THE AGENCY OF THE REPUBLIC OF
KAZAKHSTAN FOR HEALTH MATTERS

No. 1

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR IMPROVEMENT
OF MEDICAL EQUIPMENT
FOR SEMIPALATINSK REGION
IN
THE REPUBLIC OF KAZAKHSTAN

MAY 2000

JAPAN INTERNATIONAL COOPERATION AGENCY

UNICO INTERNATIONAL CORPORATION

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PREFACE

In response to a request from the Government of the Republic of Kazakhstan, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Medical Equipment for Semipalatinsk Region in the Republic of Kazakhstan and entrusted the study to the Japan International Cooperation Agency(JICA).

JICA sent to Kazakhstan a study team from October 17 to November 15, 1999.

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

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

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Kazakhstan for their close cooperation extended to the team.

May, 2000

Kimio Fujita

Kimio Fujita
President
Japan International Cooperation Agency

May, 2000

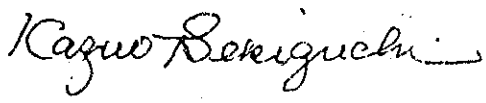
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Medical Equipment for Semipalatinsk Region in the Republic of Kazakhstan.

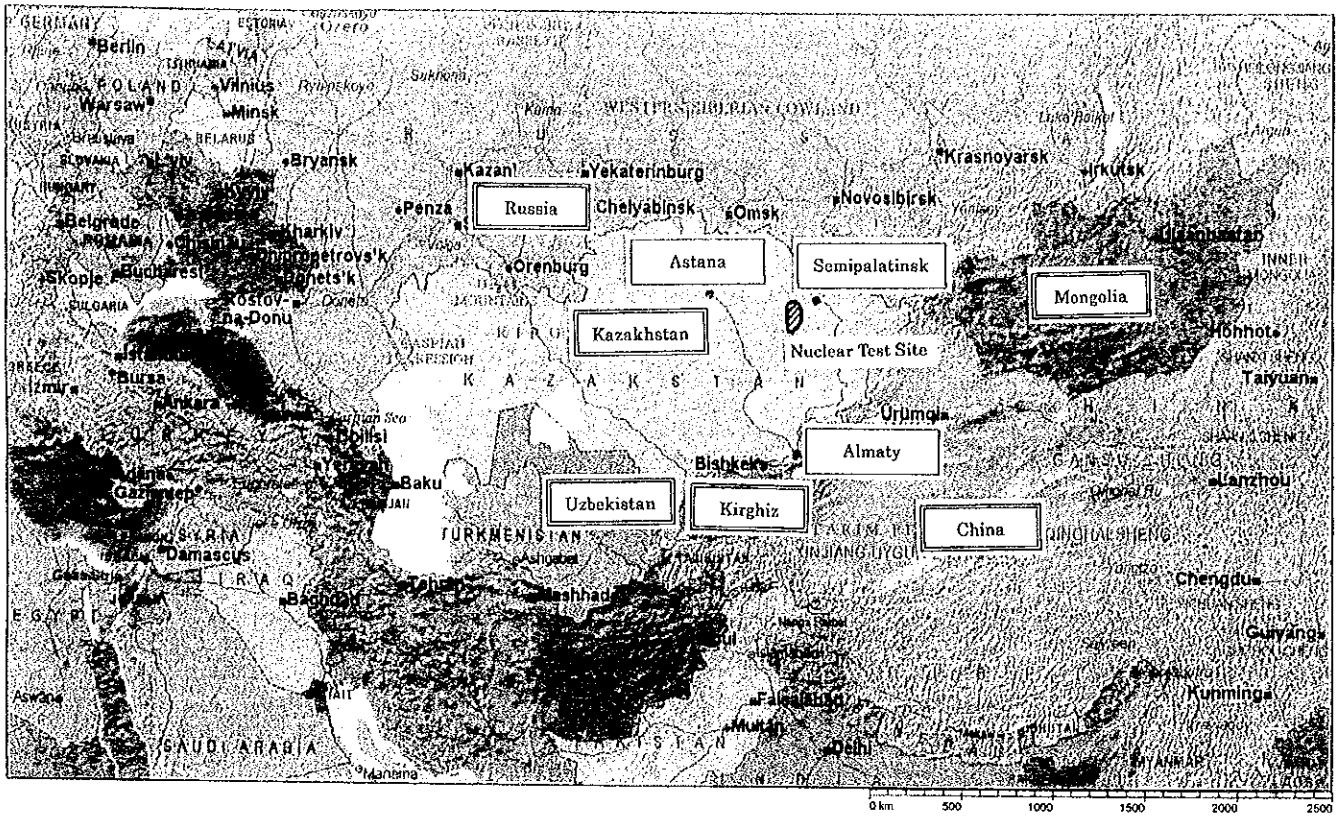
This study was conducted by UNICO International Corporation, under a contract to JICA, during the period from October 7, 1999 to June 15, 2000. In conducting the study, we have examined the feasibility and rational of the project with due consideration to the present situation of Kazakhstan and formulated the most appropriate basic design for the project under Japan's Grant Aid scheme.

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

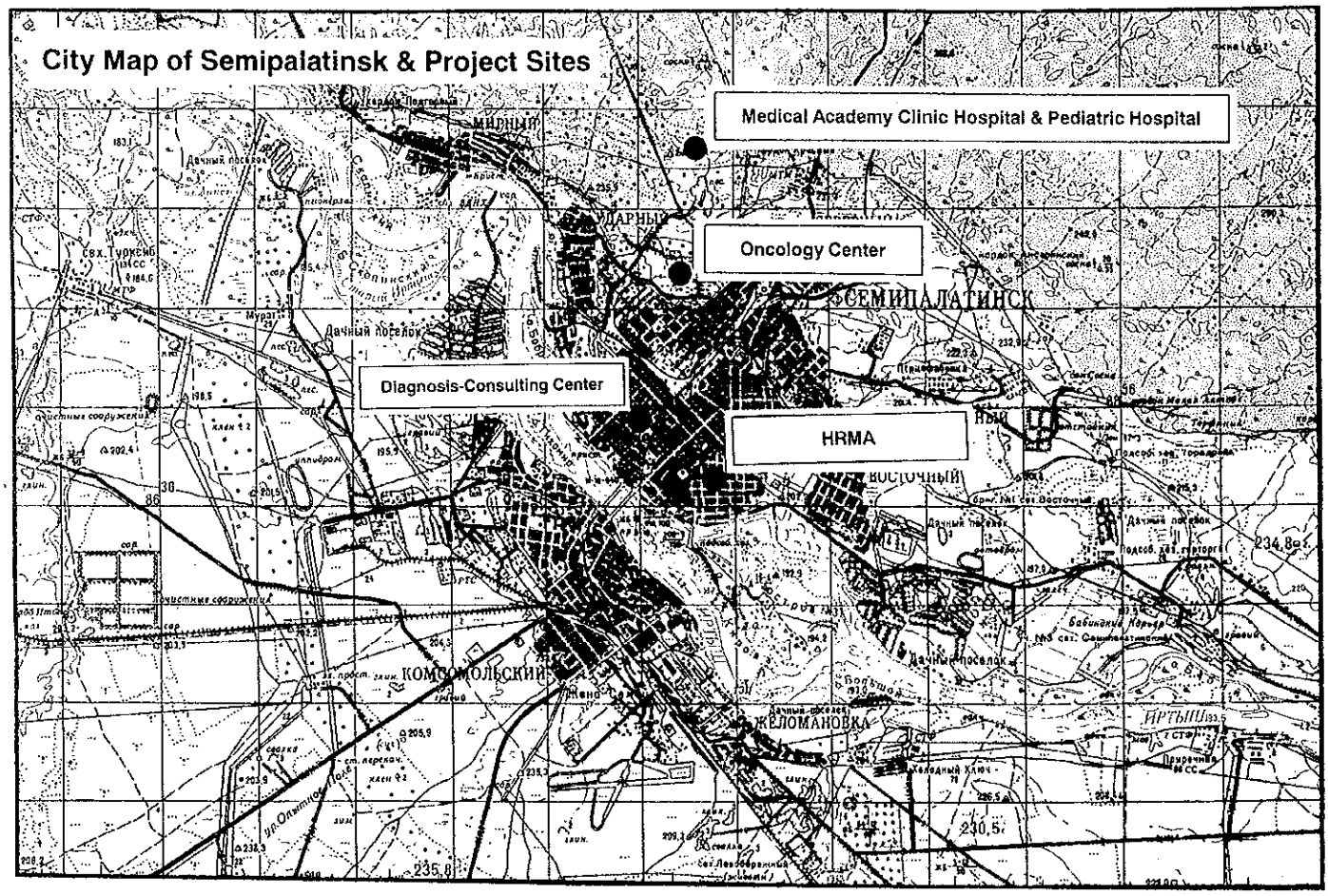
Very truly yours,



Kazuo Sekiguchi
Project Manager, Basic Design Study Team on
the Project for Improvement of Medical
Equipment for Semipalatinsk Region in
the Republic of Kazakhstan
UNICO International Corporation



Central Asia



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Chapter 1 Background of the Project

Chapter 1 Background of the Project

1-1 Current State of the Public Health Sector in the Country and Major Issues

1-1-1National Public Health Plan

In October 1997, President Nazarbayev announced the country's long-term vision entitled "Kazakhstan in 2030" (1997 – 2030). It primarily addresses seven areas, one of which deals with public health, education and welfare. As for public health, the following goals are set forth:

(1) To ensure everyday life in a healthy and clean environment;
(2) To reduce the average mortality rate to 6 persons per 1,000 population (10.1 as of 1996);
(3) To increase the average life span to 73 – 75 years old (66.8 years old as of 1994); and
(4) To ensure that people can have many children and live a secured and healthy life.

In May 1998, the president announced foremost measures to improve health conditions of people in presidential decree No.3956, which was approved as the "People's Health" plan in November 1998 under presidential decree No.4153. The plan has the primary objective to improve health conditions of people and realize people's right to have a healthy life, as set forth in the republic's constitution (eighth paragraph of Article 44). It aims to control various infectious diseases that spread among people, improve the quality of medical service, expand the range of medical service, and realize the right of people to maintain healthy life. Key items in these measures related to the project are described below:

(1) To strengthen educational activities in public to encourage healthy life;
(2) To improve the quality of primary health care (PHC);
(3) To shift stepwise the focal point of medical service from in-hospital care to outpatient treatment;
(4) To provide public facilities conducting preventive medical cares with medical equipment that meets the needs of the times;
(5) To upgrade medical equipment and systems at public facilities conducting preventive medical cares;
(6) To expand the scope of research activity in the public health fields and improve its quality;
(7) To strengthen health service for people in the area of preventive medicine; and

(8) To upgrade the management system of a public health activity.

Thus, public health policies and programs in the country focus on "people's health" by developing and promoting medical service serving the daily needs of people, such as the home doctor system, preventive medical cares, outpatient treatment and promotion of primary health care, rather than advanced treatment in a specific field.

This project has the primary purpose of improving medical service in the Semipalatinsk region by providing necessary medical equipment to four medical facilities within the city in order to provide medical examination service including primary screening, precise examination and final diagnosis for people who have been suffered from high level radioactive contamination due to radioactive fallout. Therefore the project is expected to contribute directly to improvement of medical services in the region, which is in line with the national public health policy objectives.

1-1-2 Current State and Major Issues

Public health conditions in Kazakhstan appear to have deteriorated in the 1990s according to key health indicators related to vital statistics. In 1998, the average life span was 64.4, the mortality rate per 1,000 population was 9.8, and the infant mortality rate was 21.4 per 1,000 births, compared to the average life span of 70.5 years old and the mortality rate of 7.7 in 1990. At the same time, the number of physicians decreased from 40 per 10,000 population in 1991 to 32.4 in 1996. This reflects the fact that a large number of physicians changed their jobs or returned to Russia after the collapse of the Soviet Union.

During the Soviet era, the country was under major health threats due to a nuclear testing ground that was located around 120km west of Semipalatinsk City, called "Polygon". The testing ground was used between 1948 and 1989, during which a total of 459 nuclear tests were carried out, consisting of 113 ground or aerial tests and 346 underground tests, with total explosive power equivalent to TNT 18 mega-tons, or 2,500 times that of the atomic bomb dropped in Hiroshima.

The nuclear tests produced large amounts of radioactive fallout that diffused to a wide area and caused considerable damage to the health of local residents. As the nuclear tests took place under west, northwest or north wind, the fallout concentrated in the

east to southeast side of the testing ground, including Semipalatinsk City, and created grave health hazards among local citizens. Compared to one-time, intensive, radioactive exposure occurred in Hiroshima and Nagasaki, health damage suffered by residents in Semipalatinsk is characterized by a combination of repeated, direct exposure to radioactive fallout over a long period of time, and indirect (internal) exposure due to continuous intakes of food (e.g., meat, cereal and vegetable) and beverages (e.g., drinking water, milk) that contain radioactive substances, such as cesium, strontium and plutonium. The nature and extent of damage have been publicized in various reports, as studies conducted by various countries (including Japan) and international organizations, which have also provided medical and other aids.

Under the Soviet regime, no major industries were allocated to the region containing Semipalatinsk and Polygon, except for food and service industries for military forces. After the end of the Soviet era, the military base including the nuclear testing ground was abolished and Russian military personnel returned home to leave the area with a poor economic base. Under a presidential decree issued in 1997, Semipalatinsk Oblast was incorporated into the East Kazakhstan Oblast, with a new oblast capital being transferred to Ust'-Kamenogorsk.

Semipalatinsk City has more than 400,000 population and its economy depends on agriculture and livestock raising. As it has no major industries, the city's financial sources are too weak to promote modernization or upgrading of its medical facilities and equipment.

The Japan has been providing Semipalatinsk with a wide range of support on individual basis (official, NGO, university etc.), including equipment supply, academic research, training of physicians in Japan, and sending of medical staff to the region. Kazakhstan, however, needs more support and assistance from the international community, including Japan which has extensive experience in treatment of atomic bomb victims. The Japanese government thus jointly proposed an international appeal with Kazakhstan to help people of Semipalatinsk at the 53rd General Assembly of the United Nations held in November 1998.

Subsequently, the Japanese government announced, at the International Conference on Support of Semipalatinsk that was held in Tokyo in September 1999, its plan to

provide an official development aid in the area of medical service for people living near the former nuclear testing ground.

1-2 Outline of Request for Grant-in-aid Support

(1) Month/year of request: November 1998
(2) Content:
Supply of medical equipment and medical consumables for the following four medical facilities in Semipalatinsk City
① Medical Academy Clinic Hospital (including Pediatric Hospital)
② Semipalatinsk Diagnostic-Consulting Center

Note that the study team received the additional requests for the following two facilities during the basic design mission:
③ Oncology Center
④ Hospital of Rapid Medical Assistance (HRMA)

1-3 History of Official Aids by the Japanese Government in Kazakhstan

The Japanese government has been providing support since 1991, including personnel training in Japan and the sending of experts to Kazakhstan. Also, as part of its emergency, humanitarian aids for the member countries of the former Soviet Union, totaling $200 million, the Japanese government has been providing support worth $14.4 million since 1993 to Kazakhstan, mainly pharmaceuticals, medical equipment and vaccine.

Loan for Economical Development from the Japanese government had been mainly directed to infrastructure development, led by transportation systems and networks. In the field of technical assistance, the Japanese government has been inviting a large number of trainees covering a wide range of areas including market economy, environmental protection and public administration. Development studies have been conducted for mineral resources, road and air transport, irrigation, environmental protection.

The country became eligible for the grant-aid program of the Japanese government in FY1996 (due to a decline in GNP per capita). In FY1997, non-project type grant-aid

was made, followed by the first project type grant-aid entitled "Improvement of Almaty Regional Healthcare" worth 1,365 million yen. In FY1999, Project on Improvement of Medical Equipment at Children's Hospital in Astana Region (worth 995 million yen) was implemented.

1-4 Aids by Other Countries and Organizations

There are a number of governments and organizations that provide or are committed to provide assistance for the Semipalatinsk region, including World Bank, WHO, UNICEF, the U.S. and the UK. At present 38 projects are planned under coordination of UNDP. Their sectors are classified into 13 in public health and medical service, 6 in environmental protection, 11 in economic restoration, 6 in humanitarian support, and 2 in information and public relations. In addition, NGOs are implementing various projects on their own or in cooperation with aid organizations. The following table summarizes projects, whose implementation has been decided or is under preparation, and organizations involved.

Table 1. International Aid Organization and Contents of Aid

Organization	Contents
UNICEF	Mother and Children's Health, General Management of Pediatric Diseases, Nutrition, Preventive Inoculation, Healthcare Reform
WHO	Health Survey of Radioactive Victim
World Bank	Healthcare Reform, Countermeasure for Prevailing Diseases(Hepatitis, Anemia, Tuberculosis, Hypertension, Diabetics, STD etc.), Legislation of Healthcare System, Training
USAID	Healthcare Reform, Primary Healthcare, Infectious Disease, Preventive Inoculation, Reproductive Health
DfID	Assessment of Environmental Effect and Land Utilization Plan
IRIS	Health Survey of Women, Training for Self-Diagnosis, Prevention of Tuberculosis and family Plan
Methodist Church	Primary Medical Services for Radioactive Contamination Area

Chapter 2 General Description of the Project

Chapter 2 General Description of the Project

2-1 Objectives of the Project

This project is designed to conduct physical examination on around 27,000 residents in four districts of Beskaragai, Jana Semey, Abai and Chuvaltau, which were highly contaminated by fallout from the former nuclear testing ground, located 120km west of Semipalatinsk City. In addition, physical examination will be conducted for approximately 400,000 people living in and around the Semipalatinsk city in an attempt to upgrade the levels of medical service. Primary screening by a mobile examination unit, precise diagnosis, and final diagnosis on cancer and leukemia are in the scope of the project. These tasks will be carried out by the four recipient facilities (Medical Academy Clinic Hospital, Diagnostic-Consulting Center, Oncology Center and HRMA) that will share functions and responsibilities.

In particular, primary screening will be conducted by Medical Academy Clinic Hospital and Diagnostic-Consulting Center in cooperation of Oncology Center. Precise diagnosis will be made by Medical Academy Clinic Hospital and Diagnostic-Consulting Center in cooperation of Oncology Center. Final diagnosis will be made by Oncology Center (for cancer) and HRMA (for acute leukemia).

The project intends to supply medical equipment required to perform the above activities of the four medical facilities, thereby to upgrade the quality of medical service in the Semipalatinsk region.

2-2 Basic Concepts of the Project

(1) Design concept

The project has the primary purpose of upgrading the levels of medical service in the Semipalatinsk region. In particular, the improvement of diagnostic service for local residents is given high priority in order to determine the effect of the Japanese Grant project clearly and accurately. In the field of medical treatment, the project covers only minimum required equipment related to surgical operation.

Activities for which the equipment supply plan should cover include primary

screening (including field examination using the mobile unit), precise diagnosis at Medical Academy Clinic Hospital and Diagnostic-Consulting Center, and final diagnosis at special hospitals including Oncology Center and HRMA. Note that these activities will be fully supported by Japanese experts, therefore equipment required for such technical assistance will be included in the project.

(2) Policy for the project

1) The project intends to support physical examination and treatment activities for people living in the radioactive contaminated area, which are planned by the Kazakhstan government. It should be noted, however, that these activities are still in the planning stage and have to be tested for their viability, particularly the securing of sufficient operating costs and expenses.

2) For this reason, the equipment list should focus on those required for primary screening, precise diagnosis, and final diagnosis in order to assist the recipient facilities in starting up their examination and diagnostic system. Hence, therapeutic equipment except for some surgical equipment is not included in the project.

3) In selecting equipment to be supplied under the project, priority will be given to diagnostic equipment used for the following purposes:

i) Primary screening: Physical examination and cancer screening on residents in the radioactive contaminated area by using a mobile examination unit, consisting of interviewing residents, chest X-ray, blood and urine examinations to check four major diseases closely associated with radioactive exposure (leukemia, thyroid cancer, lung cancer and breast cancer).

ii) Precise diagnosis and cytological examination: Primarily consisting of ultrasound diagnosis, endoscopic examination, microscopic examination on blood samples and cells, functional diagnosis, and precise diagnostic imaging using the CT scanner.

iii) Final diagnosis, cytological diagnosis and histopathological diagnosis: Final diagnosis on cancer and leukemia.

(4) The equipment selected will be supplied to following medical institutions according to the applicable ordinance issued by the Agency for Health Matters and

the existing system and organization related to physical examination and diagnosis:

i) Equipment for primary screening: Diagnostic-Consulting Center and Medical Academy Clinic Hospital

ii)Equipment for precise diagnosis and cytological diagnosis: Diagnostic-Consulting Center and Medical Academy Clinic Hospital

iii)Equipment for final diagnosis, cytological diagnosis and histopathological diagnosis: Oncology Center (final diagnosis on cancer) and HRMA (final diagnosis on acute leukemia)

(2) Design Principles (Basic Rules for Equipment Selection)

Priority should be given to medical equipment that supports technical assistance activities under the project. The following rules should be applied in the selection process.

Equipment with high priority

1) Fundamental equipment that contributes to better medical service for patients who have radiation sickness;
2) Equipment that replace existing equipment;
3) Equipment that is frequently used;
4) Equipment that shows high cost effectiveness in terms of operation, maintenance and replacement parts and expendables;
5) Equipment whose usefulness for medical purpose is recognized;
6) Equipment whose operation and maintenance is carried out by a recipient organization; and
7) Equipment for which personnel in charge of operation and maintenance is appointed.

Equipment with lower priority or to be excluded

1) Equipment used for research purpose only;
2) Equipment for which no maintenance plan is established;
3) Equipment that is far beyond existing equipment or present levels of technology;
4) Equipment for which no budget for replacement parts and consumables is secured;
5) Equipment for which stable supply of replacement parts and consumable is not

assured;

6) Equipment that is locally available and can be purchased within the present budget;
7) Equipment that has negative environmental impacts;
8) Equipment that is manufactured by a limited number of companies and cannot be procured on a competitive basis;
9) Equipment which installation site is not assured or inappropriate; and

(3) Equipment procurement plan

Equipment selected for each facility is presented in Table 2, including evaluation of urgency, adequacy and other relevant factors according to each function. Note that the following symbols are used in these tables.

Evaluation of existing equipment

A: Fully serviceable
B: Serviceable but deteriorated and require replacement within a few years
C: Severely deteriorated and require urgent renewal

Reason for exclusion

a: Equipment that is supplied to other hospital in the area in consideration of priority
b: Equipment that is already available and can be used for the next five years
c: Equipment that can be locally procured at an economical cost
d: Equipment that requires high costs for maintenance and procurement of replacement parts and/or expendable supplies, making smooth operation difficult
e: Equipment that is already available in sufficient quantities
f: Equipment that requires advanced skills for operation and/or maintenance
g: Equipment used for research purposes
h: Equipment that will not create much benefits intended in the project or is out of scope of the project
i: Equipment that has excess capacity compared to the number of patients or tests anticipated

Priority for equipment selection

A : Equipment that is essential for activities related to technical assistance or medical service planned under the project

B+: Equipment that is useful for activities related to technical assistance or that replaces basic equipment

B : Equipment that is supplemental to basic equipment

B- : Equipment that requires high maintenance cost or does not create significant benefits

C : Equipment that is not related to the primary objective of the project

To check adequacy of equipment requested by the counterpart, its relationship with existing equipment was compared. The results are shown in Table 2 , which summaries evaluation results of existing equipment.

Another important consideration in evaluation of existing equipment is the function of each recipient facility. Because all the four recipient facilities are located in Semipalatinsk City and their equipment can be shared to some extent, equipment selection should focus on maximization of cost effectiveness by avoiding unnecessary duplication of equipment. From this perspective, existing equipment was evaluated according to its function in the context of entire medical service.

Table 2 Evaluation of Equipment, Existing and Requested

Name of Site	No.	Name of Equipment	Requested Quantity	Relation						Necessity	Validity	Decision	Reason of Deletion	Planned Q'ty					Remarks (TCT means Japanese Technical Cooperation Team)	Targeted Population (estimated)
				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B-	C		
1. Mobile Examination Function																				
Academy Hospital	A1-1	Mobile examination unit	1						1	○	×	×	a					1		27,000
	A1-2	Chest X-ray Fluorography	1						1	○	×	×	a					1		27,000
	A1-3	Ultrasound unit (portable)w/ thyroid probe	1						1	○	×	×	a					1	Mobile examination fuction is concentrated to Diagnostic Center	8,100
	A1-4	Blood cell counter	1						1	○	×	×	a					1		27,000
	A1-5	Biochemical Analyzer	1						1	○	×	×	a					1		27,000
	A1-6	Urine Analyzer	1						1	○	×	×	a					1		27,000
Diagnostic Center	C1-1	Mobile examination unit	1		1	1	1			○	○	○		1					One unit broken, another unit is close to dilapidation. Mobile examination fuction is concentrated to Diagnositic Center.	27,000
	C1-2	Chest X-ray	1						1	○	○	○		1						27,000
	C1-3	Ultrasound Unit with Thyroid probe	1						1	○	○	○		1						8,000
	C1-4	Blood cell counter	1						1	○	○	○		1						27,000
	C1-5	Biochemical Analyzer	1						1	○	×	×						1	Projected population for first screening is estimated as 27,000. Standard equipment to be amounted are: Chest X-Ray Unit, Blood Cell Counter, Ultrasound Imager, Medical Refrigerator, and optionally Blood Smearing Instrument and Auto Stainer.	27,000
	C1-6	Urine Analyzer	1						1	○	○	○						1		27,000
	C1-7	ECG 6-12ch	1						1	○	×	×	g					1		8,000
	C1-8	Gastrofiberscope	1						1	○	×	×	g					1		900
	C1-9	Blood smearing instrument	1						1	○	○	○		1						27,000
	C1-10	Automatic stainer	1						1	○	○	○		1						27,000
	C1-11	Communication system	1						1	○	×	×	g					1	Arranged by Technical Cooperation Team (TCT)	
	C1-12	Medical refrigerator	2						1	○	○	○		1					For transport of specimen	27,000
Oncology Center	E-10-1	Mobile examination unit	1						1	○	×	×	a					1		27,000
	E-10-2	Chest X-ray unit	1						1	○	×	×	a					1		27,000
	E-10-3	Ultrasound unit (portable)	1						1	○	×	×	a					1	Mobile examination function is to be concentrated to Diagnostic Center.	8,100
	E-10-4	Blood cell counter	1						1	○	×	×	a					1		27,000
	E-10-5	Biochemical analyzer	1						1	○	×	×	a					1		27,000
	E-10-6	Urine analyzer	1						1	○	×	×	a					1		27,000
	E-10-7	Ambulance	1						1	○	×	×	a					1		700

Name of Site	No.	Name of Equipment	Requested Quantity	Relation						Necessity	Validity	Decision	Reason of Deletion	Planned Q'ty					Remarks (TCT means Japanese Technical Cooperation Team)	Targeted Population (estimated)
				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B-	C		
2. X-ray/CT Diagnostic Function																				
Academy Hospital	A-7-1	CT Scanner Slip Ring Type	1						1	○	×	×	a				1		CT scanner is concentrated to Diagnostic Center.	900
	A-7-2	Surgical X-ray unit(C-arm)	1						1	○	○	○			1				Indispensable for surgery.	1,000
	A-7-3	X-ray TV system with linear tomograph	1		1	1	1			○	○	○		1					Renewal of damaged unit	1,000
	A-7-4	General X-ray unit w/Bucky table & stand	1		1	1	1			○	×	×	a					1	Deleted by renewal of X-TV	9,000
	A-7-5	Automatic X-ray film processor	1						1	○	○	○			1				Indispensable for improvement of image quality	9,000
	A-7-6	Mobile X-ray unit	1						1	○	×	×	b					1		1,000
	A-7-7	Chest X-ray fluorography	1						1	○	×	×	b					1		3,000
Academy Pediatric Hospital	B-1-1 /A	X-ray TV system	1		1	1	1			○	×	×	a					1	Usable jointly with Academy Hospital.	5,500
	B-1-1 /B	General X-ray unit w/Bucky table & stand	1		1	1	1			○	×	×	a					1		5,500
	B-1-2	Mobile X-ray unit	1			1	1			○	×	×	a				1		Low ranking	800
	B-1-3	X-ray film illuminator	2		5					○	×	×	c					2	Able to purchase by self-finance	7,900
Diagnostic Center	C-1-1	CT Scanner Slip Ring Type	1		1			1		○	○	○			1				Addition close to renewal	4,000
	C-2-1 /A	X-ray TV system with linear tomograph	1		1			1		○	○	○		1					Renewal by dilapidation and over radiation dose.	4,000
	C-2-1 /B	General X-ray unit w/Bucky table & stand	1			1	1			○	×	×	a					1	Deleted by renewal of X-Ray TV	12,000
	C-2-2	X-ray Film Automatic Processing Machine	1						1	○	○	○			1				Improvement of image quality	12,000
Oncology Center	E-4-1 /A	X-ray TV system with linear tomograph	1		1	1	1			○	○	○			1				Renewal of X-ray TV	4,500
	E-4-1 /B	General X-ray unit w/Bucky table & stand	1		1	1	1			○	×	×	a					1	Deleted by renewal of X-Ray TV	2,500
	E-4-2	Negatoscope	4		6					○	×	×	c					4	Able to purchase by self-finance	12,000
	E-4-3	Film processor	1						1	○	○	○			1				Improvement of image quality	12,000
	E-4-5	Individual protective set	3						3	○	×	×	c					3	Able to purchase by self-finance	200
	E-4-7	Laboratory light(dark room light)	2						2	○	×	×	c					2	Able to purchase by self-finance	500
	E-8-1	Apparatus to treat external cancer (skin,labial)	1		1			1		○	×	×	d					1	Deleted, out of project	500
	E-8-2	Intracavity radiation therapy apparatus	1		1			1		○	×	×	d					1	Deleted, out of project	300

Name of Site	No.	Name of Equipment	Requested Quantity	Relation						Necessity	Validity	Decision	Reason of Deletion	Planned Q'ty					Remarks (TCT means Japanese Technical Cooperation Team)	Targeted Population (estimated)
				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B-	C		
3. Functional Examination Function																				
Academy Hospital	A-5-1	Ultrasound unit with color doppler and different probes	1						1	○	○	○		1					High demand for cardiac and circular disease	4,500
	A-5-2	ECG 6-12 channel	1			1	1			○	○	○		1					Renewal because of dilapidation	10,000
	A-5-3	ECG 1-3 channel, portable	1		1	1	1			○	×	×	c					1		4,000
	A-5-4	Spirography analyzer	1							○	×	×	c					1		4,600
	A-5-5	Electromyography unit	1							○	×	×	h					1	No clear relation with radiation and muscular disease	2,700
	A-5-6	Portable ultrasound unit	1						1	○	○	○			1				To be used in wards	1,000
	A-5-7	Ultrasound mobile with convex /linear(thyroid) probes, MO	1			1	1			○	×	×	a					1	Low ranking	3,000
	A-5-8	Audiometer	1						1	○	×	×	h					1	No clear relation with radiation and ENT disease	300
	A-5-9	Automatic stainer	1						1	○	×	×	h					1	No clear relation with radiation and ENT disease	300
	A-5-10	Bone mineral analyzer	1						1	○	×	×	h					1	No clear relation with radiation and bone mineral disease	200
	A-5-11	Ophathalmological diagnosis instrument set	3						3	×	×	×	h					3	No clear relation with radiation and ophthalmic disease	300
	A-5-12	Diagnosis instrument set for ENT	3						3	×	×	×	h					3	No clear relation with radiation and ENT disease	1,300
Academy Pediatric Hospital	B-5-1	Ultrasound color screen, color doppler, probes set, MD recorder	1						1	○	×	×	a					1	Usable jointly with Academy Hospital	1,700
	B-5-2	Ultrasound mobile with convex/ linear (thyroid) probes, MO	1			1	1			○	○	○		1					Renewal because of dilapidation	500
	B-5-3	ECG 6-12 channels	1						1	○	○	○			1				Indispensable for Cardiography	2,400
	B-5-4	EEC unit	1		1			1		○	×	×	h					1	No clear relation with radiation and encephalic disease	1,000
Diagnostic Center	C-3-1	Ultrasound unit with color doppler and different probes	1						1	○	○	○			1				Indispensable for circulatory disease	1,500
	C-3-2	Portable ultrasound unit	1						1	○	×	×	a					1	Usable of the unit for mobile examination unit	4,500
	C-3-3	ECG 6-12 channel	1			1	1			○	○	○			1				Renewal because of dilapidation	2,000
Oncology Center	E-9-4	Ultrasound unit (stationary)	1		1			1		○	○	○			1				Indispensable for disgnosis	3,000
	ED-6	Ultrasound unit (mobile) w/ thyroid probe	1		1			1		○	×	×	a					1		1,300
	E-1-9	Electrocardiograph	1			1	1			○	○	○			1				Indispensable for disgnosis of cardiac dysfunction	800

Name of Site	No.	Name of Equipment	Requested Quantity	Relation						Necessity	Validity	Decision	Reason of Deletion	Planned Q'ty					Remarks (TCT means Japanese Technical Cooperation Team)	Targeted Population (estimated)
				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B−	C		
4. Clinical Laboratory Function																				
Academy Hospital	A-6-1	Blood cell counter	1						1	○	○	○			1				Indispensable for blood analysis	900
	A-6-2	Biochemical analyzer	1						1	○	○	○			1				Indispensable for blood analysis	1,000
	A-6-3	Blood gas analyzer	1			1	1			○	○	○		1					Renewal	2,000
	A-6-4	Binocular laboratory microscope	5		6			5		○	○	○			2		3		Renewal	4,000
	A-6-5	Deep freeze refrigerator	1						1	○	○	○			1				Indispensable for preservation of specimen	1,000
	A-6-6	Na/K/Cl analyzer	1						1	○	×	×	a					1	Usable of Biochemistry Analyzer	2,500
	A-6-7	Blood smearing instrument	1						1	○	○	○		1					Requested byTechnical Cooperation Team(TCT)	3,000
	A-6-8	Automatic stainer	1						1	○	○	○		1					Requested by TCT	7,000
	A-1-6	Urine analyzer	1			1			1	○	○	○			1				Requested by TCT	7,000
	AD-18	Gas sterilizer	1						1	×	×	×	c				1		Low ranking	1,300
	AD-10	Dry chemical analyzer	1						1	○	×	×	h					1	Requested by TCT, but deleted by cancellation	1,300
	AD-11	Cell separator	1						1	○	×	×	h					1	Too expensive for running	1,300
	AD-12	ELISA auto plate reader	1						1	○	×	×	a					1	Requested by TCT. The same unit is projected to Diagnostic Center	1,300
	AD-14	Autoclave	1						1	○	×	×	c					1	Low ranking	1,300
	AD-16	Teaching microscope	1	1				1		○	×	×	a					1	Existing unit is not dilapidated	1,300
	AD-17	Photograph exposure unit	1						1	○	×	×	a					1	Deleted because the same unit is projected to Oncology Center	1,300
	AD-18	Urinary iodine analyzer	1							○	×	×	a					1	Deleted because the same unit is projected to Diagnostic Center	1,000
Academy Pediatric Hospital	B-4-1	Blood cell counter	1						1	○	×	×	a					1	Usable jointly with Academy hospital	2,500
	B-4-3	Laboratory microscope binocular	2		3			2		○	×	×	a					2	Usable jointly with Academy hospital	2,000
	B-4-4	Fluorescent microscope	1		1			1		○	×	×	h					1	Usable jointly with Academy hospital	1,000
	B-4-5	Table top autoclave	1		1			1		○	×	×	c					1	Low ranking	4,000
Diagnostic Center	C-4-1	Blood cell analyzer	1		1			1		○	×	×	a					1	Usable jointly with Mobile Examination Unit	2,200
	C-4-2	Biochemical analyzer	1			1	1			○	○	○		1					Renewal	4,000
	C-4-3	Blood smearing instrument	1						1	○	×	×	a					1	Usable jointly with Mobile Examination Unit	4,000
	C-4-4	Automatic stainer	1						1	○	×	×	a					1	Usable jointly with Academy hospital	7,000

Name of Site	No.	Name of Equipment	Requested Quantity	Relation						Necessity	Validity	Decision	Reason of Deletion	Planned Q'ty					Remarks (TCT means Japanese Technical Cooperation Team)	Targeted Population (estimated)
				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B-	C		
	C-4-5	Laboratory microscope binocular	2						2	○	○	○			2				Requested by TCT	10,000
	C-1-6	Urine analyzer	1			1			1	○	○	○			1				Indispensable for fundamental examination	20,000
	C-1-7	ELISA auto plate reader	1						1	○	○	○		1					Requested by TCT. Indispensable for immunological examination	1,300
	C-1-8	Urinary iodine analyzer	1						1	○	○	○		1					Requested by TCT. Indisensable for thyroid function examination	1,000
	C-1-9	Deep freeze refrigerator	1						1	○	○	○			1				Indispensable for preservation of specimen	1,000
	C-1-10	Automatic slide stainer	1						1	○	○	○			1				Requested by TCT	1,300
Oncology Center	E-5-1	Laboratory microscope(binocular)	6		6			6		○	○	○			2			4	Requested by TCT	2,000
	E-5-3	Sterilizing lamp	1						1	○	×	×	c					1	Low ranking	4,000
	E-5-4	Centrifuge(Table-top)	2		1	1	1	1		○	×	×	c					2	Low ranking	2,000
	E-7-1	Biochemical analyzer	1						1	○	○	○			1				Requested by TCT	2,500
	E-7-2	Blood cell counter	1						1	○	○	○			1				Requested by TCT	2,500
	E-7-3	Distiller	1						1	○	×	×	c					1	Low ranking	
	E-7-4	Biological microscope	5		5			5		○	×	×	c					3	Low ranking	2,000
	ED-1	Hot air sterilization	2		2		2			○	×	×	c					2	Low ranking	3,000
	ED-2	Na-K Analyzer	1						1	○	×	×	a					1	Low ranking	2,000
	ED-7	Immunology analyzer	1						1	○	×	×	h					1	Low ranking	1,000
	ED-8	Urine analyzer	1						1	○	○	○			1				Requested by TCT. Fundamental equipment	2,000
	ED-9	Blood gas analyzer	1			1	1			○	○	○			1				Renewal	2,000
HRMA	F-1-1	Biochemical analyzer	1						1	○	○	○			1				Requested by TCT	1,500
	F-1-2	Blood cell counter	1						1	○	○	○			1				Requested by TCT	1,500
	F-1-3	Laboratory microscope binocular	1						1	○	○	○			1				Requested by TCT	4,000
5. Pathology Function																				
Academy Hospital	A-8-1	Binocular Microscope with Photocamera, Lecturescope, Exposure Control Unit and Digital Imaging System with Computer	2						2	×	×	×	g					2	No clear relations with diagnostics	2,700
	A-8-2	Personal computer with laser printer	2						2	×	×	×	g					2	No clear relations with diagnostics	
	A-8-3	Camera stand for autopsy /surgical material photography	1						1	×	×	×	g					1	No clear relations with diagnostics	
	A-8-4	Photoprocessing laboratory	1						1	×	×	×	g					1	No clear relations with diagnostics	

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				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B-	C		
	A-8-5	Overhead projector	1						1	×	×	×	g					1	No clear relations with diagnostics	
	A-8-6	Copy Machine	1						1	×	×	×	g					1	No clear relations with diagnostics	
	A-8-7	Deep Freeze Refrigerator	1						1	○	×	×	h					1	Indispensable for dicisive diagnostics	800
	A-8-8	Microtom	1						1	○	×	×	g					1	Indispensable for dicisive diagnostics	300
	A-8-9	Set of Instrument for Pathology	2					2		○	×	×	g					1	Indispensable for dicisive diagnostics	200
	A-8-10	Cryostat	1						1	○	×	×	g					1	Requested by TCT. This function was transformed to Oncology Center	0
	A-8-11	Automatic tissue processor	1						1	○	×	×	g					1	Requested by TCT. This function was transformed to Oncology Center	0
	AD-7	Automatic slide stainer	1						1	○	×	×	g					1	Requested by TCT. This function was transformed to Oncology Center	1,300
	AD-8	Paraffin embedding	1						1	○	×	×	g					1	Requested by TCT. This function was transformed to Oncology Center	1,300
	AD-9	Streching hot plate	1						1	○	×	×	g					1	Requested by TCT. This function was transformed to Oncology Center	1,300
	AD-15	Microscope digital camera system	1						1	○	×	×	g					1	Requested by TCT. This function was transformed to Oncology Center	1,300
Oncology Center	E-6-1	Thermostat (water bath)	2			2	2			○	×	×	g					2	Deleted, Out of project	
	E-6-2	Cryostat	1						1	○	○	○			1				Requested by TCT.	
	E-6-3	Microtome	1			3	1			○	○	○			1				Requested by TCT.	300
	E-6-4	Automatic tissue processor	1			1	1			○	○	○			1				Requested by TCT.	200
	E-6-5	Set of Instrument for Pathology	1					1		○	○	○			1				Requested by TCT.	200
	E-6-6	Automatic slide stainer	1						1	○	×	×	g					1	Automatic stainer is projected	1,300
	E-6-7	Paraffin embedding	1						1	○	○	○			1				Requested by TCT.	1,300
	E-6-8	Streching hot plate	1						1	○	○	○			1				Requested by TCT.	1,300
	E-6-9	Photomicrographic system	1						1	○	○	○			1				Requested by TCT.	1,300
	E-6-10	Teaching microscope	1						1	○	○	○			1				Requested by TCT.	1,300
HRMA	F-6-1	Blood smearing instrument	1						1	○	○	○			1				Requested by TCT. Indispensable for diagnostics of acute leukemia.	1,500
	F-6-2	Automatic stainer	1						1	○	○	○			1				Requested by TCT. Indispensable for diagnostics of acute leukemia.	1,500
6. Endoscopic Function																				
Academy Hospital	A-2-1	Gastrointestinal Fiberscope	1		2	1	1			○	○	○		1					Renewal of dilapidated unit.	700
	A-2-2	Bronchofiberscope	1			1	1			○	○	○		1					Renewal of dilapidated unit.	1,250

Name of Site	No.	Name of Equipment	Requested Quantity	Relation						Necessity	Validity	Decision	Reason of Deletion	Planned Q'ty					Remarks (TCT means Japanese Technical Cooperation Team)	Targeted Population (estimated)
				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B−	C		
	A-2-3	Colonofiberscope	1			1	1			○	○	○		1					Renewal of dilapidated unit.	700
	A-2-4	Multimedia endovideo education system	1						1	○	×	×	a					1	Low ranking	900
	A-2-5	Diagnostic laparoscope	1						1	○	×	×	a					1	Low ranking	250
	A-1-1	Surgical laparoscopy unit with monitor and instruments	1			1	1			○	×	×	a					1	Low ranking	300
	AD-24	ENT fiberscope	2						2	○	×	×	g					2	Low ranking	1,300
	AD-25	Bed for endoscopic examination	2						1	○	○	○		1					Requested by TCT	2,000
	AD-26	Laryngoscope	1						1	○	○	○		1						800
	AD-27	Coagulator for endoscope	1						1	○	○	○		1						2,000
Academy Pediatric Hospital	BD-1	Duodenofiberscope, surgical w/unit	1						1	○	×	×	h				1		Low ranking	3,500
	B-5-5	Gastrofiberscope for pediatric	1						1	○	○	○			1				High demand, newly projected.	540
	B-5-6	Bronchofiberscope pediatric set	1						1	○	○	○			1				High demand, newly projected.	540
	B-5-7	Colonofiberscope pediatric set	1						1	○	×	×						1	Low ranking	120
Diagnostic Center	C-5-1	Gastrofiberscope for adult	1		7	3	1			○	○	○		1					Renewal one unit	800
	C-5-2	Pediatric fibergastroscope Set	1		3	1	1			○	×	×						1	Low ranking	700
	C-5-3	Bronchofiberscope	1			1	1			○	○	○		1					Renewal one unit	52
	C-5-4	Colonofiberscope	1		1	1	1			○	○	○		1					Renewal one unit	340
Oncology Center	E-9-1	Gastrofiberscope	2		4	1	1			○	○	○			1			1	Renewal one unit	1,000
	E-9-2	Bronchofiberscope	1			1	1			○	○	○			1				Renewal one unit	
	E-9-3	Colonofiberscope	1			1	1			○	○	○			1				Renewal one unit	
	E-9-4	Cystoscope	1						1	○	×	×	i					1	Out of project	500
	E-D-5	Colposcope	1			1	1			○	×	×	i					1	Out of project	1,500
	E-D-6	Colonoscope	1			1	1			○	×	×	i					1	Out of project	400
	E-D-7	Bed for endoscopic examination	2			1	1			○	○	○			1			1	Requested by TCT	2,000
	E-D-8	Laryngoscope	1			1	1			○	○	○			1				Renewal one unit	500
	E-D-9	Coagulator for endoscope	1			1	1			○	○	○			1				Renewal one unit	1,100
	E-D-10	Proctoscope	1			1	1			○	○	○			1				Renewal one unit	700
7. Surgery and Reanimation Function																				

Name of Site	No.	Name of Equipment	Requested Quantity	Relation						Necessity	Validity	Decision	Reason of Deletion	Planned Q'ty					Remarks (TCT means Japanese Technical Cooperation Team)	Targeted Population (estimated)
				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B−	C		
Academy Hospital	A-1-2	Surgical Arthroscopy Unit	1						1	○	×	×	i					1	No clear relation with radiation and joint diseases	600
	A-1-3	Surgery suture Material (caetgut, nylon etc) set	10					10		○	×	×	c				10		Consumables, out of project	5,000
	A-1-4	Major surgery instrument set	3		3	2	2			○	○	○			1		2		Renewal one unit	5,000
	A-1-5	Operational microscope	2		1	1	1	1		○	×	×	c					2	No clear relation with radiation and necessity of micro surgery	200
	A-1-6	Electrical surgical unit	2						2	○	○	○			1			1	Indispensable for surgery	2,000
	A-1-7	Diagnosis kit for scraping of uterine cavity	1						1	○	×	×	i					1	No clear relations with radiation	500
	AD-1	Operating table	2			2	2			○	○	○		1			1		Renewal one unit	4,500
	AD-2	Operating light	2			2	2			○	○	○		1			1		Renewal one unit	4,500
	AD-3	Anesthesia apparatus with ventilator	2		2			2		○	○	○			2				Addition close to renewal of 2 units	1,200
	AD-4	Solid-state bipolar coagulator	4		2	2	2	2		○	○	○		1			1	2	Renewal one unit	4,500
	AD-5	Portable defibrillator	2		1	1	1	1		○	×	×	c					2	No clear relations with radiation	2,000
	AD-25	Ophathalmological operation instrument	1						1	○	×	×	i					1	No clear relations with radiation	1,300
	AD-26	Operation microscope	1						1	○	×	×	i					1	Low ranking	1,300
	AD-27	Operation drill	1						1	○	×	×	h					1	Low ranking	1,300
	AD-28	Ultrasonic surgical-aspirator	1						1	○	×	×	h					1	Low ranking	1,300
	AD-13	UV water sterilizer	4						4	○	○	○					4		Low ranking	1,300
	A-4-1	Ventilator for adult	5		3	3	3	2		○	○	○		2			1		Renewal of 2 dilapidated units	900
	A-4-2	Patient monitor	5		3	7	5			○	○	○		2					Renewal of 2 dilapidated units	1,000
	A-4-3	Reanimation system (inturbation tubes of different sizes)	5		2	3	3	2		○	×	×	h				2	3	Low ranking	1,000
	A-4-4	Electric suction unit	3	1	2	3	3			○	○	○		1			2		Low ranking	500
	A-4-5	Infusion pump	3							○	○	○				3			Low ranking	1,000
	A-4-6	General diagnostic set								○	○	○		2					Requested by TCT	20,000
Academy Pediatric Hospital	B-2-1	Operation laparoscope with monitor and instrument set	1						1	○	×	×	h				1		Low ranking	450
	B-2-2	Surgery instrument set	1		3			1		○	○	○			1				Add one unit to the units dilapidated.	1,000
	B-2-3	Arthroscopy unit with instrument set	1						1	○	×	×	h					1	No clear relation with radiation dose and joint diseases	450
	B-2-4	Orthopaedy traumatology instrument set	1					1		○	×	×	h					1	No clear relation with radiation dose and joint diseases	450

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				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B-	C		
	B-2-5	X-ray operation unit(C-arm)	1						1	○	×	×	h					1	Usable jointly with Academy Hospital	200
	B-2-6	Anaesthesia with ventilator for adult	1		1	1	1			○	×	×	h					1	Low ranking	1,200
	B-2-7	Anaesthesia with ventilator for pediatric	1		1		1			○	○	○			1				Addition 1 unit for existing units dilapidated.	200
	B-6-1	Audiometer for children	1						1	○	×	×	c					1	No clear relation with radiation dose and ENT diseases	2,000
	B-6-2	ENT chair mounted unit	1			2				○	×	×	h					1	No clear relation with radiation dose and ENT diseases	200
	B-6-3	ENT operation instrument set	1		1					○	×	×	h					1	No clear relation with radiation dose and ENT diseases	200
	B-6-4	ENT operational microscope	1			1				○	×	×	h					1	No clear relation with radiation dose and ENT diseases	200
	B-3-1	Bedside monitor	6			6	6			○	○	○			2			4	Indispensable for monitoring of serious patient	1,000
	B-3-2	Operating table	2			2	2			○	○	○		1			1		Renewal of 1 unit dilapidated	4,500
	B-3-3	Operating light	2			2	2			○	○	○		1			1		Renewal of 1 unit dilapidated	4,500
	B-3-4	Electric suction unit	2	1		2	2			○	○	○		1			2		Renewal of 1 unit dilapidated	500
	B-3-5	Hi-Lo gatch reanimation bed	6			6				○	×	×	h					6	Low ranking	1,000
	B-3-6	Ventilator for adult	1		1	1	1			○	×	×	h					1	Low ranking	900
	B-3-7	Ventilator for pediatric	1		1			1		○	○	○		1					Renewal of 1 unit dilapidated	600
	B-3-8	Pulseoxymeter	1							○	×	×	h					1	Low ranking	1,000
	B-3-9	Infusion pump	6		2	4	4	2		○	×	×	h					6	Low ranking	1,000
	B-3-10	Ultrasonic nebulizer	2							○	×	×	h					2	Low ranking	600
	B-7-1	Ambulance, 4WD	1							×	×	×	h					1	No clear relation with radiation	700
	B-7-2	Minibus 12-15 passengers for rural inspection	2							×	×	×	h					1	No clear relation with radiation	400
	B-7-3	General diagnostic set	10					10		○	○	○		2			2	6	Renewal of 2 units dilapidated	2,000
	B-7-4	Infant incubator	3		2			3		○	×	×	h					3	No clear relation with radiation	1,000
	B-7-5	Neonatal resuscitation table	6							○	×	×	h					6	Low ranking	500
Diagnostic Center	D-7-1	General diagnostic set	4			2	2			○	○	○		2					Renewal of 2 units dilapidated	
	D-7-2	Electric suction unit	2	1		2	2			○	○	○		2					Renewal of 2 units dilapidated	500
Oncology Center	E-1-1	Laryngoscope	1		1			1		○	×	×						1	Low ranking	250
	E-1-2	Bronchofiberscope	2			1	1		1	○	×	×	h					2	Low ranking	350

Name of Site	No.	Name of Equipment	Requested Quantity	Relation						Necessity	Validity	Decision	Reason of Deletion	Planned Q'ty					Remarks (TCT means Japanese Technical Cooperation Team)	Targeted Population (estimated)
				Existing Condition			Classification of Equip't							Ranking						
				A	B	C	Renewal	Addition	New					A	B+	B	B−	C		
	E-1-3	Diagnostic laparoscope	2			1	1	1		○	×	×	h					2	Low ranking	600
	E-1-4	Operation laparoscope	1						1	○	×	×	h					1	Low ranking	250
	E-1-5	Proctomanoscope	4			1	1	3		○	×	×	h					4	Low ranking	1,000
	E-1-6	Operation cystoscope	1						1	○	×	×	h					1	Low ranking	400
	E-1-7	Major surgery instruments kit	2		2			1		○	○	○			1				Renewal of dilapidated unit	2,000
	E-1-8	Operation table	2		1	2	2			○	○	○			2				Renewal of dilapidated unit	2,000
	E-1-9	Electrocardiograph	2			1	1	1		○	×	×	h					2	Low ranking	800
	E-1-10	Bedside monitor	2			2	2			○	○	○		2					Renewal of 2 units dilapidated	1,300
	E-3-1	Hysteroscope	1						1	○	×	×	h					1	Low ranking	460
	E-3-2	Diagnosis kit for scraping of uterine cavity	1		1			1		○	×	×	h					1	Low ranking	460
	E-3-3	Gynecological chair unit	2			2	2			○	×	×	h					2	Low ranking	2,000
	E-3-4	Electrical surgical unit	1						1	○	○	○	○		1				Indispensable for surgery	460
	E-3-5	Gynecological operation kit	2		2			2		○	×	×	h					2	Low ranking	200
	E-3-6	Wheel chair	2						2	○	×	×	c					2	Low ranking	260
	ED-3	Operation Lamp	2		3	2	2			○	○	○			2				Renewal of 2 units dilapidated	1,000
	ED-4	Ventilator for adult	2		3	2	2			○	○	○		2					Renewal of 2 units dilapidated	900
	ED-5	Solid-state bipolar coagulator	2		2	2	2			○	○	○		1			1		Indispensable for surgery	4,500
	ED-6	General diagnostic set	4			2	2			○	○	○		2					Renewal of obsolited units.	4,000
	E-2-1	Anesthesia appararus w/ ventilator	2		2	2	2			○	○	○			2				Renewal of dilapidated units.	1,000
	E-2-2	Intubation tubes	1000					1000		○	×	×	c					1000	Consumables, deleted	500
	E-2-3	Electric suction unit	2			2	2			○	○	○		2					Renewal of dilapidated units.	500

2-3 Basic Design

2-3-1 Design Concept

The project aims to supply medical equipment required for physical examination and diagnosis of approximately 27,000 people living in high radioactive contamination areas near Semipalatinsk City, namely Beskaragai, Jana Semey, Abai and Chuvaltau. The equipment will consist of those used for primary screening of all residents, precise diagnosis of those who have signs of anomalies, final diagnosis, and surgical operation. They will be installed at four medical institutions located in the city, Diagnostic-Consulting Center, Medical Academy Clinic Hospital, Oncology Center and HRMA. All of these facilities own and operate various types of medical equipment, and the project plans to replace or add the existing equipment, so that major construction work to accommodate the new equipment is not required. In addition to permanently installed equipment, a mobile examination unit with necessary equipment will be supplied to Diagnostic-Consulting Center.

As primary screening will be carried out in the areas located 100 – 300km away from Semipalatinsk City, the mobile examination unit will play a crucial role. On-board equipment should be of portable type and will be removed to Diagnostic-Consulting Center when no field examination is carried out in severe winter.

All of the four facilities are considered to have sufficient capabilities to ensure smooth operation and maintenance of equipment they will receive under the project, in terms of both manpower and skill. In particular, most equipment will replace or supplement existing equipment and no burden will be created for their operation and maintenance. Spare parts and consumables for medical equipment currently owned by the facilities are procured from suppliers in Almaty or Medtechnika in Novosibirsk, Russia. Thus, all the facilities have sufficient knowledge, capacity, skill and manpower to use the new equipment properly and maintain it in good operating condition.

All of the four facilities are located within Semipalatinsk City and can easily accessed to each other. As they maintain close communication, they will be able to

help each other in the case of equipment failure or similar trouble.

2-3-2 Basic Design

Based on the results of evaluation and selection on the basis of the design principles and the planning framework, and discussions with the technical assistance team, basic design of the project was formulated as shown in Table 3. Facilities to accommodate the new equipment and installation locations are shown in Figures 1 through 21.

Important considerations made in the equipment selection process are summarized as follows.

(1) Mobile examination unit

As technical cooperation project by the Japanese government related to the project aims to, among other things, make medical diagnosis on rural people living in the high radioactive contamination area in order to ensure early diagnosis on radiation diseases, a vehicle equipped with physical examination capabilities is essential. The mobile examination unit should cover a shaded area in the map at Appendix 6-1. The area is an average 150km away from the city.

The mobile examination unit will be specially designed by modifying a truck in consideration of poor road conditions in the service area, i.e., rural roads are not paved and become muddy in the early spring when snow melts. It will be equipped with rubber cushions to protect on-board equipment from vibration caused by running on a bumpy road. On-board equipment includes chest X-ray fluorographic equipment, ultrasonic units (portable), a blood cell counter, and a refrigerator to store specimen, as a standard set of equipment. There will be a space to accommodate a blood smearing unit and an automatic stainer as required. The mobile examination unit is expected to examine 18,000 persons per year as it is capable of examining around 100 persons per day and it can operate only for 180 days per year due to the severe winter conditions(temperature drops to −30℃). The mobile examination unit will be operated by Diagnostic-Consulting Center. It will be accompanied by three physicians and three technicians specialized in radiology, ultrasound and clinical laboratory analysis. Any person who has shown

signs of radiation disease during the primary screening will be sent to a hospital in Semipalatinsk City for precise examination and final diagnosis. Note that costs and expenses related to operation of the mobile examination unit will be borne by the Agency of the Republic of Kazakhstan for Health Matters in Astana. The study team has obtained verbal confirmation on the budget allocation from the chairman.

Finally, during the winter, the mobile examination unit will be kept in a garage with heating to keep room temperature not less than 0℃, while portable equipment such as the ultrasound imager, the blood cell counter, and the blood smearing unit will be removed and used at Diagnostic-Consulting Center.

(2) Recording of ultrasound imager

Images obtained from the ultrasound imager are generally printed. However, as print quality is not satisfactory, MO device for image recording will be attached. MO images can be transmitted to Japan via the satellite communication system between Medical Academy Clinic Hospital and Nagasaki University.

Table 3 Planned Equipment List

No.	Name of Equipment	Total Q'ty	Site					Remarks
			Academy Hospital	Academy Pediatric Hospital	Diagnostic Consulting Center	Oncology Center	HRMA	
1	Mobile Examination Unit	1			1			Ground clearance; 400mm or more
2	CT Scanner, slip ring type	1			1			
3	Surgical X-Ray Unit (C-arm)	1	1					
4A	X-Ray TV System (with linear tomography)	2	1			1		with Linear Tomography (2 units)
4B	X-ray TV System	1			1			without Linear Tomography
5	ChestX-Ray Unit	1			1			
6	Automatic X-ray Film Processor	3	1		1	1		
7A	Ultrasound Unit (stationary) with MO	1				1		with MO output
7B	Ultrasound Unit (stationary)	1		1				without MO output
8	Ultrasound Unit (portable)	2	1		1			
9	Ultrasound Unit with Color Doppler, MO and different probes	2	1		1			with MO output
10	ECG, 6-12ch	4	1	1	1	1		
11	Biochemical Analyzer	4	1		1	1	1	
12	Blood Gas Analyzer	2	1			1		

No.	Name of Equipment	Total Q'ty	Site					Remarks
			Academy Hospital	Academy Pediatric Hospital	Diagnostic Consulting Center	Oncology Center	HRMA	
13	Automatic Blood Cell Counter	4	1		1	1	1	
14	Deep Freeze Refrigerator	2	1		1			
15	Urine Analyzer	3	1		1	1		
16	ELISA Plate Reader	1			1			
17	Urinary Iodine Analyzer	1			1			
18	Automatic Tissue Processor	1				1		
19	Set of Instrument for Pathlogy	1				1		
20	Cryostat	1				1		
21	Microtome	1				1		
22	Slide Stainer, Automatic	1			1			
23	Paraffin Enbedding Instrument	1				1		
24	Stretching Hot Plate	1				1		
25	Teaching Microscope	1				1		
26	Photomicrographic System	1				1		
27	Blood Smearing Instrument	3	1		1		1	
28	Automatic Stainer	3	1		1		1	
29	Medical Refrigerator	1			1			
30	Gastrofiberscope for adult	3	1		1	1		

No.	Name of Equipment	Total Q'ty	Site					Remarks
			Academy Hospital	Academy Pediatric Hospital	Diagnostic Consulting Center	Oncology Center	HRMA	
31	Gastrofiberscope for pediatric	1		1				
32	Bronchofiberscope for adult	3	1		1	1		
33	Bronchofiberscope for pediatric	1		1				
34	Colonofiberscope	3	1		1	1		
35	Binocular microscope	7	2		2	2	1	
36	Bed for Endoscopic Examination	2	1			1		
37	Laryngoscope	2	1			1		
38	Proctofiberscope	1				1		
39	Coagulator for Endoscope	2	1			1		
40	Patient Monitor	6	2	2		2		
41	Suction Unit	6	1	1	2	2		
42	Electric Surgical Unit	2	1			1		
43	Ventilator for pediatrics	1		1				
44	Ventilator for adult	4	2			2		
45	Anaesthesia Apparatus with Ventilator for pediatric	1		1				
46	Anaesthesia Apparatus with Ventilator for adult	4	2			2		
47	Major Surgery Instrument Set	3	1	1		1		

No.	Name of Equipment	Total Q'ty	Site					Remarks
			Academy Hospital	Academy Pediatric Hospital	Diagnostic Consultin gCenter	Oncology Center	HRMA	
48	Operating Light	4	1	1		2		
49	Universal Operation Table	4	1	1		2		
50	General Diagnostic Set	8	2	2	2	2		
51	Solid-state Bipolar Coagulator	2	1			1		

No.	Name of Equipment	Q'ty
12	Blood Gas Analyzer	1
37	Laryngoscope	1
40	Patient Monitor	2
41	Suction Unit	1
44	Ventilator for adult	2

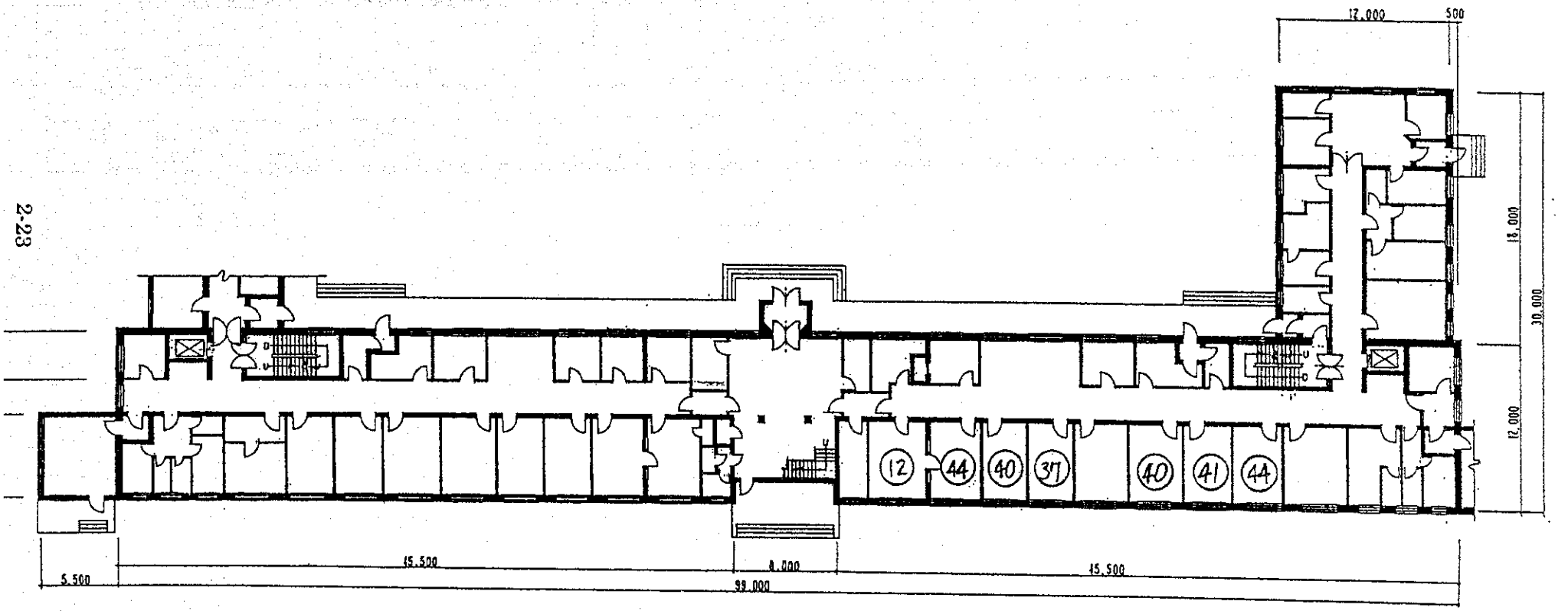


Fig.1 Medical Academy Hospital Central Therapy Bldg. 1F

No.	Name of Equipment	Q'ty
42	Electric Surgical Unit	1
46	Anaesthesia Apparatus with Ventilator for adult	1

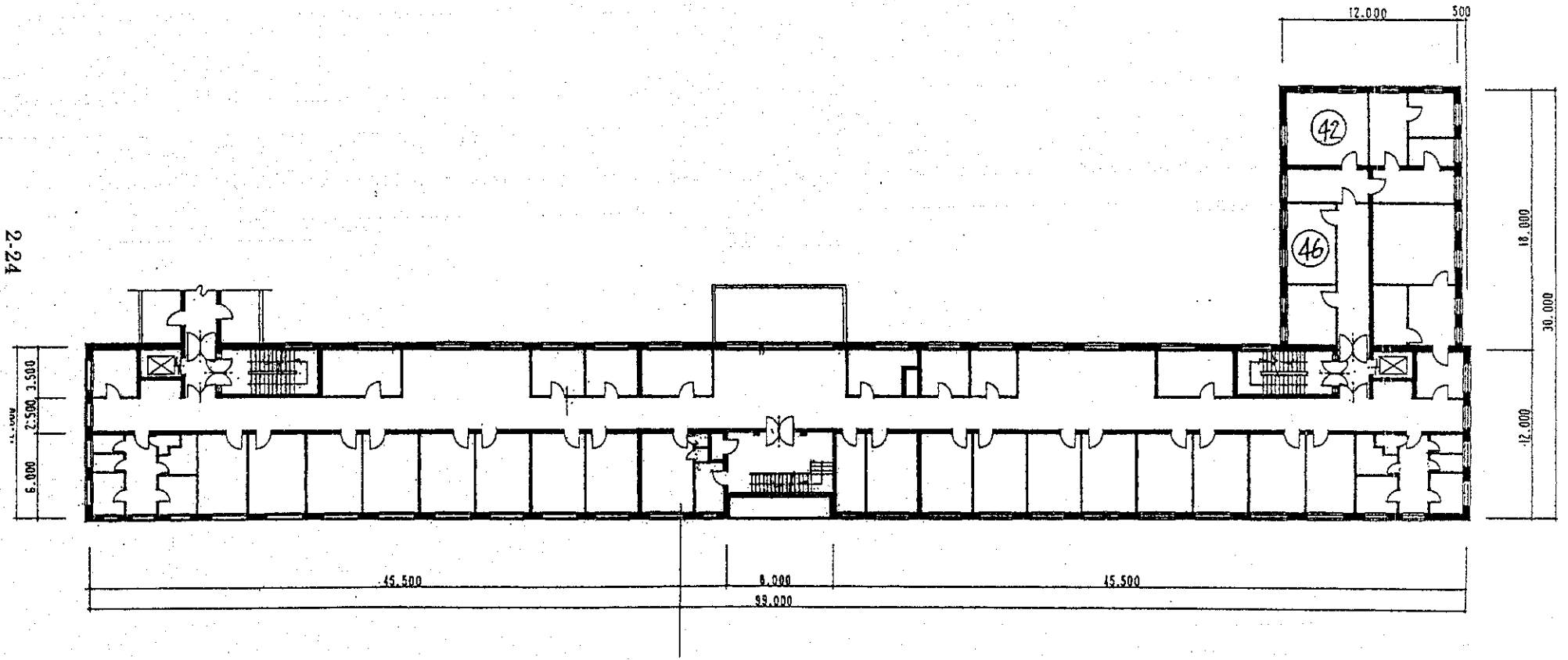


Fig.2 Medical Academy Hospital Central Therapy Bldg. 2F

No.	Name of Equipment	Q'ty
3	Surgical X-Ray Unit (C-arm)	1
46	Anaesthesia Apparatus with Ventilator for adult	1
47	Major Surgery Instrument Set	1
48	Operating Light	1
49	Universal Operation Table	1
51	Solid-state Bipolar Coagulator	1

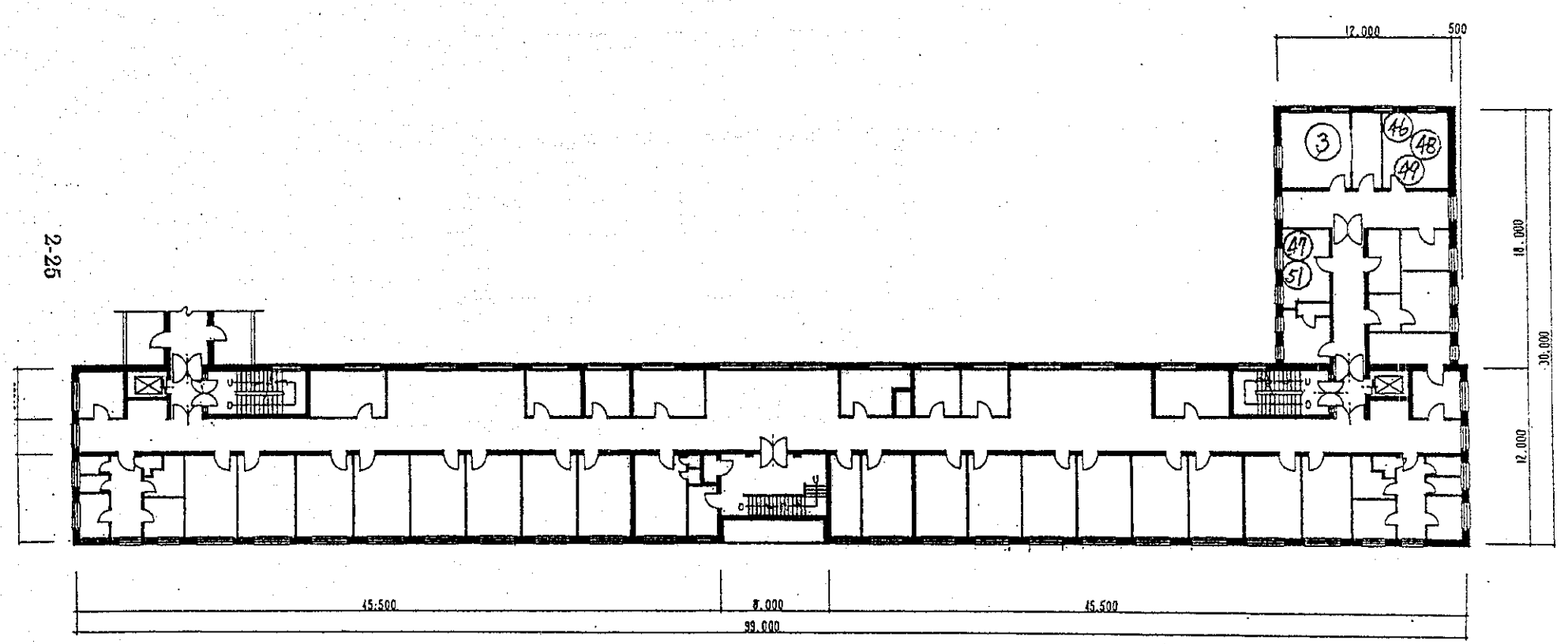


Fig.3 Medical Academy Hospital Central Therapy Bldg. 3F

No.	Name of Equipment	Q'ty
4A	X-Ray TV System (with linear tomography)	1
6	Automatic X-ray Film	1

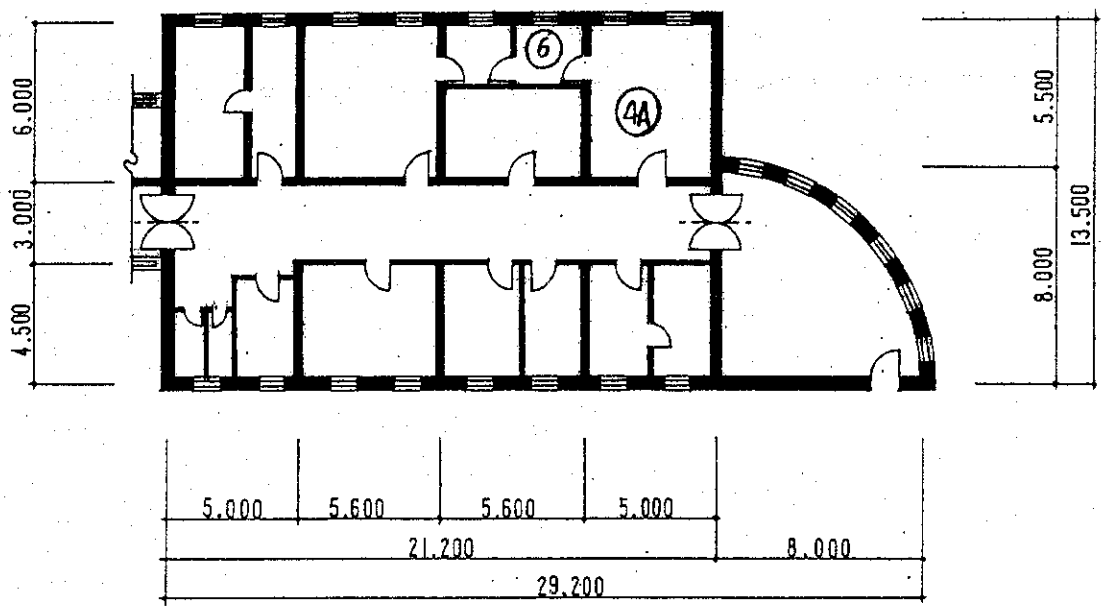


Fig.4 Medical Academy Hospital Intermediate Bldg. 3F

No.	Name of Equipment	Q'ty
50	General Diagnostic Set	2

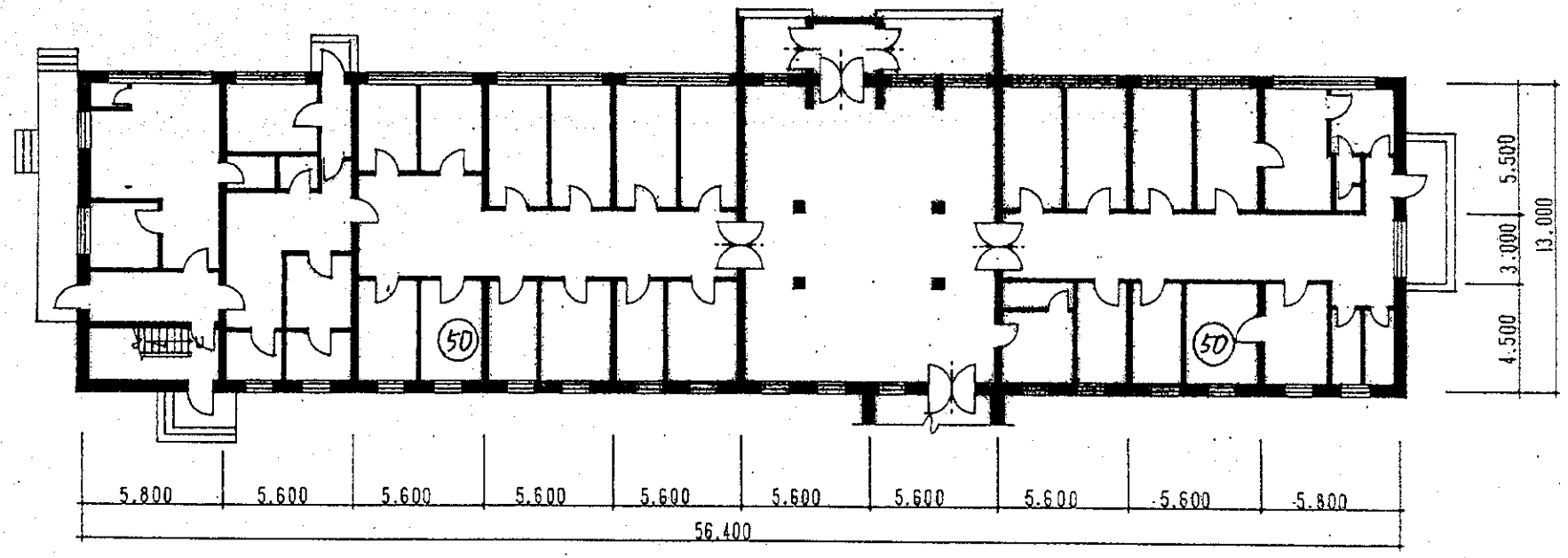


Fig.5 Medical Academy Hospital Polyclinic Bldg. 1F

No.	Name of Equipment	Q'ty
30	Gastrofiberscope for adult	1
32	Bronchofiberscope for adult	1
34	Colonofiberscope	1
36	Bed for Endoscopic	1
39	Coagulator for Endoscope	1

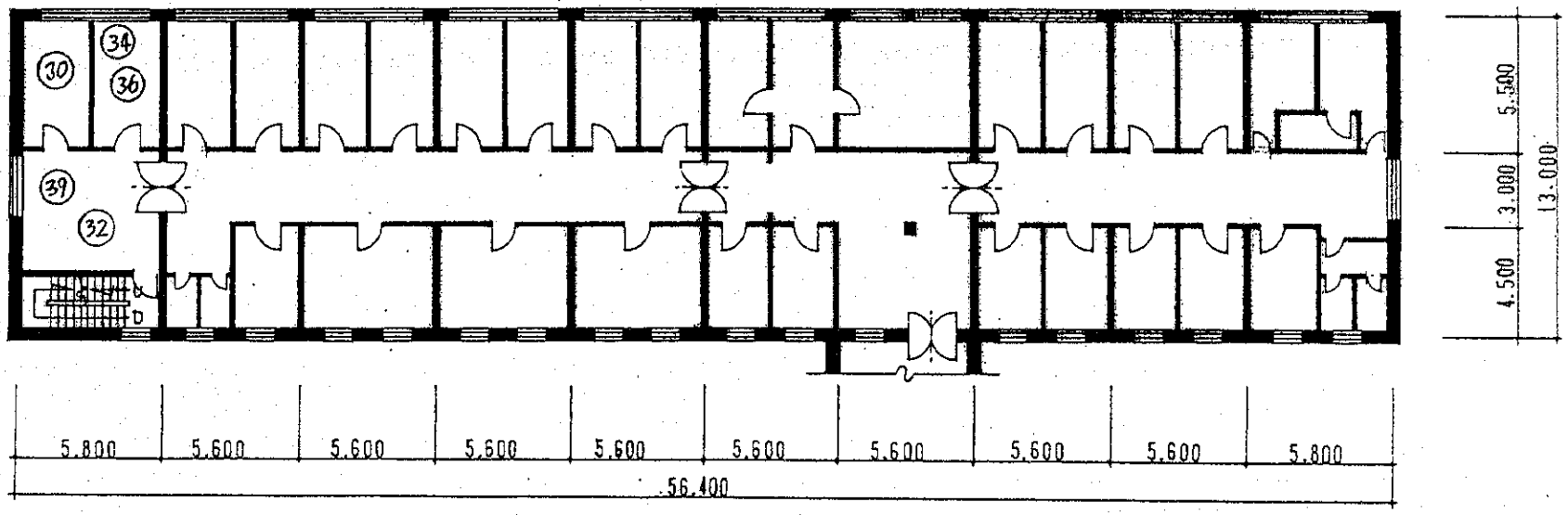


Fig.6 Medical Academy Hospital Polyclinic Bldg. 2F

No.	Name of Equipment	Q'tv
8	Ultrasound Unit (portable)	1
9	Ultrasound Unit with Color Doppler, MO	1
10	ECG, 6-12ch	1
11	Biochemical Analyzer	1
13	Automatic Blood Cell Counter	1
14	Deep Freeze Refrigerator	1
15	Urine Analyzer	1
27	Blood Smearing Instrument	1
28	Automatic Stainer	1
35	Binocular microscope	2

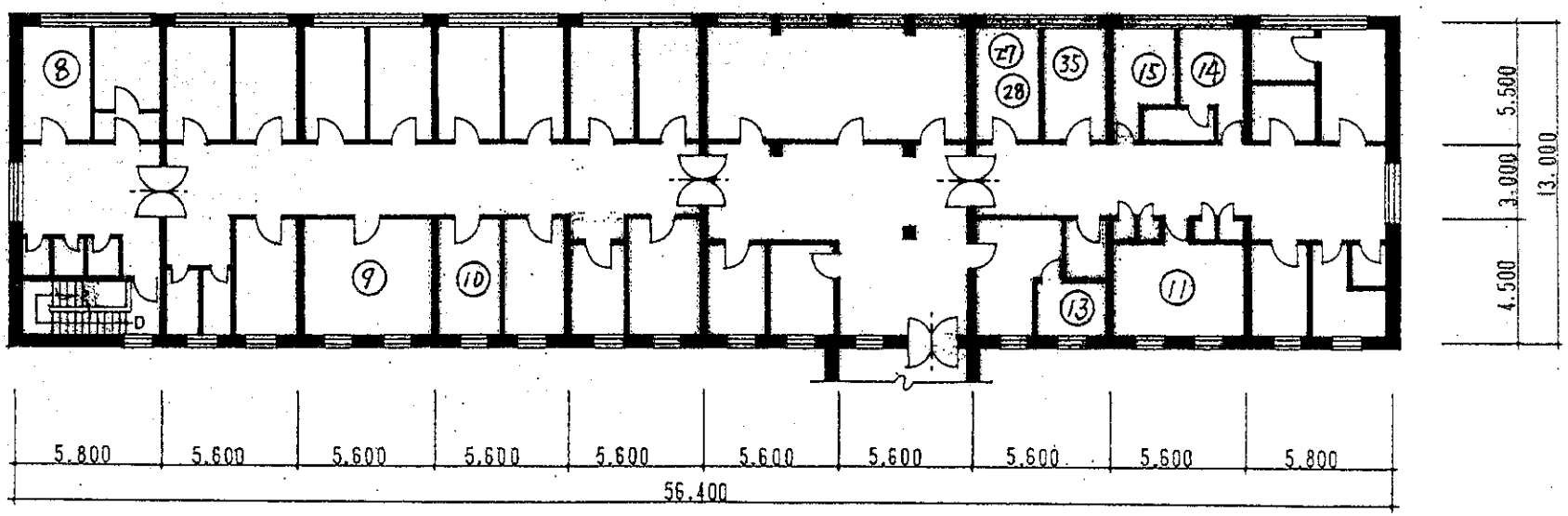


Fig.7 Medical Academy Hospital Polyclinic Bldg. 3F

No.	Name of Equipment	Q'tv
40	Patient Monitor	2
41	Suction Unit	1
43	Ventilator for pediatrics	1

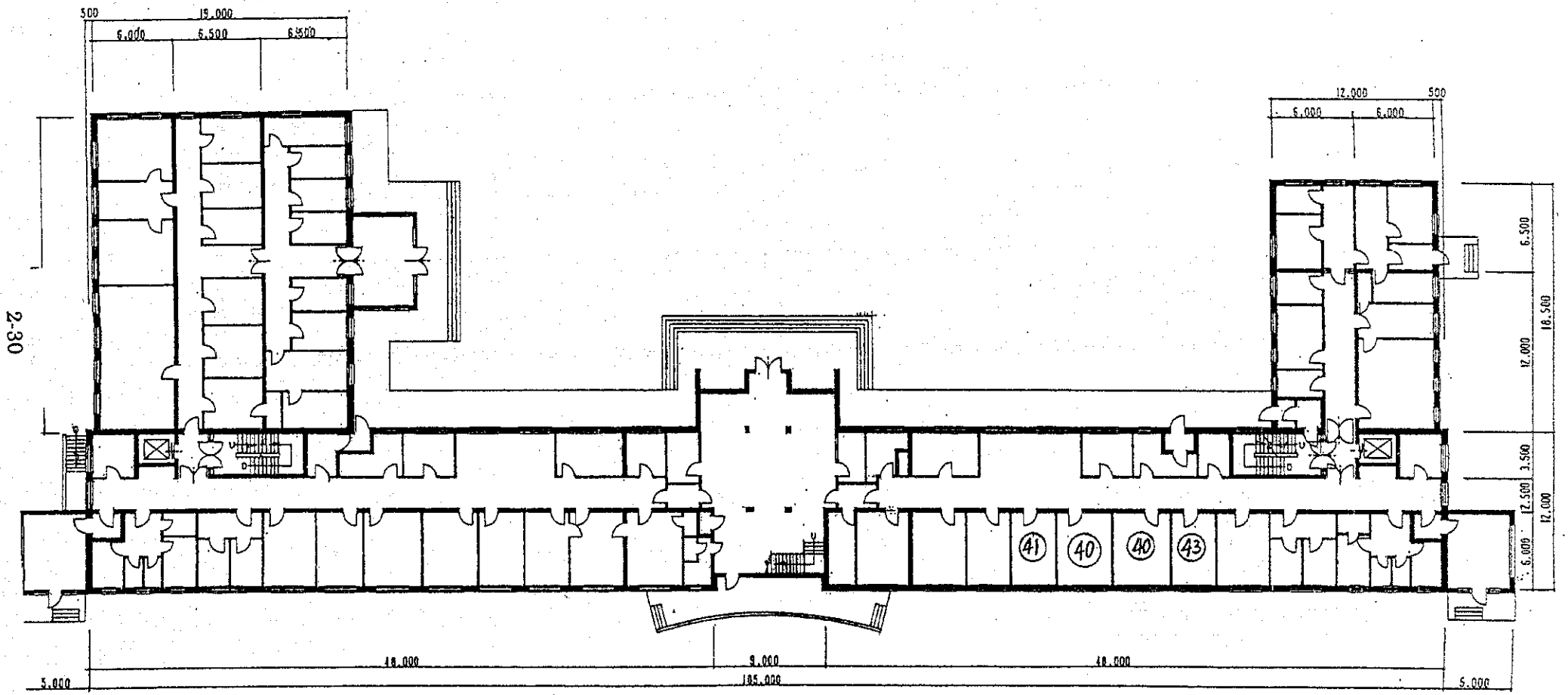


Fig.8 Medical Academy Hospital Pediatric Ward 1F

No.	Name of Equipment	Q'ty
31	Gastrofiberscope for pediatric	1
33	Bronchofiberscope for	1
45	Anaesthesia Apparatus with Ventilator for pediatric	1
47	Major Surgery Instrument Set	1
48	Operating Light	1
49	Universal Operation Table	1

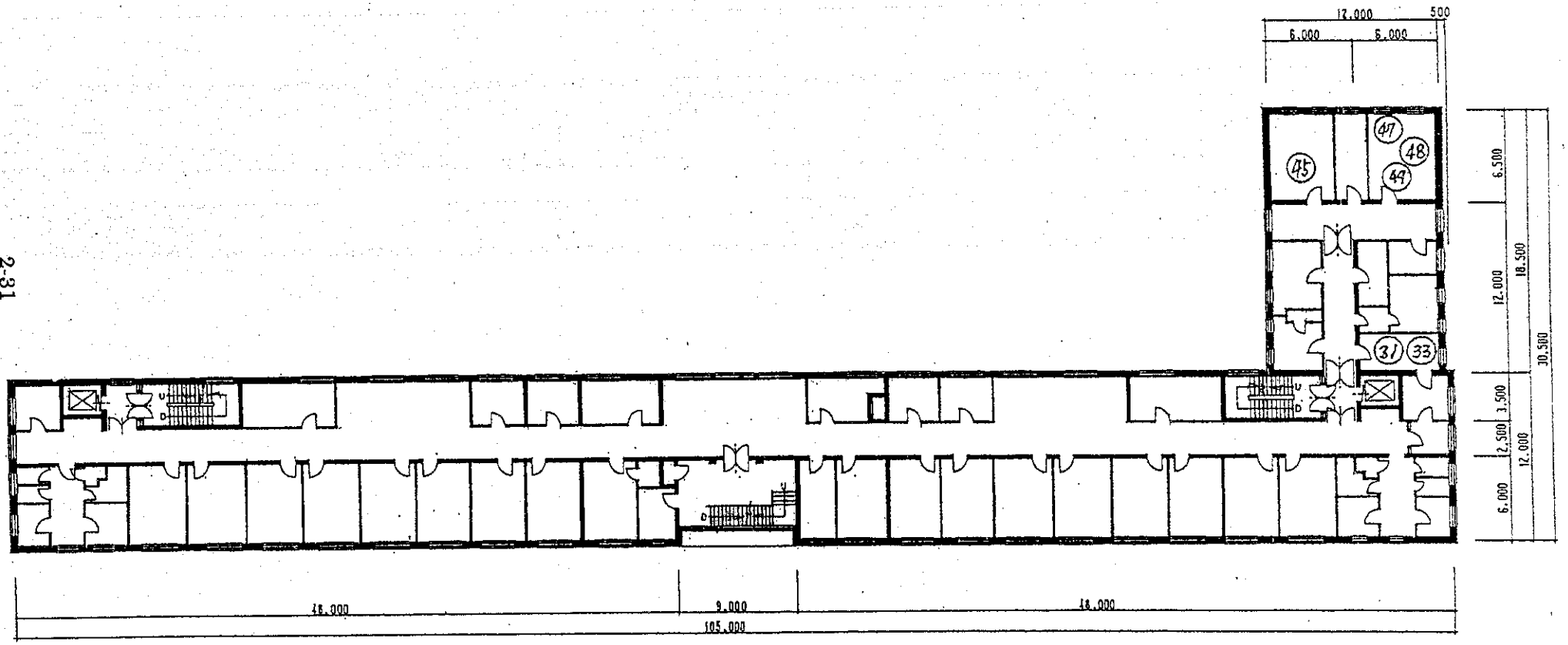


Fig.9 Medical Academy Hospital Pediatric Ward 3F

No.	Name of Equipment	Q'ty
7B	Ultrasound Unit (stationary)	1
10	ECG, 6-12ch	1
50	General Diagnostic Set	2

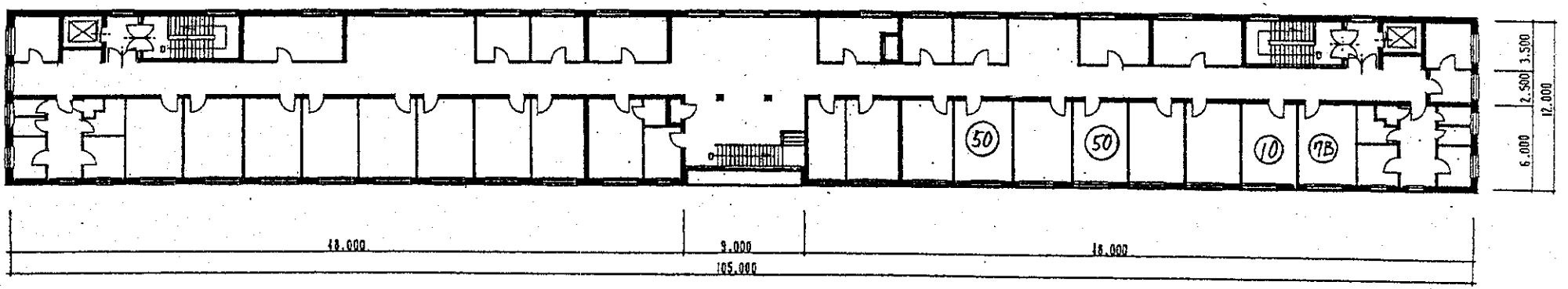


Fig.10 Medical Academy Hospital Pediatric Ward 5F

No.	Name of Equipment	Q'ty
1	Mobile Examination Unit	1
5	ChestX-Ray Unit	1
8	Ultrasound Unit (portable)	1
13	Automatic Blood Cell Counter	1
27	Blood Smearing Instrument	1
28	Automatic Stainer	1
29	Medical Refrigerator	1

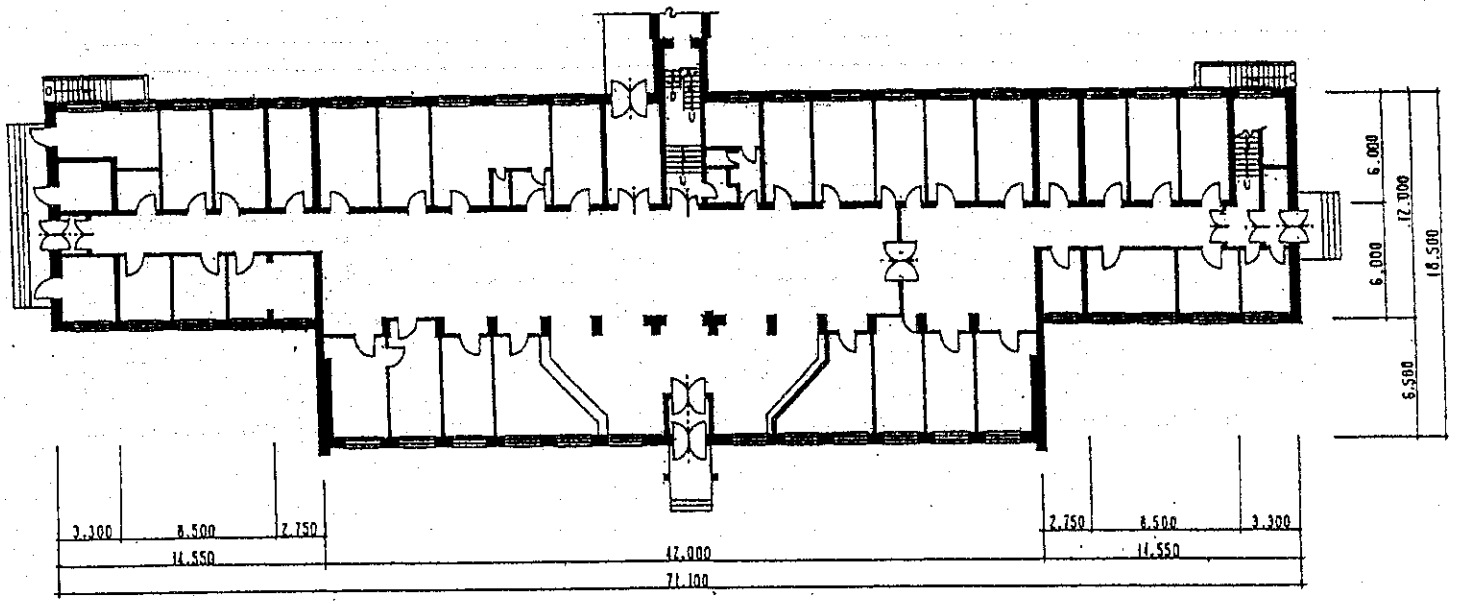


Fig.11 Diagnostic-Consulting Center Bldg.-A 1F

No.	Name of Equipment	Q'ty
11	Biochemical Analyzer	1
14	Deep Freeze Refrigerator	1
15	Urine Analyzer	1
16	ELISA Plate Reader	1
17	Urinary Iodine Analyzer	1
22	Slide Stainer, Automatic	1
35	Binocular microscope	2

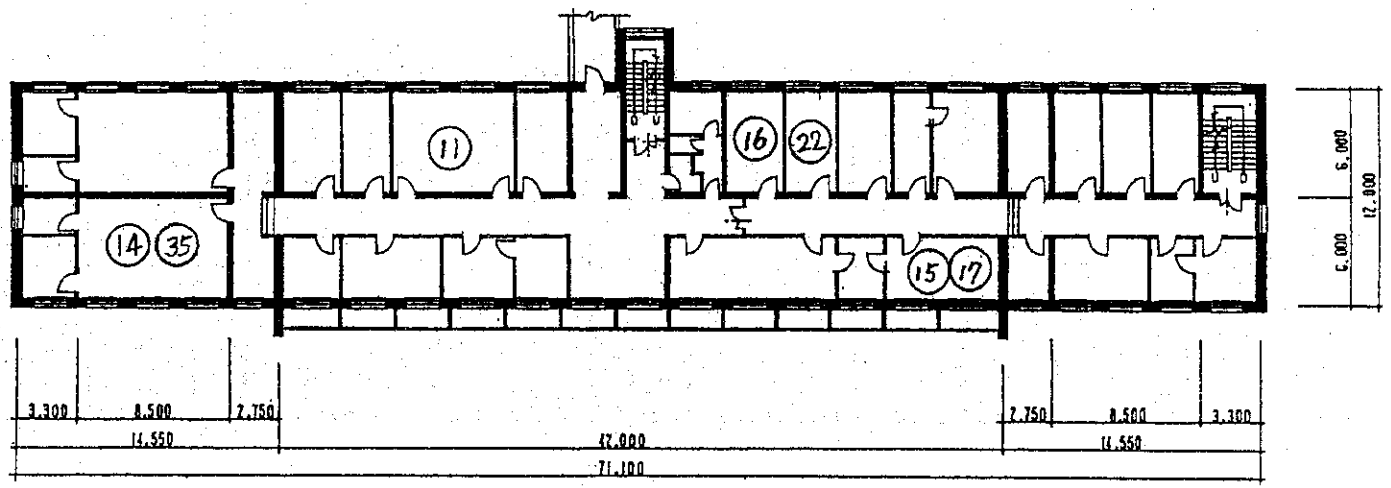


Fig.12 Diagnostic-Consulting Center Bldg.-A 2F

No.	Name of Equipment	Q'ty
30	Gastrofiberscope for adult	1
32	Bronchofiberscope for adult	1
41	Suction Unit	2

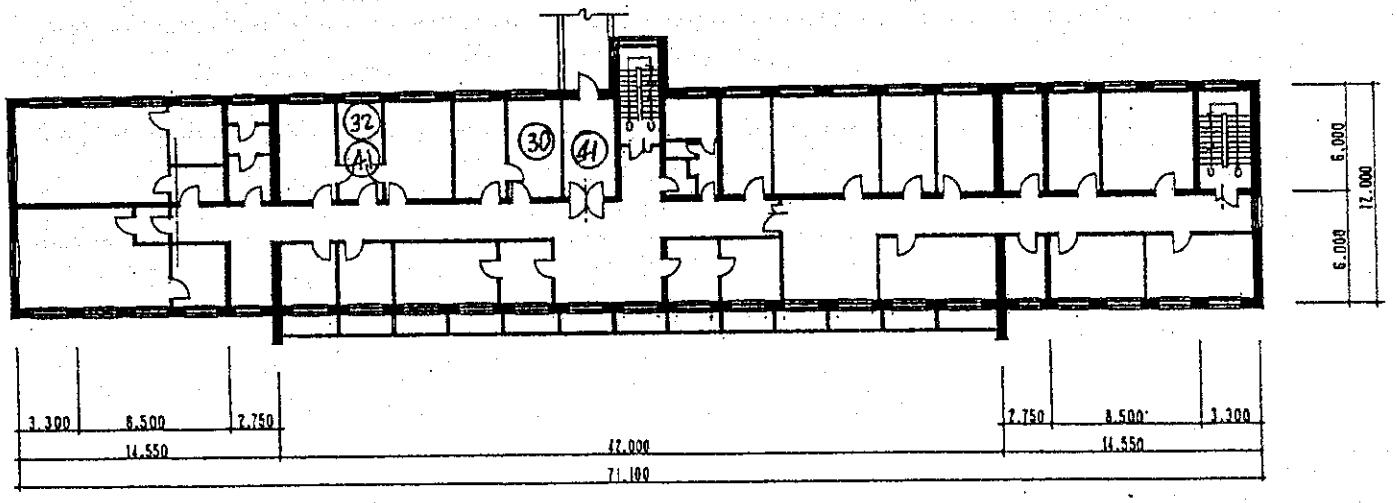


Fig.13 Diagnostic-Consulting Center Bldg.-A 3F

No.	Name of Equipment	Q'ty
10	ECG, 6-12ch	1
34	Colonofiberscope	1
50	General Diagnostic Set	2

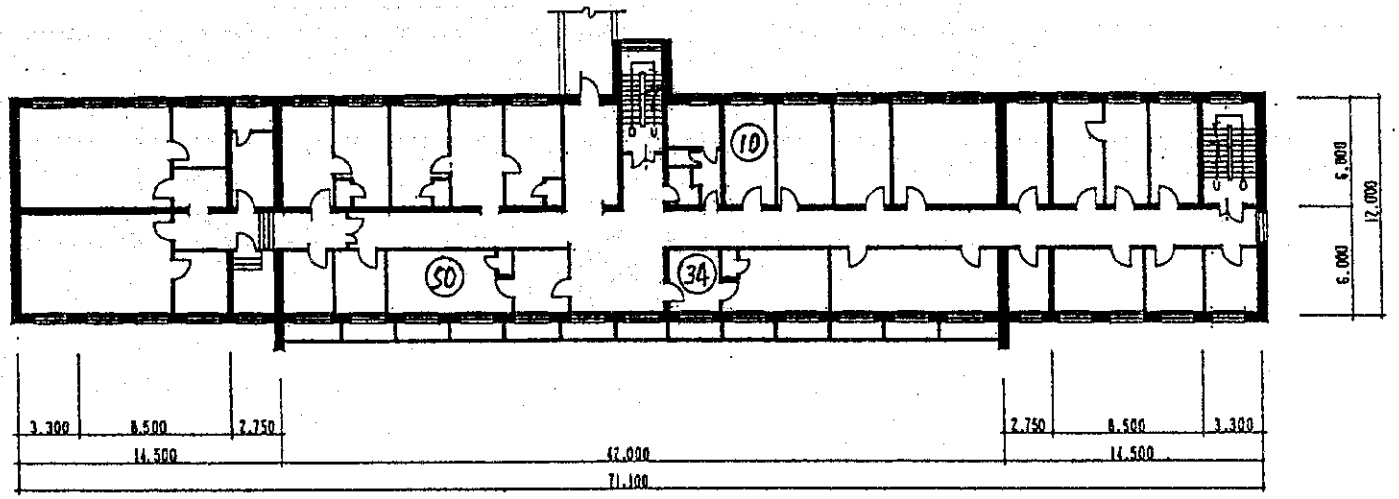


Fig.14 Diagnostic-Consulting Center Bldg.-A 4F

No.	Name of Equipment	Q'ty
9	Ultrasound Unit with Color Doppler, MO	1

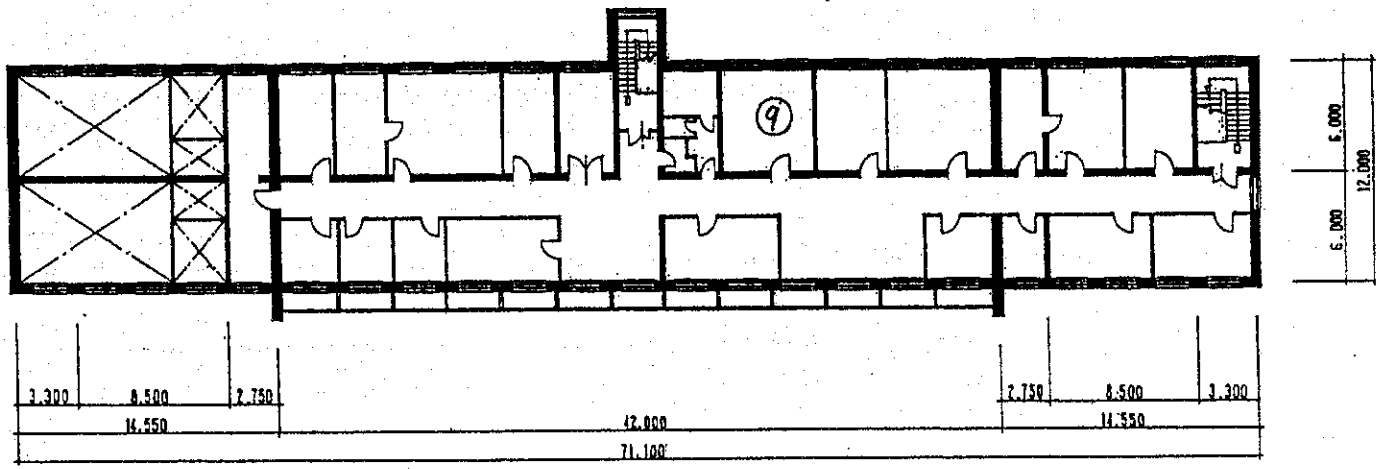


Fig. 15 Diagnostic-Consulting Center Bldg.-A 5F

No.	Name of Equipment	Q'ty
2	CT Scanner, slip ring type	1
4B	X-ray TV System	1
6	Automatic X-ray Film	1

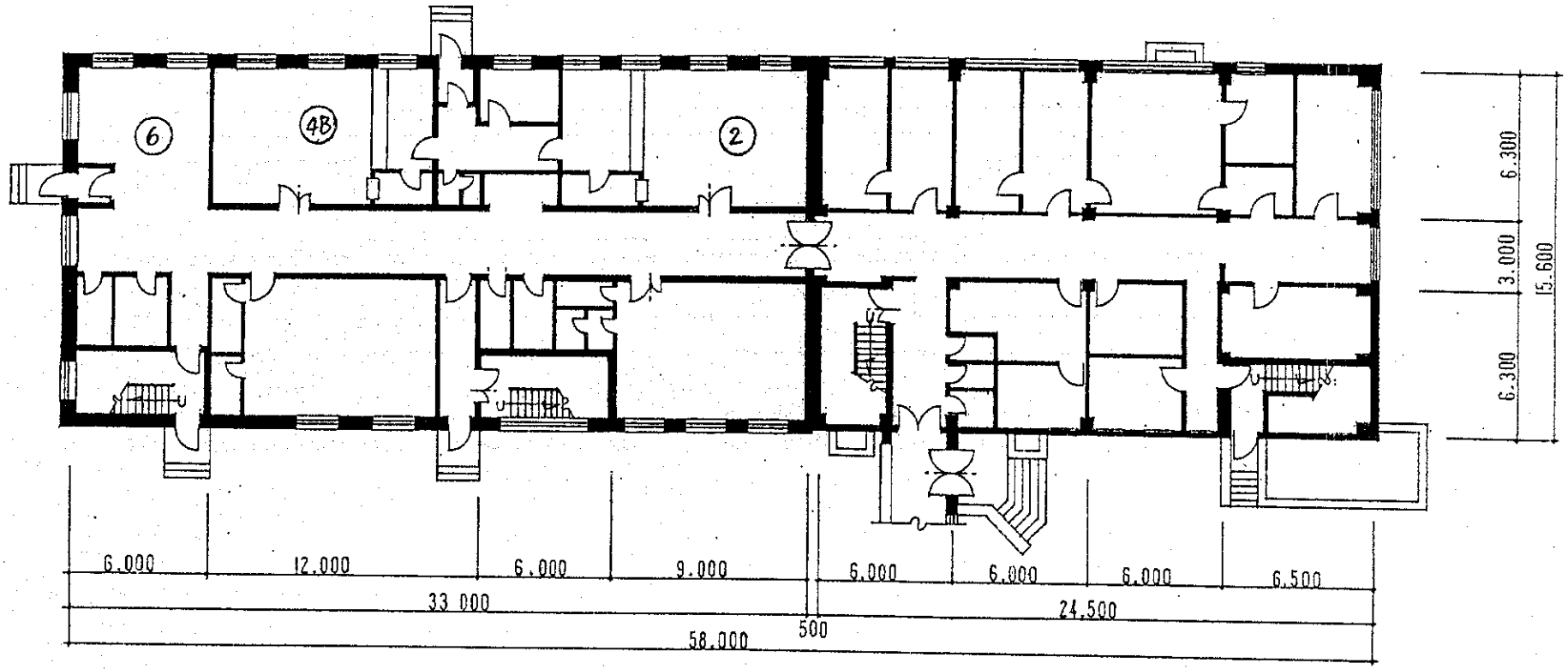
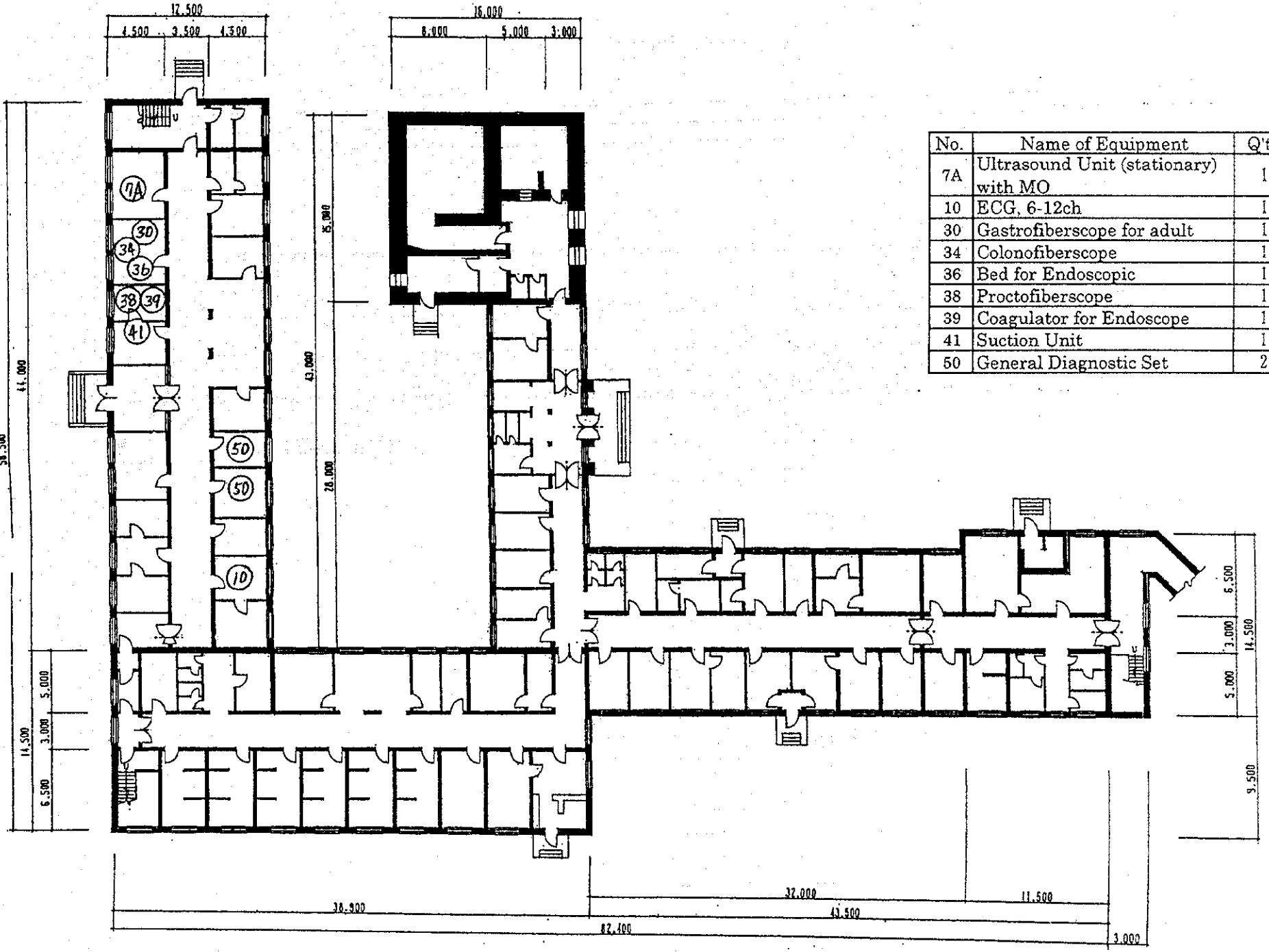


Fig.16 Diagnostic-Consulting Center Bldg.-B 1F



No.	Name of Equipment	Q'ty
7A	Ultrasound Unit (stationary) with MO	1
10	ECG, 6-12ch	1
30	Gastrofiberscope for adult	1
34	Colonofiberscope	1
36	Bed for Endoscopic	1
38	Proctofiberscope	1
39	Coagulator for Endoscope	1
41	Suction Unit	1
50	General Diagnostic Set	2

Fig.17 Oncology Center 1F

No.	Name of Equipment	Q'ty
35	Binocular microscope	2

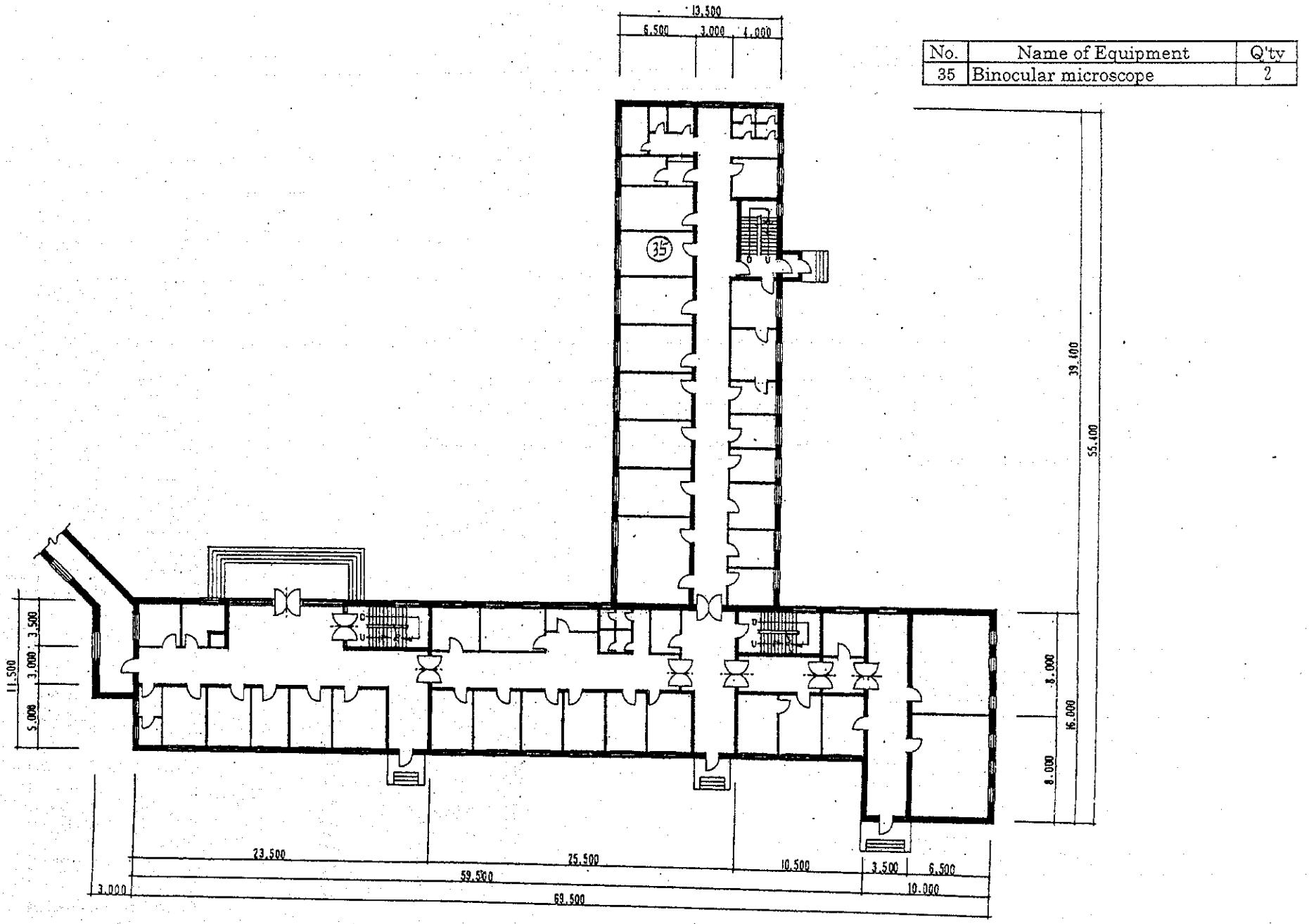


Fig.18 Oncology Center 1F

No.	Name of Equipment	Q'ty
4A	X-Ray TV System (with linear tomography)	1
6	Automatic X-ray Film	1
11	Biochemical Analyzer	1
12	Blood Gas Analyzer	1
13	Automatic Blood Cell Counter	1
15	Urine Analyzer	1
18	Automatic Tissue Processor	1
19	Set of Instrument for Pathlogy	1
20	Cryostat	1
21	Microtome	1
23	Paraffin Enbedding	1
24	Stretching Hot Plate	1
25	Teaching Microscope	1
26	Photomicrographic System	1

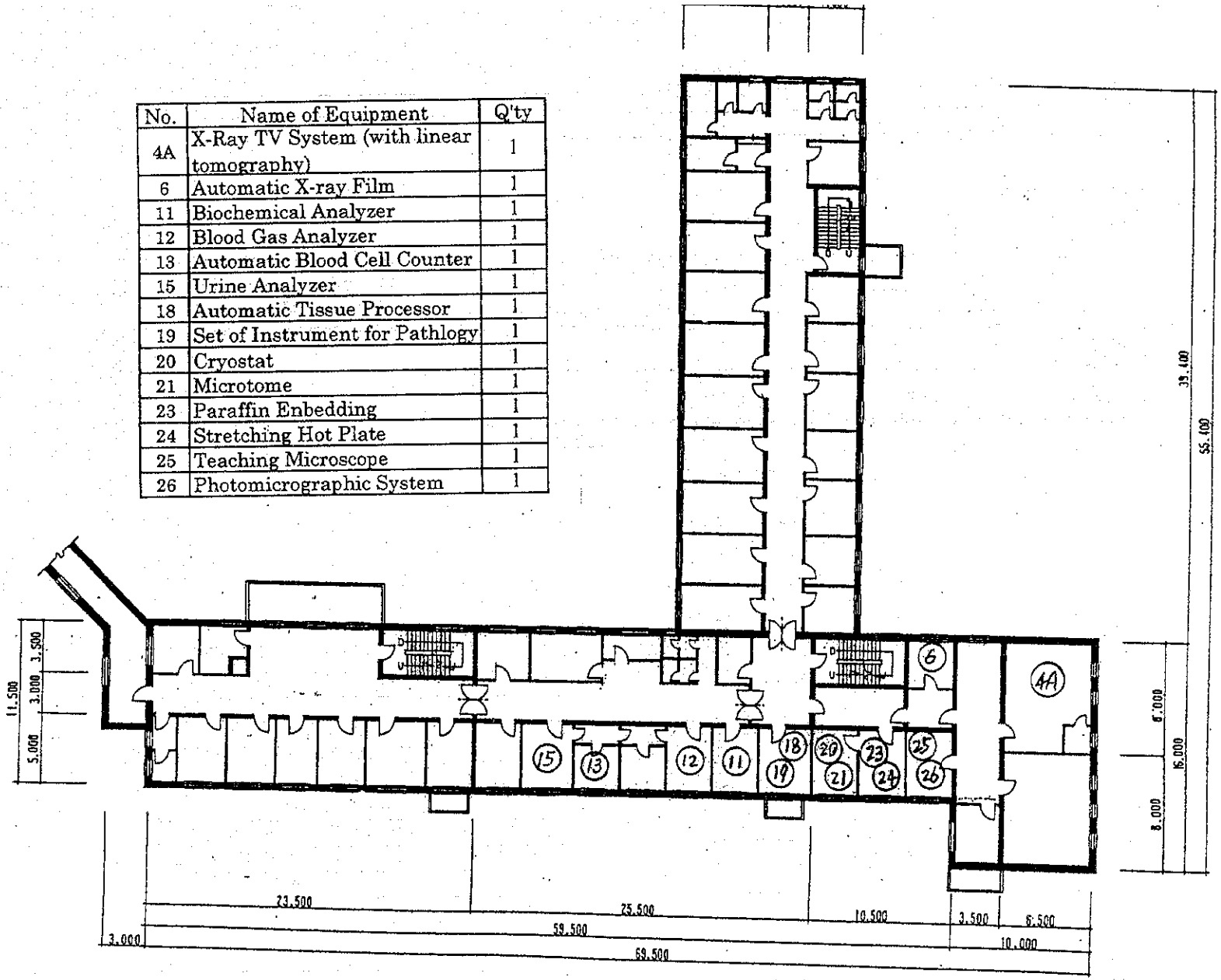


Fig.19 Oncology Center 2F

No.	Name of Equipment	Q'ty
32	Bronchofiberscope for adult	1
37	Laryngoscope	1
40	Patient Monitor	2
41	Suction Unit	1
42	Electric Surgical Unit	1
44	Ventilator for adult	2
46	Anaesthesia Apparatus with Ventilator for adult	2
47	Major Surgery Instrument Set	1
48	Operating Light	2
49	Universal Operation Table	2
51	Solid-state Bipolar Coagulator	1

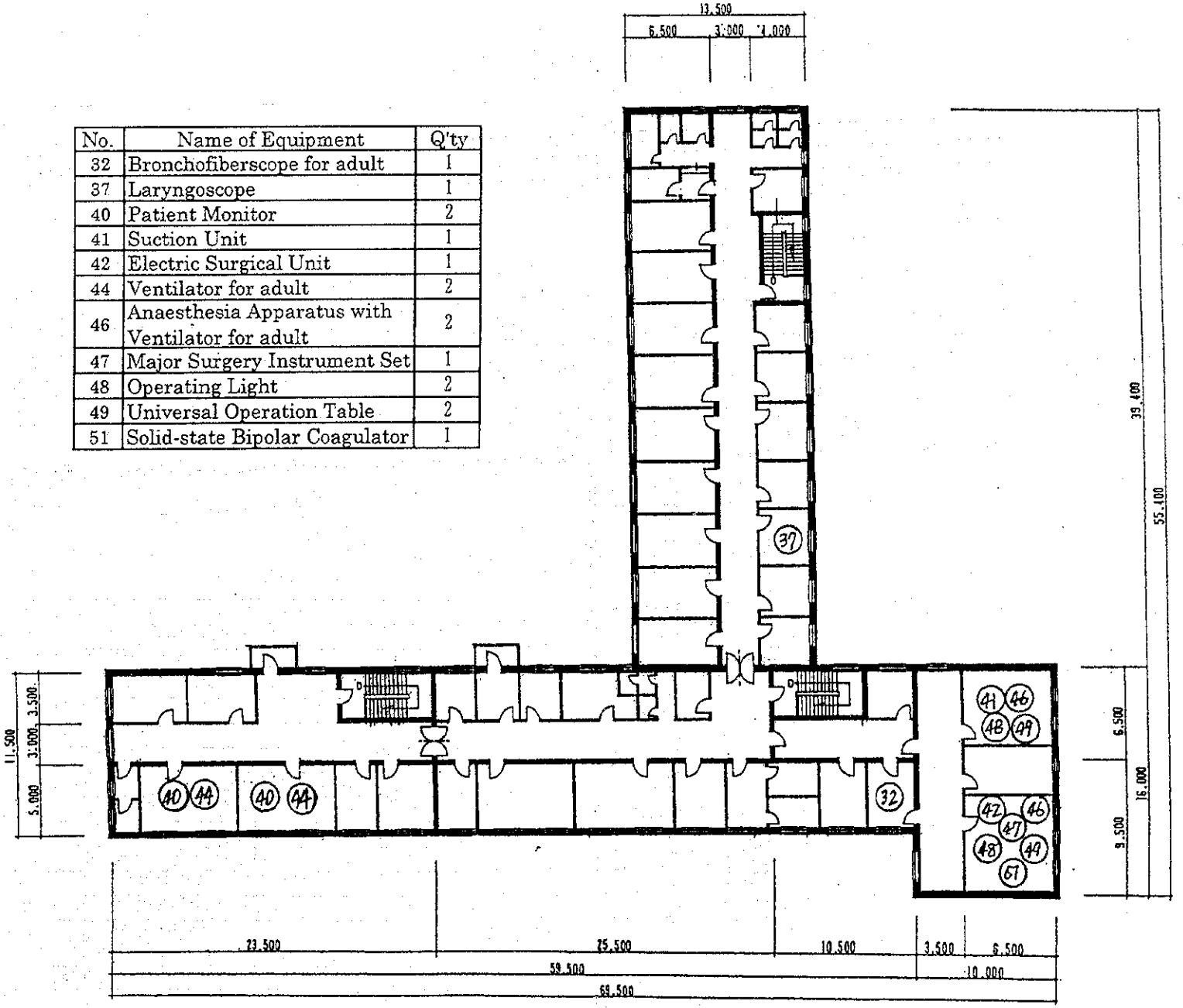


Fig.20 Oncology Center 3F

No.	Name of Equipment	Q'ty
11	Biochemical Analyzer	1
13	Automatic Blood Cell Counter	1
27	Blood Smearing Instrument	1
28	Automatic Stainer	1
35	Binocular microscope	1

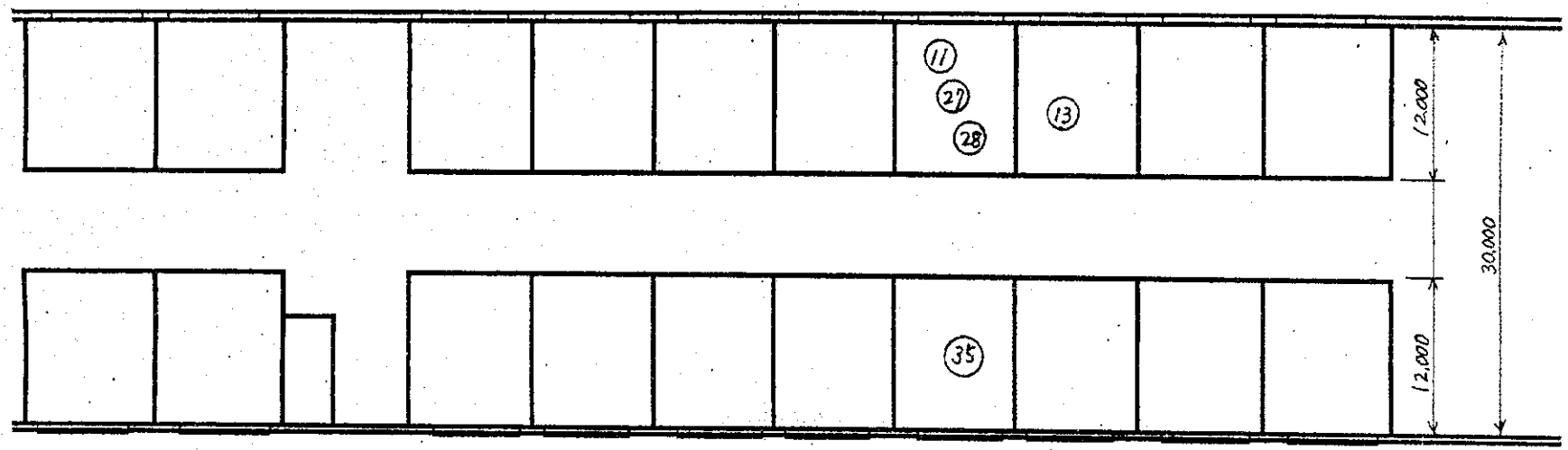


Fig.21 HRMA 2F