A System of Medical Service to Assist the Population of Uzbekistan in the Case of Natural Catastrophes

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The Republic of Uzbekistan is located in central Asia between the Amudarya and Sirdarya rivers, covering an area of 447.4 thousand square kilometers. The population is 25.4 million. It consists of 12 regions and 1 autonomous republic. The capital is Tashkent (population 2.5 million). The Republic borders Kazakhstan on the north-east, Kyrgyzstan and Tajikistan on the east and south-east, and Turkmenistan and Afghanistan on the west and south-west. The total length of the border is 6221 km.

The territory of Uzbekistan is mostly plain (around four fifths of the area). One of the main plains is the Turan plain. The foothills of Tyan-Shan and Pamir are on the east and north-east of the country. The highest peak (4643 m) of the country is also in the same region. In the north of the central part of Uzbekistan there is one of the world's largest deserts – the Kizilkum.

The climate of Uzbekistan is sharply continental with long hot summers which have the potential to adversely affect human health. The average annual precipitation is 120 – 200 mm on the plain area and 1000 mm in mountainous area. As precipitation is very low, agriculture relies mostly on irrigation.

Ecological problems of Uzbekistan and extreme weather phenomena

One of the current ecological problems of Uzbekistan is the shrinking of the Aral Sea. Once, the Aral Sea provided prosperous life to the population of the region, but today it has damaged the overall surrounding eco-system and directly influenced the health of the people of the region.

According to the UN, around 700,000 tonnes of harmful salts originating from the bottom of the Aral Sea are carried over a 1000 km radius, out of which 500 kg is precipitated per each hectare in the Amudarya's delta. The Aral crisis has caused medical, social, economical and domestic problems, which require huge financial expenses. Nevertheless the government is trying to solve these problems. Medical assistance is being sent to the area, and hospitals, schools and houses are being built.

The consequences of industrialisation are manifesting themselves at an increasing frequency. These include: air, water and soil pollution by manufacturing enterprises; shrinkage and swallowing of the water bodies and deforestation. Progressive anthropogenic pressure on the forest eco-systems of Uzbekistan becomes more evident each year, and has resulted in rare and unique floral and fauna spices becoming extinct. The Tugai forests, for example, are degenerating, their area is becoming smaller and geo-systems are changing.

The increase in greenhouse gases in the atmosphere due to human activities is causing global climate change. The main sources of greenhouse gases in Uzbekistan are fuel and energy manufacturers, the building industry, the metallurgy and chemical industries, automobile and railroad traffic, agricultural activities, mining and transportation of fossil fuel, and waste storage and processing.

Unfortunately, climate change, considerable forests reduction and soil erosion have made landslides, floods and mudflows more common in Uzbekistan. Everyone in Uzbekistan remembers the night of August 8, 1998 when two rivers, the Aksu and the Shahimardan in the Fergana valley, flooded. The flood

was unexpected and the majority of the population was sleeping. 600 people went missing, thousands remained without shelter and 109 died. Many houses, bridges and power supply lines were destroyed. The first medical aid was provided by more than 20 mobile teams (each team consisted of five people – a doctor, two nurses and two aidmen), who worked closely with 60 rescuers searching for the victims in the mountains. Difficulties experienced during the rescue, especially regarding medical evacuation, showed the necessity for a revision of the existing Emergency Medicine System (EMS) of Uzbekistan.

Nowadays, the Sarezsk Lake is a concern. The right bank of the lake is not stable, and in the event of an earthquake it may collapse. It is predicted that if a landslide occurred, a huge wave (probably 200 – 250 m high) would flow through the lower part of the blocking dam. Enormous mud and stone flows would sweep over (with a speed exceeding 80 km per hour) the the Bartang and Pyandj Rivers (where the Tajikistan-Afghanistan border is located), entering the Amudarya River, and after several days it would reach the Aral Sea. Settlements, villages and towns would be destroyed and it is predicted that around 5 million people would be affected.

Taking into account all of the above, the government of the Republic of Uzbekistan has undertaken large-scale arrangements to reduce the consequences of ecological and climate change on the health of the people and their security. Active debates are ongoing to discuss the reduction of extreme weather events. In particular, the National Strategy on reduction of greenhouses gases between 2000 – 2010 has been initiated. In cooperation with international organizations a number of projects are running to restore biodiversity and to improve water supply in the Aral region. Interstate normative documents on the establishment of regional cooperation of rescue services of CIS countries have been signed. Families living in the flood- and landslide-prone areas have been resettled to secure areas, and housing areas have been distributed for them. For mudflow prevention, local funds have been provided for cleaning lowland and river banks, and barrage construction. However, current knowledge and capability is not able to completely prevent and remove the tragic consequences of natural disasters. This is why it is important to establish and maintain different structural and effective rescue services. In Uzbekistan the Emergency Medicine Service (EMS) is responsible for medical aid to the population suffering from natural disasters, as well as in everyday life. This service differs from similar institutions of other countries.

Emergency Medicine Service

One of the main distinctive features of the Uzbek model of EMS is governmental guarantee of free and accessible high quality medical services in life-threatening cases.

Before the start of the fundamental reformation of the healthcare system EMS was not a separate division of the healthcare system of the country. Different medical institutions and their subdivisions were working separately and independently, providing emergency and systematic medical assistance to the population. There was no unique mission, unique philosophy, and unique methodology for emergency medical service in these medical institutions. There was also no consistency regarding the qualifications of staff, equipment, and medical supplies. The ambulance service was also independent. In other words, there was no unique structure of EMS organization; there was no state policy regarding support and development of EMS. The technical basis was out of date and there was lack of skilled personnel.

Considering the existing system of healthcare and distinctive features of economical transition period the model of the EMS was created. To achieve accessibility, economical and medical efficiency the EMS is organized on a multilevel basis, with all organizational-structural levels united into a single service, with stable organizationally-methodological, vertical and horizontal links. The structure and functioning of the EMS is given in ❯ *Table 1.*

Tab. 1

Structure and Functioning of Emergency Medicine Service of the Republic of Uzbekistan

Level	Institution	Type (workload) of provided assistance
Highest level	RRCEM Regional branches of RCEM	Specialized, qualified medical aid **
Medium level	EMS sections in Central Regional Hospitals	Qualified medical aid ***
Low level	Primary unit of healthcare (family polyclinic) Ambulance service	First aid
Non-hospital emergency medical assistance	Community-healthcare system in case of emergency situation (mobile groups of constant preparedness of EMS)	Have an equipment for specialized, qualified medical aid
	Sub units of the Ministry of Emergency Situations Paramedics (policemen, drivers, teachers, firemen and etc.), trained at RRCEM	First aid

* Rural (family) aid posts

** Specialized, qualified medical aid is provided in special divisions by special practitioners (cardio surgeon, neurosurgeon, urologist, etc)

*** Qualified medical aid is provided by general practitioners (surgeon, therapist, pediatrician).

The Head Centre in Tashkent – Republican Research Centre of Emergency Medicine (RRCEM) – provides emergency basic surgery and reanimation-intensive directions of emergency medicine for those who live in the capital and around; Regional Centres provide all types of medical assistance to the population of the regions (see list below). In addition, 171 settlements of the country have sub-divisions of RRCEM in their Central Regional Hospitals (CRH) and Central Town Hospitals (CTH). In addition to the mentioned sub-divisions, the EMS includes an ambulance service with 194 stations and 1485 ambulance teams, medical sub-divisions of the Ministry of Emergency Situations. Altogether around 44,000 staff are working in the EMS, among them more then 7500 qualified doctors and 20,000 nurses.

The standard beds' structuring in RRCEM and its regional branches.

A. Intensive care and surgery profile

1. Intensive care
2. Abdominal surgery
3. Thoracic and vascular surgery
4. Trauma and neurosurgery
5. Urology
6. Gynecology
7. Burn unit
8. Toxicology

B. Therapeutical profile

1. Emergency therapy
2. Cardiology
3. Neurology

C. Pediatric profile
1. Pediatric surgery
2. Pediatry

The integration of institutions providing emergency medical aid into single structure in Uzbekistan is logical considering the financial resources deficit. The advantages of a unique EMS are:
- The opportunity to realize a unique mission and policy on development of EMS
- Concentration of financial, technical, personnel and scientific potential of the healthcare system
- Efficiency and effectiveness of management
- The opportunity to address the financing of EMS

In the framework of the single system, the organizational and methodological work of the Centre is simplified and directed towards development, realization and perfection of structure and methods of EMS organization, based on efficiency, high technology and effectiveness of all levels of the service. Treatment-diagnostics standards are developed taking three levels of emergency aid into account: for general practitioners – primary unit of healthcare, i.e. first aid, primary diagnostic and primary treatment; for surgeons, therapists and pediatricians of the regional unit, qualified medical aid; and for the special practitioners of the regional unit and RRCEM specialized and qualified medical aid.

To ensure consistent functioning and availability of free bed stock, patients in a stable condition are transferred to other medical institutions (including polyclinics) for further treatment and rehabilitation. Optimal timings of hospitalization and signs for the next stage of treatment and rehabilitation are given in written instructions entitled "Treating-diagnostic standards for the doctors of EMS", as well as being regulated by corresponding Acts of the Ministry of Healthcare and regional healthcare administrations.

By the Act of the Ministry of the Republic of Uzbekistan EMS ascribed to the functional subsystem of State System of Prevention and Actions in Emergency Situation. Service of emergency aid at emergency situations became a component of the overall EMS. In 1999 the Act "About State Service of Emergency Medicine Aid at Emergency Situations" was developed. It regulates basic aims, organizational structure, and management, organization of medical aid to the population in emergency situations, technical and financial supply, as well as social and law security of medical staff of State EMS at emergency situations.

For provision of aid in the cases of emergency situations 39 specialized, ever-ready groups have been formed (three in RRCEM, and three groups in each of the 12 regional centers), 128 groups to provide emergency medical assistance on the basis of CRH and CTH exist.

Basic tasks of the ever-ready medical groups are as follows:
- Medical (on-post) sorting, emergency qualified aid and specialized qualified aid on the basis of local sub-division of RRCEM
- Coordination of efforts of institutions and services at the site of the catastrophe
- Organization and coordination of evacuation of victims out of the site of catastrophe.

The EMS with its sub-divisions is integrated into a general system of rescue works in cooperation with the Ministry of Extraordinary Situations, Ministry of Internal Affairs, Ministry of Defense and other departments. This system has not only increased the efficiency and effectiveness of the EMS and "disaster medicine" but has also reduced general expenses.

The EMS treats 500,000 people in hospital and around 500,000 out of hospital, annually. Around 5,000,000 calls for ambulance service are placed every year. It is important to admit that around 17.5 % of patients are treated in the EMS; however the number of beds is only 6.3 % of the overall number of beds in the country. These numbers not only show the intensity of the work of the EMS but also proves the accessibility of the EMS.

In summary, the EMS in the republic of Uzbekistan is single service, gathering technical and scientific personnel and equipment into a single structure, funded by the state, and is intended for the provision of free, accessible medical assistance to the population in emergency situations. By creating a single service it

has become possible to create an effective mechanism of continuous supervision, methodological upgrade of quality of medical assistance and monitoring of diseases status in emergency situations. The integration of all institutions providing emergency aid to the population into a single system is economically advantageous as well as providing state guarantees of free and accessible emergency medicine for all groups of society.

Conclusions

Long dry and hot summers are traditional in Uzbekistan, thus the population has developed effective measures against the effects of heat.

Floods and mudflows are difficult to forecast and very dangerous.

Alongside organisational measures such as resettlement of populations to safe areas from the dam construction sites and strengthening of the river banks, it became necessary to form an effective medical emergency service, which is a multi-branch system and is able to provide medical aid to the population in cases of natural disasters.

In the case of limited resources it is expedient to form the medical divisions of rescue of the population on the basis of existing medical establishments.

Uniting medical institutions into a single medical structure providing an Emergency Medical Assistance increases management efficiency and continuity of evacuation thus saving lives of the victims.