Műszaki Katonai Közlöny

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DEPLOYMENT OF STANDARDIZED EMERGENCY RESPONSE UNITS IN LARGE SCALE EMERGENCIES

STANDARDIZÁLT VESZÉLYHELYZETI REAGÁLÓ EGYSÉGEK BEVETÉSE NAGY KITEREJEDÉSŰ VESZÉLYHELYZETEK SORÁN

The number of natural disasters and armed conflicts 164n the world is constantly increasing. Sudden disasters and wars affect millions of people every year. On several occasions, many decades of development work perishes due to these crises. Different challenges, norms and standards, and the resulting demands are diverse by geographical area. In order to respond to the large scale emergencies as quickly and efficiently as possible, standardized, sector-specific, rapid-response units are needed, that can be deployed anywhere in the world within a short period of time. The author analyses the unique capacitiy and technical background of the modular emergency response units of the international system of Red Cross.

Keywords: *emergency, response, standardized, technical, module, Red Cross*

A világban a természeti csapások és a fegyveres konfliktusok száma folyamatosan emelkedik. A hirtelen bekövetkező katasztrófák és a háborúk minden évben emberek millióit érintik. Egy-egy alkalommal évtizedes fejlesztési munkák válnak semmivé ezen csapások következtében. A különböző kihívások, az eltérő normák és szabványok és az ebből fakadó igények földrajzi területenként eltérőek. Annak érdekében, hogy a nagy tömegeket érintő veszélyhelyzetekre a lehető leggyorsabban és a leghatékonyabban lehessen reagálni, olyan standardizált, szektor-specifikus, gyorsreagálású egységekre van szükség, amelyek rövid időn belül, a világon bárhol bevethetőek. A szerző a Vöröskereszt nemzetközi hálózatának modulrendszerű veszélyhelyzeti reagáló egységeinek egyedülálló képességeit, műszaki-technikai hátterét elemzi.

Kulcsszavak: *veszélyhelyzet, válaszadás, egységes, műszaki, modul, Vöröskereszt,*

INTRODUCTION

Natural disasters and infectious disease outbreaks have severe repercussions on affected population's health [1]. Not only injuries and sickness, but the failure of infrastructure, the depletion of health services and the lack of resources all together increase the likelihood of sickness and death [2]. Emergency Response Units (ERU) - similar to the modules of the EU Civil Protection Mechanism [3] - are standardised modules of equipment and trained personnel. ERUs are operating within the emergency response system of the International Federation of Red Cross and Red Crescent National Societies (IFRC) and ready to be deployed at short notice. They are designed to provide an essential, basic and standardised service platform for use in any part of the world. The units are self-sufficient for up to 6 weeks and can be deployed for up to 4 months. Whenever there is a situation that requires immediate response to which the

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affected Red Cross/Red Crescent National Society cannot respond alone, ERUs are providing a specific direct service function when local support system and facilities are either destroyed, overwhelmed by needs, or do not exist.

TYPES OF STANDARDIZED MODULES

Within the network of Red Cross emergency response system there are various types of ERUs maintained and operated by different Red Cross/Red Crescent National Societies. All of them are ready to be deployed at short notice [4; p.16.] within 24 to 48 hours, from different points of the world as it seems on the chart (Figure 1.) below.

Country	It/ Telecom	WASH Module 15	WASH Module 40	WASH Module 20	Field Hospital	Basic Health Clinic	Logistic	Relief
Austria	x	x	x	x				
Denmark	x							
Finland					x	x		
France						x	x	
Germany		x	x	x	x	x		
Japan						x		
Norway					x	x		
Spain	x	x		x		x	x	x
Sweden			x	x				
Switzerland							x	
Turkey								x
UK							x	
USA	x							x
All together	4	3	4	5	3	6	5	5

Figure 1. ERUs and it's country of station (created by the author) Forrás: IFRC - DMIS

The Base Camp's objective is to provide Red Cross Red Crescent staff with appropriate living and working conditions. Accordingly the Base Camp offers accommodation in tents conditioned for both hot and cold climates, toilets and showers, recreational facilities, kitchen, offices, as well as IT/communication and coordination facilities in locations where these are not available for Red Cross Red Crescent teams. Base Camp comes with it own staff and deploys like other ERUs [4; p.13.].

Logistics is a key professional element in successful disaster management. It is a support service to both disaster relief operations and ongoing programmes. The basic task of the logistics function is to deliver the appropriate supplies and services, in good condition, in the quantities required and at the places and time they are needed. Humanitarian logistics refers to the management of emergency relief supplies from source to the beneficiaries, both efficiently and effectively. The importance of coordinated supply chain management for an efficient response, as well as the optimized use of scarce resources acquires a crucial significance in a humanitarian context, based on preliminary assessment with appropriate methodology [5;p. 13.]: it means

saving lives and diminishing the impact of communicable diseases due to inhuman living conditions.

Similary the *Relief ERU* is normally deployed to support the disaster response operations when the operation have a significant relief/logistics component, like large-scale relief distributions, and where the local actors are overwhelmed with disaster and does not have the capacity to manage and suitably report on relief activities. The primary purpose of the relief ERU is to ensure that essential relief goods are delivered rapidly, effectively and in a well coordinated and dignified manner to the appropriate beneficiaries in support of Red Cross and Red Crescent Movement partners [6]. The goods received and distributed by the Relief ERU are those goods mobilized under the IFRC in support of a National Society disaster response operation.

The main tasks of the *Information technology and telecommunications* unit are to provide support to Red Cross/Red Crescent National Societies in the telecom and information technologies. One important activity is the emergency and disaster support, given through the Telecom ERU and the field assessment and coordination teams. In a world with disasters of growing complexity telecommunication and information technology are the backbone of any operation, they are providing services to the operations on the ground.

The *consumption of water* and the generation of human waste are such commonplace aspects of human life that planning for the appropriate use or removal of them is often overlooked. The evidence is abundant that failure to ensure an adequate supply of safe water or to arrange for safe disposal of excreta is a major contributing factor to disease transmission, ill health, misery and death. The failure to promote a safe water supply and healthy hygiene practices often lead to the transmission of infectious diseases. People affected by disasters are more likely to become ill and to die from diseases related to poor access to safe water and appropriate sanitation facilities than from any other single cause. People become more vulnerable to diseases like cholera when water is contaminated, toilets are not available and safe hygiene habits are not put into practice (e.g handwashing before eating or after visiting the toilet). Better access to safe water, sanitation facilities, hygiene promotion activities and hygiene commodities (like soap) not only leads to improvements in health, but also saves time and energy and enhances livelihood opportunities.

There are three *water and sanitation modules* available according to water volume required, hygiene requirements, and beneficiary numbers and locations. The work of the modules conforms to Sphere [7] and WHO standards. On average, four to eight water engineers, technicians or hygiene promoters are deployed with each module. The three modules can be deployed separately or jointly depending on needs.

- Module M15

This module provides treatment and distribution of up to 225,000 litres of water a day for a population of up to 15,000 people, with a storage capacity of a maximum of 200,000 litres a day and also can also provide limited sanitation. The availability of local water sources is required for this module which is designed for response to scattered populations, with a flexible approach due to a number of smaller treatment units (minimum three), which can be split and

set up as stand-alone units in different locations. Module 15 has integrated distribution and trucking capacity, for transport of treated water to dispersed populations with a capacity of up to 75,000 litres a day, with the capacity to set up nine different storage and distribution points [4; p.12.] (preconditions are availability of flatbed trucks, fuel, road access). The approximate weight of the module is 22 t, and the volume is 160 m3, (including technical and team equipment, vehicles).

- Module M20

This module provides basic sanitation facilities (latrines, vector control and waste management) for up to 20,000 beneficiaries as well as initiating hygiene promotion programmes [4; p.12]. The revised mass sanitation module has hygiene promotion activity to maximise the health benefits from appropiate excreta disposal and handwashing in particular. The approximate weight of the module is 14 t, and the volume is 90 m3, (including technical and team equipment, vehicles).

- Module M40

Availability of local water sources is required for this module to provide treatment and distribution of water for larger populations, and can treat up to 600,000 litres a day for up to 40,000 people and to provide limited sanitation as well. M40 has integrated distribution and trucking capacity, for transport of treated water to dispersed populations with a capacity of up to 75,000 litres a day and the capacity to set up nine different storage and distribution points [4; p.12.] (preconditions are availability of flatbed trucks, fuel, road access). The approximate weight of the module is 25 t, the volume is 110 m3, (including technical and team equipment, vehicles).

HEALTH CARE MODULES

Health care modules has many variations considering their function, the number of patient to be cared, and there are significant differences on their logistic requirements, due to their weight, volume, or the and electricity needed to operate the unit (Figure 2.).

Module	Basic Health Care	Referral Hospital	General Field Hospital
Weight	18 t	30-60 t	70 t
Volume	80 m3	120-160 m3	220-240 m3
Area	50 x 50 m	150 x 200 m	400-600 m2
Generator	2-3 x 5 kW	20 kW	3-4 x 20 kW

Figure 2. Basic technical datas of healthcare modules (created by the author) Forrás: IFRC - DMIS

Basic Healthcare (BHC) ERU

After a disaster healthcare is not only about the treatment of injuries. As longer term consequences, diseases burden from unsafe water, sanitation and hygiene (WSH) is estimated at the global level taking into account various disease outcomes [8; p.1321.]. Basic Healthcare module provides immediate preventive, curative and community health care. It can deliver

outpatient clinic service and mother and child health including uncomplicated Moreover, community outreach, health promotion, epidemic control, surveillance, immunisation and therapeutic feeding can be conducted through optimized modules. Recent additions are the newly developed psycho-social module as well as the community health module. The unit enables the care for a population of 30 thousand people, can care for 20 temporary inpatients, and provides referral services to other secondary and tertiary health facilities. Depending on the needs of the affected population and the specifics of the crisis, the BHC ERU can function in three ways: as the traditional fixed clinic, as a hub with smaller satellite clinics so as to increase the geographical area of operation, or as a full mobile clinic with light teams spreading out to communities affected and without geographical limitations. The BHC ERU supports affected or overwhelmed local health infrastructure, works with local health authorities and health professionals and fills the gaps created by an emergency.

The module includes a safe sufficient water supply, i.e. minimum 50 liters per outpatient per day plus extra for cleaning etc. In the event of therapeutic feeding or functioning as a cholera treatment centre, the water usage rate would be significantly higher. It organises referral systems for more serious cases in need of hospitalisation - i.e. a hospital within reasonable distance, plus transportation (ambulance) facilities. This ERU also requires availability of local health staff and interpreters to support services and should have the agreement of the local health authorities for the ERU and expatriate health professionals to provide health care.

Personnel are: 5 - 8 nurses, doctor, midwife, technician. The approximate weight of the module is 18 t, the volume is 80 m3.

Referral Hospital ERU

After complex or large scale disasters, this unit functions as a first level referral hospital, providing essential services for a population of up to 250,000 people. The inpatient capacityof this module ranges from 120 to 150 beds, providing surgical and medical care, intensive observation, anesthesia and operating theatre, as well as x-ray, laboratory, maternal-child health, pharmacy, sterilization and outpatients clinics. Accordint to IFRC standard operating procedures, this type of ERU always works on the basis of an agreement with the health ministry of the country affected, and welcomes national health staff to work alongside the expatriates. This ERU can be deployed as small rapid deployment version first, and can be broaben with additional parts of the full module when it is needed [4; p.13.]. The unit requires a sufficient water supply (40-60 litres per patient per day, plus extra for washing, laundry, cleaning, etc.) It also needs local health and support service staff and interpreters, plus a sufficiently large surface area with good road access. For larger population, it is possible to combine two existing referral hospital ERUs to increase the operating capacity, similar as Foreign Medical Teams belonging to category Type 1, 2 or 3 [9; p.12.]. In addition, a modular Rapid Deployment Hospital has been established, consisting of two 4x4 Land Cruisers and trailers.

This module, containing all the necessary medical and logistics supplies to cover the crucial first ten days after a disaster can call on other hospital ERUs to expand the operation as necessary. The unit can also be converted for community outreach. Personnel for the unit are

15 - 20 nurses, surgeon, doctor, anaesthetist, administrator, technician. The approximate weight of this ERU is 30 - 60 t, and it's volume is 120 - 160 m3.

Main tasks of the Referral Hospital module:

- Surgery & limited Trauma: Emergency care;
- Internal medicine: Infectious diseases, including basic preparedness to care for large numbers of patients in case of epidemics. Therapeutic feeding of patients suffering from either disease or malnutrition;
- Obstetrics, Gynaecology - Deliveries & Paediatrics: Emergency care;
- Out Patient Department: Out Patient Department (OPD), triage, registration, dentistry.

Rapid Deployment Hospital

This module can deploy within 48 hours of alert and offers triage, first aid, and limited medical/surgical care for the very first time response activities, including an out patient department, in addition a 10 beds capacity is also available, as it is a much lighter version of the Referral Hospital ERU. It has a capacity work up to 10 days pending assessment and arrival of (parts of) the Referral Hospital and/or Basic Health Care ERU and based on the decision of IFRC, local Ministry of Health or Health Cluster. The unit is flexible and mobile (two Land cruisers and two attached trailers) and requiring no loading equipment, the team works with limited material and resources. It can be used as mobile clinic if required at later phase of operation upon request. Options that can be added to the unit are the newly developed psycho-social module as well as the community health module in the scope of efficiency, based on the decision within the health cluster in the field [10; p.30.].

General Field Hospital

This ERU is deployed after complex or large scale disasters, when there are no longer adequate hospital-level health services to the affected population and acts as a referral hospital for mobile or fixed basic health centres operating in the area, based on international standardization. Nowdays uniquely Finnish Red Cross has the capacity to deploy the hospital as such or in combination with one or more of its ERU basic health centres [11]. This type of healhcare ERU has the capacity to serve a population of 200,000 to 300,000 and has the ability to treat 150 to 250 patients per day, standard ward capacity of the hospital is 160 beds. The unit offers outpatient services and also specific, long term services like vaccination programmes or programmes to deal with malnourishment and diseases related to insufficient hygiene conditions. The module dispose units for surgery and trauma patients, internal medicine, paediatric patients and also medical teams specialized in infectious diseases and tropical medicine as well. Since it's long term capacity, the module offers gynaecology services, ante- and postnatal guidance and a maternity ward.

Based on the services provided by the module and defined by international standards the staffing of general field hospital are the following. Team Leader**,** medical coordinator**,** surgeon**,** anaesthesiologist**,** **g**ynaecologist**,** paediatrician**,** general practitioner**,** nurses (specialities: outpatient treatment, anaesthesia, paediatrics, midwife, ward nurses)**,** pharmacist**,** laboratory

technician**,** X-ray technician**,** administration delegate**,** information delegate**,** technical delegates (specialities: water and sanitation, IT, electricity plus generalists) [12; p.20.]**.** In addition up to 200 staff.

Setting up a general field hospital requires a minimum of 4.000 to 6.000 square metres of suitable land. For the transportation two regular freight planes are needed to dispatch the hospital to its location by air freight. Since it weighs approximately 70,000 t, requires the transport capacity of 5 semi-trailer trucks.

Figure 3. General field hospital (created by Finnish Red Cross) www.redcross.fi

Deployment layout for general field hospital as it seems on Figure 3: 1. Gate, 2. Water point, 3. Latrine, 4. Ward unit, 5. Laundry, 6. Showers, 7. Kitchen, 8. Morgue, 9. X-ray, 10. Medical warehouse, 11. Laboratory, 12. Intensive care unit, 13. Operation theatre, 14. Sterilization, 15. Dispensary, 16. Administration, incl. communication and data traffic, 17. Workshop, general stockroom and technical depot, 18. Communication antenna, 19. Dressing unit, 20. Outpatient unit, 21. Water storage, 22. Water purification, 23. Generators, 24. Waiting area and patient registry, 25. 4x4 pickup, 26. 4x4 all terrain vehicle, 27. Personnel accommodation area, 28. Sauna, 29. Dining area, relaxation area [11].

A laboratory tent has the capability to perform 20 to 30 different laboratory examinations based on samples of blood; urine, faeces, and other excrete and puncture samples, with the staff as one laboratory technician delegate and two local laboratory technicians.

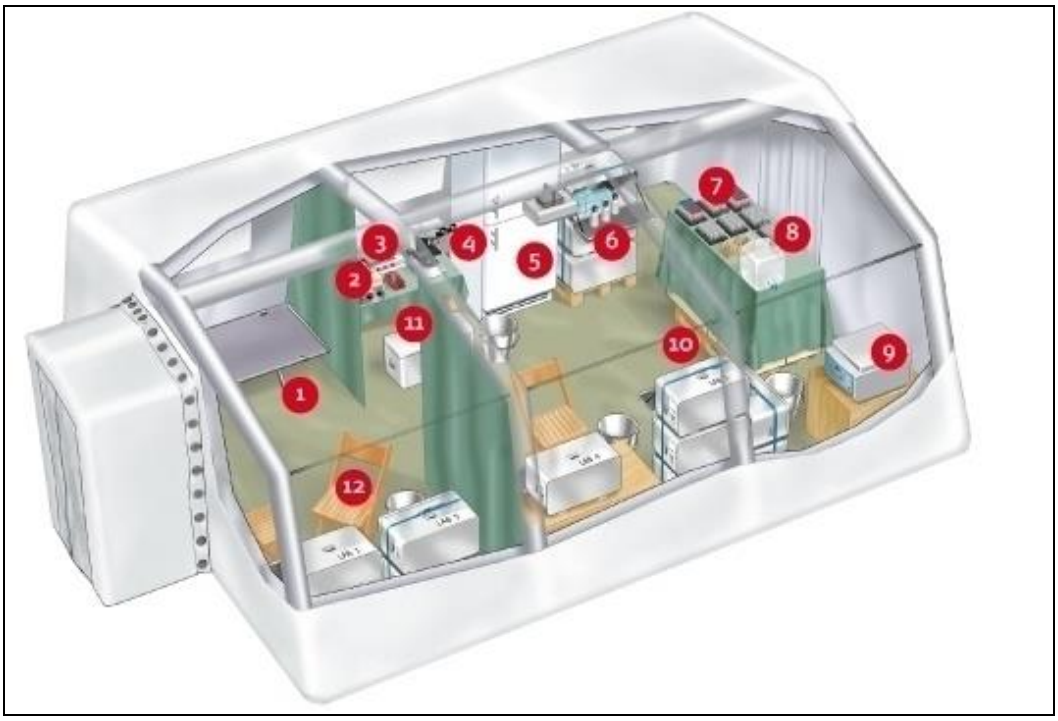

Figure 4. Field hospital laboratory tent (created by Finnish Red Cross) www.redcross.fi

Deployment layout for laboratory tenta s it seems on Figure 4: 1. Patient area. "Staff only" on the other side of the curtain, 2. Heating poultice, 3. Cell counter and blood glucose meter, 4. Microscope, 5. Laboratory fridge, 6. Laboratory accessories, 7. Sampling tubes, 8. Water container, 9. Centrifuge, 10. Examination of urine, faeces and other excrete samples is performed in this part of the laboratory, 11. Examination of blood samples is performed in this part of the laboratory, 12. Blood sampling [11].

The site selection criteria for all types of health care ERUs is very accurate. First of all has to be accepted by authorities or landowners. An outside camp is preferrable, within walking distance, but no low land or swamp, with access to main roads, appropriate for security expectations Access to high quality water (up to 150 litres per inpatient per day) is crucial, same with a waste disposal. Good soil conditions, drainage and latrines are fundamental for the installation of the hospital. In order to the uninterrupted operation of the module, availability of construction materials and fuel are necessary. Infrastructural background needed as: storing possibilities, logistics capacities, telecommunications, possible connections to electricity, water, sewage, waste.

The main goal of the modules is to improve health in emergencies on the community level. While giving due attention to providing curative health services in emergencies through standardized emergency response units and other response tools, the focus remains on informing, empowering and mobilizing communities to participate in improving their health [13].

SUMMARY

Emergency Response Unit's standardized system is perfectly suited to cover the full range of the population's needs after disasters. The base camp, logistics, IT and telecommunications modules grants that all the other modules - which are deployed to support the affected country – are self-sufficient, so they can operate independently anywehere in the world, without encubering the local response system. Analyzing the standardized emergency response system of the International Federation of Red Cross and Red Crescent Societies, it is visible, that all the sector-specific, technical modules can be deployed within 48 hours with all required equipment and capacities. Due to their standardization, all of the modules are able to be connected between each other, all the staff are trained by the same methodology, and all the standard operating procedures are congruent.

In summary ERUs provide specific services where local infrastructure is damaged or insufficient to cope with the basic needs of the affected population after complex or large scale disasters or during armed conflicts. If the need for assistance continues after the ERU's four month operational period comes to an end, the service provision and equipment is taken over by the IFRC's ongoing operation, the host Red Cross/Red Crescent National Society or very often the local government [4; p.16.]. The modules are able to fulfill all the international standards, regulations, and qualification requirements, so they are active participants of the international humanitarian assistance system.

REFERENCES

[1] Hornyacsek – Nyitrai: Területi járványügyi veszélyhelyzet egészségügyi és logisztikai támogatása, Hadmérnök, XIII. Évfolyam, 1. szám. 2018. március. 73-96. o., Url: http://hadmernok.hu/181_06_hornyacsek.pdf, 2018. 04. 16.

[2] American Health Organization: Hospitales seguros ante inundaciones. PAHO, Washington, 2006.

[3] Muhoray – Teknős: A HUNOR hivatásos nehéz kutató - mentő mentőszervezet alkalmazásának logisztikai feladatai. Hadtudomány: A Magyar Hadtudományi Társaság folyóirata. 25:(E-szám) 15-16. o. (2015). Url: http://real.mtak.hu/23389/1/2_MUHORAY_TEKNOS.pdf, 2018. 04. 16.

[4] International Federation of Red Cross. Emergency Response Unit. Geneva: IFRC, 2008.

[5] International Committee of the Red Cross and International Federation of Red Cross. Guideline for assessment in emergencies. Geneva: ICRC, IFRC, 2008.

[6] International Federation of Red Cross. Introduction to disaster preparedness. Geneva: IFRC, 2000.

[7] Sphere Handbook: Minimum standards in water supply, sanitation and hygiene promotion

[8] Prüss-Üstün – Kay – Fewtrell – Bartram: Unsafe Water, Sanitation and Hygiene in Comparative quantification of health risks: global and regional burden of disease due to selected major risk factors. World Health Organization, 2004, 1321–1352. o.

[9] WHO Health Cluster: Classification and minimum standards for emergency medical teams in sudden onset disasters, WHO Press, World Health Organization, Geneva, 2013.

[10] WHO: Health Cluster Guide – A practical guide for country-level implementation of the Health Cluster, WHO Press, World Health Organization, Geneva, 2009.

[11] https://www.redcross.fi/about-red-cross/our-work-throughout-world/general-field-hospital 2018. 14. 16.

[12] AECID. 2013 Guía operativa para la respuesta directa de salud en desastres- requisitos mínimos para equipos médicos de la cooperación española durante la fase de emergencia. Edita: Agencia Española de Cooperacion Internacional para el Desarrollo, AECID, 2013.

[13] International Federation of Red Cross. Red Cross Red Crescent successes in global health. Geneva: IFRC, 2008.