

## EXPERIENCE OF ELIMINATION OF MEDICAL AND SANITARY CONSEQUENCES OF EMERGENCY IN MAGNITOGORSK: CHRONOLOGY OF EVENTS

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**Abstract.** The experience of liquidation of medical and sanitary consequences of the emergency situation caused by domestic gas explosion and collapse of the entrance of a multistory building in Magnitogorsk on December 31, 2018 is presented. Actions to mobilize resources of the Government, the Ministry of Health and the Territorial Center for Disaster Medicine of Chelyabinsk region, organization of coordinated work of ambulance teams and visiting teams of specialized medical care, forensic experts and psychologists were analyzed. The important role of the Ministry of Health of Russia, of the Government and personally of the President of the Russian Federation V. Putin in the organization of care for the victims, in forming the third echelon of medical forces and means using air ambulance was noted.

**Key words:** ambulance teams, casualties, Chelyabinsk Oblast Government, Chelyabinsk Oblast Ministry of Health, Chelyabinsk Oblast Regional Center of Disaster Medicine, domestic gas explosion, forensic experts, house collapse, psychologists, regional emergency situation, resource mobilization, specialized medical teams, third echelon of medical forces and facilities, victims

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## ОПЫТ ЛИКВИДАЦИИ МЕДИКО-САНИТАРНЫХ ПОСЛЕДСТВИЙ ЧРЕЗВЫЧАЙНОЙ СИТУАЦИИ В г.МАГНИТОГОРСКЕ: ХРОНОЛОГИЯ СОБЫТИЙ

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**Резюме.** Представлен опыт ликвидации медико-санитарных последствий чрезвычайной ситуации (ЧС), вызванной взрывом бытового газа и обрушением подъезда многоэтажного дома в г.Магнитогорске 31 декабря 2018 г. Проанализированы действия Правительства, Минздрава и территориального центра медицины катастроф (ТЦМК) Челябинской области по мобилизации ресурсов, организации слаженной работы бригад скорой медицинской помощи (СМП), выездных бригад специализированной медицинской помощи, судмедэкспертов и психологов. Отмечена важная роль Минздрава России, Правительства и лично Президента Российской Федерации В.В.Путина в организации оказания медицинской помощи пострадавшим, формировании третьего эшелона медицинской группировки сил и средств с использованием санитарной авиации.

**Ключевые слова:** бригады скорой медицинской помощи, бригады специализированной медицинской помощи, взрыв бытового газа, мобилизация ресурсов, обрушение дома, погибшие, пострадавшие, психологи, судмедэксперты, территориальный центр медицины катастроф, третий эшелон медицинской группировки сил и средств, чрезвычайная ситуация регионального масштаба

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In Magnitogorsk on December 31, 2018 as a result of a domestic gas explosion there was a collapse of the entrance of a multistory apartment building in the center of the city. The explosion destroyed 26 apartments, where 46 people lived. Fifty-one apartments were damaged — 126 people lived there. Thirty-nine people were killed at the scene, including six children. The time of the event was 6:00 a.m. Climatic conditions at that time: air temperature -21 °C, sunrise - 9:20. In the aftermath of the explosion 575 people were involved, 123 vehicles and 10 search and rescue teams of Russian Emergencies Ministry. Search and rescue operation was completed on January 3, 2019 at 17:49.

Organization of medical assistance. On 31.12.2018 at 06:08 the central control room of the Emergency Medical Service Station of Magnitogorsk received a message from the Unified Duty Dispatch Service about the explosion of a residential building at the address: K. Marx Avenue, 164.

The message was received by the senior doctor of the dispatcher service of emergency station. At 06:08, five ambulance crews were sent to the scene of the emergency. The first teams, including resuscitation ones, arrived at the scene of the explosion at 06:15. The arrival time was 7 minutes. Based on the estimated number of victims, 7 more ambulance crews were sent to the emergency area at 06:10. At 06:35, 12 ambulance crews were already working at the scene of the emergency. A resuscitation team doctor took charge of the work of the ambulance crews. A medical triage area was identified on site, and the ambulance crews were ready to conduct it with simultaneous emergency medical care. All ambulance crews were equipped with the necessary medications and additionally equipped with emergency packs. When the first casualties arrived at the triage area, the crews worked as a team. The drivers of the ambulances, given the darkness of the day and weather conditions, illuminated the collection point with their headlights. They prepared stretchers, blankets, a supply of water, a set of transport tires and were ready to act as a recorder.

Since 8:00 on December 31, 2018, in accordance with the Decree of the Governor of the Chelyabinsk region in its territory mode of emergency of regional character was introduced and the zone of the regime — K. Marx Avenue in Magnitogorsk — was determined.

On the site of the emergency around the clock operational headquarters of the Government of the Chelyabinsk region was created to prevent and to eliminate emergencies and to ensure fire safety.

The Commission instructed the Ministry of Health of the Chelyabinsk region:

- to make ready and to send specialists of the territorial center of disaster medicine of the Chelyabinsk region to the zone of emergency;
- to provide health care facilities with the necessary set of medicines and blood;
- to organize medical and psychological support of victims and of personnel involved in the liquidation of the emergency situation.

The Minister of Health of the Chelyabinsk region announced a meeting of heads of medical organizations of Magnitogorsk. The deputy chief physician for civil defense and mobilization work of station of first aid took part in it.

In addition, the following instructions were given:

- To the deputy director of the Center for the coordination of medical organizations of the Chelyabinsk region — to provide operational work on the coordination of medical organizations in Magnitogorsk city district;

- To the chief physician of the Chelyabinsk Regional Clinical Hospital — to prepare and to send to the place of emergency a comprehensive emergency response team. The team consisted of two anesthesiologists-resuscitators, a surgeon, an orthopedic trauma surgeon, a cardiovascular surgeon, and a neurosurgeon; to ensure smooth operation of the emergency consultative medical care department of the Chelyabinsk Regional Clinical Hospital;

- To the chief physician of Chelyabinsk Regional Children's Clinical Hospital - to prepare and to send a comprehensive team of doctors to the place of the event. The team consisted of two anesthesiologists-resuscitators, a pediatric surgeon, an orthopedic trauma surgeon, a neurosurgeon; to ensure uninterrupted operation of the resuscitation and consultation center of Chelyabinsk Regional Children's Clinical Hospital;

- To the Chief Psychiatrist of the Ministry of Health of the Chelyabinsk Region — to coordinate the work on the provision of medical and psychological and psychiatric care to the residents of Magnitogorsk with the participation of psychiatrists and medical psychologists of all services.

The Ministry of Health of the Chelyabinsk region mobilized the necessary resources. The order of the Ministry of Health of the Chelyabinsk region "On the organization of medical care in the Chelyabinsk region for the period of liquidation of consequences of emergencies on the territory of the Magnitogorsk city district" from 31.12.2018 №2756 was issued.

There were deployed:

- at Magnitogorsk City Hospital No. 3 — 446 beds for adults;

- in the Children's City Hospital of Magnitogorsk — 403 beds for children;

- In the Central Clinical Medical and Health Care Unit of Magnitogorsk — 526 reserve beds.

There were 42 ambulance crews ready for action.

Uninterrupted work of structural subdivisions of medical treatment organizations was provided; the reserve and stocks of medicines and medical products were checked; stocks of dressings, equipment, food, drinking water, fuel and lubricants for continuous operation were checked; readiness for uninterrupted work of technical services was provided.

96 artificial pulmonary ventilation devices were put in readiness.

For the treatment of patients with acute renal failure 16 places for dialysis were prepared.

The stock of blood components for transfusion has been checked.

All donors have been notified. Preliminary collection of donor blood was scheduled for 03.01.2019.

A referral scheme was put in place for victims to receive specialized medical care in inpatient settings.

To reinforce the medical team of the territorial Center for Disaster Medicine an anesthesiologist of the Central Clinical Medical Unit was sent to the site of the event.

The work of 11 medical psychologists and psychiatrists was organized in all medical treatment organizations of Magnitogorsk, as well as medical psychologists on the basis of secondary school № 14 and on the site of the emergency situation — 164, K. Marx Ave.

In the department of neuroses of the regional psychoneurological hospital № 5 an office of psychological care was opened.

For the period of emergency response on the territory of Magnitogorsk city district operational group of the Ministry of Health of the Chelyabinsk region was created.

At 9:30 a.m. by order of the operational headquarters 9 mobile ambulance teams were withdrawn from the scene of the emergency.

Since 10:00 on 31.12.2018 medical assistance was provided:

- *at the scene of the event:*
- by three mobile ambulance crews (one — resuscitation, 2 — paramedic);
- in a temporary mobile point — the bus — by the doctor of urgent medical aid of city hospital No. 3 of Magnitogorsk;
- by medical psychologist of the regional psychoneurological hospital No. 5;
- in the operational headquarters on the basis of school №14:
- by visiting medical team of the ambulance;
- in a temporary point of medical care — by the team of emergency medical care of city hospital No. 3 of Magnitogorsk;
- by medical psychologists of the regional psychoneurological hospital No. 5.

In accordance with the order of the Ministry of Health of the Chelyabinsk region "On providing medical assistance to citizens living in temporary accommodation points on the territory of the Magnitogorsk city district" from 31.12.2018 № 2757 2 temporary accommodation points for 50 places each were organized.

On December 31 to Magnitogorsk arrived: the Minister of Health of the Russian Federation V. I. Skvortsova, Deputy Minister of Health of the Russian Federation O. O. Salagai, specialists of the National Medical Research Center of Psychiatry and Narcology named after M. P. Serbsky of the Ministry of Health of the Russian Federation.

Russian Minister of Health V. Skvortsova visited the scene of the accident and the victims hospitalized at the Children's City Hospital and City Hospital № 3.

The same day in Magnitogorsk Russian President Vladimir Putin arrived. He visited the scene of the emergency and the child hospitalized from the scene of the tragedy at the Children's City Hospital.

At 17:00 from Chelyabinsk regional clinical hospital a complex medical team consisting of 2 anesthesiologists-resuscitators, a surgeon, a cardiovascular surgeon, an orthopedic traumatologist, a neurosurgeon was sent to the area of emergency.

Under the guidance of the chief forensic expert of the Chelyabinsk Oblast Ministry of Health, a team of forensic experts was formed, which included 5 employees of the Magnitogorsk interdistrict branch of the Chelyabinsk Regional Bureau of Forensic Medicine.

On 31.12.2018 21 applications of victims for medical assistance were registered. Of these, 16 people (including one child) were treated on an outpatient basis, 5 people (including one child) were hospitalized in a moderate degree of severity. In addition, one adult patient was hospitalized in serious condition.

On 01.01.2019, a medical post continued to work at the operational headquarters. From 8:00 to 20:00, one ambulance team was on duty, a medical psychologist, specialists from the National Medical Research Center of Psychiatry and Narcology named after M.P. Serbsky, and specialists from the regional psychoneurological hospital № 5 were on duty.

Since 01.01.2019 (pending the decision of the Task Force) the number of outreach ambulance teams working around the clock has been increased. The duty of one mobile ambulance team in the Magnitogorsk interdistrict branch of the Chelyabinsk regional bureau of forensic medical examination was organized.

At 10:30 medical workers made a round of all apartments of the nearest entrances (basically 5th and 9th) to determine the state of health of residents.

Two mobile ambulance teams and medical psychologists continued to be on duty at the scene of the emergency.

A temporary accommodation center was open 24 hours a day with 14 people in it (medical examination of the victims was made 3 times a day).

At 16:35, a day and a half after the emergency situation occurred, a child (date of birth — 16.02.2018) was extracted from under the rubble of the house. The provision of medical assistance to him started. The Minister of Health of the Russian Federation V.I. Skvortsova was informed. Under her guidance, S.I. Prikolotin, Minister of Health of Chelyabinsk Region, and E.N. Baibarina, Head of the Department of Medical Care for Children and Obstetric Services of the Russian Ministry of Health, coordinated the medical care for the child.

The resuscitation team of doctors on the resuscitation ambulance of Chelyabinsk Regional Children's Clinical Hospital consisting of two physicians, anesthesiologists-resuscitators and chief freelance specialist, children's surgeon of Chelyabinsk Region Ministry of Health left Chelyabinsk to evaluate the condition of the child and to adjust his treatment.

The council decided on the medical evacuation of the child to the Research Institute of Emergency Pediatric Surgery and Traumatology of the Moscow Department of Health. An air ambulance of the Russian Federal Medical and Biological Agency was called in. The child was handed over to the air ambulance resuscitation team. The child's condition did not deteriorate during the medical evacuation.

Since January 2, 2019, two mobile ambulance crews have been constantly on duty at the scene of the emergency. The residents of the neighboring entrances continued to make door-to-door visits, with no complaints about their state of health.

One of the victims, who was in a serious condition, was evacuated to the Chelyabinsk Regional Clinical Hospital (his condition during transportation was stable).

In the neurosis department at the children's day hospital of Regional Psychoneurological Hospital #5, a medical-psychological consulting room continued to operate

In the temporary accommodation, medical workers were on duty around the clock, and a psychologist worked.

On 03.01.2019 until 22:17 at the place of emergency 2 mobile ambulance teams were on duty.

Blood collection from donors was organized. 99 donations were carried out, more than 60 liters of blood were taken.

04.01.2019 on the basis of school № 14 from 8:00 until the close medical post and psychologist worked. The duty of the ambulance team during the reception of citizens by the Governor of the Chelyabinsk region was organized. On January 5-6, 2019, the medical post at School #14 continued to work. There were no calls to the emergency room.

The Commission on Emergency Situations and Fire Safety of the Chelyabinsk region decided to cancel the emergency regime in the territory of the Chelyabinsk region from 17:00 January 6, 2019. The regional subsystem of the Unified State System of Prevention and Elimination of Emergency Situations was transferred to the mode of daily activities. Medical organizations of Magnitogorsk were transferred to the normal mode of operation.

In total during the period from December 31, 2018 to January 08, 2019 230 people applied for medical and psychological assistance. Of these, 112 people (including 10 children) received psychological care. 112 people received emergency medical care in outpatient settings. Six people, including two children, were hospitalized. Of the 112 people who received emergency medical assistance in outpatient settings, 16 people (including one child) received medical care on site; 93 people (including 12 children) received medical care at school No. 14; 3 people received medical care at a temporary housing center.

### **Conclusion**

1. Emergencies caused by gas explosions in residential buildings usually lead to severe consequences and cause many victims. They require the use of a large number of forces and means to eliminate their medical and sanitary consequences.

The peculiarity of an emergency situation in Magnitogorsk is a large number of deaths. It demanded involvement of a considerable number of forensic experts and medical psychologists to work with relatives of the victims. The potential

of the Chelyabinsk region allowed to solve these problems promptly.

3. The second peculiarity of this emergency situation is a relatively small number of victims in need of medical care. The stage of medical triage of the victims at the scene of the emergency was characterized by the gradual arrival of the victims extracted by rescuers from under the rubble. The time of evacuation of victims from the emergency zone (from the moment of their extraction by rescuers of EMERCOM of Russia and transfer to the ambulance crews to hospital) was not more than 20 minutes.

Special attention should be given to the rescue of a child from under the debris one and a half days after the explosion at -20°C. The coordinated and prompt work of the municipal, regional and federal levels resulted in the full recovery and rehabilitation of the rescued child. We believe that in fact in this situation we can talk about the formation of the third echelon of medical forces and means, which is typical for an emergency of the federal scale. Direct participation of the President of the Russian Federation V.V. Putin and members of the Government of the Russian Federation in the liquidation of the consequences of the emergency situation, as well as participation of specialists of medical organizations of the federal level in providing medical and psychological assistance to the victims testify to the federal scale of this emergency situation.

5. The Minister of Health of the Russian Federation V.Skvortsova highly appreciated the work of emergency services — ambulance, emergency response teams of medical organizations of Magnitogorsk and Chelyabinsk region, the territorial center of disaster medicine of the Chelyabinsk region.

It was noted that ongoing regular tactical, special training and joint exercises with structures of Ministry of Emergency Situations and of the Ministry of Internal Affairs and of the territorial Center for Disaster Medicine of Chelyabinsk region allowed to avoid loss of time in this emergency situation, to mobilize the necessary resources and to organize the provision of medical care.

6. We believe that a detailed description of the decisions made and the course of organizational work on the elimination of medical and sanitary consequences of the emergency situation will provide an opportunity to study the experience gained in various exercises and trainings.