

REVIEW ARTICLE

MECHANISM OF STATE REGULATION OF MEDICAL RESPONSE TO EMERGENCIES AS AN ELEMENT OF THE CIVIL PROTECTION SYSTEM

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ABSTRACT

The aim: Conducting a comprehensive analysis on ensuring the mechanism of state regulation of the development of medical emergency response as an element of the civil protection system of Ukraine in the context of dynamic changes of external and internal factors of its functioning.

Materials and methods: The data of the state statistical reporting for the period 2010-2019 and the legislative acts of Ukraine on medical emergency response were used as the materials of study. Bibliosemantic and statistical method and the method of structural-and-logical analysis were applied in the course of study.

Conclusions: The sustainable socio-economic development of Ukraine should be accompanied by the formation of a safe environment for the society and each individual, guaranteeing an acceptable level of risk and a modern security system based on the principles of international law. The high degree of the Ukrainian industry concentration is currently in a conflict with the low technological discipline of production, which creates objective preconditions for the growth of man-made and technologically-environmental disasters, catastrophes, and other emergencies. Outbreaks of particularly dangerous and infectious diseases, which are of concern not only because of their prevalence but also because of the potential danger to the health of the nation, its economy and international reputation of the state can pose a significant threat to the socio-political and socio-economic stability of the state. Ukraine is a potentially vulnerable area for epidemics due to a number of natural, geographical and geopolitical factors. Therefore, the health consequences (real and potential) of any emergency are certainly a threat to the national security of Ukraine both directly and due to the extremely negative impact on the socio-economic, socio-political and psychological conditions of the population.

Increasing the level of public administration for medical emergency response will increase the effectiveness of emergency response measures.

KEY WORDS: civil protection, regulation, emergency situations.

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INTRODUCTION

The last decades of human history have been marked by the occurrence of a significant number of emergencies of natural, anthropogenic and socio-political nature, which were accompanied not only by material but also, unfortunately, substantial human losses.

In Ukraine, the average mortality rate resulted from emergencies is 130-135 individuals per 100,000 population, which exceeds the corresponding figures in the European countries by 3-5 times. At the same time, about 24% of victims die in hospitals, and 76% – at the prehospital stage. According to similar indicators in the developed world, 72% of victims die in hospitals and only 28% – at the pre-hospital stage [1,2].

There is a significant number of explosive and fire-hazardous facilities on the territory of Ukraine. Hazardous chemical facilities, which are located at a short distance from the residential areas where about 26% of the population live, are of particular concern, and there is a threat of possible chemical contamination. About 10,000 tons of gunpowder and 8,000 tons of explosives are stored in

the arsenals, bases and warehouses of the Armed Forces throughout Ukraine and the capacity of ammunition storage sites is on average one and a half times higher than the accepted and approved norms.

The issue of storage of the toxic components of rocket fuel remains burning. At most of the storage facilities, the service life of special tanks has expired, and therefore, there is an immediate threat to individuals' life and health from the negative impact caused by the environmental pollution. Highlighting the issue of terrorism in the international dimension has really emphasized the narrowness of the technological and natural dimension of safety and added other danger factors, primarily biological.

Emergencies tend to affect the lives of large areas of the population. For this reason, there is a high probability of a significant number of victims requiring emergency medical care (EMC). In this case, to prevent a large number of irreversible sanitary losses there should be a set of measures on medical protection of victims against emergencies of natural or technogenic nature, which includes medical evacuation, sanitation and anti-epidemic measures, as

Table 1. Quantitative indicators of the classified emergencies that occurred on the territory of Ukraine during 2010–2019.

Nº	Region of Ukraine	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
1	The Autonomous Republic of Crimea	12	4	18	3	1						38
2	Vinnitsia	9	7	6	3	6	5	4	7	3	4	54
3	Volyn	4	7	1	8	6	6	10	5	6	7	60
4	Dnipropetrovsk	17	10	5	3	6	5	8	4	9	9	76
5	Donetsk	35	29	25	20	20	7	6	24	10	10	186
6	Zhytomyr	8	6	10	3	5	5	8	5	5	8	63
7	Zakarpattia	9	5	5	7	4	5	6	9	8	7	65
8	Zaporizhia	10	11	8	4	7	5	1	3	4	3	56
9	Ivano-Frankivsk	8	4	3	3	2	3	5	7	2	7	44
10	Kyiv	9	7	13	4	3	13	5	6	6	7	73
11	Kirovohrad	3	3	3	2	2	2	6	3	3	4	31
12	Luhansk	26	18	13	11	7	3	4	5	9	7	103
13	Lviv	11	14	20	14	7	4	6	3	5	8	92
14	Mykolaiv	9	12	11	7	7	7	10	8	8	5	84
15	Odesa	14	17	13	10	9	7	14	13	5	11	113
16	Poltava	3	2	3	5	5	8	10	5	4	10	55
17	Rivne	5	11	4	3	5	4	6	10	2	5	55
18	Sumy	5	4	5	6	4	7	7	3	5	5	51
19	Ternopil	3	9	8	3	7	5	2	3	6	4	50
20	Kharkiv	14	11	11	8	10	9	6	10	4	3	86
21	Kherson	19	6	15	4	10	4	5	9	7	4	83
22	Khmelnitsk	11	6	6	4	5	4	4	2	3	2	47
23	Cherkasy	4	4	9	4	2	5	3	9	5	1	46
24	Chernivtsi	11	1	2	2	1	4	7	5	2	5	40
25	Chernihiv	7	7	6	5	8	9	8	3	5	5	63
26	Kyiv City	4	4	9	8	3	14	7	12	7	5	73
27	Sevastopol City	3	1	1	1	1						7
28	Outside Ukraine		1									1
Total emergencies, including:		254	221	212	144	143	148	149	166	128	146	1711
Technological disasters		135	134	120	76	74	63	56	50	48	60	816
Natural disasters		108	77	74	56	59	77	89	107	77	81	805
Social disasters		11	10	18	12	10	8	4	9	3	5	90
among which, in particular:												
state level		5	4	1	1	5	2	1	2	2	2	25
regional level		16	3	13	12	9	9	9	8	6	7	92
local level		107	89	83	58	59	62	64	70	64	63	719
object level		126	125	115	73	70	75	75	86	56	74	875
people died		361	355	301	253	287	242	183	172	168	199	2521
people affected		753	985	861	854	680	962	1805	892	839	1492	10123
material losses, UAH million		984,70	102,75	249,79	396,33	198,85	532,72	265,31	896,80	496,97	685,27	4809,49

well as medical supplies. At the same time, these measures should be carried out within the shortest possible periods and by special, professionally trained units [3, 4].

The analysis of this issue in the context of modern military conflicts, as well as during a special period, shows that sanitary losses among the civil population are 93-95% of

total number of sanitary losses and require the availability of appropriate medical units, stocks of medical equipment, medicines, sufficient number of beds and personnel greater than the calculations for sanitary losses from peacetime emergency situations [5, 6, 7, 13, 14].

Among the main shortcomings of the existing subsystem of medical protection within the unified state system of civil protection (USSCP) the following ones can be identified: there is no centralized institution (headquarters) that would coordinate the activities of various services in providing medical care to victims in case of an emergency; there is a problem of medical evacuation of victims to medical institutions that is the effective organization of triage is not worked out, which negatively affects the number of the rescued; there is no centralized system of pre-medical care training of the population; pre-medical care directly in the emergency zone needs to be under legislative regulation.

THE AIM

The purpose of this study is to carry out comprehensive analysis, generalization and systematization of approaches to ensure an effective and efficient mechanism of state regulation development of medical response to emergencies of natural, anthropogenic and socio-political nature as an element of the USSCP in circumstances of dynamic changes of external and internal factors of its functioning. The main emphasis in the paper is focused on identifying the systemic shortcomings in this area of public administration and on the development of the appropriate recommendations for their elimination in order to improve this subject area.

MATERIALS AND METHODS

The development of any state in view of the dynamic transformations in the field of science and technology is impossible without development, testing and implementation of the various types of innovative technologies – industrial, agricultural, military, etc. However, there is a constant risk of the various types emergency occurrence, which can potentially lead to damages of local and global scale.

According to the data presented in the research [10, p. 11–15], in our country the technogenic accidents and disasters annually take the lives of about 50,000 citizens, and the largest number of them are in the industrial regions of Ukraine, in particular, Zaporizhia, Donetsk, Dnipropetrovsk, Luhansk, Lviv and Odesa oblasts. Thus, in the structure of people mortality the third place is occupied by accidents, injuries and poisonings. Every year in Ukraine it would be possible to save 30,000 – 50,000 people if timely medical care were provided.

The statistical data below is to illustrate and confirm the points mentioned above for the period of last 10 years are given in Table 1 [8]. (Table 1).

The specification of the data provided is presented in the analytical review on technological and natural safety status in Ukraine in 2018, according to which among 128 disasters that occurred during 2018, almost half of them

(61) are medical and biological in which 744, 839 people were injured, 47 people out of 168 died [1, p. 204].

The current, comprehensive systematized legislation – the Civil Protection Code of Ukraine [9] – governs relations concerning the protection of the population, territories, environment and property against emergencies by responding to them and by functioning of the USS CP. It defines the public authority powers, citizens' rights and responsibilities in the field.

However, the analysis of the legislation for medical protection in emergencies has showed its imperfection and inconsistency in terms of civil protection and health care; lack of proper, specific and detailed legal framework, which regulates timely and appropriate medical care to victims directly in the emergency zone, as well as the fact that the inadequate control over its enforcement has led to many shortcomings in the implementation of the measures on elimination of health impacts of disasters in recent years.

The authors [10, p. 26] emphasize that “during the first days and months of the armed conflict in eastern Ukraine, the entire burden of providing medical care and evacuation of wounded servicemen, soldiers from volunteer battalions and civilians rested on the shoulders of emergency (ambulance) brigades of the Emergency and Disaster Medicine Centres and their subdivisions on a territorial basis”. This underlines the importance of considering the issues raised.

REVIEW AND DISCUSSION

In Ukraine, the Emergency Medical Services (UEMS) was established in 1990 to provide medical care to the population during the cases of disasters and natural emergencies. In 1997, the State Disaster Medicine Service (SDMS) was established to form a single state system of emergency medical care in Ukraine with the main task of providing free medical care to the citizens in extreme situations (natural disasters, catastrophes, accidents, mass poisonings, epidemics, epizootics, radiation, bacteriological and chemical contamination, etc.).

The management and organization of SDMS work should be supported by a reasonable combination of the UEMS centralized governing at the pre-hospital stage, medical evacuation and victims' hospitalization by appointment, qualified and specialized emergency medical care with decentralized management to overcome health impacts of emergencies.

The centralization of UEMS management was implemented in a functional subsystem of the Government Information and Analytical System on Emergencies within the powers of the Ministry of Health of Ukraine with the managerial decisions and information transfer at all levels of emergency response.

The organizational structure of the UEMS assumed two levels of the government: central and territorial. The central level of government included specially designated medical forces and facilities of the Ministry of Health of Ukraine, central executive bodies and health authorities of administrative territories operated in any region of Ukraine after

Table 2. Phased provision of medical care to victims in Ukraine

Phases of medical care		Pre-hospital	Early hospital	Hospital
Place of medical care	Emergency zone	Emergency zone boundary	Admission department of health care facilities	Clinical departments of health care facilities
Type of medical care	Pre-hospital aid (The Law of Ukraine "On emergency medical care")	Emergency medical care (The Law of Ukraine "On the basics of the legislation of Ukraine on health care")	Secondary medical care (The Law of Ukraine "On the basics of the legislation of Ukraine on health care")	Tertiary medical care (The Law of Ukraine "On the basics of the legislation of Ukraine on health care")
Medical care providers	Rescuers, firefighters, volunteers	Ambulance crews, first-line disaster medicine service crews, mobile medical centres of the State Emergency Service of Ukraine	second-line disaster medicine service crews, admission department staff	Clinical department staff of health care facilities
Medical care capacity	Initial medical triage Professional life support	Medical triage Emergency care Medical evacuation	Qualified medical care with the elements of the specialized one	Specialized medical care Medical and psychological rehabilitation
Medical care timeframe	up to 60 min (so-called «golden hour»)	0-72 hours (the time is specified considering search and rescue works)	1–24 hours	1–90 days
Medical care is regulated	Orders of the Ministry of Health of Ukraine: "On approval of the procedures for the provision of pre-hospital care to individuals in medical emergency", "On improving training of individuals without medical background in pre-hospital care"	Medical standards Clinical protocols Order of the Ministry of Health of Ukraine "On approval and implementation of medical and technological documents on standardization of emergency medical care"	Medical standards Clinical protocols	Medical standards Clinical protocols
Logistics support	Individual first aid kit. Car first aid kit	Report card of material and technical equipment of the unit	Report card of material and technical equipment of the department	Report card of material and technical equipment of the department

disasters strike. It was taken into account that the territorial medical forces and means of the disaster medicine service from the relevant administrative unit (including its mobile units) could not liquidate the health consequences of the emergency.

The territorial level of the government included medical forces and means of the administrative-territorial bodies of health authorities as well as forces and means of medical institutions under the central executive bodies, local private or public medical institutions aimed at managing health consequences of emergencies in the territories concerned (the Autonomous Republic of Crimea, oblasts, and directly governed municipalities).

The main institutions of the UEMS were: at the central level – the Ukrainian Scientific and Practical Centre for Emergency Care and Disaster Medicine, USPCEC and DM (now – the State Institution "Ukrainian Scientific and Practical Centre for Emergency Care and Disaster Medicine of the Ministry of Health of Ukraine"; USPCEC and DM of the

Ministry of Health of Ukraine); at the territorial level – the territorial centres of emergency medical care and disaster medicine as legal entities of double subordination directly accountable to the Ministry of Health of the Autonomous Republic of Crimea, the Department of Health Care in oblast, Kyiv and Sevastopol cities state administrations, functionally – to USPCEC and DM.

Since the beginning of 2013, the Law of Ukraine "On Emergency Medical Care" (EMC) came into force, which defines: organizational and legal principles of securing the emergency medical service to the residents and non-residents of Ukraine; the principles of organization and functioning of the EMC system; powers of authorities and local self-government in the field; the legal status of the EMC centres, operational and dispatching services of these centres, stations and crews of EMC; the social rights and guarantees for EMC employees; financial, logistical and scientific support for the operation of the EMC system.

This legal act on the issues of disaster medicine intro-

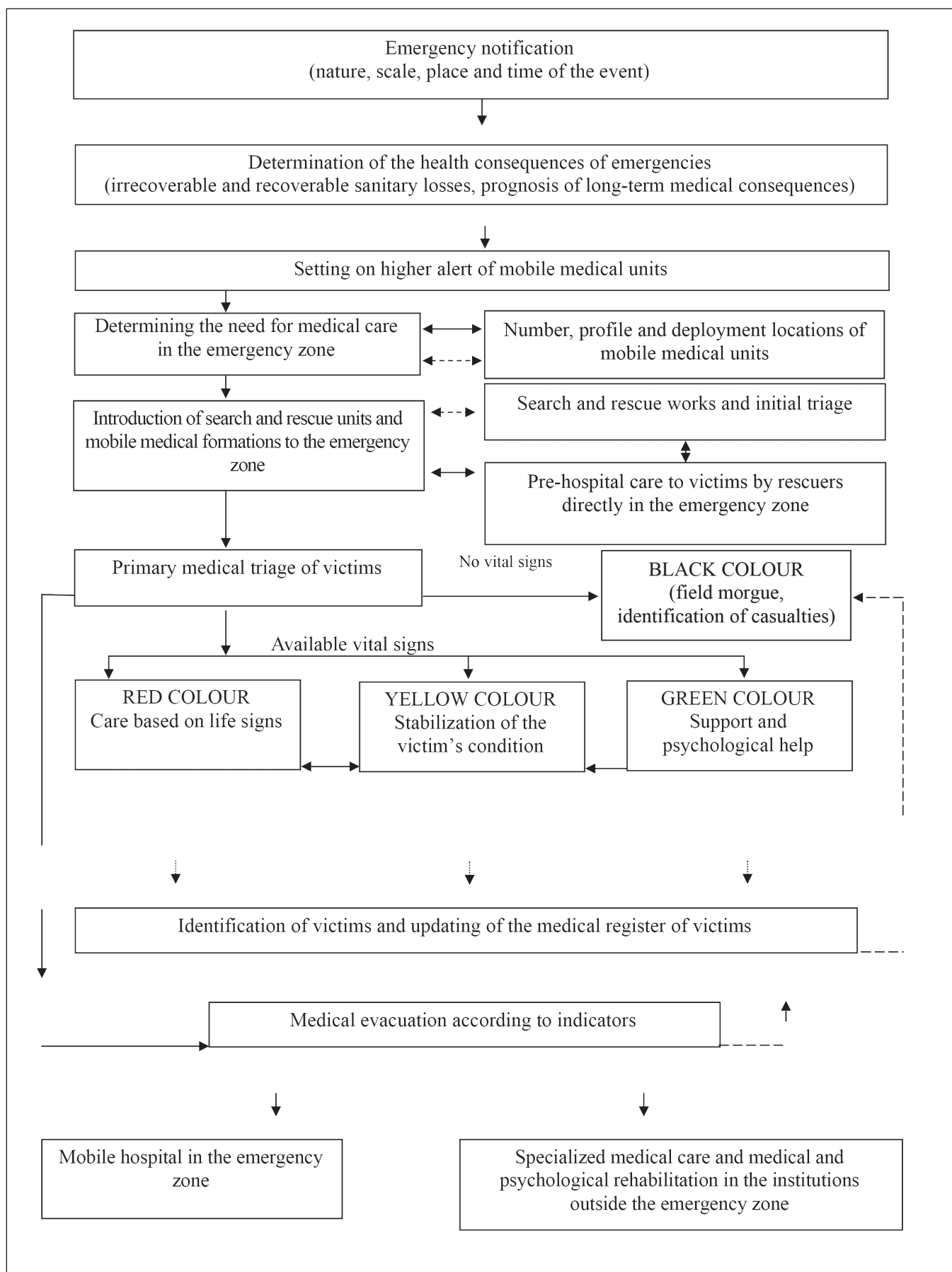


Fig. 1. Organizational and functional scheme of medical response to emergencies

duced some radical changes. In particular, the notions concerning the State Disaster Medicine Service (SDMS) and its central level were actually (indirectly) eliminated. Along with the elimination of these concepts, the legitimacy of the existence and further functions of the institutions and units at the central level of the State Disaster Medicine Service remained an open issue. This also includes the main mobile medical unit of the SDMS – a mobile hospital of the State Emergency Service of Ukraine, as well as the main institution at this level – the State Institution “The Ukrainian Scientific and Practical Centre for Emergency Care and Disaster Medicine of the Ministry of Health of Ukraine”.

It should be noted that SDMS of Ukraine as a civil service is a subsystem of the Unified State System of Civil Protection and is developed at the central and regional levels. The centralization of the structure stems from the fact that any dangers caused by state-level emergencies require the immediate centralized administration of all civil protection forces (including medical), as well as the ability to mobilize more forces than any regional service can immediately do.

The Code of Civil Protection of Ukraine defines disaster medicine services as a special type of the emergency services which operate as part of the EMC centres and DM of the UEMC system and are established by the authorities of the Autonomous Republic of Crimea, oblasts, the cities of Kyiv and Sevastopol.

At the same time, the medical protection, sanitary and epidemic well-being includes medical care to victims given by rescuers and other people involved in the implementation of rescue and other urgent work during the disaster response. The medical care is provided by the Disaster Medicine Service, which is managed by the central executive body. The latter ensures the development and implementation of the government policy in the field of health care. Thus, the Ministry of Health of Ukraine establishes and manages the Disaster Medicine Service, which was previously considered the central level of the State Disaster Medicine Service.

Currently, the disaster medicine services of the Emergency Medicine Services of the Territorial Centres and Emergency Medicine have not been established yet. The existing provisions of the regulations of the Cabinet of Ministers of Ukraine, departmental orders of the Ministry of Health of Ukraine concerning fulfillment of the functions assigned to SDMS at the territorial level, as well as to its institutions, units and their structural subdivisions, are not based on the requirements of the Civil Protection Code of Ukraine. They relate to the formations and structures of the inactive SDMS and, therefore, are not fully implemented.

With the adoption of the Law of Ukraine “On Emergency Medical Care” there was a distinction between the types of medical care and categories of people who provide medical care to victims, namely: pre-hospital care and emergency medical care.

Thus, pre-hospital care for people during the emergencies should be provided by rescuers, firefighters, police, pharmacists, railway conductors, flight attendants and other

people who in relation to their official duties are obliged to possess the appropriate skills.

It should be emphasized that the basic principles of the medical care organization during disasters include: the establishment of the coordination centre in the emergency zone, which provides the medical and evacuation support for victims; the maximum utilization of the local network of health-care facilities; regular medical units involvement at the pre-hospital stage that are able to provide a complete medical care within a specific time frame; mandatory inclusion of specialized inpatient facilities in the structure of the disaster medicine service.

A phased approach to delivering medical care to victims in Ukraine is presented in Table 2. (Table 2)

Afterwards, based on the developed organizational model of managing medical care when overcoming the health consequences of emergencies with a significant concentration of people [13], taking into consideration the analysis of the scientific resources [3, 12, 5, 11] we have developed an organizational and functional scheme of medical response to emergencies (Fig. 1).

Should an emergency arise, the work of the health protection authorities from the first minutes of the event must be aimed at providing the emergency medical care: mobilized the medical staff; mobile units of the disaster medicine service, which are sent to the emergency centre; the supply of medicine and medical equipment is provided; medical evacuation of casualties is arranged; as well as order on the roads and uninterrupted flow of transport.

The implementation of the current legislation, which is a basis for organization and provision of medical care to casualties is possible if common approaches to the organization of the medical evacuation service during disasters are developed [3, 4, 5]. This will allow the responsible bodies to make emergency medical assistance to victims affected by emergencies more effective; to avoid the development of injury and disease complications, thus, to preserve human health; to reduce the workload of ambulance crews and keep up the pace of their daily work.

CONCLUSIONS

The establishment of the State Disaster Medical Service was justified and met the needs and objectives of public administration in the field of civil protection at that time. The further area of development proved that the substantiation of the principles of the state regulation mechanism of medical response to emergencies would allow the authorities (responsible institutions) to optimize the public administration of overcoming the health consequences of emergencies both in Ukraine and abroad. At the same time, the health care management system remains unstructured, in particular due to its non-standardization as a corresponding functional subsystem of the Unified State System of Civil Protection, which is subordinated to the central executive body in the field of health care. Some inconsistency of management functions has now led to the de facto liquidation of the State Emergency Medical Service

of Ukraine and the distribution of the functions on the medical protection between the central executive bodies. However, the larger the scope of the disaster, the higher the requirements to administration and management, thus, the final result of the emergency response greater depends on the effective administration and management in the field.

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Conflict of interest:

The Authors declare no conflict of interest.

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