Ing. Mgr. Cezary Tomiczek, Ph.D.
WSB University in Dąbrowa Górnicza
e-mail: ctomiczek@poczta.fm
ORCID: 0000-0003-4256-814X

Assoc.prof. Ing. Mgr. Radomír Ščurek, Ph.D.
VSB TU Ostrava
e-mail: radomir.scurek@vsb.cz
ORCID: 0000-0002-2971-9313

Ing. Vojtěch Jarkuliš
VSB TU Ostrava
e-mail: vojtech.jarkulis@vsb.cz
ORCID: 0000-0002-5844-0215

DOI: 10.26410/SF_1/22/6

INTERNATIONAL SOLUTIONS TO HELP VICTIMS OF MASS CASUALTY INCIDENT

Abstract

safety is the basic need for every human as it determines the existence and proper development. Over the years, different levels of safety threats have been identified, as it was stated that the protection against external aggression is one of many challenges that must be faced in order to ensure the security of a country. It should be noted, however, that recent years have been a time characterized by a particular intensity of natural disasters in the form of adverse natural phenomena causing both natural catastrophes and technical failures. Natural disasters such as earthquakes, tsunamis, hurricanes, floods, epidemics such as acute respiratory distress syndrome (SARS), Ebola or the SARS-CoV-2 coronavirus causing the COVID-19 disease are gaining in

importance and intensity. A quick response of medical personnel during a disaster is of key importance for the health care of mass casualties. Thus, a key aspect of the health care entities in situations of a threat to public safety is the ability to quickly expand the health care system operating under normal conditions of the functioning of the State.

Keywords

safety, natural disasters, health care, medical entity

Introduction

Safety is the basic need for every human as it determines the existence and proper development. The feeling of secure existence free from any threats is the determinant of human activity aimed at satisfying higher needs.[1] Initially, safety was considered in the category of protection against hostile attack by other countries. Over the years, however other levels of safety threats have been identified, indeed the protection against external aggression is one of many challenges that must be faced in order to ensure the security of a country.[2] "Each individual tries to protect and save his or her own goods from any harm as much as it is possible. However, a stranded individual would not be able to keep watch over them all the time"[3]. Thus, the highest form of organization of people is the State, understood as a compulsory organization which possesses the attributes of supreme authority in order to protect against threats of both external and internal nature, providing the community inhabiting its territory with favorable living conditions according to the strength of their economic position and political influence[4].

Activities aimed at ensuring safety "usually form a rather complex system with interdependent subsystems. This means that different threats, and in turn security systems that relate to various areas of human life and activity can be selected"[5]. This gives the possibility to distinguish many dimensions and levels of security, ranging from personal and local security to regional, national and international security, as well as social, cultural, ecological, economic, public, or universal security, which is crucial from the point of view of research issues.

The 21st century is a time characterized by a particular intensity of natural disasters in the form of unfavorable natural phenomena causing both natural catastrophes and technical failures.[6] The progressing scope of globalization and the related opportunities for rapid movement of people around the world also create a number of new threats to human health and life. Widespread travelling, migration movements resulting from poverty and political and social instability, as well as numerously occurring natural disasters in the world can lead to mass incidence of infectious diseases, which can in turn lead to significant negative health, economic and social consequences, as exemplified by the SARS coronavirus pandemic -CoV-2 causing the infectious disease COVID-19. The challenge in this area involves the efficient and adequate action of State authorities in combating epidemic threats and their consequences, as well

[1] See: R. Gwardyński, Safety in Praxeolog Aproach, [w:] Security–Threats, Law and Organization", Schriften zu Mittel–und Osteuropa in der Europeischen Integration, red. B. Wiśniewski, G.G. Sander, P. Kobes, Band 24, Verlag Dr. Kovac, Hamburg 2019, pp. 9-20.

[2] More: R. Socha, Bezpieczeństwo i zagrożenia – wzajemne relacje, [w:] Wybrane aspekty badań nad bezpieczeństwem, red. nauk. B. Kaczmarczyk, A. Wawrzusiszyn, Ełk 2014, pp. 11-29.

[3] C. Znamierowski, Szkoła prawa. Rozważania o państwie, PAX Publishing Institute, Warsaw 1988, pp. 80, 83.

[4] M. Gulczyński, Nauka o polityce, Druktur Publishing, Warsaw 2007, p. 12.

[5] J. Kaczmarek, A. Skowroński, Bezpieczeństwo. Świat – Europa – Polska, Alta 2, Wroclaw 1998, p. 5.

[6] See: R. Socha, Współczesne postrzeganie zagrożenia, [w:] Zarządzanie kryzysowe. Teoria, praktyka, konteksty, badania, red. J. Stawnicka, B. Wiśniewski, R. Socha, Szczytno 2011, pp. 19 – 30.

as the appropriate preparation of procedures, and the availability of an appropriate number of medical personnel and of protective measures[7].

Methodological and methodical assumptions

The condition for conducting any scientific research is, inter alia, to determine the purpose of the research and the research issue. Therefore, the aim of the article is to present aspects of the operation of medical entities in situations of threat to general safety and the ability to quickly expand the health care system in the logistical and organizational aspect. Purpose thus defined influenced the formulation of the problem in the form of defining the functional areas necessary to improve the operation of medical entities in terms of the efficiency of their operation in situations of threat to general safety. With a view to achieving the goal and solving the research problem, theoretical research methods were used. The key role was played by the analysis of the literature on the subject, among which particular attention deserves special attention.

Organization of action

In a situation of a threat to public safety[8], understood as a state that should ensure protection of the life and health of citizens and national property from the effects of natural disasters, i.e. extreme phenomena which can cause significant damages in the area affected, leaving often behind an altered image of the earth's surface and an increase in the number of victims, it is necessary to apply the principle of gradation in the area of using the available resources. This means that the use of further, previously prepared resources is possible only after overall use of the potential of the health care sector that is available on a daily basis. The efficient reorganization of the health care system in order to adapt to a specific situation caused by the threat to public safety depends on the proper preparation of medical entities in the normal conditions in which the State functions. The main objective of the undertaken actions should be to guarantee at least minimum conditions of the provision of medical assistance to the increased number of people in need. The efficient conduct of collective actions or team actions, depending on the nature of the threat, will be of key importance in the event of a threat to public safety in achieving the goal of healthcare services by healthcare entities.

Natural disasters cause heavy losses to the human economy and may also remodel the state of nature and even pose a threat to health and life. It should be noted that at the early stage of a natural disaster, its dimensions are difficult to assess. Therefore, the emerging crisis situation may be underestimated, and the level of rescue actions initiated may be lower than the situation requires.[9]

[7] National Security Strategy of the Republic of Poland 2020, approved on May 12, 2020, by the President of the Republic of Poland, Warsaw 2020, p. 9.

[8] See: R. Socha, Zarządzanie bezpieczeństwem w ruchu drogowym według przepisów Unii Europejskiej, [w] Bezpieczeństwo na lądzie, morzu i w powietrzu w XXI wieku, red. nauk. J. Zboina, Józefów 2014, pp. 53-62.

[9] J. Ziobro, The Role of Exercises in Managing Entities Responsible for Ensuring Internal Security – Selected Aspects, Schriften zu Mittel und Osteuropa in der Europäischen Integration, 25, Hamburg 2020, p. 159–174.

Along with the gradual disclosure of the actual size of the incident, the level of response must be systematically adjusted to the current state. Hence, it is so important to quickly undertake effective action in the event of a crisis situation, and even more important to precisely determine the level of response adequate to the situation.[10]

Temporary mobile medical protection

Natural disasters, caused both by natural forces and by human activities, present a challenge to the international community[11]. Natural disasters such as earthquakes, tsunamis, hurricanes, floods, epidemics such as acute respiratory distress syndrome (SARS), Ebola or the SARS-CoV-2 coronavirus causing the COVID-19 disease are gaining in importance and intensity. A quick response of medical personnel during a disaster is of key importance for the health care of mass casualties[12]. Hence, a key aspect of the health care entities in situations of a threat to public safety is the ability to quickly expand the health care system operating under normal conditions of the functioning of the State.

After the incident of destruction and possible paralysis of local medical facilities, it is very important to quickly and efficiently deploy an external medical emergency platform centered on a mobile hospital. A mobile hospital is a type of hospital that deals with basic and specialist treatment of patients. It may include medical entities, technical support entities, life support entities, etc. The advantages of a mobile hospital include mobility, strong adaptability to external conditions and the ability to quickly activate medical functions.

In terms of the form of transport, mobile hospitals can be divided into three types: terrestrial, floating and flying. The most common is the terrestrial mobile hospital, which can include a tent, vehicle hospital etc. The mobile terrestrial hospital is characterized by a modular structure, which, if necessary, allows for changes, e.g. in spatial organization. The disadvantage of such a hospital is its long deployment and withdrawal. The floating hospital is, in turn, an independent water medical facility. Already at the end of the 1980s, Germany, by combining the so-called medical shelter with cargo ship created a miniaturization of the hospital ship[13]. Examples of hospital ships include: the hospital ship "Mercy" used in the United States for rescue and humanitarian operations, the "Peace Ark" – a Chinese hospital ship that has provided assistance to over 180,000 people since the beginning of its creation[14]. The disadvantage of this solution is that floating hospitals can only reach places

[10] More: R. Socha, B. Kaczmarczyk, A. Szwajca, Zarządzanie kryzysowe w systemie bezpieczeństwa publicznego RP, Kraków 2014.

[11] N. Bitterman, Y. Zimmer, Portable Health Care Facilities in Disaster and Rescue Zones: Characteristics and Future Suggestions, „PrehospDisaster Med." 2018, 13(4), pp. 411–417.

[12] M.S. Sever, G. Remuzzi, R. Vanholder, Disaster medicine and response: Optimizing life-saving potential, „PrehospDisaster Med." 2018, 1 3(4), pp. 253–264.

[13] H. Zheng, F. Tian, H. Fan, Application and Prospect of a Mobile Hospital in Disaster Response, „Shandong Ind Technol" 2015, no.: 17, p. 225.

[14] Ministry of National Defense, People's Republic of China. A look at China's 'floating hospital' Peace Ark, at: Http://eng.mod.gov.cn/news/2019-04/23/content_4840098.htm (access 12.05.2021).

near the water. In addition, they require a large amount of space to dock the ship and provide boat access for patient and personnel transport. In turn, the flying hospital ensures quick transport of the injured from the accident site to hospitals. Moreover, it can provide both surgical hospital services and emergency medical care during mass accidents.

Mobile terrestrial hospitals are most commonly used during disasters, e.g., during the 2010 Haiti earthquake, the US emergency services established the first tented hospital on Prince Lane. In 2013, typhoon "Haiyan" that swept through the central region of the Philippines damaged local infrastructure including hospitals. Medical teams dispatched by Israel and South Korea, led by the Philippine authorities, set up tent hospitals near the local, damaged hospitals[15]. During the 2015 Nepal earthquake, a Chinese medical team set up a mobile hospital of inflatable tents in a mountainous area.

From the point of view of the risk of the SARS coronavirus, the vehicle hospital, which is a type of terrestrial mobile hospital, draws special attention. After SARS in 2003, China's infectious disease-oriented medical emergency system was significantly developed. The National Health Commission of China introduced four categories of medical teams, that is an emergency medical team, an emergency infectious disease prevention and control team, an emergency response team for poisoning, a radiation emergency rescue team, equipped with vehicle hospitals. An outbreak of the new coronavirus pneumonia known as the COVID-19 coronavirus disease appeared in Wuhan, China. In an effort to cut off the transmission of the coronavirus, many national rescue teams rushed to Wuhan to help, using hospitals.

A hospital ship is an unarmed service ship designed specifically for the sea admission, treatment and evacuation of the injured and the dead, for example in 2013 in connection with a typhoon in the Philippines, Great Britain commissioned the ship HMS "Daring" to participate in humanitarian aid under the code name PATWIN[16].

A flying hospital is another type of a mobile hospital, which is also the fastest means of delivering medical supplies to the site of a disaster or evacuating injured people at the site of a disaster, e.g., in 2010, during a rescue operation in Haiti, France proposed the delivery of medical equipment by means of transport, and the Canadian medical team provided mobile hospitals via aviation transport[17].

Despite the widespread use of mobile hospitals during rescue operations, there are still many aspects that need to be improved in terms of their use. First, there is a transport problem, as most of the terrestrial mobile hospitals today use road and rail transport. However, in the event of damage to the road or traction,

[15] G. Lin, T. Marom, D. Dagan, Ethical and Surgical Dilemmas in a Zone of Recent Disaster, „Word Surg." 2017, no.: 41, pp. 381–385.

[16] S. J. Butterworth, Operation PATWIN: HMS DARING's experience of providing humanitarian disaster relief following super-Typhoon Haiyan, „JR NavMedServ" 2014, 100 (1), pp. 81–87.

[17] M. Talbot, B. Meunier, V. Trottier, et al. Canadian Field Hospital in Haiti: surgical experience in earthquake relief, „Journal Surg." 2012, 55 (4), p. 271–274.

the hospital's mobile transport time may be significantly extended. Secondly, it is necessary to consider the use of special imaging equipment and laboratory tests by for example adding a CT scan unit for computed tomography, because in an emergency, especially during an earthquake, brain trauma is the main problem of emergency treatment, and this type of surgery requires the use of CT for accurate positioning[18]. Third, the equipment of a mobile hospital should be systematically updated. In the Nepal earthquake, it was proposed not to conduct independent operations due to the imperfection of the equipment in the mobile hospital. There is, therefore, a need to develop uniform standards for mobile hospitals in order to achieve consistency in emergency site management, especially during international rescue operations. What is more, the rapid deployment of mobile hospitals at the site of a disaster is an essential requirement for effective treatment. Hence, the design and transport of mobile hospitals are the subject of scientific research conducted in order to better adapt them to the emergency services in the event of disasters.

Due to systematic development and innovation in science and technology, mobile hospitals as the main force of ad hoc mobile medical support will play an important role in responding to disasters. It can be predicted that the use of diagnostics and treatment supported by artificial intelligence and telemedicine based on new generation wireless communication technology will effectively improve the capabilities of mobile hospitals[19].

Actions undertaken by medical entities should take into account the principles of logistics, which, in turn, should provide each patient with the necessary medical assistance in terms of their expectations caused by the injuries suffered. In order to provide assistance to the greatest possible number of those affected in the shortest possible time, it is necessary to optimize the flow of material resources, such as: medicines, dressings, food. Despite the fact that in the state of high readiness not many people attach importance, the financial aspect of the entire action should not be forgotten as it is always associated with higher financial outlays, which result from the increase in the consumption of any material resources and the need to ensure an increased staffing. At each stage of activities, however, it should be remembered to minimize the costs associated with the implementation of tasks often performed in specific, or even extreme conditions[20].

One of the countries where earthquakes result in disasters the most is China, which lies at the joint of two major seismic belts in the world – the Pacific seismic belt and the Eurasian seismic belt. Over the past century, a total of 40 earthquakes of magnitude ≥ 7 on the Richter scale have occurred worldwide,

[18] X. Guo, J. An, Y. Huang, Application of field shelter hospital in Yushu earthquake relief, „Journal Hosp. Manag. PLA" 2011, no.: 18 (7), pp. 653–654.

[19] Owens PJ, Forgione A, Jr, Briggs S. Challenges of international disaster relief: use of a deployable rapid assembly shelter and surgical hospital. Disaster Management Response. 2005, no.: 3 (1).

[20] See F. Mroczko, Zarządzanie kryzysowe w sytuacjach zagrożeń niemilitarnych. Zarys problemów regionu dolnośląskiego, WSZIP (Walbrzych Higher School of Management and Enterprise), Marketing, Walbrzych 2012.

10 of which occurred in China and killed nearly 600,000 people (53% of the total number of global earthquake deaths)[21]. China has experienced two catastrophic earthquakes in recent years, one in Wenchuan, Sichuan Province and the other in Yushu, Qinghai Province. Both caused heavy losses.

On May 12, 2008, a catastrophic 8.0 magnitude earthquake occurred in Wenchuan, Sichuan Province. This disaster was the most devastating earthquake since the establishment of the People's Republic of China (PRC), affecting the widest region and the most difficult to aid. As a result of the disaster, 690,000 people were killed, 180,000 were missing and 370,000 were injured. Following the earthquake, the Chinese military immediately activated the emergency response mechanism, organizing medical teams, command, treatment and evacuation structures. Within 60 hours of the earthquake, 87 units consisting of 2,346 medical workers were dispatched to the disaster area, which constituted 60% of all health workers involved in rescue. In total, 397 mobile medical units consisting of 7,061 medical workers were directed to the area affected by the disaster, they provided medical aid to 69,000 injured and performed 22,000 operations[22].

The participation of the military in the rescue operation is based on the PRC law on responding to emergency situations and the regulations of the army's participation in rescue in the event of disasters. The regulations define the main tasks of the Chinese army participating in the rescue operation, as well as the method of coordination and command.

The use of the armed forces was based on the following principles. First, the best medical forces were dispatched to the disaster area, i.e., from the general hospital, affiliated hospitals of the Military Medical University and other medical facilities with a high medical and technical level. Secondly, military medical forces were mobilized from the location closest to the incident site. Next, the best medical equipment was dispatched to the disaster area (two modular field hospitals, 20 tent field hospitals and more than 200 field ambulances, operational vehicles, X-ray diagnostics vehicles and remote consultation vehicles). Moreover, rescue teams were organized based on scientific basis of operation (teams of various sizes were created, that is large teams of around 100 members, medium teams – around 30 members – and small teams – around 10 members). The staff of medical teams also included specialists in various fields. In areas with high numbers of injured, modular field hospitals and tent hospitals were set. 60 health care units were included in 19 field hospitals. In areas where the victims were dispersed, the 30-person medical teams were split into several smaller teams of three to five members. After segregating and providing medical assistance, the people were evacuated based on the established priorities[23]. Ten

[21] Y.L. Zhang, Chinese military health service in the non-war period, „MedJournalChine PLA" 2011, no.: 36, pp. 1–4.

[22] Y.L. Zhang, Considering a post-Wenchuan earthquake medical rescue strategy, „MedJournalChine PLA" 2009, no.: 34, pp. 1–5.

[23] S.B. Lu, The importance of medical segregation in emergency medical services after the Wenchuan earthquake, „MedJournalChine PLA" 2008, no.: 33, pp. 919–920.

thousand injured people were transported to hospitals across the country by air, rail or road.

Coordination of rescue operations was also based on previously developed principles. First, the military health service headquarters was incorporated into the earthquake rescue command system, and a medical command post was established at the Joint Medical Command headquarters to integrate national, military and local rescue forces. Secondly, a four-level medical service command system was implemented[24]. Third, cooperation mechanisms were developed to increase the effectiveness of rescue operations, by establishing a common system of conferences, consultations, etc., which allowed to prevent chaos and organize the rescue operation.

In most countries, the National Disaster Medical System (NDMS), as part of the National Disaster Risk Management System (NDRMS), plays an important role in protecting human life by reducing the number of victims through the provision of appropriate medical services[25]. The subsets of this system include, among others disaster response teams established at local, regional and national levels[26]. Team care is an essential and integral part of medical disaster response. Due to different national policies, these teams often have different structures. Nevertheless, the first paramedics to arrive at the incident site are paramedics from local health systems.

In the USA, the National Disaster Medical System provides nationwide medical assistance for mass emergencies and disasters. NDMS consists of several teams, including the Disaster Medical Assistance Team (DMAT), i.e., a group of trained medical and non-medical volunteers with varying degrees of skills. In addition, the NDMS includes more specialized teams such as the International Medical Surgical Response Team (IMSuRT) and the National Veterinary Response Team (NVRT)[27]. It can be stated that DMAT play the role of small mobile hospitals, whose members have the ability to work in difficult conditions. It should be emphasized that disaster specialists classify and segregate patients according to the probability of their survival in three groups: red (immediate), yellow (delayed) and black (dead).

NDMS has developed a standardized DMAT operating process based on organizational development, training, supply and equipment, and team staffing. Rescue teams are divided into three levels of readiness. Level 1 teams have the highest level of readiness and can be deployed within 6-12 hours of the disaster. In addition, they can operate for at least 72 hours without any outside help, providing medical services to up to 250 victims a day. Hence, these teams are assumed to be self-sufficient in terms of technical and medical equipment, water, food, as each team member should have their own personal equipment. The

[24] Y.L. Zhang, op.cit., pp. 1–4.

[25] G.R. Ciottone et al., Disaster Medicine, Amsterdam 2015. p. 1010.

[26] D.P. Sklar et al., Responding to disasters: academic medical centers' responsibilities and opportunities, „Acad Med." 2007, no.: 82, pp. 797–800.

[27] Public Health Emergency, National Medical System (NDMS) Disaster Response Teams. 2011; http://www.phe.gov/Preparedness/responders/ndms/teams/Pages/default.aspx [14.07.2020].

weight limits for equipment per member are: 30 kg for operation in hot areas and 40 kg for cold areas. Level 2 teams only require additional training, staffing, or equipment adaptation to be able to develop into a Level 1 team. Then, the teams of the third level are basic teams that do not have adequate equipment or sufficient staff. These personnel are very diverse. These teams include doctors, nurses, paramedics, pharmacists, mental health specialists, dentists, emergency medicine technicians, etc. In turn, the technical staff consists of engineers, radio operators, administrators, logisticians, safety specialists, mechanics, IT specialists, etc. At least two or three people should be assigned to each of the required positions in the team, so that there is a possibility of replacing if one of the members is not able to participate. The full team ranges from 33 to 35 people, with the size of the team varying depending on the nature of the mission as the final team combination is determined based on the special medical needs identified for the region at risk. As an example, was the concept of creating the so-called strike teams prepared for the 1996 Summer Olympics in Atlanta. Such a team usually consisted of five or six medical personnel and was able to quickly move to the scene[28]. The team sent to New Guinea after the 2004 tsunami had 58 members.

The DMAT teams that are sent to other countries to provide humanitarian aid have different combinations. The best solution would be if these teams were on the one hand specialized teams with a high level of specialization, and on the other hand, the deployment of overly specialized teams does not seem so favorable. Each disaster has its own course and requires a different, often another combination of medical forces. For example, the medical needs of people during a flood are different than during an earthquake. The characteristics of the affected area and its geographic conditions, such as mountainous or desert climate, different seasons, also influence the composition of the team. Even at different periods of a particular disaster the composition of the teams needs to be different. Thus, it is extremely difficult to establish the right composition of a team that will be highly efficient and effective in helping the injured. For example, Japan's DMAT, which is well-known for a rapid response to geological threats such as earthquakes at the local and national level, has the smallest number of members (around 4-5) at the time of deployment[29]. However, the Canadian Armed Forces Disaster Response Team (DART) has approximately 200 members for international rescue operations[30]. Some team structures, such as the Australian Medical Assistance Team, do not define a fixed number of members, only a range from 15 (at least) to 40 (at most)[31]. As an example of improper

[28] T.W, Sharp et al., Medical Preparedness for a Terrorist Incident with Chemical and Biological Agents during the Olympic Olympic Games 1996 Atlanta, „Ann Emerg Med." 1998, no.: 32 (2), pp. 214–23.

[29] Parmar P, Arii M, Kayden S. "Learning from Japan: Strengthening US emergency care and disaster response, „HealthAff (Millwood)" 2013, no.: 32, p. 2172.

[30] Disaster Relief Team (DART). National Defense and Canadian Armed Forces: Department of National Defense (DND) and Canadian Armed Forces (CAF) at: http://www.forces.gc.ca/en/operations-abroad-recurring/dart [18.06.2021].

[31] L. Benjamin et al., Australian Medical Assistance Team, National Critical Care and Trauma Response Centre, 2011. p. 370.

team composition, the team of surgeons that was sent to Bam by the International Medical / Surgical Response Team after the 2003 earthquake. The team consisted of 56 medical staff, including one cardiac surgeon, pediatrician, gynecologist, trauma surgeon, anesthesiologist etc. The team examined 727 patients of which only five operations were performed as the patients mainly suffered from general diseases such as anxiety, gynecological and pediatric diseases[32]. Hence, it is necessary to create general DMAT teams with different specializations adapted to the situation, such as: the place and type of the disaster, the needs of the local population, the time the team starts treatment at the disaster area, etc., which is both a practical and economical solution. In turn, according to a 2003 report by the World Red Crescent Society, although the Iranian Red Crescent Society was equipped with only 10 tracking dogs, they managed to save 1,000 lives in the first 24 hours. Only 25 people were rescued by 35 international search and rescue teams who arrived at the disaster site 36 hours after the quake[33]. As it turned out, the local rescue forces were the most effective entities. Research shows that, especially at the local and national level, it is necessary to provide and deploy small, agile and qualified teams to provide urgent medical services that not only provide quick and effective assistance in the acute phase of a natural disaster, but also strengthen local response forces such as emergency medical teams or units of local health systems.

In recent decades critical situations have occurred all over the world, caused by natural disasters, technical failures or human activities. Hence, the growing demand for medical services, which exceed the capabilities of the local structures of the health care system as a result of mass emergencies caused by catastrophes, is becoming widespread.

Summary

Medical activity involves providing health services understood as taking actions aimed at preserving, rescuing, restoring or improving health and other medical activities resulting from the treatment process.

The occurrence of an epidemic differs from the occurrence of other crisis situations which appear suddenly, violently, in a specific place, which at the same time results in a large number of victims. Hence, human infectious diseases force a different organization of the activities of medical entities than those with the occurrence of other natural disasters or technical failures. The common feature, however, is the fact of cooperation between entities involved in the reduction and minimization of the scale of the threat.[34]

Bearing in mind the fact that the key aspect of the operation of healthcare entities in situations of public safety

[32] P.J. Owens, Jr. A. Forgione, S. Briggs Challenges of international disaster relief: use of a deployable rapid assembly shelter and surgical hospital. Disaster Manag Response. 2005, no.: 3 (1), pp. 11–16.

[33] More: B. Chomilier et al., Operation review of the Red Cross Red Crescent movement response to earthquake in bam/Iran. International Federation of Red Cross and Red crescent societies and Iranian Red crescent society, 2004.

[34] R. Gwardyński, Możliwości doskonalenia działań prewencyjnych Policji w sferze utrzymywania bezpieczeństwa publicznego, Dąbrowa Górnicza 2021, pp. 11-13.

threats is the ability to quickly expand the healthcare system in terms of logistics and organization. Such solutions enable the possibility to strengthen the capacity of local structures to respond in the event of a natural disaster, such as: the use of mobile hospitals, the inclusion of the military and foreign disaster response teams.

Bibliography

Benjamin L. i in., Australian Medical Assistance Team, National Critical Care and Trauma Response Centre, 2011.

Bitterman N., Zimmer Y., Portable Health Care Facilities in Disaster and Rescue Zones: Characteristics and Future Suggestions, „PrehospDisaster Med." 2018, 13(4).

Butterworth S.J., Operation PATWIN: HMS DARING's experience of providing humanitarian disaster relief following super-Typhoon Haiyan, „JR NavMedServ" 2014, 100 (1).

Chomilier B. et al., Operation review of the Red cross Red Crescent movement response to earthquake in bam/Iran. International Federation of Red Cross and Red crescent societies and Iranian Red crescent society, 2004.

Ciottone G.R. et al., Disaster Medicine, Amsterdam 2015.

Gulczyński M., Nauka o polityce, Druktur Publishing, Warsaw 2007.

Guo X., An J., Huang Y., Application of field shelter hospital in Yushu earthquake relief, „Journal Hosp. Manag. PLA" 2011, no.: 18 (7).

Gwardyński R., Możliwości doskonalenia działań prewencyjnych Policji w sferze utrzymywania bezpieczeństwa publicznego, Dąbrowa Górnicza 2021.

Gwardyński R., Safety in Praxeolog Aproach, [w:] Security–Threats, Law and Organization", Schriften zu Mittel–und Osteuropa in der Europeischen Integration, red. B. Wiśniewski, G.G. Sander, P. Kobes, Band 24, Verlag Dr. Kovac, Hamburg 2019.

Kaczmarek J., Skowroński A., Bezpieczeństwo. Świat – Europa – Polska, Alta 2, Wroclaw 1998.

Kogut B., Lubiewski P., Management and coordination of rescue activities, Вісник Львівського державного університету безпеки життєдіяльності, No 17, Львів 2018.

Kogut B., Lubiewski P., Organization of rescue activities in crisis situations caused by terrorist attacks, Вісник Львівського Державного Університету Безпеки Життєдіяльності, No 2018/6/11, Lviv 2018.

Lin G., Marom T., Dagan D., Ethical and Surgical Dilemmas in a Zone of Recent Disaster, „Word Surg." 2017, no.: 41.

Lu S.B., The importance of medical segregation in emergency medical services after the Wenchuan earthquake, „MedJournalChine PLA" 2008, no.:33.

Mroczko F., Zarządzanie kryzysowe w sytuacjach zagrożeń niemilitarnych. Zarys problemów regionu dolnośląskiego, WSZIP (Walbrzych Higher School of Management and Enterprise), Marketing, Walbrzych 2012

Owens P.J., Forgione Jr. A., Briggs S., Challenges of international disaster relief: use of a deployable rapid assembly shelter and surgical hospital. Disaster Management Response. 2005, no.:3 (1).

Parmar P., Arii M., Kayden S. "Learning from Japan: Strengthening US emergency care and disaster response, „HealthAff (Millwood)" 2013, no.:32.

Sever M.S., Remuzzi G., Vanholder R Disaster medicine and response: Optimizing life-saving potential, „PrehospDisaster Med." 2018, 1 3(4).

Sharp T.W. i in., Medical Preparedness for a Terrorist Incident with Chemical and Biological Agents during the Olympic Olympic Games 1996 Atlanta, "Ann Emerg Med." 1998, no.: 32 (2).

Sklar D.P. et al., Responding to disasters: academic medical centers' responsibilities and opportunities, „Acad Med." 2007, no.: 82.

Socha R., Bezpieczeństwo i zagrożenia – wzajemne relacje, [w:] Wybrane aspekty badań nad bezpieczeństwem, red. nauk. B. Kaczmarczyk, A. Wawrzusiszyn, Ełk 2014.

Socha R., Współczesne postrzeganie zagrożenia, [w:] Zarządzanie kryzysowe. Teoria, praktyka, konteksty, badania, red. J. Stawnicka, B. Wiśniewski, R. Socha, WSPol, Szczytno 2011.

Socha R., Kaczmarczyk B., Szwajca A., Zarządzanie kryzysowe w systemie bezpieczeństwa publicznego RP, Kraków 2014.

Socha R., Zarządzanie bezpieczeństwem w ruchu drogowym według przepisów Unii Europejskiej, [w] Bezpieczeństwo na lądzie, morzu i w powietrzu w XXI wieku, red. nauk. J. Zboina, Józefów 2014.

Wyzwania, szanse, zagrożenia i ryzyko dla bezpieczeństwa narodowego RP o charakterze wewnętrznym, R. Jakubczak, B. Wiśniewski (sci. ed.), Szczytno 2016.

Talbot M., Meunier B., Trottier V. et al. Canadian Field Hospital in Haiti: surgical experience in earthquake relief, „Journal Surg." 2012, 55 (4).

Zhang Y.L., Chinese military health service in the non-war period, „MedJournalChine PLA" 2011, no.: 36.

Zhang Y.L., Considering a post-Wenchuan earthquake medical rescue strategy, „MedJournalChine PLA" 2009, no.: 34.

Zheng H., Tian F., Fan H., Application and Prospect of a Mobile Hospital in Disaster Response, „Shandong Ind Technol" 2015, no.: 17.

Ziobro J, Ratownictwo transgraniczne jako forma współpracy i integracji międzynarodowej oraz środek w procesie zapewniania bezpieczeństwa powszechnego – wybrane aspekty organizacji transgranicznych działań ratowniczych, Zeszyty Naukowe SGSP 2020, No 73/1/2020.

Ziobro J., Lubiewski P., Podstawowe problemy powszechności zagrożeń dla ludzi i środowiska [in:] Racjonalizacja zarządzania jednolitymi formacjami umundurowanymi odpowiedzialnymi za bezpieczeństwo wewnętrzne, Tom 3, ed. B. Wiśniewski, Warszawa 2018.

Ziobro J., Rescue Efficiency Determinants as a Guarantee of Acceptable Security Level, „Security Forum", No 1/2021, Dąbrowa Górnicza 2021.

Ziobro J., The Role of Exercises in Managing Entities Responsible for Ensuring Internal Security – Selected Aspects, Schriften zu Mittel und Osteuropa in der Europäischen Integration, 25, Hamburg 2020.

Znamierowski C., Szkoła prawa. Rozważania o państwie, PAX Publishing Institute, Warsaw 1988.

National Security Strategy of the Republic of Poland 2020, approved on May 12, 2020, by the President of the Republic of Poland, Warsaw 2020.

About the Autors

Cezary TOMICZEK, MSc**,** Ph.D., MBA, DBA Specialist in security. CEO of Medical Center in Mikolow. He gained experience in the industry performing significant functions in the health care sector and in local government work. Specialist in managing, he has special achievements in safety management. Author of many articles and monographs related to safety.

Radomír ŠČUREK, Associate Professor, MEng, MSc, Ph.D., specialises in security of persons and property, protection of companies, current security threats, criminology and national security. Researcher and co-researcher of several security research projects author of many securities related articles and monographs.

Vojtěch JARKULIŠ, Ing., VŠB – Technical University of Ostrava, Faculty of Safety Engineering, Lumírova 630/13; 700 30 Ostrava – Výškovice; Czech Republic; PhD student, specialises in cyber security, physical security, and information security. Leading and participating in different security consultancy assignments for both private and public sector clients, performing security development tasks, security assessments and gap analyses.