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Transformation of Health Services from Civilian to Wartime Medical Corps – Example from Bosnia and Herzegovina

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A B S T R A C T

In the multiethnic Bosnia and Herzegovina, Croats and Muslims, attacked by the Yugoslav army and Serbs, had to employ rationally their poorly provisioned civilian health services so that they could respond to the extremely numerous and prompt needs of war conditions. The health services in the areas controlled by Croats and Muslims had to be reorganized twice because of sudden changes of wartime conditions. With further development of the situation, when all three sides participated in the conflict, the number of wounded increased rapidly. In the meantime, a large-scale population shift on an ethnic basis occurred in all parts of Bosnia and Herzegovina, thus giving rise, along with a greater number of the wounded, to a severe humanitarian crisis. Civilians were therefore another heavy burden to the wartime health services. This created enormous problems for the inadequately provisioned health services of Bosnia and Herzegovina in the area under the control of Croats and Muslims. However, poorly equipped with personnel as well as everything else, the health services in the area controlled by Croats and Muslims, through appropriate reorganization, successfully accomplished their task in the wartime medical corps. Besides this correctly executed transformation from civilian health services into a wartime medical corps, high motivation of medical staff also greatly contributed to successful operation of the medical corps in the war zone despite the long duration of the war. In the majority of cases, the wounded were within 30–40 minutes from the moment of injury in the hands of a surgical team and within the next ten minutes were already in the operating theater. After primary wound dressing, the wounded were sent to one of the well-organized main war hospitals for further treatment. This resulted, along with secure evacuation routes, in a minimum number of lifelong invalidity among the wounded.

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Introduction

World War I started in Europe, to be precise, in Bosnia and Herzegovina, or even more precisely, in Sarajevo, with the assassination by Serbian extremists of the heir apparent to the throne of the Habsburg Monarchy. This region has always been known as the crossroads of several cultures and religions (Catholic, Orthodox and Muslim). The conflict of Serbs on the one hand and Croats and Muslims on the other side, decimated the population of this area, in particular Croat and Muslim, during World War II. All in all, the area has, for centuries, been turbulent and will probably remain so for a long time.

Centralism and Serbian hegemony were in Yugoslavia strictly enforced also in the health services of the former state. The Yugoslav government in Belgrade had developed and established a health service under peacetime conditions based on specially elaborated plans so that in the event of war these services could effectively be used to serve the Serbian side. Thus, the efforts of the health services of other republics /nations to defend themselves in war were thwarted[1].

The location of health service units in the vicinity of army barracks, organization of a military health system with staff, authority and autonomy in decision making of the commanding military personnel, among whom 85% were of Serbian nationality, the whole system of administrative subordination etc. testify to the above. The fact that even in peacetime the military health services had complete autonomy in decision making and acted accordingly, i.e. were outside the jurisdiction of the Federal Ministry of Health, also offers ample proof.

When the Yugoslav army and Serbia attacked other member states of the Federation (Slovenia and Croatia in 1991, Bosnia and Herzegovina in 1992) a new, more pressing situation for the health services was created in these regions. They now had to provide both for the military and civilians. Urgent transformation of the health services from peacetime to wartime conditions was imperative. It was accomplished in two phases, due to the complex situations in the region. When the Yugoslav army and Serbs started their attacks on Croats and Muslims in Bosnia and Herzegovina in April 1992, the health services in the region had to be reorganized taking into consideration both area and staff. This was the first phase of transformation. The second phase of transformation occurred with the outbreak of hostilities between Muslims and Croats. This reorganization was again related to and conditioned by location and personnel. The Mostar area offers particular evidence in this respect

This paper will present measures which were taken to reorganize in Bosnia and Herzegovina the health services from peacetime (communist) to wartime at the moment of Serbian aggression on Croats and Muslims as well as the circumstances under which it occurred. We will elaborate further elements under which the second phase of transformation occurred. The health service had already been transformed to a wartime one prior to the outbreak of hostilities between Muslims and Croats. The circumstances in which the conflict took place and elements which could have affected the efficiency of the health services in this newly emerging situation will also be discussed. The activities of the wartime medical corps in Mostar will also be given full attention. Physicians, nurses and medical technicians as well as auxiliary non-medical personnel of Mostar War Hospital all voluntarily remained at their working places throughout the war. They were highly motivated: having been attacked, they repulsed the attacks and defended their homes and children. Their second

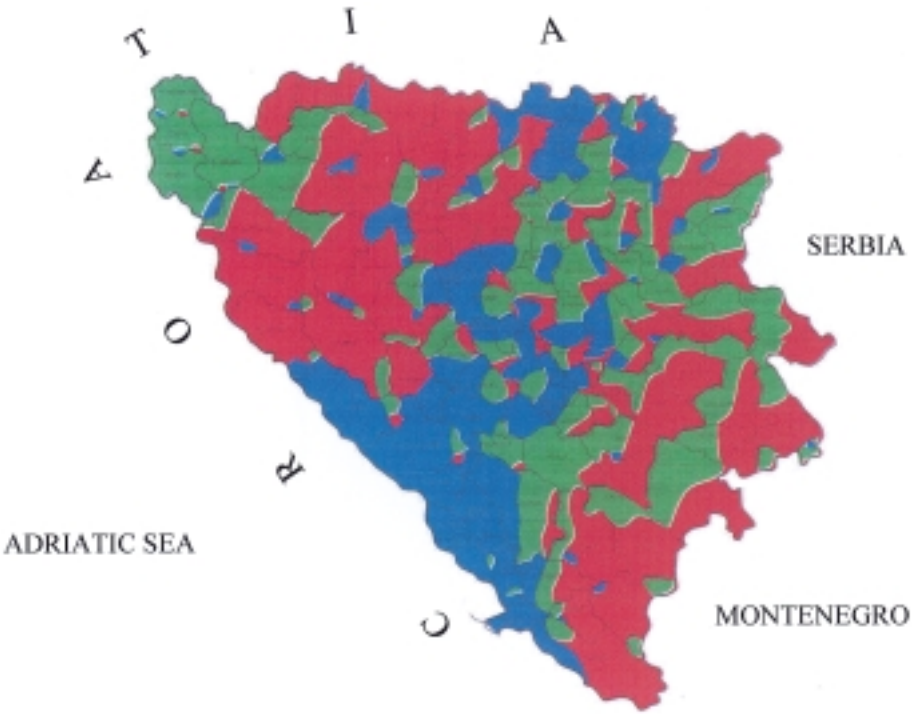

Fig. 1. Map of ethnic composition of Bosnia and Herzegovina before the war made acthe criterion of ethnic majority in specified regions: a) blue – Croats, b) green – Muslims, c) red – Serbs.

reason for fighting was to resist the enemy who had a year previously shown all its brutality in aggression on Croatia[1–3]. Therefore, planning for the reorganization of the civilian health services to a wartime medical corps in the regions of Bosnia and Herzegovina, where Croats and Muslims were in the majority, had already been initiated in 1991. The experience of the Croatian Health Services was of great assistance[4–6]. The role of the mobile field medical corps, evacuation routes of the wounded, supply of military units and civilians, working conditions of the wartime medical corps and hospital personnel as well as auxiliary war hospitals will also be elaborated. The wounded will be classified, based on type of injury to the body and organs.

The Situation in the Health Services in Bosnia and Herzegovina Prior to the Outbreak of Hostilities

Prior to the outbreak of hostilities, the health services of Bosnia and Herzegovina had 4 university hospital centers, 17 general hospitals, 18 regional medical centers, and 106 primary health centers and local surgeries. There were no private clinics or surgeries, except for a small number of dental surgeries.

The population of Bosnia and Herzegovina was 4.366,036 altogether, 17.2% were Croats, 43.6% Muslims, 31.4% Serbs and 7.2% other nationalities. Figure 1 shows the ethnic composition of the country according to the criteria of the majority in each specified area. Figure 2 shows

Fig. 2. Map of health institutions location before the war on the territory of Bosnia and Herzegovina: CH – University Hospital, H – Hospital.

the pre-war distribution of health institutions in Bosnia and Herzegovina. It is important to note their location in relation to the ethnic map so as to have a better understanding of the problems which the health services faced with the first and, later, the second reorganization. Figure 3 shows the ethnic map of Bosnia and Herzegovina immediately prior to the signing of the Dayton Agreement. This shows that a greater part of the territory was occupied by Serbs while the majority of those who were expelled from these territories or killed were of Croat or Muslim origin. A comparison of Figures 2 and 3 shows that the greatest number of pre-war health institutions was occupied by Serbs while a substantial number was demolished. This also indicates that Croats and Muslims had just a small number of health institutions and an urgent need for a new plan of activities in wartime conditions was imperative.

In April, 1992 the Croatian Defense Council was constituted, consisting both of Croat and Muslim representatives, with the task of establishing a supreme administrative body in order to protect the civilian population in the territory under their control, regardless of nationality or religion. The headquarters of the medical corps was also constituted within this administrative body with the task of providing health and medical care for military units and civilians alike.

Situation in the Health Services of Bosnia and Herzegovina after the Outbreak of Hostilities

Figure 4 represents the Croatian Defense Council area of activities within the territory of Bosnia and Herzegovina and the location of wartime health institutions in that region. The lined space in the Figure 4 denotes Mostar War Hospital gravitational area. After the Yugoslav army and Serbian aggression on Bosnia and Herzegovina, there was a massive exodus of Croats and Muslims from their

Fig. 3. Map of ethnic composition of Bosnia and Herzegovina immediately prior to Dayton agreement: grey – Bosnian Serbs territory, dotted – Bosnian Croats and Muslims territory.

centuries-old domiciles, now occupied by Serbs, towards the territory under the control of the Croatian Defense Council. Hundreds of thousands of Croats and Muslims were then either killed or expelled from their homes, and some of them were sent to concentration camps, where, again, many perished. This ethnic shift of the population to places they had never inhabited before initially caused great confusion and enormous difficulties in every respect, medical care included. Medical personnel had to provide for the local population as well as thousands of newcomers. Figure 4 shows clearly that the wartime health services of the Croatian Defense Council had a small number of medical institutions as well as qualified staff, but they had to confront the sudden increase in requirements arising from the war. Because of a great shortage of medical institutions, church, school and factory cellar premises were, in many places, transformed into infirmaries where the sick and wounded were cared for. All civilian Croatian medical personnel, partly Muslim, and partly Serbian nationality placed themselves at the beginning of the war at the disposal of the medical corps in the region controlled by the Croatian Defense Council. Their work was organized in such a way that they worked for a time at medical corps in-patient institutions and for a time served in medical corps mobile teams on the frontlines. By means of this organizational plan, medical staff, equipped with a minimum of personnel, achieved maximum impact.

The organization of the health services in war-stricken areas was carried out according to territorial principle and in accordance with the organization of military formations. At the onset of war, this organization was constituted on territorial levels, i.e. on municipality levels. Furthermore, as main administrative

Fig. 4. Grey – territory of Bosnia and Herzegovina under control of the Croatian Defens Council with marked health institutions. CH – University Hospital, H – Hospital.

bodies, municipalities were bases for the organization of defense, so that municipality health headquarters were immediately formed then with their chief-of-staff as commanding officer. In most cases, health centers were reorganized into larger medical corps units and their pre-war heads appointed chief-of staff in wartime conditions. These institutions also had authority over the first medical echelon and, therefore, the right to appoint military unit physicians. Some health centers were transformed into war hospitals where even the most complex surgical operations were performed. They had their own pharmacies, and epidemiological and other indispensable services for the smooth running of war health services in the area. Thus, they constituted wartime health units which were of extreme importance, especially regarding the situation in the war, since some areas had, for a long time, been totally isolated and surrounded by the enemy. Moreover, health centers operating as wartime medical units also supplied war hospitals as well as the armed forces, oversaw the epidemiological situation in the area, military motor pool, personnel, information network maintenance, and some other minor services. The experience from the war in Croatia was a great help in all these matters[7].

Reorganization of the Mostar Health Services into a Wartime Medical Corps and Its Operations

Figure 5 shows the ground configuration of Mostar town and its surrounding area, location of the wartime hospital, and battlefield line after the Serbian assault on the town. Before the war, Mostar had 120,000 inhabitants – 35.8% Croats, 35.0% Muslims, 14.0% Serbs, and 15.2% other nationalities. Mostar is located in a basin surrounded by high mountains that stretch from 436m up to 1,967m above

Fig. 5. Draft of the position of Mostar: the Mostar War Hospital ( ), reserve and rear war hospitals ( ), evacuation route ( ), and battlefield line ( ).

sea level. Figure 5 shows evacuation and local supply routes as well. The location of the wartime hospital is also marked so that its distance (circa 150 m) from the battlefield line is clearly visible. Evacuation routes were constantly shelled and under sniper target from the surrounding hills – a distance of 1,000 – 2,000 m as the crow flies. The only evacuation and supply route for Mostar was in the northwest, across the area under military control of the Croatian Defense Council. That road was called »The Salvation Trail« (Figure 5), and it was under constant enemy fire so that communication along it was possible only at night.

Directly before the Serbian attack on the town of Mostar, practically all the medical personnel of Serb nationality, with notable exceptions, had abandoned the hospital and crossed over to the Serbian units. The majority of Serb civilians had left even earlier. The first attacks on Mostar by armed Serbian civilians and soldiers of the Yugoslav army began on April 3, 1992 and within those first few hours, already 36 heavily wounded young defenders were brought to hospital. The siege of the town lasted 80 days, until the Croatian Defense Council successfully took over the Serb outposts on the surrounding mountains. The whole war lasted 707 days.

The building in which the Mostar War Hospital was situated is old and in a derelict state. Besides, it was not even built to serve medical purposes. That is why it was also nonoperational with respect to admission, triage and care of patients in peacetime conditions and, thus, obviously even more inadequate for wartime conditions. Access to the building, as well as

TABLE 1
PERSONNEL OF UNIVERSITY HOSPITAL MOSTAR BEFORE AND DURING THE WAR AND ITS CASUALTIES IN WAR

	Physicians	Nurses	Others
Before the war (1991)	233	778	618
During the war (1993)	107	388	332
Wounded	1	3	8
Dead	1	1	2

TABLE 2
DISTRIBUTION OF WOUNDED IN MOSTAR WAR HOSPITAL ACCORDING TO COMBAT STATUS AND SEX (A), TYPE OF WOUND (B), AND INJURED PART OF BODY (C)

		N	%
A	Soldiers	1258	63.7
	Civilians	717	36.3
	Men	1499	75.9
	Women	476	24.1
	Total	1975	100
B	Multiple	630	31.9
	Single	1345	68.1
	Total	1975	100
C	Head	205	10.4
	Thorax	348	17.6
	Abdomen	498	25.2
	Arm	322	16.3
	Lower limb	602	30.5
	Total	1975	100

TABLE 3
DISTRIBUTION OF INJURY ACCORDING TO ORGANS

Injury	N	%
Abdomen		
Stomac	23	4.6
Duodenum	13	2.6
Pancreas	14	2.8
Ileum and jejunum	112	22.5
Cecum	19	3.8
Colon ascedens	18	3.6
Colon trnsversum	59	11.8
Colon descendens	18	3.6
Colon sigmoideum	23	4.6
Rectum	17	3.4
Liver	78	15.7
Spleen	27	5.4
Gall bladder and channels	8	1.6
Urinary system		
Kidneys	18	3.6
Ureter	2	0.4
Bladder	12	2.4
Urethra	6	1.2
Penis	3	0.6
Scrotum	10	2.0
Great vessels		
Arteries	11	2.2
Veins	7	1.4
Total	498	100

the entrance, were also unsuitable for admission of patients, either sick or wounded. Furthermore, the greatest number of rooms as well as the entrance, was on the eastern side facing the enemy position in the surrounding mountains. All three operating theaters located on the first floor, likewise faced east. The Mostar Hospital, apart from being ill-equipped, had already been inadequate in providing for the civilian population of the Mostar region before the war. The surgical ward had 120 beds in those days, but because of the position of the building and its low-quality structure, many of the rooms could not be used in a wartime situation. The number of available beds had to be reduced to only 42 because of the dangers of direct enemy artillery shelling and sniper shots. All three operating theaters were also exposed to the possibility of being directly hit. In fact, the building was struck 22 times with cannon fire of great destructive capacity. However, due to the previously described reorganization of the hospital capacities, there were no casualties. This indicates that the assessments in avoiding injuries and fatalities were correct and the measures taken

TABLE 4
HEAVILY WOUNDED CIVILIANS AND SOLDIERS: WOUNDED AND SURVIVED AFTER TREATMENT, WOUNDED AND DEAD DURING TREATMENT

Wounded	Civilians	Soldiers	Total
Survived	695 (35.2%)	1213 (61.4%)	1908 (96.6%)
Dead	22 (1.1%)	45 (2.3%)	67 (3.4%)
Total	717 (36.3%)	1258 (63.7%)	1975 (100%)

were effective as a result. Because of the above mentioned dangers at the beginning of the conflict, an operating theater with two surgical tables was set up in the hospital cellar. An intensive care unit with 8 beds and a semi-intensive care unit with 8 beds were also set up in the cellar. This was all carried out during the first phase of the reorganization of Mostar Hospital into a war hospital.

Phase two of the reorganization of the medical corps occurred when the Muslim-Croat conflict started. Initially, the conflict had the characteristics of street fighting – one side held one building while the opposing side held the neighboring one. The old bridge on the River Neretva was blown up in order to prevent a full-scale conflict between the warring sides. Immediately prior to the eruption of this conflict, the majority of the Muslim medical personnel had secretly crossed over to the other, Muslim, side. Thus, at the outbreak of the conflict, the number of Mostar War Hospital personnel was reduced far beyond all peace and wartime standards and norms (Table 1). This conflict was extremely severe because of the fanaticism of Muslim fighters supported by the *mudjahedins* from Arab countries who often behaved almost like *kamikazes*. The close vicinity of the enemy, often at distance of ten meters, and a second drop in the number of medical personnel of Mostar War Hospital, as well as dwindling military formations, were the greatest problems. They created fresh, almost insurmountable difficulties and placed new demands on the Mostar health services. The town had by then already become a multi-facilities center, including medical services, for the Croatian population from all over Bosnia and Herzegovina as well as for those Muslims and Serbs who had remained together with them throughout the war on the territory controlled by the Croatian Defense Council. The Mostar wartime health services were by then quite well supplied except for personnel.

There were only 10 physicians in the surgical team. The staff also included physicians of other specialities, a psychiatrist and a psychologist. During the war, 107 physicians, 388 nurses and medical technicians along with 332 members of non-medical personnel worked at the Mostar Hospital (Table 1). This staff was then reduced by 50% during the war (Table 1) but in those times had to provide medical care for soldiers and twice the number of civilians (325,000 before the war and 700,000 during the war) in the Mostar region. Four of the medical corps staff were killed (a surgeon, a technician, and two ambulance drivers). The staff worked in three shifts 24 hours a day. The most experienced surgeon was in charge of triage. The heavily wounded were reanimated (establishing an intravenous path and dextrane and crystalloid infusion, administration of pain killers and anti-tetanus prophylaxes, endo-tracheal intubation and assisted breathing, when necessary, and prescription of antibiotics according to regulations of wartime plan) and then transferred urgently to the operating theater. It usually took just a few

minutes to do all the above mentioned proceedings. The less seriously wounded were sent to the Bijeli Brijeg Reserve Hospital, situated also in Mostar or to a hospital in Grude, situated 25 kilometers from Mostar (Figure 5), after stabilization of vital functions (breathing, pulse, blood pressure, diuresis, bowel peristaltic). The Grude War Hospital had a surgeon and an anesthesiology technician along with a few nurses in charge of a small operating theatre and infirmary.

The heavily wounded with cranio-cerebral injuries and those who, according to the assessment of the triage physician, could not be adequately treated in Mostar War Hospital, were sent by ambulance to Split Hospital in Croatia 2 hours away, or to Zagreb, the capital of Croatia 5 to 6 hours away. Since they needed assisted breathing, a physician always accompanied them. Patients who had to undergo surgery were, after primary treatment and wound dressing had been completed, also sent to one of these two main hospitals for further treatment. Wounded enemy soldiers were also given the same treatment regardless of the side they belonged to.

Mostar War Hospital treated two types of patients (ill or wounded): those from the inner Mostar area and others who came from more remote places of Bosnia and Herzegovina, which were also controlled by the Croatian Defense Council. All the wounded from the Mostar area were brought to hospital within 20–30 minutes of injury and their wounds were dressed promptly by the surgical team. In other areas controlled by the Croatian Defense Council, mobile medical corps, responding to a call, found the wounded, gave them first aid and transported them urgently to the nearest local wartime hospital. The majority of the wounded were given adequate surgical treatment in these local, often improvised, wartime hospitals[6], while a smaller number were transported to Mostar War Hospital. In most cases, it took about 45 minutes from the time of injury to the moment of admission by the surgical team of a local wartime hospital and up to 3 hours only in exceptional cases. This was closely related and depended on enemy activities along the evacuation route to Mostar.

Rationalization of medications, blood derivatives, sanitary material, vaccines, diagnostic reagents and other requirements contributed to the fact that basic needs were met. Supplies of medical material came from various sources – donations from European or overseas countries initiated by people of goodwill. Not a single life was endangered because of the shortage of medications or any other material. Diagnostic and therapeutic devices were, in most cases, old but still operational and most welcome for wartime needs. As there was constant, 24 hour a day artillery shelling on Mostar, the dead could not be buried in traditional graveyards but hurriedly in the nearest possible parks or any other green spot in the town. Hundreds of them had to be buried in this way. The hospital, situated just 150 meters from the battlefield line, because of the ongoing possibility of enemy infantry breakthrough and a raid on its premises, had to be guarded by armed police forces so that its patients would not meet the same destiny as those of Vukovar Hospital, in Croatia[8].

Throughout the war (April 3, 1992 till June 1, 1995) there were altogether 6,741 wounded, including 15.9% civilians and 84.1% soldiers – all war casualties. Out of this number, 1,975 were heavily wounded (Table 2). Table 2 shows that the number of men wounded were three greater than women. More than a third of the wounded had multiple injuries. Lower extremities accounted for the greatest injury incidence. There were 36.3% heavily wounded civilians and 63.7% soldiers (Table 2).

Table 3 shows the incidence of abdominal organ, urinary-genital structure and blood vessel war injuries. Out of 498 wounded with symptoms and signs of abdominal organ injuries, in 5 cases the diagnosis was wrong and an unnecessary laparatomy was performed accordingly. Out of 1,975 heavily wounded 67 died or 3.4%; their deaths cannot be attributed to incorrect or inadequate treatment but to the seriousness and scale of their injuries, mostly gunshot wounds (Table 4).

Conclusion

Even prior to the attack of the Yugoslav army and armed Serb civilians on Bosnia and Herzegovina, informed about their brutality during the war in Croatia, both Croats and Muslims started to make plans for resistance which included the reorganization of peacetime health services into wartime medical corps. Therefore, in those initial plans, full attention was paid to the impoverished state of medical services. Transformation of the civilian health services into a wartime medical corps was carried out without any great fuss and, what is more important, after each phase wartime tasks were successfully accomplished. In addition, the mobility of medical personnel, their shifting from military formations to wartime hospitals and vice versa had a positive psychological effect, achieving a balanced exchange of periods of strain and periods of fear of death and injury.

A two-phase transformation of poorly provisioned health services into a wartime medical corps was accomplished correctly and efficiently and a great motivation to participate in resistance resulted in maximum response and engagement of all available, though inadequately trained, medical personnel. During their wartime service in the area of Mostar, the reduced personnel of the medical corps gave its maximum contribution.

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TRANSFORMACIJA ZDRAVSTVA OD MIRNODOPSKOG U RATNI SANITET – PRIMJER BOSNE I HERCEGOVINE

S A Ž E T A K

Naglo nastali ratni uvjeti stavljaju posebne i velike zahtjeve zdravstvenoj službi čak i onda kada je država ustrojena i samosvojna pa bila ona napadnuta ili napadač. Na području bivše Jugoslavije rat je započeo 1991. godine iznenadivši sve osim napadača. U multietničkoj Bosni i Hercegovini Hrvati i Muslimani napadnuti od Jugoslavenske armije i Srba morali su racionalno koristiti vrlo skromne mogućnosti osiromašene zdravstvene službe da bi ona udovoljila ekstremno velikim i naglo nastalim zahtjevima rata. Zdravstvena se je služba na područjima pod kontrolom Hrvata i Muslimana morala tako, zbog naglo promijenjenih i novonastalih ratnih okolnosti, prestrojavati u dva navrata. Naknadnim razvojem ratne situacije u kojoj su sudjelovale sve tri strane u sukobu ubrzano se povećavao broj ranjenika. Istovremeno je došlo do masovnog premještanja pučanstva iz jednih područja Bosne i Hercegovine u druga već prema etničkoj pripadnosti što je uz masovna ranjavanja dovelo i do teških humanitarnih stanja. Veliki su teret tako činili ratnoj zdravstvenoj službi i civili. To je, opet, stavilo ogromne zahtjeve pred jako osiromašenu zdravstvenu službu Bosne i Hercegovine na područjima pod kontrolom Hrvata i Muslimana. Kadrovski i svekoliko osiromašena zdravstvena služba na području pod kontrolom Hrvata i Muslimana svrsishodnom je reorganizacijom uspješno obavila službu ratnog saniteta. Uz svrsishodno izvršenu transformaciju mirnodopskog zdravstva u ratni sanitet jaki je domoljubni motiv medicinskog osoblja (braniti svoje domove) pridonio uvelike uspješnosti djelovanja saniteta na ratnom području, makar je rat dugo trajao. U najvećem broju slučajeva ranjenik je unutar 30–40 minuta od trenutka ranjavanja bio prihvaćen od kirurškog tima ratne bolnice Mostar a u sljedećih desetak minuta bio je već u operacijskoj dvorani. Nastavak adekvatnog liječenja ranjenih, nakon primarnog zbrinjavanja, u organiziranim pozadinskim ratnim bolnicama (usprkos neprijateljskim napadima putovi evakuacije bili su dobro osigurani) omogućilo je svođenje konačnog životnog hendikepa ranjenih na minimum i vidno smanjilo postotak smrtnosti teško ranjenih.