

Ministry of Health, Federation of Bosnia and Herzegovina  
Ministry of Health and Social Welfare, Republic of Srpska  
Bosnia and Herzegovina

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR IMPROVEMENT OF MEDICAL EQUIPMENT IN PRIMARY HEALTH CARE INSTITUTIONS (Phase II) IN BOSNIA AND HERZEGOVINA

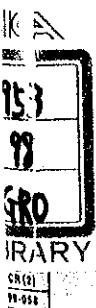
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**( Phase II )**  
**IN**  
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March, 1999

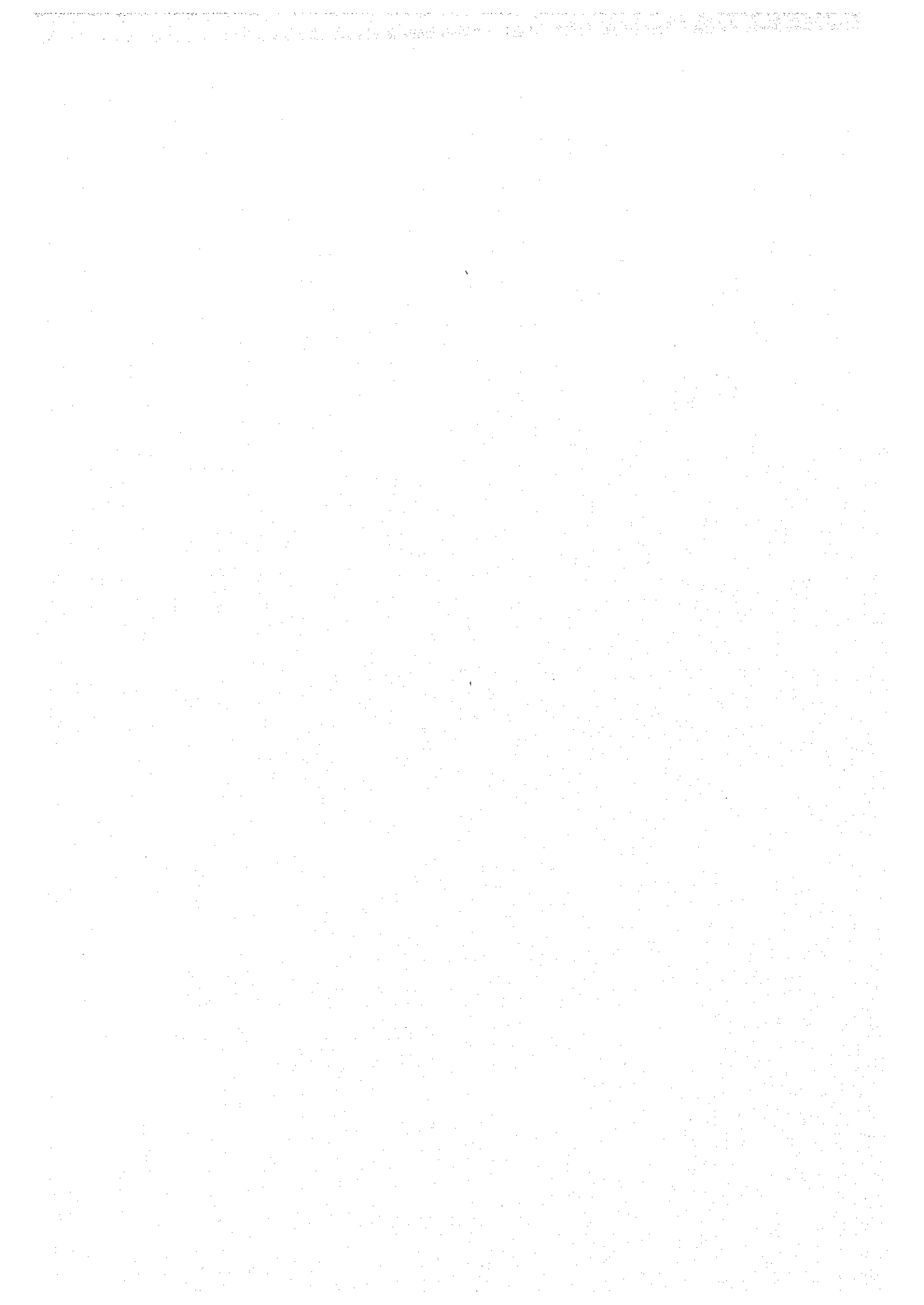


**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**  
**INTERNATIONAL TECHNO CENTER CO., LTD.**  
**OVERSEAS ENGINEERING SERVICE**

MARCH, 1999



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## PREFACE

In response to a request from the Government of Bosnia and Herzegovina, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Medical Equipment in Primary Health Care Institutions (Phase II) and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Bosnia and Herzegovina a study team from August 4 to September 6, 1998.

The team held discussions with the officials concerned of the Government of Bosnia and Herzegovina, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Bosnia and Herzegovina in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Bosnia and Herzegovina for their close cooperation extended to the teams.

March, 1999



Kimio Fujita  
President  
Japan International Cooperation Agency





March, 1999

### Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Medical Equipment in Primary Health Care Institutions (Phase II) in Bosnia and Herzegovina.

This study was conducted by International Techno Center Co., Ltd., and Overseas Engineering Service under a contract to JICA, during the period from August 12, 1998 to March 31, 1999. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Bosnia and Herzegovina and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.


Very truly yours,



Chiharu Abe  
Project Manager,  
Basic design study team on the Project  
for Improvement of Medical Equipment in  
Primary Health Care Institutions (Phase II)  
in Bosnia and Herzegovina  
International Techno Center Co., Ltd.

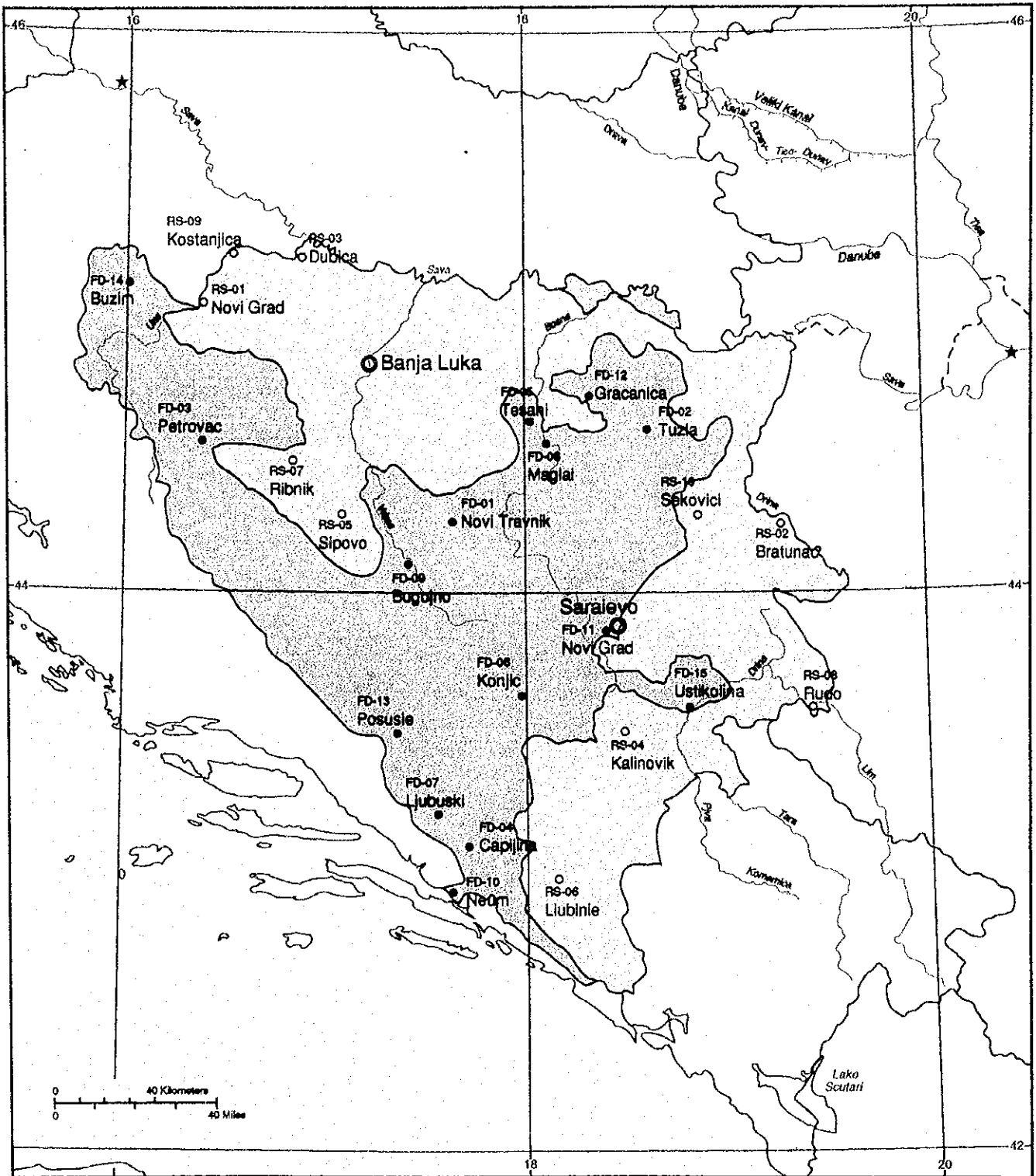
# BOSNIA AND HERZEGOVINA




 FEDERATION OF BOSNIA AND HERZEGOVINA


 REPUBLIC OF SRPSKA

# PROJECT SITES



- FEDERATION OF BOSNIA AND HERZEGOVINA
  - REPUBLIC OF SRPSKA
- FD-1~15 PROJECT SITES
  - RS-1~10 PROJECT SITES

## **Abbreviation**

<b>A/P</b>	<b>Authorization to Pay</b>
<b>B/A</b>	<b>Banking Arrangement</b>
<b>BiH</b>	<b>Bosnia and Herzegovina</b>
<b>E/N</b>	<b>Exchange of Notes</b>
<b>FD</b>	<b>Federation of Bosnia and Herzegovina</b>
<b>FY</b>	<b>Fiscal Year</b>
<b>GDP</b>	<b>Gross Domestic Product</b>
<b>GP</b>	<b>General Practitioner</b>
<b>JICA</b>	<b>Japan International Cooperation Agency</b>
<b>NGO</b>	<b>Non Governmental Organization</b>
<b>OBGY</b>	<b>Obstetrics and Gynecology</b>
<b>PHC</b>	<b>Primary Health Care</b>
<b>RS</b>	<b>Republic of Srpska</b>
<b>WHO</b>	<b>World Health Organization</b>

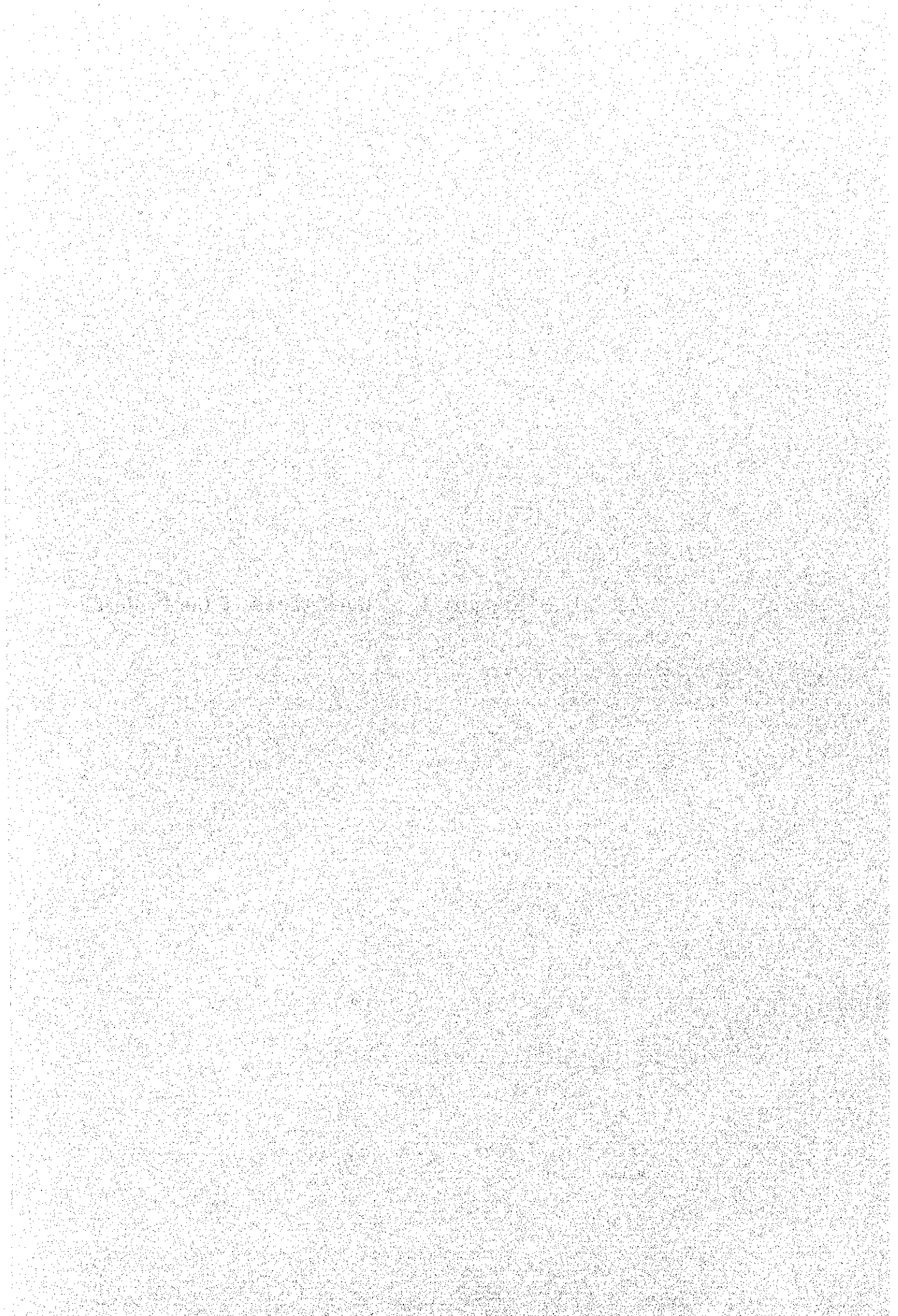
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## **Chapter 1      Background of the Project**





## Chapter 1 Background of the Project

### 1-1 General Situation

Bosnia and Herzegovina is located at the center of former Yugoslavia at the heart of the Balkan Peninsula. The national area is approximately 51,000 km<sup>2</sup>, which is almost equal to the area combining Kyushu and Shikoku islands in Japan. Most of the national land is mountainous area, in which forests account for 46%. Bosnia and Herzegovina is bordered on the north by the Republic of Croatia being divided by Sava River and on the east by the Federal Republic of Yugoslavia being divided by Drina River. Bosnia and Herzegovina belongs to the continental climate and the weather and the temperature change of mountainous areas are violent. Wild animals and a variety of fishes live in the dense forests and the ravines of mountainous areas. Flat lands stretch along the Sava River. However these land are of Karst stratum, they are good for cattle raising rather than for farming.

The population of Bosnia and Herzegovina was approximately 4.4 million in the 1991 census, but is estimated to be 4 million at present. After the Bosnia and Herzegovina War between 1992 and 1995, no census has been conducted.

The Bosnia and Herzegovina War started in 1992 ceased with the Peace Agreement of 1995. The present Bosnia and Herzegovina consists of two entities, which are the Federation of Bosnia and Herzegovina (to be referenced as "the Federation" hereafter) and the Republic of Srpska (to be referenced as "Srpska" hereafter). The Government of Japan recognized Bosnia and Herzegovina as a state in January 1996.

<b>Bosnia and Herzegovina</b> Presidency Council of Ministers Ministry of Foreign Affairs, Ministry of Foreign Trade & Economic Relations, Ministry of Civil Affairs & Communications	
<b>Federation of BiH</b> President, Vice-President Prime Minister, Deputy Prime Minister  Ministry of Finance, Ministry of Defence, Ministry of Internal Affairs, Ministry of Justice, Ministry of Energy, Mining & Industry, Ministry of Transport & Communications, Ministry of Social Policy, Displaced person & Refugees, Ministry of Health, Ministry of Education, Science, Culture & Sport, Ministry of Trade, Ministry of Physical Planning and Environment, Ministry of Forestry & Water Management, Ministers without Portfolio	<b>Republic of Srpska</b> President, Vice-President Prime Minister, Deputy Prime Minister  Ministry of Finance, Ministry of Veterans, War Casualties & Labour, Ministry of Agriculture, Water Resources & Forestry, Ministry of Defence, Ministry of Interior, Ministry of Education, Ministry of Health & Social Welfare, Ministry of Administration and Local Self-Rule, Ministry of Industry & Technology, Ministry of Energy & Mining, Ministry of Information, Ministry of Justice, Ministry of Refugees & Displaced Persons, Ministry of Religions, Ministry of Trade & Tourism, Ministry of Sport & Youth, Ministry of Urbanism, Housing/Communal Infrastructure & Environment, Ministry of Traffic & Communications, Ministry of Economic Relations with Foreign Countries, Ministry of Science and Culture

**Figure 1-1 : Administrative Organizations of Bosnia and Herzegovina**

The common government organs of Bosnia and Herzegovina of national level established by the Peace Agreement include the Presidency, Council of Ministers (appointed by the Presidency

and consists of three Ministers of the Minister of Foreign Trade and Economic Relations, the Minister of Foreign Affairs, and the Minister of Civil Affairs and Communications, as well as the Bicameral Diet. With the establishment of the Council of Ministers, the Ministries as the common government organs are the Ministry of Foreign Trade and Economic Relations, the Ministry of Foreign Affairs, and the Ministry of Civil Affairs and Communications. Other Ministries are established in the governments of entity level.

## 1-2 Present Social and Economic State

In Bosnia and Herzegovina, main industries received heavy damages by the war and the productivity is said to have decreased to 5 to 10% of that of the pre-war days. According to the report of the World Bank, the GDP of US\$ 8,670 million in 1991 dropped to US\$1,538 million as shown in Table 1-1. In 1995 when the Peace Agreement was concluded and the following 1996, the GDP recovered with the rate of 30 to 50% of the previous year. After 1997, the growth rate of GDP is said to be maintained at about 30% a year. However the scale of the GDP itself has recovered only to about 50% of that of the pre-war days. Both entities are still suffering from high unemployment rate (33% in the Federation and 27% in Srpska, 1997), and national living cannot be said to be good. However, at present, the financial/currency policy is being stabilized and the economic situation is recovering with the increased investments from overseas countries. Thus both entities show the sign of increasing industrial production and the increase of actual wages and dispensable income.

**Table 1-1 : Transition of GDP**

		1991	1994	1995	1996
GDP	million US\$	8,670	1,538	2,105	3,260
GDP per capita	US\$	1,979	357	501	776
Real growth rate	%			33	50

Source : Bosnia and Herzegovina, From Recovery to Sustainable Growth, World Bank, May 1997

## 1-3 Present State of Health Sector

### 1-3-1 Leading Diseases and Causes of Death

The diseases often seen in Bosnia and Herzegovina are respiratory and cardiovascular diseases, which accounted for 32% and 16% respectively in the statistics of 1990. Because the medical statistic operation has not recovered sufficiently after the war, no medical statistics is available on the national basis at present, but the effects of the war and the present state can be summarized as follows.

According to Table 1-2, it can be understood that both the diseases and the causes of death had directly and indirectly affected by the war. People wounded in the war have severely suffered mentally and physically from the mines, bombardment, and/or aerial bombardment, to whom the rehabilitation for their returning to work is significantly necessary. The study of the WHO

in 1994 confirmed that 3,000 to 5,000 people lost their limbs, 750 suffered spinal injuries, 3,000 had injured peripheral nerves, 1,200 had injured cranial bones. The registered number of the injured people are approximately 13,000 in the Federation (as of December 1995). However the number of actually injured is almost 70,000, among which 50,000 are said to be children. The injured people are treated by surgeries, postoperational in-house rehabilitation in the hospital, relief of pain by medicine, installation of artificial limbs, hands, and legs, and the rehabilitation for returning to work on the outpatient basis. In addition, the treatment of mental disorder caused by psychological pressure during the war is needed. Namely, the dissolution of vague anxiety or fear, recovery of the will to work, or improvement of will to participate in social life are very important. Furthermore, due to the poor hygienic conditions during and after the war, the number of infectious diseases increased as well as the manifestation of tularemia carried by rats broke out. However, social infrastructure and hygienic facilities have recovered until now, and the medical facilities have started normal activities even though they do not have sufficient equipment. The vaccination rate has recovered to 50 to 90%. The presently reported infectious diseases include chicken pox, bacterial enterocolitis, scabies, and influenza. However because the medical statistics have not recovered sufficiently, the morbidity in the country cannot be determined yet. One of the infectious diseases from which the effects of the war to the future are anticipated is the viral hepatitis. This is assumed to have been caused by the fact that during the war when the blood transfusion without screening was forced because the priority was given to urgency over safety, and the injured people of relatively large number at that time must have been infected with viral hepatitis.

**Table 1-2 : Leading Diseases and Causes of Death**

	Leading Disease	Cause of Death
1990	① Respiratory diseases (32%) ② Cardiovascular diseases (16%) ③ Diseases of muscle-bone system (10%)	① Circulatory system diseases (50%) ② Neoplasm of digestive system (6%) ③ Neoplasm of respiratory organs (5%)
1991~95	① Acute respiratory infectious ② Hypertension ③ Neurotic disturbances ④ Injuries ⑤ Digestive system diseases	① Circulatory system diseases ② War activities ③ External causes ④ Malignant neoplasm ⑤ Digestive system diseases

### 1-3-2 Medical Service System

Both entities of Bosnia and Herzegovina have the administrative district called "Opstina" covering several thousand people and numbering approximately 80 in the Federation and 50 in Srpska. The Federation gives the administrative functions to a Kanton consisting of several opstinas. However, there is no Kanton in Srpska. The domestic medical facilities can be classified from the standpoints of medical service system and administrative division as shown in Figure 1-2 into the primary medical service of the administrative district level, the secondary

medical service of the Kanton/regional level, and the tertiary medical service of the entity level. The central facilities of the service activities are the Dom Zdravljas of the municipality level, regional hospitals of each Kanton and region, and the clinical centers located in the cities of both entities. These facilities suffered damages by the war, but the buildings have been repaired since during the war. However because the medical equipment has not been properly maintained or the deteriorated one has not been replaced in the course of the independence and the war until now, there is an absolute lack of equipment. The number of medical employees including both the present employees and medical students has fairly dropped because of death or evacuation to overseas countries.

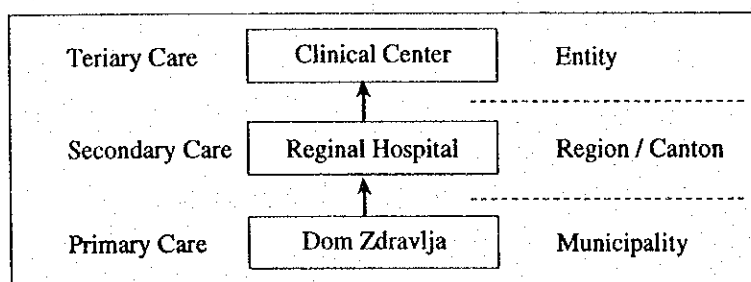


Figure 1-2 : Medical Service System in Bosnia and Herzegovina

### 1-3-3 Health Administration

The Health Administration of Bosnia and Herzegovina is conducted under the responsibilities of both entities based on the Peace Agreement, and each entity has its own Ministry of Health (the Ministry of Health in the Federation and the Ministry of Health and Welfare in Srpska). The organizations of both Ministries of Health are shown in Figure 1-3. The matters related to the improvement of medical facilities and equipment are conducted by the Department for Medical Affairs and Organization of Health System of the Ministry of Health of the Federation and the Department for Health System Reform and Reconstruction of the Ministry of Health and Social Welfare of Srpska.

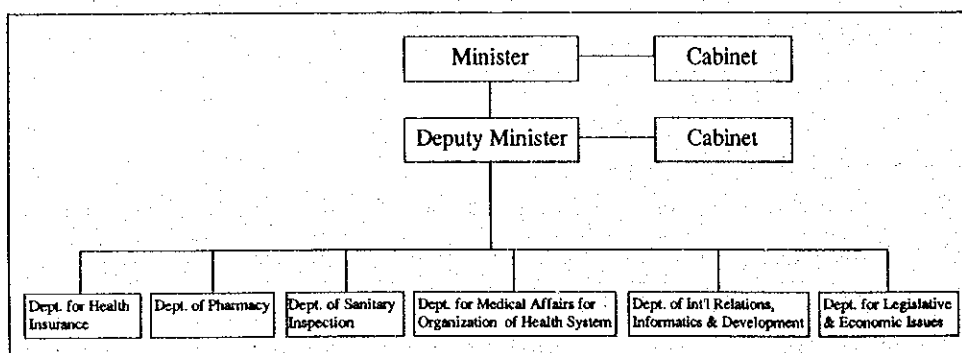


Figure 1-3-1 : Organizations of Ministry of Health of the Federation

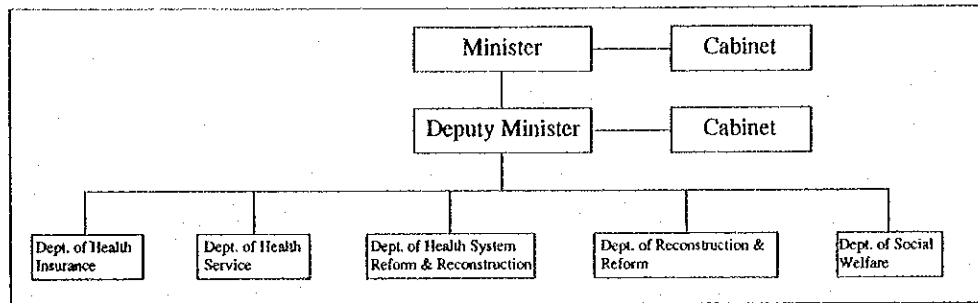


Figure 1-3-2 : Organizations of Ministry of Health and Social Welfare of Srpska

#### 1-3-4 Medical Finance

The health finance of Bosnia and Herzegovina mainly uses the health insurance fund as its financial source, and the income sources of health insurance fund are the insurance premium and the participation by the patients when they receive medical services. Because the unemployment rate is still high at present, the incomes from the health insurance premium and the participation by the patients have not recovered yet, and the health finance is at low level. Since the economical situation is recovering, the incomes for health insurance fund and the medical finance are considered recovering in the long run. However for pursuing the stable supply of better health services, it is important to review the medical financial system from pre-war days and to rebuild the financial system as well as to make the services more efficient.

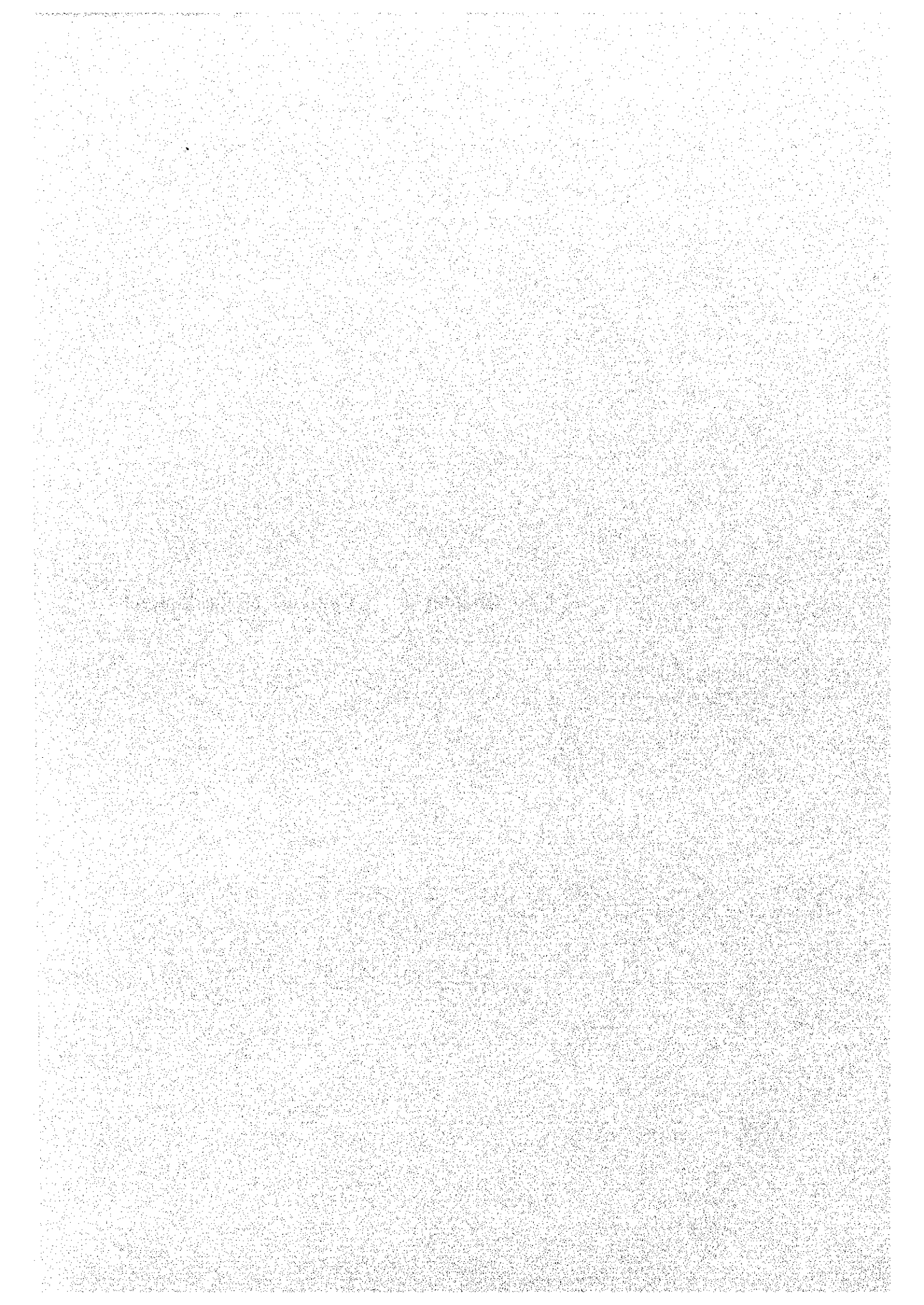
#### 1-4 Request for Japanese Grant Aid

Under the above mentioned circumstances, the Ministries of Health of both entities are actively trying to improve the health service system and also to use the financial sources effectively and efficiently. Especially they are trying to improve the medical service systems which were strongly oriented to hospitals to the ones focusing PHC and putting efforts in realising the effects of preventative medicine and therapeutic activities in more efficient manner. Therefore the reform and reconstruction of PHC is one of their most important policies. Especially, the improvement of the functions of primary medical facilities is urgently needed. The biggest problem of primary medical facilities at present is the lack of proper medical equipment. This is the serious problem common to all regions and facilities in both entities and the improvement or procurement of all items is significantly difficult from the financial standpoint. In this Project, the grant aid cooperation of Japan is requested for procuring the medical equipment as a part of the improvement of the functions of Dom Zdravljas. The original request included one hundred and twenty-one Dom Zdravljas all over the country. The Phase I of this Project covered twenty-seven Dom Zdravljas selected from them was implemented in FY 1997. The present request for the Phase II of the Project includes twenty-five Dom Zdravljas not covered by the Phase I.

**Table 1-3 : Requested Equipment by Recipient Sides**

	Federation of Bosnia and Herzegovina															Republic of Srpska										Total				
	FD-01 Novi Travnik	FD-02 Tuzla	FD-03 Bosanski Petrovac	FD-04 Capljina	FD-05 Tesanj	FD-06 Konjic	FD-07 Ljubski	FD-08 Maglaj	FD-09 Bugojno	FD-10 Neum	FD-11 Novi grad	FD-12 Gracanica	FD-13 Posusje	FD-14 Buzim	FD-15 Ustikolina	Total Fd	RS-01 Novi Grad	RS-02 Bratunac	RS-03 Kozarska Dubica	RS-04 Kainovik	RS-05 Sipovo	RS-06 Ljubinje	RS-07 Ribnik	RS-08 Rudo	RS-09 Kostajnica		RS-10 Sekovici	Total RS		
RTG apparatus	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	1	1	1	1	1	1	1	1	1	1	1	1	10	25
Film X-ray developing machine		1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	1	1	1	1	1	1	1	1	1	1	1	1	10	24
Ultrasound	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	1	1	1	1	1	1	1	1	1	1	1	1	9	24
Spirometer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	14														14
ECG	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	1	1	1	1	1	1	1	1	1	1	1	1	10	25
Biochemistry analyzer	1	1		1	1	1	1	1	1		1		1		10														10	
Spectrophotometer			1							1		1		1	1	5		1	1	1	1	1	1	1	1	1	1	1	9	14
Bloodcell counter	1	1	1	1	1	1		1	1	1	1	1		1	1	13	1	1		1	1	1	1	1	1	1	1	1	9	22
Microscope	1	1	1	1	1	1		1	1	1	1	1	1	1	1	14	2	2	2	1	1	2	1	1	1	1	2	15	29	
Centrifuge	1	1	1	1	1	1		1	1	1	1	1	1	1	1	14		2	2	1	1	2	1	1	1	1	2	13	27	
Sterilizer		1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	2	2	2	1	1	2	1	1	1	1	1	1	14	28
Balance			1	1	1	1	1	1	1	1	1			1	1	11	1	1	1	1	1	1	1	1	1	1	1	1	10	21
Distilator	1		1	1	1	1	1	1	1	1	1	1	1	1	1	14	1	1	1	1	1	1	1	1	1	1	1	1	10	24
Washing machine for lab. glassware	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15														15
Ambulance vehicle	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	1	1	1	1	1	1	1	1	1	1	1	1	10	25
Defibrillator		1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	1	1	1	1	1	1	1	1	1	1	1	1	10	24
Reanimation set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	1	1	1	1	1	1	1	1	1	1	1	1	10	25
Laryngoscope	1	1	1	1	1	1	1	1		1	1	1	1	1	1	14	1	1	1	1	1	1	1	1	1	1	1	1	10	24
Aspirator	1		1	1	1	1	1	1	1	1			1	1	1	13	1	1	1	1	1	1	1	1	1	1	1	1	10	23
Computer																	2	2	2	1	1	1	1	1	1	1	1	1	13	13

## **Chapter 2    Contents of the Project**





## **Chapter 2 Contents of the Project**

### **2-1 Objectives of the Project**

The Ministries of Health of both entities of Bosnia and Herzegovina are actively trying to improve the health service system and make the effective and efficient use of financial sources. Especially they give large priority to the reform and reconstruction of PHC. In the reform and reconstruction plan of PHC, they attach importance to the improvement of the functions of primary medical facilities and the introduction of the Family Medicine Component. However the primary medical facilities, which are the places to conduct PHC services, are the bases for providing the diagnostic activities to introduce the Family Medicine Component. Therefore the improvement of the functions of primary medical facilities requires extreme urgency. The biggest problem at the primary medical facilities at present is the lack of proper medical equipment. Improvement and procurement of these items impose significant financial burden to the Ministries of Health of both entities. Under the above-mentioned background, the grant aid cooperation of Japan is requested for to procure the medical equipment to Dom Zdravljas. Among the one hundred twenty-one Dom Zdravljas throughout the country that originally requested the provision of equipment, twenty-seven Dom Zdravljas were selected in the Phase I of this Project which was implemented in FY1997. Improvement of similar medical equipment for the other twenty-five Dom Zdravljas was requested as the Phase II of this Project.

Because of the importance of PHC in the health plans of both entities of Bosnia and Herzegovina, the significance of implementing this Project to support the self-effort by both Ministries of Health is very large. In addition, the improvement of PHC, which is directly connected to the nation's living, has a large effect on stabilizing the public welfare.

Based on the above-mentioned situation, the followings are the objectives of this Project.

Project objectives:

1. Improvement of the diagnostic functions (diagnostic imaging, physiological examination, and laboratory examination) at Dom Zdravljas
2. Securing of emergency medical functions (acceptance of emergency patients, emergency transportation of patients to upper level facilities) at municipalities

### **2-2 Basic Concept of the Project**

The outline of the medical services in Bosnia and Herzegovina is shown in Figure 2-1. This Project has the objective to improve the diagnostic and emergency functions of Dom Zdravljas, from which the improvement of diagnostic activities at the primary level in the municipalities where Dom Zdravljas are located is expected.

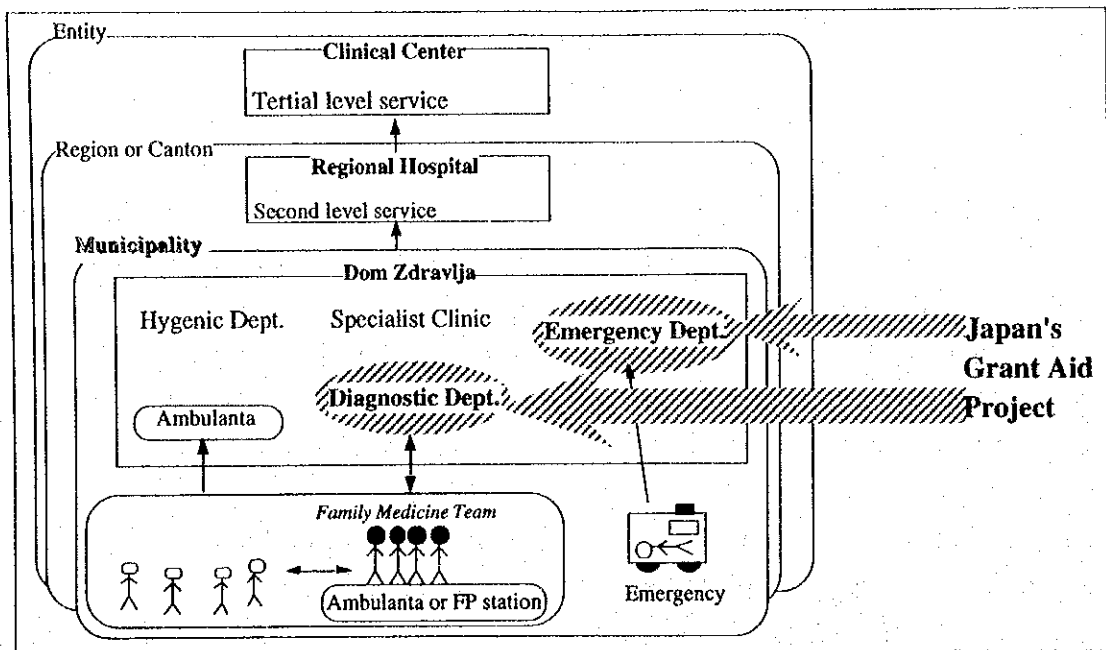


Figure 2-1 : Medical Service System of BiH and Objectives of the Project

## 2-3 Basic Design

### 2-3-1 Design Concept

#### (1) Grade and Specification of Equipment

In the First Phase of this Project, the equipment was selected in accordance with the concept that the equipment must be appropriate for the functions, activity scale, personnel system, and technical level of each Dom Zdravlja. Especially with regard to the equipment which required consumables, examination was made to suppress the burden on the financial ability of Dom Zdravlja to the minimum as to the type, the grade and the specifications of the equipment. Based on the results of the First Phase, the equipment plan will be prepared in accordance with the similar concept for the Second Phase of this Project.

#### (2) Procurement from Third Countries

Just like in the First Phase, products made in third countries can be included in the determination process so that the supplier can be selected on a fair and optimal basis, in case a comparison of plurality of products is difficult.

#### (3) Consideration of Local Agents

As for the equipment requiring the technical services of manufacturer(s) and/or agent(s), the equipment of the manufacturers whose agents are located in BiH or their neighbouring cities (Zagreb of Croatia, Beograd of Yugoslavia, or Vienna of Austria) will be procured.

#### **(4) Work Schedule**

If this Project is implemented, the Project period from the conclusion of the Exchange of Notes by both governments to the completion will be approximately twelve months. However, the effects of snowfalls during the winter must be sufficiently taken into consideration. From the entire schedule of this Project, it is unavoidable that the installation of equipment will be in winter. From the experience of the Phase I of this Project, the transportation of equipment to each site is strongly desired to be completed before snow starts to fall. It is necessary to try to proceed each process without delay after the conclusion of the Exchange of Notes until the selection of equipment suppliers.

### **2-3-2 Basic Design**

#### **(1) Project Sites**

This Project covers the following twenty-five Dom Zdravljas.

##### **Federation**

FD-01 Novi Travnik  
FD-02 Tuzla  
FD-03 Bosanski Petrovac  
FD-04 Capljina  
FD-05 Tesanj  
FD-06 Konjic  
FD-07 Ljubuski  
FD-08 Maglaj  
FD-09 Bugojino  
FD-10 Neum  
FD-11 Novi Grad  
FD-12 Gracanica  
FD-13 Posusje  
FD-14 Buzim  
FD-15 Ustikolina

##### **Srpska**

RS-01 Novi Grad  
RS-02 Brautonac  
RS-03 Kozarska Dubica  
RS-04 Kalinovik  
RS-05 Sipovo  
RS-06 Ljubinje  
RS-07 Ribnik  
RS-08 Rudo  
RS-09 Kostanjica  
RS-10 Sekovici

As a result of the site study, it is recognized that the twenty-five sites to be covered by this Project have basic medical service activities; department of internal medicine, pediatrics and obstetrics and gynecology. From the standpoints of the personnel system of diagnostic departments, facility condition and medical activities of these sites, improvement of diagnostic function and examination activities are considered sufficiently possible by solving the problems caused by the deterioration and lack of equipment.

#### **(2) Equipment to be Included**

This project improves the equipment used for diagnostic imaging, physiological examination, laboratory examination, emergency service, and so on in the same manner as the First Phase of this Project. The categories related to this Project and the equipment items are shown below.

**Table 2-1 : Use of Equipment in this Project**

Project Objectives	Category	Equipment	Purpose
Diagnostic function	Imaging diagnosis	RTG apparatus	general x-ray : chest, borne fluoroscopy : internal disease
		Film x-ray developing machine	processing of x-ray film
		Ultrasound	diagnosis for OBGY, internal medicine
	Physiological examination	Spirometer	general examination, respiratory disease
		ECG	examination of heart function
	Laboratory testing	Biochemistry analyzer	blood or urine test for kidney, liver etc.
		Spectrophotometer	blood or urine test for kidney, liver etc. (for less number of testing)
		Blood cell counter	blood testing
		Microscope	examination for anaemia, virus diseases
		Centrifuge	separating of testing sample
		Sterilizer	sterilizing of laboratory instruments
		Balance	preparation of reagents
		Distiller	washing instruments, mixing reagents
Emergency Service	Washing machine for lab glassware	washing of glassware instruments	
	Ambulance vehicle	transportation of patients	
	Defibrillator	resuscitating of heart stop	
	Reanimation set	resuscitating of emergent patient	
	Laryngoscope	Insertion of endoracheal tube	
Medical statistics	Aspirator	suction of sputum or blood of patient	
	Computer	processing of medical statistics	

The Equipment Plan of each site is made to ensure the sufficient effects of the said equipment procured by the grant aid. Decisions were made based on the current activities or the expected activities. Detail contents of the equipment plan are explained in the following sections.

### 2-3-3 Equipment Plan

#### (1) Diagnostic Imaging [RTG apparatus, Film X-ray developing machine, Ultrasound]

##### \* RTG apparatus, Film X-ray developing machine

The radiography is an most important in the diagnostic functions of Dom Zdravljas. However most of the equipment is significantly deteriorated, causing sever problems. From this fact, the RTG apparatus is the most important item in the request and all the sites requested it. Film developing machines are requested from all sites excluding FD-01 Novi Travnik of the Federation. The current conditions of RTG apparatus and film developing machines at twenty-five Dom Zdravljas are shown in Table 2-2. All the existing RTG-related items were purchased in the former Yugoslavia age, and none can operate perfectly. Since these facilities are taking radiography with partial functions, the radiographs have very poor precision, and there is a fear on the amount of irradiation.

**Table 2-2: Present State of RTG Related Activities**

related activities : internal / pediatric / OBGY / PFD / emergency with ●=full-time specialist, ○=part-time specialist, ○= full-time staff  
 existing equipment :○=normal, △=bad condition, ×=out of operation  
 RTG staff :●=full-time radiologist, ○=part-time radiologist, ○=full-time radiographer

	municipal population	daily patients	total doctors	related services	existing equipment description	age	condition	RTG testing	RTG staff	participation
FD-01 N. Travnik	34,000	600	11	●●●●○	f. /g. x-ray fluoroscopy developing machine	24 1	△ × ○	15-20/day	○	5DM
FD-02 Tuzla	160,000	3,000	103	●●●●●	fluoroscopy, general developing machine	10 5	×△ △	50-60/day	●○	5DM
FD-03 Petrovac	7,600	100	9	○●●●●	fluoroscopy, general developing machine	25 20	×△ △	(30/day)	○	10DM
FD-04 Capljina	29,000	200	20	○●●●○	fluoroscopy general x-ray developing machine	24 24,46 0.3	△ △,△ ○	5-10/day 50/day	●○	3DM
FD-05 Tesanj	66,000	500	25	●●●●●	fluoroscopy, general mirror camera	10 10	△ △	(35-40/day)	○	F.-20DM G.-5DM
FD-06 Konjic	40,000	250	11	●●●●○	fluoroscopy, general mirror camera developing machine	12 23 15	△ △ △	F. 15/day G. 50-60/day	○	G.-3DM
FD-07 Ljubski	30,000	320	16	●●●●○	fluoroscopy general x-ray developing machine	20 20	× △ △	45/day	○	G.-3DM
FD-08 Maglaj	30,000	400	28	●●●●○	fluoroscopy general x-ray	12 12	× △	30/day	○	G.-5DM
FD-09 Bugojno	50,000	800	39	●●●●●	fluoroscopy general x-ray developing machine	15 15 25	△ △ △	20/day 80/day	●○	3DM
FD-10 Neum	5,000	100	5	-○●-●	fluoroscopy	25	×	(100/day)	-	
FD-11 N. grad	12,000	110	72	●●-●○	fluoroscopy, general mirror camera developing machine	20 25 0.5	△, × △ △	10-15/day 100/day	○	8DM
FD-12 Gracanica	60,000	860	30	●●●●●	fluoroscopy, general developing machine	20 20	×, △ old ×	60/day	●○	5DM
FD-13 Posusje	17,000	30	17	●●●●○	fluoroscopy general x-ray developing machine	20 20 10	△ △ △	20/w 30-40/day	○	5.5DM
FD-14 Buzim	20,000	70	11	●●●●○	-	-	-	(20-25/day)	○	
FD-15 Ustikolina	5,000	30	5	●●●●○	-	-	-	-	-	
RS-01 N. Grad	50,000	700	22	●●●●●	fluoroscopy, general mirror camera developing machine	12 10 10	△ ○ ×	2/day, 12/day 20/day	●○	2.5Din
RS-02 Bratunac	27,000	300	18	○●●●○	fluoroscopy general x-ray	13 13	△ △	4/day 30/day	○	2.5Din
RS-03 K. Dubica	30,000	500	14	●●●●○	fluoroscopy, general developing machine	12 12	△× △	4/day, 28/day	○	G.-2.5Din F.-70Din
RS-04 Kalinovik	5,000	14	5	○●●○	fluoroscopy	20	×	-	-	
RS-05 Sipovo	13,000	400	12	●●●○	mobile	20	△	10/day	●○	G.-15Din
RS-06 Ljubinje	5,000	70	10	●●○	fluoroscopy, general	20	×, △	5/day	○	
RS-07 Ribnik	15,000	100	10	●●○	-	-	-	-	●○	
RS-08 Rudo	12,000	200	8	○●●○	fluoroscopy general x-ray	20 20	△ △	15/day	○	G.-10Din
RS-09 Kostanjica	8,500	200	17	○●●○	fluoroscopy/general	20	△	20/m	○	
RS-10 Sekovici	10,000	60	8	○●○	fluoroscopy, general developing machine	12 12	×, △ △	15/day	○	1.5DM

Among the twenty-five sites, five Dom Zdravljas, namely, FD-10 Neum, FD-14 Buzim, FD-15 Ustikolina, RS-04 Kalinovik, and RS-07 Ribnik, do not have any operating RTG apparatus at present. Radiography is mainly conducted at the other Dom Zdravljas or the upper referral hospitals.

**Ribnik** The radiologist of Ribnik Dom Zdravlja stays in the Dom Zdravlja of neighbouring municipality and patients from Ribnik receive radiography there. Because the X-ray

room is prepared in the recently renewed building, if the apparatus is procured, they can conduct radiography in their own Dom Zdravlja. The burden to Dom Zdravlja and the patients visiting the neighbouring Dom Zdravlja will be reduced.

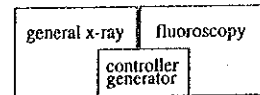
- Neum Because the existing RTG apparatus is completely out of use, no radiography is taken at present. However, in order to resume the radiographic activity, the Ministry of Health of the Kanton will assign a radiographer in the Kanton to Neum Dom Zdravlja when this Project is implemented.
- Buzim Being a newly opened Dom Zdravlja after the Peace Agreement, it has never conducted radiography yet. But the demand for the diagnosis by radiography is high as new tuberculosis patients are reported. Thus they constructed an x-ray room in the building of Dom Zdravlja remodelled in 1998 and employed a local radiographer, so that they are well prepared to conduct radiography now.
- Ustikolina Dom Zdravlja is new and its activity scale is small. The introduction of RTG apparatus will impose too much burden to this Dom Zdravlja. Referring patients to the regional hospital for radiography, as it is, is considered appropriate at present.
- Kalinovik The radiography has been stopped since their RTG apparatus became out of use. Furthermore, the number of full-time doctors is insufficient, and the medical activity itself is unstable. A full-time GP has been assigned in 1998. The specialization of said GP is expected and another GP will be supplemented, however, resuming of radiography will cause too much burden yet. Thus transferring to the upper referral hospital is determined appropriate.

From the above mentioned reasons, the RTG apparatuses and the film developing machines will be planned for the sites, which need the replacement of the too old apparatus, or ones which are determined to be able to resume or start the sufficient radiography because of the personnel system, facility conditions and activity scale. FD-15 Ustikolina and RS-04 Kalinovik will be excluded.

The configuration of RTG apparatus will be basically same as that in the Phase I of this Project in which the general x-ray and the fluoroscopy will be combined. The preparation work prior to the installation of the equipment such as the removal of the existing equipment and the expansion of door width will be borne by the recipient sides. With regard to this Project, because the twenty-three sites where the RTG apparatuses are planned have more different layouts of X-ray rooms from each others than those of the sites of the Phase I, the following four types of item configuration will be designed in order to reduce their preparation work as much as possible.

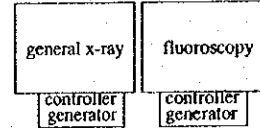
**- Type-A (general x-ray + fluoroscopy + controller / generator)**

For the sites where the preparation work by the recipient sides would be the similar contents done by each Dom Zdravlja in the Phase I; removing existing equipment, expanding door width, clearing obstacles and so on, the configuration shall be same as that of the Phase I.



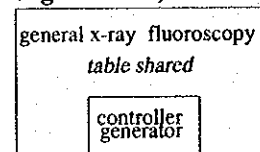
**- Type-B (general x-ray + controller / generator, fluoroscopy + controller / generator)**

For the sites where the present layout consists of separate x-ray room and operation room for the general x-ray and the fluoroscopy, the configuration of equipment shall include separate high voltage generator for general x-ray and fluoroscopy respectively.



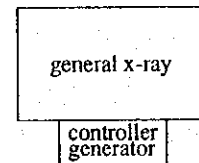
**- Type-C (general x-ray and fluoroscopy sharing the table + controller / generator)**

For the sites where the present x-ray room is too small for Type-A and the expansion of the room is considered too difficult from the standpoint of the building structure such as to remove the neighbouring wall, the table shall be shared by the general x-ray and the fluoroscopy.



**- Type-D (general x-ray + controller / generator)**

For the sites which do not conduct radiography within the Dom Zdravlja, although the personnel system and facility conditions are sufficient, the radiography function shall include only general x-ray to reduce the operational burden, and the fluoroscopic function shall be excluded.



The planned number of RTG apparatuses and the equipment configuration, and the planned number of film developing machines are shown below.

**Table 2-3: Planned Number of RTG apparatuses and Configuration for Each Site**

	Request	Plan	Configuration
FD-01 Novi Travnik	1	1	A type
FD-02 Tuzla	1	1	B type
FD-03 B. Petrovac	1	1	A type
FD-04 Capljina	1	1	A type
FD-05 Tesanj	1	1	A type
FD-06 Konjic	1	1	B type
FD-07 Ljubski	1	1	A type
FD-08 Maglaj	1	1	A type
FD-09 Bugojno	1	1	B type
FD-10 Neum	1	1	D type
FD-11 Novi grad	1	1	A type
FD-12 Gracanica	1	1	A type
FD-13 Posusje	1	1	A type
FD-14 Buzim	1	1	D type
FD-15 Ustikolina	1		Excluded
<b>Total FD</b>	<b>15</b>	<b>14</b>	

	Request	Plan	Configuration
RS-01 Novi Grad	1	1	A type
RS-02 Bratunac	1	1	A type
RS-03 K. Dubica	1	1	A type
RS-04 Kalinovik	1		Excluded
RS-05 Sipovo	1	1	A type
RS-06 Ljubinje	1	1	C type
RS-07 Ribnik	1	1	D type
RS-08 Rudo	1	1	C type
RS-09 Kostanjica	1	1	C type
RS-10 Sekovici	1	1	A type
<b>Total RS</b>	<b>10</b>	<b>9</b>	

<b>Total</b>	<b>25</b>	<b>23</b>
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Configuration A : general x-ray, fluoroscopy, controller/generator 14 (the Federation 9, Srpska 5)  
 B : general x-ray + controller/generator, fluoroscopy + controller/generator 3 (the Federation 3, Srpska 0)  
 C : general x-ray and fluoroscopy sharing table, controller/generator 3 (the Federation 0, Srpska 3)  
 D : general x-ray, controller/generator 3 (the Federation 2, Srpska 1)  
**Total 23 (the Federation 14, Srpska 9)**

**Table 2-4: Planned Number of Film X-ray Developing Machines**

	Request	Plan	Remarks
FD-01 N. Travnik			
FD-02 Tuzla	1	1	
FD-03 B. Petrovac	1	1	
FD-04 Capljina	1	0	New one existing
FD-05 Tesanj	1	1	
FD-06 Konjic	1	1	
FD-07 Ljubski	1	1	
FD-08 Maglaj	1	1	
FD-09 Bugojno	1	1	
FD-10 Neum	1	1	
FD-11 N. grad	1	0	New one existing
FD-12 Gracanica	1	1	
FD-13 Posusje	1	1	
FD-14 Buzim	1	1	
FD-15 Ustikolina	1	0	Excluded
<b>Total FD</b>	<b>14</b>	<b>11</b>	

	Request	Plan	Remarks
RS-01 N. Grad	1	1	
RS-02 Bratunac	1	1	
RS-03 K. Dubica	1	1	
RS-04 Kalinovik	1	0	New one existing
RS-05 Sipovo	1	1	
RS-06 Ljubinje	1	1	
RS-07 Ribnik	1	1	
RS-08 Rudo	1	1	
RS-09 Kostanjica	1	1	
RS-10 Sekovici	1	1	
<b>Total RS</b>	<b>10</b>	<b>9</b>	

<b>Total</b>	<b>24</b>	<b>20</b>
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**\* Ultrasound**

One each ultrasound was requested by the twenty-four sites. The present states of the requested equipment and the diagnostic activities using ultrasound at all sites are shown in Table 2-5. Some sites have ultrasounds and some do not have any, but both types of sites have the demand for ultrasound from the obstetrics and gynecology, internal medicine, and pediatrics departments, and they have specialists in charge of diagnosis. However, in most of the sites having the ultrasound, many of the existing ultrasounds are second hand or being used for more than ten years. Therefore, they are doing examination works somehow or other but they often face troubles. In FD-01 Novi Travnik, FD-12 Gracanica, and FD-13 Posusje, the existing ultrasounds are significantly deteriorated and cannot conduct any examination. The sites having no equipment are not significantly different from those having one in terms of the diagnostic activities related to obstetrics and gynecology, internal medicine, and pediatrics as well as on the specialities of the doctors. If new equipment can be procured, it will be sufficiently used for the examination.

**Table 2-5: Present State of Ultrasounds Related Activities**

related activities; doctors : internal / pediatric / obgy / PFD / emergency with ●=full-time specialist, ○=part-time specialist  
tests : numbers in () shows expected number of tests after a new apparatus is procured

**A) Dom Zdravljas with ultrasound apparatus**

	pop.	patients per day	doctors total	existing equipment			related activities			participation
				q'ty	age	condition	doctor	service	tests	
FD-01 Novi Travnik	34,000	600	11	1	15	out of order	●●○	mainly OBGY	(20/day)	
FD-03 Bosanski Petrovac	7,600	100	9	1	10	probe in bad condition	○●●	OBGY	3-4/day	2
FD-04 Capljina	29,000	200	20	1	12	bad condition	○●●		25/day	free
FD-05 Tesanj	66,000	500	25	1	10	bad condition	●●●	OBGY, internal	10-15/day	
FD-06 Konjic	40,000	250	11	2	20	bad condition	●●●	OBGY, internal	20/day	3-10
FD-07 Ljubski	30,000	320	16	1	7	bad condition	●●●	OBGY	25-30/day	8
FD-08 Maglaj	30,000	400	28	1	14	printer in bad condition	●●●	OBGY, internal	15-20/day	10
FD-09 Bugojno	50,000	800	39	1	9	bad condition	●●●	OBGY, internal	100/week	10
FD-10 Neum	5,000	100	5	1	15	monitor in bad condition	-○○	OBGY	10/week	free
FD-12 Gracanica	60,000	860	30	1	16	out of order	●●●	internal, pediatrics, OBGY	(40/day)	2
FD-13 Posusje	17,000	30	17	2	30	out of order	●●○	OBGY	(10/day)	
FD-14 Buzim	20,000	70	11	1	3	bad condition	●●○	OBGY	25-50/day	10
RS-01 Novi Grad	50,000	700	22	3	10	probe in bad condition	●●●	OBGY	30/day	
RS-02 Bratunac	27,000	300	18	1	14	over heated often	●●●	OBGY	10-15/day	5
RS-03 Kozarska Dubica	30,000	500	14	1	9	probe in bad condition	●●●	OBGY	15/day	10
RS-10 Sekovici	10,000	60	8	1	13	probe insufficient	○○○	OBGY	35/week	5



**B) Dom Zdravljas without ultrasound apparatus**

	pop.	patients per day	doctors total	existing equipment			doctor	related activities service	tests	participation
				qty	age	condition				
FD-02 Tuzla	160,000	3,000	103	-	-	-	●●●	esp. OBGY	(20/day)	
FD-11 Novi grad	12,000	110	72	-	-	-	●●-	(internal, pediatrics)		
FD-15 Ustikolina	5,000	30	5	-	-	-	●○○	(OBGY, internal, pediatrics)		
RS-04 Kalinovik	5,000	14	5	-	-	-	○○○			
RS-05 Sipovo	13,000	400	12	-	-	-	●●○	esp. OBGY	(5~10/day)	
RS-06 Ljubinje	5,000	70	10	-	-	-	●●○	(OBGY, internal, pediatrics)		
RS-07 Ribnik	15,000	100	10	-	-	-	●●○	esp. OBGY. SP being added	(15/day)	
RS-08 Rudo	12,000	200	8	-	-	-	○○○	(OBGY, internal)		
RS-09 Kostanjica	8,500	200	17	-	-	-	○○○	(OBGY, internal)		

From what mentioned above, it is determined that in the twenty-four sites that requested the ultrasounds, although the quantitative examination demand may differ from the reasons of population or activity scale, if the proper ultrasound is procured by this Project, the improvement of diagnostic functions and the related medical services by this equipment will be sufficiently possible. Therefore, one each ultrasound shall be procured to each Dom Zdravlja.

**Table 2-6: Planned Number of Ultrasounds**

	request	plan	remarks
FD-01 Novi Travnik	1	1	
FD-02 Tuzla	1	1	
FD-03 B. Petrovac	1	1	
FD-04 Capljina	1	1	
FD-05 Tesanj	1	1	
FD-06 Konjic	1	1	
FD-07 Ljubski	1	1	
FD-08 Maglaj	1	1	
FD-09 Bugojno	1	1	
FD-10 Neum	1	1	
FD-11 Novi grad	1	1	
FD-12 Gracanica	1	1	
FD-13 Posusje	1	1	
FD-14 Buzim	1	1	
FD-15 Ustikolina	1	1	
<b>Total FD</b>	<b>14</b>	<b>14</b>	

	request	plan	remarks
RS-01 Novi Grad	1	1	
RS-02 Bratunac	1	1	
RS-03 K. Dubica	1	1	
RS-04 Kalinovik	1	1	
RS-05 Sipovo			
RS-06 Ljubinje	1	1	
RS-07 Ribnik	1	1	
RS-08 Rudo	1	1	
RS-09 Kostanjica	1	1	
RS-10 Sekovici	1	1	
<b>Total RS</b>	<b>9</b>	<b>9</b>	

<b>Total</b>	<b>23</b>	<b>22</b>	
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**(2) Physiological Examination [ Spirometer, ECG]**

**\* Spirometer**

One each spirometer is requested by each of the fourteen sites of the Federation. In the Federation, when people are employed, they must take the tests of pulmonary functions. Thus the spirometer is one of the basic equipment for Dom Zdravlja in the federation. However, the present spirometers in Dom Zdravljas are extremely old and often cause troubles. In addition, some sites do not have any spirometer, or their spirometers were damaged or discarded already.

**Table 2-7: Present State of Spirometers and Examination of Pulmonary Functions**

**A) Dom Zdravlyas with spirometer**

	pop.	patients per day	existing equipment			related service activities		
			qty	age	condition	testing	doctors	service
FD-02 Tuzla	160,000	3,000	1	8	bad	40-50/day	pneumophysiologist	tuberculosis protection
FD-04 Capljina	29,000	200	1	20	out of order	(10-15/day)	(pneumophysiologist)	ditto
FD-05 Tesanj	66,000	500	1	1	normal	25/day	pneumophysiologist	ditto
FD-08 Maglaj	30,000	400	1	9	bad	10-15/day	internist	work medicine
FD-11 Novi grad	12,000	110	1	15	bad	15-20/day	pneumophysiologist	tuberculosis protection
FD-12 Gracanica	60,000	860	1				ditto	ditto

(part-time specialist)

**B) Dom Zdravlyas without spirometer**

	pop.	patients per day	existing equipment			related service activities		
			qty	age	condition	testing	doctors	service
FD-01 Novi Travnik	34,000	600	-			(5-10/day)	pneumophysiologist	tuberculosis protection
FD-03 Bosanski Petrovac	7,600	100	-			(10-15/day)	(internist)	work medicine
FD-06 Konjic	40,000	250	-				pneumophysiologist	tuberculosis protection
FD-07 Ljubski	30,000	320	-			(10-15/day)	ditto	ditto
FD-09 Bugojno	50,000	800	-			(15-20/day)	ditto	ditto
FD-10 Neum	5,000	100	-			(2-3/day)	(general medicine)	general medicine
FD-13 Posusje	17,000	30	-				(pneumophysiologist)	ditto
FD-14 Buzim	20,000	70	-			(5-10/day)	(pneumophysiologist)	ditto
FD-15 Ustikolina	5,000	30	-			(150/year)	(internist)	pediatrics, internal

(part-time specialist)

From the standpoint of service activities, examination of pulmonary functions can be implemented by the work medicine, tuberculosis protection, internal medicine or pediatric department. In the Dom Zdravljias having spirometers, examinations of pulmonary functions are implemented by the respiratory specialists or the physicians specialized in internal medicine at present. At the sites which do not have spirometers, the state of the physicians and/or departments in charge of examination are not much different. Therefore, the number of spirometers to be procured in this Project is determined one for each site excluding FD-05 Tesanj that has a new equipment and FD-12 Gracanica that did not request it.

**Table 2-8: Planned Number of Spirometers**

	request	plan	remarks
FD-01 Novi Travnik	1	1	
FD-02 Tuzla	1	1	
FD-03 B. Petrovac	1	1	
FD-04 Capljina	1	1	
FD-05 Tesanj	1	0	New One Existing
FD-06 Konjic	1	1	
FD-07 Ljubski	1	1	
FD-08 Maglaj	1	1	
FD-09 Bugojno	1	1	
FD-10 Neum	1	1	
FD-11 Novi grad	1	1	
FD-12 Gracanica			
FD-13 Posusje	1	1	
FD-14 Buzim	1	1	
FD-15 Ustikolina	1	1	
Total FD	14	13	

**\* ECG**

Each of the twenty-five sites requested one each of electrocardiograph (ECG). In Dom Zdravljias, ECGs are operated by nurses or GPs. The departments that need the ECG examination include

the internal medicine related services (Internal Medicine, Work Medicine, and General Practitioner), the pediatric medical services (Pre-School Medicine and School Medicine), and the emergency medical services. The present situations at these sites are shown in Table 2-9.

**Table 2-9: Present State of ECG Related Activities**

existing equipment; condition : ○=normal, △=bad, ×=out of operation

related service activities : ●=full-time specialist, ◐=part-time specialist, ○=full-time technician

**A) Dom Zdravljas with ECG**

	pop	patient per day	existing equipment			related service activities			
			age condition	age condition	age condition	testing	internal	pediatrics	emergency
FD-01 Novi Travnik	34,000	600	2 ○	15 ×		10/day	●	●	○
FD-02 Tuzla	160,000	3,000	1 ○	8 △	8 △	50/day	●	●	●
FD-03 Bosanski Petrovac	7,600	100	1 ○				●	●	●
FD-05 Tesanj	66,000	500	1 ○			25/day	●	●	●
FD-08 Maglaj	30,000	400	1 ○	15 △	15 △	10/day	●	●	○
FD-10 Neum	5,000	100	2 ○				○	○	●
FD-11 Novi grad	12,000	110	1 ○			20/day	●	○	○
FD-12 Gracanica	60,000	860	3 ○	10 ×		90/day	●	●	●
FD-14 Buzim	20,000	70	2 ○			4/day	●	○	○
RS-01 Novi Grad	50,000	700	1 ○			30/day	●	●	○
RS-06 Ljubinje	5,000	70	2 ○			10/day	●	●	○
RS-07 Ribnik	15,000	100	1 ○			20/day	○	●	○
RS-09 Kostanjica	8,500	200	1 ○	10 △		30/day	●	○	●

**B) Dom Zdravljas with over 10 years ECG only**

	pop	patient per day	existing equipment			related service activities			
			age condition	age condition	age condition	testing	internal	pediatrics	emergency
FD-04 Capljina	29,000	200	12 △	22 △		70/day	●	●	○
FD-06 Konjic	40,000	250	10 △			25/day	●	●	○
FD-07 Ljubski	30,000	320	10 △			25/day	●	●	○
FD-13 Posusje	17,000	30	15 △			30/day	●	●	○
RS-02 Bratunac	27,000	300	20 △			20/day	●	●	○
RS-03 Kozarska Dubica	30,000	500	15 △			20/day	●	●	○
RS-04 Kalinovik	5,000	14	20 △			17/day	○	○	○
RS-05 Sipovo	13,000	400	15 △			10/day	●	●	○
RS-08 Rudo	12,000	200	10 △			20/day	●	○	○

**C) Dom Zdravljas without ECG**

	pop	patient per day	existing equipment			related service activities			
			age condition	age condition	age condition	testing	internal	pediatrics	emergency
FD-09 Bugojno	50,000	800				(100/day)	●	●	●
FD-15 Ustikolina	5,000	30					●	○	○
RS-10 Sekovici	10,000	60				(4-5/day)	●	●	○

FD-09 Bugojno, FD-15 Ustikolina, and RS-10 Sekovici have no ECG at present but are considered to be able to conduct proper examinations if proper ECGs are procured. Some sites have new ECGs procured within the last three years, but many of them have very old ECGs only. Although the ECGs of more than ten years old are operable, the precision of examination is doubtful. Thus the replacement of these ECGs is strongly desired.

From what mentioned above, one each ECG shall be procured to the sites having no normally operating ECG of ten years old or more. The sites having normally operating ECG of less than ten years old shall be excluded.

**Table 2-10: Planned Number of ECGs**

	request	plan	remarks
FD-01 Novi Travnik	1	0	New one existing
FD-02 Tuzla	1	0	ditto
FD-03 B. Petrovac	1	0	ditto
FD-04 Capljina	1	1	
FD-05 Tesanj	1	0	New one existing
FD-06 Konjic	1	1	
FD-07 Ljubski	1	1	
FD-08 Maglaj	1	0	New one existing
FD-09 Bugojno	1	1	
FD-10 Neum	1	0	New one existing
FD-11 Novi grad	1	0	ditto
FD-12 Gracanica	1	0	ditto
FD-13 Posusje	1	1	
FD-14 Buzim	1	0	New one existing
FD-15 Ustikolina	1	1	
Total FD	15	6	

	request	plan	remarks
RS-01 Novi Grad	1	0	New one existing
RS-02 Bratunac	1	1	
RS-03 K. Dubica	1	1	
RS-04 Kalinovik	1	1	
RS-05 Sipovo	1	1	
RS-06 Ljubinje	1	0	New one existing
RS-07 Ribnik	1	0	ditto
RS-08 Rudo	1	1	
RS-09 Kostanjica	1	0	New one existing
RS-10 Sekovici	1	1	
Total RS	10	6	

Total	25	12	
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**(3) Laboratory Examination [Biochemistry analyzer, spectrophotometer, blood cell counter, microscope, centrifuge, sterilizer, balance, distillator, and washing machine for laboratory glassware]**

All the items requested in this Project are basic equipment for the clinical examination, and the present states of the examination activities of Dom Zdravljas are shown in Table 2-11. The number of actual examinations done differ for each Dom Zdravlja. As a general tendency, the Dom Zdravljas having a large number of patients in a day and a large number of specialists naturally conduct a large number of examinations, and the Dom Zdravljas having small number of patients conduct small number of examinations. However among the Dom Zdravljas having almost same number of patients, the number of actual examinations differ depending on whether they have basic examination equipment or whether they do most of examination manually. In other words, the number of actual examinations done in Dom Zdravlja can be said to depend on two aspects: demand for the examination (number of patients in the entire Dom Zdravlja, contents of medical services, and the number and the specialities of full-time doctors) and the capacity of the examination room (number of clinical technicians and whether the examination is done manually or by equipment)

With regard to the laboratory examination equipment requested in this Project, the present states of the equipment actually used at present are shown in Table 2-12. Some items are relatively new, but most are deteriorated, and there are not a few that often cause trouble or have uncertain precision even though they are operating.

**Table 2-11: State of Clinical Examinations**

doctors SP: internal / pediatrics / obgy ●=full-time specialist, ○=part-time specialist  
 apparatus : b.o.=biochemistry analyzer, s=spectrophotometer, c=colorimeter, b=blood cell counter, m=microscope, \*=existing

	pop	pat. /day	doctors SP	biochem. specialist	medical technician	testing			apparatus				
						biochemistry	blood	urine	b. o.	s	c	b	m
FD-01 Novi Travnik	34,000	600	● ● ○		8	15-20/day	20/day	30/day		*	*	*	*
FD-02 Tuzla	160,000	3,000	● ● ●		2	6000/month in total				*	*	*	*
FD-03 Bosanski Petrovac	7,600	100	○ ● ●		4	10/day	20-30/day	20-30/day			*	*	*
FD-04 Capljina	29,000	200	○ ● ●		1	4	50/day	40-50/day	50/day		*	*	*
FD-05 Tesanj	66,000	500	● ● ●		1	11	30/day	30/day	40/day				
FD-06 Konjic	40,000	250	● ● ●		6	25-30/day	10/day	10/day			*	*	*
FD-07 Ljubski	30,000	320	● ● ●		7	500-600/day	50-60/day			*	*	*	*
FD-08 Maglaj	30,000	400	● ● ●		5	80-100/day	40/day	40/day			*	*	*
FD-09 Bugojno	50,000	800	● ● ●		1	6	35-50/day		60-80/day			*	*
FD-10 Neum	5,000	100	○ ○ ○		1	20-30/day in total					*	*	*
FD-11 Novi grad	12,000	110	● ● -		15	100/day	120/day	150/day		*	*	*	*
FD-12 Gracanica	60,000	860	● ● ●		8	300/day	100-120/day	70/day			*	*	*
FD-13 Posusje	17,000	30	○ ● ●		4	20-30/day	30-40/day	30-40/day				*	*
FD-14 Buzim	20,000	70	○ ● ●		4	16/day	12/day	17/day			*	*	*
FD-15 Ustikolina	5,000	30	○ ● ○		1	10/day							
RS-01 Novi Grad	50,000	700	● ● ●		7	50/day	100/day	15/day		*	*	*	*
RS-02 Bratunac	27,000	300	○ ● ●		6	35/day	60-70/day	60-70/day			*	*	*
RS-03 Kozarska Dubica	30,000	500	● ● ●		6	10/day	40/day	40/day			*	*	*
RS-04 Kalinovik	5,000	14	○ ○ ○		1	5/day							*
RS-05 Sipovo	13,000	400	● ● ○		3	10/day	30/day	30/day			*	*	*
RS-06 Ljubinje	5,000	70	● ● ○		2	10/day	10/day	10/day			*	*	*
RS-07 Ribnik	15,000	100	● ● ○		3	15-20/day	15-20/day	15/day			*	*	*
RS-08 Rudo	12,000	200	○ ○ ○		2	30-50/day in total					*	*	*
RS-09 Kostanjica	8,500	200	○ ○ ○		2	20/day	30/day	30/day			*	*	*
RS-10 Sekovici	10,000	60	○ ○ ●		2	2-5/day	5-10/day	5-10/day				*	*

**Table 2-12: States of Laboratory Examination-Equipment**

a: biochemistry analyzer b: spectrophotometer c: blood cell counter d: microscope e: centrifuge  
 f: sterilizer g: balance h: distillator i: glassware washer

	a		b		c		d		e		f		g		h		i	
	qty	age	qty	age	qty	age	qty	age	qty	age	qty	age	qty	age	qty	age	qty	age
FD-01 Novi Travnik					1	2	1	2	2	1/15Δ	2	20Δ	1	25Δ	1	25Δ		
FD-02 Tuzla	1	1							3	1/20Δ	2	10Δ	1	1	1	10		
FD-03 B. Petrovac							2	0.5			1	15Δ	1	25Δ			1	30Δ
FD-04 Capljina									2	10Δ	1	10Δ	2	10Δ	1	10Δ		
FD-05 Tesanj									1	25Δ	1	1						
FD-06 Konjic									1	1	1	20Δ	2	1/20Δ	1	35Δ		
FD-07 Ljubski					1	1	2	2/8	1	10Δ								
FD-08 Maglaj									1	16Δ	1	17Δ	1	18Δ	1	19Δ		
FD-09 Bugojno					1	0.5			2	10Δ	1	25Δ					1	32Δ
FD-10 Neum									1	16Δ	1	17Δ	1	18Δ	1	19Δ		
FD-11 Novi grad	1	1	1	3	1	0.5			3	1/20Δ	2	20Δ	1	25Δ	1	25Δ		
FD-12 Gracanica			1	4					3	6Δ	1	10Δ			1	10Δ		
FD-13 Posusje									2	4/20Δ	1	20Δ			1	20Δ		
FD-14 Buzim			1	1			1	1	1	3Δ	1	16Δ						
FD-15 Ustikolina																		
RS-01 Novi Grad			1	1			1	20	2	20Δ	1	10Δ	1	10	1	12		
RS-02 Bratunac							2	1/20	1	1	2	20Δ	1	20Δ	1	20Δ		
RS-03 Kozarska Dubica			1				1	20	1	10	1	10Δ	1	20				
RS-04 Kalinovik							1	20Δ	1	20Δ	2	15Δ/20Δ						
RS-05 Sipovo							1	1	1	1	1	1	1	1	1	15Δ		
RS-06 Ljubinje							1	5	1	15	1	15			1	15Δ		
RS-07 Ribnik			1	1			1	1	2	1	1	12Δ						
RS-08 Rudo							2	30Δ	1	14	1	20			1	10		
RS-09 Kostanjica			1				2	10Δ	1	10Δ	2	10Δ			1	10Δ		
RS-10 Sekovici							1	10Δ	1	5	1	25Δ						

All of the requested laboratory items are basic equipment for clinical examination. Based on the personnel system of each site, there is no problem for procuring these items in this Project from the technical as well as maintenance aspects. Therefore, the equipment plan for the laboratory examination items shall be selected mainly for the purpose of replacing the existing equipment and procuring normally operating equipment. The equipment plans of each item are shown below.

**\* Biochemistry Analyzer and Spectrophotometer**

Biochemistry analyzers and spectrophotometers procured in this Project shall be those which use open-type reagents, and the biochemistry analyzers shall be semi-automatic and the spectrophotometers shall be manual ones.

One biochemistry analyzer is requested from each of the ten sites of the Federation, but the biochemistry analyzers shall be procured for the sites having a certain examination activities based on the fact that the population coverage of Dom Zdravlja is 30,000 or more, or the number of the biochemistry examinations done per day is 30 or more. For the requesting sites not satisfying the above-mentioned conditions, spectrophotometers will be procured. The population, the number of biochemical examinations, and the determination results of fifteen sites of the Federation are shown below. A spectrophotometer is planned for FD-13 Posusje, which requested the biochemistry analyzer, and a biochemistry is planned for FD-2 Gracanica, which requested a spectrophotometer.

	municipal population	biochemistry per day	tests:pop. >30,000	tests > 30	judgement	original request
FD-01 Novi Travnik	34,000	15~20	○		○	Biochemistry analyzer
FD-02 Tuzla	160,000	200 for all tests	○	○	○	Biochemistry analyzer
FD-03 B. Petrovac	7,600	10			×	Spectrophotometer
FD-04 Capljina	29,000	50		○	○	Biochemistry analyzer
FD-05 Tesanj	66,000	30	○	○	○	Biochemistry analyzer
FD-06 Konjic	40,000	25~30	○	○	○	Biochemistry analyzer
FD-07 Ljubuski	30,000	500~600 for all	○		○	Biochemistry analyzer
FD-08 Maglaj	30,000	80~100	○	○	○	Biochemistry analyzer
FD-09 Bugojino	50,000	30~50	○	○	○	Biochemistry analyzer
FD-10 Neum	5,000	20~30 for all tests			×	Spectrophotometer
FD-11 Novi Grad	12,000	100		○	○	Biochemistry analyzer
FD-12 Gracanica	60,000	300	○	○	○	Biochemistry analyzer
FD-13 Posusje	17,000	20~30			×	Spectrophotometer
FD-14 Buzim	20,000	16			×	Spectrophotometer
FD-15 Ustikolina	5,000				×	Spectrophotometer

One each spectrophotometer is requested by fourteen sites (five sites of the Federation and nine sites of Srpska). Looking at the states of the existing equipment of these sites, some have new equipment procured in the last three to four years, but many sites have the spectrophotometers of more than ten years old or the second hand ones donated through the emergency aid.

As for the biochemistry analyzers and the spectrophotometers in this Project, one each will be planned for the sites having no normally operating equipment of less than ten years. The sites having new and normally operating equipment will be excluded. Among the existing equipment of the sites, the biochemistry analyzer of FD-02 Tuzla is a special equipment offered by the emergency aid after the war and needs a special reagent. One agent in Bosnia and Herzegovina offers this reagent, but the price is extremely high, causing a serious burden to the operation of this equipment. The spectrophotometers of RS-03 Dubica and RS-09 Kostanjica were also provided as emergency aids. Because they need an expensive reagent exclusive for the equipment, which cannot be procured in the country, they cause severe problem for maintaining the future examination activities consecutively. Therefore, it is determined that the equipment that can be operated by general reagents shall be procured by this Project in order to reduce the operational burden and secure the sustainable examination activities, which is significantly meaningful for these three sites. Therefore these sites shall be included. The contents of the plan on biochemistry analyzers and spectrophotometers are shown below.

**Table 2-13: Planned Number of Biochemistry Analyzers and Spectrophotometers**

	Biochemistry analyzer				Spectrophotometer		
	condition	request	plan	remarks	request	plan	remarks
FD-01 Novi Travnik	satisfying	1	1				
FD-02 Tuzla	satisfying	1	1				
FD-03 B. Petrovac					1	1	
FD-04 Capljina	satisfying	1	1				
FD-05 Tesanj	satisfying	1	1				
FD-06 Konjic	satisfying	1	1				
FD-07 Ljubski	satisfying	1	1				
FD-08 Maglaj	satisfying	1	1				
FD-09 Bugojno	satisfying	1	1				
FD-10 Neum					1	1	
FD-11 Novi grad	satisfying	1	0	New one existing			
FD-12 Gracanica	satisfying	(spectro)	1		1	(biochemistry)	
FD-13 Posusje	not	1	(spectro)		(biochemistry)	1	
FD-14 Buzim					1	0	Operating one
FD-15 Ustikolina					1	1	
Total FD		10	9		5	4	
RS-01 Novi Grad							
RS-02 Bratunac					1	1	
RS-03 K. Dubica					1	1	
RS-04 Kalinovik					1	1	
RS-05 Sipovo					1	1	
RS-06 Ljubinje					1	1	
RS-07 Ribnik					1	0	Operating one
RS-08 Rudo					1	1	
RS-09 Kostanjica					1	1	
RS-10 Sekovici					1	1	
Total RS					9	8	
Total		10	9		14	12	

### \* Blood Cell Counter

Twenty-two sites (thirteen sites of the Federation and nine of Srpska) requested one each blood cell counter. Looking at the state of the existing equipment, there are many sites that do not have any normally operating equipment or that need the replacement of existing equipment as seen in other examination equipment. Therefore, one each equipment is planned to be procured the site having no normally operating equipment of less than ten years old. The sites having new one will be excluded from this list. Among the requesting twenty-two sites, FD-15 Ustikolina and RS-04 Kalinovik are determined to be excluded from this list because the manual counters are considered appropriate for them from the standpoints of their activity states and maintenance costs.

**Table 2-14: Planned Number of Blood Cell Counters**

	request	plan	remarks
FD-01 Novi Travnik	1	0	New one existing
FD-02 Tuzla	1	1	
FD-03 B. Petrovac	1	1	
FD-04 Capljina	1	1	
FD-05 Tesanj	1	1	
FD-06 Konjic	1	1	
FD-07 Ljubski			
FD-08 Maglaj	1	1	
FD-09 Bugojno	1	0	New one existing
FD-10 Neum	1	1	
FD-11 Novi grad	1	0	New one existing
FD-12 Gracanica	1	1	
FD-13 Posusje			
FD-14 Buzim	1	1	
FD-15 Ustikolina	1	0	excluded
<b>Total FD</b>	<b>13</b>	<b>9</b>	

	request	plan	remarks
RS-01 Novi Grad	1	1	
RS-02 Bratunac	1	1	
RS-03 K. Dubica			
RS-04 Kalinovik	1	0	excluded
RS-05 Sipovo	1	1	
RS-06 Ljubinje	1	1	
RS-07 Ribnik	1	1	
RS-08 Rudo	1	1	
RS-09 Kostanjica	1	1	
RS-10 Sekovici	1	1	
<b>Total RS</b>	<b>9</b>	<b>8</b>	

<b>Total</b>	<b>22</b>	<b>17</b>	
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### \* Microscope

Nineteen sites (fourteen sites of the Federation and five of Srpska) requested one each microscope, and five sites of Srpska requested two each microscopes, with a total of twenty-nine microscopes. Generally, laboratories use separate microscopes for biochemistry, haematology, and bacteriological examination, and it is normal to use one each microscope for each section or each technician in a laboratory. Therefore, the number of requested microscopes varies by each site as one or two. In this Project, the number of normally operating microscopes of less than fifteen years old is taken as the basis of planning, and one microscope shall be planned for those having only one normally operating microscope or none. The sites having more than two normally operating microscopes shall be excluded. For the sites requesting two



microscopes, two microscopes shall be planned if they have more than five examine technicians and if they have no normally operating equipment. However, for the sites requesting two microscopes having less than five technicians, one microscope shall be planned for those having only one normally operating microscope or none, and the sites having more than two microscopes shall be excluded as above mentioned basic way of planning. The planned number of microscopes is shown below.

**Table 2-15: Planned Number of Microscopes**

	Existing equipment		request	plan		Existing equipment		request	plan	remarks		
	q'ty	age				q'ty	age					
FD-01	Novi Travnik	1	2	1	1	RS-01	Novi Grad		2	2	8 technicians	
FD-02	Tuzla			1	1	RS-02	Bratunac	1	1	2	1	6 technicians
FD-03	B. Petrovac	2	0.5	1	0	RS-03	K. Dubica		2	2	6 technicians	
FD-04	Capljina			1	1	RS-04	Kalinovik		1	1		
FD-05	Tesanj			1	1	RS-05	Sipovo	1	1	1	1	
FD-06	Konjic			1	1	RS-06	Ljubinje	1	5	2	1	2 technicians
FD-07	Ljubski					RS-07	Ribnik	1	1	1	1	
FD-08	Maglaj			1	1	RS-08	Rudo		1	1	1	
FD-09	Bugojno			1	1	RS-09	Kostanjica		1	1	1	
FD-10	Neum			1	1	RS-10	Sekovici		2	1	2	2 technicians
FD-11	Novi grad			1	1	Total RS			15	12		
FD-12	Gracanica			1	1							
FD-13	Posusje			1	1							
FD-14	Buzim	1	1	1	1							
FD-15	Ustikolina			1	1							
Total FD				14	13	Total			29	25		

#### \* Centrifuge and Sterilizer

With regard to the centrifuge and sterilizers, it is general to use multiple items at the laboratory for the purpose of generating the samples of high precision, preventing the infection, and preventing the contamination of samples. As for the number of requested items, some sites of Srpska are requesting two items just like the case of microscope.

In this Project, based on the concept on the microscope, the planned number of items shall be determined using the number of the normally operating items of less than fifteen years as the basis. For the sites requesting two items, the planned number shall be determined by considering the number of laboratory technicians.

#### \* Balance and Distillator

Twenty-one sites (the Federation 11, Srpska 10) are requesting one each balance and twenty-four sites (the Federation 14, Srpska 10) are requesting one each distillator. The state of owning the equipment and the deterioration of existing equipment are almost same as other items. One each item will be procured to the sites having no new and normally operating equipment.

The planned numbers of centrifuges, sterilizers, balances and distillators are shown Table 2-16, 2-17, 2-18 and 2-19.

**Table 2-16: Planned Number of Centrifuges**

		Existing equipment		request	plan				
		qty	age						
FD-01	Novi Travnik	1	1	1	1				
FD-02	Tuzla	1	3	1	1				
FD-03	B. Petrovac			1	1				
FD-04	Capljina			1	1				
FD-05	Tesanj			1	1				
FD-06	Konjic			1	1				
FD-07	Ljubski								
FD-08	Maglaj			1	1				
FD-09	Bugojno			1	1				
FD-10	Neum			1	1				
FD-11	Novi grad	1	0.5	1	1				
FD-12	Gracanica			1	1				
FD-13	Posusje	1	4	1	1				
FD-14	Buzim			1	1				
FD-15	Ustikolina			1	1				
Total FD				14	14				

		Existing equipment		request	plan	remarks
		qty	age			
RS-01	Novi Grad					
RS-02	Bratunac	1	1	2	1	technicians 6
RS-03	K. Dubica			2	2	technicians 6
RS-04	Kalinovik			1	1	
RS-05	Sipovo	1	1	1	1	
RS-06	Ljubinje			2	1	technicians 2
RS-07	Ribnik	2	1	1	0	
RS-08	Rudo			1	1	
RS-09	Kostanjica			1	1	
RS-10	Sekovici	1	5	2	1	technicians 2
Total RS				13	9	
Total				27	23	

**Table 2-17: Planned Number of Sterilizers**

		Existing equipment		request	plan				
		qty	age						
FD-01	Novi Travnik								
FD-02	Tuzla			1	1				
FD-03	B. Petrovac			1	1				
FD-04	Capljina			1	1				
FD-05	Tesanj			1	1				
FD-06	Konjic	1	1	1	1				
FD-07	Ljubski			1	1				
FD-08	Maglaj			1	1				
FD-09	Bugojno			1	1				
FD-10	Neum			1	1				
FD-11	Novi grad			1	1				
FD-12	Gracanica			1	1				
FD-13	Posusje			1	1				
FD-14	Buzim			1	1				
FD-15	Ustikolina			1	1				
Total FD				14	14				

		Existing equipment		request	plan	remarks
		qty	age			
RS-01	Novi Grad			2	2	technicians 8
RS-02	Bratunac			2	2	technicians 6
RS-03	K. Dubica			2	2	technicians 6
RS-04	Kalinovik			1	1	
RS-05	Sipovo	1	1	1	1	
RS-06	Ljubinje			2	1	technicians 2
RS-07	Ribnik			1	1	
RS-08	Rudo			1	1	
RS-09	Kostanjica			1	1	
RS-10	Sekovici			1	1	
Total RS				14	13	
Total				28	27	

**Table 2-18: Planned Number of Balances**

		Existing equipment		request	plan				
		qty	age						
FD-01	Novi Travnik								
FD-02	Tuzla								
FD-03	B. Petrovac			1	1				
FD-04	Capljina	2	10△	1	1				
FD-05	Tesanj			1	1				
FD-06	Konjic			1	1				
FD-07	Ljubski	2	1/20△	1	0				
FD-08	Maglaj			1	1				
FD-09	Bugojno			1	1				
FD-10	Neum	1	18△	1	1				
FD-11	Novi grad	1	25△	1	1				
FD-12	Gracanica								
FD-13	Posusje								
FD-14	Buzim			1	1				
FD-15	Ustikolina			1	1				
Total FD				11	10				

		Existing equipment		request	plan
		qty	age		
RS-01	Novi Grad	1	10△	1	1
RS-02	Bratunac	1	20△	1	1
RS-03	K. Dubica	1	20△	1	1
RS-04	Kalinovik			1	1
RS-05	Sipovo	1	1	1	0
RS-06	Ljubinje			1	1
RS-07	Ribnik			1	1
RS-08	Rudo			1	1
RS-09	Kostanjica			1	1
RS-10	Sekovici			1	1
Total RS				10	9
Total				21	19

**Table 2-19: Planned Number of Distillators**

		Existing equipment		request	plan
		q'ty	age		
FD-01	Novi Travnik	1	25	1	1
FD-02	Tuzla				
FD-03	B. Petrovac	1	30	1	1
FD-04	Capljina	1	10△	1	1
FD-05	Tesanj			1	1
FD-06	Konjic			1	1
FD-07	Ljubski	1	35△	1	1
FD-08	Maglaj			1	1
FD-09	Bugojno	1	32△	1	1
FD-10	Neum	1	19△	1	1
FD-11	Novi grad	1	25△	1	1
FD-12	Gracanica	1	10△	1	1
FD-13	Posusje	1	20△	1	1
FD-14	Buzim			1	1
FD-15	Ustikolina			1	1
Total FD				14	14

		Existing equipment		request	plan
		q'ty	age		
RS-01	Novi Grad	1	12	1	1
RS-02	Bratunac	1	20△	1	1
RS-03	K. Dubica			1	1
RS-04	Kalinovik			1	1
RS-05	Sipovo	1	15	1	1
RS-06	Ljubinje			1	1
RS-07	Ribnik	1	1	1	0
RS-08	Rudo			1	1
RS-09	Kostanjica	1	10△	1	1
RS-10	Sekovici	1	10△	1	1
Total RS				10	9

Total			24	23
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**\* Washing Machine for Laboratory Glassware**

Fifteen sites of the Federation have requested one each of washing machine for laboratory glassware. No requesting sites have this equipment. There is no problem for procuring this equipment from the standpoints of technical aspect, maintenance, and facility, but the effects of procuring this equipment vary depending on the amount of processing at each laboratory. This Project will cover the sites having a certain laboratory activity scale, and the sites will be determined in accordance with the reference similar to the one used for the biochemistry analyzer. One washing machine will be procured to each site conforming to the condition, and the sites not conforming to the condition will be excluded. The planned number of washing machines for laboratory glassware is shown below.

**Table 2-20: Planned Number of Washing Machine for Laboratory Glassware**

	judgment	request	plan
FD-01 Novi Travnik	satisfying	1	1
FD-02 Tuzla	satisfying	1	1
FD-03 B. Petrovac	not	1	0
FD-04 Capljina	satisfying	1	1
FD-05 Tesanj	satisfying	1	1
FD-06 Konjic	satisfying	1	1
FD-07 Ljubski	satisfying	1	1
FD-08 Maglaj	satisfying	1	1
FD-09 Bugojno	satisfying	1	1
FD-10 Neum	not	1	0
FD-11 Novi grad	satisfying	1	1
FD-12 Gracanica	satisfying	1	1
FD-13 Posusje	not	1	0
FD-14 Buzim	not	1	0
FD-15 Ustikolina	not	1	0
Total		15	10

**(4) Emergency care [Ambulance Vehicle, Defibrillator, Reanimation Set, Laryngoscope, Aspirator]**

The emergency treatment system, the distances to the upper facilities, and the present states of medical vehicles in the Dom Zdravljas covered by this Project are shown in Table 3-21. In all the municipalities, the emergency phone number of "94" is directly connected to Dom Zdravlja. In addition, a minimum necessary number of personnel such as the driver or the staff on duty is assigned for twenty-four hour basis in all sites. Furthermore, all sites have full-time doctors of emergency medical, surgery, internal medicine / pediatrics / obstetrics and gynecology who can determine the necessity for the emergency treatment or the transportation to upper facilities.

**Table 2-21: State of Emergency Department of Dom Zdravlja**

full-time staff : S=surgery, I=internal medicine, P=pediatrics, O=obstetrics & gynecology

●=full-time SP, GP=full-time GP in charge, W=work medicine SP, N=nurse, E=emergency SP

no. of vehicle : all available cars included

usage of vehicle : E=emergent transportation, H=hemodialysis, O=out reach of service

	staff in emergency dept. of Dom Zdravlja	full-time staff of Dom Zdravlja				vehicle			referral			
		S	I	P	O	number	usage			place	distance	
							E	H	O			
FD-01	Novi Travnik	medical technician	W	W	●	GP	4	■	■	■	Nova Bila	12km
FD-02	Tuzla	emergent dr	●	●	●	●	8	■			Tuzla	near
FD-03	Bosanski Petrovac	surgeon	●	GP	●	●	1	■		■	Bihac	60km
FD-04	Capljina	GP	W	W	●	●	5	■		■	Mostar	30km
FD-05	Tesanj	emergency dr	W	●	●	●	1	■			Zenica	100km
FD-06	Konjic	GP	W	W	●	●	1	■			Sarajevo	60km
FD-07	Ljubski	GP	GP	●	●	●	3	■	■		Mostar	40km
FD-08	Maglaj	GP	W	●	●	●	4	■	■		Zenica	60km
FD-09	Bugojno	GP, surgeon	●	●	●	●	5	■		■	Travnik	50km
FD-10	Neum	emergency dr	E	GP	GP	GP	2	■			Mostar	100km
FD-11	Novi grad	GP	W	●	●	●	2	■			Sarajevo	10km
FD-12	Gracanica	emergency dr	E	●	●	●	1	■	■		Tuzla	55km
FD-13	Posusje	GP	W	●	GP	●	8	■			Mostar	55km
FD-14	Buzim	GP	GP	●	GP	●	4	■	■	■	Bihac	50km
FD-15	Ustikolina	medical technician		GP	GP	N	1	■			Goradjude	25km
RS-01	Novi Grad	GP	W	●	●	●	4	■	■		Prijedor	35km
RS-02	Bratunac	GP	W	W	●	●	1	■			Zvornik	40km
RS-03	Kozarska Dubica	GP	GP	●	●	●	1	■			Prijedor	45km
RS-04	Kalinovik	medical technician	GP	GP	GP	GP	2	■			Srbinje	60km
RS-05	Sipovo	GP	W	W	●	GP	3	■	■		Banja Luka	90km
RS-06	Ljubinje	medical technician	W	●	●	GP	1	■			Trebinje	60km
RS-07	Ribnik	GP	GP	●	GP	GP	3	■		■	Prijedor	110km
RS-08	Rudo	GP	GP	GP	GP	GP	2	■	■		Srbinje	120km
RS-09	Kostanjica	emergency dr	W	W	GP	GP	4	■	■		Prijedor	60km
RS-10	Sekovici	medical technician	W	W	●	●	4	■			Zvornik	40km

**\* Ambulance Vehicle**

All the twenty-five sites requested one each ambulance vehicle. The medical vehicles owned by Dom Zdravljas are severely deteriorated or damaged. Especially the vehicles of more than ten years old (including the used vehicles even when they were started to be used) often cause trouble and are not in sufficient condition as the medical vehicles. The vehicles of less than ten

years old are relatively in good conditions, but there are some sites having no such vehicles. The Dom Zdravljas included in this Project satisfy the minimum conditions of personnel system and the emergency telephone line, but because the present states of vehicles are not enough, their transportation abilities are not stable.

**Table 2-22: Medical Vehicles of Dom Zdravljas**

	type and age of vehicles		out of operation (impossible to repair)
	less than 10 years	more than 10 years	
FD-01 Novi Travnik	saloon 9years	one box 20years coupe 15years coupe 10years	
FD-02 Tuzla	one box 1year one box 8years one box 8years one box 9years	one box 12years one box 14years one box 14years one box 14years	one box 15years wagon 10years
FD-03 B. Petrovac		wagon 14years	one box 20years one box 20years
FD-04 Capljina	one box 8years saloon 8years one box 9years	one box 11years saloon 10years	one box 14years
FD-05 Tesanj		one box 10years	
FD-06 Konjic		one box 10years	one box 12years
FD-07 Ljubski	wagon 1year	one box 10years one box 10years	wagon 10years
FD-08 Maglaj	saloon 8years	one box 20years saloon 12years wagon 14years	
FD-09 Bugojno	wagon 1year one box 8years wagon 1year	wagon 14years saloon 14years	
FD-10 Neum	one box new	wagon 10years	one box 10years
FD-11 Novi grad		wagon 12years wagon 12years wagon 12years	wagon 25years one box 23years
FD-12 Gracanica			wagon 12years one box 14years
FD-13 Posusje	one box 2years one box 2years	one box 10years saloon 15years one box 10years saloon 15years one box 10years saloon 15years	
FD-14 Buzim	one box 2years saloon 9years	one box 13years wagon 12years	
FD-15 Ustikolina		one box 25years	
RS-01 Novi Grad	one box 6years one box 9years wagon 8years		one box 10years wagon 11years one box 11years
RS-02 Bratunac		cruiser 16years	one box 20years wagon 16years wagon 16years saloon 16years
RS-03 K. Dubica	wagon 8years		one box 17years one box 8years
RS-04 Kalinovik	cruiser 2years	one box 20years	
RS-05 Sipovo		one box 12years saloon one box	
RS-06 Ljubinje		one box 10years	one box 15years one box 20years one box 15years
RS-07 Ribnik	cruiser 6years one box 9years wagon 8years		
RS-08 Rudo		one box 20years one box 18years	
RS-09 Kostanjica	one box 9years	wagon 10years one box 10years	one box 14years
RS-10 Sekovici	saloon saloon	one box 20years wagon 10years	

In this Project, with the purpose of securing the safe vehicles proper for emergency transportation as a minimum, one each ambulance vehicle shall be planned for the sites having no emergency transportation vehicle of less than ten years. Other sites shall be excluded. FD-10 Neum of the Federation has one emergency transportation vehicle of box type. However this site will be included considering the fact that the distance to the referral hospital is more than 100km. The planned emergency vehicles shall have minimum necessary equipment for the emergency transportation such as a stretcher, a doctor's chair, oxygen inhalation device, IV hook and others. The planned number of ambulance vehicles is as follows.

**Table 2-23: Planned Number of Ambulance Vehicle**

	request	plan	remarks
FD-01 Novi Travnik	1	1	
FD-02 Tuzla	1	0	4 cars less than 10 years
FD-03 B. Petrovac	1	1	
FD-04 Capljina	1	0	3 cars less than 10 years
FD-05 Tesanj	1	1	
FD-06 Konjic	1	1	
FD-07 Ljubski	1	0	1 car less than 10 years
FD-08 Maglaj	1	1	
FD-09 Bugojno	1	0	3 cars less than 10 years
FD-10 Neum	1	1	1 car less than 10 years
FD-11 Novi grad	1	1	
FD-12 Gracanica	1	1	
FD-13 Posusje	1	0	2 cars less than 10 years
FD-14 Buzim	1	0	1 car less than 10 years
FD-15 Ustikolina	1	1	
Total FD	15	9	

	request	plan	remarks
RS-01 Novi Grad	1	0	3 cars less than 10 years
RS-02 Bratunac	1	1	
RS-03 K. Dubica	1	0	1 car less than 10 years
RS-04 Kalinovik	1	0	1 car less than 10 years
RS-05 Sipovo	1	1	
RS-06 Ljubinje	1	1	
RS-07 Ribnik	1	0	3 cars less than 10 years
RS-08 Rudo	1	1	
RS-09 Kostanjica	1	0	1 car less than 10 years
RS-10 Sekovici	1	1	
Total RS	10	5	

Total	25	14	
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**\* Defibrillator, reanimation set, laryngoscope, and aspirator**

In the medical facilities of Bosnia and Herzegovina, the wear or damage of emergency equipment is sever because of the war. The twenty-five sites included in this Project have almost no emergency equipment including the damaged or already discarded one. In the request made by the recipient sides, almost all sites requested one each of defibrillator, reanimation set, laryngoscope, and aspirator as shown below.

Defibrillator: 24 sites (the Federation 14, and Srpska 10)

Reanimation set: 25 sites (the Federation 15, and Srpska 10)

Laryngoscope: 24 sites (the Federation 14, and Srpska 10)

Aspirator: 23 sites (the Federation 13 ,and Srpska 10)

Among the above mentioned requests, a defibrillator for FD-02 Tuzla shall be excluded from this Project because a new defibrillator exists at the site. For other requests, one each item shall be planned. The planned numbers of items are shown below.

**Table 2-24: Planned Number of Defibrillators**

		existing equipment		request	plan
		qty	age		
FD-01	Novi Travnik				
FD-02	Tuzla	2	0.3/10△	1	0
FD-03	B. Petrovac			1	1
FD-04	Capljina			1	1
FD-05	Tesanj			1	1
FD-06	Konjic	1	12△	1	1
FD-07	Ljubski			1	1
FD-08	Maglaj			1	1
FD-09	Bugojno			1	1
FD-10	Neum			1	1
FD-11	Novi grad			1	1
FD-12	Gracanica			1	1
FD-13	Posusje	1	5△	1	1
FD-14	Buzim			1	1
FD-15	Ustikolina			1	1
Total FD				14	13

		existing equipment		request	plan
		qty	age		
RS-01	Novi Grad			1	1
RS-02	Bratunac			1	1
RS-03	K. Dubica			1	1
RS-04	Kalinovik			1	1
RS-05	Sipovo			1	1
RS-06	Ljubinjce			1	1
RS-07	Ribnik			1	1
RS-08	Rudo			1	1
RS-09	Kostanjica			1	1
RS-10	Sekovici			1	1
Total RS				10	9

Total				24	23
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**Table 2-25: Planned Number of Reanimation Sets**

		Existing equipment		request	plan
		qty	age		
FD-01	Novi Travnik			1	1
FD-02	Tuzla	1	10△	1	1
FD-03	B. Petrovac			1	1
FD-04	Capljina			1	1
FD-05	Tesanj			1	1
FD-06	Konjic			1	1
FD-07	Ljubski			1	1
FD-08	Maglaj			1	1
FD-09	Bugojno			1	1
FD-10	Neum			1	1
FD-11	Novi grad			1	1
FD-12	Gracanica			1	1
FD-13	Posusje			1	1
FD-14	Buzim			1	1
FD-15	Ustikolina			1	1
Total FD				15	15

		Existing equipment		request	plan
		qty	age		
RS-01	Novi Grad			1	1
RS-02	Bratunac			1	1
RS-03	K. Dubica			1	1
RS-04	Kalinovik			1	1
RS-05	Sipovo			1	1
RS-06	Ljubinjce			1	1
RS-07	Ribnik			1	1
RS-08	Rudo			1	1
RS-09	Kostanjica			1	1
RS-10	Sekovici			1	1
Total RS				10	10

Total				25	25
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**Table 2-26: Planned Number of Laryngoscopes**

		Existing equipment		request	plan
		qty	age		
FD-01	Novi Travnik			1	1
FD-02	Tuzla			1	1
FD-03	B. Petrovac			1	1
FD-04	Capljina			1	1
FD-05	Tesanj			1	1
FD-06	Konjic			1	1
FD-07	Ljubski			1	1
FD-08	Maglaj			1	1
FD-09	Bugojno				
FD-10	Neum			1	1
FD-11	Novi grad			1	1
FD-12	Gracanica			1	1
FD-13	Posusje			1	1
FD-14	Buzim			1	1
FD-15	Ustikolina			1	1
Total FD				14	14

		Existing equipment		request	plan
		qty	age		
RS-01	Novi Grad			1	1
RS-02	Bratunac			1	1
RS-03	K. Dubica			1	1
RS-04	Kalinovik			1	1
RS-05	Sipovo			1	1
RS-06	Ljubinjce			1	1
RS-07	Ribnik			1	1
RS-08	Rudo			1	1
RS-09	Kostanjica			1	1
RS-10	Sekovici			1	1
Total RS				10	10

Total				24	24
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**Table 2-27: Planned Number of Aspirators**

		Existing equipment		request	plan
		qty	age		
FD-01	Novi Travnik	1	15△	1	1
FD-02	Tuzla				
FD-03	B. Petrovac			1	1
FD-04	Capljina			1	1
FD-05	Tesanj	1	5△	1	1
FD-06	Konjic	2	20△	1	1
FD-07	Ljubski	1	20△	1	1
FD-08	Maglaj	1	10△	1	1
FD-09	Bugojno			1	1
FD-10	Neum			1	1
FD-11	Novi grad			1	1
FD-12	Gracanica				
FD-13	Posusje			1	1
FD-14	Buzim			1	1
FD-15	Ustikolina			1	1
Total FD				13	13

		Existing equipment		request	plan
		qty	age		
RS-01	Novi Grad			1	1
RS-02	Bratunac			1	1
RS-03	K. Dubica			1	1
RS-04	Kalinovik			1	0
RS-05	Sipovo			1	1
RS-06	Ljubinje			1	1
RS-07	Ribnik			1	1
RS-08	Rudo			1	1
RS-09	Kostanjica			1	1
RS-10	Sekovici			1	1
Total RS				10	9

Total				23	22
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**(5) Medical Statistics [ Computer ]**

Altogether thirteen computers are requested from the sites of Srpska. Although computers are not directly used for medical activities, they are important for managing patient records or medical statistics in the hospital. Dom Zdravljas of Srpska have less computers compared with those of the Federation and ten requesting sites have no computer at all. In BiH, no national census has been conducted after the war. Thus compared with the medical services, the reconstruction of medical statistic activities is delayed. Under these situations, the in-hospital statistics at the primary level Dom Zdravljas constitute important materials to know the present disease structure or the tendency of patients in municipalities. Among the sites requesting computers in this Project, some are doing enormous effects by preparing the basic statistics of local health care and medical services based on the medical records of Dom Zdravljas and the

demographics of the administration authority even though they must do all the data collection and analysis manually. Under these situations and based on the results of the First Phase, computers will be procured to the requesting sites. However, one each computer will be procured regardless of the amount requested.

**Table 2-28: Planned Number of Computers**

		request	plan
RS-01	Novi Grad	2	1
RS-02	Bratunac	2	1
RS-03	K. Dubica	2	1
RS-04	Kalinovik	1	1
RS-05	Sipovo	1	1
RS-06	Ljubinje	1	1
RS-07	Ribnik	1	1
RS-08	Rudo	1	1
RS-09	Kostanjica	1	1
RS-10	Sekovici	1	1
Total RS		13	10



## (6) Equipment List and Outline of Items

The contents of the equipment plan and the main specifications of planned equipment for each site are shown in Tables 2-29 and 2-30.

**Table 2-29: Equipment Plan for each Dom Zdravlja**

	Federation of Bosnia and Herzegovina															Republic of Srpska										Total				
	FD-01 Novi Travnik	FD-02 Tuzla	FD-03 Bosanski Petrovac	FD-04 Capljina	FD-05 Tesanj	FD-06 Konjic	FD-07 Ljubski	FD-08 Maglaj	FD-09 Bugojno	FD-10 Neum	FD-11 Novi grad	FD-12 Gracanica	FD-13 Posusje	FD-14 Buzim	FD-15 Ustikolina	Total Fd	RS-01 Novi Grad	RS-02 Braunac	RS-03 Kozarska Dubica	RS-04 Kalinovik	RS-05 Sipovo	RS-06 Ljubinje	RS-07 Ribnik	RS-08 Rudo	RS-09 Kostajnica		RS-10 Sekovici	Total RS		
RTG apparatus	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	14	1	1	1	0	1	1	1	1	1	1	1	1	9	23
Film X-ray developing machine		1	1	0	1	1	1	1	1	1	0	1	1	1	0	11	1	1	1	0	1	1	1	1	1	1	1	1	9	20
Ultrasound	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	1	1	1	1	0	1	1	1	1	1	1	1	9	24
Spirometer	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	13													13	
ECG	0	0	0	1	0	1	1	0	1	0	0	0	1	0	1	6	0	1	1	1	1	0	0	1	0	1	0	1	6	12
Biochemistry analyzer	1	1		1	1	1	1	1	1		0	1	0			9													9	
Spectrophotometer			1							1	0	1	0	1	4		1	1	1	1	1	1	0	1	1	1	1	1	8	12
Bloodcell counter	0	1	1	1	1	1		1	0	1	0	1		1	0	9	1	1		0	1	1	1	1	1	1	1	1	8	17
Microscope	1	1	0	1	1	1		1	1	1	1	1	1	1	1	13	2	1	2	1	1	1	1	1	1	1	1	1	12	25
Centrifuge	1	1	1	1	1	1		1	1	1	1	1	1	1	1	14		1	2	1	1	1	0	1	1	1	1	1	9	23
Sterilizer		1	1	1	1	1	1	1	1	1	1	1	1	1	1	14	2	2	2	1	1	1	1	1	1	1	1	1	13	27
Balance			1	1	1	1	0	1	1	1	1			1	1	10	1	1	1	1	0	1	1	1	1	1	1	1	9	19
Distilator	1		1	1	1	1	1	1	1	1	1	1	1	1	1	14	1	1	1	1	1	1	0	1	1	1	1	1	9	23
Washing machine for lab. glassware	1	1	0	1	1	1	1	1	1	0	1	1	0	0	0	10													10	
Ambulance vehicle	1	0	1	0	1	1	0	1	0	1	1	1	0	0	1	9	0	1	0	0	1	1	0	1	0	1	0	1	5	14
Defibrillator		0	1	1	1	1	1	1	1	1	1	1	1	1	1	13	1	1	1	1	1	1	1	1	1	1	1	1	10	23
Reanimation set	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15	1	1	1	1	1	1	1	1	1	1	1	1	10	25
Laryngoscope	1	1	1	1	1	1	1	1		1	1	1	1	1	1	14	1	1	1	1	1	1	1	1	1	1	1	1	10	24
Aspirator	1		1	1	1	1	1	1	1	1			1	1	1	13	1	1	1	0	1	1	1	1	1	1	1	1	9	22
Computer																	1	1	1	1	1	1	1	1	1	1	1	1	10	10

**Table 2-30: Outline of Items of Equipment**

Equipment	FD	RS	Total	Component	Purpose
RTG apparatus	14	9	23	fluoroscopy, general x-ray floor loading support	general x-ray : chest, borne fluoroscopy : internal disease
Film x-ray developing machine	11	9	20	table top processor, developer, fixer	processing of x-ray film
Ultrasound	15	9	24	general purpose type liner, convex, micro convex printer	diagnosis for OBGY, internal medicine
Spirometer	13	--	13	portable type measuring range : 0 to $\pm 15L$ parameters : VC, FVC, FEV, PEF	general examination, respiratory disease
ECG	6	6	12	3 channel cable rack, mobile cart	examination of heart function
Biochemistry analyzer	9	--	9	UV to visual continuous measuring(sipper) end point & kinetics	blood or urine test for kidney, liver etc.
Spectrophotometer	4	8	12	UV to visual manual measuring(cuvette) end point & kinetics	blood or urine test for kidney, liver etc. (for less number of testing)
Blood cell counter	9	8	17	8 parameters	blood testing
Microscope	13	12	25	halogen lamp, mechanical stage	examination for anaemia, virus diseases
Centrifuge	14	9	23	table top type approx. 500rpm, angle roater	separating of testing sample
Sterilizer	14	13	27	dry heat type capacity ; 500 x 500 x 600 mm temperature range : 10 ~ 250°C	sterilizing of laboratory instruments
Balance	10	9	19	range approx. 400g readability : 0.001 g digital display	preparation of reagents
Distiller	14	9	23	Beckman type single distillation capacity : approx. 5L/hour	washing instruments, mixing reagents
Washing machine for lab glassware	10	--	10	rotary jet spray type capacity : 500x500x500mm	washing of glassware instruments
Ambulance vehicle	9	5	14	diesel engine type displacement 2400CC stretcher, IV hook, oxygen inspiration	transportation of patients
Defbrillator	13	10	23	main unit, ECG monitor, printer mobile cart	resuscitating of heart stop
Reanimation set	15	10	25	airway tube, resuscitator, foot suction, others	resuscitating of emergent patient
Laryngoscope	14	10	24	blades for adult and children battery type	Insertion of endoracheal tube
Aspirator	13	9	22	capacity approx. 45L/min bottle 3000ml x 1pc	suction of sputum or blood of patient
Computer	--	10	10	desk top type IBM compatible, ink jet printer	processing of medical statistics