

b) Physiological Function Test

A variety of equipment are provided such as the Spirometer, Electrocardiograph (3-ch. and 4-ch.) and Monitor Oscilloscope as well as a Portable Type Ultrasound Diagnostic Equipment.

c) Surgical Operation, ICU

Surgical and ICU sections provided each for the pediatrics general clinics and obstetrics and gynecology general clinics are both of the standard sets for an operation room equipped with Operating Table, Anesthesia Apparatus, Operating Light and Suction Unit. The Electro Surgical Unit have been installed one set for each of the above clinics. The respirations being carried out on a new-born baby in a critical condition with a Breathing-Bag operated by hand, just because of the lack of the Respirator for infants. According to the Anesthetist this has been carried on for more than 24 hours by the 3 doctors taking turns in continuing this respirations. The Incubator for premature new born babies is a product of the Soviet Union, and is still utilized.

Shortages of surgical gloves in the operating room of the obstetrics and gynecology and the operating instruments necessary for surgical operations are made in Soviet Union. And it was claimed that its form and size are too large and big for usage in the obstetrics and gynecology.

d) Others

Diagnosis equipment such as Colposcope (Soviet Union product) for obstetrics and Japanese made Gastrointestinal Fiberscope and Duodeno Fiberscope are being utilized. All of the equipment of physical treatment are made in Soviet Union. Nevertheless, ample kinds and types such as the Ultra Violet Ray Lamp, Ultrasonic Therapy Apparatus, Micro Wave Therapy Apparatus and Ultrasonic Nebulizer for use in the respiratory organs related treatment are being installed and in usage.

2-4-2 Hospitals in Ulan-Bator City

Medical Care of the inhabitants within the city of Ulan-Bator is fundamentally taken care of by the Ulan-Bator City Central Clinical Hospital operated

by the city. The medical system is organized with the Ulan-Bator City Central Clinical Hospital at the top of the 6 zones District Hospitals and the subordinate 3 of Obstetrics and Gynecology Hospitals and Pediatrics Hospital.

The Ulan-Bator City Central Clinical Hospital is a referral hospital for the district hospitals intractable diseases patients as well as the central medical facility to attend to the medical treatments of the inhabitants in the city. Simultaneously, it functions as the upper medical organ for the October District Hospital, Worker's District Hospital. And in addition it also is within the total medical care system throughout the country and acts the part of a referral hospitals to all the hospitals below the Aimak Hospitals. The Ulan-Bator City Central Clinical Hospital can be considered as on the same level of medical organization as that of the Central Republican Clinical Hospital operated by the National Government. And especially in the line of the cardiovascular it is the only medical facility in the country that is fully provided to give treatments.

The District Hospitals are each responsible for the inhabitants medical care within its administrative district area. The various clinics are distributed within the district areas and cover the whole Ulan-Bator city medical care network system from the Ambulatoriya, Kheseg, Khuruu and Obstetrics Hospitals and Pediatrics Hospitals.

The request is aimed at the 6 District Hospitals within the city, but at this time it is projected to 4 out of the 6 District Hospitals. They are the Shukhebaatar District Hospital, Nairamdal District Hospital, October District Hospital and Worker's District Hospital.

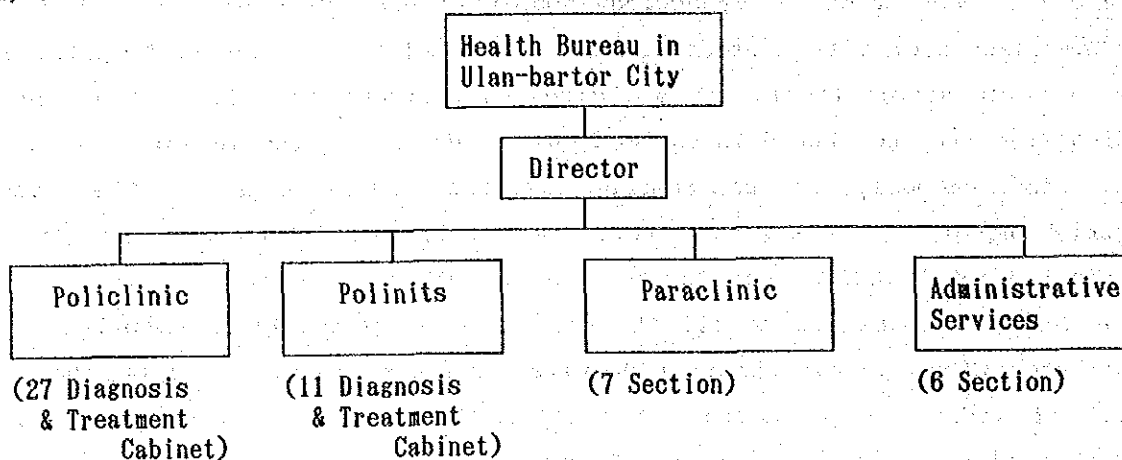
#### (1) Ulan-Bator City Central Clinical Hospital (The Third Hospital)

##### 1) Outline

Ulan-Bator City Central Clinical Hospital (The Third Hospital) operates the Polyclinic with 27 specialized cabinets (diagnosis and treatment for outpatients), Polinits with 11 specialized cabinets (wards for inpatients), Paraclinic with 7 sections and Administrative Services with 6 sections. This hospital is also the same as the Central Republican Clinical Hospital, in its functions as an education and training organization for the students of the Medical University as well as for postgraduate doctors training and practice hospital.

## 2) Organization Structure of The Third Hospital

### a) Outline



b) Organization Chart of the Medical Services

POLICLINIC

1. Internal Medicine
  - (1) Cardiovascular
  - (2) Lung, Respiratory Organs
  - (3) Kidney
  - (4) Liver
  - (5) Pancreas
2. Surgery
  - (1) General Surgery
  - (2) Heart
  - (3) Neurology
  - (4) Lung
  - (5) Emergency Surgery
3. Ultrasound Diagnosis
4. Otolaryngology
  - (1) Auditory Senses Function
  - (2) I, II
5. Ophthalmology (I, II)
6. Urology
7. Gynecology
8. Neurology Block,
9. Painclinic
10. Dental Surgery (I,II,III)
11. Section of Youth (Over 16 Years)
12. Diseases of the Aged
13. Allergy
14. health Section

POLINITS

- |                         |         |
|-------------------------|---------|
| 1. Heart Surgery        | 70 beds |
| 2. Kidney               | 60 beds |
| 3. Cardiovascular       | 60 beds |
| 4. Neurosurgery         | 50 beds |
| 5. Lung,                |         |
| Respiratory Organs      | 60 beds |
| 6. Stomach & Intestines | 60 beds |
| 7. Neurology            | 50 beds |
| 8. Ear & Nose           | 35 beds |
| 9. ICU                  | 10 beds |
| 10. Emergency Theatre   | 50 beds |
| 11. Medical Records     |         |

PARACLINIC

1. Clinical Examination
2. Ultrasound Diagnosis
3. Radiotherapeutic,Diagnosis
4. Electrocardiogram
5. Pathology, Anatomy
6. Physiotherapy
7. Sterilizing

ADMINISTRATIVE SERVICES

1. General Affairs, Accounting
2. Engineering
  - Building & Medical Equipment
3. Supply Services
4. Main Kitchen
5. Laundry

### 3) Clinical Activities of The Thrid Hospital

#### a) Number of Outpatients of Polyclinic

Cabinet	Number of medical examination	average per day
Internal Medicine	68,358	244
Surgery	21,162	75
Otolaryngology	11,823	42
Opehthalmology	11,118	39
Stomatology	24,323	86
Kidney	9,467	34
Neurology	20,054	71
Gynecology	7,344	26
Neurostomatology	9,416	33.6
Glaucoma	12,307	43.9
Cardiovascular	12,181	42.5
Neurosurgery	9,781	34.9
Others	37,761	134.8
Total	230,952	824

(April, 1990)

b) Comparative Diseases of Inpatients

Diseases	Outpatients	Inpatients
Infectious, Parastic Diseases	28	108
Ulcers	32	214
Endocrine Organs' Diseases	312	79
Hematogenous Organs' Diseases	48	66
	97	387
Neurology Diseases	893	958
Circulatory Organs' Diseases	513	2, 151
Respiratory Diseases	342	1, 308
Digestive Diseases	237	2, 066
Urinary & Genital Diseases	503	704
Deseases on Pregnancy	-	41
Skin & Hypodermic Diseases	212	95
Bone, Articular & Muscular Diseases	83	259
Congenital Disorder	139	389
Unspecified Syndrome	21	44
Disaster, Injury & Poisoning	72	426
Total	3, 532	9, 325

(April, 1990)

c) Comparative Diseases of Inpatients

Diseases	Patients	Average per day
Infectious, Parastic Diseases	97	0.3
Ulcers	209	0.7
Endocrine Organs' Disease	387	0.3
Hematogenous Organs' Diseases	55	0.1
Mental Diseases	433	1.4
Neurology Diseases	841	2.8
• Central Neuritis	<u>198</u>	0.6
• Hypertonia Bulbi	<u>3</u>	
• Eye Diseases & Complications	<u>3</u>	
• Tympanitis	<u>133</u>	0.4
Circulatory Organs' Diseases	2,265	7.5
• Heart Rheumatism	<u>386</u>	1.2
• Hyperpiesia	<u>808</u>	2.7
• Heart Diseases	<u>455</u>	1.5
Respiratory Diseases	1,260	4.2
• Diseases of Air Ways	<u>57</u>	0.1
• Pneumonia	<u>745</u>	2.4
Digestive Diseases	2,039	6.7
• Liver Cirrhosis	<u>170</u>	0.5
• Cholangitis	<u>314</u>	1.0
Urinary & Genital Diseases	670	2.2
• Nephritis, Nephrosis & Others	<u>605</u>	2.2
Congenital Disorder	432	1.4
Others	799	2.6
	9,182	30.6

(April, 1990)

d) Number of Operations

Categories	1985	1986	1987	1988	1989
Thyroid	1	-	28	16	14
Lung	1	-	5	2	1
Blood Vessel	67	58	56	59	71
Breast	2	9	2	8	1
Canncer of the Stomach	1	-	1	2	-
Liver	4	24	19	27	19
Gallbladder	24	77	103	108	60
Hernia	36	63	53	60	36
Hernia•Incarceration	-	3	3	4	2
Acute Appendicitis	141	569	699	792	714
Chronic Appendicitis	16	10	8	18	4
Others Intestinal Operations	12	74	33	51	30
Diagnosis laboratory	2	2	5	11	6
Digestive Organs	-	-	1	1	-
Kidney	-	-	-	1	-
Uterus	-	-	2	1	-
Others Gynecological Operation	-	14	22	13	16
Bone, Articular	1	3	7	14	6
Bone	7	4	9	10	3
Others	36	114	104	143	31
	353	1,033	1,170	1,355	1,021

(April, 1990)



e) Number of Clinical Examinations

Categories	1986	1987	1988	1989 Up to Sep.	Total of 5 years
Biochemistry	23,280	29,574	13,419	16,670	118,248
Blood	12,500	15,400	16,108	18,049	80,458
Urine, Stomach Humor	10,200	13,573	14,960	2,026	51,863
Bacillus	6,430	7,210	3,905	4,304	31,089
Immunity	233	292	395	600	1,917
Total	52,643	66,049	38,787	41,649	272,575

(April, 1990)

4) Outline of the Main Departments

a) Radiology

The equipment for the radiological diagnosis is provided much more fully than the Oncological Research Centre and even the Central Republican Clinical Hospital. These equipment and apparatus installed are X-ray Fluoroscopy Apparatus, X-ray Radiography Apparatus, Angiography System and CT Scanner. Angiography System and CT Scanner are made in Japan. The X-ray Fluoroscopy Apparatus is of the same types as those found in the hospitals, and of a dangerous types, because the technician is exposed to the X-rays every time the apparatus is used to observe the fluoroscopy.

b) Clinical Laboratory

The clinical examinations department is made up of 20 examination rooms, due to the subject to be examined, which calls for specializations. To this end 7 doctors and 16 laboratory technicians are doing the general examination, biochemical examination, immunological examination, bacteriological examination. In the general examination room, the Microscopes, Colorimeters and the Centrifuges are equipped to examine the blood and urine. In the biochemical examination room, the Centrifuges and Spectrophotometers are used to examine albumen serums, bilirubin and transamylase, but most of the examination are done by hand. The biochemical reagents are prepared by the biochemist, with the 2 units of Analytical Balances.

The Microscope provided are the monocular and binocular types. Both types as the reflector types of the old models. The Centrifuge is of the same type in all the hospital. These Centrifuges have not functioning for separation of blood serum using with capillary tubes.

The Spectrophotometer has been used in similar type of Japanese product of 15 years old.

#### c) ICU, Surgical Operations

The ICU is centered in looking after the patients who had been operated for cardiovascular and neurosurgery. The Respirator and Patient Monitoring System are installed. The Respirator is of Soviet Union product, and it is in use. The Patient Monitoring System is a compact, and equipped with measuring functions of electrocardiogram, respiration, electroencepharogram.

The installed equipment in the operation room used for cardiovascular surgery, The Heart Lung Machines made in Sweden (Agger) and Japan (Senko Ika) are installed. And also from Sweden product, the Blood Gas Analyzer, which makes it possible to measure the balancing of acid and base during the operations had been installed. This equipment is not for the Uran-Bator City Central Clinical Hospital, but the property of the Medical University. The reagents, the CO<sub>2</sub> gas are being paid by the University.

#### d) Ultrasound Diagnostic Equipment

The 2 sets of Ultrasound Diagnostic Equipment installed are made by 2 different manufacturers in Japan. One is the type for heart and the other is of a general use type. This hospital is training the domestic doctors the ultrasound diagnostic technics. As for methods to record images of attected part projected by CRT of ultrasound diagnostic equipment, there are polaroid photographing, film photographing, video tape recording and video printing. However, this hospital does not possess such equipment, the images have been copied manually by hand and kept as data. This has been largely affected on the accuracy of ultrasound diagnostics.

## (2) 4 District General Hospitals (District Hospital)

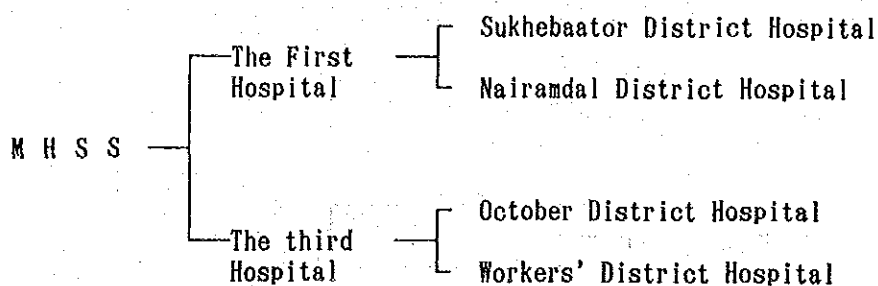
### 1) Outline of the 4 District Hospitals

The 4 district hospitals are the objects of the request. All of the hospitals are within the city zone of Ulan-Bator, and are general hospitals projected to directly attend to the medical care of the inhabitants within their district area. Hence, all of the 4 district hospital's medical care structures are practically of the same type, and managing operations as well, consisting of Policlinic, Ambulatoriya, Polinit, Pediatrics Hospitals, Maternity Hospitals, Dispensal, Kheseg, and Khuruu. Policlinic is the top organ of each, and the Kheseg and Khuruu are the subordinate organs to others having outpatient medical care function. The Ambulatoriya of outpatient is set up in a relatively, densely populated and quite away from the district general hospital. For instance, case of the October district Ambulatoriya is about 10 Km away from the district general hospital and Ambulatoriya of the Worker's district hospital is located near by the airport, where is a densely populated. The Sukhebaatar district hospital was promoted into an independent hospitals with 2 Ambulatoriya within its operations 5 years ago. One of the Ambulatoriya is about 5 minutes away on foot, and the other Ambulatoriya is also in the suburbs, and is also equipped with a Dental Treatment section cabinet.

Ambulatoriya is an outpatient medical care, mainly operating in the Internal Medicine care fields, and also equipped with an Ophthalmology. It is made up of 8 section cabinets. The Kheseg is set up in a relatively populated village and has several Khuruus under its sphere of medical care. The Khuruu clinic is the foremost front outpost in the net work of the city medical system and the small village in the city and administrative areas. The medical care is practiced by an internal medicine doctor who looks after all of the village inhabitants medical care and keeps the records of Carte of each any other inhabitant. In case of the sickness, the patient goes first to the Khuruu clinic. In case the internal medicine doctor deems in to the proper, the patient is referred to the Ambulatoriya and/or the Policlinic of the district hospital for further medical care. In case for the in hospital treatment or surgical operations, the patient is sent to the Polinit of the district general hospital to be treated, accordingly. The Dispensal is the affiliated to the district general hospital and specializes in the medical care of the outpatients in the field of tuberculosis, all forms and skin diseases.

There are The First and The Third hospitals as higher authority (referral hospital) of 4 District Hospitals. Sukhebaator and Nairamdal District Hospitals are in the higher position operated under The first Hospital, and October and Worker's District hospital are also in the higher position as well, operated under The Third Hospital.

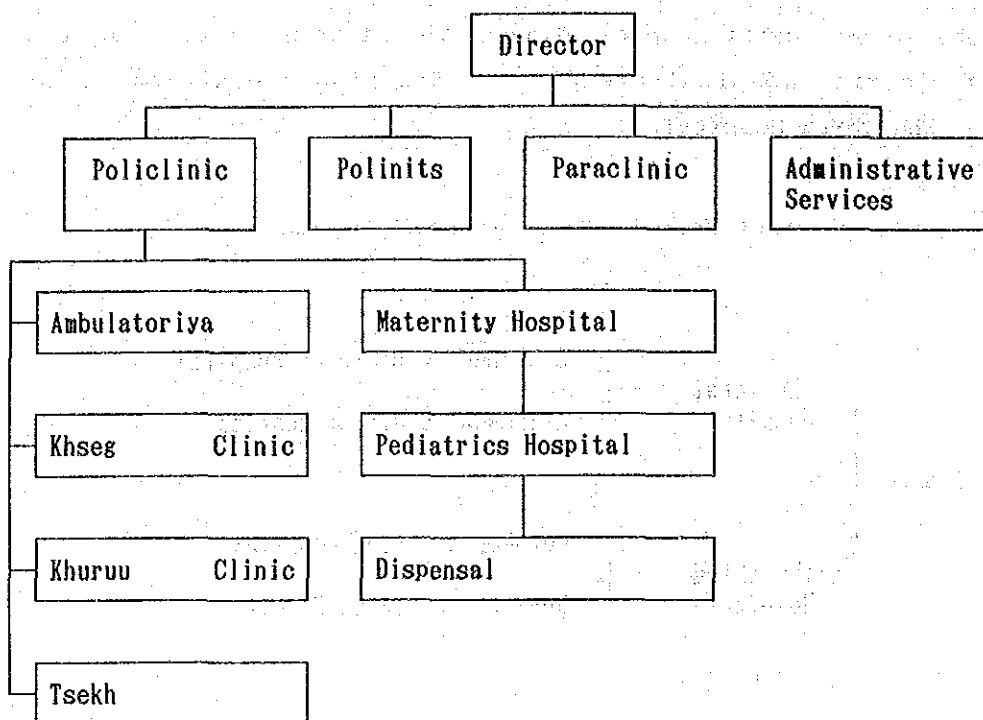
a) Relation between District Hospital and Referral Hospital



The medical care organization of the 4 district general hospitals as shown in the chart (organization chart of medical services, 81 page) are each having specialized medical care departments. For instance, the Transportations for the Worker's district hospital, the Constructions in the Sukhebaatar district hospital, and for the factory of the October district hospital, all of them have separate diagnosis cabinets. These cabinets are specialized care facilities for those workers employed in the transportation, constructions, and factory workers. And even for the young people, children and young people cabinets are provided. In addition, the cabinet for the youth (boys) over 16 years old whose are being compulsorially military service has been provided. The acupuncture is a Chinese medical care system and to this end cabinets are provided.

Medical diagnosis and treatment organization of these 4 district general hospitals always have the Policlinics, the Polinits, the Paraclinics and an Administrative Services.

b) Administrative Structure of District Hospital



## 2) Organization Chart of Medical Services (District Hospitals)

### POLOCLINIC

1. Internal Medicine
2. Surgery
3. Neurology

### Obstetrics & Gynecology

4. Ophthalmology
5. Otolaryngology
6. Urology
7. Dental Surgery
8. Health of Youth
9. Health of Aged
10. Specialized Clinic  
Transportation Workers'  
(Workers' District)  
Civil Engineers'  
(Sukhbaatar District)  
Factories Workers'  
(October District)  
(Nairamdal District)

### 11. Allergy

### 12. Acupuncture

### 13. Cabinet for Oncological Clinic

### 14. Dispensal

- (1) Dermatology
- (2) Tuberculosis, All Forms
- (3) Infectious Disease

### Pediatrics Hospital

- (1) Internal Medicine
- (2) Surgery
- (3) Neurology
- (4) Ophthalmology
- (5) Ear & Nose
- (6) Dental Surgery

### Maternity Hospital

- (1) Internal Medicine
- (2) Gynecology

### POLINITS

1. Internal Medicine
2. Neurology
3. Obstetrics

### 4. Pediatrics

5. ICU  
Adult  
Child

### PARACLINIC

1. Radiotherapeutic, Diagnosis
2. Clinical Examination
3. Physical Treatment,  
Rehabilitation

### AMBULATORIYA

1. Outpatient
2. Internal Medicine
3. Surgery
4. Ophthalmology
5. Otolaryngology
6. Neurology, Alcoholism
7. Clinical Examination

Out of the 4 district general hospitals, the Worker's District Hospital does not have an obstetrics and gynecology hospital. Therefore, the patients of the obstetrics and gynecology would have to go to the receive diagnosis at the obstetrics and gynecology hospital affiliated to Sukhebaatar District Hospital.

### 3) Conditions of the District Hospitals

Out of the 4 District Hospitals 3 of them, excepting the Nairamdal District Hospital were visited and surveyed. The survey were made mainly in the main part of the Hospitals, and also inspections of the related supplementary facilities in the District of Nairamdal were made at the Obstetrics and Gynecology general clinic and Sukhebaatar, Ambulatoriya of Worker's District and some of the Kheseqs as reference surveys. The 3 District Hospitals, that were surveyed, were of practically the same scale and also in that of medical care functions. The installed equipment and supplies conditions were practically at its marginal requirement position.

#### a) Radiology

Each one unit of the X-ray Fluoroscopic and the X-ray Radiographic equipment were installed. These are almost of the same model as equipped in other hospitals. The system is combined with the Bucky Stand and Table as generally used for X-ray Diagnosis. Both are of the '60s type. The X-ray film processing are being conducted by hand with using fixer and developer in 2 separate containers.

#### b) Clinical Laboratories

It is made up from a general examination and a biochemical examination. The general examination that were carried out for urine and blood examinations. The examinations for leukocytes and erythrocytes was done with the Blood Cell Counter and Microscope. The biochemical examination equipment provided were Colorimeter, Spectrophotometer and Centrifuge (without rotor for capillary tube). The reagents used to find the chemical reaction in order to be measured with the Colorimeter and the Spectrophotometer were adjusted and prepared.

c) Operating Room, ICU

The Polinits (treatment facilities for inpatients) of the district hospital is centrally a internal medicine department and a psychiatry department. It does not have facilities for outpatients. That is the reason it has, only, one operating room, which is used by the pediatrics and the surgeons of the outpatients. It is not possible to use this operating room for seriously heavy operations, as it is provided only with the minimum equipment such as the Operating Table, Operating Light and Anesthesia Apparatus. The ICUs for the district hospitals are presently under construction.

d) Others

Outpatients clinical functions for the ophthalmology are equipped only a Test Chart, Head Mirror, and Trial Lens Set, and also in case of outpatients clinical functions of Ear and Nose are equipped a Head Mirror, Ear Speculum, Nose Speculum and Forceps for treatment.

After visiting and surveying all of these type of hospitals, it was concluded that practically all of its kind were in the same position and conditions. For instance, the X-ray Fluoroscopic Equipment installed were of the '60s models with no preventative measures from exposures to X-rays. Instruments in the clinical laboratories were of the 20 years old types, the operating instruments were worn out and the needles were in shortages. ICU department has no Respirators for infants.

4) Operating Budget

The operating budget are supplied in one lump sum to the various District Hospitals. Each hospital, then, separates the budget funds supplied into the various portfolios in accordance to the operational uses of the subjects. In case of surpluses arising in the year's budget, the surpluses are left to the discretion of the hospital, and the hospital could use it freely. But in case of shortages occurring, the hospital is held responsible, and it has to make up for the shortages. The hospital's application for the budget is in the early part (within the 10th day of the month) of December, and approved by the end of the same month. The budget funds directly necessary in the operations



of the hospitals are supplied from the City Health Bureau, but for equipment purchases orders amounting to more than 200 Tug. (inverted into Japanese yen 10,000) falls into the category of investments in facility and equipment, which is purchased directly by the Ministry of Health and supplied to the hospitals that had placed their applications and those that have been approved. The following indicates the October District Hospital 3 years budget and expenditures. This is a typical district hospital budget and expenditures case, which for other district hospitals are about the same or a bit more or less at this level.

Comparative Statement of Income and Expenses (October District, 1987 to 1989)

(unit: 1,000 Tug.)

	1987		1988		1989	
	Budget	Actual	Budget	Actual	Budget	Actual
Total Budget	1,549.2	1,580.9	1,812.8	1,947.3	2,217.4	2,486.0
Salary for personnel	790.0	887.0	1,000.0	1,025.0	1,207.4	1,218.1
Office Expenses	31.6	35.5	31.0	44.4	36.0	48.7
Foods	460.1	338.3	486.3	457.7	621.0	678.3
Medicines	140.0	170.6	158.0	234.8	200.0	182.9
Consumables	8.8	9.1	10.0	14.5	8.0	10.5
Consumables (Linen, etc.)	15.0	14.8	20.0	25.4	22.5	22.5
Maintenance	6.0	6.0	8.0	7.6	10.0	13.6
Traveling Expenses	0.5	-	0.5	-	1.0	-

( Source : Aug. 1990 )

Expenditures are defrayed through the distributions of the National Budget. The above Budget and Expenditures are the actual records for the 3 years listed above. Medical care services are free of charges. The health and medical care revenue is zero, and all the operational costs and its incidentals comes from the District's Budget distributions, which leaves only the expenditure items to be accountable.

## 2-4-3 The Object of the Hospitals in the Provinces

The provinces medical care system set up is to give to all of the inhabitants living in that place the security of medical care. To this end, it has constructed 2 city operated hospitals (Darkhan-Khoto and Erdenet Khoto). 18 Aimak hospitals, networked with the Somon Joint Health Institutions, Somon Health Institutions and Brigads. Aimak hospitals, Darkhan hospital, Erdenet hospital and Ulan-Bator city District hospitals are the kernel of the provincial medical care, and both are directly taking charge of the medical care of their inhabitants and also the medical structure and scale are almost similar to each other. The only difference is that in the former hospital there are an Obstetrics and Gynecology, Pediatrics and Dispensal (inpatients facilities are available) collectively built-in and clinical doctors are in placement, while in the Ulan-Bator it does not have these facilities. These Aimak hospitals and Khoto (Darkhan and Erdenet) hospitals are located in the city central, and managed by the city Health Bureau, as well as its administrations.

The present object equipment adjustment plans of this Project are the Hospitals (6 Aimak Hospitals, 32 Somon Joint Health Institutions, 8 Somon Health Institutions and Darkhan City Hospital) have been selected in consideration of the distinctive conditions Aimak, Somon, Khoto have to perform in fulfilling obligations to the region's health and medical care.

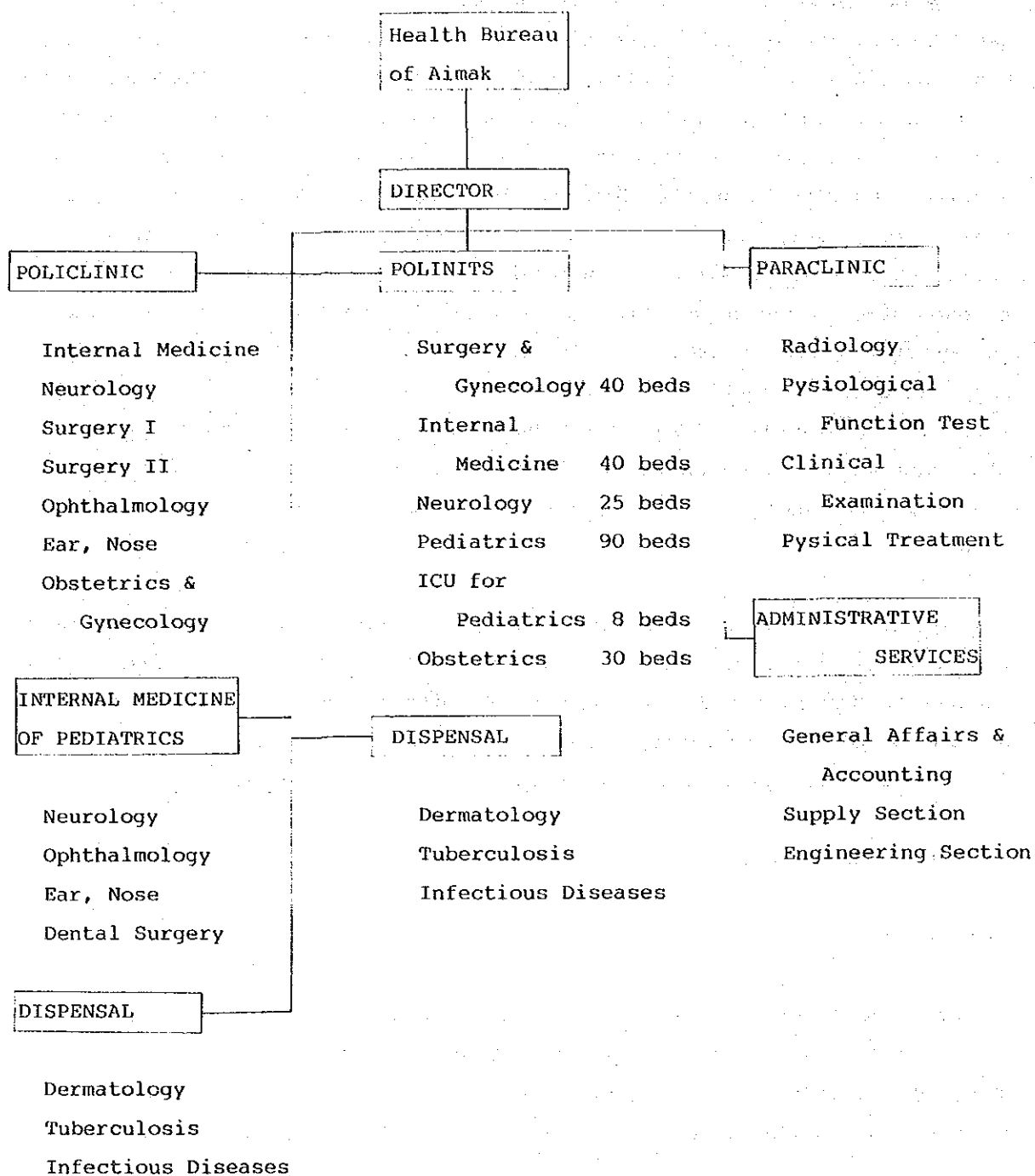
### (1) Tov Aimak Hospital

#### 1) Outline

From the central part of the Government Administrative office of Tov Aimak to Ulan-Bator is situated at the nearest place (about 15 km in a straight line and 45 km by road map). Tov Aimak is divided into 27 Somons, and has a population of 100,000 inhabitants, which makes it a relatively large Aimak.

The medical care organization of Tov Aimak is composed of Aimak Hospital, 2 Somons Joint Health Institutions, 24 Somons Health Institutions, 1 Clinic and 83 Brigads. It is planned for ensuring the health and medical care of the inhabitants, and organized in the structure to place Tov Aimak Hospital at the top of this arrangement.

## 2) Organization Structure of the Tov Aimak Hospital



Oncological Cabinet, Health Prevention Cabinet, Cabinet for Local Inhabitants and Cabinet for Factory

The facilities and functions available in this hospital are the Policlinic with 14 cabinets (for outpatients), Polinits with 9 cabinets (for inpatients) and wards of 360 beds capacities, Paraclinic with 9 cabinets and composed 4 sections of the Administrative Services. And as the hospitals in affiliation to the main facility composes the Dispensal with ward of 360 beds (patients for nfectious Diseases).

### 3) Clinical Activities of the Tov Aimak Hospital (1989)

#### a) Leading Causes of Morbidity (per 10,000 sickness)

1. Respiratory Diseases	928.2
2. Digestive diseases	363.0
3. Infectious, Parastic Diseases	146.0
4. Diseases on Pregnancy	125.0
5. Urinary & Genital Diseases	108.8
6. Neurology Diseases	99.2
7. Circulatory Organs' Diseases	91.5
8. Skin & Hypodermic Diseases	52.5
9. Disaster, Injury & Poisoning	47.9
10. Endocrine Organs' Diseases	31.6
11. Bone, Articular & Muscular Diseases	20.1
12. Ulcers	16.0
13. Mental Diseases	13.4
14. Hematogenous Organs' Diseases	12.1
15. Unspecified Syndrome	4.0
16. Congenital Disorder	3.3
Total	2,062.6

#### b) Clinical Activities

##### Polyclinic (per 100 outpatients)

##### Clinical Examination

General	24.9%
Biochemistry	27.0%

##### Radiograph

Fluoroscopy	0.4%
Photographing	5.2%

##### Polinits (per 100 inpatients)

##### Clinical Examination

General	2.8
Biochemistry	2.8

#### Radiograph

Fluoroscopy	0.4
Photographing	0.4

#### c) Physical Treatment

##### Policlinic

Physical Treatment	30.2%
Rehabilitation	1.6%

##### Polinits

Physical Treatment	2.6%
Rehabilitation	0.2%

#### d) Maternal & Infant

Birth rate in Hospital (per outpatients) 100.0%

#### e) Surgical Operation

Mortality rate after operation 0.7%

#### f) Mortality rate of Patients

Inpatients	2.3%
Inpatients (Pediatrics)	1.6%
Inpatients (within 24 hours)	17.0%

Patients from the various Somons shares 33.4% of the inpatients, and 14.8% of the Policlinics diagnosis recipients.

#### 4) Outline of the Main Departments

Tov Aimak Hospital being situated near by the vicinity of Ulan-Bator, and the inhabitants of Tov Aimak living close to the city area of Ulan-Bator are utilizing the medical care in the city medical facilities because of its accessibility did not object to equipping of this hospital's facilities and equipment adjustment plan due to the small numbers of 360 beds in comparison to the other Aimak hospitals equipped with 500 or so beds. Nevertheless, its diagnosis and treatment functions, having 14 cabinets for outpatients, 9 cabinets for inpatients, 9 cabinets for Paraclinics; which makes it in the same scale and contents as other Aimak hospitals. And also, have within the hospital the same 2 systems of X-ray Radiographic Apparatus, Clinical Laboratory and ICU (Intensive Care Unit), and operates as a general hospital.

a) X-ray Diagnosis Room

X-ray Diagnosis Apparatus that are equipped with one system each of Fluoroscopic and Radiographic, which are all Soviet Union products. The equipment installed are in comparison to Japanese products, more than 20 years old types. Only the camera for radiographic is an East German, Zeiss product. What can be said generally for all of the hospitals Fluoroscopic equipment (breast portion) is that in taking the observations and diagnosis, each and every time the technicians always receive exposure to X-rays. In the present Japan, it is considered as an unimaginable old type thing of the past.

b) Clinical Laboratory

The department consists of a general examination, biochemistry and bacteriology, and is equipped with the Microscopes, Centrifuges, Colorimeters, Spectrophotometers and Incubators. The Microscopes is monocular type, which is comparatively easy to use for examinations, but it is difficult in the night time and on cloudy days. The Centrifuge is not equipped with rotor for the capillary tubes.

c) Operating Room, ICU

Facilities for operations are composed the surgical operation and ophthalmologic operation, and equipment of the Operating Table, Anesthesia Apparatus and Operation Light are already installed. And for the ICU it is under going construction, Bedside Monitoring System of Czechoslovakia product is being installed. Respirator for adults have been equipped, but nothing on the side for pediatrics usages were furnished. The Suction Unit equipment is considered insufficient.

d) Delivery Room

Obstetrics examination room and instruments of delivery room were practically not furnished, and such equipment as the Vacuum Extractor and Forceps for delivery were also not furnished. Just recently a Swiss made Portable Doppler Fetus Detector had been installed, and it is being preciously managed.

The field survey made at this time on Aimak hospitals was concentrated solely on Tov Aimak hospital. However, from this survey and the conditions of

Ulan-Bator it is possible by parity of reasoning that the hospital operational functions and the scale of medical care being practically similar, it can properly be judged that the facilities, equipment are more or-less on the same level. Therefore, in summarizing the survey; adjustment in the lines of the basic diagnosis, treatment and examination operational functions to the level requested are prerequisites and first priority must be made to have the equipment installed in order to ensure the contemplated efficiencies to be actualized. For example, as a diagnostic equipment like X-ray Radiographic & Fluoroscopic Apparatus, as a treating equipment like Instruments for Surgery, Obstetrics and Delivery, Suction Unit, as a equipment for clinical examination like Spectrophotometer, Centrifuge, Refractometer, Hematocrit Centrifuge and Binocular Microscope, these equipment should be equipped with first priority on this Project.

## (2) Ar-hangai Aimak Hospital

### 1) Outline

Ar-hangai Aimak has 17 Somons, 97 Brigads, and out of Aimak's 84,000 inhabitants, the livelihood of the majority is centered in a nomadic style.

Ar-hangai Aimak hospital is a general hospital, and is operating as the central hospital for its subordinates comprising of 3 Somon Joint Health Institutions, 14 Somon Health Institutions, 97 Brigads. The medical care for the inhabitants is being taken care of through the above net work system.

The general hospital consists of: Policlinic having 14 diagnosis cabinets, and 9 cabinets for inpatient medical care, 560 beds scale Polinits, 6 cabinets Paraclinic, and the department of Administrative Services. It is made up of 4 departments, with 79 doctors and 245 paramedicals.

### 2) Organization Structure of Ar-khangai Hospital

- refer to Tov Aimak General Hospital (Page 91) -



### 3) Clinical Activities of Ar-khangai Aimak Hospital (1989)

#### a) Leading Causes of Morbidity (per 10,000 sickness)

1. Respiratory Diseases	1,347.6
2. Diseases on Delivery	459.2
3. Digestive Diseases	414.1
4. Urinary & General Diseases	236.3
5. Circulatory Organs' Diseases	230.0
6. Infectious, Parastic Diseases	210.1
7. Neurology Diseases	127.0
8. Mental Diseases	35.0
9. Skin & Hypodermic Diseases	34.5
10. Disaster, Injury & Poisoning	28.5
11. Hematogenous Organs' Diseases	28.8
12. Bone, Articular & Muscular Diseases	28.0
13. Endocrine Organs' Diseases	13.3
14. Diseases on Pregnancy	5.0
15. Ulcers	4.9
16. Congenital Disorder	3.0
Total	3,157.8

#### b) Leading Causes of Morbidity (per 10,000 inpatients)

1. Respiratory Diseases	951.7
2. Diseases on Pregnancy	313.9
3. Digestive Diseases	290.8
4. Circulatory Organs' Diseases	184.3
5. Urinary & Genital Diseases	180.3
6. Infectious, Parastic Diseases	151.1

#### c) Clinical Activities

##### Policlinic (per 100 outpatients)

##### Clinical Examination

General (Urine, Blood)	56.8%
Biochemistry	35.0%

Radiograph

Fluoroscopy	0.8%
Photographing	2.1%

Polinits (average of 1 inpatient)

Clinical Examination

General	8.1
Biochemistry	4.6

Radiograph

Fluoroscopy	0.04
Photographing	0.1

d) Physical Treatment

Policlinic

Physical Treatment	31.6%
Rehabilitation	1.7%

Polinits

Physical Treatment	3.6%
Rehabilitation	0.1%

e) Maternal & Infant

Birth rate in Hospital (per outpatients)	100.0%
Maternal Mortality rate (per 1,000 deliveries)	0.1%
Infant Mortality rate      Delivery	93.6%
Premature Birth	6.0%
Immature Infant Birth rate	5.4%

f) Surgical Operation

Mortality rate after operation	0.2%
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g) Mortality rate of Patients

Inpatient	23.0%
Inpatients (Pediatrics)	1.6%
Inpatients (within 24 hours)	17.0%

### (3) Dorno-gobi Aimak Hospital

#### 1) Outline

The Government Administrative organs of Dorno-gobi Aimak is centered along the railway tracks. This part of the Aimak is a newly coming up industrial belt, which is under promotion for further developments. And 14 Somons of Aimak are within this belt, having a population of around 57,000 inhabitants making their living there.

The inhabitants medical care within this Aimak belt is centrally operated by Dorno-gobi Aimak Hospital and the kernel of 1 Somon Joint Health Institution and 13 Somon Health Institutions. Dorno-gobi Aimak Hospital being the central medical care of the inhabitants and composed of a Policlinic with 14 medical care cabinets, 9 inpatients medical care cabinets and Polinits having provisions of 320 beds ward for inpatients and 6 specialized cabinets in the Paraclinic, and department of the Administration Services. And medical personnel consists of 45 doctors and junior medical technicians amounting to 172.

#### 2) Organization Structure of Dorno-gobi Aimak Hospital

- refer to Tov Aimak Hospital (Page 91)-

#### 3) Clinical Activities of Dorno-gobi Aimak Hospital (1989)

##### a) Leading Causes of Morbidity (per 10,000 sickness)

1. Respiratory Diseases	794.6
2. Diseases on Delivery	543.1
3. digestive Diseases	487.0
4. Infectious, Parastic Diseases	261.7
5. Urinary & Genital Diseases	181.7
6. Circulatory Organs' Diseases	147.0
7. Skin & Hypodermic Diseases	84.5
8. Neurology Diseases	80.0
9. Disaster, Injury & Poisoning	64.5
10. Bone, Articular & Muscular Diseases	48.4
11. Mental Diseases	40.8
12. Endocrine Organs' Diseases	31.2
13. Ulcers	25.7

14. Hematogenous Organs' Diseases	18.5
15. Congenital Disorder	6.3
16. Unspecified Syndrome	4.3
17. Pregnancy Diseases	<u>1.4</u>
Total	2,812.4

b) Leading Causes of Morbidity (per 10,000 inpatients)

1. Respiratory Diseases	865.9
2. Pregnancy Diseases	349.0
3. Digestive Diseases	331.0
4. Circulatory Organs' Diseases	164.5
5. Infectious, Parastic Diseases	113.8
6. Urinary & Genital Diseases	103.2

c) Clinical Activities

Policlinic (per 100 outpatients)

Clinical Examination

General	10.5%
Biochemistry	9.5%

Radiograph

Fluoroscopy	0.3%
Photographing	7.5%

Polinits (average of 1 inpatient)

Clinical Examination

General	2.2
Biochemistry	2.1

Radiograph

Fluoroscopy	0.1
Photographing	0.3

d) Physical Treatment

Policlinic

Physical Treatment	22.0%
Rehabilitation	0.3%

Polinits

Physical Treatment	1.6%
Rehabilitation	0.3%

e) Maternal & Infant

Birth rate in Hospital (per outpatients)	100.0%
Maternal Mortality rate (per 1,000 deliveries)	0.0%
Infant Mortality rate (on Pregnancy)	24.3
(on Delivery)	12.1
(after Delivery)	12.3
Leading Causes of Infant Mortality	
Non-oxygen	23.5
Diseases on Delivery	64.7
Pneumonia	5.9

f) Surgical Operation

Received operation rate (per outpatient)	26.0
Referral patient rate from Somon	14.1
Mortality rate after operation	0.3

g) Mortality rate of Patients

Mortality rate of inpatient	2.5%
Infant Mortality rate (inpatient)	1.7%
Inpatients (within 24 hours)	16.0%

(4) Dornod Aimak Hospital

1) Outline

Dornod Aimak has in the recent past few years being building factories, and its industries are in this area of Aimak, growing up successfully. It has

15 Somons in its area with a population of 80,000 inhabitants of which 60 to 65% are concentrated in the central part of Aimak Administrative areas. The medical care system is being the Aimak Hospital as the kernel, with a net work of 1 Somon Joint Health Institution, 14 Somon Health Institutions and 71 Brigades, and the medical care of the inhabitants are provided. This hospital's medical operational functions and operations are of the same contents as for the other Aimak Hospitals. Medical personnels consists of 83 doctors, and junior medical technicians amounting to 285.

## 2) Organization Structure of Dornod Aimak Hospital

- refer to Tov Aimak Hospital (Page 91) -

## 3) Clinical Activities of Dornod Aimak Hospital (1989)

### a) Leading Causes of Morbidity (per 10,000 sickness)

1. Respiratory Diseases	2,391.2
2. Digestive Diseases	945.9
3. Infectious, Parastic Diseases	382.9
4. Neurology Diseases	334.0
5. Urinary & Genital Diseases	301.9
6. Disaster, Injury & Poisoning	163.7
7. Skin & Hypodermic Diseases	140.7
8. Circulatory Organs' Diseases	70.1
9. Pregnancy Diseases	55.5
10. Bone, Articular & Muscular Diseases	44.1
11. Endocrine Organs' Diseases	29.5
12. Ulcers	18.4
13. Mental Diseases	12.9
14. Hematogenous Organs' Diseases	12.1
15. Congenital Disorder	1.9
16. Unspecified Syndrome	<u>1.7</u>
Total	4,907.1

b) Clinical Activities

Policlinic (per 100 outpatients)

Clinical Examination

General 24.1%

Biochemistry 16.6%

Radiograph

Fluoroscopy 3.4%

Photographing 2.0%

Polinits (per 100 inpatient)

Clinical Examination

General 2.2%

Biochemistry 2.1%

Radiograph

Fluoroscopy 0.5%

Photographing 0.1%

c) Physical Treatment

Policlinic

Physical Treatment 35.6%

Rehabilitation 5.0%

Polinits

Physical Treatment 1.8%

Rehabilitation 0.2%

d) Maternal & Infant

Birth rate in Hospital (per outpatients) 100.0%

Maternal Mortality rate (on Deliveries) 0.0%

e) Surgical Operation

Mortality rate after operation	0.7%
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f) Mortality rate of Patients

Inpatient	3.2%
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Inpatient (Pediatrics)	2.5%
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Inpatient (within 24 hours)	24.6%
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4) Outline of the Main Departments

Dornod Aimak Hospital has been established in the most eastern (Dornod) Aimak in Mongol. After the independence the capital of this Aimak is founded artificially in the wilds as the memorial of "Choibarusan", so-called Father of Revolution, who come from this district. This hospital is named Choibarusan Central Hospital, which built up relatively in recent years. The equipment and facilities are new and are operated with good care.

a) Internal Medicine Department

Multi-purpose type equipment with functions of EGG, EGG and spirometer are installed in this department. It is said that only Egg is effectively used and two other functions are hardly used. The examination by the Egg has found out 20 to 30 cases of heart diseases in the past 5 years. As the Egg examination is seldom conducted, patients who suffer from congenital cerebral diseases are sent to Ulan-Bator to have diagnosis and treatment. Consumables such as recording papers for Egg are in shortage.

b) Radio-diagnosis Room

For X-ray diagnosis examination, there are one unit of fluoroscope and one unit of fluoroscope and X-ray photography are equipped, which are all made in Soviet Union. The equipment itself are 20 years-old models compared to those in Japan. Those were imported from Soviet Union through the barter dealings and were applied to provide such old type unit even to new hospitals for common components to make easier maintenance.



#### c) Clinical Examination Room

This department carries out general, biochemical and bacteriological examinations. Microscope, centrifuge, colorimeter, spectrophotometer and bacterial culture unit etc. are installed here. The microscope of monocular reflecting type is used. It can be examined easily in day time but can be difficult in the night and cloudy days. The centrifuge used in this room is required a lot of blood as sample because of the lack of hematocrit capillaries, which separate serum from blood and fix quantity of blood cell component for biochemical examination, and no rotors for small quantity precipitation tubes.

#### d) Operating Room and ICU

There are 2 operating rooms installed with operating tables, anesthesia apparatus and shadowless operating light as standard equipment. Ultraviolet sterilization lights are provided to sterilize inside of operating rooms. In ICU there are respirators, defibrillators (to give electric shock and remove fibrillation to restore myocardium exercise), X-ray diagnosis mobile etc. Respirators made in Soviet Union are used for adults but the one for children is not procured yet.

#### e) Delivery Room

Electrical surgery units, anesthesia apparatus, suction unit for helping delivery, and incubators for new-born babies are provided for the gynecological diagnosis and delivery. Doppler fetus, monitors are not procured yet.

### (5) Ovor-khangai Aimak General Hospital

#### 1) Outline

Ovor-khangai Aimak has 18 Somons, a population of 96,500 inhabitants, which makes it a comparatively populated Aimak. Within this Aimak, there are the Aimak Hospital, 3 Somon Joint Health Clinics, 15 Somon Health Clinics, 3 Dispensaries (a doctor is always stationed there) 69 Brigades are looking after the medical care of the inhabitants.

The hospital operational functions and operations system is no different than any of the other Aimak hospitals. The ward for inpatients scale is 480 beds.

Medical personnel in the hospital consists of 80 doctors and 286 junior medical technicians.

2) Organization Structure of Ovor-khangai Aimak Hospital

- refer to Tov Aimak Hospital (Page 91)-

3) Clinical Activities of Ovor-khangai Hospital (1989)

a) Leading Causes of Morbidity (per 10,000 sickness)

1. Respiratory Diseases	2,782.1
2. Digestive Diseases	562.3
3. Neurology Diseases	193.6
4. Urinary & Genital Diseases	170.2
5. Skin & Hypodermic Diseases	163.5
6. Infectious, Parastic Diseases	161.6
7. Diseases on Delivery	108.7
8. Circulatory Organs' Diseases	91.6
9. Endocrine Organs' Diseases	65.2
10. Bone, Articular & Muscular Diseases	63.3
11. Disaster, Injury & Poisoning	38.8
12. Hematogenous Organs' Diseases	16.1
13. Mental Diseases	15.0
14. Ulcers	6.7
15. Unspecified Syndrome	2.3
16. Congenital Disorder	0.6
17. Pregnancy Diseases	<u>0.4</u>
Total	4,447.6

b) Clinical Activities

Policlinic (per 100 outpatients)

Clinical Examination

General	32.0%
Biochemistry	37.2%

Radiograph

Fluoroscopy	2.4%
Photographing	2.2%

Polinits (per 100 inpatients)

Clinical Examination

General	3.1
Biochemistry	3.6

Radiograph

Fluoroscopy	0.2
Photographing	0.1

c) Physical Treatment

Policlinic

Physical Treatment	44.6%
Rehabilitation	1.0%

Polinits

Physical Treatment	3.0
Rehabilitation	0.16%

d) Maternal & Infant

Birth rate in Hospital (per outpatient)	100.0%
Maternal Mortality rate on Delivery	0.0%
Immature Infant Mortality rate	0.0%

e) Surgical Operation

Mortality rate after operation	0.5%
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f) Mortality rate of Patient

Inpatient	3.0%
Inpatients (Pediatrics)	2.4%
Inpatients (within 24 hours)	19.0%

## (6) Khovd Aimak Hospital

### 1) Outline

Khovd Aimak is in the Western part of Mongol (1,700km west of Ulan-Bator city) and is the center of industry and culture in this western area. In this Aimak there are 16 Somons, and the population is approximately 76,500 inhabitants living at this place.

Khovd Aimak inhabitants receive their medical care at this hospital, which is the kernel of 1 Somon Joint Health Clinic, 15 Somon Health Clinics and 83 Brigads. The scale of this hospital is 415 beds, medical care operational facilities are the same as the other Aimak hospitals in scale and contents. It has 69 doctors and 194 junior medical technicians.

### 2) Organization Structure of Khovd Aimak Hospital

- refer to Tov Aimak Hospital (Page 91) -

### 3) Clinical Activities of Khovd Aimak Hospital (1989)

#### a) Leading Causes of Morbidity (per 10,000 sickness)

1. Respiratory Diseases	2,782.1
2. Diseases on Delivery	321.0
3. Infectious, Parastic Diseases	211.3
4. Urinary & Genital Diseases	189.6
5. Neurology Diseases	182.0
6. Digestive Diseases	165.0
7. Skin & Hypodermic Diseases	127.5
8. Circulatory Organs' Diseases	93.9
9. Bone, Articular & Muscular Diseases	23.6
10. Hematogenous Organs' Diseases	23.0
11. Diseases on Pregnancy	21.1
12. Ulcers	16.7
13. Disaster, Injury & Poisoning	13.4
14. Congenital Disorder	7.0
15. Endocrine Organs' Diseases	6.5
16. Unspecified Syndrome	5.3

17. Mental Diseases	4.8
Total	2,636.6

b) Clinical Activities

Poloclinic (per 100 outpatients)

Clinical Examination

General 21.6%

Biochemistry 6.1%

Radiograph

Fluoroscopy 3.3%

Photographing 2.2%

Polinits (per 100 inpatients)

Clinical Examination

General 2.5%

Biochemistry 0.5%

Radiograph

Fluoroscopy 0.2%

Photographing 0.1%

c) Physical Treatment

Policlinic

Physical Treatment 4.4%

Rehabilitation 0.4%

Polinits

Physical Treatment 0.5%

Rehabilitation 0.02%

d) Maternal & Infant

Birth rate in Hospital (per outpatients) 100.0%

Maternal Mortality rate on Delivery 0.0%

Infant Mortality rate	0.0%
Immature Infant Mortality rate	0.0%
e) Surgical Operation	
Mortality rate after operation	0.5%
f) Mortality rate of Patients	
Inpatient	1.5%
Inpatient (Pediatrics)	0.3%
Inpatient (within 24 hours)	24.6%

#### (7) Somon Joint Health Institution and Somon Health Institution

The objects for the health facilities are upon 40 Somon Health Institutions places, and out of the 40 places 32 places were the Somon Joint Health Institutions, and the other 8 were Somon Health Institutions (Institution in charge of a unitary Somons). All of those 40 institutions are functioning as the rear guard institutions in each of its places within the zone area of the Somon Health Institutions. These 40 institutions are supplying medical care technics and patients services backups to approximately 300 and so many institutions. For example Tov Aimak's Lun Somon Joint Health Institution is also, supporting the medical care services of the rural outpost 5 clinics; At-tal, Octal, Ertegent, Zarmal and Ungeshireto. In this way these 40 placed institutions are operating to the benefit of the inhabitants health and medical care. Hence, by strengthening the facilities and equipment which in turn would not only level up the efficiencies diagnosis, but also the efficiencies of these institutions would up-grade the basics of the primary health care and medical treatment in the whole country of Mongol.

##### 1) Jargalant Somon Joint Health Institution

This Institution is based in the center of the Jargalant agricultural village and is under Tov Aimak which is about 150km of Ulan-Bator. Normally, Somons Joint Health Institution attends to the medical care of the inhabitants living in the area it is located, and also at the same time its mission is to looks after the difficult patients and in cases of emergencies to dispatch doctors to support the medical cares of the Somon Health Institutions that are far away from the Aimak Hospital. This Institution has 5 Somon Health Institutions (Bornor, Bainchindo, October, Battsonzal and Tselu) rear end subor-

dinates requiring medical assistances under its umbrella.

Jargalant Somon Joint Health Institution is in the central of Jargalant (pop. approx. 5,000) and together with the 5 subalterns have a total population of approximately 30,000 inhabitants scattered throughout the rural villages, and it is at the top of the net work for the medical care in this area. At this Somon Health Institution, the Ambulatoriya (for outpatients medical care departments) consists of the 6 cabinets such as Internal Medicine, Surgery, Pediatrics, Otolaryngology, Obstetrics and Gynecology and Dental Surgery. Polinits are the ward for inpatients its capacity 80 beds for Obstetrics and Pediatrics.

The number of doctors are altogether 9, which are divided into 2 for Pediatrics, 1 for each of 5 cabinets of the Amburatoriya and 1 for the Radiotherapeutic and the Director of the hospital. Besides this 7 for Bagaimuchi (Semi-doctor), 16 nurses and 10 for mid-wife are all participating directly in looking after the health and medical care.

Conditions of equipment in this clinic, excepting the X-ray Diagnosis Apparatus, there was nothing special to note. It was scaled mainly with equipment to carry out clinical examinations, blood cell counting and urine examinations.

Surgical operations were only for minor operations. For the serious operations the patients were transported to the Ulan-Bator or at Darkhan city General Hospital, whichever was convenient.

## 2) Hojiruto Somon Joint Health Institution

Hojiruto Somon is in the Ovur-khangai Aimak have a total population of approximately 30,000 inhabitants scattered throughout the rural villages.

Hojiruto Somon Joint Health Institution is a general hospital located in central of the Hojiruto Somon, consists of 10 cabinets for medical diagnosis and treatment, having 128 beds for outpatients, 78 beds for general public, 50 beds for children and 300 outpatients a day. Medical personnel consist of 20 of doctors, 20 of nurses and 3 of midwives, and annual operation budget is about 600,000 Tug.

a) Clinical Activity

Outpatient	Surgery	20 to 25 persons/day
	Internal Medicine, Pediatrics	30 to 40 persons/day
	Gynecology	20 to 25 persons/day
Surgical Operation	General(e.g. injury)	100 operations/day
	Emergency(e.g. appendectomy, cesarean section)	100 operation/day
Radiograph	Photographing	7 or 8/day
	Fluoroscopy	15 to 20/day
Clinical Examination	Biochemistry	25/day
Delivery		300 to 450/year

b) Condition of Medical Equipment in Main department

Laboratory Dept.	Monocular Microscope	2 units
	Binocular Microscope	1 unit
	pH Meter	1 unit
	Balance	1 unit
	Centrifuge	1 unit
	Spectrophotometer	1 unit
	Incubator	1 unit
	Drying Oven	1 unit
Physiotherapeutic Dept.	Low Frequency Therapy Unit	1 unit
	Electric Therapy Unit	1 unit
Operating Room	Anesthesia Apparatus	1 unit
	Operating Table	1 unit
Pediatrics Dept.	Ambu-bag Type Resuscitator	2 pcs.
	note; This equipment is not used in Japan entirely.	



### 3) Kharahorin Somon Joint Health Institution

Kharahorin Somon is in the Ovur-khangai Aimak too, and located in the north from the Hojiruto Somon. Population of this Somon has approximately 15,000 (5,00 population are under 16 years old) and consists of the 6 subordinate (Khuruu).

This Somon Joint Health Institution is a general hospital located in the north part which is about 100km from Hojiruto Somon Joint Health Institution, and its facility scale is composed with 10 diagnostic and treatment cabinets and 120 beds capacities (30 beds for children, 20 beds for maternity, 8 beds for ICU). Outline of the clinical activities are being 150 outpatients per day, and medical personnels consists of 15 doctors, 20 nurses and 3 of midwives. At the moment, the new ward is being constructed and scheduled to build up within 2 years.

#### a) Clinical Activity

Surgical Operation	year	120 operations (10 to 20 are under the whole body anesthesia)
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Delivery	year	530 to 580
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#### b) Condition of Medical Equipment in Main Department

Pediatrics Dept.	Resuscitator, Potable Type	1 unit
Operation Room	Anesthesia Apparatus	1 unit
	Operating Table	1 unit
	Operating Light	1 unit
	Electro Surgical Unit	1 unit
Laboratory Dept.	Colorimeter	1 unit
	Spectrophotometer	1 unit
	Centrifuge	1 unit
	Balance	1 unit

Monocular Microscope	2 units
Differential Leucocyte Counter	1 unit
Others	Equipment for Water Therapy

#### 4) Vholnol Somon Health Institution

This Somon Health Institution is located in the neighborhood of the industrial factory area, about 20km away from Tov Aimak General Hospital. It has only one doctor centering activities in medical examinations in the field of Internal Medicine, Obstetrics and Pediatrics. Polinits has 15 beds, equipped mostly for use in the obstetrics. In cases of the delivery of newborn babies, it takes up about 30 cases annually.

There is only 1 medical care doctor, 3 Bagaimuchi, 3 nurses and 2 mid-wife. Bagaimuchi does the work of visiting the tents in its nearby area and takes care of the inhabitants health and medical care.

The medical equipment are a Stethoscope and a Sphygmomanometer. And in the department of obstetrics the Vaginal Speculum only was seen.

At the last survey of the Basic Design Study Team, one each of these type of Institution as samplings have been picked up and surveyed at random. The above 2 samplings of the survey result, can be concluded that the remaining 38 Somon Joint Health Institutions and Somon Health Institutions are in the same plight and facilities, and equipment are about in the same conditions can readily be inferred.

#### (8) Darkhan City General Hospital

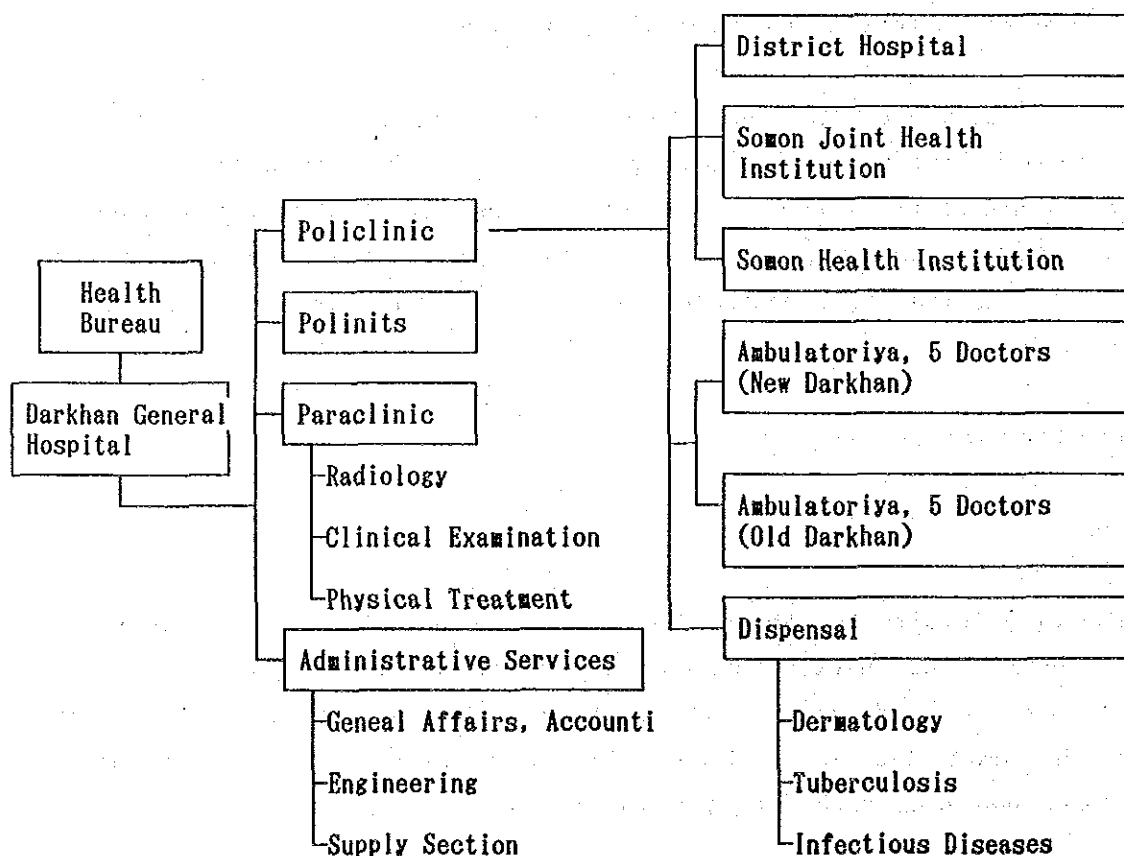
##### 1) Outline

Darkhan city is situated about 259km north of Ulan-Bator. It has light industrial plants and Refineries for mineral resources, with a population nearly of 85,000 inhabitants, making it next in size to that of the Capital. Within the city, the administration is divided into 4 districts (Orkhon, Darkhanzangai, Kphodol, Sharingo) under its jurisdictions.

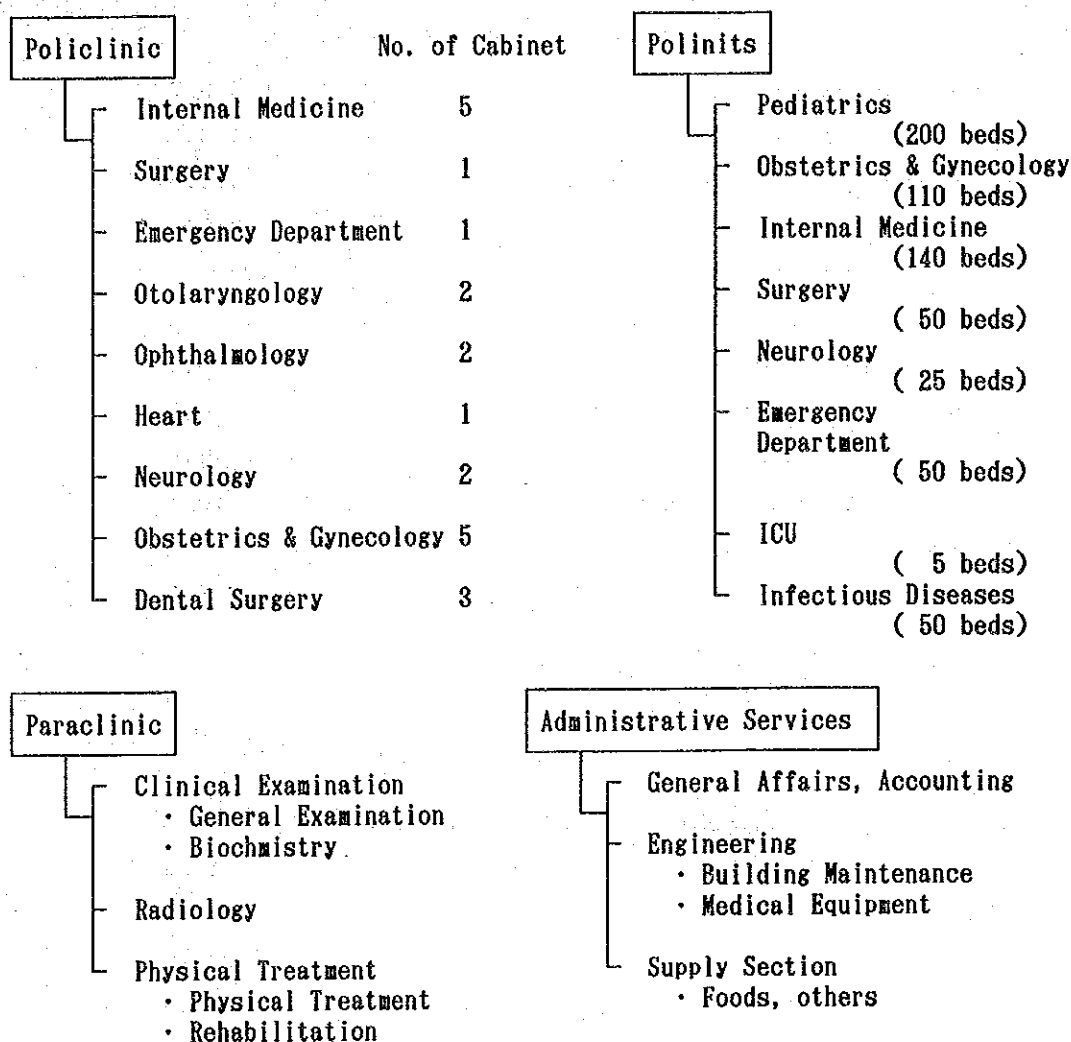
Darkhan city General Hospital in order to ensure the security of the medical care within and without its city limits, besides looking after its neighboring inhabitants have set up a net work system in which the city General Hospital has subordinate hospitals in each of its districts with 1 Somo Joint Health Clinic, 1 Somo Health Clinic and 2 medical care units, and besides these 4 hospitals, it has for each of the new city (streets and avenues) and also the same for the old ones in Darkhan Khoto, setup outpatients medical care unit as Ambulatoriya as outpost for the city General Hospital. And for measures against infectious diseases for the city as a whole, a Dispensal with 170 beds had been provided. Under this system medical care are being provided.

Darkhan city General Hospital has a Policlinic with cabinets being able to take care of 22 outpatients, 8 medical treatment cabinets and a Polinits that is equipped with 630 beds, and an Administrative Services, which makes up the 4 departments it needs to operate. The doctors and the junior medical technicians in totaling 141 are being posted.

## 2) Organization Structure of Medical System in Darkhan City



### 3) Administrative Structure of Darkhan General Hospital



#### 4) Clinical Activities of Darkhan City General Hospital

##### a) Leading Causes of Morbidity (per 10,000 sickness)

1. Respiratory Diseases	1,815.7
2. Digestive Diseases	1,020.5
3. Disaster, Injury & Poisoning	379.6
4. Urinary & Genital Diseases	263.7
5. Neurology Diseases	257.6
6. Infectious, Parastic Diseases	157.1
7. Circulatory Organs' Diseases	106.6
8. Skin & Hypodermic Diseases	70.8
9. Endocrine Organs' Diseases	43.8
10. Bone, Articular & Muscular Diseases	19.1
11. Ulcers	17.1
12. Hematogenous Organs' Diseases	6.2
13. Mental Diseases	1.3
14. Congenital Disorder	0.5
Total	4,160.2

##### b) Leading Causes of Mobidity (per 10,000 inpatients)

1. Respiratory Diseases	446.3
2. Pregnancy Diseases	289.1
3. Digestive Diseases	195.9
4. Infectious, Parastic Diseases	117.5
5. Disaster, Injury & Poisoning	109.1
6. Circulatory Organs' Diseases	101.9

##### c) Clinical Activities

###### Poloclinic (per 100 outpatients)

###### Clinical Examination

General	18.3
Biochemistry	25.7

###### Radiograph

Fluoroscopy	1.2
Photographing	0.9

Polinits (average of 100 inpatients)

Clinical Examination

General 3.1

Biochemistry 3.5

Radiograph

Fluoroscopy 0.2

Photographing 0.1

d) Physical Treatment

Policlinic

Physical Treatment 38.1

Rehabilitation 8.0

Polinits

Physical Treatment 2.8

Rehabilitation 0.3

e) Maternal & Infant

Birth rate in Hospital (per outpatients) 100.0%

Maternal Mortality rate (per 1000 deliveries) 0.0%

Infant Mortality rate %

Immature Infant Mortality rate %

f) Surgical Operation

Mortality rate after operation 0.7%

g) Mortality rate of inpatients 2.6%

Infant Mortality rate (inpatients) 2.1%

Inpatients (within 24 hours) 27.2%

## 5) Outline of Main Departments

### a) Radiograph

There are 3 X-ray rooms, 1 system for the Radiographic and 2 system for the Fluoroscopic are being installed and in use. The equipment are Soviet Union made product, and as it is so for all the other hospitals, the observation is done under the direct exposure to X-rays, hence, every time it is in use, the operator always is exposed to this X-rays.

### b) Clinical Laboratory

Clinical examinations are carried out for general examinations, biochemistry, bacteriological examinations. General examinations are being operated with the Microscopes (3 Monocular type and 1 Binocular type), Centrifuge and Colorimeter for blood cell countings and urine examinations. Biochemistry examinations are being operated with the 2 Colorimeters, 2 Balances, 2 Centrifuges and Glass Instruments for blood and urine examinations. Bacteriological examinations are being operated with the Binocular Microscope, Incubator, Anaerobic Jar and Drying Oven as each 1 unit for the examinations.

### c) Physiological Function Test

Physiological functions measuring are being equipped with 3 Electrocardiograph 3-ch and 3 Oscilloscopes, and a Portable Ultrasound Scanner equipped with Japanese product.

### d) Surgical Operation

It is provided with 3 surgical operation rooms, and in each room with an Operating Table is equipped. Against 3 Operating Tables, just 2 Anesthesia Apparatus is equipped. Out of the 3 Operating Tables one Operating Table is an electrical type (Soviet Union made) and the only one of its kind that has been installed in Mongol. The ICU department is for mainly the monitoring of the post operation patients and each is equipped with a Bedside Monitoring System, Respirator and Defibrillator, the Bedside Monitoring System is made by Hungary, and its monitoring functions covered to the electroencepharogram, electrocardiogram and respirations.

## (9) The Maintenance Centre

### 1) Outline

This Maintenance Centre was established in 1956 by the Ministry of Health as a repair section. And by 1969, it developed into a full-scale rebuilt and with the object of manufacturing some parts of its medical requirements it seceded from the Ministry of Health and became an independent maintenance centre. Since then it started operating on a self supporting principle in maintenance and repair servicing of the medical equipment and supplies in Mongolia. At present it has setups in 3 cities, 18 Aimaks and 1 to 2 repair shops (which are the outposts for the Centre) which forms the network tie-up in repair servicing with the medical organizations. The repair centre established in the various places are mainly operating in after servicing of the daily operated equipment and supplies and to carry out the technical repairs. And in cases of a large scale repairs and installment of a large scale equipment, which the repair centre are not able to handle; technicians from the Maintenance Centre are dispatched to the spot to repair and or assist in the setting up of the equipment.

In January of this year, this Centre formally changed its name into "Maintenance Centre for Medical Equipment", and started plans (new buildings and transfers) to expand its business anew. At present, the Centre has tied maintenance contracts with all of the hospitals in the country, and it is carrying out the repairs and servicing, accordingly. The centre has 53 technicians and the annual income from the repairs operations amount to 200 million Tugriks (73,000,000 Japanese Yen). The main items of income areas are listed below. As a matter of reference, the 1990 repairs and maintenances up to this report date are listed below:

	<u>1989</u>	<u>March, 1990</u>
-1. X-ray Equipment	162	35
-2. Equipment for Physical Treatment	133	23
-3. Sterilizer, Water Distillation Apparatus	248	92
-4. Electronic Equipment	62	27
-5. General Medical Equipment	16	5
Total	621	182



The breakdown of the equipment made and delivered in accordance to the orders received from the various hospitals during last year.

-1. Dissecting Table	30
-2. Instrument Trolley	35
-3. Foods Wagon	50
-4. Medication Trolley	200
-5. Examination Bed	200
-6. Irrigator Stand	100
-7. Sterilizer	5
-8. Instrument Cabinet	100
-9. Protection Board for X-rays	10
-10. Stretcher	80
-11. Draftchamber	4

The engineers of this centre are Industrial Technical College graduates coming from the Soviet Union, Poland, East Germany and Mongolia Technical University graduates. Most of the above engineers are not only college graduates, but are also engineers, who have had medical equipment and supplies and its maintenance and control experiences in Soviet Union and its Eastern European countries. This comes from the fact that Mongolia medical equipment are practically 100% made in Soviet Union (over 70%) and its East European countries, which gives rise to the necessity of planning to have engineers coming from the countries supplying the equipment and also to receive training in respect of the product in order to carry out a good repair, maintenance services and its incidental planning. During the past few years Mongolia imported from Japan the latest modern types of medical equipment such as the CT Scanner, Angiography System and Ultrasound Scanner, for which the Japanese manufacturers received the Mongolian engineer trainers dispatched and instructions training in the technics of operation and maintenance were carried out.

The Maintenance Centre is planning to expand existing facilities, and already have finished its basic design, and expects to start on it in the autumn of this year. The expansion plan shall be done by the Soviet Union, and the equipment to be installed for carrying out repairs and also the production of equipment and its incidental machineries shall be made by the Soviet Union. The new expansion plan is expected to be completed in 1993.

In pursuant to the basic estimation of the repair expenses accountable is set at its minimum level prices, which shall form the centre operation funds

## 2) Maintenance and Repair Expenses of the Main Equipment

### a) X-ray Diagnosis Equipment and Peripherals

-1. Repair & Replace of Condenser	11.20 Tug.	(¥336.-)
-2. Repair & Replace of Coil	61.60	(¥1,848.-)
-3. Repair & Replace of Relay	76.00	(¥2,280.-)
-4. Painting for Parts	24.00	(¥720.-)
-5. Mechanical Repairing	42.00	(¥1,260.-)

### b) Radiotherapy Apparatus I (Gamma ray)

-1. Pre-checkup	90.00	(¥2,700.-)
-2. Disassemble & Assembly of Equipment	90.00	(¥2,700.-)
-3. Operating of Equipment	90.00	(¥2,700.-)

### c) Radiotherapy Apparatus II (Gamma ray)

-1. Pre-checkup	150.00	(¥4,500.-)
-2. Checkup & Adjustment of Battery Unit	80.00	(¥2,400.-)
-3. Disassemble & Assembly of Equipment	70.00	(¥2,100.-)
-4. Electrical Repairing	240.00	(¥7,400.-)
-5. Adjustment & Irradiation Unit	150.00	(¥4,500.-)

### d) ECG & EEG

-1. Checkup & Repairing for Booster Unit Circuit	80.00	(¥2,400.-)
-2. Operation	50.00	(¥1,500.-)

### e) Autoclave

-1. Pre-Checkup (Mechanical Malfunction)	25.00	(¥756.-)
-2. Electrical Checkup	48.00	(¥1,440.-)
-3. Cleaning-up for Inside Chamber	7.00	(¥210.-)
-4. Oiling (Lubrication) for Equipment	9.00	(¥270.-)
-5. Operation	24.00	(¥720.-)
-6. Overhaul	53.20	(¥1,500.-)

### 3) Functioning Outline of the Maintenance Centre

The Maintenance Centre shall be made up of 4 sections; the production, the repair, parts management and the administrative Services. The production section is on the ground floor and 10 sets of the Draftchambers are under production and other items such as the Traction Table (for Rehabilitation use), which were reformed from the Bucky Table.

The repair section shall be on the 2nd floor. Medical Electronics (ME equipment) to monitor repairs such as Oscilloscopes, Signal Analyzer, Wave Analyzer were in place. And actual repairs were being done for the Blood Gas Analyzer, 14-ch. Electroencephalograph and 6-ch. Electrocardiograph. This impressed to understand that the repairs for most of the parts of the modernized efficient equipment repairs could competently be carried out. On the other hand, the engineers of the Soviet Union are being dispatched, and equipped with the above mentioned same type repair equipment, for which technical instructions and guidances have already been completed. This is due to the fact that the Soviet Union had dispatched the competent persons to attend to the contract contents of giving direct instructions, and guidances as stipulated in the guarantee provisions concerning repairs, and its incidentals, all of which is included in the procurement costs.

As for the parts management section, spare parts for the medical equipment that are being used in Mongol are being stocked; and any orders for parts that are received, the parts are supplied. Procurement of parts are done only once a year to the Soviet Union and the Eastern Europe. Medical equipment in Mongol, whether it is a Radiographic equipment or any other equipment, and whether it is a medical treatment organization; it is always the same maker and model that is being used. This in other words unifies the parts, thereby, stock control of spare parts for repairs of the same types of equipment can be supplied to any and all of the orders coming in from the medical treatment organs. This simplifies the parts control to be procured as that applies to the uniformity of parts is convenient in implementing a set amount of parts through past records and experiences.

Such being the case the procurement of spare parts is done only once a year, and this system is not limited to only these items but as well as to other medical equipment items; and also any shortages that should arise in an item, it would have to wait until the next year's procurement time. This

arises from the trade being carried out under a barter system, which rests upon yearly settlement basis. The set up of the trade system makes it impossible to settle accounts on a monetary basis. Hence, should such the same situations of shortages arise, it is not limited to this parts, but also can be said on consumables. By any chance, should such an emergency case arise, the only alternative left would be to check whether the country's barter has items that are still not been settle, and to do the necessary procedure of changing a part of the contents of the trade contract with the trading country. This emergency procurement then calls for an international political decision, which if it should happen it would be of a critical emergency matter. Hence, this can be considered as an impractical situation.

## 2-5 Outline of the Request

### 2-5-1 Outline of the Request

After World War II, Mongolia began to actively tackle the problems of developing the country by formulating basic policies and projects based on the country's 5-year plan, and at present it is pursuing its Eighth consecutive 5-year plan. In the execution of the present 5-year plan, relative to the basic development policies in the health and medical sector, serious efforts in the realization of the following 6 items are being stressed.

- (1) Reinforcement of preventative measures and activities as well as escalating the health care registry activities.
- (2) Amplification of medical care and preventive measures.
- (3) Fulfillment of child and maternal medical care measures.
- (4) Normalization of personnel in medical sector.
- (5) Efficient application of scientific technology.
- (6) Improvement of the pharmaceuticals supply system.

At the Mongolian People's Revolutionary Party's 19th General Meeting in 1986, the Eighth 5-year Plan was resolved. The Party approved expanding the specialization of medical care, raising the level of medical services and diagnosis, and revising and improving health care and registry activities as one of the basic policies of the Eighth 5-year Plan. In order to realize these goals, the plan for constructing a National Diagnosis Centre was formulated, and the request was submitted to the Government of Japan for grant aid on this

plan. The Government of Japan responded to this request, and the Japan International Cooperation Agency (JICA) dispatched a Preliminary Study Team to confirm the details of the request and to study the background and the implementation organization of the Project in October 1989.

Mongolia initial request was:

- (1) To improve the effectiveness and efficiencies to avoid diagnosis mistakes, diagnosis in the early stages and speed up of the examinations by ways of concentrating on a higher graded diagnosis functions.
- (2) To obtain economic effectiveness in virtue of the central management system by equipping of expensive and highly efficient functioning equipment.
- (3) To educate effectively the persons engaged in medical care, and through the Japanese technical cooperation to promote a research project in the utilization of the highly efficient equipment.

These are the merits of establishing the above mentioned Diagnosis Centre. The contents of the plan were diagnosis department, radio-diagnosis department, administrative Services and computer department and its incidentals within a building facility of 3,000 meter square. As for the required equipment were in the line of installing CT Scanner and such highly efficient equipment.

The Preliminary Study Team, after studies and examinations relative to this Centre construction plan, held several discussions on this matter with the Ministry of Health & Social Services and the related competent parties in Mongolia concluded that in order to establish this Centre, first of all, it take much time to establish the organization with the competent doctors and paramedicals; and the facilities and equipment operational maintenance and management burdens would be another problem on Mongolia fiscal side as well as the present medical situations and the doctors requirements, another words; the on-the-spot actualities have not been classified and their requests been considered. Although, it was recognized the necessity of such the Centre, but to put this Project into the grant aid at this time would not be relevant as it would require much more preparator study and preparations. Nevertheless, the authorities concerned of Mongolia side shall continue the elaboration upon this planned Centre as a part of future plans, and for the present request upon the things which would be widely beneficial and to the direct interest of

the people by providing and furnishing the basic medical equipment and increasing its efficiency which are indispensable matters for the General Hospitals, Specialized Hospitals, Aimak General Hospitals, Somon Joint Health Institutions and Somon Health Institutions that are providing medical care to the people. On these matters, the Government of the Mongolian People's Republic and the Preliminary Study Team have come to an understanding of the issues and both parties have reached an agreement.

## 2-5-2 Contents of the Medical Equipment

The Government of the Mongolian People's Republic based upon the agreement with the Preliminary Study Team, in January of this year newly revised its request of grant aid to the Government of Japan into that of the Project for Improvement of Medical Equipment. This request is based on the Eighth 5-year Plan in the basic policies of the Ministry of Health for development in the medical field. It is one of the basic policies decided at the Peoples Revolutionary Party's General Meeting (May 1986) to level up the standards of the medical care services, and to this end; to actually realize this object widely in the related competent medical care department that fits into the equipment and supplies needed to be provided. The content of this project indicated in the request made by the Mongolian government is the disposition of basic medical equipment necessary for diagnosis toward the object hospitals. The object hospitals were 3 of National Hospitals located in Ulan-Bator city (Central Republican Clinical Hospital, Republican Oncological Research Centre and National Centre for M.C.H.), 5 of Ulan-Bator City Hospitals (Ulan-Bator City Central Clinical Hospital and 4 of District General Hospitals; Sukhebaatar, Nairamdal, October and Workers), Darkhan City General Hospital, 6 of Aimak General Hospitals, 37 of Somon Joint Health Institutions and 3 Somon Health Institutions. The detailed informations for this requirements had received at the stage of the Basic Design Study and are shown as the following.

### (1) Project Sites for the Improvement of Medical Equipment

Before the Basic Design Study Team was dispatched, on the District Hospital level, only 2 District Hospitals were planned as the Project Sites. And after the Study Team was dispatched, the Mongolia side added the requests for the district of Sukhebaatar and Nairamdal.

1) Project Sites

- 1. The First Hospital
- 2. National Centre for M.C.H.
- 3. Oncological Centre
- 4. The Third Hospital
- 5. District Hospitals
  - a) October
  - b) Worker's
  - c) Sukhbaatar
  - d) Nairamdal
- 6. Darkhan City General Hospital
- 7. Aimak Hospitals (6 hospitals)
- 8. Somon Joint Health Institutions and Somon Health Institutions  
(40 Institutions)
  - a) Arkhangai Aimak Somons - Eedenemandal, Battengel, Tariat
  - b) Bayan Olgii Aimak Somons - Deluun, Tsengel
  - c) Bayankhongor Aimak Somons - Jargalant, Bogd
  - d) Bulgan Aimak Somons - Ulzit, Orkhon, Hutag
  - e) Govialtai Aimak Somons - Biger, Tugrug
  - f) Dornogobi Aimak Somon - Airag
  - g) Dornod Aimak Somons - Sumber, Bayanuul
  - h) Dundgovi Aimak Somons - Erdenedalai, Goviugataal
  - i) Zavkhan Aimak Somons - Tudevtei, Zavkhanmandal, Shiluustei,  
Tosontsengel\*1
  - j) Ovorkhangai Aimak Somons - Hujirt, Zuil, Guchin us, Harkhorin  

\*2                      \*3
  - k) Omnogovi Aimak Somon - Gurvantes
  - l) Sukhebaatar Aimak Somon - Ongon
  - m) Selenge Aimak Somon - Sant
  - n) Tov Aimak Somons - Lun, Jargalant
  - o) Uvs Aimak Somons - Tes, Baruunturun, Umnugovi
  - p) Khovd Aimak Somon - Bulgan
  - q) Khovsgol Aimak Somons - Lkhuul, Khatgal, Shinelder
  - r) Khentii Aimak Somons - Binder, Umnudelger, Kherlen

\*1,\*2,\*3 : Somon Health Institute

## 2) Contents of Medical Equipment

At the time of leaving, the required list was a collective one for each department, hence the details of the contents were not known. Two days after the arrival of the Study Team, the Team received the detail lists. In addition, Mongolian side had prepared its priority order based on the detail lists for the Study Team and submitted. The below detail list has been listed in accordance to its priority order.

The priority order means needs requiring as a first from A, B and C. Priority D means deleted quantities by the Mongolian side at the stage of the priority considering.



1. Endoscope Equipment

Hospital  Generic Title	C.R.C.H.			U.B.C.C.H.			M.C.H.			Oncological C.			District			A i m a k			S o m o n			T O T A L	
	Priority			Priority			Priority			Priority			Priority			Priority			Priority				
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C		D
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C		D
A-18 Mechanical Lithotriptor																							10
- Basket Type BML-10	10																						
A-19 Television System for Endoscope	1						1																2
A-20 SLR Camera and OM Adaptor OES 35mm	1																						1
A-21 OES Medical Camera and SC	1																						1
A-22 Halogen Lamp JCM 15- 150W	40			10			10			5	( 5)	40				50							180

## 2. Ultrasound Diagnostic Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D					
B- 1 Echocamera with * Color Doppler				( 1 )	1							( 1 )													4				
B- 2 Color Video Printer for Color Doppler System				( 1 )																					1				
B- 3 Universal Echocamera with Doppler Unit												( 1 )													1				
B- 4 Probes - Linear 3.5MHz - Sector 2.5MHz - Convex 3.5MHz - Biopsy 3.5MHz - Pediatric 5.0MHz																									1 1 1 1 1 1				
B- 5 Printer																									1				
B- 6 Universal Echocamera													( 1 )	4		6		1							12				
B- 7 Probes - Linear 3.5MHz - Sector 3.0MHz - Convex 3.5MHz - Biopsy 3.5MHz														4	4	6	1	1	1	1					12 12 12 12				
B- 8 Monochrome Video Graphic Printer																				( 7 )	( 4 )				11				

2. Ultrasound Diagnostic Equipment

Hospital  Generic Title	C.R.C.C.H.				U.B.C.C.C.H.				M.C.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
B- 9 Printing Paper																	8												22
B-10 Biopsy Puncture Needles	50				50				50				5								6		1						207
B-11 Ultrasound Sterile Gele	50				30				30				10								10								150
B-12 Portable Echocamera	1								1				1								7								10
B-13 "Sonolaer" Phased Arrey Scanner with Color Flow Imaging				( 1 )				( 1 )				1																	3

3. Surgical, Anesthetic, Resuscitation Equipment

Hospital Generic Title	C.R.C.H.				U.B.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
C- 1 Universal Operating Table	1			( 4 )	2				2					2															18
C- 2 Electro Coagulator				( 3 )	3							( 3 )				( 2 )													20
C- 3 Anesthesia Apparatus	1				1				1																				3
C- 4 Infant Ventilator	1				1				2												7								11
C- 5 Halm Absorption Equipment	1				1				1																				10
C- 6 Operating Microscope	1				1				1																				3
C- 7 Patient Monitoring System with Remote Guidance				( 1 )	1				2					2															6
* C- 8 Baro Chamber				( 1 )																									3
* C- 9 Laser Surgery Acc. C-71				( 1 )	1							( 1 )				( 1 )													4
C-10 Suction Unit	2				2				2					2			4									( 7 )	20	20	59
C-11 Automatic Dialysis Unit for Children									2																				2

3. Surgical, Anesthetic, Reanimation Equipment

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
C-12 Water Distillation Unit									1				( 1 )																2
C-13 Single-patient Automatic Dialysis Unit for Acetate or Bicarbonate with Ultrafiltration Control									1				( 1 )																2
C-14 Hollow Fiber Dialyzer									500																				500
C-15 Blood Tubing Set									500																				500
C-16 Fistula Needle									200																				200
C-17 Osmometer				( 1 )					1																				2
C-18 Neonatal Monitor									5	5						4													14
C-19 Disposable Electrode									10																				10
C-20 Surgical Suture Needle Code : T	1000				1000				1000					1000			300									1000			5800
C-21 Surgical Suture Needle Code : R	1000				1000				1000					1000			100									1000			5100

### 3. Surgical, Anesthetic, Reanimation Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D					
C-22 Surgical Suture Needle Code : C	1000				1000				1000				1000								100				1000				5100
C-23 Surgical Suture Needle Code : V	1000				1000				1000				1000			200	500							1000				5700	
C-24 Blood Vessel Suture Needle	1000				1000				1000				1000			100					100			1000				5400	
C-25 Eye Suture Needle	1000				1000				1000				1000								300			1000				5300	
C-26 Small Operating Instrument Set																5					7						(40)	52	
C-27 Cholecystotomy Instrument Set	1				1				1				1								7							11	
C-28 Gastrectomy Instrument Set	1				1								1															3	
C-29 Standard Plastic Surgery Instrument Set	2				1				2				1															6	
C-30 Nephrectomy Instrument Set	1								1																			2	

3. Surgical, Anesthetic, Reanimation Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
C-31 Neurosurgery Instrument Set				1																								1	
C-32 Operating Light																											17		
C-33 Urethral Silicone Rubber	50			50				50																			480		
C-34 Whistle Tip Urethral Catheter	50			50				50																			480		
C-35 Nasal Oxygen Catheter, Green	50			50				150																			580		
C-36 Intravenous Catheter	50			50				150																			580		
C-37 Polyethilen Tubing 5m ling	50			50				150																			580		
C-38 Infant Feeding Tube 400mm long	50			50				150																			580		
C-39 Stomack Tube 125cm	50			50				150																			580		
C-40 Trocars 3.0, 3.5-4.0	5			5				5																			87		
C-41 Ascites Trocars, 4 N	3			3				3																			80		

### 3. Surgical, Anesthetic, Reanimation Equipment

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
C-42 Silk Suture Braided Non Terile	10				10								10				10				10								70
C-43 Hepatotomy Instrument Set	1				1								1																3
C-44 Endotracheal Tube 8-22041																													
- 2.5mm																													300
- 3.0mm																													400
- 3.5mm																													650
- 4.0mm																													800
- 4.5mm																													800
- 5.0mm																													550
- 5.5mm																													500
- 6.0mm																													400
- 6.5mm																													400
C-45 Endotracheal Catheter																													350
C-46 Ventricular Catheter and Ureteral Cathe.																													6000
C-47 Venepuncture Catheter with Contrast																													7000
C-48 Gastroesophageal Catheter for Child.																													5400



### 3. Surgical, Anesthetic, Reanimation Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
C-49 Berman Airway									30								100				50								150
C-50 Manual Resuscitator C-72												5	(25)				8			(22)	40								100
C-51 Critical Care Ventilator for Child									5								4			(7)									16
C-52 Laryngoscope											10						5				7								62
C-53 Tube Dryer									5											(5)									17
C-54 Electrocoagulator									1								4				20								25
C-55 Colposcope									2					1			4				7								14
C-56 Syringe Infusion Pump																				(4)									41
C-57 Amnioscope Cervical Channel Dilator																	4												61
C-58 Laparoscope									1												7								8
C-59 Cusco's Vaginal Speculum									200								200			(300)									1500
C-60 VANGERIER's, Large Speculum									200								200			(300)									1500

3. Surgical, Anesthetic, Resuscitation Equipment

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
C-61 Vaginah de Vanagi Retractor										200																			1500
C-62 Uterine Cervical Dilators Set										10																			65
C-63 Cesarean Incision Set											2																		49
C-64 Portable Doppler Fetus Detector											2																		53
C-65 Uterine Curette																													65
C-66 Electrocardiograph 6 Channel																													11
C-67 Electrocardiograph 1 Channel Portable																													40
C-68 ECG Paper																													600
C-69 Electro Sphygmomanometer																													54
C-70 Electro Sphygmomanometer Digital Control																													52

### 3. Surgical, Anesthetic, Reanimation Equipment

Hospital Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
C-71 Laser Therapy C-9 Equipment *				( 1 )	1																								10
C-72 Manual Resuscitator																													65
C-73 Single-patient Dialysis Unit				( 2 )																									2
C-74 Hollow Fiber Dialyzer				( 1 )																									1
C-75 -1.0m2, 1.6m2, 1.8m2				(400)																									400
C-76 Blood Tubing				(250)																									250
C-77 Hemofilter				(200)																									200
C-78 Sorbent for Hemoperfusia				(20)																									20
C-79 Water Treatment Unit				( 1 )																									1

#### 4. Laboratory Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
D-1 Fluorescence Microscope	1				1				1								(1)											4	
D-2 Monocular Microscope																4					7				40			51	
D-3 Binocular Microscope	2		2		4				5		(2)		(4)		15													34	
D-4 Hemometer	5				5				5		(2)		4		10										40			71	
D-5 Hemacytometer		1		(4)	5				5		(2)		(4)												(10)	40		71	
D-6 Differential Leucocyte Counter		1		(3)	5			1 (2)	1		(2)		4												(10)	40		69	
* D-7 Blood Cell Counter	1				1				1																			3	
D-8 Colorimeter	1				1				1				4								7							14	
D-9 Clinical Spectrophotometer	1								1																			2	
D-10 Chlorid Analyzer				(1)					1																			2	
D-11 Glucose Analyzer	1								1																			2	
D-12 Gas Chromatograph				(1)				(1)																				2	

#### 4. Laboratory Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
D-13 Blood Gas Analyzer *	1								1								(5)	7											14
D-14 Flame Photometer	1						(1)		1				1					7											11
D-15 pH Meter									1												(7)								8
D-16 Centrifuge																4					(7)								11
D-17 Refrigerated Centrifuge	1							1																					3
D-18 Freezing Microtome	2								1												(7)								10
D-19 Microtom Knife	2											(1)									(7)								10
D-20 Microtom Knife Sharpener				(2)					1																				3
D-21 Electrophoresis Apparatus													1			4													5
* D-22 Electrolyte Analyzer	1							1																					3
D-23 Ultra Centrifuge	1			(1)										1	(1)														5
D-24 Laminar Box	1								1																				2

# 4. Laboratory Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
D-25 Anaerobic Jar	1				1																								8
D-26 Radioimmunoassay System				( 1 )																									2
D-27 Hemoglobin Meter	1				1				1																				14
D-28 Refractometer	1							( 1 )				1																	14
* D-29 Enzymeimmunoassay System	1							( 1 )				1																	3
D-30 Urinometer	20				20				20																				110
D-31 Inverted Microscope																													1
D-32 Ultraviolet Spectrophotometer																													1
D-33 Densitometer	1											1																	2
D-34 Automatic Pipette																													8
15 - 25 ml	2				2				2																				53
50 - 100	4				10				10																				59
200 - 500	10				10				10																				59
500 - 1000	10				10				10																				59

# 5. Pulmonary Function Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				Alimak				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
E- 1 Electrocardiograph 6 Channel	1				1							(1)																14	
E- 2 Electrophono- cardiograph, PCG			(1)	1								(1)																10	
E- 3 Electroencephalo- graph, 12-Channel			(1)	1				1																				10	
E- 4 Evoked Response Recorder			(1)	1								(1)																10	
E- 5 Ergometer	1				1																							10	
E- 6 Medical Thermography System			(1)	1								(1)																10	
E- 7 Ultrasonic Doppler			(1)	1								(1)																10	
E- 8 Blood Pressure Manometer				1				1				(9)																22	
E- 9 Pulmonary Function Test System	1			1				1																				11	

6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
F- 1 OKOMOGI's Ear Forceps	20				5				100								40				50				200				415
F- 2 HARTMANN's Ear Forceps	20				10				10								20				25				100				185
F- 3 Ear Forceps	10				10				10								20				30								80
F- 4 WILD's Ear Snare	10				10														(20)		25				100				165
F- 5 MANASSE-PASSOW's Retractor	10				2															35									47
F- 6 JANSEN's Retractor	10				2				5										(25)										42
F- 7 KABERSKIE's Powder Blower	10				5				10								20				25				250				320
F- 8 XRAUSE's Ear Snare	10				10												20				25				100				165
F- 9 VOLKMANN's Retractor	10				2																25								37
F-10 VOLKMANN's Bone Curettes Set	3				1																5								9
F-11 KILLIAN's Pattern Respiratory	10				5														(20)										35



6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				I O I A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
F-12 LUCAE's Metal Mallet	5		5		5																							35	
F-13 SCHWARTZE's Chisels	3							( 1 )																				5	
F-14 SCHWARTZE's Gouges	3							( 1 )																				19	
F-15 CITELLI's Sinus Bone Rongeur	10							( 2 )																				22	
F-16 JANSEN's Bone Rongeur	10							( 2 )																				22	
F-17 BARTH's Bone Curette double-ended	20				5																							45	
F-18 LEMPET's Nippert	20				5																							50	
F-19 ZOELLNER's Typanoplasty Instrument Set	1				1				1																			8	
F-20 SHEA's Scissors	1								1																			2	
F-21 SHEA's Teflon Piston	100								30																			130	
F-22 Austin Teflon Umbrella	100								30																			130	

6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C.R.C.H.				U.B.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
F-23 SHEA's Teflon Drain Tube	100									30																			130
F-24 Ear Speculum Set	10					5				10								12								(15)	80		132
F-25 Head Mirror	30					10				30								20				25					120		235
F-26 Ear Syringe 50 ml	20					10				20								20				25					120		215
F-27 Endoaural Retractor	5									5																			10
F-28 Surgical Suture Needles	100					20				100								40								(50)			310
F-29 SLUDER's Tonsillectome	10														10							25							45
F-30 MYLES's Lingual Tonsil Guillotine	10														10							30							50
F-31 DENKER's Peritonsillar Abscess Knife	20														10							25							55
F-32 TAKAHASHI's Tonsil Seizing Forceps	40																									(20)			65
F-33 KUBO's Tonsil Seizing Forceps	40																									(20)			65

6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
F-34 OKADA's Tonsil Scissors	40				10																								75
F-35 TYDING's Tonsil Snare	10				5																								40
F-36 JOHNSON's Palate Retractor	20				10																								55
F-37 YOSHIDA's Aspirating Tonsil Dissector	20				40																								70
F-38 Tonsil Abscess Knife curved	40				20																								85
F-39 OKADA's Tonsil Knife and Dissector	10				10																								40
F-40 BROPHY's Staphylorrhaphy Knife	20				10																								50
F-41 MAURICE-SASAKI's Tonsil Ligature Forceps	20				10																								55
F-42 Laryngeal Mirror	20				20												40										120		250

6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m a k				S o m o n				T O T A L	
	Priority				Priority				Priority				Priority				Priority				Priority				Priority					
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D		
F-43 KUZUME's Laryngeal Syringe	20				10												40											(120)	240	
F-44 TOBOLD's Laryngeal Forceps	10				10												20											(100)	165	
F-45 FRAENKEL's Laryngeal Knife	10				10												20											(80)	145	
F-46 LABORDE's Tracheal Dilator, 3 pronges	10				10												15											(80)	140	
F-47 TROUSSEAU's Tracheal Dilator	10				10												20											(80)	145	
F-48 FRAENKEL's Laryngeal Forceps	3				1												4											(40)	53	
F-49 KOCHER's Thyroid Probe	10				5												4											(40)	69	
F-50 LUER's Tracheal Tube	5				3												4											(40)	57	
F-51 Tracheotomy Instrument Set	2				2												4											(40)	53	
F-52 Nasal Speculum																														
- LENPERT's	10				10												20											(80)	180	
- WATSUJI's	10				10												20											(80)	180	
- HARTMANN's	10				10												20											(80)	180	

6. Equipment for Ear, Nose, Throat

Generic Title	Hospital	C.R.C.H.				U.B.C.C.H.				M.C.H.				Oncological C.				District				Alimark				Somon				TOTAL
		Priority				Priority				Priority				Priority				Priority				Priority				Priority				
		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
- KILLIAN'S		10				5				10																			75	
F-53 KRAUS'S Nasal Snare		10				5								12														(80)	132	
F-54 HARTMANN'S Nasal Forceps, cupped jaw		12				5												(12)										(80)	134	
F-55 GRUENWALD'S Nasal Cutting Forceps		10				5												(12)										(80)	132	
F-56 BRUENING'S Septum Forceps, 1-2		15				5												(12)										(80)	137	
F-57 SAKAKI'S Septum Forceps		10				5																						(10)	25	
F-58 KUKUCHI'S Nasal Forceps		10				2																						(10)	22	
F-59 Maxillary Sinus Forceps		10				5																						(10)	25	
F-60 GRUENWALD'S Nasal Forceps		10				5																						(10)	25	
F-61 NISHITATE'S Ethmoid Forceps																														
- up-curved		5				5																						(10)	20	
- slightly curved		5				3																						(10)	18	
- Straight		5				3																						(10)	18	

6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D					
F-62 HEYMANN's Turbinate Scissors	10				10												( 4)				(15)				(40)	79			
F-63 BECKMANN's Turbinate Scissors	10				5												4				(15)				(40)	74			
F-64 BECKMANN's Middle Turbinate Scissors	10				5												4				(15)				(40)	74			
F-65 KILLIAN's Maxillary Sinus Mucosa Elevators	10				5																(20)					35			
F-66 TORII's Maxillary Sinus Mucosa Elevators, double-ended	10				5																(20)					35			
F-67 TADOKORO's Gingival Incising Knife	20				5												4				(15)					44			
F-68 KYOTO Univ. pattern Mucosa Knife, of maxillary sinus	20				5																(15)					40			
F-69 KILLIAN's Frontal Sinus Cannula	10				10												4				(25)				(40)	89			
F-70 KILLIAN's Ethmoid Cannula	10				10																(25)					45			

6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
F-71 HAJEK's Ethmoid Cellulitis Operating Instrument Set	5				2																								12
F-72 Frontal Sinus Rasps	10				5																								30
F-73 KILLIAN's Eyeball Protector	10				5																								30
F-74 KUBO's Maxillary Antrum Probe	10								( 5 )								4										( 15 )	( 40 )	74
F-75 KILLIAN's Maxillary Antrum Probe	10								( 5 )								4										( 15 )		34
F-76 MIKULICZ's Maxillary Antrum Cannula	10								( 5 )								4										( 15 )		34
F-77 KILLIAN's Frontal Sinus Probe	10								( 5 )																		( 15 )		30
F-78 KASHIWABARA's Nasal Retractor	10								( 5 )																		( 10 )		25
F-79 STERNBERG's Lip Retractor	10								( 5 )																		( 10 )		25
F-80 DENHART's Mouth Gogs	10								( 5 )																		( 10 )		25

6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
F-81 WHITEHEAD-JENING's Mouth Gogs	10				5																								25
F-82 KILLIAN's Gouge	10				5																								30
F-83 MIKULICZ's Maxillary Antrum Trocar	10				10												4										(40)	74	
F-84 TANAKA's Sinus Rasps	20				5												4										(10)	39	
F-85 TAKAHASHI's Suture Needle Holder	1				1																								2
F-86 Treatment Chair	2				1								( 1 )																4
F-87 Automatic Recording Audiometer	1			1	1													4									( 7 )		14
F-88 Binocular Microscope for ENT	1									( 1 )							4										( 7 )		14
F-89 Light Source	1				1							1					4										( 7 )		14
F-90 Otoscope	1			( 9 )							( 10 )									( 10 )							( 50 )		80
F-91 Antroscope	1																												2
F-92 Oto Nasal Scope	1																												1



6. Equipment for Ear, Nose, Throat

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
F-93 Ultrasound Scanner for Ear	1												( 1 )																2
F-94 Diagnostic Equipment Invitro Ear		1											( 1 )																2
F-95 Equipment for Balances Ear		1											( 1 )																2
F-96 Objective Audiometry System		1										1																	2

# 7. Equipment for Ophthalmic

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D					
G- 1 Auto Refractometer			1						1																2				
G- 2 Slit Lamp	1								1																2				
G- 3 Compact Slit Lamp	1					1											4						( 5 )		12				
G- 4 Ultrasonic Scanner	1								1																2				
G- 5 Ophthalmoscope	1		1			1											( 4 )			5					13				
G- 6 Ophthalmoscope with Battery	1		1						1								( 4 )			5					13				
G- 7 Trial Lens Set	2								2								( 4 )					( 5 )			13				
G- 8 Microsurgical Set for Cataract and Glaucoms	2								1																3				
G- 9 Microsurgical Set for Crystalline Lens	1																								1				
G-10 Microsurgical Suture with Needle																													
- 6-0	100								100																200				
- 7-0									100																100				
- 8-0									100											50					200				
- 9-0	200								200											50					500				
- 10-0	500								200																700				

7. Equipment for Ophthalmic

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D					
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D					
G-11 Surgical Argon Laser Photocoagulator				(1)																					1				
G-12 Needle Holder	5								5																30				
G-13 Scissors, Corneal Section	5								5																30				
G-14 Forceps, Corneal	5								5																30				

# 8. Dental Equipment

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m e k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
H- 1 Laboratory Micromotor					2												4												20
H- 2 Dental Chair	3				2				2																			(40)	58
H- 3 Dental Pulp Tester	1				1				1																				15
H- 4 Amalgam Gun	2								( 1 )								4												15
H- 5 Centrifugal Casting Machine	1				1												4				7								13
H- 6 Dental Operative Instrument	50				30				20								120				21								1170
H- 7 Table Anesthesia																													58
H- 8 Physicians Bag																													100
H- 9 Hair Washing Trolley																													62
H-10 Kelly's Pad																													102

9. X-ray Equipment

Hospital  Generic Title	C. R. C. H.				U. B. C. C. H.				M. C. H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
I- 1 X-ray Equipment with TV System	1				1				1				1								7								11
I- 2 X-ray Car																					7					3			10
I- 3 Blood Drawing Car																										2			2

10. Equipment for Gynecology

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
J- 1 Hystero- salpingography Set									2				(1)																3
J- 2 Amniotic Fluid Suction Catheter									4																				4
J- 3 Hysteroscope System									1				(4)																5
J- 4 KEO-Univ. Type Salpingoplasty Apparatus									1				(1)																2
J- 5 Gynecological Examination Table									2				(4)																6

# 11. Urological Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.C.H.				M.C.H.				Oncological C.				District				Aimakk				Somon				TOTAL
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D					
K- 1 Light Source for Light Guide Bundle	1																								1				
K- 2 Cystofiberscope Set	2																								2				
K- 3 Urtera Renofiberscope	2																								2				
K- 4 Percutaneous Nephroscope Set	2																								2				
K- 5 Kidney Stone Punch Set	2																								2				
K- 6 TV System for Endoscope	1																								1				
K- 7 Lecture Scope	1																								1				
K- 8 Cystofix with Balloon Catheter	100			(900)																					1000				
K- 9 Nephrostomy Catheter																													
- 14x4	100																								100				
- 14x5	100																								100				
- 16x6	100																								100				
- 16x8	200																								200				
- 18x8	200																								200				
- 20x8	200																								200				
- 22x8	200																								200				

# 11. Urological Equipment

Hospital  Generic Title	C.R.C.H.				U.B.C.C.H.				M.C.H.				Oncological C.				District				A i m a k				S o m o n				T O T A L
	Priority				Priority				Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D					
X-10 Balloon Catheter																										25			
- 8 Fr.																										25			
- 10 Fr.																										50			
- 12 Fr.																										80			
- 14 Fr.																										200			
- 16 Fr.																										800			
- 18 Fr.																										500			
- 20 Fr.																										500			
- 22 Fr.																										400			
- 24 Fr.																													
K-11 Urological Operating Table																										1			
K-12 Urological Examination Table																										1			



12. Repair Equipment for Maintenance Center

Generic Title	Maintenance C.				Priority				Priority				Priority				Priority				I O I A L
	Priority				Priority				Priority				Priority				Priority				
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
L- 1 Vacuum Gauge for X-ray Tube	1																			1	
L- 2 X-ray Tube Voltage Meter	1																			1	
L- 3 Memory Oscilloscope	1																			1	
L- 4 X-ray Voltage Current Meter	1																			1	
L- 5 4 Channel Portable Digital Oscilloscope	1																			1	
L- 6 Universal Generator, Functional	1																			1	

## **CHAPTER 3**

### **CONTENTS OF THE PROJECT**



## CHAPTER 3 CONTENTS OF THE PROJECT

### 3-1 Objective

The objective of the Project is to assist the selected hospitals in the improvement of their diagnostic and curative capabilities, taking into consideration the balanced development of the national medical system as a whole, based on the Health and Medical Policy of the Government of the Mongolia, through procuring medical equipment ( 1)Endoscope, 2)Ultrasound Scanner, 3)equipment for surgery, anesthesia and recovery room, 4)equipment for clinical laboratory, 5)equipment for physical function tests, 6)equipment for ear, nose and throat, 7)ophthalmic equipment, 8)dental equipment, 9)X-ray systems, 10)equipment for gynecology, 11)equipment for urology, 12)equipment for Maintenance Centre ) and thus to contribute to the promotion of health for the Mongolian people.

### 3-2 Study and Examination of the Request

#### 3-2-1 Appropriateness of the Project

Through analysis of the requested equipment, the items of basic agreement in the Preliminary Study, and through the Field Survey of the Basic Design Study and discussions on two occasions with those concerned in Mongolia, it was confirmed that the objective of the request from Mongolia (MHSS) is to attain an improved and balanced diagnostic and curative capability from the Somon level to the central level, with emphasis placed on improving the diagnostic capability particularly in local Somon and Aimak areas where medical facilities are inadequate.

Taking the foregoing into consideration, the medical equipment requested to attain the above objective may be classified into the following four categories.

- (1) Expendables such as Suture and Needles; semi-expendables such as Catheters and Tubes.
- (2) Basic equipment such as Forceps for operations, Electrocardiograph, Slit Lamp, Hemoglobin Meter.

- (3) Modern equipment in Japan, but not yet in wide spread use in Mongolia such as Endoscope, Ultrasound Scanner, Respirator and Blood Gas Analyzer.
- (4) Expensive equipment such as Ultrasound Scanner with Color Doppler Unit, Laser Therapy Apparatus and Automatic Dialysis Unit.

From the field surveys of existing medical facilities and listening to those in charge of the local facilities, the lack of medical expendables/semi-expendables and basic equipment of (1) and (2) and superannuation are noticeable with demands increasing for enhancement of basic equipment for routine diagnosis and treatment. The requested equipment is also based on this need. In addition, there are requirements for (3) and (4) for the respective functions in the mainstay hospitals (Central Republican Clinical Hospital, Ulan-Bator City Central Clinical Hospital, National Centre for M.C.H and Republican Oncological Research Centre).

Although all of the equipment is needed in Mongolia, judging from the need emphasis should be placed on the aforementioned improvement of high priority basic medical equipment rather than on such equipment as Ultrasound Scanners with Color Doppler Unit and Automatic Dialysis Units. Although the mainstay city hospitals provide diagnosis and treatment for patients from throughout the country, improvement of the mainstay hospitals' diagnostic capability will probably be limited principally to city residents and not necessarily extend to the local people scattered throughout the country. Although an Republican Oncological Centre is provided as a national centre to treat patients requiring high level medical technology such as those with cancer, the actual situation is that many of the patients are introduced only when they reach a state beyond medical aid because of the lack of general diagnostic capability for the patients in the local medical facilities. In the cities, the actual situation is that patients that could be treated at District General Hospital level are hospitalized in the mainstay hospitals due to lack of equipment in the medical facilities at a level below the mainstay hospitals. An ophthalmologist at the Central Republican Clinical Hospital, which is the National Ophthalmology Centre, pointed out that the first step in raising the level of ophthalmic treatment in Mongolia is to equip the Aimak and District General Hospitals with Slit Lamps and Ophthalmoscopes since the hospitals will be ineffective, even if provided with ophthalmologists, if they lack basic medical equipment. There is also the need for Automatic Dialysis Units but continued treatment is threatened because of the lack of medical

materials required for present dialysis treatment. It was considered that priority should be placed on providing medical materials to enable maintaining the present level of capability.

The first thing necessary for the mainstay hospitals around the City of Ulan-Bator is to equip them with various basic medical equipment that are currently lacking as explained above. However, the need to improve medical equipment at referral hospital in the country side to enable them to cope with special patients must also not be overlooked. Although some of these hospitals are already aiming at improvement of their diagnostic level and are introducing modern medical equipment such as Ultrasound Scanners and Endoscopes, they are still inadequate and require reinforcement centering on treatment instrument. In addition, since the existing Fluoroscopic Radiography Systems are of the direct exposure type, physicians or operators in charge of diagnosis and handling under fluoroscopy are urged to operate while receiving directory radioactivity. It is therefore judged that the time has arrived to consider introduction of Remoto Control Systems whereby the physicians or operators are able to observe fluoroscopic images indirectly through the monitor television and is kept from direct X-ray exposure from the viewpoint of securing the safty, coping with future technical introduction (i.e. endoscopic diagnosis and treatment under fluoroscopy). Furthermore, the actual situation is that these modern medical equipment have still not used sufficiently at the Aimak General Hospitals which are referral hospitals on the provincial level. The significance of providing modern medical equipment at the Aimak level would be highly effective for the purpose of improvement of diagnosis and treatment technology at the provincial level, which is the main objective of this Project, and also when considering the special difficulty in transporting patients from their dwellings which are scattered throughout Mongolia.

Implementing this Project which emphasizes providing various basic medical equipment lacking in Mongolia and also providing indispensable medical equipment necessary for the country's technical improvement of diagnosis and treatment may be said to be of great significance.

### 3-2-2 Plan of Operation

It will be necessary to confirm operation and maintenance abilities and the procurability of medical expendables and spare parts, and also to establish the required budgets. There is no problem in relation to equipment (1) and (2). Mongolia also hopes to procure equipment in (3) and (4) of the type used in Japan. There will be no problem as long as the equipment procured is of the same level as those already existing in the selected Project facilities, but peripheral improvements will be required in Mongolia since practically all will be equipment new to the country.

Since practical courses are already being held twice a year for the doctors of the Aimak and District General Hospitals (Ultrasound Scanner only) on Endoscopes and Ultrasound Scanners, and since periodic re-education programs are being implemented in Mongolia, in relation to other equipment being introduced, and they are actively participating in study courses in the Soviet Union and other countries, it is possible to assume that the operation of equipment can be coped with. However, in case doctors and technicians are inexperienced with the new types of equipment, considerable time will be required to cope with. It is therefore hoped that technical cooperation (i.e. training in Japan and sending experts) be maintained for the early and effective use of introduced medical equipment.

	<u>Practical Courses</u> <u>in Mongol</u>	<u>Re-education</u> <u>Programs</u>	<u>Practical Courses</u> <u>in Foreign Countries</u>
<u>Equipment</u>	Ultrasound Scanner	Endoscope	Laboratory Equipment
<u>Terms &amp; Times</u>	2 weeks x 2/year	1 week/year	3 months/2 years
<u>Object</u>	Doctor & Clinical Engineer	Doctor & Clinical Engineer	Laboratory Technician
<u>Personnels</u>	(Aimak Hospital Level & District Hospitals Level)	(National Centre Level & Aimak Hospital Level)	(National centre Level)

Generally speaking, it was observed that the competent people concerned in Mongolia were actively and earnestly using the present equipment as compared to other developing countries. However, medical expendables such as laboratory reagents used for specimen tests and recording paper for Electrocardiographs are in short supply and, though the staff of the MHSS say that this is not due to insufficient budget but rather to difficulty in obtaining those materials (Distribution of goods to Mongolia has been decreasing noticeably in recent years due to the effects of Perestroika in the Soviet Union), the shortage of foreign exchange is also a concern. Equipment that were out of order and were left unattended were also observed and the reason given by the people concerned was that the "Soviet Union had sent equipment that could no longer be used and that spare parts are unavailable." (with respect to this point, opinion was expressed hoping that equipment of which parts are able to be secured henceforth continuously be procured in this Project). The MHSS affirmed to do their best for obtaining the necessary budget in the connection with maintenance and utilization of the equipment provided after this Project is executed. (It was also requested that Mongolia would be informed of roughly estimated operation cost of the equipment introduced so that necessary budgetary measure may be taken.)

Repairs of various equipment including IC boards are being conducted at the Maintenance Centre, which is an exclusive organ for repairing medical equipment in Mongolia, and measures such as actively securing spare parts and permanent stationing of repair technicians from the Soviet Union are being implemented. Although still not adequate, the approach to maintenance of equipment is earnest as compared to other developing countries. As already explained, the MHSS is expanding its repair and assembly section to cope with the modernization of medical services and construction plans have already been completed by engineers from the Soviet Union to train repair technicians, and it has been decided to commence construction during the Field Survey of the Basic Design Study Team of this Project. Although the principal repair equipment will be imported from the Soviet Union, it will be necessary to provide adequate repair tools and measuring instruments that conform to the equipment procured in this Project in order to cope with the medical equipment acquired from Japan in the future.

Matters of highest concern in this Project are the possibility of continued availability of medical expendables and spare parts from Japan after



implementation of this Project and the purchasing budget, though information relative to procurement routes and assurance of the budget was obtained by the Study Team.

### 3-2-3 Assistance Plans by International Organs and Their Relation with the Project

A personnel training program through WHO is also being conducted as a supporting plan. This was started in 1988 with two years as one cycle in which two to three persons are dispatched to the West (Europe and America) for study with the objective of becoming medical engineers and technicians (including medical doctors). Some of the objective fields are as follows:

- (1) Dental Surgery
- (2) Clinical Laboratory
- (3) Physical Treatment
- (4) Disease measures (excluding Infectious Diseases)
- (5) Tuberculosis Diseases

Technical-transfer is being conducted in the form of joint research with two or three medical doctors being dispatched per cycle from the advanced countries of the West to conduct training in Mongolia. Since implementation of these personnel training programs will lead to improvement of the technical level of those in the medical profession, further improvements in effective use of the equipment procured under this Project may be anticipated.

On the other hand, UNDP 5-year Plan assistance is being conducted from 1987. Budgetary amount of this assistance (from 1987 to 1991) is 1,150 to 1,200 US\$ totally (medical field: 200 US\$). Contents of this plan are:

- (1) establishment of foods factory, and its related technical transfer.
- (2) establishment of vaccine factory for viral hepatitis (B type), and its related technical transfer.
- (3) equipment procurement for blood analyzing, and its related technical transfer.

Objective of this assistance plan is manufacturing of foods and medical products and related technical cooperations.

### 3-2-4 Outline of the Required Equipment

As explained in Section 3-2-1, the equipment requested in this Project may be broadly classified into four fields.

As classified in the list of requested equipment, examinations were conducted by type of equipment in this section with examinations also being conducted on the possibility of peripheral improvements required relative to procurement of high priority equipment as classified in (3) and (4).

#### (1) Expendables, Semi-Expendables and Basic Medical Equipment

##### 1) Expendables and Semi-expendables for Surgery, E.N.T., Ophthalmic Department

In this department, Sutures and Needles, Catheters for stomach and urethra are the principal contents of the request. As a result of the survey of various medical facilities, it was noted that there was a conspicuous shortage of medical expendables and semi-expendables, such as suture needles being especially scarce thus resulting in one type of suture needle being used for many types of surgery. The same may also be said of forceps, so it is believed that, from the standpoint of priority, these items should be the first to be provided.

##### 2) Semi-expendables and Basic Equipment for Clinical Laboratory Department

The above situation also holds true for semi-expendables items such as Test Tubes, Beakers, Flasks and Pipettes in this category for the overall objective facilities of this Project since quantity and type were noticeably lacking with many hospitals using chipped Test Tubes. It is also considered that consolidation of such basic instruments as automatic pipettes and dispenser are effective for enhancement of accuracy in manual examination and raising examination efficiency since automation of clinical examination is hopeless for the present. Although these items are not on the list of requested equipment, they may be considered equipment that must be strengthened as an objective of this Project. Shortage and aging of Microscopes and Centrifuges, which are considered basic medical equipment, was also conspicuous, with maintenance of functions being the most urgent task at hand.

### 3) Basic Equipment for Maintenance Centre

At present, the Maintenance Centre is provided with practically all the equipment necessary to repair electronic medical equipment commencing with Frequency Analyzers. The request at this time is for repair equipment for X-ray Systems. There are no technical problems in operating this type of system in Mongolia so it may be said that improvements in repair techniques of X-ray Systems may be anticipated if transfer of repair technology is implemented in parallel with the introduction of these systems.

### (2) Modern Medical Equipment and Expensive Equipment

#### 1) Endoscope Equipment

Some of the Endoscopes presently being used in the mainstay hospitals in Ulan-Bator are made in Japan. The principal request in this Project is for Endoscopes for Upper Gastrointestinal, Duodenal, Lower Gastrointestinal and Urological use. At present, diagnosis and treatment of focus (ulcers) is being conducted with an Endoscope for Upper Gastrointestinal use in several hospitals under the guidance of the First Hospital. Training for medical doctors is also being conducted in each Aimak General Hospital to enable them to perform endoscopic diagnosis centered on the gastrointestinal organs. The First Hospital plans to improve endoscope-using curative technology (Polypectomy and Hemostase), requesting necessary medical instrument (i.e. Forceps etc.)

#### Endoscopes for Gynecology and Urology Department

Hysteroscopes and Colposcopes as gynecology equipment used for diagnosing abnormality in the uterus or cervix are requested. As for endoscopes for use in urology, especially as instrument necessary for percutaneous removal of kidney stones, cystoscope and pyeloscope currently not in their possession was requested.

## 2) Ultrasound Scanner

Ultrasound Scanner are requested centering on mainstay hospitals since the scanners are used for various purposes and are handled in a simple way. Especially, it is believed that portable ultrasound scanners which can be used for diagnosis in the hospitals involved in this plan and traveling clinics within the community will offer great convenience to those local inhabitants who are estranged from modern medical care. In addition, various types of probes are also requested to cope with a variety of diagnosis since this instrument can be connected to various types of probes. With respect to this point, selection needs to be made in consideration of objective patients and sites for diagnosis (e.g., adults/children, obstetrics, thyroid gland, liver, bile-duct, kidney, etc). Similarly, excavator adapters applicable to new medical care technology, e.g. biochemical examination and drainage by the existing Ultrasound Scanner, were requested. Therefore, this matter has been taken into consideration. The Ultrasound Scanners have already been introduced in some mainstay hospitals. Therefore, it can be foreseen that the Ultrasound Scanners will be spread widely in the country in the future because of its usefulness. Accordingly, there is a need to standardize the convertibility of various types of probes with the existing equipment in consideration of future maintenance.

The Ultrasound Scanner enables physician to make a diagnosis while watching images on the monitor television. Therefore, it is necessary to establish some recording system centering on training facilities (e.g. the first hospital) useful for spreading diagnosis technology education. As four kinds of means, such as filming, polaroid camera, videotape and videoprinter. The use of videotape and videoprinter is efficient, if the cost of expendables is taken into consideration. It was concluded as a result of discussion with the Mongolian officials that the use of videoprinters would be the best.

The Third Hospital requested Ultrasound Scanners with color dopplers for the improvement of cardiac function diagnosis ability. However, there is the necessity to transfer operating and analytical technologies and difficulties are also felt in repairing and maintaining the Scanner. In addition, image-oriented diagnosis is possible even with general-purpose equipment. Consequently, it was considered reasonable that priority should be given to other equipment.

When viewed from the aspect of maintenance and running costs, a steady supply of the recording paper for obtaining clear pictures to judge adequate diagnosis and gel for a probe must be assured for effective use. Using a general hospital in Japan as an example, the criteria of costs for expendables used per person per diagnosis are recording paper for video printers at 9 yen x 8 sheets = 72 Japanese yen (1.97 Tug) and gel at 500 Japanese yen (13.7 Tug)/bottle/100 people = 5 Japanese yen (0.137 Tug).

### 3) Equipment for Surgery, Anesthesia and Recovery

As expensive equipment, high pressure oxygen cure system and laser cure system are included in the requested equipment list. In Japan, the high pressure oxygen cure system was spread temporarily for the cure of caisson disease, hydrocarborism, etc. However, the opportunity to use the system for the cure of the latter decreased in recent years as artificial respiratory systems have been developed. Concerning this system, no definite answer was obtained from Mongolia in conjunction with target disease. The laser cure system is used for treatment of microfocus site mainly in Ophthalmology and Orthopedics (Use of laser for hepatectomy and gastrorrhagia has not been appreciated uniformly even in Japan). Priority is given to electric operating machine, artificial respiratory system and operating microscope consolidation where the number and efficacy of target diseases are taken into consideration. Expensive equipment, namely and laser cure system, were deleted with the remark that difficulties were felt in introduction into Mongolia in view of after-service system on the Japanese manufacturers side, technology to use these systems and limitation on useful gas procurement.

In addition, concerning artificial dialysis system, the First Hospital has four systems for adult use at present. However, there is no such system for use of children in Mongolia. Therefore, MHSS strongly requests introduction of some dialysis systems for children into the National Centre for M.C.H. as priority task. For the effective use of this system, expendables need to be procured continuously. Therefore the Draft Final Report Explanation Team Provided Mongolian counterparts (MHSS) information on technical problems and a total amount of budget for operation and maintenance of the system. In response, MHSS stated that it would back up securing the budget fully, emphasizing the necessity of the system again. For the First Hospital, the possibility of supplementing consumables, i.e. hemo-circuit, AV-shunting device, pterygoid detention needle, peritoneum back flow set for home use, was studied

in view of difficulty in procuring consumables for the existing systems.

#### 4) Equipment for Clinical Laboratory Department

As for requested equipment, Blood Gas Analyzer, EIA System, Electrolyte Analyzer, Flame Photometer, Glucose Analyzer, Chloride Analyzer are listed. As biochemical examination, Approximately 23 items of examination are performed currently using the Spectrophotometer and Colorimeter. The samples examined daily reaches a total of 30 to 50 although the number of samples differs depending on hospitals. Therefore, provided such a situation does not change so much, it can be said that there is a necessity to consider the necessity of automatic examination units restrictively from the point of peripheral conditions such as increasing running cost, procurement of reagents, technical knowledge for repair.

As Blood Gas Analyzer has been recently been installed for use in the operating room. This system is used through analyzing Blood Gas and equilibrium of acid and base in their blood for the purpose of obtaining calculatin standard for anesthetic density in patients under operation and adjusting body fluid balance. The EIA (Enzyme Immuno Assay) system is of a comparatively standard type and is useful for examination due to its high accuracy. However, there remain some problems to be solved e.g. as for Enzyme since the active period is comparatively short, its cost is high and once unsealed the preserration conditions are restricted. Therefore, it is difficult to maintain the system properly. In addition, Japanese manufacturers have not consolidated maintenance structure yet. For those reasons, the system have been deleted out of the list since it is considered impossible to procure.

Mongolia attaches importance to clinical examination. Above all, the country requests that the clinical examination room of the First Hospital be provided with consolidated equipment demanding various kinds of examination equipment. Similarly, consultation was held on the equipment with the presence of an MHSS technical official who had been promoted from former post as examination technicain with the First Hospital.

Flame Photometer is requested for the reson that the existing equipment is old and deteriorated. However, this system requires routine operating technology as well as troublesome daily care. there is also the said gas procurement problem. As subsitute, Electrolyte Analysis Unit is conceivable if the

necessity of minimizing the amount of blood sampling and reducing burden against the patients is to be taken into consideration. Likewise, in the case of Blood Gas Analyzer, only the system installed in the Third Hospital is in operation at present. Therefore, the analyzer is in joint use with the First Hospital. When other hospitals need to analyze Blood Gas, the Third Hospital is requested to take charge of the analysis enabling other hospitals to continue medical treatment. Generally, the Blood Gas Analyzer is used frequently. Especially, in the case of the National Centre for M.C.H, the present situation is that it does not have such a system as to sample a small amount of blood for examination although serum electrolyte analysis and equilibrium of acid and base analysis based on the blood gas analysis are necessary for management of critical immature baby and patients under serious condition. For this reason, introduction of Electrolyte Analysis Unit and Blood Gas Analyzer to the National Centre for M.C.H. was studied emphasizing the necessity to sample a small amount of blood for examination and leaving a trial footstone for automation of the examination.

Some other equipment, such as Chrolide Analyzer and Glucose Analyzer, are requested on the central hospital level. Examinations on this level can be conducted manually using the existing equipment, if the number of samples currently handled are to be taken into consideration.

#### 5) Equipment for Physical Function Test Department

High performance equipment such as an Evoked Response Recorder and Medical Thermography System are in the agenda. The former is used to check changes in electrical potential induced in the patient by applying stimulus with sound, electricity and light, and is a type of equipment used widely for diagnosing brain stem syndrome and monitoring the state of recovery, and also to monitor operations and judge brain death. The latter is a type of equipment for detecting diseased parts by receiving electromagnetic waves of infrared rays radiated from the body and displaying temperature distribution on the surface of the body on the CRT screen. Since the proper maintenance services can't be provided, a decision was made to exclude from the list for cancellation. The Third Hospital requested Six-element ECG with monitor, which is necessary for a loading electrocardiographic examination. Similarly, the Third Hospital requested three-element ECG in order to cover the shortage of existing equipment. The ECG of this type is most frequently used in routine ECG examination ever in Japan and is easy to operate.

Concerning Lung Function Measuring Unit, equipment with poor work efficiency is currently in use and it is operated manually in all process up to measurement. In such hospitals specializing in thoracic surgery as Oncological Center and the Third Hospital where many old patients requiring precise lung function measurements are necessary for treated, some compact equipment which are capable of obtaining high precision examination levels through automatic calculation and which are in use already in Japan, are first of all required.

#### 6) Equipment for Radiology Department

The remote control type (This is the mode to operate a Fluoroscopic Radiography System by radiologist outside of the X-ray room seeing a patient radiation zone through TV monitor) X-ray TV System is requested in this Department. After result of survey, it was found that two different types of Radiography System (General-purpose Radiography System and Fluoroscopic Radiography System), which are installed in the Radiology Department of the target hospitals under this project, have been operated systematically by one operating panel. It is impossible to keep up usual diagnosis functions by only procuring a new Remote Control type X-ray TV System. Therefore General-purpose Radiography System is requested to procure additionally. Since the Fluoroscopic Radiography System and General-purpose Radiography System are of the old type, which are manufactured about 20 years ago, the operator receives direct radioactivity especially in the course of fluoroscopic operation. Therefore, it involves high risk. On the other hand, the clinical sector assumes a positive attitude toward introduction of defensive examination and treatment technology under fluoroscopy using endoscopy and ultrasound scan system, looking for some new type of equipment therefore. It was judged that the remote control type X-ray TV system, which has generally been used in Japan as the movable type system with TV would be recommendable in consideration of the possibility of the examination and treatment under fluoroscopy and securing operator's safety. Considering the above operating situation, the General-purpose Radiography System which has a similar function of existing system would be necessary to procure under this project. Preparatory work has already started in the installation room of each target hospital involved in this introduction plan. On the other hand, Mongolian government is considering to remove the existing systems to some district hospitals or some the rural hospitals after this plan is implemented.



Considering procurement of this system, it is believed that this is a type of equipment for which relatively few problems exist in procurement from the viewpoint of the frequency of use of diagnosis with X-ray equipment in Mongolia and, also, from the viewpoint of maintenance and running capability. These are equipments that will require adequate technical transfer to the Mongolian engineers since this will be the first case of operating, servicing and repairing of Japanese equipment in Mongolia. Although there is concern in relation to the steady procurement of expendables and spare parts for operation and maintenance of the equipment, it is believed that effective maintenance of functions can be anticipated if the X-ray films and X-ray tubes are procured on a well-planned basis.

In reference to the calculations based on the concrete maintenance costs in Japan relative to purchase of this equipment in Japan, the criteria will be 1,086 Japanese yen (29.75 Tug) - 181 Japanese yen (4.96 Tug) x 6 films - for X-ray film costs and 300 (8.2 Tug) Japanese yen and 22 (0.6 Tug) Japanese yen respectively for contrast medium and foaming agent (cost per person for Gastrointestinal Fluoroscopy) as expendable items, spare parts at 150,000 Japanese yen (4.110 Tug)/once/year, X-ray tubes at 1,200,000 Japanese yen (32.880 Tug)/set/2 years, Image Intensifier at 2,400,000 Japanese yen (65.760 Tug)/set/4 years, and about 500,000 Japanese yen (13.700 Tug) will be the target cost for operation and maintenance with technicians being dispatched from Japan once every two years.

### 3-2-5 Basic Plan of Implementation

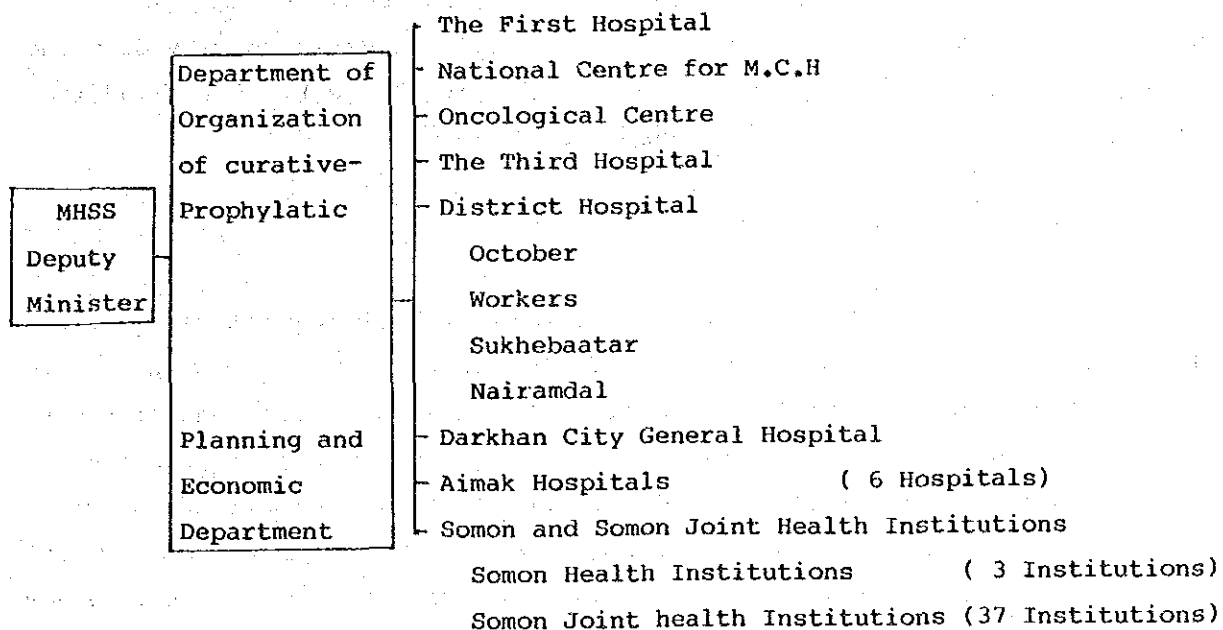
With confirmation of the results of the foregoing study and examination, and an understanding of the reality and implementing capability of the recipient country, and the fact that the effectiveness of this Project matches the Japan's Grant Aid System, it was judged that implementation of this Project under grant aid is appropriate. With grant aid from Japan as the prerequisite, studies and examinations will be conducted as follows on the outline of the Project and the Basic Design will be implemented. However, certain changes in equipment are appropriate as explained in the studies and examinations conducted on the contents of the equipment requested.

### 3-3 Outline of the Project

#### 3-3-1 Executing Agency and Operational Structure

The MHSS will be in full charge of as well as manage this Project. With a new Minister assuming office, the Ministry was currently reorganized. And it was clarified by the new Minister of the MHSS that the new First Deputy Minister was assigned as the person responsible and that the departments specializing in Aid and in Facilities Supply of MHSS are in charge of the actual work.

#### Organization Structure of the Project



#### 3-3-2 Object Facilities (Hospitals) of the Project and Reason for their Selection

- 1) Mainstay Hospitals at National Level (The First Hospital, National Centre for M.C.H, Oncological Centre and The Third Hospital)

It is necessary for the mainstay hospitals in Ulan-Bator that are the objective of this Project to be improved with equipment for basic diagnosis and treatment in addition to the necessity of perfecting their diagnosis and treatment as a National Centre for exclusive fields with special characteristics. In concrete form, the objective is to upgrade diagnosis and clinical

examinations by means of X-rays, Endoscopes and Ultrasound Scanners, improvement of surgical techniques for eye, ear and plastic surgery (microsurgery) fields with the introduction of Operating Microscopes, and strengthening of ICU functions with Respirators and Bedside Monitoring Systems. As for the others, such facilities as a national level centre, The 2nd National General Hospital, Tuberculosis Centre, Dermatological Centre, Psychiatric Centre and Infectious Disease Centre are available as specialized hospitals on the national level. However, the 2nd National General Hospital is limited to high ranking government officials and foreign people and the other exclusive facilities are final referral hospitals with special patients receiving diagnosis and treatment. However, if compared with Oncological Centre and National Centre for M.C.H, patients are few and judging from the benefits to local residents, it may be said that priority will be placed on providing the facilities mentioned first as the object of this Project. The facilities selected here are, therefore, considered appropriate.

## 2) District Hospitals in Ulan-Bator City

At present, Ulan-Bator is divided into six (6) administrative districts with a District General Hospital located in each. Although two hospitals (October District, Worker's District) were the object District General Hospitals of the Project at the Preliminary Study stage, two hospitals (Sukhebaatar District, Niramdal District) were added as object of this Project in the Basic Design Study process. Of the six (6) districts, the Baganor District and Nalaiha District, which are not objects of this Project, are located in a new industrial belt located away from Ulan-Bator City. With development of this area, a District General Hospital was newly constructed and the facilities in the hospital have been reinforced with the assistance of the Soviet Union. Since the foregoing four (4) District General Hospitals that are the object of this Project were in the city centre, they received little beneficial effect from the strengthening of the mainstay hospitals at the national level these past several years causing delays in providing hospital medical equipment and severe delays in diagnostic functions. Those hospitals were selected as the objects of this Project since their condition was such that improvement was essential.

### 3) Darkhan City General Hospital

Darkhan City with a population of 86,000 is an industrial city located 250 km north of Ulan-Bator. This city was selected as an object of the Project since it is the second city in size to Ulan-Bator in Mongolia and that industrialization will continue to be advanced there in the future. Ulan-Bator, Darkhan and Erdenet are three special administrative cities but Erdenet City is not an object of this Project. The reason for not including Erdenet City is that this is a city for the mining of mineral resources such as copper and molybdenum and the improvement of medical facilities had been advanced with assistance from the Soviet Union.

### 4) Aimak Hospitals (6 Hospitals)

Of the 18 Aimak General Hospitals, six (6) hospitals consisting of the Khovd, Dornod, Dornogobi, Tov, Arkhangai and Ovorkhangai hospitals were selected as objects of this Project. The principal reasons for selecting these six Aimak General Hospitals were that they are in Aimaks with a comparatively large population, they are important industrial cities, and they are in distant areas where improvement of medical technology at the provincial level is required because of the difficulties in the means of transporting patients.

#### a) Khovd

Khovd (pop. 80,000) is an Aimak which is an important base for health and hygiene in the western part of the country. Since the three surrounding Aimaks of Bayan-olgiy (pop. 93,000), Gobi-altai (pop. 64,000) andUvs (pop. 88,000) do not have direct air connections to Ulan-Bator, it is difficult to receive medical service from the hospitals in Ulan-Bator city. Khovd has direct air connections to Ulan-Bator and, since it also has air routes to the central administrative areas of the three above-mentioned Aimaks, the Khovd General Hospital is obligated to provide medical service to the other three Aimak General Hospitals as a referral hospital. The Khovd General Hospital was therefore selected as an object of this Project since improvement of its medical functions will also lead to improvement of the medical services of the other three Aimak General Hospitals.

b) Dorno-gobi

Dorno-gobi was selected as an object of this Project since it is an important industrial Aimak with a population of 70,000 and since developments of its industries is being promoted, improvement of its medical system is also urgent.

c) Dornod

This is the most distant Aimak from Ulan-Bator and the general hospital here provides medical services and supports the health of the nomadic people. Out of a population of 80,000, about 60% live in and around the central administrative area of the Aimak and the remaining 40% live in areas where the provision of medical services is difficult. Dornod General Hospital was therefore selected as an object of this Project since the improvement of diagnosis and treatment functions of this hospital will lead to improvement of medical services to the areas furthest from Ulan-Bator.

d) Tov

This is an Aimak with a population of about 100,000 and is located about 45km (15km in a straight line) from Ulan-Bator and its general hospital was selected as an object of this Project since there has been little improvement in its medical equipment because of continued importance being placed on strengthening the medical facilities in Ulan-Bator, and also since it is an Aimak General Hospital near the city.

e) Ar-Khangai and Ovor-Khangai

The population of Ar-Khangai and Ovor-Khangai are 88,000 and 99,000 respectively. These two Aimaks are located in the Gobi desert area with the people living in scattered regions. Mongolia is emphasizing protection of its nomadic people, and assuring medical services to these people scattered over a wide area is also a matter of highest priority. In other words, selection of these two Aimak General Hospitals as object of this Project will support for strengthening primary health care in this area through improving facilities.

5) Somon Health Institutions and Somon Joint Health Institutions  
(40 Institutions)

Of the 40 clinical hospitals that are objects of this Project, 37 are Somon Joint Health Institutions (with jurisdiction over multiple Somons) and the remaining 3 are Somon Health Institutions (with jurisdiction over one Somon). These 40 hospitals function as medical facilities in the respective areas of Suuri and Brigad, and also as supporting hospitals for other Somon Health Institutions by providing medical technology and backup patient services to the 300 odd Somon Health Institutions. Although it differs by area, the Somon and Somon Joint Health Institutions are each supporting six to seven Somon Health Institutions. Strengthening these 40 medical facilities will therefore be the base for improving medical treatment and primary health care throughout Mongolia.

Medical Statistics of Aimaks

(Source:

1988)

Name of Aimak	Area (1000 km <sup>2</sup> )	Population	Population Density	No. of Doctors	Para Medical	No. of Hosp.	Patients /Mill.	No. of Inpati.	No. of Bed	Same per 10000	No. of Bed (for Gyne.)
Ar-khangai ☉	55.0	87.5	1.59	140	628	22	30	9.2	935	107	103
Bayan-olgi	46.0	92.9	2.02	114	524	17	23	7.2	775	83	119
Bayan-khongor	116.0	75.9	0.65	103	502	21	28	8.3	675	89	75
Bulgan	49.0	50.8	1.04	94	434	16	28	10.0	460	91	70
Gobi-altai	142.0	67.0	0.47	119	535	20	26	8.4	605	90	74
Dorno-gobi ☉	111.0	52.5	0.47	110	440	16	26	9.7	465	88	57
Dornod ☉	123.5	74.9	0.61	122	563	18	31	10.7	330	111	85
Dund-gobi	78.0	48.0	0.62	96	410	17	30	10.0	510	106	62
Zavkhan	82.0	95.1	1.16	134	682	27	28	8.1	940	99	118
Ovor-khangai ☉	63.0	98.3	1.56	142	598	21	28	8.5	890	94	122
Omo-gobi	165.0	38.7	0.23	87	396	15	34	11.7	405	105	58
Sukhbaatar	82.0	52.4	0.64	86	395	15	26	9.8	525	100	50
Selenge	42.8	87.2	2.04	122	522	21	29	8.8	720	83	69
Tov ☉	81.0	99.3	1.23	152	609	29	29	7.9	860	87	104
Uvs	69.0	88.3	1.28	117	546	21	23	9.6	780	88	102
Khovd ☉	76.0	79.9	1.05	116	482	18	24	8.0	745	93	122
Khovsgol	101.0	104.0	1.03	139	719	26	29	8.5	930	89	119
Khentii	82.0	66.8	0.81	118	540	25	31	9.2	715	107	78
Ulan-bator	2	528.4	264.20	2601	5327	35	35	11.8	7745	147	622
Darkhan	0.2	79.7	398.5	203	612	6	33	8.4	950	113	105
Erdenet	-	50.9	-	129	390	5	35	7.6	555	109	75
Country	1566.5	2018.6	1.29	5192	16410	423	27.2	9.8	22633	112	2443