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EDITORIAL

Medical Services of Croat People in Bosnia and Herzegovina during 1992-1995 War: Losses, Adaptation, Organization, and Transformation

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During the 1992-1995 war in Bosnia and Herzegovina (BH), Croatian people in BH had 19,600 (2.6%) killed and 135,000 (17.6%) displaced persons, and 222,500 (28.9%) refugees. They lost around two thirds of both physicians and other health personnel, and were left with 8.5% of prewar patient beds. Fortunately, the organized defence against Serbs was initiated in time and Croats defended the territories where they formed majority. The first defense unit established was the Medical Corps Headquarters (MCH), caring for soldiers and civilians alike. MCH was soon incorporated in the Croatian Defense Council (CDC, armed forces of Croatian people in BH). MCH had two chains of command. The first one went through the district commanders of medical services and their subordinated physicians to paramedics in military units, and the other one directly to the commanders of 14 war hospitals. After its formation in 1993, the Ministry of Health took the jurisdiction over the civilian medical services and after the Washington Peace Agreement (April 1994) over the war hospitals, too, whereas the medical services within military units remained under control of the Ministry of Defense. Dayton Peace Agreement divided BH into the Federation of BH and Republic Srpska, each with their own army. The Federation of BH Army is composed of the CDC and Bosniac-controlled Army of BH, with overall numerical ratio 1:2.3 for Bosniacs, and organized in accordance with NATO standards. Military medical services are provided by the Logistics Sector of both Ministry of Defense and Military Corps Headquarters (Joint Command).

Key words: *armed forces personnel; Bosnia and Herzegovina; Croatia; hospitals, military; military medicine; military personnel; military science; military veterinary service; soldiers; war*

Contrary to the expectations (1,2), in the 1992-1995 war in Bosnia and Herzegovina (BH), the Croats managed to organize and defend themselves against powerful Yugoslav Federal Army (YFA). Their defense forces were formed under the name of the Croatian Defense Council (CDC). In the beginning, the Medical Services were established in parallel with the CDC. Later they were incorporated in the CDC, but retained a great degree of independence. After the war both were incorporated into the BH Army as an undivided peacetime military organization.

The aim of this article is to analyze the organization of Medical Services within the CDC, especially with respect to its specificities imposed by unique political and martial setting, its adaptation to wartime circumstances, and final integration into the BH Federation system. The establishment of the CDC Medical Services and the way they were organized illustrate the quality, adaptability, and loyalty of the civilian medical services, from which all the wartime medical services were formed.

Organization of Military Medical Services

In many countries, military and civilian medical services are separated. For example, USA has a large system of health facilities (more than 300) for war veterans (3-5), that operates under the Department of Veterans Affairs and answers mainly veterans' service-related needs. The health care for the military is provided by the three separate medical service corps each within the corresponding military service – the Army, the Air Force, and the Navy, with the medical service corps of the Navy caring for the Marine Corps. The military provides the continuum of medical care

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from the primary level health care units to the tertiary level health care hospitals. These facilities support the military whether peacetime or wartime (6).

In some other countries, military and civilian health care services are integrated, and the number of countries seriously considering such a type of health care system organization is increasing (7,8). Israel is an example of the country with well-organized health service in which the civilian and military health services are integrated (9,10). The Israeli medical professionals are prepared through additional education to work in war conditions (11).

Former Yugoslavia followed the model of the Soviet Union (12,13) and had a large military health care (14). The Republic of Croatia, which suffered great material damage in the 1991-1995 war (15-17), including the intentional destruction of the health care facilities (18-21), started developing its military medical services with the beginning of the war (18,19). First, the mobile surgical teams were organized (22) and the civilian health care facilities urgently adapted to the war circumstances (23-26). Then, the establishment of war hospitals followed (27) and, in the end, Croatia had a well-organized and efficient health care system (28). Today, Croatian military medical services are integrated in the civilian health care system (19). Similar, but in a number of aspects also different, process took place in BH (29-35).

Within systems (states, armies) where military health care is separated from the civilian one, the former follows hierarchical organization: from the first echelon where medical care is provided by a medical orderly in a platoon, to the echelon levels where the wounded are given subspecialized health care (36,37). Basically, we accepted this scheme, but united civilian and military medical services (30-33). Echelon system was replaced by (an imposed!) positioning the war hospitals in the war zones, often very close to the front line.

Setting

Bosnia and Herzegovina

Before the war, BH was one of the six republics of the former socialist Yugoslavia. It had a considerable degree of autonomy, which included the right to separation, and the population of 4.3 million people (38). The BH population consisted of three nations: Muslims (recognized as a nation in former Yugoslavia; took the name Bosniacs after the war) (43.4%), Serbs (31.2%), and Croats (17.4%), all three officially equal and constitutive

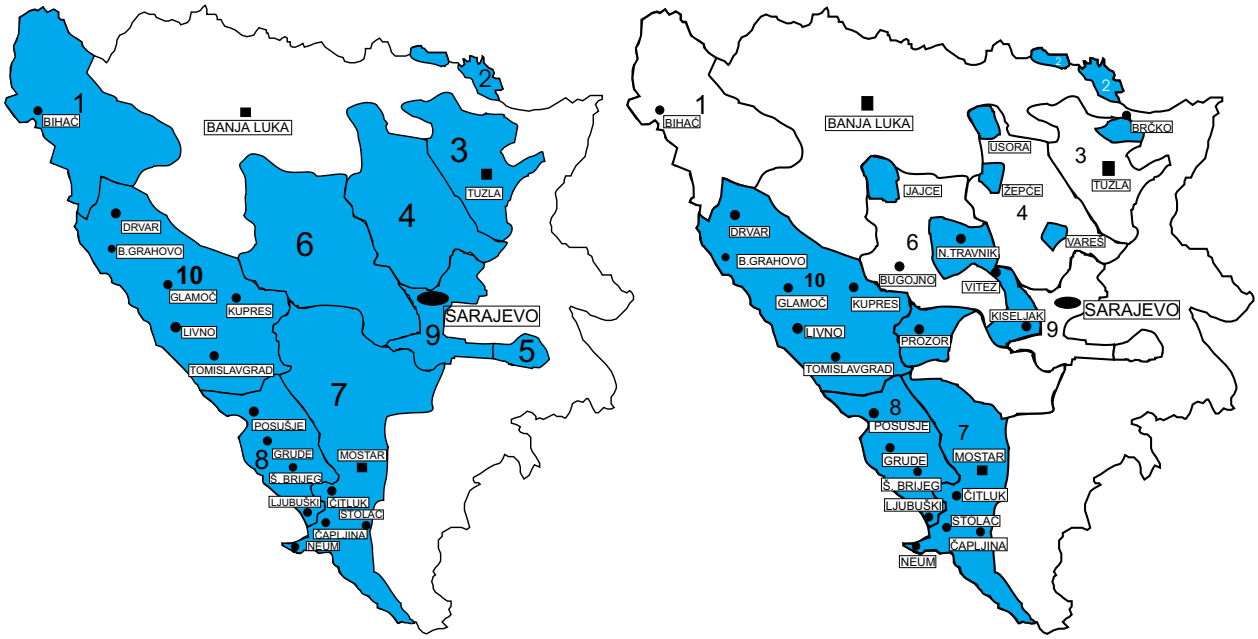

Table 1. The chronology of the most important events related to the Croat population in Bosnia and Herzegovina (BH) during the 1992-1995 war (adapted from ref. 41)

Date	Event	Comment
November 18, 1990	Multi-party elections	Bosniac (Muslim), Serb, and Croat national parties formed the government according to the votes won at the elections.
September 19, 1991	Yugoslav Army forces attacked the village of Ravno	As a part of the aggression against Republic of Croatia (the offensive against Dubrovnik).
November 17,1991	Announcement of the decision to establish the Croatian Community of Herzeg-Bosnia	Facing the threat of Serbian aggression against the Republic of Croatia and BH, representatives of Croat nation in BH, elected on November 18, 1990, founded Croatian Community of Herzeg-Bosnia as a "political, cultural, economical, and geographical entity within the sovereign and democratic BH".
January, 25,1992	The Parliament of BH brought decision on the referendum for sovereign and independent BH	Bosniacs and Croats won two-thirds and were able to proclaim a sovereign and independent BH (in respect to the former Yugoslavia). Serb representatives then left the Parliament and Serbs started the war.
April 18, 1992	The decision to establish the Croatian Defense Council	Founded by Croatian Community of Herzeg-Bosnia, as "the supreme body of defense of Croats in BH and the highest executive and governing body of the Croatian Community of Herzeg-Bosnia".
October, 27,1992	Vance-Owen Plan on the draft of the constitution and map of cantonization of BH	An attempt to achieve peace by cantonization of BH. Signed by Croats only.
May 8/9, 1992	Fights between Croatian Defense Council and BH Army	The clashes started as soon as January 1992, due to disagreements about the application of Vance-Owen plan and the arrival of thousands of displaced Bosniacs to the area liberated by CDC.
June 23, 1993	Owen-Stoltenberg Plan and map on the organization of BH	Another attempt to achieve peace by cantonization of BH. Immediately signed by Croats, rejected by Serbs, and reluctantly accepted by Bosniacs.
August 28, 1993	Proclamation of the Croatian Republic of Herzeg-Bosnia	Formed with all governing attributes, as the response to already proclaimed Republic Srpska and "Bosniac Assembly" in Sarajevo at which BH Muslims changed their name into "Bosniacs" (BH Croats felt that this reflected an intention to organize BH as a centralized state with Bosniac dominance).
March 1, 1994	The Washington Peace Agreement on the peaceful solution of the crisis in BH	It marked the lasting armistice between Bosniacs and Croats and laid grounds for foundation of (Bosniac-Croat) Federation of BH.
November 21, 1995	The Dayton Peace Agreement	Representatives of Bosniacs, Serbs, and Croats, with the assistance of international community, ended the war, and agreed on the organization of BH as a state consisting of two entities: Federation of BH (Bosniacs and Croats) and Republic Srpska (Serbs). The Federation was further divided into 10 cantons.
May, 1997	All-Croatian Assembly in Neum proclaimed Croatian Community of Herzeg-Bosnia as a cultural association of Croats in BH	Within the Dayton Peace Agreement, Croats were obliged to dissolve the Croatian Republic of Herzeg-Bosnia, but wanted to retain some form of cultural and economical unity.

(Fig. 1). Minorities and "Yugoslavs" accounted for 7.9% of the population.

The war in BH started in April 1992, following the 1991 war, which YFA started against former Yugoslav Republics of Slovenia and Croatia. In both these conflicts, YFA in Slovenia, and YFA and Serb paramilitary forces in Croatia, were defeated. They withdrew to BH (wherefrom they continued to attack Croatia), while Slovenia and Croatia became recognized as independent states. BH proclaimed its independence early in 1992. This proclamation elicited the aggression of Bosnian Serb paramilitary forces and YFA, which tried to gain control over the BH by arms. In 1992, BH Croatian people and Muslims (Bosniacs) lost much of their territories and manpower, but managed to hold out. Having learned from the war experience of the Republic of Croatia during 1991, Croatian people in BH was better prepared for the armed conflict and actually led the defense. Thus, throughout the 1992, the de-

Table 2. General data (No., %) on human suffering in Bosnia and Herzegovina during the 1992-1995 war

Nations	No. (%)[a]	Killed and missing[b]	Displaced[b]	Refugees[b]	Total affected[b]
Bosniacs	1.898,963 (43.4)	138,800 (7.2)	602,000 (31.1)	640,000 (33.0)	1.380,800 (72.7)
Serbs	1.365,093 (31.2)	89,300 (6.5)	350,000 (25.4)	330,000 (23.5)	769,300 (56.4)
Croats	759,906 (17.4)	19,600 (2.6)	135,000 (17.6)	222,500 (28.9)	377,100 (49.6)
Other	353,071 (8.0)	10,300 (2.9)	83,000 (23.1)	57,500 (16.0)	150,800 (42.7)
Total	4.377,033 (100.0)	248,000 (5.8)	1.170,000 (26.7)	1.250,000 (28.6)	2.678,000 (61.2)

[a]Before the war (1991).
[b]According to ref. 44. Percentages in brackets are with respect to the size of the entity.

fense was predominantly organized and led by the CDC, while Bosniacs were either included in the CDC forces or were fighting organized as Territorial Defense Forces. Rather complicated geographic distribution and different interests of the three nations in BH gradually weakened the alliance between BH Croats and Bosniacs (Table 1). They fought together against Bosnian Serb paramilitary forces and YFA until early 1993, but then, forced by Serbs to one third of the BH territory, they began fighting against each other. These fights lasted until early 1994. As this conflict begun, the CDC and Territorial Defense Forces separated. The war in BH ended in 1995, with Dayton (USA) Peace Agreement. Two entities were created, the Serb-controlled Republic Srpska (49% of the territory) and the Federation of BH (51% of the territory) controlled by both Bosniac and Croatian people. The Federation was divided into 10 cantons, 5 with Bosniac and 3 with Croat people majority, and 2 mixed.

During the war, except losing the major part of Posavina, Croats successfully defended other areas in BH where they formed majority, whereas Bosniacs lost the entire eastern half of BH. During the armed conflict between Croats and Bosniacs, Croats lost some parts of the territory in central Bosnia, where they ended up in enclaves encircled by either Serb or Bosniac forces for a long period (Fig. 1) (40).

Key Events

Key events related to 1992-1995 war in BH are listed in Table 1 (41). The official date of the commencement of the war in BH is still a matter of controversy. In reality, the Serbian aggression against non-Serb nations in BH started on September 19, 1991, with the occupation and destruction of the Croat-populated Ravno village in southeast BH (32). However, since this attack was connected with the Serbian offensive against the Dubrovnik area in the Republic of Croatia (42), it is considered that the war in BH really started early in 1992, when BH Serbs, backed by YFA, attacked other two nations after the January referendum on BH independence (see Table 1). Croats and Bosniacs voted in favor of independence and Serbs voted against it. The BH Parliament brought the Declaration of Independence that was followed by referendum. Since they lost in the Parliament, Serb representatives left and Serb paramilitary forces, backed by YFA, attacked Croatian people and Bosniacs. The aggression spread over the country and the war continued for 4 years until the Dayton Peace Agreement signed in USA on November 21, 1995 (41,43). The armed conflict between Bosniac forces and Croats (CDC) started as sporadic small group clashes, early in 1993. The clashes became more and more frequent and grew to a large-scale conflict in May 1993, which lasted until March 1, 1994, when the Washington Peace Agreement was signed (41). It

Table 3. Self-management units of health care[a] in Bosnia and Herzegovina before the war (1991) and their fate in war

Location	No. of health professionals[b]		No. of patient beds[c]		Jurisdiction after war[d]
	Total	Physicians	Total	Per 1,000 population	
Banja Luka	3,935	849	2,696	4.5	Serbs
Bihać	1,429	286	899	3.4	Bosniacs
Bosanski Brod	117	27	—	—	Serbs
Doboj	2,338	513	2,783	7.0	Serbs
Konjic	192	49	13	0.3	Bosniacs
Livno	436	86	338	4.1	Croats
Mostar	2,313	472	1,352	4.2	Croats
Prijedor	1,307	302	616	2.4	Serbs
Sarajevo	9,030	2,298	5,672	6.7	Bosniacs
Trebinje	468	103	242	4.2	Serbs
Tuzla	5,524	1,305	3,349	3.4	Bosniacs
Zenica	3,058	737	1,952	3.7	Bosniacs
Total	30,147	7,027	19,912	4.5	

[a]In the communist Yugoslavia, health system was "self-managed"; the institutions were organized in units which did not correspond to either municipalities, districts, or institutions.
[b] According to ref. 45. The data are as of 31 December 1991, except for Mostar and Livno (1990).
[c]According to ref. 46. The data are for 1989.
[d]As a result of the war, but the division has persisted after the Dayton Peace Agreement in 1995.

Table 4. Territorial distribution of hospitals and other health care institutions in parts of Bosnia and Herzegovina with Croat majority before the war, number of inhabitants for which they cared until the war, and hospitals to which they referred the patients

Town	Largest health institution[a]	No. of health care workers[b]	Population under care[c]		Referring hospital
			Total	Croats	
Jajce	MC	367	45,007	15,811	Jajce
Bosanski Brod	HC[a]	117	34,138	13,993	Doboj
Derventa	HC	296	56,489	21,951	Doboj
OdŽak	HC	78	30,056	16,338	Doboj
Orašje	HC	76	28,367	21,308	Doboj
Doboj	Regional HC	1,255	102,549	13,264	Doboj
Konjic	HC	193	43,878	11,513	Mostar
Tomislavgrad	HC	87	30,009	25,976	Livno
Livno	MC	274	40,600	29,324	Livno
Čapljina	HC	103	27,882	14,969	Mostar
Čitluk	HC	49	15,083	14,823	Mostar
Grude	HC	87	16,358	16,210	Mostar
Jablanica	HC	54	12,691	2,291	Mostar
Široki Brijeg	HC	68	27,160	26,884	Mostar
Ljubuški	HC	73	28,340	26,127	Mostar
Mostar	Regional MC	1,528	126,628	43,037	Mostar
Neum	HC	20	4,325	3,792	Mostar
Posušje	HC	70	17,134	16,963	Mostar
Prozor (Rama)	HC	56	19,760	12,259	Mostar
Stolac	HC	104	18,681	6,188	Mostar
Fojnica	HC	170	16,296	6,623	Sarajevo
Kiseljak	HC	99	24,164	12,550	Sarajevo
Kreševo	HC	24	6,731	4,714	Sarajevo
Vareš	HC	111	22,203	9,016	Sarajevo
Sarajevo	University MC	4,200	527,049	34,873	Sarajevo
Bosanski Šamac	HC	134	32,960	14,731	Brčko
Brčko	MC	513	87,627	22,252	Brčko
Tuzla	University MC	2,148	131,618	20,398	Tuzla
Bugojno	HC	163	46,889	16,031	Travnik
Busovača	HC	41	18,878	9,093	Travnik
Kakanj	HC	160	55,950	16,556	Zenica
Kupres	HC	28	9,618	3,813	Travnik
Novi Travnik	HC	100	30,713	12,162	Travnik
Travnik	MC	600	70,747	26,118	Travnik
Vitez	HC	71	27,859	12,675	Travnik
Uskoplje (G. Vakuf)	HC	59	57,164	10,706	Travnik
Zenica	Regional MC	1,490	145,517	22,510	Zenica
Žepče	HC	59	22,966	9,100	Zenica
Banja Luka	University MC	2,318	195,692	29,026	Banja Luka

[a]Health Center (HC) – health care institution with outpatient specialist services. Medical Center (MC) – health care institution with specialist patient beds.
[b]Total number of the health workers in the town, dentists not included. According to refs. 45 and 47. Data are for 1991.
[c]According to ref. 38. Data are for 1991.

must be emphasized that BH survived due to the resistance and survival of the Croatian people in the enclaves scattered through Central BH and Posavina (Fig. 1), which functioned as a connective tissue keeping the country from being taken apart.

Losses

Losses during the 4-year war were huge on each side (Table 2). Since the exact data are not yet available due to the destruction of services, protocols, and archives, Table 2 offers rough estimates provided by Bosniacs, which have been the only estimates given so far (44). Nevertheless, even on the grounds of these estimates only, the trend and extent of the catastrophe are obvious.

Health Care System War-Related Damages in Bosnia and Herzegovina

Resources

In 1991, at the time of dissipation of the former Yugoslavia (wars in Slovenia and Croatia had already started), the health care services in BH were still organized in a socialist manner specific for former Yugoslavia, i.e., there were self-management units of health care and insurance. These units were financially independent, constituting thus centers

Table 5. Regional distribution of physicians specialists in Bosnia and Herzegovina before the war[a]

Location	No. of physicians specialists								
	Surgery	Anesthe-siology	Transfu-siology	Gyneco-logy	Other surgical	Pathology, forensic medicine	Neurology, psychiatry, physiatry	Public health	Total
Banja Luka	66	17	6	66	38	2	72	19	286
Bihać	17	4	1	12	6	2	10	5	57
Doboj	23	4	5	19	21	1	31	12	118
Foča	7	2	1	12	6	–	7	5	40
Mostar	40	14	5	38	25	2	39	18	181
Sarajevo	148	51	9	100	127	12	188	88	723
Tuzla	70	18	7	74	50	1	46	88	354
Zenica	49	10	5	41	28	1	36	18	188
Total	420	120	39	362	301	21	429	253	1,945

[a]Only specialties important for war-related medicine are presented. According to ref. 45.

of power that determined the organization and way of financing of the area they covered (Table 3). There were 4.5 patient beds per 1,000 inhabitants on average, but their distribution was relatively uneven (from 0.3 in Konjic to 7.0 in Doboj), with remote rural areas faring the worst (45). The distribution of physicians was just as uneven (Table 3).

During 1992, Croatian people in BH and Bosniacs used the same health facilities, but with the development of Croat-Bosniac conflict (early 1993) only a small fraction of human and material resources remained under Croat control – a general hospital in Livno and less than a half of Mostar health care staff, which made about 8.5% of the total patient beds in BH (Table 3). Such a situation continued after the war, with lasting political division of the country and separate canton jurisdiction.

Table 4 shows basic data on health care resources in the areas with considerable proportion of Croatian people in the local population. When needed, people living in these areas were referred to the nearest medical center. With the war developments, only those with access to Mostar and Livno hospitals had the opportunity to receive secondary medical care.

Since the very beginning of the war (April 1992), Sarajevo, the capital of BH and the seat of central administration, had been cut off from the rest of the country, and the periphery was left without any material and financial supplies or guidance. Moreover, the martial developments brought a number of areas and groups of people (e.g., Croatian people in Central Bosnia, see Fig. 1) under military siege, isolating them and preventing any help and assistance from their allies. For example, Mostar stayed under Serb siege for six months in 1992 and, until it was liberated by Croat and Bosniac forces united under CDC, its medical services were accessible to its inhabitants only. Also, at that time of the war, the assistance from international humanitarian organizations was relatively small.

Physicians

The prewar distribution of specialists in the surgical fields of medicine, extremely important in war situation, in different BH regions is shown in Table 5. During the war, almost all of these areas came under heavy military attacks and/or siege. This caused migrations of the people and a corresponding the migration of health personnel (Table 6). Approximately two thirds of physicians and other health professionals left their domicile institutions during the war (Table 6). The consequence of this was that, for example, Croat population could receive medical specialist services only in Mostar and, to a smaller extent, in Livno. Mostar was left with less than a half of its prewar personnel, e.g., only one out of 14 pre-war anesthesiologists stayed in the hospital (Table 6). Some areas listed in Table 6 were lost in the war to either Serbs (Bosanski Brod, Jajce, Derventa, and Brčko) or Bosniacs (Jablanica, Bugojno, Kakanj, Zenica, and Konjic). In the case of Bosanski Šamac area, its bigger part was lost to Serb forces, but in a small zone that was successfully defended, "Domaljevac" Health Center was established. The same was done after losing Brčko – "Brčko Ravne" Health Center was formed in the defended part of the Brčko area. It should be emphasized that, in the beginning of the war, Croat and Bosniac forces, as the CDC forces, jointly defended the areas with Croat and Bosniac majority. This explains why it was the CDC that organized war hospitals in the locations listed in Table 5 at that phase of the war. During the 1993-1994 conflict with Bosniacs, Fojnica and Vareš came under Bosniac control. After losing Vareš, the CDC instituted a health center in the village of Daštansko, and did the same after losing Fojnica, moving its medical services to a nearby village. When Travnik was lost to Bosniac forces, part of its medical services moved to Nova Bila. Another example is the town of Kupres with its surroundings, which was lost to Serb forces early in 1992, and regained in 1995. All these war events influenced the number of physicians who remained in those areas after the war, especially as the control over the territories imposed in the war still persists.

Health personnel were also injured or killed at their workplace (Table 7).

There were three sources of assistance to Croat medical personnel in BH (Table 8): volunteers from the Republic of Croatia, volunteers from other countries, and personnel of Croat nationality displaced

Table 6. Number of physicians and other medical personnel in areas with Croat majority, before and after the war in Bosnia and Hercegovina[a]

Location	No. of personnel			
	Before war		After war	
	Physicians	Other	Physicians	Other
Jajce	79	288	4	15
Bosanski Brod	27	90	–	–[b]
Derventa	74	222	–	–[b]
OdŽak	24	54	3	85
Tomislavgrad	17	70	16	154
Livno	56	218	46	151
Čapljina	25	76	15	46
Čitluk	9	40	8	42
Grude	19	68	11	61
Jablanica	14	40	–	–[c]
Ljubuški	16	57	16	51
Mostar	312	1,216	243	685
Neum	4	16	6	14
Posušje	14	56	7	56
Prozor	11	45	7	23
Stolac	19	85	8	24
Široki Brijeg	17	51	15	58
Fojnica	37	133	1	11[d]
Kiseljak	27	72	25	83
Kreševo	6	18	4	25
Vareš	26	85	4	13[d]
Brčko ("Ravne")	141	372	10	40
Bosanski Šamac (Domaljevac)	39	95	1	5[b]
Orašje	21	56	29	73
Bugojno	44	119	–	–[c]
Busovača	11	30	7	34
Kakanj	44	116	–	–[c]
Kupres	7	21	2	7
Novi Travnik	25	75	12	37
Travnik	137	463	18	74[e]
Vitez	18	53	10	41
Žepče	14	45	8	68
Zenica	358	1,132	–	–[c]
Uskoplje	18	41	10	30
Konjic	49	135	–	–[c]
Usora	–	–	3	15
Total	1,759	5,773	549	2,021

[a]The data are for the municipalities of the former Croatian Republic of Herzeg-Bosnia in Bosnia and Herzegovina, with Croat majority. The prewar data are according to ref. 45, as of 31 December 1991, except for Mostar and Livno (1990). The postwar data are according to ref. 48. Physicians include all physicians in the area. "Other" include dentists, pharmacists, and auxiliary medical personnel.
[b]Lost to Serbian control. In the case of Bosanski Šamac, the Health Center "Domaljevac" was established in the small area that remained under our control (7,000 inhabitants).
[c]Lost to Bosniac control either by military force (e.g., Bugojno) or political division (e.g., Zenica).
[d]CDC hospital was lost to Bosniac forces, and we were left with only one medical office located in a small village that remained under the CDC control.
[e]After Travnik was lost to Bosniac forces, the hospital in Nova Bila was reactivated.

from other parts of BH to Croat-controlled territories. The numbers given in Table 8 apply to personnel who were within the CDC Medical Corps from the start of the war until the Washington Peace Agreement (April 1994). Since then, within the program of humanitarian assistance, approximately

Table 7. Casualties among the personnel of the Croatian Defense Council Military Medical Service during the 1992-1995 war in Bosnia and Herzegovina[a]

Health professionals[b]	No. of casualties		
	Wounded	Killed	Total
Physicians (300-360)	13	3	16
Nurses and technicians (1,000-1,200)	97	16	123
Ambulance drivers (280-300)	85	19	104

[a]Data on casualties of soldiers educated to serve as paramedics are not known because they were registered among soldier casualties.
[b]Numbers in brackets are estimates because a formal census of the health professionals was not done, and their number varied during the war.

Table 8. Assistance to medical personnel in the Croatian Defense Council Military Medical Service during the 1992-1995 war in Bosnia and Herzegovina (BH)[a]

Origin of the personnel	Physicians	Nurses and technicians
Volunteers from the Republic of Croatia	25	67
Volunteers from other foreign countries	6	23
Personnel from other parts of BH	45	77

[a]Only the personnel working permanently for the Corps; temporary volunteers (some of them coming and leaving several times) were not included.

1,000 physicians from Croatia came to assist their colleagues in BH for a shorter or longer period. They mostly came as organized medical teams.

Loss of manpower in health care was not a characteristic of the areas with the Croat majority only. Major demographic changes within health personnel occurred in all parts of BH (Table 9).

Hospitals

Before the war, the BH medical institutions providing secondary and tertiary medical care were university hospitals, regional medical centers, and local medical centers (Table 10). Primary care was provided by health centers in each municipality. The difference between medical centers and health centers was that the former had specialists and patient beds, whereas health centers offered outpatient services only. The institutions listed in Table 10, which represent most of the country's capacities, had a total of 15,159 beds and 2,435 physicians. As the only health institutions that remained under Croat control, in Livno and Mostar, were in the south of the country (Table 10), the Croats that ended up encircled in enclaves in central northern BH (Fig. 1) when the Croat-Bosniac armed conflict started in 1993, were left without secondary and tertiary levels of health care.

Damage or destruction of the medical institutions caused further losses to the health care system. In the areas with Croat majority, only 4 out of 35 institutions did not suffer any damage (Table

Table 9. Number of physicians in 10 cantons of Bosnia and Herzegovina before (1991) and after the war (1995)[a]

Year	No. of health care personnel				
	Physicians[b]	Dentists	Pharmacists	Technicians	Total
Canton 1: Unsko-Sanski					
1991	377 (162)	86	33	1,248	1,744
1995	168 (80)	23	14	797	1,002
Diff.	-209 (-82)	-63	-19	-451	-742
Canton 2: Posavski					
1991	35 (9)	11	4	104	154
1995	21 (10)	5	5	43	74
Diff.	-14 (1)	-6	1	-61	-80
Canton 3: Tuzla-Podrinje					
1991	799 (394)	115	90	2,304	3,308
1995	688 (330)	60	50	2,083	2,881
Diff.	-111 (-64)	-55	-40	-221	-427
Canton 4: Zenica-Doboj					
1991	632 (310)	130	73	1,703	2,538
1995	317 (192)	66	49	1,642	2,074
Diff.	-315 (-118)	-64	-24	-61	-64
Canton 5: GoraŽde					
1991	47 (24)	13	7	126	193
1995	22 (3)	3	0	66	91
Diff.	-25 (-21)	-10	-7	-60	-102
Canton 6: Central Bosnia					
1991	418 (212)	65	49	1,224	1,756
1995	224 (119)	33	16	959	1,232
Diff.	-194 (-93)	-32	-33	-265	-524
Canton 7: Neretva-Herzegovina					
1991	443 (278)	100	78	1,477	2,098
1995	300 (159)	53	13	980	1,346
Diff.	-143 (-119)	-47	-65	-497	-752
Canton 8: West Herzegovina					
1991	66 (18)	33	1	198	298
1995	49 (24)	19	3	203	274
Diff.	-17 (4)	-14	2	5	-24
Canton 9: Sarajevo					
1991	1,799 (1,299)	342	170	4,408	6,719
1995	955 (639)	175	103	2,146	3,379
Diff.	-844 (-660)	-167	-67	-2,262	-3,340
Canton 10: Herzeg-Bosnia					
1991	137 (54)	39	22	434	632
1995	65 (35)	12	2	236	315
Diff.	-72 (-19)	-27	-20	-198	-317
Total: Federation of Bosnia and Herzegovina					
1991	4,753 (2,760)	934	527	13,226	19,440
1995	2,809 (1,591)	449	255	9,155	12,668
Diff.	-1,944 (-1,169)	-485	-272	-4,071	-6,772

[a]Prewar data are from ref. 45, and post-war data from refs. 47 and 48.
[b]Total number of physicians; number in brackets shows the number of specialists.

Table 10. University and regional health care institutions in Bosnia and Herzegovina before the war, and their fate in the war[a]

Location	No. of physicians	No. of beds	Jurisdiction after war[b]
University Medical Center[c]			
Sarajevo	913	4,256	Bosniacs
Tuzla	317	1,519	Bosniacs
Banja Luka	249	1,586	Serbs
Regional Medical Center[d]			
Bihać	93	825	Bosniacs
Doboj	131	998	Serbs
Mostar	145	914	Croats
Foča	44	412	Serbs
Zenica	158	1,047	Bosniacs
Local Medical Center[e]			
Bosanska Gradiška	22	245	Serbs
Jajce	22	170	Serbs
Prijedor	60	452	Serbs
Drvar	13	200	Serbs
Derventa	19	408	Serbs
Livno	33	338	Croats
Trebinje	30	217	Serbs
Bijeljina	32	296	Serbs
Brčko	54	488	Serbs
Zvornik	37	273	Serbs
Travnik	63	515	Bosniacs
Total	2,435	15,159	

[a]Data according to ref. 45, as of 30 December 1991, except for Mostar and Livno (1990). Physicians and beds from primary health care (HC, special hospitals, rehabilitation centers) are not counted in.
[b]As a result of the war, but the division has persisted after the Dayton Peace Agreement in 1995.
[c]Large institutions with medical school teaching facilities and personnel.
[d]Institutions with special hospital beds.
[e]Institutions with outpatient specialist services.

11). The extent of destruction varied, but 5 institutions were destroyed to the ground. As described earlier, some of the institutions (Travnik, Žepče, Orašje, Brčko, and Usora) were what remained of the institutions organized and held by the CDC at the beginning of the war; during the war, these areas were lost and medical services were then organized in the neighboring locations which were still under Croat control. After the war, these institutions became either health centers (Nova Bila, Daštansko, Ravne Brčko) or general hospitals (Orašje, which replaced the CDC Tolisa war hospital). The case of Usora is especially interesting: before the war, this location did not have its own medical service. During the war, it became the only Croat-controlled part of Tešanj and Teslić area, where the medical service was organized for the needs of the local population under siege. These institutions continued to work after the war.

The war caused considerable number of people to migrate (Table 11). The number of Croats decreased 35.3% – from 784,176 in 1991 (before the war) to 507,007 in 1996. However, this did not ease the burden the health care system had to carry because the needs increased: large numbers of injured and psychically traumatized soldiers and civilians demanded organization of medical services in areas without adequate health care institutions (Table 12). These needs were met by the war hospitals – institu-

Table 11. Health care institutions within the political territorial areas of Bosnia and Herzegovina under Croat jurisdiction; situation after the war (1996)

Location	Category[a]	Area (m^2) and percent (%) of destruction[b]	No. of physicians[c]	Population 1991[d]	Population 1996[b] (% difference to 1991)
Grude	HC	2,010 (38)	11	16,358	19,635 (+20.3)
Ljubuški	HC	1,950 (24)	16	28,340	32,636 (+15.6)
Posušje	HC	1,000 (0)	7	17,134	19,183 (+11.9)
Široki Brijeg	HC	1,860 (0)	15	27,180	3,100 (+14.8)
Čapljina	HC	3,250 (14)	15	72,882	28,000 (-61.5)
Čitluk	HC	2,100 (0)	8	15,083	20,239 (+34.1)
Mostar	HC+UH	3,302 (99)	243	126,626	49,914 (-60.5)
Neum	HC	1,008 (69)	6	4,325	6,882 (+59.1)
Rama	HC	1,400 (71)	7	19,760	12,350 (-37.5)
Stolac	HC	2,000 (65)	8	18,681	10,000 (-46.4)
Kreševo	HC	432 (27)	4	6,731	6,426 (-4.5)
Fojnica	HC	250 (64)	1	16,298	2,500 (-84)
Kiseljak[e]	HC	860 (19)	25	24,164	20,396 (-15.5)
Busovača	HC	550 (34)	7	18,897	11,081 (-41.3)
Vitez	HC	1,450 (32)	10	27,859	17,155 (-38.4)
Novi Travnik	HC	1,650 (26)	12	30,713	10,000 (-67.4)
Travnik[e]	HC Nova Bila[f]	700 (59)	18		6,000
Uskoplje	HC	350 (100)	10	25,181	7,645 (-69.6)
Jajce	HC	1,900 (30)	4	45,007	12,810 (-71.5)
Vareš	HC Daštansko	250 (100)	4	22,203	2,500 (-88.7)
Žepče[e]	HC	1,100 (60)	8	22,066	20,000 (-9.3)
B. Grahovo	HC	1,850 (12)	1	8,311	500 (-93)
Glamoč	HC	2,400 (98)	1	12,593	3,000 (-76.1)
Drvar	HC	2,500 (29)	–	17,126	3,000 (-82.4)
Kupres	HC	1,450 (72)	2	9,618	3,813 (-60.3)
Livno	HC+GH	1,900 (13)	46	40,600	34,000 (-16.2)
Tomislavgrad	HC	2,300 (0)	16	30,009	32,284 (+7.5)
OdŽak	HC	2,500 (80)	3	30,056	4,000 (-86.6)
Orašje[e]	GH	1,660 (95)	29	28,376	24,082 (-15.1)
Ravne Brčko	HC	950 (37)	7	22,000	17,236 (-21.6)
Usora[f]	HC	600 (40)	3	–	11,400
Total		51,020	547	784,176	507,007 (-35.3)

[a]HC – Health Center (outpatient facilities only), GH – General Hospital, UH – University Hospital.
[b]According to the official estimates of the Intercounty Institute for Public Health, Mostar 1997.
[c]According to refs. 47 and 48.
[d]According to ref. 38.
[e]Locations of war hospitals, that were transformed into civilian institutions after the war.
[f]Did not exist before the war, but were created during the war due to isolation of the area.

tions established by the Medical Corps Headquarters of the CDC, which received the wounded from the most active battlefields. Various buildings of different sizes and prewar functions were transformed into the war hospitals 14 in total (Table 13). They provided secondary and tertiary health care for the military as well as for the civilian population (see below). In the beginning of the war, and before the conflict with Bosniacs, all these hospitals were organized by the CDC and served local inhabitants and soldiers regardless of their nationality. During the conflict with Bosniacs, Jablanica, Bugojno, Fojnica, and Kostajnica (near Konjic) came completely under the Bosniac control, except for the Fojnica war hospital, which was transferred to Kiseljak.

Organization of the Croatian Defense Council Medical Services

The development, adaptations, and transformations of the CDC Medical Services corresponded to those that went on in the CDC military part: from a simple organization of the people by themselves, followed by amateur forms of organization, and finally to a relatively well organized army.

The Beginning

Croat population in BH was the first to face the Serbian aggression in 1992. The data in Tables 2-11 illustrate the (rather sudden) loss of resources, which was worsened by a lack of any experience or education in war medicine. When the war broke out, a group of physicians, who were all members of the BH Parliament, too, started a systematic planning of the concept of medical care for the oncoming catastrophe. They used the war experience of the Croatian health care and were helped by the physicians from Croatia, mostly those who were of BH origin. I was one of the physicians from the BH Parliament who initiated the establishment of the Military Medical Headquarters, by the end of March 1992, just before the open Serbian aggression. Ser-

bian occupation and destruction of the Croat-populated Ravno village in the southeast of BH occurred as early as September 1991, and it was obvious that the aggression would spread over the whole country in no time.

We toured the areas populated by Croats, listed all the health centers, and prompted their adaptation to the situations of emergency in which there would be a large number of the wounded. Strategic points for the war surgery units – future war hospitals – were determined. Health care institutions were connected by a computer network and packet radio connection (49), which soon proved extremely important since many of the war hospitals became isolated and this technology was the only means of communication for a long time. War experience of the Republic of Croatia (where the war started in May 1991) was kept in mind: the concept of Medical Corps Headquarters was adopted (19), but mobile surgical teams (22) were not organized in BH because we had neither surgical clinics nor sufficient number of surgery specialists. Thus, we opted to use primary health care institutions with whatever personnel they had. The Croatian model of computer network, which helped Croats immensely during the evacuation of the Vukovar hospital in November 1991 (49), was used in its entirety. Later it proved crucial for commanding and coordinating medical activities. Since there were no military formations, we asked the heads of health institutions to be in charge of preparing municipal medical services for a war situation. This reflected the future structure and organization of the MCH, i.e., Municipal Medical Service Headquarters were established in each municipality where it was possible. Most health institutions had already started building up the reserves of drugs and medical material for future needs related to emergency situations.

These preparations were done in time. We recognized the danger for Croat population to be left without any larger medical institution and with insufficient medical personnel in case of war. Our strong belief that the war was imminent stemmed from the political developments in the BH Parliament, and the knowledge about the tragic experience of our colleagues from the Republic of Croatia in 1991 war (27,50-52) was precious to us. We learned a lot from contacts with the health personnel who worked in the neighboring parts of Croatia and with whom we had always cooperated since large areas of northern and southern BH relied on the secondary and tertiary health care services in Croatia in former Yugoslavia.

The overall result of our activities was the establishment of the Medical Corps Headquarters (MCH) of the BH Croat population on March 12, 1992, which makes it the oldest defense unit in the entire BH. Not much later, the Croatian Defense Council (CDC) was formed as a civilian and military organization in charge of defense of the Croat-populated areas from Serbian aggression (53).

Table 12. Medical institutions and other buildings in areas with Croatian majority, transformed into war hospitals at the beginning of the war in Bosnia and Herzegovina

Location	Previous function of the building	Beginning of work
Tomislavgrad	health center[a]	1992
Livno	medical center[b]	1992
	Sturba anti-atom bomb shelter	1992
Mostar	new hospital under construction and surgery ward[c]	1992
Grude	tobacco repository	1992
Neum	"Sunce" Hotel	1992
Jablanica	health center[d]	1992
Rama	floppy disc factory	1992
Gornji Vakuf	Franciscan rectory	1993
Jajce	city hospital	1992
Bugojno	"Kalin" Hotel[d]	1992
Kiseljak	health center	1993
Fojnica	rehabilitation center[d]	1992
Nova Bila	church	1992
Busovača	health center	1993
Žepče	primary school	1992
Bosanska Bijela	primary school	1993
Orašje Tolisa	Franciscan rectory	1992
Kostajnica	private house[d]	1993

[a]Health care institution with outpatient specialist services.
[b]Health care institution with specialist patient beds.
[c]New hospital was under construction; "old" hospital was partly destroyed at the beginning of war, and only the surgery ward was used.
[d]Established by the CDC Medical Corps Headquarters, but lost in subsequent war operations.

Table 13. War hospitals of the Croatian Defense Council on territories with Croat majority in Bosnia and Herzegovina, with numbers of workers[a], hospital beds[b], and inhabitants[c] for which they cared

Location	No. of physicians	No. of other health care workers	No. of beds	Population under care
Tomislavgrad	10	56	40	30,000
Livno	12	64	60	40,000
Rama	14	35	40	20,000
Grude	7	30	15	30,000
Mostar	32	120	200	80,000
Tolisa	11	30	35	30,000
Žepče	8	18	40	25,000
Fojnica	9	35	60	35,000
Kiseljak	25	67	56	25,000
Bos. Bijela	5	18	30	20,000
Nova Bila	10	54	50	50,000
Bugojno	15	42	30	46,000
Jajce	10	32	40	45,000
Uskoplje	10	30	10	27,000

[a]The numbers include only personnel working in war hospitals, which were either the only health care institution in the region or a part of the existing civilian health institution. Other health personnel worked in Health Centers, civilian parts of local health institutions, or battlefield in medical units.
[b]The number of beds in war hospitals; those were emergency beds, from which the wounded either returned to the unit or were sent to another health institution for final treatment.
[c]The population changed greatly according to the war situation – many left the area and refugees settled in. The numbers in the table are estimates of an average population during the war.

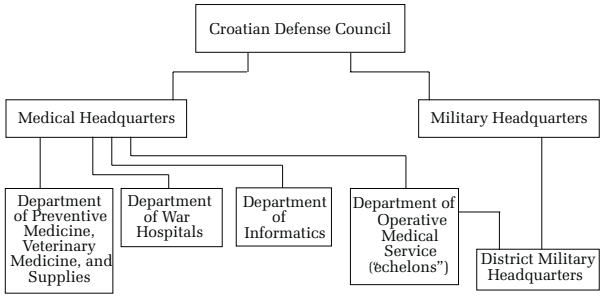

Figure 2. Hierarchical structure of the Military Medical Corps of the Croatian Defense Council (CDC) in the Croatian Community of Herzeg-Bosnia (CC H-B) from the beginning of the war in Bosnia and Herzegovina until October 1992.

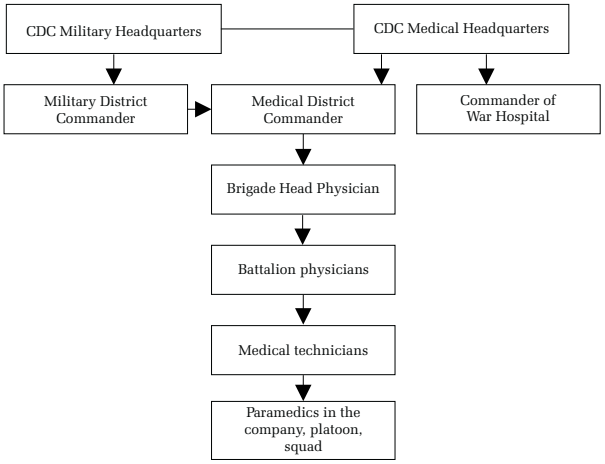

Figure 3. Commanding line in the Military Medical Corps of the Croatian Defense Council (CDC) in the Croatian Community of Herzeg-Bosnia (CC H-B) from the beginning of the war in Bosnia and Herzegovina until October 1992.

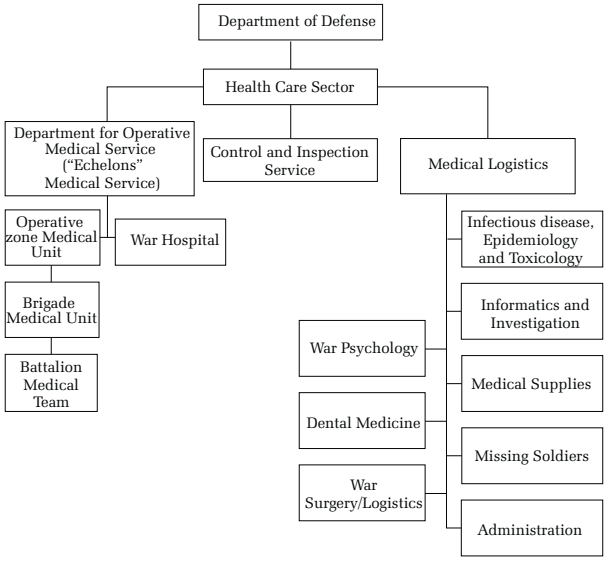

Figure 4. Structure of the Croatian Defense Council military medical service from October 1992 until August 1993.

Growth of the Croatian Defense Council

The establishment of the CDC was immediately followed by the organization of military units. These units were organized on a territorial principle – soldier volunteers were assigned to units defending their homes. The MCH joined the CDC and with the CDC Headquarters became the key leading factor in the defense of the BH Croat and all other populations in the areas it covered.

It should be emphasized that neither the CDC Headquarters nor MCH had emerged as a continuation of an organization of the former YFA and had not taken over their doctrine either. The number of officers of the Croat nationality in the prewar YFA was insignificant and there was nobody of such profile to contact or learn from. Besides, with the 1991 wars in Slovenia and Croatia, the YFA became completely Serb-controlled. Since the MCH and CDC Headquarters were organized independently from each other, the MCH did not become a formal part of the CDC Military Headquarters; the two bodies cooperated closely, but, within the CDC, they were on the same hierarchical level (Fig. 2), which is probably a unique case in military medicine.

The MCH had 4 departments (Fig. 2): 1) Preventive medical care, veterinary services and medical supplies; 2) War hospitals; 3) Echelon medical services; and 4) Informatics. This scheme was established before the actual organization of the military units and formal establishment of CDC (April 1992) and Military Headquarters (May 1992). Echelon Medical Services took care of the wounded until they would reach a hospital with tertiary medical care. Municipal military commands included municipal heads of medical services as assistants to the military commanders in the District Military Headquarters. In the field, the Armed Forces Headquarters had the military commanders of the municipalities under command, and these military commanders had the heads of the headquarters of the municipal military medical services as assistants (Fig. 3). Military medical services encompassed physicians in military units (brigades and battalions), medical technicians, and finally paramedics in companies, platoons, and squads. The chain of command of the medical services went from the MCH, to the municipal heads of medical services, to brigade physicians, to battalion physicians, to medical technicians, and to paramedics. Another vertical chain of command went directly from MCH to the commanders of war hospitals (Fig. 3).

Figure 4 depicts changes in the structure of MCH. As of October 14, 1992, the MCH became integrated into the CDC Department of Defense and became its Health Care Sector. To increase command efficacy, the commands of field medical units and war hospitals were integrated at the level of the Department of Operative Medical Service of the Health Care Sector. This Service was similar to an echelon medical care system, with the difference that it did not have a proper eche-

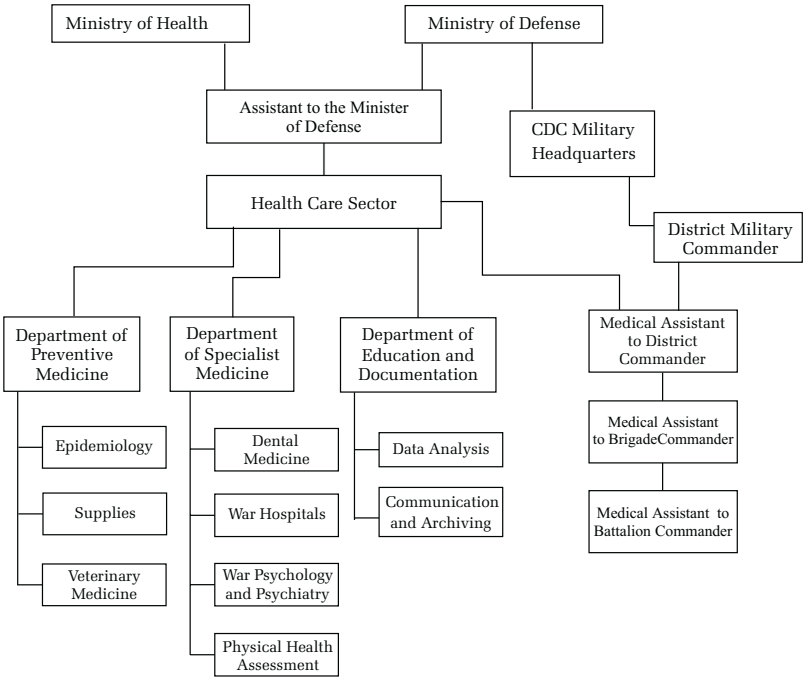

Figure 5. Structure of the Croatian Defense Council military medical service from August 1993 until the end of the war in Bosnia and Herzegovina.

lon organization. Commander of the Operative Medical Service was a surgeon, who received commands from the Health Care Sector Headquarters, and was directly superior to the commanders of operative medical units. Commanders of the brigade medical corps were responsible for the physicians in battalions, and the downward chain of command remained as before. Although the commander of the Operative Medical Service was technically a superior officer to the commanders of the War hospitals, these hospitals had a special position, which will be described later.

Due to the growth of the system, a Control and Inspection Service was formed and headed by a specialist in occupational medicine.

Operative Medical Sector Service and Control and Inspection Service were the operative part of the Health Care Sector, whereas Medical Logistics Service provided logistics to their work, as well as health care other than direct treatment of the wounded in the field, such as epidemiological service, dental medicine, psychology, and psychiatry (Fig. 4).

Formation of the Ministries

On the basis of war experiences in 1992, the CDC and Health Care Sector underwent another major reform in August 1993 (Fig. 5). With the formation of the Ministry of Health, standard civilian medical services and their organization in the areas that were not affected by war became the responsibility of the Ministry of Health. MCH was assigned the jurisdiction over the military medical services only. Civilian and military medicine had never been completely separated but their organization and functioning were adapted to the local situations. Basically, all medical institutions and personnel in the given area in the war zones, including the war hospitals and medical personnel serving in military units, were obliged to assist both military and civilian populations and were in charge of the entire medical care of the area. With this reform, civilian medical institutions in the areas unaffected by war came under the jurisdiction of the newly formed Ministry of Health. At that time, MCH had 3 departments: 1) Department of Preventive Medical Care and Supplies, with the Epidemiological Division, Division for Veterinary Medicine, and Division for Medical Supplies; 2) Department of Specialist Medicine, with Divisions for War Hospitals (War Surgery), Psychology and Psychiatry, Dentistry, and Physical Health Assessment; 3) Department of Education and Medical Documentation, with Divisions for Education and Analysis, and for Communications, Acquisition and Archiving of Information.

After the CDC forces liberated Mostar from the Serbian occupation in August 1992, most of the Health Care Sector moved to this city. Only a small part of it remained in Tomislavgrad, the town at the crossroads of communication routes defined by military developments (see Fig. 1). This location rendered optimal communications with the field units and institutions and served the units and war hospitals in the central and northwest BH.

The Head of the Health Care Sector was first stationed at the Ministry of Defense, located in Mostar, but soon moved to the premises of the Health Care Sector at the Mostar War Hospital (from March 1993 until the Vienna Peace Agreement in March 1994).

Hierarchically, Health Care Sector was under command of the Ministry of Defense and the Head of the Military Medical Services served as an Assistant to the Minister of Defense. He also collaborated with the Ministry of Health (Fig. 5). The same scheme was applied to all commanding instances: all medical commanders in military units were assistants to the military commanders of the respective unit. However, war hospitals, regardless of their locations, were completely autonomous from the both the military and civilian commanding chain. They also had a high degree of freedom within the Health Care Sector. For example, the Head of the Health Care Sector appointed their commanders, but their connection with the Sector's Department for War Hospitals was primarily a logistical and not a commanding one. The Chief Surgeon from the Health Care Sector (previously the Commander of the Operative Medical Service), who headed the Department for War Hospitals, controlled the quality of medical work, but in decision-making respect, war hospitals were quite autonomous. This feature stemmed from the way in which they were established and high professionalism of their personnel, but also from the fact that many of them ended up in encircled enclaves, having only computer packet radios as the means of communication with the Health Care Sector. Thus, the Sector's strategy toward war hospitals was freedom in initiative and commanding and taking full responsibility for the work. It should be emphasized that a military commander never entered any war hospital and issued a command.

After Washington Peace Agreement

After the Washington Peace Agreement between Bosniacs and Croats in April 1994, as a consequence of cessation of hostilities and a sign of good will, the Head of the Health Care Sector suggested to the Minister of Defense to transfer the jurisdiction over all war hospitals to the Ministry of Health, except those in Orašje and Bosanska Bijela (Posavina, north-east BH), where the war with Serbs continued. From that time on, the personnel of the Health Care Sector were considerably reduced and Health Care Sector became one of the administration departments of the Ministry of Defense, headed by the Head for Health Administration.

Several war hospitals were reactivated in 1995, when BH Army (Bosniac armed forces), CDC, and Army of the Republic of Croatia jointly undertook several offensives to liberate west BH from Serb occupation. For example, during the battles for the liberation of Kupres and other southwest parts of BH (west of Livno to Grahovo, see Fig. 1), war hospitals in Rama, Tomislavgrad, and Livno were reactivated within several hours. Immediately after the liberation of Kupres, 4 days after the commencement of offensive, Kupres War Hospital was formed by combining the personnel and equipment from other 3 war hospitals, to serve the armed forces in their further military advancements. Soon, the same happened in Jajce after it was liberated (see Fig. 1).

Military Medical Service

Medical Services in Military Formations

In the beginning of 1992, when the defense was organized on the municipal level, the municipal military formations relied on local health centers for medical personnel and supplies. When needed, local military formations included physicians and other medical personnel as ordered by the municipal head of medical services (director of the health center in most cases). These local formations had from several hundred to 1,500 men; two medical teams took care of 500 soldiers. Each team consisted of a physician, two medical technicians, and two ambulance drivers. Selected soldiers were trained in first aid and resuscitation, and then assigned as paramedics to every platoon.

With the formation of the brigades, brigade medical service commanders were appointed, and the function of the municipal head of medical services was abolished. Commanders of the brigade medical service took care of the personnel in battalions and companies. Each battalion had a physician, 2 medical technicians, and 2 ambulance drivers. There was a medical technician on each company and a paramedic for every 10 soldiers.

Subsequent reorganization of military formations included the formation of operative zones, with their medical service commanders in charge of medical service of all brigades constituting the operative zone. They relied upon all medical institutions in the area and the closest war hospital.

In the military conflict with the Serb forces, there was a regular front-line because the YFA preferred classical warfare, with artillery, armored vehicles, and infantry. The rear was shelled, and air forces were used in attacks at the beginning of the war. This allowed us to position physicians very close to the front-line, where they could help the wounded much quicker and send them by short evacuation routes to a brigade medical station, where basic resuscitation measures were undertaken (hemostasis, inspection of airways, placement of iv. line) (32). These medical stations were positioned from few hundred meters to at most 2 km away from the front-line, and all the wounded would reach them within an hour after injury. After that, a patient would be transported to a war hospital. All routes of evacuation were relatively safe, aside from artillery attacks. In contrast, mostly city fights, often head-to-head, characterized the conflict with Bosniacs, and echelon principle was inapplicable. Instead, the wounded would be taken directly to the nearby war hospital. They were very close to most of the places of fighting , anyway.

War Hospitals

All CDC war hospitals were located in buildings. Almost all were within the zone of the active fighting, and some were on the very front-line in the cities, especially during the armed conflict with Bosniacs. The closeness of the front-line was the reason that the CDC, in distinction from many other

armies, including that in Croatia, neither needed nor could use mobile surgical teams or field hospitals. This was probably the most specific characteristic of the CDC medical services in BH.

In the CDC military medical service, surgeon had a key position in a war hospital. Due to the closeness of the front-line and location of war hospitals, positioning surgeons in the rear was neither necessary nor advisable, unlike the positioning of battalion surgeons within the framework of the NATO doctrine (36).

Only the most serious cases, such as head and brain injuries, were transported further after first aid and stabilization, most often to Croatia (32).

Although generally short in personnel and equipment, the war hospitals were able to offer complete medical care, after which the soldiers would return to their units. Most of the wounded received definite treatment in the war hospitals. Patients needing longer recovery and rehabilitation were sent to civilian hospitals in the rear.

The 1-5 echelon principle of care for the wounded, as well as distribution of the equipment, was mostly condensed to two or three steps of care (31).

War hospitals did not have a strict organizational structure, but were the result of needs, capacities, and initiative of their commanders. It should be emphasized that the war hospitals, albeit located within operational zones, were under command of the Health Care Sector of the Department of Defense (Fig. 4). Moreover, since all CDC physicians were officers, they had a considerable independence and freedom in making decisions, which not only resulted in high-quality leadership but was also indispensable for survival in encircled enclaves.

After Dayton Peace Agreement

Dayton Peace Agreement (21 November 1995) divided BH into two entities – Croat-Bosniac Federation of BH and the Republic Srpska, with two respective armies. The Federation of BH had the army composed of two components – the CDC and the Bosniac-controlled Army of BH, whose organization stemmed from the key principles of authenticity and sovereignty of both nations of the Federation of BH. Currently, every commanding post has a deputy position alternately occupied by Bosniacs and Croats. Overall numerical ratio is 2.3:1 for Bosniacs. The army is organized in accordance with NATO standards, which means that its organization and training is provided through the "Equip and Train" program by the Military Professional Resource Inc. (MPRI, Alexandria, VA, USA), a forum of US military experts.

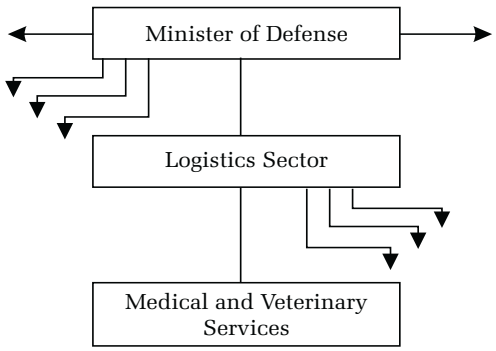

Figure 6. Proposal of the structure of the Ministry of Defense of the Federation of Bosnia and Herzegovina (after Dayton Peace Agreement in 1995). Lines with arrows indicate other Sectors or Departments.

At the level of the Ministry of Defense, medical service, together with veterinary medicine, is part of the Logistics Sector (Fig. 6).

At the level of Military Corps Headquarters (Joint Command) military medical and veterinary services also belong to the Logistics Sector (Fig. 7).

Discussion

The MCH was established as a managerial and organizational body with the task to conceptualize the system of health care in war circumstances. The concept of integrated civilian and military medical services was adopted. Health care was based on the resources within the primary health care (health centers), small local hospital in Livno, and Mostar regional center, whose personnel was reduced by at least a half. The development of military formations was adequately followed by the development of medical formations within them. War hospitals were established depending on the development of military actions, and most of them were positioned close to the battlefront. War hospitals cared for both soldiers and civilians. Since a complete treatment and rehabilitation of the wounded were provided, these war hospitals

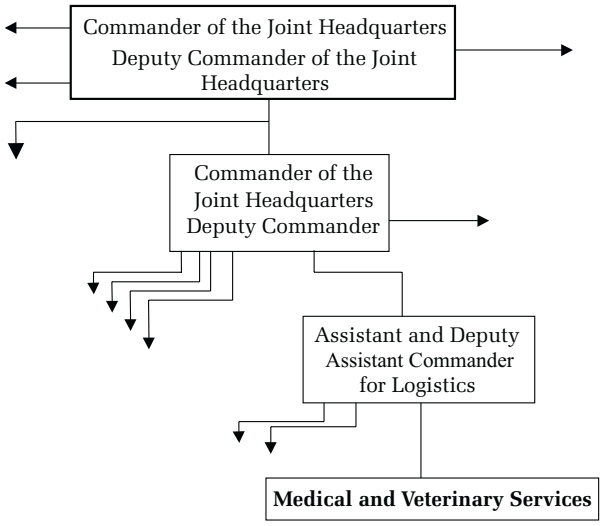

Figure 7. Structure of the Joint Headquarters of the Army of Bosnia and Herzegovina and Croatian Defense Council (Army of the Federation of Bosnia and Herzegovina) after Dayton Peace Agreement in 1995. Lines with arrows indicate other Sectors or Departments.

could be considered the 5th echelon (36), although they were too close to the front-line (31).

Patients who needed further medical care were sent to the tertiary level institutions in the Republic of Croatia. There were many of them, and they were sent to Croatia from both Bosniac and Croat medical institutions in BH (19,23,31, 32,34,35,54), regardless of patients' combat status, nationality, or religion (55,56). The cost of care for BH patients in the Republic of Croatia reached DM35 million (official data from the Croatian Health Insurance Institute), which is surely one of the greatest humanitarian supports ever given from one state to another.

In addition to with primary health care for the wounded and the sick, preventive and epidemiologic measures were also carried out efficiently, because there were no epidemic outbreaks despite the sharp decrease in the living standard and a large-scale refugee crisis.

Medical supplies, equipment, and sanitary materials were not manufactured in BH, but their supply to war and civilian medical institutions was adequate. The help came from many humanitarian organizations and individuals from all over the world, especially those who had experience or connection with Međugorje (a famous pilgrimage destination in West Herzegovina).

Our doctrine of independent war hospitals, headed by a strong-minded and highly educated commander, grossly alleviated problems of personnel shortage. A smart commander could greatly affect functioning of the hospital by retraining of the personnel (e.g., dentist into surgeon), or organizing additional training (e.g., of a medical technician to perform anesthesia). Medical specialists were recruited partly from displaced physicians from other parts of BH, and partly (at the beginning) from the volunteers from abroad, mostly Croatia.

Although we were acquainted with military medical doctrine of the former Yugoslav Federal Army, NATO, and other countries, we could not use any of their models. We were actually compelled to build a unique system of our own. Our system was a mixture of NATO (36), Israeli (9-11), and Croatian (19,52) doctrine, but on the whole, it was our own doctrine, specific for the given situation (31). Its main feature was independence – of politics and of the army. Relative independence, high level of education, and experience of the physicians resulted in satisfactory organization of military/civilian medical services and made these very physicians, as those in Croatia a year earlier (57), leading figures in peace initiatives, exchanges of prisoners of war, and humanitarian actions. Organizing care for the refugees and displaced persons and the surveillance of prisons were physicians' merits.

Since there were not many highly educated military commanders, the MCH opted for independent position in the planning and organizing, as well as in operational activities. All head physicians in armed units were officers and completely autonomous in their medical command. Although they were the assistants to the commanding officers, they were not subordinated to them. Commander of the MCH was at the same hierarchical level as the commander-in-chief of the armed forces.

After the Dayton Peace Agreement and cessation of war in BH, integration of war hospitals into the civilian health system allowed the establishment of the civilian sector of medical services, whereas the CDC military services remained in the CDC armed units, i.e., in professional brigades and teaching centers integrated into the BH Federation Army. The MCH was dissolved, with only medical documentation remaining.

Medical service and its professionals in the BH Federation Army now exist within the both Ministry of Defence and Joint Army Headquarters. My personal opinion is that Medical Service is not given the importance it should have in a military system. "Low" positioning of medical officers within the officer personnel, as well as the hierarchical position of the medical service itself, is not adequate. It is true that the current BH Army model has been made according to the NATO system, but neither tradition, health care experience, nor traditionally respected status of a physician were taken into account. Communication with the civilian health care system is weak, which is a setback for any country or situation. Hopefully, the existing tendency of reducing armed units in BH will lead to eventual demilitarization of BH, making the discussion on the position of medicine and physicians in BH armed forces unnecessary.

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NATO war medical doctrine was applied in the war in Croatia, Bosnia and Herzegovina. However, due to rather specific martial and organizational circumstances, the doctrine had to be modified. sometimes substantially. A medical team from the war hospital in Livno, Bosnia and Herzegovina describes their work with respect to the four-echelon NATO doctrine. The team covered a relatively large and active battlefield, and treated 597 patients with 314 major surgical interventions.Â A medical team from the war hospital in Livno, Bosnia and Herzegovina describes their work with respect to the four-echelon NATO doctrine. The team covered a relatively large and active battlefield, and treated 597 patients with 314 major surgical interventions. Due to the lack ofâ€¦ CONTINUE READING. With the beginning of fighting in Bosnia and Herzegovina in the spring of 1992, wide scale armed actions started in the summer of 1992 in the west of the country as well as in Bosanska Kraina.Â Local Muslims were an important factor in the communist guerilla movement and together with Serbs suffered heavy losses in fighting the NDH(Goverment of Croatia installed by Germans) Â»ustasesÂ», including in the well known NDH concentration camp Jasenovac. Because of these traditions all Bosanska Kraina remained under the biggest communist influence in Bosnia and Herzegovina up to the start of the war. 3. M. Imamovi , Bosnia and Herzegovina, Evolution of its Political and Legal Institutions, 2006. 4. N. Malcolm, A Short History of Bosnia, 2002, 5. F. Kar i , The Bosniaks and the Challanges of Modernity, 1999.Â CHAPTER 5 DISSOLUTION OF YUGOSLAVIA AND WAR 285 Yugoslavia could not be controlled as a single entity, then he would carve out of it a new entity, an extended Serbian territory, which would be his and his alone.Â When a Croat party was founded in Bosnia in early 1990 it was an offshoot of Tudjman's HDZ, and its official policy was to keep the borders of Bosnia inviolate. Bosnia and Herzegovina (BH) is located on the western part of the Balkan Peninsula. It has an area of 51 210 km2 and a population of 3 972 000. According to the Dayton Agreement of November 1995, which ended the 1992-95 war, BH comprises two â€˜entitiesâ€™ - the Federation of Bosnia and Herzegovina (FBH) and the Republic of Srpska (RS) - and the District of Brcko. The administrative arrangements for the management and financing of mental health services reflect this. The FBH, with 2 325 018 residents, is a federation of 10 cantons, which have equal rights and responsibilities. The RS has 1 487 785