CHAPTER 4: IMPROVEMENT PLAN OF MEDICAL EQUIPMENT

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4-1 PROPOSAL AND OBJECTIVES OF THE PLAN

The objectives of the Long-Term Health Plan are to optimize the use of installed facilities and to drop the morbidity rate of the communicable diseases caused by the malnourishment, bad habits and poor sanitation with the top priority set on reducing the infant (under 5-year-old) mortarity rate, being 150 infants out of 1,000, who has little resistance to diseases.

The Project for Improvement of Medical Equipment for Kanti Children's Hospital is corresponding to the above objectives. Kanti Children's Hospital, which is the sole pediatric hospital in the Kingdom of Nepal, has recognized the importance of reinforcing its medical equipment in order to upgrading the required functions as the pediatric training center for the necessary manpower as well as the referral hospital identified, particularly in the following points, and has requested for the cooperation of the Government of Japan:

1) To define the hospital corresponding to the tertiary care,
2) To strengthen the Noenatal and Pediatric Surgey therapy,
3) To start Anesthetic Department for the full functioning of the Pediatric Surgery,
4) To strengthen the facilities of Neonatal and Infant Intensive Care Unit,
5) To facilitate the Service Facilities for the above activities, and
6) To be the medical and training center for the Teaching Hospital and the Nursing Shool.

As a result of the site survey it is summarised that the reinforcement of the necessary equipment, which is necessary for the tertiary care, being the exclusive equipment for the infant, who has little resistance to diseases, Operating Instrumsnts Set for neonatal surgery, post operative monitoring equipment, ventilation equipment for the emergency and acute cases. But the present operation and maintenance system is not sufficient for the medical staff enrollment and the financial conditions either. Therefore, the Plan must strictly consider the present conditions of the hospital, and include

the following items:

1) The correspondence to the tertiary care,
2) The re-equipment of the insufficiency portion, and
3) The close cooperation with the Teaching Hospital constructed by the Grant Aid of the Government of Japan and the Nursing School to be constructed for the training of the medical manpower including the approval of pediatricians.

4-2 Outline of the Plan

It is essential that the outline of the improvement plan of medical equipment for Kanti Children's Hospital should be concentrated to the reinforcement for the diagnosis and therapy in connection with the current medical background of the Kingdom of Nepal. In addition to this, modern medical care which is essential to the hospital will be provided with the following:

1) Improvement of diagnostic and therapeutic service with,
   a) The reinforcement of the Special Care Bady Unit,
      * re-equipping for NICU
      * starting of ICU
   b) The reinforcement of the Neonatal Surgical Unit
      * re-equipping for the Neonatal Surgical Unit
      * equipping of the life-saving unit and post operative monitor for the premature infant cases,
   C) Cross cooperation with the Teaching Hospital regarding the laboratory tests in addition to the reinforcement of it.
2) Improvement of the hospital service facilities but, additional local costs to be born by the re-equipment shall be adjusted by the newly equipped oxygen plant and emergency generator set.
3) Improvement of the manpower training with the audiovisual equipment for training and teaching use etc.
4) Provision of the maintenance service engineer training for the newly equipped equipment to be provided with reasonable spare parts.

The departments for which the medical equipment is to be supplied with the above-mentioned outline are for:

1) Special Care Baby Unit (NICU)
2) Milk Kitchen
3) Intensive Care Unit (ICU)
4) Urgent Clinical Test Room
5) Radiographic Department
6) Neonatal Surgical Unit
7) Operation Theater
8) Sterilization Room
9) Clinical Pathology Department

10) Casualty Department

11) Ward, and

12) Service Facility

4-2-1 Improvement of Pediatric Service Activities

Kanti Children's Hospital is the sole specialized pediatric hospital in the Kingdom of Nepal that serves as a educational training center in the pediatric field of the Teaching Hospital, Institute of Medicine, Tribhuvan University that was constructed by the Japanese grant aid assistance. Other big hospital in all over Nepal, such as Bir Hospital, Maternity Hospital or Tribhuvan University Teaching Hospital, do not have the specialized pediatric department, so that the role of the reference hospital in the pediatric field is represented by the activities of Kanti Children's Hospital. The Plan will enable the activities of the following departments.

1) Special Care Baby Unit (NICU)

2) Milk Kitchen

The patients are premature or neonatal, usually in their crucial cases, who either are transferred to the hospital or visit the outpatient wards. At Maternity Hospital in Kathmandu, approximately 6,000 babies are born each year of which about 400 die within 7 days. Although not an official data, the premature rate is about 20 %. Premature babies are those of less than 2,250g body weights, and the chances of treatment is limited to the crucial disease patients with complications owing to the insufficient acceptance facility of the hospital. Extreme shortage of equipment is reflected in insufficient nursing capability, by which only one third of professional technique can be met. Current bed number of four will be increased to eight and the total will be ten adding other two stand-by beds.

3) Intensive Care Baby Unit (ICU)

4) Urgent Clinical Test Room

Newborn or infant patients of crucial diseases and post-operatative intensive therapy are the main activities, and the performance outcome to the time required for treatments and nursing is not efficient. Besides, limited number of staffs and necessary medical instruments under-equipped are forming an additional difficulty.

Taking the objective patient numbers into account, the number of beds will be limited to six, with which therapeutic performance for diseases particular to infants will be increased by means of providing emergency test equipment indispensable and adequate for these diseases.

5) Radiographic Department

With X-ray machines provided by USSR, X-ray photos of 10x12 film size are taken approximately 12 per day or 3,700 per year. They do not have X-ray machines for children, neither Roentgenoscopy equipment for the diagnosis of alimentary canal diseasees. In an absolutely necessary cases patients are transferred to Tribhuvan Unversity Teaching Hospital. X-ray technicians come to Kanti from Tribhuvan University only during the hospital hours. The plan is to cope with the alimentary canal diseases including enterostasis and to increase the diagnosis and therapy with more accurate X-ray apparatus. The coordination with the existing equipment at Tribhuvan University Teaching Hospital will be respected for the convenience.

6) Neonatal Surgical Unit

7) Operation Theater

At the present time there is no exclusive operating theater for infant patients nor post-operative care facility, so operating instruments for adults are used temporarily. Lack of post-operative care facility is a matter of disappointment to doctors who were fully trained overseas. Three operations are done three days a week but recently only three patients can be operated a day. Anaesthetists, without whom an operation is impossible, are badly wanted in Nepal so the day when an anesthesist from the Royal Military Hospital visits Kanti to help the operations. Neonatal Operating Instruments, Anesthesia Table and sundries kits for infant use, and various machines required for post-operative care to make progress in the operation numbers and results are planned.

8) Sterilization Room

The present central sterilization system is in function but autoclave does not match to this system. Since sterilization is one of the key functions in the hospital, a plan should cover the expected increase in number of surgeries as detailed before and the activities by opening of NICU and ICU as well as to cope with increased cases of cross contamination due to the increasing clinical cases.

9) Clinical Pathology Department

At present, routine clinical tests include blood, urine and stool of outpatients and inpatients, and CFS tests. All other clinical tests required in diagnosis are sent to outer institutions (Central Health Laboratory, Bir Hospital, Tribhuvan University Teaching Hospital) with indications on test items and on the reports of those outside institutions, clinical decision making and therapy are carried out. As far as special test items with infant patients, they can not satisfy this requirement with the facility they have, so largely in want of improving the accurate diagnosis or therapeutic achievements. Test items of non-urgent nature, that require high technological skills or of small number due to special cases, shall be continued to be sent out to Tribhuvan University Teaching Hospital as well as to Central Health Laboratory. This has been deemed optimal for the time being in consideration of the difficulty in having sufficient manpower in this department and the existing facilities should be made full use of. Therefore the plan aims at addition of equipment that will usefully strengthen the basic facility.

10) Casualty Department

Patients in Kathmandu Valley as well as from other regions in the country are sent to this department which is the sole specialized hospital for children. Since the normal outpatient wards do not accept patients outside their working hours (Sunday to Friday, from 9:00 AM to 2:00 PM), this department provides 24-hours service for those who have inability for reaching the hospital within the working hour due to geographic problem or poor transportational means. Acute diseases which are typical to children, such as burn associated with inflammable fires used in home for cooking and

trauma in accidents are the major cases here, but the present facility is inadequate to meet these requirements. Under these circumstances, some of the doctors and nurses that will be increased in numbers under the future development plan will be assigned to this department. In particular, the emergency tests such as in acute abdominal diseases are impossible due to the difficulty of having the technicians on duty. Besides, this department is susbject to customers claim on inconvenience partly because of inadequacy in special surgical tools. Therefore the plan will include dry chemistry test system that are wanted for the prompt examination at an easy operation at an absence of experienced technical staffs.

11) Ward Department

In the hospital system in Nepal, the nursing system as regulated in Japan does not exist, and patients are taken care of by their families, according to their life style. In Kanti Children's Hospital, a family of an infant patient spent nights on the floor. Besides the major reason of diseases as being infections, this implies in-hospital cross contamination. Special attention such as having an separate Special Care Unit to prevent cross contamination has not been paid. This plan aims at intensive care units (NICU, ICU and Recovery Room) for the patients with little resistance to infection, by separating them according to the cases and ages. As to the accompany by the family, this is difficult to stop, therefore adult beds for the family and newborn bed with fences to prevent falling down to the floor should be provided to make the nursing works efficiently.

12) Service Facility

Service Facility in Kanti Children's Hospital is apparently in an insufficient condition. Basically wanted are electricity acceptance system from the power supply, emergency power generator with adequate capacity to cope with power failures, and sufficient laundry services for the frequent exchange of bed-sheets etc. Smooth operation of these will be vital to Kanti Children's Hospital. From this perspect, the first objective is to budget the electricity acceptance system, independent of the present life, enabling the power supply

at high voltage (for the account of Nepal).
Other service facilities planned here are the Emergency Power Generator to continuously operate various equipment that can not be stopped in the event of power failures, Water Pumps to increase the water pressure, and laundry machines to keep cleanliness. Also planned is Oxygen plant that provides respiratory oxygen that is indispensable to neonatal and infant care and that requires electricity only at the production of oxygen, we well as Air Cmpressor System, another indispensable gas source for respiratory care. Nepal has been dependent on India in supply of oxygen which amounted to a large expenditure. The plant is to be of the lowest production capacity which will make oxygen equivalent to 6 large cylinders per day (8 working hours/day) at a cost of 1,200 to 1,500 Yen for electricity. Any surplus gas can be sold to other medical institutes thus an income to the hospital. This system has been included in this plan to minimize the increase of local cost after the equipemnt installation.

4-2-2 Expansion of Pediatric Field Services

As stated before in 2-3-4, Medical Manpower and Its Training Facilities, much effort are being put to bring up the medical staffs at high educational institutions and actual training is indispensable for technical works. Kanti Children's Hospital with planned medical equipemnt installation will not only upgrade the current medical standards but also will provide empirical knowledge to cope with various cases that are necessary in taking medical degree, as well as enable the nurses to learn through experiences how to confront technically the particular situations of infant patients, much different from adults. Thus far effective training has been difficult with inadequate equipment. Therefore in the training project, the main departments that suit above-mentioned training reinforcement are as follows:

1) Special Care Baby Unit (NICU),
2) Intensive Care Unit (ICU),
3) Neonatal Surgical Unit,
4) Pediatric Surgical Anaesthesia, and
5) Diagnosis of Pediatric Medicine.

The advantage gained from a systematic medical trainings on the pediatric field will further contribute to the development of medical and health care plans in Nepal. Inter-ministrial agreement has been reached between the Ministry of Education and Culture in charge of medical education and the Ministry of Health administering Kanti Children's Hospital where actual training course will take place. In other words, education of the medical manpower staffs covering all segments including doctors and nurses, will be the role of Institute of Medicine, Tribhuvan University. The curriculum is independent in each department. Trainees are grouped in small nubmers according to their specialities, visit the hospital to join the courses according to their curriculum schedule. Since Tribhuvan University Teaching Hospital does not have pediatric department, post-graduate doctors, professors or lecturers in the pediatric course are to undertake constant diagnosis of the patients to train themselves.

4-3 Significance of the Project in Nepalese Health Planning

The Kingdom of Nepal has carried out six Five-Year National Economic Development Plans between 1955/1956 and the present. In response to these, the Ministry of Health established its Long-Term Health Plan covering the years from 1965 to 1990. The specific aim of the plan is to make fuller use of the existing equipment in Kanti Children's Hospital, so as to optimize the use of the installed facilities. In general, the fields of the hospital's functions are classified as primary to tertiary care and specialized care. Nepalese hospitals are all organized in line with this, but the equipment installed is unsatisfactory, and infant medical care in particular is far from playing its proper role owing to the absence of infant care facilities at general hospitals and regional hospitals other than Kanti. Upon completion of the Project for Kanti Children's Hospital, the hospital will serve as the sole specialized pediatric health care facility to carry out tertiary hospital functions. In addition, the Project will facilitate consolidation of the teaching programs for doctors and nurses at Tribhuvan University and at the Nursing School. Thus, increases in the numbers of personnel involved in primary health care, and proper functioning of medical facilities, both of which are primary national aims, must go hand-in-hand in creating a healthy future for Nepal and the Project may be considered as one of those vital hands that will contribute to the achievement of the goals of the Long-Term Health Plan.

4-4 Necessity of Technical Cooperation

When this plan is carried out, new standards of technical application will be described in the Kingdom of Nepal. Knowledge on pediatric medical care at standard level has been gained by overseas training, enabling basic and satisfactory reactions. However it is feared that, in operation of the medical equipemnt to be granted from Japan, their expertise may not be enough, then the effect of the Project will be further increased if Japan should provide technical cooperation.

Therefore in selecting the specifications of the equipment, good reference should be made with an organization that will provide the technical cooperation. Nepalese side has strongly requested the technical cooperation because of the continually developing diagnostic and therapeutic techniques in the pediatric care.

The specific technical cooperation they have requested are for the doctors of:

1) Newborn and infant ICU,
2) Post-operative patient care,
3) Neonatal anesthesia control.

Next to these priority, they have also requested cooperation in an accurate diagnosis service using new radiographical and echographical imaging diagnostic equipment.

In cooperation for the pediatric nursing care are for:

1) Neonatal surgical unit,
2) Intensive Care Unit,
3) Pediatric nursing care.

Their request on technical cooperation to nurses has been already forwarded to JOCV, whose official request has been submitted to the Government of Japan.

CHAPTER 5: BASIC DESIGN

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5-1 BASIC DESIGN POLICY

As detailed in 4-1 Proposal and Objectives of the Plan, with a view to contributing to the improvement of pediatric medical care in the Kingdom of Nepal, the basic design team has reviewed the background, significance, purpose and function of the Project and set out a basic policy so that the requirements may be fully met. The details of this policy are as follows:

1) Diagnostic and therapeutic improvement is to be made through the installation of the equipment required to enable the hospital to serve as a referral hospital.
2) Priority is to be given to the ease of maintenance of the facility, and consumables or spare parts are to be covered, taking the local cost into consideration.
3) The number and nature of the equipment covered is to be such that its use is within the capabilities of the current staff and the personnel expected to be employed in the hospital.
4) Full use is to be made of the equipment already installed in the Tribhuvan University Teaching Hospital, also constructed by the Government of Japan, or in the Central Health Laboratory, and duplication of equipment is to be avoided.
5) An oxygen plant is to be installed in order to prevent high expenditure on the gas from arising and increasing the cost of care of respiratory disorders as a result of an increase in the amount of equipment requiring it, and in turn lowering the level of medical care.
6) The current conditions in the existing facility are to be taken carefully into account in the installation of the equipment, and at the same time, careful account is to be taken of Nepalese conditions.
7) Initial orientation should be provided for the technical staff concerned.

5-2 OUTLINE OF THE DESIGN

Based upon the field survey, the following four items should be considered in the Project for Improvement of Medical Equipment for Kanti Children's Hospital.

1) Equipment plan to enable accurate diagnosis
2) Equipment plan to strengthen therapy
3) Plan to improve patient monitoring to function as a referral hospital
4) Improvement and maintenance plan of service facilities to keep the medical functions in level.

5-3 MEDICAL EQUIPMENT PLAN

5-3-1 Necessary Departments

The departments for which the medical equipment is to be supplied have been summarized to the following categories considering the medical activity plan in the field of medical care and medical manpower training.

1) Special Care Baby Unit (N.I.C.U.)
2) Milk Kitchen
3) Intensive Care Unit (I.C.U.)
4) Urgent Clinical Test Room
5) Radiographic Department
6) Neonatal Surgical Unit
7) Operation Theater
8) Sterilization Room
9) Clinical Pathology Department
10) Casualty Department
11) Ward Department
12) Service Facility

5-3-2 Necessary Equipment

Main equipment to be supplied for the twelve departments is described below and the complete equipment list is referred to 5-3-3.

1) Special Care Baby Unit

Infant Incubator
Infant Warmer
Phototherapy Apparatus
Infant Ventilator
Neonatal Monitor Apparatus
Infusion Pump
Apnea Monitor
Oxygen Monitor
Transport Infant Incubator

Effective treatment can be executed by use of the suitable equipment. Infant Incubator must be equipped with the top priority for the premature and such infant who are always cannot control his

temperature by himself. Infant Ventilator and Infusion Pump are theessential for his respiratory control. These equipment must be cooperated with Neonatal Monitor Apparatus, Oxygen Monitor and Apnea Monitor to monitor his vital sign from time to time.
Transport Infanat Incubator is for the transportation of the infant transferredfrom the other hospital.

2) Milk Kitchen

Nursing Bottle Sterilizer
Refrigerator
Bottle Washer Apparatus
Water Boiler

Milk Kitchen in charge of the nutrition control of the premature and neonatal infant must be facilitated with the equipment with the precise additive and milk measuring function. To avoid the cross contamination between the infectious disease patients, instruments for the sterilized stores are planned.
As this department have an important role not only for the field nursing training but also for the after school site work for the nursing school students accordingly.

3) Intensive Care Unit

Patient Monitor Apparatus
Artificial Ventilator
Ultra-sonic Nebulizer
Oxygen Head Box
Radiant Warmer
Oxygen-Air Mixer
Infusion Pump
Portable X-ray Apparatus

The scope of service of this unit shall be determined in consideration with the available manpower and the local costs.
Six beds are the reasonable plan with 6 Patient Heart Monitoring Apparatus consisting of 2 sets of ECG, HR, RR, BP parameter measuring and 4 sets of ECG, HR parameter measuing and private bedside monitoring system is considered preferable.
Blood Pressure Detector for blood pressure monitoring which is the necessary parameter for ICU is expensive consumables.

Therefore, the detector shall not be supplied for each apparatus for the future supplementation as the technical upgrading of the doctors and nurses in charge of the unit. Artificial Ventilator, Oxygen Inhalor Head Box and Oxygen Air Blender for the respiration control, and Radiant Warmer for the temperature control, and Infusion Pump for the micro infusion control are the equipment for the control and monitoring use.

4) Urgent Clinical Test Room

Urgent clinical testing equipment shall be used in common with the Special Care Bady Unit.

Blood Gas Analyzer
Transcutaneous Oxygen Monitor
Flame Photometer
Refrigerator
Hematocrit Centrifuge
Water Bath

Suitable treatment is given in accompanied with the frequent clinical tests. Therefore, Blood Gas Analyzer for base excess of child, T.C. PO2 Analyzer for PO2 PCO2, PH of neonatal, Flame Photometer for fluid correction are selected. The equipment should be such a kind whose results can be available with small blood samples. These clinical test equipment is so useful for NICU and surgical department also that the general usage can be considered.

5) Radiographic Department

Diagnostic Radiography Apparatus
Pediatric Radiography Accessories
Dark Room Accessory Set
X-ray Consumables

This department has been operated by the visiting radiologist from the Tribhuvan University Teaching Hospital. The existing equipment is not for diagnosis use and only radiophotography is available. The most effective re-equipping plan for this department is the selection of the equipment that has Roentgenoscopy and Barium Enemation system, which are necessary for the diagnosis for the prevailing alimentary canal diseases among the children.

6) Surgical Department

Neonatal Monitor

Recovery Stretcher

Oxygen Inhaler Set

Infant Warmer

Micro Surgery Instrument

As this department must meet mostly such case as a reparative surgery for the congenital abnormality baby, the instruments for the microsurgery operation is badly essential, including the respiration, aerotherapy and vital sign monitoring equipment which is necessary forthe post-operative infant control.

7) Operation Theater

Operating Table for Child

Operating Light

Auxiliary Operating Light

Suction Unit

Electrosurgical Unit

Anesthesia Machine for Infant

Defibrillator

Infant Operating Instrument Set

Thermo Exchanger

Operating Room Materials

Once the hospital was constructed as a general hospital, then assigned to as a pediatric hospital without regular pediatricians. Necessary equipment for pediatric treatment including Infant Operating Instruments has not been equipped yet, which has compelled the departmental procedures limited one. The pediatricians recently assigned including the doctors in charge of post-operative monitoring for the serious cases and the nurses also, though the number is not sufficient. The plan is for the coverage to the high level operation with the equipment like Microsurgery Unit and Anesthesia Machine for infant with assorted accessories including the Operating Instrument Set. As the equipment for the use of temperature and thermo control, Warmer Cabinet for infusion fluid and blood have been planned. Above equipment plan shall be followed by the operating room materials in its reasonable quantity.

8) Sterilization Room

Autoclave
Hot Air Sterilizer
E.O.G. Sterilizer
Water Sterilizer
Washing Sink
Others

The objective is to prevent cross contamination mostly caused by way of instruments and utensils. Equipment with high sterilization ability and easily operated type shall be selected. Sterilization way for the medical materials is categorized into 3 i.e., steamed heat system, dry heat system, and low-temperature system. Therefore, above 3 categories are described as Autoclave, Hot Air Sterilizer, and Ethylen Oxcide Gas Sterizer respectively. And Washing Sink for the plastic and rubber made catheter and Tube Dryer supplementary attached to the above equipment are planned. Disposables are made of plastic and can be used again, but strictly followed by washing and sterilizing procedures.

9) Clinical Pathology Department

Centrifuge	Water Still
H.C. Centrifuge	Pipette Washer
Water Bath	Hemoglobinmeter
Incubating Water Bath	Refracotmeter
Spectrophotometer	Hemacytometer Set
Balance	Micropipettes (Assorted)
Microscope (Assorted)	ECG Apparatus
Incubator	Autospirometer
Hot Air Sterilizer	Refrigerator
Autoclave	Mortuary Refrigerator

This department shall be re-equipped by the essential equipment. The equipment by which tests can be executed in the Teaching Hospital and other institute, are excluded. But, the essential equipment with some standard functions must be selected by the reason of the diagnosis accuracy's point of view for the training and be concluded after consultation with the personnels concerned.

10) Casualty Department

Diagnostic Instrument Set
Spygomomanometer
X-ray Film Viewer
Simple Operating Table
Autoclave (Desk-top)
Suction Unit
Trachetomy Set
Resuscitator Set (Bag Type)
Minor Operating Instrument Set
Stand Light
Dry Chemistry Test Set
Observation Bed

This department have been functioning as 24 hours 7 days a week system receiving the patients who live far from the hospital and come after the hospital time by use of the traffic facilities which is rather inconvenient so far, and attending the emergency cases also. Inspite of its function they cannot fully meet the demand. The time after the hospital hour ends is the coverage of this department to its utmost operation. To supplement the department, simple laboratory equipment including necessary equipment for resuscitation which should be the model operated by the doctors and nurses on duty.

11) Ward Department

Infant Stretcher
Child Stretcher
Refrigerator
Sterilizer (Boiling Type)
Ice Machine
Suction Unit
Resuscitator (Bag Type)
X-ray Film Viewer
Oxygen Inhaler Set
Traction Frame Set
Bed (Crib)
Hospital Bed

The hospital being the capacity of 150 beds, the reasonable nursing unit can be set as 25 beds which calculates six nursing units. The above equipment is required for nursing care. X-ray Film Viewer for use of bedside care, Sterilizer necessary for the treatment, Suction Unit for suction and nebulization work, Cradle and Traction Set for the post-operative protection are necessary for the inpatient care, while Oxygen Inhaler Set, Fluid Therapy Set are necessary for the Internal Medicine and Surgery.

12) Service Facility

Oxygen Generator Apparatus
Washing Equipment
Medical Gas Supply System
Emergency Generator Apparatus
Air Conditioner Set
Audio-visual Equipment
Incinerator Apparatus
Water Pump
Emergency Call System

Above service facilities have been planned considering the full functioning of the hospital equipment as it is. Oxygen consumption for the pediatric institute shall be increased as the hospital service increases to its full function and effectivity. Local costs, judging from the conditions of the Kingdom of Nepal, must be saved strictly. Therefore, Oxygen Plant that produces oxygen requiring the electricity cost only has been planned for the cost saving of the oxygen consumption to be increased. Evading the power failure is required for the hospital for its functions sake, and Emergency Generator Set for the fully functioning of the life support equipment has been added. Medical Gas Supply System (O2, compressed air, N2O gas) for ICU, NICU, and Operation Theater where the cleanliness is necessary for the prevention of cross contamination has been planned. Air Conditioner Set shall be installed each in such room as ICU, NICU, Operation Theater

where temperature control is essential. To keep the hospital circumstances clean, Washing Machine with which bed sheets, linen for operation, and dressing materials are washed and Incinerator for the daily waste shall be added. Doctors, nurses, and technicians whose medical rolls are important and sometimes must be called urgently from the other hospitals to this hospital. To supplement this manpower conditions, Emergency Call System has been planned. Kanti Children's Hospital as the referral hospital has to make endeavour to train the medical manpower. Audiovisual Equipment has been selected for the group training to be executed.

5-3-3 Medical Equipment List

(1) SPECIAL CARE BABY UNIT

NO.	ITEM	Q'TY
1.	Infant Incubator	6
2.	Infant Warmer	4
3.	Infant Warmer Stand	4
4.	Bassinet Stand	12
5.	Infant Dressing Table	1
6.	Phototherapy Unit	4
7.	Oxygen Inhaler Head Box	4
8.	Infant Ventilator	4
9.	Patient Monitor App.	4
10.	Portable Suction Unit	6
11.	Ultrasonic Nebulizer Set	3
12.	Sphygomomanometer	4
13.	Infusion Pump	2
14.	Infusion Pump	6
15.	Instrument Table	4
16.	Dressing Cart	2
17.	Dressing Drum Stand	1
18.	Dressing Jar Set	1
19.	Instrument Tray Set	1
20.	Puss Basin Set	2
21.	Oxygen Regulator Set	8
22.	Transport Incubator	1
23.	Apnea Monitor	3
24.	Thermometer	3
25.	CPAP System	2
26.	O2 Monitor	2
27.	Weighing Scale	6

(2) MILK KITCHEN

NO.	ITEM	Q'TY
1.	Refrigerator	1
2.	Water Boiler	1
3.	Nursing Bottle Sterilizer	1
4.	Bottle Washing Machine	1
5.	Balance	1
6.	Kitchen Utensils	1
7.	Sink Unit	1
8.	Working Table	1
9.	Cupboard	1
10.	Utility Cart	1

(3) INTENSIVE CARE UNIT

NO.	ITEM	Q'TY
1.	Patient Heart Monitoring App.	6
2.	ICU Bed	6
3.	Artificial Ventilator	3
4.	Ultrasonic Nebulizer	6
5.	Oxygen Head Box	3
6.	Radiant Warmer Stand	2
7.	Oxygen Air Blender App.	3
8.	Auto-infusion Pump	6
9.	Oxygen Inharation App.	6
10.	Suction Unit	3
11.	Stand Light	2
12.	Portable X-ray Unit	1

(4) URGENT CLINICAL TEST ROOM

NO.	ITEM	Q'TY
1.	Blood Gas Analyzer	1
2.	Transcutaneous Oxygen Monitor	1
3.	Flame Photometer	1
4.	Centifuge	1
5.	Hematcrit Centrifuge	1
6.	Refrigerator	1

(5) RADIOGRAPHIC DEPARTMENT

NO.	ITEM	Q'TY
1.	Diagnostic Radiograph App.	1
2.	Pediatric Radiography Acc.	1
3.	Ultrasonic Diagnostic App.	1
4.	Endoscope Set for Pediatric Use	1
5.	Portable Suction Unit	2
6.	Dark Room Acc. Set	1
7.	X-ray Consumables	1
8.	Ultrasonic App.	1
9.	Microwave Diathermy App.	1

(6) SURGICAL DEPARTMENT

NO.	ITEM	Q'TY
1.	Recovery Stretcher	4
2.	Radiant Warmer Stand	2
3.	Oxygen Inhaler Set	5
4.	Suction Unit	4
5.	Sphygomomanometer	4
6.	Instrument Table	2
7.	Medicine Refrigerator	1

(7) OPERATION THEATER

NO.	ITEM	Q'TY
1.	Universal Operating Table	2
2.	Major Operating Table	1
3.	Operating Light	2
4.	Auxiliary Operating Light	4
5.	Suction Unit	4
6.	Electro Surgical Unit	2
7.	Anesthesia Machine	2
8.	Defibrillator	1
9.	X-ray Film Viewer	3
10.	Instrument Cabinet	6
11.	Instrument Tray Stand	4

12.	Mayo Stand	3
13.	Instrument Table	4
14.	Patient Stretcher	4
15.	Operating Instrument Set	2
16.	Operating Room Materials	1
17.	Body Temperature Control Mattress	1
18.	Tube Dryer	1
19.	Anesthesia Equipment Set	1

(8) STERILIZATION ROOM

NO.	ITEM	Q'TY
1.	Autoclave	1
2.	Hot Air Sterilizer	1
3.	Washing Sink	1
4.	Water Sterilizer Set	4
5.	EOG Sterilizer	1

(9) CLINICAL PATHOLOGY DEPARTMENT

NO.	ITEM	Q'TY
1.	Centrifuge	2
2.	Hematocrit Centrifuge	1
3.	Water Bath	2
4.	Water Bath Incubator	1
5.	UV-VIS Spectrophotometer	1
6.	Electronic Balance	1
7.	Analytical Balance	1
8.	Ph Meter	1
9.	Microscope (Binocular)	2
10.	Microscope (Trinocular)	1
11.	Microscope Projector Acc.	1
12.	Stereo Microscope	1
13.	Fluorescent Microscope	1
14.	Incubator	1
15.	Hot Air Oven	1

16.	Autoclave	1
17.	Water Still	1
18.	Hemacytometer Set	2
19.	Hemoglobinometer	1
20.	Pipette Shaker	1
21.	Clinical Refractometer	1
22.	Refrigerator	1
23.	Bilirubinometer	1
24.	Micropipette Set	1
25.	Autodispenser	1
26.	Blood Cell Calculator	1
27.	Magnetic Stirrer	1
28.	Tube Mixer	1
29.	Double-pan Balance	1
30.	Pipettte Washer	1
31.	Mortuary Refrigerator	1
32.	Electro Cardiograph (6-ch)	1
33.	Electro Cardiograph (1-ch)	1
34.	Autospirometer	1

(10) CASUALTY DEPARTMENT

NO.	ITEM	Q'TY
1.	Treatment Table	1
2.	Emergency Stretcher	1
3.	Diagnostic Instrument Set	5
4.	Examination Couch	5
5.	Instrument Table	3
6.	Sphygomomanometer	2
7.	Stand Light	1
8.	Autoclave	1
9.	Suction Unit	1
10.	Resuscitator Set	1
11.	Oxygen Inhaler Set	2
12.	Refrigerator	1
13.	Emergency Tracheotomy Set	1

14.	Operating Instrument Set	1
15.	Utility Cart	2
16.	Water Sterilizer	1
17.	Dressing Drum Set	1
18.	Dressing Materials	1
19	Dry Chemistry Test Set	1
20.	Centrifuge	1
21.	Microscope	1
22.	Hemacytometer Set	2
23.	Hemoglobinometer	1
24.	Observation Bed	4
25.	X-ray Film Viewer	10

(11) WARD

NO.	ITEM	Q'TY
1.	Patient Stretcher (Infant)	2
2.	Patient Stretcher (Child)	4
3.	Dressing Cart	6
4.	Refrigerator	6
5.	Working Table	6
6.	Sterilizer	6
7.	Suction Unit	6
8.	Resuscitator	6
9.	Wheel Chair	6
10.	Ice Cube Machine	3
11.	Food Conveyer	6
12.	Utility Cart	6
13.	Oxygen Inhaler Set	10
14.	Patient Bed	60
15.	Patient Bed (Crib)	30
16.	Treatment Cradle	1
17.	Traction Frame Set	1
18.	Irrigation Stand	30

19.	Infusion Set	30
20.	Traction Set	2
21.	Thomas Split	1
22.	Chart Holder Cart	6

(12) GENERAL

NO.	ITEM	Q'TY
1.	Audiovisual Equipment	1
2.	Washing Machine	1
3.	Extractor Machine	1
4.	Medical Gas Supply System	1
5.	Air Conditioner Set	1
6.	Emergency Generator	1
7.	Oxygen Plant	1
8.	Emergency Call System	1
9.	Water Pump	1
10.	Incinerator	1
11.	White Board	1

5-4 MEDICAL EQUIPMENT LAYOUT DRAWING

Medical Equipment Layout Drawing: Figure 5-1 and 5-2.

Scale: 1/100 **LAYOUT PLAN**

Numerals in a circle refer to the No. on the Medical Equipment List

Gothic numerals refer to the Department No. on the Medical Equipment List

1 Special Care Baby Unit (N.I.C.U.)
2 Milk Kitchen
3 Intensive Care Unit (I.C.U.)
4 Urgent Clinical Test Room
5 Radiographic Department
6 Neonatal Surgical Unit
7 Operation Theater
8 Sterilization Room
9 Clinical Pathology Department
10 Casualty Department
11 Ward Department
12 Service Facility

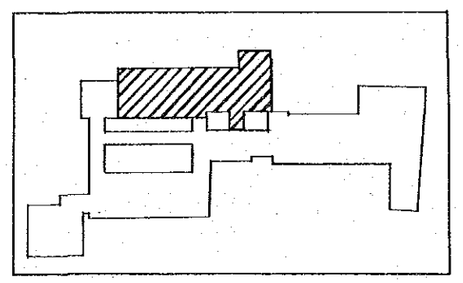
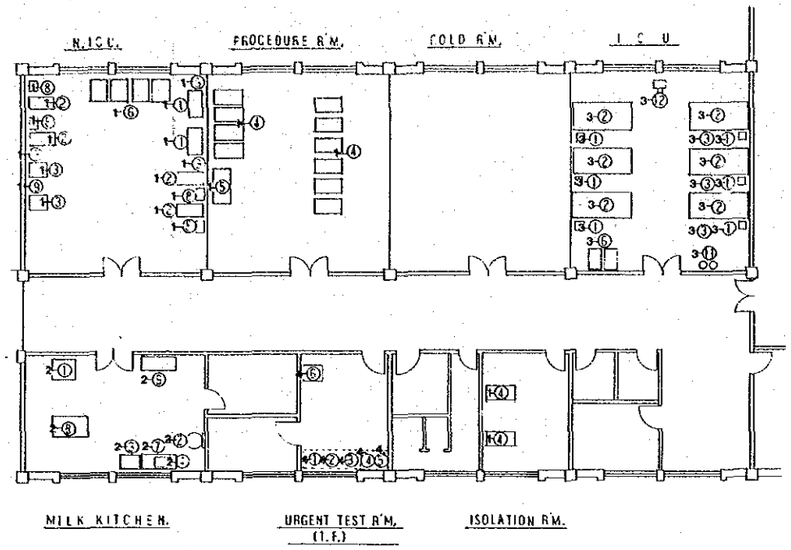


Fig 5 – 1



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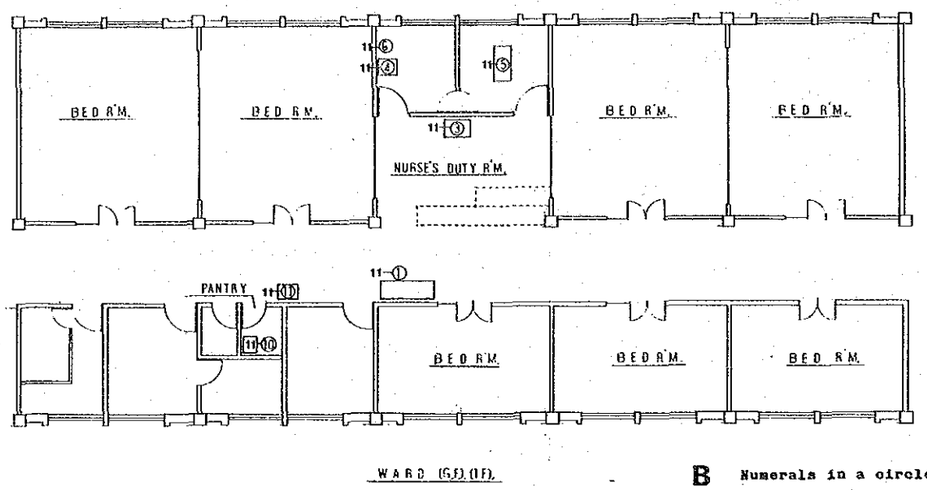
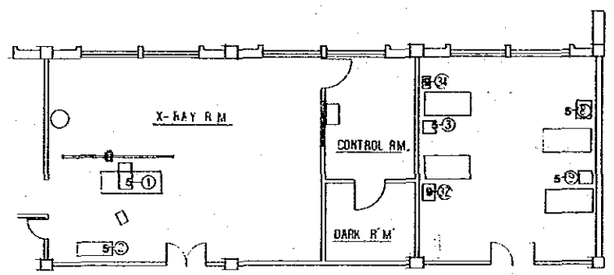


WARD (G.F) (1F)

B

Numerals in a circle refer to the No. on the Medical Equipment List

Gothic numerals refer to the Department No. on the Medical Equipment List

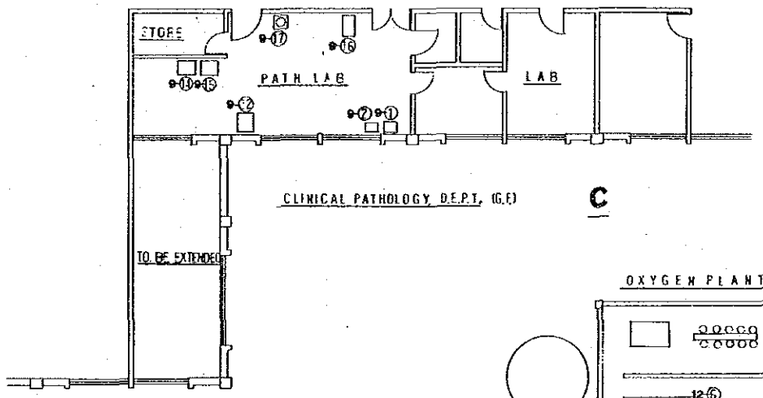


RADIOGRAPHIC D.E.P.T. (G.F)

PHYSIOTHRAPY R'M.

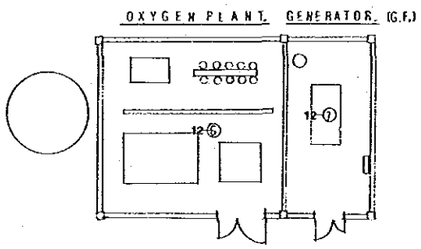
D

1 Sp Special Care Baby Unit (N.I.C.U.)
2 Mi Milk Kitchen
3 In Intensive Care Unit (I.C.U.)
4 Ur Urgent Clinical Test Room
5 Ra Radiographic Department
6 Ne Neonatal Surgical Unit
7 Op Operation Theater
8 St Sterilization Room
9 Cl Clinical Pathology Department
10 Ca Casualty Department
11 Wa Ward Department
12 Se Service Facility



CLINICAL PATHOLOGY D.E.P.T. (G.F)

C



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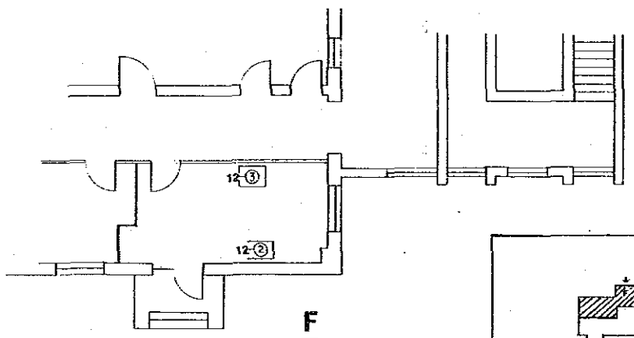

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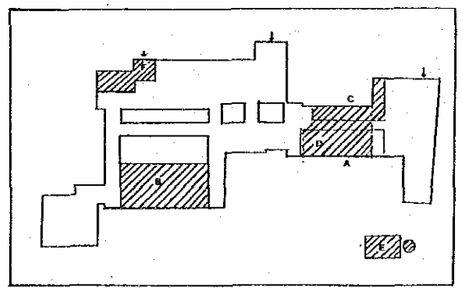
Fig 5 – 2



LAYOUT PLAN

Scale: 1/100

5-5 ESTIMATED COSTS

5-5-1 Estimated Costs to be borne by the Nepalese Side

Estimated operation cost to be borne by the Nepalese side is as follows.

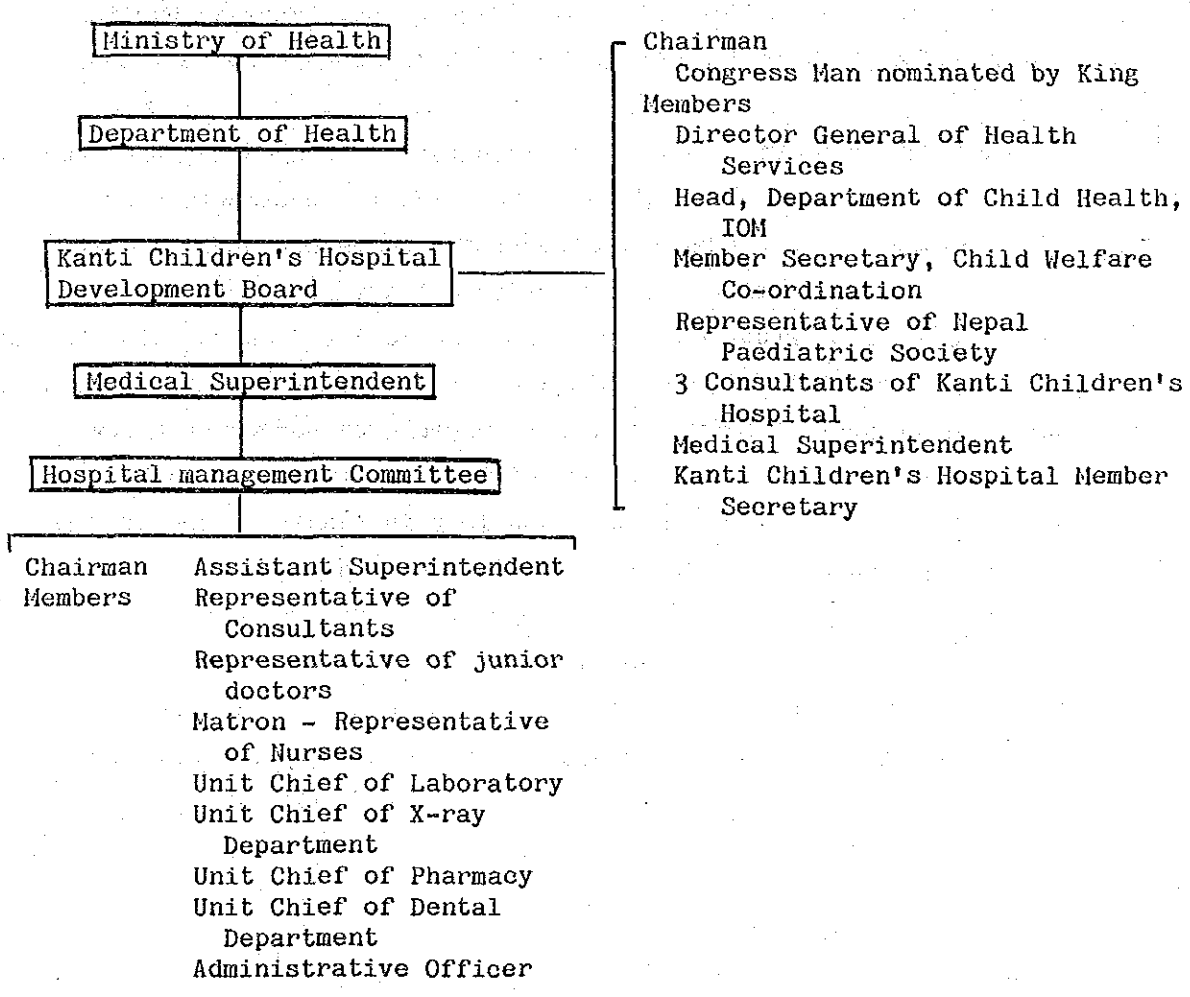
1.	Construction Work	Rs.935,178.93
	a) Room for Emergency Generator and Oxygen Plant	(857,528.69)
	b) Outside building for compressor	(60,769.75)
	c) Partition work for manifold room	(6,752.20)
	d) Partition work for laundry	(10,128.29)
2.	Piping Work	Rs. 33,760.97
	a) Works for water supply and sewage for laundry	
3.	Electric Work	Rs.567,184.33
	a) Outline work from transformer	
	b) Installation work for panel board	
	c) Distribution work from the panel board to the receptacle	
	d) Installation work for the receptacle	
4.	Total	Rs.1,536,124.23

CHAPTER 6: IMPLEMENTATION OF THE PROJECT

CHAPTER 6: IMPLEMENTATION OF THE PROJECT

6-1 IMPLEMENTATION ORGANIZATION

Kanti Children's Hospital, the sole pediatric hospital in the Kingdom of Nepal, for which the Ministry of Health is totally responsible, will be the implementation body of the Project. Kanti Children's Hospital Development Board organized by the Congress Man nominated by the King as a chairman and the personnel in charge of medical and welfare works as members, participatinig the Project promotion, has administrated the whole hospital. Hospital Management Committee whose chairman is the assistant superintendent has been functioning as a management body of the hospital under the board:



6-2 IMPLEMENTATION SCHEDULE

The Project for Improvement of Medical Equipment for Kanti Children's Hospital will be executed under the the Japanese Grant Aid Program. After the agreement by the Exchange of Notes between the twogovernments, on behalf of the Kingdom of Nepal a consultant (a Japanese firm) will take the responsibilities of selecting the supplier (a Japanese firm), checking of the equipment, transportation, installation and inspection of the equipment then transfer to Nepalese Government in a turn key style. The Project will be executed to the hospital in Kathmandu with relatively good traffic conditions, thus assisting the improvement of the medical services in the Kingdom of Nepal particularly in the pediatric field. However, due to its characteristics as a medical equipment, greatest caution must be paid in the supply and installation of the equipment.

Most of the medical equipment is unavailable locally, therefore will be procured in Japan. This in turn impels in selection of equipment well prepared consideration to maintenance, operation, and repair as well as having recommended spare parts and disposables (about one year's consumption) and orientation to local engineers at the initial stage of their operation. Needless to say mill inspection prior to shipment should be performed fully. Labours for installation work will basically depend on the local power but wherever special technology is required, technicians shall be sent from Japan to attain perfectness.

6-3 IMPLEMENTATION AND SUPERVISION PLAN

Total procedure in carrying out the Project will take approximately eight months including detailed esign, tender documentation, tendering, selection of supplier, manufacturing of equipment, inspection prior to shipment, ocean and inland transportation, and installation. Consultant will supervise and control the execution of the Project based upon the contract with the Nepalese authorities. The purpose of supervision and control is, standing on a fair ground, to confirm whether it meets the specifications, to lead, advise and adjust the procedures so as to ascertain the adequate execution including the following:

1) Cooperation in supply contract
   Selection of contractor by tender, contract drafting, study on contracted price, presence at the contract.
2) Study and approval of the layout plans, specification sheets, catalogues.
   Study and approval of the relevant documents by the supplier.
3) Confirmation and approval of the equipment.
   Quality and performance check and its approval.
4) Supervision and control of shipment, ocean and inland transportation.
5) Installation control.
6) Progress reporting (Reporting on the progress of the implementaion schedule and site conditions.)
7) Site inspection.
   Site inspection, if necessary, at installation and delivery to guarantee the quality and performance including the documentation check and cooperation for the formalities.

Executing the above-mentioned duties, consultant shall report the progress of the Project including the banking arrangements, and the delivery procedures.

6-4 SCOPE OF WORK

6-4-1 Work to be undertaken by the Government of Japan

The works to be undertaken by the Government of Japan in the Grant Aid Program are the supply of the medical equipment for the improvement of Kanti Children's Hospital including the relevant instruments and the installation work. This scope of work was agreed on the Minutes of Discussions signed on September 21, 1984 at Kathmandu.

Installation and incidental works are described in the Table 6-1, List of Undertakings by both Governments.

(1) Medical equipment to be supplied by the Government of Japan is for:

1) Special Care Baby Unit
2) Milk Kitchen
3) I.C.U.
4) Urgent Clinical Test Room
5) Radiographic Dept.
6) Neonatal Surgical Unit
7) Operation Theater
8) Sterilization Room
9) Clinical Pathology Dept.
10) Casualty Dept.
11) Ward, and
12) Service Facility

(2) Ocean and inland transportation, carrying the equipment into the hospital and installation.

6-4-2 Works to be undertaken by His Majesty's Government of Nepal

Following items are to be undertaken by His Majesty's Government of Nepal:

1) To provide space and facilities necessary for the medical equipment to be installed.
2) To provide facilities for distribution of electricity, water supply, drainage and other incidental facilities.
3) To provide stock sheds for the medical equipment to be supplied in case that the medical equipment is required to be stored for some time for installation.
4) To ensure prompt unloading, customs clearance in Nepal and tax exemption of the imported medical equipment and materials for the Project and to facilitate the internal transportation for them.
5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Nepal with respect to the supply of the products and services under the verified contracts.
6) To provide and accord necessary permission, licences and other authorization required for the project.
7) To bear all the expenses other than those to be borne by the grant, necessary for the supply of the medical equipment.
8) To maintain and use properly and effectively the medical equipment for the Project.

Table 6-1 List of Undertakings by both Governments

No.	Description	Japan	Nepal
Building Work:			
1.	Outer room for Transformer to be supplied		o
2.	Outer room for Generator to be supplied		o
3.	Outer room for Oxygen Plant to be supplied		o
4.	Partiton work inside Laundry		o
5.	Partition work for Clinical Lab. to be equipped		o
6.	Outside room for Gas Compressor		o
7.	Partition work for manifold room		o
Electricity Work:			
1.	Wiring work to Transformer from out line		o
2.	Installation work for panel board, distribution board	o	
3.	Installtion of Emergency Generator	o	
4.	Wiring work from Transformer, Emergency Generator to panel boards	o	
5.	Supply and installation of switch board	*o	o
6.	Distribution work from panel board to receptacle	*o	o
7.	Supply and installation of receptacle (1ø,230v):	*o	o
	Special Care Baby Unit		
	Milk Kitchen		
	I.C.U.		
	Urgent Clinical Lab.		
	X-ray Dept.		
	Neonatal Surgery Dept.		
	Operation Theater		
	Sterilization Room		
	Clinical Pathology Dept.		
	Emergency Dept.		
	Ward		
8.	Wiring work from switch board to the equipment to be supplied: Washing Machine, Air conditioner Set, Oxygen Plant, Compressor Set	*o	o

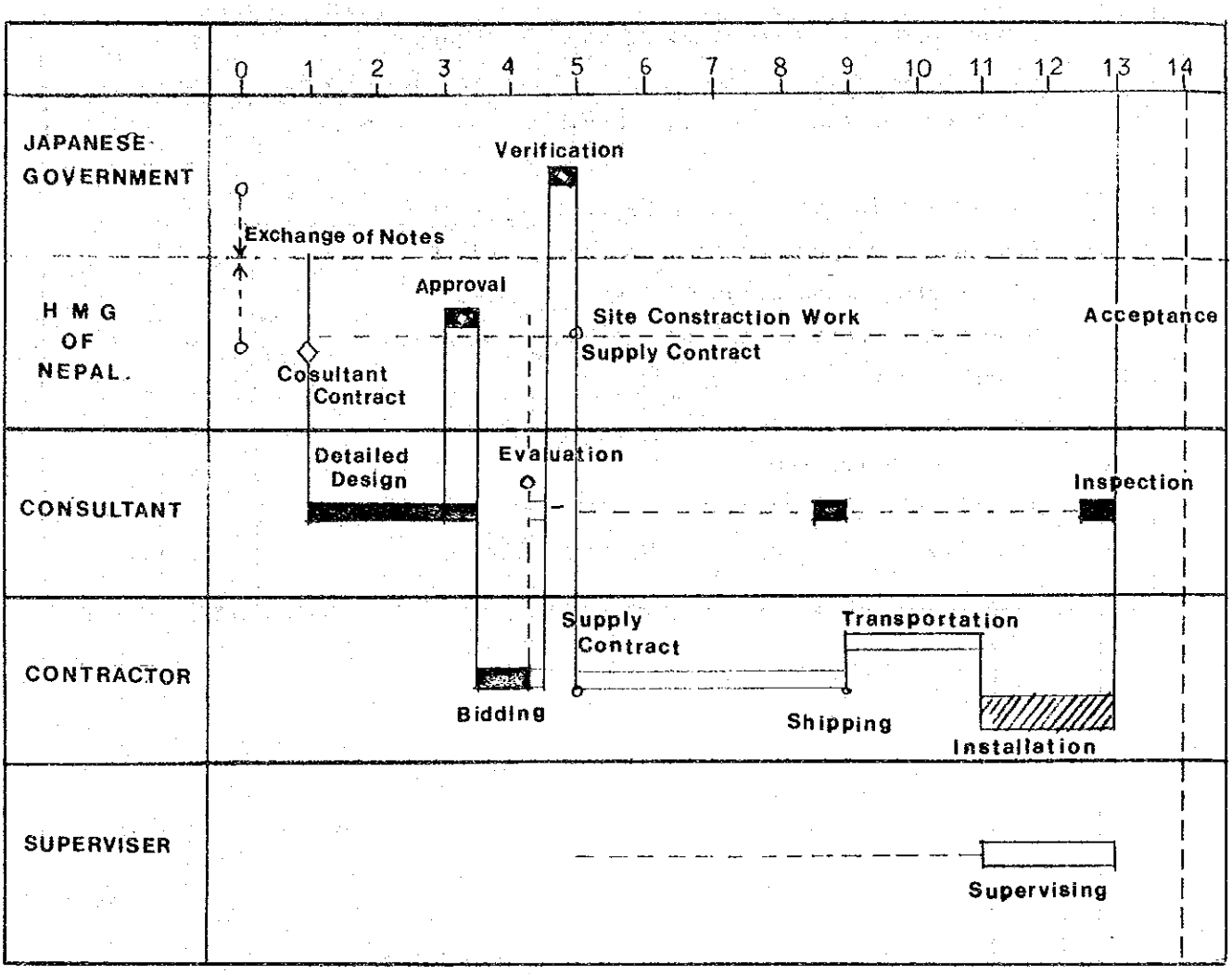
* Electric work for generator circuit

Description	Japan	Nepal
9. Supply and installation of Audiovisual Equipment	o	
10. Supply and installation of Emergency Call system	o	
Equipment Installation:		
1. Water supply, sewage plumbing work for Laundry		o
2. Plumbing work for medical gas, N2O gas and compressed air from Manifold room and Compressor room to Operation Theater, NICU, ICU, Recovery room, Emergency Dept.	o	
3. Supply and installation of Manifold apparatus (including oxygen gas and N2O Gas cylinders) Supply and installation of Compressor Set	o	
4. Supply and installation of Air conditioner Set (Operation theater, NICU, ICU)	o	
5. Installation of Oxygen Plant	o	
6. Supply of Water Pump	o	
7. Installation of Incinerator	o	
8. Installation and supply of Washing Machine	o	

6-5 OVERALL SCHEDULE

Overall Schedule for the Project is shown as below:

OVERALL SCHEDULE



6-6 MEDICAL EQUIPMENT PROCUREMENT PLAN

Most of the medical equipment to be procured and installed in the hospital will originate in Japan, in view of the present conditions in Nepal, but some will be imported from third countries. Most of the equipment to be procured for the project is life support equipment. Although India is a neighbouring country, Indian products are not to be employed, because not only is their quality not satisfactory, but also the difficulties of maintenance and warranty problems make them unsuitable for the Project.

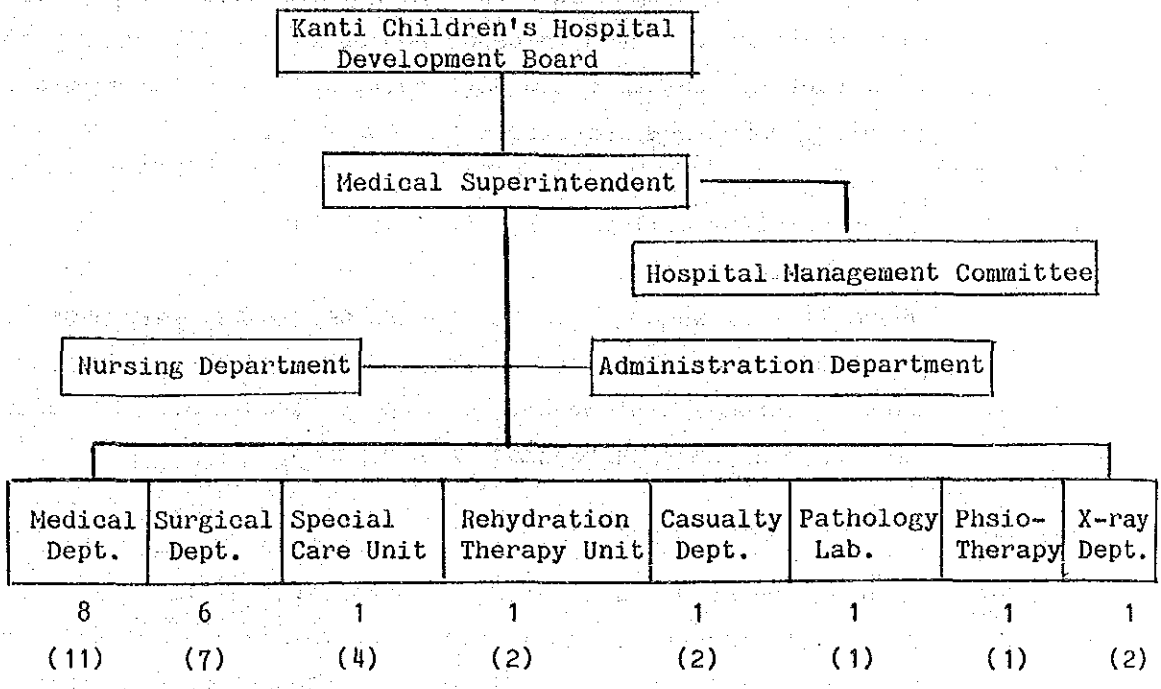
Transportation will be effected as follows:
The equipment will be dispatched by sea from Japan to Calcutta, where it will undergo customs clearance, and it will then be carried overland through India to Raxaul, on the India-Nepal border, again passing through customs there. The total estimated transportation time from Japan to Kathmandu is two months.

Certain precision equipment and materials requiring controlled temperature conditions during transportation will be air-freighted. They will account for less than 5% by volume and approximately 20% of the total equipment cost. It will be necessary to dispatch engineers from Japan for the installation of the equipment in the following numbers:
One for monitoring equipment, four for therapeutic equipment, and five for mechanical equipment -- a total of ten.

6-7 ORGANIZATION AND PERSONNEL

6-7-1 Organization and Operation System

Organization chart of Kanti Children's Hospital under the Kanti Children's Hospital Development Board is shown as follows:



Actual number of doctors are 20, while 30 doctors (figures in the parenthesis) are planned to be enrolled as of the end of 1984.

Hospital Management Committee managed by the Assistant Superintendent as a chairman and composed by the members as follows:

Chairman	Assistant Superintendent
Members	Representative of Consultants
	Representative of Junior Doctors
	Matron - Representative of Nurses
	Unit Chief of Laboratory
	Unit Chief of X-ray Department
	Unit Chief of Pharmacy
	Unit Chief of Dental Department
	Administrative Officer

The hospital is managed with the job descriptions by:

Medical Superintendent : will have the overall responsibility of the hospital administration in the technical, general and financial issues.

Assistant Superintendent: will have the overall assistance to Medical Superintendent and supervision of the departments and manage the Hospital Management Committee.

Other medical staffs are managed under the job regulations.
As for the implementation of the Project, medical superintendent of Kanti Children's Hospital for which the Senior Public Health Administrator, Ministry of Health, who signed the Minutes of Discussions, is totally responsible.

6-7-2 Maintenance Costs

Kanti Children's Hospital have the budget for maintenance as follows:
(as of 1983/1984, Unit: rupees)

Item	Income	Outlay	Remarks
Governmental grant			actual amount
Personnel fee		727,342	
Benefits		172,223	travelling expenses allowance etc.
Food and milk		178,000	for medical use
Medicine and equipment		200,000	for clinical use
Others		169,915	
Total:		1,447,480	
Medical income			
Outpatient tickets	11,919		
Paying beds	55,016		
X-ray	49,281		
Lab Test	56,705		
Total:	172,921		

Item	Income	Remarks
Budget of 1984/85		
Regular	1,600,000	Personnel fee etc
Development	3,000,000	Expansion of beds up to 150 from 88
Treatment Fee	200,000	15% up than the previous year
Total:	4,800,000	

Item	Outlay(estimated)	Remarks
Personnel pay cost	1,584,142	for 104
Running cost for facility	103,165	building maintenance
Security & sewage cost	57,000	
Facility maintenance cost	24,500	for repairing
Equipment maintenance cost	569,200	medical equipment
Medical consumables	1,536,800	for medical use
Total:	3,874,807	

Development budget of 3,000,000 rupees has been assigned for the facility consolidation, and medical equipment procurement as the number of beds increases up to 150, which are under control of the Hospital Development Board. For the construction cost for the facility, the extra requirement to the Government must be applied and as the electric installation cost of 100,000 rupees have been assigned.

Beside this, clinical income as listed in the previous list can be allotted to the hospital running cost.

Cost estimation calculates to approximately 200,000 rupees which is equivalent to the increase of 15% compared with the actual cost of 1983/1984. As for the outlay, the amount has been calculated by the estimation considered the expected clinical activities to be increased.

CHAPTER 7: OPERATION AND MAINTENANCE PLAN

CHAPTER 7 : OPERATION AND MAINTENANCE PLAN

7-1 OPERATION, MAINTENANCE AND STAFFING PLAN

Medical equipment of Kanti Children's Hospital as its function corresponding to the tertiary care, must be supervised and maintained in the accurate conditions. And the medical equipment for clinical control use must be managed only by the present staffing, which has been essentially considered for the equipment selection.

Daily checking and repairing, if necessary, for the equipment must be executed by the regular staffs, but current staffs are not enough in numbers. So, the engineers from the Tribhuvan University have supplement the role. They have been trained in Japan so as to maintaine the equipment supplied by the Government of Japan as a Grant Aid. But there must be the equipment of the kind that needs maintenance services from overseas manufacturers. In case that the engineers from the Tribhuvan University will do the maintenance work, the repairing charge shall be born by the hospital. Such costs have been estimated in 7-2-5 Equipment Maintenance Costs, separately. Therefore, three technicians to be required and their categories corresponding to the plan have been summarized as follows:

Required Staffs for Maintenance Service

Category	Technical Field	Number
X-ray Equipment Monitoring Equipment Echography Apparatus Analyzing Apparatus ECG Apparatus other Electric Apparatus	- Electronic Technician - Electric Technician	1 1
Artificial Ventilator Anesthesia Apparatus Autoclave Washing Machine Oxygen Plant other Service Equipment	Mechanical Technician	1
	Total :	3

Estimation for required number of the maintenanoe services is as follows:

Category	Self-support	Entrustment
X-ray Equipment	1/month	2/year
Monitoring Equipment	2/month	3/year
Echography Apparatus	1/month	2/year
Analyzing Apparatus	1/month	3/year
ECG Apparatus	2/month	3/year
other Medical Electric Apparatus	1/month	1/year
Artificial Ventilation Apparatus	3/month	3/year
Anesthesia Apparatus	0.5/month	1/year
Sterilizing Apparatus	2/month	1/year
Washing Machine	0.5/month	1/year
Oxygen Generator	1/month	1/year
other Equipment	0.5/month	1/year

Remarks: Entrustment number is the one to be required to oversea i.e. Japan, summarizing 4 engineers/3 times/year.

7-2 Operation and Maintenance Costs Plan

After the Project implementation to be completed by the handing over to the Kingdom of Nepal, following costs plan comprising of the personnal pay costS, maintenance and running costS, building cleaning and guarding costS, building maintenance and repairing costS, medical equipment maintenance costS, have been calculated as of October, 1984 with the grand total amounting to 3,874,807 rupees.

7-2-1 Personnel Pay Costs

As stated in 3-2-2 Organization and Budgetary Status, the operation and maintenance costs is mostly spent by the personnel costs and the like (traffic, allowance, etc.) The total personnel pay costs (yearly): 727,342 rupees divided by total personnel (56) make 13,000 rupees (approx.)

As the hospital bed capacity increases to 150 from 88, governmental grant increases accordingly with the staff expansion planned up to 104 amd most of them are nurses and the total cost estimation for them is 856,800 rupees/year and the calculation is:

727,342 + 856,800 = 1,584,142 rupees/year.

7-2-2 Maintenance and Runing Costs

(1) Yearly Water Cost

Water consumption shall be 200 lit./bed;

200 lit. x 150 beds x 30 days = 900m3/month

900m3 x 12 months = 10,800m3/year makes

Yearly Water Cost : Rs. 9,265

Basis rate/month is Rs. 60

Rs. 60 + (900m3 - 10m3) x Rs. 0.80 = Rs. 772

Rs. 772/month x 12 months = Rs. 9,265

(2) Yearly Electricity Cost

Electricity consumption shall be 50KWH x 8 hours = 400KWH/day.

400KWH x 30 days = 12,000KWH/month

12,000KWH x 12 months = 144,000KWH/year

Yearly Electricity Cost : Rs.83,000, being (a) + (b)

basis rate/month:

100KW x Rs. 20 = Rs. 2,000

Rs.2,000 rupees x 12 months = Rs. 24,000 .. (a)

additional rate/month:

12,000KWH x Rs. 0.41 x 12 months = Rs. 59,000 .. (b)

(3) Yearly Diesel Oil Cost

Diesel operated generator 50KVA, with consumption 15 lit./hour shall be operated 2 hours/week:

15 lit/hour x 2.0 hours x 52 weeks x Rs. 7 = Rs. 10,920

Total Cost: Rs. 103,165 comprising:

Water	Rs. 9,265
Electricity	Rs. 83,000
Oil	Rs. 10,920

7-2-3 Building Cleaning and Guarding Costs

Yearly building cleaning and guarding costs shall be covered as the personnel pay costs:

Sweeper	Rs. 500/month x 12 months x 5 =	Rs. 30,000
Guardsman	Rs. 750/month x 12 months x 5 =	Rs. 27,000
Total :		Rs. 57,000

7-2-4 Building Maintenance and Repairing Costs

Building maintenance costs shall be considered as repairing costs. Equipment for the service facilities will require the following yearly cost calculated from the budget of 1983/84;

Equipment for the service facilities	Rs. 800,000 x 2% =	Rs.16,000
others	Rs. 169,915 x 5% =	Rs. 8,500
	Total :	Rs.24,500

7-2-5 Equipment Maintenance Costs

Maintenance procedures must be functioning to its utmost corresponding to the hospital's functions being the tertiray care service and the training center. To maintain the operation as stated in 7-1 Operation, Maintenance and Staffing Plan, following cost shall be estimated;

Category	Costs for Spare parts
X-ray Equipment	Rs. 6,700
Monitoring Equipment	Rs. 13,500
Echography Apparatus	Rs. 2,000
Analyzing Apparatus	Rs. 12,000
ECG Apparatus	Rs. 2,000
other Medical Electronic Apparatus	Rs. 15,000
Artificial Ventilation Apparatus	Rs. 30,000
Anesthesia Apparatus	Rs. 4,000
Sterilizing Apparatus	Rs. 10,000
Washing Machine	Rs. 8,000
Oxygen Generator	Rs. 1,000
other Service Equipment	Rs. 15,000
Sub-total	Rs.119,200

Entrust Pay

Entrust pay to Teaching Hospital	Rs. 12,000
Entrust pay to Engineers from Japan (4 engineers x 3 times/year) Rs.36,500 x 12 times = Rs.438,000/year	Rs.438,000
Total (a) :	Rs.569,200

Costs for medical consumables shall be estimated as follows:

Item	Description	Unit price	Amount
X-ray Film (10"x12")	6,000/year	Rs. 14	84,000
Dressing Materials	840 cases/year	Rs. 70	58,800
	100 inpatients/day	Rs. 5	182,500
	35,000 outpatients/year	Rs. 2	70,200
Surgical materials	operation number		
	-840 cases/year- (ordinal)	Rs.150	126,000
	-1,800 cases/year- (minor)	Rs. 25	45,000
NICU	2,000days/year	Rs.120	240,000
ICU	1,420 days/year (as estimated by 65%)	Rs.120	170,400
Materials for Path. Lab.	34,500 cases/year	Rs. 3	103,500
Food Service	Increment of 30% up		231,400
Medicines	Increment of 50% up		225,000

Total (b) : Rs.1,536,800

Grand total for the equipment maintenance costs (a) + (b) Rs.2,106,000

Total Operation and Maintenance Cost

1) Personnel Costs	Rs.1,584,142
2) Maintenance and Running Costs	Rs. 103,165
3) Building Cleaning and Guarding Costs	Rs. 57,000
4) Building Maintenance and Repairing Costs	Rs. 24,500
5) Equipment Maintenance Costs	Rs.2,106,000
Total :	Rs.3,874,807

In addition to the 1984/1985 budget of 1,600,000 rupees for regular costs, according to the above estimates, when the annual income of the hospital from treatment fees, namely, 200,000 rupees is deducted from the total running costs, the provision of a further sum of 2,100,000 rupees will be required as from this year in order to cover regular costs.

CHAPTER 8: PROJECT EVALUATION

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The object of the Project is to improve the facilities of Kanti Children's Hospital, which occupies a position of major importance in the Long-Term Health Plan for the upgrading of medical services in the Kingdom of Nepal.

The present conditions in the health sector in Nepal are characterized by hardships. The infant mortality rate is very high and health expectancy is very low, which means that the economically active population has a very low average age. This is the principal factor that causes depression of production capability, and is the result of poorly equipped medical facilities and medical manpower shortage. These in turn result from insufficient government expenditure on health services.

The Project implementation will provide the country with a strong pediatric capability. With competent hospital management by the Hospital Management Committee under appropriate guidance by the Kanti Children's Hospital Development Board, which is responsible to the Ministry of Health, this hospital should become an exemplary facility for all future developments in the medical services.

The following Table sets out the estimated capacities within the facilities concerned that will result from the employment of the Grant Aid from the Government of Japan in accordance with the plan made by Nepalese side.

Item	Present	Plann.	Increment (approx.)
Inpatient beds	10	150	1.5 times
Operations (major)	300	1,000	3.3 times
High Risk Care Unit (NICU, ICU)	4	16	4.0 times
Paying beds	27	50	2.0 times
Laboratory Tests	23,000	34,500	1.5 times
X-ray plates	3,700	11,000	3.0 times

The following qualitative changes may be expected:

1) Improvement, by the Project, of the hospital's pediatric capabilities will facilitate the performance of adequate treatment in accordance with the requirements of the people of the Kingdom of Nepal.
2) The country's own standards for pediatric disease control will be established, and will contribute greatly to the proper execution of primary health care.
3) The location of the hospital in Kathmandu together with the accessibility that will be afforded by roads currently under construction will facilitate the transportation and acceptance of critical pediatric cases from outside Kathmandu Valley, thus enabling the hospital to act as an efficient referral hospital.
4) Enlarged clinical experience and application will improve the quality of education of medical personnel. A wide variety of beneficial effects are expected from close cooperation with other Japanese Grant Aid Project facilities, namely, the existing Tribhuvan University Teaching Hospital and the Nursing School to be constructed in the near future. Education and certification of doctors will become possible within the country itself. The completion of the Project will additionally act as an incentive to the Nepalese doctors, nurses and medical technicians drained to other countries, to return home and help to solve the problem of medical manpower shortage.
5) Conditions will be improved by the institution of a suitable system of paying wards. Income from the beds concerned will contribute significantly to hospital management finances in Nepal, where medical service is basically free.
6) The Project will introduce an Oxygen Plant to minimize the running cost of the pediatric health service facility where respiratory oxygen is vital. Any excess gas can be sold to other institutes, and the income from such sales may be used for operation and maintenance of the hospital's facilities.

As a result of the presence, among both the current staff and those due to be enrolled at the end of the fiscal year, of medical staff with overseas experience in the field of pediatrics, the Project's implementation will lead to considerable increase in the hospital's capacity for treating patients.

However, it is normal for improvement of pediatric care services to involve increased expenditure, and since operation costs, including maintenance costs, at Kanti Children's Hospital will be no exception, it will be necessary for His Majesty's Government of Nepal to make a budget allocation specifically to cover the costs of the increased salary outlay and running expenses.

In summary, the Project will assist the improvement, both in quantity and in quality, of medical health care in the Kingdom of Nepal, provide better primary health services to the nation, assist in the education of medical personnel, and improve the age structure of the population. Thus, the benefits offered by the Project for Improvement of Medical Equipment for Kanti Children's Hospital in the Kingdom of Nepal under the Japanese Grant Aid system make the Project fully justifiable, and its effects and repercussions are judged to be enormous.

CHAPTER 9: CONCLUSION AND RECOMMENDATION

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With its National Economic Development Plan, the Kingdom of Nepal aims to strengthen its economy as a whole, and to improve economic conditions nationwide. In the face of a great number of obstacles and considerable difficulties, His Majesty's Government of Nepal have executed various administrative programs in order to meet the basic minimum needs of the people. The principal hindrance to these aims is in the field of health, as indicated by the following current medical statistics: a mean life expectancy of 45 years, and an infant mortality rate of 150/1,000.

The Project, whose object is the improvement of the undesirable health conditions in Nepal by making fuller use of the only referral pediatric hospital in the country, will serve well to meet the urgent and serious pediatric health care demands and to ameliorate the health personnel training system. It is judged that the Project will also become a major contributory factor in the achievement of national primary health care policy. Consequently, this Project possesses a high degree of suitability for the Government of Japan to execute as a Grant Aid Project.

The implementation of the Project and the conditions that it brings will be a new experience for the health care system of the Kingdom of Nepal, and therefore the following suggestions are made to His Majesty's Government of Nepal in order to ensure the continued usefulness and effectiveness of the facilities in accordance with the aims of the project:

1) The operation and maintenance costs have been estimated on the basis of 1984 conditions to amount annually to approximately 3,875,000 rupees. For fiscal 1984/85, an extra budget allocation to supplement the regular grant of 1,600,000 rupees will therefore be required in order to maintain the quality of medical services in the hospital, but further estimations of the budgetary requirements for this purpose will be necessary on an annual basis. In addition to the securing of a budget of 1,536,000 rupeess by His Majesty's Government of Nepal for the Project, the installation of electricity

and water supplies must be completed by the commencement of the equipment installation work covered by the Project, and customs clearance procedures for the medical equipment to be installed must be expedited, so that the work of the Project may be carried out smoothly and efficiently.

2) In order to maintain medical care standards, a close relation should be maintained with the Tribhuvan University Teaching Hospital, the Nursing School and other medical institutes in Nepal.
3) To secure the planned total of fifty personnel such as doctors, nurses and technicians by the end of 1985.
4) To carry out the following works by the end of 1985 in order to ensure smooth operation of all equipment and facilities provided under the Project: incidental works for an Oxygen Plant, an Emergency Generator, a Morgue, and sufficient space to accommodate a laundry; installation of a High Voltage Transformer; improvement of the Operating Theaters and Clinical Pathology Department; and other incidental works for the equipment to be supplied.
5) To ensure the timely provision of two regular maintenance technicians for electrical and electronic equipment, and one for mechanical equipment (totally: three).
6) To make an official request without delay for the parallel technical cooperation of the Government of Japan for the purpose of upgrading the standard of the specialized pediatric services.