho-obstructive syndrome due to bronchial asthma (BOS). 6. Pulmonary embolism (PE). 7. Spontaneous pneumothorax (obstructive shock). 8. Hypoglycemia. 9. Hyperglycemia. 10. Acute cerebrovascular accident (ACVA). At the same time, airway foreign bodies, syncope, and convulsions were excluded.

As a rule, emergency medical measures are carried out at the site where the patient's condition has sharply deteriorated. Each medical organization must have a set of equipment for providing emergency medical care in the form of a mobile emergency medical unit and a manual defibrillator (or Automated External Defibrillator - AED). The kit includes everything necessary to provide emergency medical care in various situations by a medical worker of any specialty authorized to work with patients.

This station follows the principles of the generally accepted Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach, used in world and domestic practice to provide emergency medical care. Currently, chest compression comes first - cardiac resuscitation (Circulation); and the algorithm changes to CABED.

In the multidisciplinary accreditation and simulation center (MASC) of the Kazan State Medical Academy, 16 OSCE stations have been organized, allowing us to reproduce not only all emergency situations, resuscitation measures using AEDs, but also pathologies in narrow specialties. The MASC equipment provides the opportunity for full-fledged practice-oriented training of doctors for peacetime diseases. Now we are also adapting simulators for emergency assistance in the most common and life-threatening conditions of the wounded.

Currently, new Federal State Educational Standards (FSES) for higher education are being introduced in all medical specialties. Clinical recommendations for the treatment of a large number of diseases are widespread and being actively implemented. However, data on drug therapy or special approaches to the treatment of extreme conditions are beginning to differ from the presented OSCE algorithms. We monitor these changes annually, publish them in the form of teaching aids, and introduce them into the educational and accreditation process [1].

Military medical training has been excluded from the curricula for training doctors in universities and in the system of additional professional education. The relevance of this discipline today does not require discussion.

The experience of the All-Russian Center for Disaster Medicine "Zashchita" once again confirmed that providing assistance to victims of disasters (both in peacetime and wartime) has its own distinct specifics. Even highly qualified specialists of a narrow profile, not familiar with the peculiarities of organizing and providing medical care in conditions of shortage of time, limited diagnostic and treatment capabilities, will not be able to provide adequate assistance to a large number of victims [2].

A great contribution to the development of military medicine was made by the development of assistance protocols (Tactical Combat Casualty Care). They systematized the actions when a wounded person appears, dividing assistance into three stages: "under fire" (red zone), "in temporary shelter" (yellow zone), "at the stage of prolonged evacuation" (green zone). These principles are the basis of all modern field medicine.

Tactical medicine requires the most serious approach in training specialists who provide assistance to the wounded in the first stages. Particular attention should be paid to the medical support of special-purpose units due to their autonomy in performing some tasks. In conditions where quick evacuation is simply impossible, they have to act on their own for several hours, and sometimes even days. To do this, it is necessary not only to well prepare the medical professional for the group and optimize the wearable composition of medical equipment, but it is equally important to train each unit specialist in the basics of providing care and resuscitation measures on the battlefield [3]. But at the beginning of the training there is always a highly qualified doctor (teacher), who not only has knowledge and skills, but can also convey them to the listeners and teach them the proper actions.

The improvement of military medical training of personnel, as well as the use of modern means of protection and medical care, makes it possible to reduce the number of irretrievable losses during modern armed conflicts. In this regard, the medical service, when planning medical support for military contingents, has to solve a number of problems, such as:

1. Equipping of field medical institutions with modern diagnostic and laboratory apparatus, which is very expensive, requires maintenance by qualified engineering personnel, and is not intended for frequent movements from place to place.
2. Timely training of medical personnel, taking into account advanced views on the provision of surgical care and treatment of modern combat pathology.
3. Staffing field military medical organizations with highly qualified personnel, taking into account the rotation of medical personnel, attracting civilian specialists, their additional training and remuneration [4].

Information available in public journals and online resources highlights the characteristics of modern combat trauma and the concept of potentially preventable death. The experience of Soviet and Russian troops in Afghanistan and Syria, and the medical services of foreign armies in Afghanistan and Iraq, has revealed a number of features of medical support in such cases.

The constant and widespread use of personal armor (body armor, Kevlar helmets) by military personnel has led to a significant decrease in the number of wounds in the torso and skull and a relative increase in the number of wounds in unprotected parts of the body: limbs, face, neck [5, 6].

What are wartime injuries? Mine blast traumas (MBT) are divided into:

MBW – mine blast wounds - are injuries caused by direct impact of wounding shells, blast waves and gas jets. They are observed during the explosion of various mines, shaped charges, grenades, and fuses, and occur in 69% of MBT cases. Multiple fragment wounds in combination with the impact of a blast wave and explosion fumes (blind, tangent, through-and-through ones) - from the action of primary and secondary projectiles in combination with penetrating distant and direct damage to internal organs prevail. Shrapnel wounds, up to the separation of a limb, or wounds with damage to internal organs are predominant.

MBI - mine blast injuries occur due to the indirect impact of a blast wave through some kind of barrier (armor plate, body, chassis of a vehicle), as well as a fall from the vehicle at the moment of detonation. These include distant injuries far from the place of direct impact of the wounding projectile. MBIs are most often encountered during landmine detonation under wheel of military machinery, accounting for 31% of MBTs. In case of MBI, closed and open polytrauma occurs from the action of the shock wave and secondary wounding projectiles. At the same time, the impact of a shock wave is characterized by the direct action on the body, a sharp pressure drop, leading to severe injuries to the skull, spine and internal organs (concussions, bruises, hemorrhages, hematomas, ruptures, destruction, organ avulsions), open and closed bone fractures, destruction and separation of limb segments.

Bleeding resulting from wounds is divided into:

TB - “tourniquet” bleeding, that is, those that can be stopped by applying a tourniquet located in a soldier's individual first aid kit.

NT - “not tourniquet, but potentially amenable to compression” - for wounds of the neck, joints of the limbs with the body (neck, axilla, groin area).

NC - non-compressible bleeding.

The modern nature of combat tactics - first of all, evasion of direct fire contacts, the widespread use of artillery shells, mines and various improvised explosive devices - results in a significant number of cases of mine blast injuries with traumatic separation or crushing of limbs - up to 70- 75% of all combat traumas [7].

Due to the significant power of the explosive devices used, the number of polytraumas has increased: “large” ones (above the level of the ankle or wrist), including bilateral, accompanied by pelvic fractures, perineal, genitourinary trauma, trauma to the abdominal organs, chest and central nervous system [8].

It was established that in 70.3% of the wounded the cause of death was mine blast injury, in 22.1% - gunshot wounds, and others - in 4.2%. Dismemberment of the body, severe damage to the brain (its evisceration, penetrating wounds of the skull with damage to the basal ganglia or large vascular structures, as well as the brain stem), complete transection of the cervical spinal cord above the C3 level, transection of the respiratory tract in the chest cavity, cardiac injuries more than 1 cm in length, damage to the thoracic aorta and pulmonary artery, liver lacerations (grade 6 injuries), catastrophic abdominopelvic injuries with lower limb amputation, open pelvic

fracture, and loss of significant volume of soft tissue (traumatic hemipelvectomy) were classified as unpreventable causes of death (injury incompatible with life).

In all other cases, death is considered to be potentially preventable. In the analyzed group [3, 9], 87.3% of the injured died in the prehospital stage, while the death of 75.7% of them was regarded as unpreventable and 24.3% as potentially preventable. Bleeding (90.9%) and damage to the respiratory system (8%) prevailed in the structure of the latter. The source of fatal bleeding in 13.5% was wounds of the distal extremities, in 19.2% - the junction of the limbs and neck with the torso ("junctional injuries"). Injuries to the torso occurred in 67.3% of cases. Of these, 36% were chest injuries and 64% were abdominal and pelvic injuries.

In summary, major hemorrhage, tension pneumothorax, and airway obstruction were the leading causes of potentially preventable death during combat in Iraq and Afghanistan. At the same time, massive bleeding was the main one (more than 80% of cases of potentially preventable death), while the proportion of tension pneumothorax and airway obstruction, and respiratory disorders caused by thoracic trauma was 10–15%.

An analysis of 232 cases of death of the wounded [10] found out that bleeding led to the death of 81% of the wounded who had injuries potentially compatible with life. Bleeding events were categorized as tourniquet (TB), non-tourniquet but potentially compressible (NTPC), and non-compressible (NC). Bleeding of the listed types and locations was the cause of death of the wounded who had injuries potentially compatible with life in 20%, 30% and 50% of cases, respectively.

NC is defined as bleeding due to damage to one or more of the following areas: great vessels of the body, injuries to the lungs, parenchymal organs of the abdomen (liver, kidneys, spleen from grade 4 and more severe) and pelvic fractures with rupture of the pelvic ring; in this case, unstable hemodynamics are noted, and (or) immediate stop of bleeding is necessary. In a group of 296 wounded with similar injuries, the mortality rate was 85.5%, with the majority of them (75.0%) dying at the pre-hospital stage [11].

Thus, the most difficult problem remains caring for the wounded with NC and NTPC, although most bleeding during combat trauma relates to TB. The features of modern combat trauma and the resulting structure of the causes of injuries in battle dictate changes in the training system of military personnel, improvement of their equipment, as well as tactics and techniques for providing care to the wounded at the prehospital stage. Accordingly, training programs for doctors on these issues should be optimized [12].

In case of emergencies of radiation and chemical nature and the occurrence of bleeding, it is necessary to take measures to stop it using personal protective equipment (PPE), including skin PPE. Evaluation of the effectiveness of stopping external bleeding is traditionally carried out in field uniform (clothing) to be worn in summer or winter, while the presence of skin PPE during training is a rare exception. A hypothesis has been put forward that the presence of skin PPE may cause a decrease in the quality of bleeding control using a tourniquet, which is due to the possible difficulty of threading the Velcro strap through the buckle and locking the fixation mechanism. In addition, the presence of skin PPE on a wounded person may cause a decrease in the effectiveness of stopping bleeding due to underestimation of the additional volume of tissue (protection).

The actions of the wounded person and his colleagues in the first minutes after receiving a wound (injury), as a rule, determine whether the wounded will survive or not, since the rules of the "golden hour" and "platinum" 10 minutes have been proven in practice. A doctor, paramedic or medical instructor is rarely in the front ranks of the battle formations, so the task of providing first aid (self-help) before the arrival of the evacuation group must be solved by the military personnel themselves. At the same time, the importance of the ability to provide first aid in the form of self- and mutual aid, to stop massive external bleeding, restore airway patency, apply an occlusive dressing, and eliminate tension pneumothorax, increases significantly. To perform these manipulations, military personnel are provided with individual medical equipment [13].

Restoring airway patency is relevant and involves a number of medical techniques (manipulations): transferring the lying victim to the lateral position; if the wounded person is sitting, then with the torso tilted forward. Next, step by step: Heimlich maneuver, oropharyngeal or nasopharyngeal airway, laryngeal mask, conicostomy, tracheostomy, tracheal intubation. At the Kazan State Medical Academy, this training is organized using MASC simulators.

The building and development of the architecture of a multipolar world order, along with the intensified formation of new geopolitical centers of power, are accompanied by an increase in the variability of military conflicts. Laboratories for the development of biological weapons are becoming a potential battlefield today, along with land, air and water. In this regard, new directions are needed in the system of specialized training of

medical personnel for conflicts of the 21st century (using biological weapons). We are faced with the task of showing the importance of a new system of measures to prevent illness among personnel in such conflicts.

The living conditions of military personnel on the front line, in the trenches, and combat create certain conditions for the emergence and development of infectious diseases. This requires an assessment of the risk of infection of military personnel and the development of appropriate approaches to the organization and procedure for vaccination of military personnel. Currently, modern effective vaccines have been developed for a number of infections that can prevent and reduce the incidence of illness in military personnel [14].

It is an undeniable fact that the scarcest resource at the scene of an incident, which directly affects the outcome of a critical condition, especially when several victims are seriously injured simultaneously, is time. In this regard, the witness at the scene of the incident should not think, but act, and in such a way as to "... prolong life, and not prolong death" [15]. When providing emergency assistance at the scene of an incident, following the concept of "maximum information and actions in the minimum time" is possible only with strict adherence to certain algorithms - step-by-step instructions for solving specific problems in various emergency conditions. It should be noted that higher medical education does not guarantee the effective provision of medical care in emergency situations, and in some cases even interferes, since the excessive complexity of doctors' clinical thinking causes reasonable concern, and it is precisely this that is often the cause of medical errors with possible consequences.

Medical triage is of fundamental importance, especially with a significant number of victims. B.K. Leonardov wrote: "... the correct anatomical and etiological diagnosis for individual surgical care is as important as this same criterion is insufficient for the classification (categorization) of mass contingents in need of very different surgical care in a military field situation". This is the domain of experienced and specially trained doctors.

There is an algorithm for providing emergency medical care – BARTF: B - bleeding; A - asphyxia; R - respiratory disorders; T—transport immobilization. Temperature control; F - first aid kit. Here it is necessary to keep in mind the use of painkillers and, what is very important, antibiotics for the prevention of purulent-inflammatory complications and sepsis.

Damage control is the primary healing strategy in war. Such control is even more relevant than in emergency medicine.

Providing surgical care has its own characteristics:

— high-energy injuries;
— high incidence of combined and multiple injuries;
— difficulties and errors in providing prehospital care;
— prolonged evacuation;
— mass influx of the wounded;
— lack of resources;
— lack of training in military field surgery;
— staged (sequential) provision of surgical care.

Naturally, such situations require knowledge and competencies from a military surgeon regarding:

— reception of the wounded and diagnostics;
— damage control;
— visceral injury;
— intensive care and resuscitation;
— vascular injury;
— traumatology;
— neurotrauma;
— thermal burns;
— basic skills in endovascular surgery;
— wound infection, sepsis;
— ballistics;
— emergency surgery.

X-ray endovascular surgery is being actively introduced. The most popular endovascular procedures in military surgery and intensive care are as follows:

— resuscitative endovascular balloon occlusion of the aorta (REBOA);

— selective aortic arch perfusion (SAAP);

— extracorporeal membrane oxygenation (ECMO).

Based on what has been presented, it is necessary to teach surgeons the following techniques and manipulations:

— thoracotomy, stopping bleeding;

— suturing a cardiac wound;

— pulmonary tractotomy, atypical lung resection;

— applying a clamp to the aorta;

— thoracentesis, drainage of the pleural cavity;

— laparotomy, stopping bleeding;

— temporary sealing (ostomy) of damaged hollow organs of the abdomen and pelvis;

— temporary closure of the abdominal cavity;

— extraperitoneal pelvic tamponade;

— application of an external fixation device to the pelvis and limbs;

— revision of the internal structures of the neck, stopping bleeding;

— suture and ligation of great vessels;

— temporary vascular prosthetics;

— REBOA;

— tracheostomy, conicostomy;

— amputation of a limb according to the type of primary surgical treatment;

— blood reinfusion.

The experience of a team of employees of the Kazan State Medical Academy (full professors, teachers, clinical residents of the second year of training in surgical departments in the amount of 15 people), who worked with conscripted military personnel at a tank training ground in Kazan, showed that it is important to train doctors, paramedics, and nurses called up for military service in emergency medical care and tactical medicine techniques at the proper level. Next, they train military personnel in attached units. In this way, mutual contact between the fighter and the medical worker is established, and the effectiveness of training is also increased. Preparation for mastering such techniques requires both methodological and material support for the educational process. It is effective to conduct classes on simulators of varying degrees of complexity.

The introduction of simulation techniques into the learning process leads to improved mastery of the material, consolidation in practice of knowledge and skills acquired in theoretical classes, and also has a positive effect on the motivation of doctors to further study the subject and master the profession. The ability to identify during the simulation weak points in students' training with subsequent work on mistakes (debriefing stage) is also important.

A review of modern literature indicates a change in the paradigm of providing care to the wounded and victims with damage to blood vessels in both peace and war. Options for the use of various modern technologies lie at the intersection of many specialties, where the leading ones are trauma surgery and military field surgery.

In modern conditions, providing care to wounded people with combat injuries to blood vessels must necessarily include the possibility of performing endovascular interventions aimed at temporarily or permanently stopping bleeding (angiography, REBOA/TEBOA, embolization, stenting, endoprosthesis). The equipment of multidisciplinary military hospitals (3rd level), as well as groups of surgical reinforcement of medical units of the 2nd level, should include a mobile C-arm and a basic set of consumables for X-ray endovascular surgery. The quality of care for the wounded depends entirely on the training of surgeons, including at specialized angiotraumatology courses [16].

We consider it advisable to include a program of military medical training of doctors for mandatory completion by specialists studying in cycles of professional retraining and advanced training for healthcare workers, as well as in the Federal State Educational Standard of Higher Education - training programs for highly qualified personnel in residency in all specialties in the form of a module in residency and professional retraining

programs in the amount of 36 academic hours, and in advanced training programs ranging from 144 to 288 academic hours - 18 academic hours.

At the Kazan State Medical Academy, within the framework of additional professional education, the Department of Emergency Medical Care and Simulation Technologies conducts the following cycles: “Planning and implementation of mobilization training and civil protection activities in healthcare organizations” (volume of 72 academic hours); and “Organization of medical support for military operations of troops. Surgical and therapeutic pathology in wartime” (144 academic hours). The Department of Traumatology and Orthopedics has organized the cycles: “Surgical pathology of wartime. Medical care for injuries to the musculoskeletal system" (72 academic hours).

A necessary condition for including the direction “Military medical training (tactical medicine)” in advanced training programs for healthcare specialists is the training of the teaching staff of the Kazan State Medical Academy by highly qualified military medical teaching staff.

The implementation of this area of training for practical healthcare specialists should be carried out at the expense of budgetary funds with the allocation of additional state assignments for the educational organization, additional positions of the teaching staff and means of providing medical care and evacuation at various stages.

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