

No.

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR PROVISION OF MEDICAL
EQUIPMENT TO MINISTRY OF HEALTH HOSPITALS
IN
THE HASHEMITE KINGDOM OF JORDAN

March 2006

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to a request from the Government of Jordan, the Government of Japan decided to conduct a basic design study on the Project for Provision of Medical Equipment to Ministry of Health Hospitals and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Jordan a study team from August 21 to September 11, 2005.

The team held discussion with the officials concerned of the Government of Jordan, 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 Jordan in order to discuss a draft 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 Jordan for their close cooperation extended to the teams.

March 2006

Seiji Kojima

Vice-President

Japan International Cooperation Agency

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Provision of Medical Equipment to Ministry of Health Hospitals in the Hashemite Kingdom of Jordan.

This study was conducted by Fujita Planning Co., Ltd., under a contract to JICA, during the period from August 2005 to March 2006. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Jordan 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.

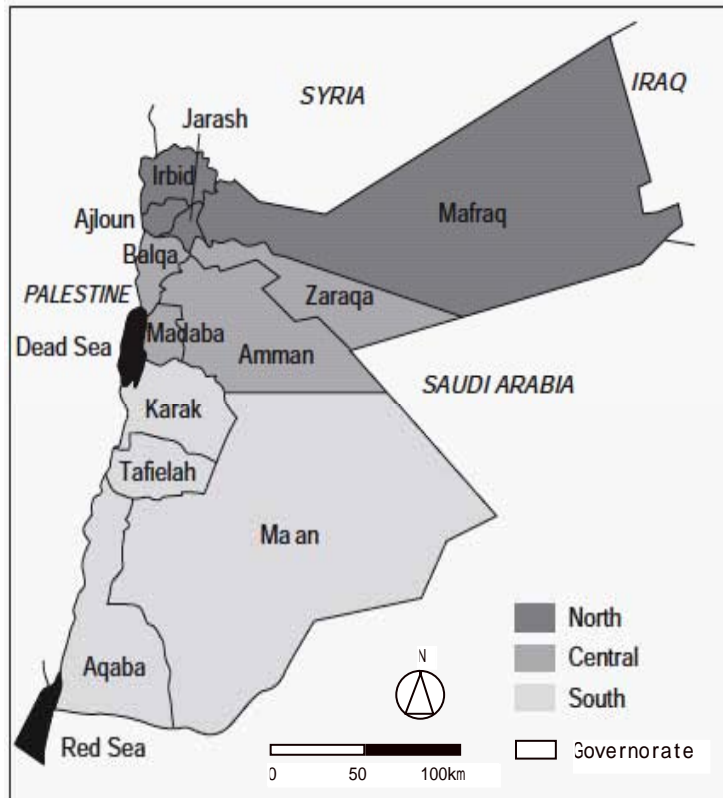
Very truly yours,

Tamotsu Nozaki

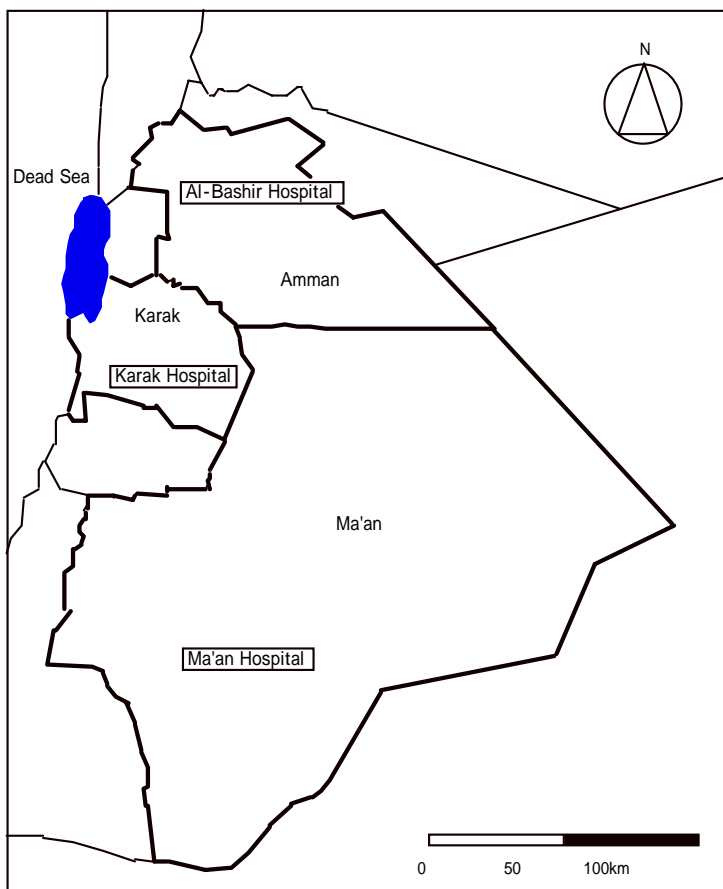
Chief Consultant,

Basic Design Study Team on the Project for Provision of
Medical Equipment to Ministry of Health Hospitals

Fujita Planning Co., Ltd.



Map of the Hashemite Kingdom of Jordan



Location Map of Project Sites

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Abbreviations

A/P	Authorization to Pay
B/A	Banking Arrangement
CCU	Coronary Care Unit
E/N	Exchange of Notes
ENT	Ear, Nose, Throat
ICU	Intensive Care Unit
MRI	Magnetic Resonance Imaging System
MOH	Ministry of Health
NICU	Neonatal Intensive Care Unit
PICU	Paediatric Intensive Care Unit
RMS	Royal Medical Services
RSS	Royal Scientific Society

Summary

Summary

The Hashemite Kingdom of Jordan (hereinafter referred to as “Jordan”) borders on Syria on the north, Saudi Arabia on the south, Iraq on the east, and Palestine and Israel on the west, with the southern region partly facing the Red Sea. Jordan has an area of about 89 thousand km², a little larger than that of Hokkaido in Japan and about one-fourth of that of Japan, and a population of about 5.5 million, about as large as Hokkaido.

In Jordan, people's standard of living has improved in proportion to economic progress. At the same time, the basic health care indicators also improved until life-style related diseases such as cancer and circulatory diseases became leading causes of death, beginning to form a disease structure similar to developed countries, so to speak. However, there still remains many problems in basic health services such as breakout of infectious diseases such as acute respiratory infections, and improvement of maternal and child health and reproductive health such as securing the health of infants and women.

Jordan is promoting social development with a focus on promotion of public and private investments, structural reforms, and development and poverty reduction of rural regions with underdeveloped social capital according to the Social Economic Development Plan that it has established as a national development plan for 2004 to 2006. As for the health care sector, eight priority items have been established, (i.e., primary health care, hospital services, health care finance, health insurance, medical workers, medical institutions and equipment, foods and drugs, and medical service quality). Based on these measures, the "National Health Strategy" (for 2005 to 2010) defines specific measures for the eight priority items in order to lay emphasis on "supply of impartial public medical service to Jordanian citizens" and "efficient utilization of medical resources." One of the priority items defined in the above Plan and Strategy is the improvement of health care institutions. The Ministry of Health is planning improvement of 17 out of 29 hospitals under the jurisdiction of the ministry, focusing on the health care institutions in the secondary and tertiary levels in Jordan, from the viewpoint of ensuring beneficiary effects and scope of benefits for local residents and correcting regional differences between urban and rural regions in health care services. The Ministry of Health and the Ministry of Planning and International Cooperation of Jordan have established in collaboration the “Strategy and Working Plan for the Health Sector” (for 2004 to 2006), which includes an improvement plan for ten hospitals under the jurisdiction of the former including medical equipment.

Jordan intends to improve the health care institutions with a focus on three hospitals: From the viewpoint of country-wide improvement, Al-Bashir Hospital (tertiary level) in the capital city of Amman and, from the viewpoint of correcting regional differences, Karak and Ma'an Hospitals (both secondary level), being located in the Karak and Ma'an governorates in the southern region inhabited by many poor people.

Al-Bashir Hospital (tertiary level) is the leading hospital both in Jordan and the Amman metropolitan area but, like many secondary hospitals, this hospital's basic medical equipment which is supposed to benefit many residents are superannuated and broken. This condition has resulted in problems that need urgent attention such as delay in everyday medical services and insufficient care for patients who have been transferred from other medical institutions. Improvement of health care services at Karak and Ma'an Hospitals (both secondary level), being located in the underdeveloped southern region inhabited by many poor people, are delayed due to regional differences. Whereas medical equipment has never been sufficient in either quantity or quality to begin with, mainly the basic medical equipment is superannuated and broken, causing limitations on the diagnostic and therapeutic abilities of these hospitals. This is why Karak and Ma'an Hospitals, despite being secondary hospitals, cannot supply sufficient services and have no choice but to transfer patients to the higher-level hospital in the metropolitan area.

The Jordanian government, in view of the afore-mentioned difficulties in improvement of basic medical equipment due to shortage of budgets, etc., requested the Japanese government for a grant aid for improvement of basic medical equipment in Al Bashir Hospital and Karak and Ma'an Hospitals in order to achieve recovery of essential functionality of secondary and tertiary-level hospitals and improvement of health care services.

In response to the request from the Jordanian government, the Japanese government decided to conduct a basic design study and the Japan International Cooperation Agency (JICA) dispatched a basic design study team from August 21 to September 11, 2005. The objectives of the team were to consult with the concerned parties of Jordan; to investigate the position of the three target facilities in the medical service improvement project in the metropolitan area and southern region; to investigate activities and peripheral improvement statuses; to investigate specifications of requested equipment, the status quo and problems in the concerned field; and thus to verify the necessity and relevance of the cooperation project. The study team prepared a basic design based on analysis made after coming back to Japan. From November 22 to December 1, 2005, JICA dispatched to Jordan a study team to explain the Draft Basic Design Study Report and made the current report based on it.

This study confirmed that the request of the Jordanian government will contribute to improvement of medical services required for the target medical institutions as well as improvement of medical services for the southern-region inhabited by a large percentage of poor people. The target medical institutions and the major medical equipment to be procured under the cooperation project are as follows:

Target Institutions and Major Equipment Planned for the Project

<p>Al-Bashir Hospital</p> <p>1) Imaging Diagnosis (Radiology and Ultrasound) Fluoroscopic X-ray Machine, General X-ray Machine, Mobile X-ray Machine, Ultrasound Apparatus</p> <p>2) Surgical Operation Ultrasound Intraoperative, Laparoscope, Operating Table, Anesthesia Machine, Operating Light, Electrosurgical Unit, High Pressure Steam Sterilizer, Surgical C-arm X-ray Machine</p> <p>3) Intensive Care Unit (ICU) Patient Monitor, Infant Incubator, Ventilator, Infusion Pump, Blood Gas Analyzer</p> <p>4) Obstetrics & Gynecology Laparoscope, Patient Monitor, Operating Table, etc.</p>
<p>Karak Hospital</p> <p>1) Imaging Diagnosis (Radiology and Ultrasound) General X-ray Machine</p> <p>2) Surgical Operation Vital Sign Monitor, Surgical C-arm X-ray Machine, Operating Table</p> <p>3) Intensive Care Unit (ICU) Ventilator, Electrocardiograph, Patient Monitor, Blood Gas Analyzer, Suction Unit, Infant Incubator</p> <p>4) Obstetrics & Gynecology Cardio Tocograph, Clposcope, etc.</p>
<p>Ma'an Hospital</p> <p>1) Imaging Diagnosis (Radiology and Ultrasound) Fluoroscopic X-ray Machine, General X-ray Machine</p> <p>2) Surgical Operation Operating Microscope, Operating Table, Surgical C-arm X-ray Machine, Operating Instruments Set</p> <p>3) Intensive Care Unit (ICU) Ventilator, Blood Gas Analyzer, Mobile X-ray Machine</p> <p>4) Obstetrics & Gynecology Cardio Tocograph, Clposcope, Cryosurgery Unit, Operating Table, Operating Light, Ultrasound Apparatus, Delivery Table, etc.</p>

If the cooperation project is to be implemented, the Project duration shall include about four months for the detailed design process including tendering and about eight months for the procurement and installation process for medical equipment and the supervision to be conducted by the consultant. The total Project expense is estimated to be 523 million yen (of which 523 million yen shall be shouldered by the Japanese government).

The operating budget of the three target institutions is controlled by the Ministry of Health which have jurisdiction over the institutions. Appropriate maintenance and operation of equipment can be expected because most of the equipment planned under the cooperation project is to be supplied as renewal replacements for the existing superannuated equipment and as new equipment that has been checked and verified to be manageable both technically and financially. In sum, the equipment to be procured under this Project can be operated by the current medical workers. This Project, therefore, is

highly likely to invigorate the medical service activities immediately after it is completed. The implementation of this Project is expected to have the following effects and impacts.

(1) Revitalization of Medical Services

Improving the medical equipment related to major medical services at the target medical institutions will improve the efficiency of medical services.

- Improving the equipment related to diagnostic imaging (X-ray and Ultrasound) will enable supply of appropriate medical services to patients and shorten the time for waiting for X-ray imaging and diagnosis, which is currently two to three days (Al-Bashir Hospital).
- Improving the equipment related to diagnostic imaging (X-ray and Ultrasound) will improve the accuracy of diagnosis dependent on the equipment performance and the efficiency of medical care, consequently increasing the number of patients who can receive X-ray imaging and diagnosis (currently 36,165 at Karak and 27,075 at Ma'an).
- Improving the equipment related to surgical operations will contribute to making operations safer and improving the efficiency of surgical operations and manipulations, which will shorten the waiting time for operations, which is currently five to seven days (Al-Bashir Hospital).
- Improving the equipment related to surgical operations will contribute to making operations safer, improving the efficiency of surgical operations and manipulations, and expanding the scope of treatment and medical care, which will increase the number of operations (currently 2,452 at Karak and 1,068 at Ma'an).

(2) Improvement of Reliability

- Improving the functionality of the three target hospitals will improve the reliability of local residents in the entire community for these hospitals.
- Recovering the essential functionality of the three target hospitals will allow them to fulfill their duties as secondary and tertiary hospitals such as providing appropriate medical service to introduced patients and better technical guidance to other health care institutions.
- Improving the three target hospitals, being major medical institutions in Jordan, will enhance the medical service system of the entire country.

For smoother and more effective improvement of the functionality of the target medical institutions, the following issues and proposals must be earnestly dealt with.

(1) Securing Procurement Budgets for Appropriate Renewal and Improvement of Medical Equipment

The Ministry of Health is thinking of evaluating at present values the medical equipment procured and installed at the medical institutions (hospitals and health centers) under its jurisdiction as tangible fixed assets and thus implementing renewal and improvement of the equipment by applying the concept of depreciation to it. As of 2005, the total present value is estimated to be about 82 million JD (about 13 billion yen). Using the depreciation rates specified for different models of medical equipment (an average of about 10% per year), the annual depreciation amount for present values is estimated to be about 8.2 million JD (about 1.3 billion yen).

Looking at the actual purchase of the new medical equipment over three years from 2002 to 2004, however, the spending was only 900 thousand to 1.2 million JD (about 142 million to 197 million yen) every year. These amounts are equivalent to only 10.9% to 15.1% of the annual depreciation amount of present values estimated earlier. This status quo, although hinting at a difficult financial situation, can be understood as a necessity that calls for an increase of budgets to be spent on the purchase of new equipment, with which we hope that the Jordanian government will tactfully deal.

(2) Diversification of Medical Equipment Procurement System

The Jordanian government procures and installs medical equipment with emphasis on financial efficiency by classifying equipment to be procured, selecting suppliers through tendering, and having them deliver the equipment to the medical institutions. Such a procurement system is accompanied by difficulties in purchasing one or two inexpensive machines or meeting individual needs of each institution and tends to create and prevent elimination of an imbalance in an institution, i.e., a situation in which some departments have expensive equipment while others have mostly superannuated equipment.

Although the apprehension that financial efficiency may be impaired is understandable, we propose that the Jordanian government should supplement the current system by adopting also a procurement system and budget means for procuring one or two inexpensive machines or meeting individual needs of each institution.

(3) Consciousness-Raising for Operations of Institutions

For all the medical institutions under the jurisdiction of the Ministry of Health, the ministry controls the purchase of all the articles for each expense item (category). Such a system of budget control seems efficient. If, however, the Ministry of Health adopts a policy of reducing the operating expenses of the institutions under its control, it would have difficulty in offering incentives for improving the efficiency and productivity to each medical institution (medical care provider) because the system lacks flexibility in operation of the institution and applications of budgets. Rather, there is even a possibility that a medical care provider may derive an undesirable incentive to encourage spending of the budget of the Ministry of Health up to its upper limit (by demanding articles).

Although some moves have been observed to transfer some of discretion in operations to each hospital, we recommend promoting flexible transfer of some of powers concerning operations in view of collaboration between the Ministry of Health and each medical institution in a way that does not impair the awareness-raising for added value productivity in medical services.

Basic Design Study on the Project for Provision of Medical Equipment to Ministry of Health Hospitals
in the Hashemite Kingdom of Jordan

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Chapter 1 Background of the Project

Chapter 1 Background of the Project

Jordan intends to improve the health care institutions with a focus on three hospitals selected from 17 secondary and tertiary hospitals all around the country, which were planned to be improved in the National Health Strategy (NHS) (2005 to 2010): from the viewpoint of country-wide improvement, Al-Bashir Hospital (tertiary level) in the capital city of Amman and, from the viewpoint of correcting regional differences, Karak and Ma'an Hospitals (both secondary level), being located in the Karak and Ma'an governorates in the southern region inhabited by many poor people.

Al-Bashir Hospital (tertiary level) is the leading hospital in Jordan and the Amman metropolitan area but, as for secondary hospitals, this hospital's basic medical equipment which is supposed to benefit many residents are superannuated and broken. This status quo has resulted in problems that need urgent attention such as delay in everyday medical services and insufficient handling of patients who have been transferred from other medical institutions. Improvement in health care services in Karak and Ma'an Hospitals (both secondary level), being located in the underdeveloped southern region inhabited by many poor people, are delayed due to regional differences. Whereas medical equipment has never been sufficient in either quantity or quality to begin with, mainly the basic medical equipment is superannuated and broken, causing limitations on the diagnostic and therapeutic abilities. This is why Karak and Ma'an Hospitals, despite being secondary hospitals, cannot supply sufficient services and have no choice but to transfer patients to the higher-level hospital in the metropolitan area.

This Project is intended to solve the problem in quality of health care services at secondary and tertiary hospitals and the problem of regional differences between urban and rural regions in health care services from the viewpoint of beneficiary effects and scope of benefits for local residents. The Project shall be implemented at Al-Bashir Hospital (tertiary level) in the capital city of Amman and Karak and Ma'an Hospitals (both secondary level) in the Karak and Ma'an governorates in the southern region inhabited by many poor people in order to recover the essential functionality of secondary and tertiary-level hospitals and thus improve the health care services by improving necessary basic medical equipment.

The implementation of this Project shall achieve the functional improvement of the main medical services of the target medical institutions. It is expected that these three hospitals will greatly contribute to the improvement of medical services: Al-Bashir Hospital as an institution providing hospital services to the local residents living in the metropolitan area of Amman as well as tertiary medical services of Jordan and Karak and Ma'an Hospitals as central hospitals in the southern region of Jordan.

Table 1.1 Target Hospitals and Major Equipment Planned for the Project

Name of Hospital	Name of Major Items of Equipment
Al-Bashir Hospital	<p>1) Imaging Diagnosis (Radiology and Ultrasound) Fluoroscopic X-ray Machine, General X-ray Machine, Mobile X-ray Machine</p> <p>2) Obstetrics & Gynecology Laparoscope, Patient Monitor, Operating Table</p> <p>3) Surgical Operation Ultrasound Intraoperative, Laparoscope, Operating Table, Anesthesia Machine, Operating Light, Electrosurgical Unit, High Pressure Steam Sterilizer, Surgical C-arm X-ray Machine</p> <p>4) Intensive Care Unit (ICU) Patient Monitor, Infant Incubator, Ventilator, Infusion Pump, Blood Gas Analyzer</p> <p>5) Endoscopes Endoscope Set (Upper Gastrointestinal and Lower Gastrointestinal)</p>
Karak Hospital	<p>1) Imaging Diagnosis (Radiology and Ultrasound) General X-ray Machine</p> <p>2) Obstetrics & Gynecology Cardio Tocograph, Clposcope</p> <p>3) Surgical Operation Vital Sign Monitor, Surgical C-ram X-ray Machine, Operating Table</p> <p>4) Intensive Care Unit (ICU) Ventilator, Electrocardiograph, Patient Monitor, Blood Gas Analyzer, Suction Unit, Infant Incubator</p> <p>5) Laboratory Centrifuge, Microscope, Water Bath</p>
Ma'an Hospital	<p>1) Imaging Diagnosis (Radiology and Ultrasound) Fluoroscopic X-ray Machine, General X-ray Machine</p> <p>2) Out-patient / ENT ENT Unit</p> <p>3) Obstetrics & Gynecology Cardio Tocograph, Cryosurgery Unit, Operating Table, Operating Light, Ultrasound, Delivery Table</p> <p>4) Surgical Operation Operating Microscope, Operating Table, Surgical C-arm X-ray Machine, Operating Instruments Set</p> <p>5) Endoscopes Endoscope Set (Upper Gastrointestinal and Lower Gastrointestinal)</p> <p>6) Blood Bank Blood Bank Refrigerator</p>

Chapter 2 Contents of the Project

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

Jordan, for the sake of improvement of health care institutions based on the national and high-order health care development plans such as SEDP (2004 to 2006)," "NHS (2005 to 2010)," and "SWPHS (2004 to 2006)," is focusing its efforts on the secondary and tertiary hospitals around the country from the viewpoints of retaining beneficiary effects and scope of benefits for local residents and correcting regional differences between urban and rural regions in health care services.

Jordan intends to improve the health care institutions with a focus on three hospitals selected from 17 secondary and tertiary hospitals all around the country, which were planned to be improved in the National Health Strategy (NHS) (2005 to 2010): from the viewpoint of country-wide improvement, Al-Bashir Hospital (tertiary level) in the capital city of Amman and, from the viewpoint of correcting regional differences, Karak and Ma'an Hospitals (both secondary level), being located in the Karak and Ma'an governorates in the southern region inhabited by many poor people

This Project is intended to solve the problem of quality of health care services at secondary and tertiary hospitals and the problem of regional differences between urban and rural regions in health care services from the viewpoint of ensuring beneficiary effects and scope of benefits for local residents. This Project shall be implemented at Al-Bashir Hospital (tertiary level) in the capital city of Amman and Karak and Ma'an Hospitals (both secondary level) in the Karak and Ma'an governorates in the southern region inhabited by many poor people in order to recover the essential functionality of secondary and tertiary-level hospitals and thus improve the medical services by improving necessary basic medical equipment.

In this context, the cooperation project shall concern procurement of medical equipment related to medical services such as diagnostic imaging (X-ray and ultrasound machines), surgical operations, intensive care units (ICUs), and obstetrics and gynecology department.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

The cooperation project shall be planned based on the following design policy for improvement and sustainable operations of medical services to be provided by the target medical institutions.

- In accordance with the principles of priority and elimination in equipment planning in a grant aid project, this Project will cover medical equipment related to the improvement of secondary and tertiary medical services, and the improvement and enhancement of a medical referral system between secondary and tertiary medical institutions.
- Consideration will be given to the improvement of equipment to eliminate the imbalance between medical / general service departments such as surgical operations as well as intensive care unit (ICU), etc. at the same hospital.
- Should this Project be accompanied by other plans made by the Ministry of Health (MOH) for the extension or reconstruction of facilities, the employment or supplementation of medical workers, etc., this Project will cover equipment related to those plans implemented at the expense of those parties, insofar as these plans are judged to be feasible.
- This Project will cover equipment that can be operated and maintained both technically and financially by the Jordanian government or the MOH.
- The improvement of facilities at Karak and Ma'an Hospitals is expected to result in systematic cooperation with the "Reproductive Health and Community Health Project in Southern Governorates" (activities in the primary health field), a Japanese technical assistance project to be implemented this fiscal year (2005), in the form of improved backup support services. Particular consideration will be given to the improvement of equipment related to the departments of obstetrics and gynecology and to newborn care services.
- Plans for the quantity of equipment will be based on the replacement of existing equipment. Consideration will be given to the quantity of equipment to be supplemented and newly procured/ introduced so as to meet the minimum requirements for the current scale of the institution and its medical workers.

It has been agreed with the Jordanian government that, out of the initial request, advanced and expensive equipment related to nuclear medicine and radiotherapy shall be excluded from the plan in view of correcting the imbalance in budget allocation for equipment improvement in Jordan preventing this kind of equipment from being prioritized in budget allocation, promoting the improvement of basic medical equipment, and considering the difficulty in operation and management and benefits to general residents.

Based on the above policy and background, consideration shall be given to planning of medical

equipment required for medical services such as Imaging Diagnosis (X-ray and Ultrasound), Surgical Operations, Intensive Care Unit (ICU), and Obstetrics & Gynecology in order to contribute to the improvement of basic medical services of Al-Bashir, Karak, and Ma'an Hospitals.

(2) Policy on Institution Infrastructure Influencing the Equipment Plan

According to the results of the field survey on the electricity situation, the voltage variation is not so significant, being no more than +/-8%, but power failures are frequent at Karak Hospital. Particular consideration will be given to the backup power supplies for equipment to be used in operating rooms etc., and to the installation of uninterruptible power supplies (UPS) for operating lights and anesthesia apparatus.

While the city water supply is used as the water source, a lot of it is well water. The results of an examination of the water quality test records show that the water is hard water. As is now the case, High Pressure Steam Sterilizers are to be equipped with Water Softeners.

(3) Policy on Implementation Period

The implementation period will be 12 months or less. Should the medical activity of the institution concerned need to be interrupted in order to bring in and install the equipment, the procedure for carry-in and installation will be planned so as to minimize the effect of this.

2-2-2 Basic Plan

(1) Overall Plan

The planned equipment will mainly involve the replacement of the existing old equipment. Equipment such as X-ray Machines, Operating Lights and High Pressure Steam Sterilizers will be removed and new ones installed in their place. Therefore, the existing incidental facilities for electric power, water supply and drainage will be used for the new equipment.

The planned equipment is basic medical equipment essential for the supply of hospital medical services, and will be used to improve these medical services and reinvigorate activities that have fallen away.

(2) Equipment Plan

The outline of the Equipment Plan is as follows:

1) Al-Bashir Hospital

For this hospital, a Master Plan for the significant expansion and renovation of facilities has been created with financing from the World Bank and Saudi Arabia, and construction work in stages (divided into phases) is under way based on the Master Plan. There is also a renovation plan for some of the hospital departments to be covered by the Equipment Plan. The Equipment Plan, therefore, will be focused on the replacement and supplementation of equipment needed to improve functionality, based

on the present facility infrastructure as well as new facilities which renovation works should be finalized within the year of 2006. Much of the equipment is old and suffers from breakdowns and malfunctions. In the service departments related to Imaging Diagnosis (X-ray and Ultrasound Machines) and Surgical Operations in particular, many patients are forced to wait for treatment or be referred to another medical institution. More information on this is provided below.

Imaging Diagnosis / Radiology & Ultrasound

At present the Radiology Department has six General X-ray Machines, three Fluoroscopic X-ray Machines, two Computed Tomography (CT) Scanners and one MRI, which is installed in another building. The newest of the General X-ray Machines was installed five to six years ago. This Plan will cover the replacement of the three oldest machines. Of the three Fluoroscopic X-ray Machines, the one that is too deteriorated for fluoroscopic imaging will be replaced. In addition, the three old X-ray Film Processors will also be replaced.

The Mobile X-ray Machines placed in each of the departments are also under the control of the Radiological Diagnosis Department. Of these Mobile X-ray Machines, those placed in the Pediatrics ICU and in the Emergency Wing ICU are old and break down frequently, and will be replaced.

Some departments of this hospital carry out digital image processing. When capturing an image, an Imaging Plate (Computed Radiology cassette) capable of storing the captured image as digital data is used; the image data is fed into a Computed Radiography system and then the image is output to film (dry type) using a Laser / Dry Imager. However, there is no thought at the moment of changing the current system under which the captured images are output to film (wet type) for doctors to make their diagnoses, and there are no concrete plans yet to shift to digital image diagnostics.

Meanwhile, images captured on CT scanner are digital images from the start, and these are sent directly to a Dry Imager for outputting to film. It is planned to relocate the Dry Imager currently in use to the Prince Hamza Hospital, currently under construction in the city of Amman, when it opens (end of 2005 or later). Therefore, this Plan will include the supply of a Dry Imager so that CT images can be output even after the present equipment has been relocated.

Obstetrics and Gynecology

Although the Obstetrics and Gynecology Department is located in the new wing, much of the existing equipment in its two operating rooms is too old to use. Therefore, the Operating Tables, Vital Sign Monitors for Operating Rooms, Electrosurgical Units and Suction Unit will be replaced. Additionally, the Laparoscope Set has few attachments and are too old to use, and will be replaced.

Operating Rooms / General Surgery

There are three operating rooms on each of the first and second floors. There is also a sterilizing room on the first floor. The operating rooms on the first floor are used by the General Surgery, Neurosurgery and Urology Regions, while those on the second floor are used by the

Laparoscope / General Surgery, General Surgery and Pediatric Surgery Regions. On a six-day-week operation schedule, four to five operations are conducted every day in each operating room. Each operating room has a full set of basic equipment, much of which appears to be decrepit. Furthermore, the monitoring equipment used to monitor the status of a patient under anesthesia is too old to use, making it difficult to measure the vital signs of the patient. Some machines are outdated models that cannot measure supplemented essential items. This situation sometimes makes it difficult to conduct an operation smoothly. This Plan aims to replace these pieces of equipment and also to increase the numbers of some and to introduce some equipment for the first time, to improve service functionality.

The equipment to be replaced is a Laparoscope Set, Operating Tables, Operating Lights, Anesthesia Machine, Electrosurgical Units, Vital Sign Monitors, Defibrillators, Urethroscope Set and High-Pressure Steam Sterilizers.

Equipment to be added to or supplemented includes an Operating Microscope for Neurosurgery and an Ultrasound Surgical Unit. Neurosurgical operations are currently being conducted using an Operating Microscope for Ophthalmology. In neurosurgical operations, doctors need to actually move the lens forward and backward in order to observe the affected area. In an Operating Microscope for Ophthalmology, however, the lens does not move forward and backward, making it unsuitable for neurosurgical operations and causing apprehension of danger during an operation. This Plan will therefore cover an Operating Microscope for Neurosurgery. The Ultrasound Surgical Unit to be supplemented in this Plan has the distinctive feature of being able to excise and stop bleeding at the same time, thanks to the supersonic vibration of the blade. This type of ultrasound surgical unit can significantly reduce bleeding when, for example, excising the intestinal tract. With an ordinary ultrasound surgical unit, on the other hand, it is difficult to do an excision in, for example, a brain or liver without damaging the numerous blood vessels running through the tissue (Damaging a blood vessel will cause heavy bleeding, putting the patient in a critical condition). This plan will cover one Ultrasound Surgical Unit, as this is a very useful and essential piece of equipment for the excision of tissue from the liver, etc., and can be fully utilized by the surgeons at this hospital.

Equipment to be introduced for the first time will be Ultrasound Apparatus for Intraoperative and a Resectoscope Set. The Ultrasound Apparatus for Intraoperative is used when operating on the internal organs to identify how far a tumor or ulcer has spread and decide how much of the organ should be removed, making it an essential device for modern surgical operations. The Resectoscope Set is used in the Urology Region to remove part of an enlarged prostate through the urethra, and is considered effective in alleviating the burden on the patient. Both pieces of apparatus can be operated, as they can be used by specialists at this hospital.

Operating Rooms / Emergency Surgery

In the Emergency Ward, there are two operating rooms for orthopedic surgery, one minor operating room (for local-anesthesia operations), and one emergency operating room. With the exception of the emergency operating room, in a six-day-week operation schedule, four to five

operations are conducted every day in each of the operating rooms. As general, situations of the existing equipment are old and break down frequently, same as general surgery departments.

The equipment to be replaced is the Operating Tables, Operating Table for Orthopedic Surgery, Operating Light, Electrosurgical Units, Suction Unit, Vital Sign Monitors, Defibrillators, Surgical C-arm X-ray Machine, and Water Bath for Blood Warming.

Equipment to be introduced for the first time will be Arthroscope Set. At the current level of cleanliness in the operating rooms, operations to open joints are not free of the risk of infection. The Arthroscope Set will be introduced to minimize such risk, to enable the treatment of arthritis and other conditions that could not be easily handled before now. Any orthopedic surgeon can manage the basic operation of this equipment, and the specialists at this hospital can use it with no problem.

Intensive Care Unit (ICU) / Emergency Ward

The ICU accommodates those emergency patients hospitalized in the Emergency Ward who need intensive observation and care. On either side of a passageway are two rooms with five beds each (a total of 10 beds). Out of a total of 10 Bedside Monitors currently in place, eight units (four in each room) are connected to a Central Monitor in the nurses' station. The ICU has nine Ventilators, one Mobile X-ray Machine, one Infusion Pump, two Defibrillators, one Suction Unit, and one Blood Gas Analyzer. These pieces of apparatus are often required urgently when a patient is brought in. However, since some of the equipment is old, breakdowns sometimes occur during emergency treatment. Furthermore, the deterioration of eight of the ten ICU Beds is considerable.

This being the situation, the old equipment to be replaced is a Central Monitoring System with Bedside Monitors, Defibrillator, Ventilators, Infusion Pumps, ICU Beds and Mobile X-ray Machine.

The equipment to be introduced for the first time will be a Syringe Pumps, an essential piece of apparatus for the continuous dispensation of very small amounts of drug solution to a patient. This equipment is highly necessary, as many of the wide variety of emergency patients coming to this hospital need continuous infusion of small amounts of drug solution such as cardiotoxic drugs.

Coronary Care Unit (CCU)

This hospital provides medical care in coronary care only, not in cardiovascular surgery. All the patients who need cardiovascular surgical care are transferred to other institutions such as the King Hussein Medical Center, which is under the control of the Royal Medical Services (RMS). Therefore, most of the patients at this hospital suffer from ailments related to an irregular pulse. The CCU has ten beds and provides internal-medicine treatment.

The existing old equipment to be replaced in this Plan is Bedside Monitors including a Central Monitoring System, an Electrocardiograph and Defibrillators. Care will be taken to ensure that the Bedside Monitors can measure the same parameters as the monitors in other departments, as internal medical care is given in the CCU. As catheters are seldom used, blood pressure is kept to noninvasive measurement.

Chest / Pulmonary Department

The existing old equipment to be replaced is the Bronchoscopes and Spirometer. Of the three Bronchoscopes currently owned, one is out of order because the some fibers are broken, and another is too deteriorated to be used. Currently, the remaining Bronchoscope is used to conduct checkups but it too has a broken fiber, making diagnosis difficult. Meanwhile the Spirometer used for screening checks can measure only vital capacity (VC) because of the degradation of its sensor.

Endoscopy

The Endoscopy Department located in the Emergency Ward has two examination rooms, in each of which upper gastrointestinal and lower gastrointestinal examinations are conducted. At the time of study, there were so many patients that they were waiting in a queue.

Both of the examination rooms are equipped with Endoscopes for Upper and Lower Gastrointestinal Examinations. One of the examination rooms was equipped with an Endoscope (Electron Fiberscope) procured in the Japanese Follow-up Assistance. The other examination room was equipped with Endoscopes for Upper and Lower Gastrointestinal Examinations that was already old, broken and unusable, and an Endoscope for Duodenal Examinations. This Plan will cover the replacement of the superannuated and broken Endoscopes for Upper and Lower Gastrointestinal Examinations.

In these examination rooms, technical guidance is given to doctors who are working at local hospitals throughout Jordan and are in charge of endoscopes there. The doctors in charge of endoscopes at Karak and Ma'an Hospitals are also undergoing training in these examination rooms.

Intensive Care Unit (ICU) / Pediatrics

The Pediatrics Department is located on the third and fourth floors of the new ward. This Plan will not cover the General Pediatric Ward but the Pediatric Intensive Care Unit (PICU) and Neonatal Intensive Care Unit (NICU), for which there was a request for assistance. The NICU cares for premature infants and the PICU for ordinary newborns as well as infants who have grown to a certain degree. Patients are accepted from hospitals throughout Jordan and private hospitals, not only those born at Al-Bashir Hospital.

- Pediatric Intensive Care Unit (PICU)

Located on the second floor of the ward, there are three PICU rooms to accommodate patients. There are infants in one room and babies in the remaining two rooms. The infants' area has eight beds, four of which are equipped with Bedside Monitors. The babies' area has a total of five Infant Incubators. A child is transferred from PICU to the general ward once his condition improves.

The equipment storeroom stores / is equipped with Ventilators for Infants, Mobile Infant Incubators, Defibrillators, Phototherapy Units and one Blood Gas Analyzer, all of which can be taken out and used whenever required. In the hallway adjacent to the equipment storeroom is a Mobile X-ray

Machine. To use the Mobile X-ray Machine, a doctor contacts the Radiology Department to have a radiologist visit the PICU with a film and take an X-ray image.

This Plan will cover the replacement of the equipment in this department that is old and makes the provision of medical treatment difficult. The equipment to be replaced is Infant Incubators, Ventilators for Infants, Phototherapy Units, Blood Gas Analyzers and the Mobile X-ray Machine.

The equipment to be supplemented is the Bedside Monitors to be used with the Ventilators for Infants and Bilirubin Meters (Transcutaneous) so that the examinations currently carried out in the examination rooms can be efficiently carried out in this department.

- Neonatal Intensive Care Unit (NICU)

Located on the third floor, the NICU has five rooms to accommodate patients, one of which is for patients with infectious diseases. This is a large-scale NICU, with 44 Incubators and two Mobile Infant Incubators. Serious cases are accommodated in the rooms further from the entrance, while mild cases are accommodated closer to the entrance.

This Plan will cover the replacement of equipment that is too old and cannot be used for medical service in this department. The equipment to be replaced is Infant Incubators, Ventilators for Infants, Phototherapy Units and Infant Care Units.

The equipment to be supplemented is the Bedside Monitors to be used with the Ventilators for Infants, Bilirubin Meters (Transcutaneous) so that the examinations currently conducted in the examination rooms can be efficiently carried out in this department, and Infusion Pumps of which there is an insufficient number.

2) Karak Hospital

This hospital is functioning as a core hospital providing medical service to local residents as well as teaching hospital for the Faculty of Medicine, Mutah University. The vision for the future appears to be to provide it with the function of a referral hospital for the Southern region (the four Governorates of Karak, Aqabah, Tafeeleh and Ma'an), accordingly expanding and renovating the hospital infrastructure under the Spanish assistance. However, as no detailed plans regarding this future vision could be confirmed, it is excluded from this Plan. The Plan therefore will cover the improvement of equipment within the scope of current medical activities. The Plan will cover mainly the replacement of the existing equipment that is old, with frequent breakdowns and malfunctions. More information is provided below:

Imaging Diagnosis / Radiology & Ultrasound

The Radiology Department has four rooms: a General X-ray Room, a Fluoroscopic X-ray Room, a CT Room and an Ultrasound Room. Initially, Italian General X-ray and Fluoroscopic X-ray Machines were installed, but these repeatedly malfunctioned from just after installation, making it difficult to maintain good operations. The Fluoroscopic X-ray Machine and the Ultrasound Apparatus

were replaced in previous Japan's grant aid assistance "Emergency Medical Care System Improvement Plan" implemented in 1997. The General X-ray Machine was not replaced because, at the time, only three to four years had passed since installation and it was confirmed to be operational, although some users said that they sometimes encountered problems with it. In 2005, Ultrasound Apparatus with Color Doppler has been procured in the Japanese follow-up assistance.

This Plan will cover the replacement of the General X-ray Machine, which has further deteriorated and is now completely out of order and beyond repair. The equipment specifications and configuration will be the same as for the current equipment, namely the analog imaging bucky-stand and table type.

Obstetrics and Gynecology Department

In the Obstetrics and Gynecology Department, on average eight babies a day are delivered in the one room, which means the department is very busy. The department owns a Cardio Tocograph (CTG) that is used to observe the expectant mother and her unborn baby during checkup and delivery, but this is old, with the event mark recording function out of order and beyond repair. The Vacuum Extractor owned by the department is an old, manual type. This Plan therefore will cover the replacement of the CTG and the Vacuum Extractor. The replacement Vacuum Extractor will be an electrically powered type.

Operation Rooms / General Surgery

This hospital has two operating rooms, and in these two rooms all the operations including those for the Obstetrics and Gynecology Department are carried out. The Study Team found that, in both the operating rooms, the necessary equipment was available but some apparatus including the Operating Tables was too old to use. Furthermore, the study found that monitors used to monitor the vital states of patients under anesthesia were either decrepit or of an old model so that appropriate vital information (measured items) of patients could not be obtained, and that there was considerable deterioration of the C-arm X-ray Machine used in orthopedic surgery operations, causing difficulties in operations.

In this Plan, the old equipment to be replaced is the Operating Tables, Vital Sign Monitors and C-arm X-ray Machine. The Operating Tables will be of an electric motor-driven type and the Vital Sign Monitors will have equipment specifications enabling the measurement of Electrocardiogram (ECG), Respiratory, NIBP, Pulse Oxymetry, Temperature, and CO₂ Concentration in breath.

Intensive Care Unit (ICU)

The ICU was originally constructed as an observation room in the Emergency Department and has four beds. Two of them are used as ICU beds and the other two as CCU beds. Various pieces of equipment are appropriately placed but the Ventilators, Electrocardiographs and Suction Units are too old to use. Therefore, the Plan will cover the replacement of this old equipment.

The equipment to be replaced is the Ventilators, Electrocardiograph and Suction Units.

On the other hand, there was a request for Bronchoscope for use in the first-aid treatment of children. Currently, this hospital has no Bronchoscope and all cases of infants who have swallowed a foreign object, which needs to be removed from the bronchus at once, are transferred to Al-Bashir Hospital in Amman; but in some cases the child dies on the way. To improve this situation, this Plan will provide Bronchoscope to enable the removal of foreign objects at this hospital. There are two doctors at this hospital with experience in the removal of foreign objects using Bronchoscopes, and so the equipment can be put to use.

Intensive Care Unit (ICU) / Emergency Ward

The emergency ward was built through the technical assistance of Italy and at the expense of the Jordanian MOH when this hospital was constructed with the assistance of Italy. The costs for procurement of medical equipment are also handled by the MOH. The ICU in the emergency department is used to treat and observe relatively mild cases, while serious cases are transferred to the ICU or CCU in the main building.

This Plan will cover the replacement of Bedside Monitors and Mobile X-ray Machine that are considerably superannuated. Additional equipment to be supplied will be a Blood Gas Analyzer and a Ventilator. Currently, a specimen for blood gas measurement needs to be carried to the main building ICU. From the viewpoint of making examination operations more efficient, it seems appropriate to install a Blood Gas Analyzer in this ICU. Seeing that the one Ventilator currently owned cannot be said to be operating well, another Ventilator will be added to enhance the functionality of the ICU.

Intensive Care Unit (ICU) / Neonate

The neonatal ICU has five Infant Incubators, accommodating premature babies born in the Karak region who have relatively few problems. Newborns in serious condition are transferred to Al-Bashir Hospital in Amman.

This Plan will cover the replacement of the Infant Incubators, Infant Care Unit and Ventilator for Infants, all of which are still operational but extremely old.

Laboratory

The laboratory testing rooms are divided into general (urine and feces), biochemical, hematological and bacterial. Additionally, a blood bank is attached. Various tests are conducted in the testing rooms, all of which are well equipped. However, part of the equipment is extremely old. This Plan will cover the replacement of these old items of equipment.

The equipment to be replaced is the Water Bath and Centrifuges in the biochemical testing room, the Microscopes in the hematological testing room and the Microscopes in the general testing room.

3) Ma'an Hospital

This Plan will cover mainly the replacement of old equipment in the Imaging Diagnosis (Radiology and Ultrasound), Surgical Operation, ICU, Obstetrics and Gynecology Department, etc. Much of the equipment to be renewed breaks down or malfunctions frequently, and each time this occurs patients have to either wait for the resumption of medical service or be referred to another medical institution. More information on this matter is provided below:

Imaging Diagnosis / Radiology & Ultrasound

The Radiology Department has two General X-ray Machines, one Fluoroscopic X-ray Machine, one Computed Tomography (CT) scanner, one Ultrasound System and one Panoramic X-ray Machine for dentistry. Mobile X-ray Machines are placed throughout the hospital. Of this equipment, this Plan will cover the replacement of the very old General X-ray Machine, Fluoroscopic X-ray Machine and Ultrasound System.

Outpatient Department / Ear, Nose, and Throat (ENT)

This Plan will cover the replacement of the present old ENT Unit in the Outpatient Department.

Hemodialysis

There are five Hemodialysis Machines in the hemodialysis room of this hospital. There is also a Water Treatment Unit that can cover eight Hemodialysis Machines. Currently, Ma'an Hospital is giving hemodialysis treatment to 18 patients with chronic renal failure twice a week each. At its current scale, 18 patients seem to be the most that the hospital can accept. As the hospital lacks a kidney specialist who can treat renal failure, treatment is given to those patients who have had a shunt inserted and started to receive dialysis at Al-Bashir Hospital, and whose condition is stable. Anyone needing emergency dialysis is given peritoneal dialysis by a physician and is then transferred to Al-Bashir Hospital. The existing Hemodialysis Machines are allocated to the treatment of chronic patients, and have no vacancies. Should a new dialysis patient emerge the situation will become impossible. Therefore, this Plan will supplement one Hemodialysis Machine for emergency dialysis.

Obstetrics and Gynecology Department

There is one delivery room with two Delivery Tables, and about seven babies are delivered each day. This Plan will cover the replacement of old Ultrasound Apparatus, Vacuum Extractors, Hot-air Sterilizers, Anesthesia Apparatus, Laparoscope Set, Operating Tables, Operating Lights, Delivery Tables and Cardio Tocographs. These new pieces of equipment will be of the same level as the present ones. From the viewpoint of enhancing the linkage with the Japanese Technical Cooperation Project, this Plan will also cover, in order to improve the functionality of the gynecological services, the procurement of Colposcope, which are useful in the diagnosis of the uterus and cervix, and a

Cryosurgery Unit, which will be useful in treating inflammation of the uterus and cervix and first-term / early-stage cancer. The Cryosurgery Unit will replace the existing old equipment.

Intensive Care Unit (ICU) / Pediatrics

The Pediatrics Department has a NICU for newborns and a PICU for infants. The equipment in the PICU had just been upgraded and all the equipment was in good operating condition. This Plan will cover upgrades aimed at enhancing the functionality of the NICU.

The newborns accommodated in the NICU are premature babies born in the Ma'an region who are relatively free of problems. Newborns in serious condition are transferred to Al-Bashir Hospital in Amman. The NICU consists of a room with ten Incubators and an isolation room with three Infant Incubators to care for babies with infectious diseases.

This Plan will cover the replacement of the very old Phototherapy Units, Blood Gas Analyzer and Ventilators for Infants for the isolation room. Furthermore, the existing Resuscitation Set, which is considerably decrepit, will be replaced and another Resuscitation Set will be added, as it is appropriate for one piece of such equipment to be available for healthy babies and another for babies with infectious illnesses. Also, bilirubin testing of newborns is currently carried out by taking blood samples from the newborns to the testing room. This Plan will cover the purchase of a new Bilirubin Meter, which eliminates the need to draw blood and enables the measurement of bilirubin values on the spot, in order to lessen the strain of blood sampling on newborns and improve the efficiency of diagnosis activity.

Operation Rooms / General Surgery

There are three operating rooms, for minor operations, general surgery and orthopedic surgery. All the operating rooms are provided with basic equipment, some of which is significantly superannuated and makes surgery difficult. This Plan will cover the replacement of such equipment in order to enable proper surgery. The equipment to be replaced is Microscopes for Surgery, Operating Tables and C-arm X-ray Machine. Furthermore, various clamps for surgery, which are currently insufficient in quantity, will be supplemented.

Intensive Care Unit (ICU)

The current ICU with four beds is relatively well equipped but some of the equipment is old. This Plan will cover the replacement of the Ventilator and Electrocardiograph, the deterioration of which is particularly severe.

Endoscopy

Currently, this hospital is not equipped with an Endoscope and every week several patients are transferred to Al-Bashir Hospital. Most of these patients have suspected gastrointestinal bleeding, and for these the transfer is a large burden in terms of traveling expense and time. An Endoscope at this hospital will enable diagnosis locally and, often, it will be possible to stop the bleeding. At this hospital,

there are two doctors who have experience in using an Endoscope at Al-Bashir Hospital, and therefore the equipment can be operated by these doctors. If required, they can undergo additional training at Al-Bashir Hospital. This being the situation, set of Endoscopes will be introduced for the first time to improve the diagnosis and treatment of gastrointestinal complaints.

Blood Bank

The blood bank controls the blood given by donors and close relatives of patients, from testing to transfusion. There are currently two Blood Bank Refrigerators for blood storage but both appear to be old. This Plan will cover the replacement of one Blood Bank Refrigerator that is particularly deteriorated.

Tables 2.1 through 2.3 show a list of equipment covered in this Plan as described above. The major discussion points that were considered are as follows.

- A: Is the equipment needed for secondary / tertiary medical service? (Tertiary medical services are provided by Al-Bashir Hospital.)
 - B: Is there anyone who uses or can use the equipment?
 - C: Is maintenance and management (financially) possible?
 - D: Is maintenance and management (technically) possible?
 - E: Will a wide / common range of the general public be benefited?
- * (: Yes, : Undetermined, x : No)

Remarks:

Replace; Replaced of old existing Equipment

Supple.; Supplemented Equipment in the Department

Newly; Newly Introduced in the Hospital

Table 2.1 List of Planned Equipment / Al-Bashir Hospital, 1/2

Department / Equipment	Q'ty	Replace	Supple.	Newly	A	B	C	D	E
Radiology / Diagnostic									
General X-ray Machine	3	3							
Fluoroscopic X-ray Machine	1	1							
Dry Imager	1		1						
X-ray Film Processor	3	3							
Mobile X-ray Machine	2	2							
Obstetrics & Gynecology									
Laparoscope Set	1	1							
Operating Table	2	2							
Bedside Monitor	2	2							
Electrosurgical Unit	2	2							
Suction Unit	1		1						
High Pressure Steam Sterilizer	1	1							
Operation Rooms / General Surgery									
Laparoscope Set	1	1							
Operating Table	4	4							
Operating Light	4	4							
Suction Unit	1		1						
Operating Microscope for Neurosurgery	1		1						
Ultrasound Apparatus for Intraoperative	1			1					
Ultrasound Surgical Unit	1		1						x
Electrosurgical Unit	3	3							
Vital Sign Monitor	6	6							
Defibrillator	3	3							
High Pressure Steam Sterilizer	2	2							
Resectoscope Set	1			1					
Urethroscope Set	1	1							
Anesthesia Apparatus	1	1							
Operation Rooms / Emergency									
Operating Table	2	2							
Operating Table for Orthopedic	1	1							
Operating Light	1	1							
Suction Unit	1		1						
Electrosurgical Unit	3	3							
Vital Sign Monitor	3	3							
Defibrillator	2	2							
Arthroscope Set	1			1					
C-arm X-ray Machine	1	1							
Water Bath for Blood Warming	1	1							
ICU / Emergency									
Central Monitoring System (A)	1	1							
Defibrillator	1	1							
Ventilator	3	3							
Syringe Pump	2			2					
Infusion Pump	2	1	1						
ICU Beds	8	8							
Coronary Care Unit (CCU)									
Central Monitoring System (B)	1	1							
Electrocardiograph	1	1							
Defibrillator	1	1							

Table 2.1 List of Planned Equipment / Al-Bashir Hospital, 2/2

Department / Equipment	Q'ty	Replace	Supple.	Newly	A	B	C	D	E
Chest / Pulmonary Department									
Bronchoscope Set	1	1							
Spirometer	1	1							
Endoscopy									
Video Endoscope Set (Upper & Lower)	1		1						
ICU / Pediatric & Neonate									
Infant Incubator	12	12							
Ventilator for Neonate	7	7							
Phototherapy Unit	11	11							
Infant Care Unit	3	3							
Infusion Pump	5		5						
Bedside Monitor	7		7						
Blood Gas Analyzer	1	1							
Bilirubin Meter	2		2						

Table 2.2 List of Planned Equipment / Karak Hospital

Department / Equipment	Q'ty	Replace	Supple.	Newly	A	B	C	D	E
Radiology / Diagnostic									
General X-ray Machine	1	1							
Obstetrics & Gynecology									
Cardio Tocograph	1	1							
Vacuum Extractor	1	1							
Colposcope Set	1			1					
Hysteroscope Set	1			1					
Operation Rooms / General Surgery									
Operating Table	2	2							
Vital Sign Monitor	2	1	1						
C-ram X-ray Machine	1	1							
ICU									
Ventilator	2	2							
Electrocardiograph	1	1							
Suction Unit	2	2							
Bronchoscope Set	1			1					
ICU / Emergency									
Bedside Monitor	3	3							
Ventilator	1		1						
Mobile X-ray Machine	1	1							
Blood Gas Analyzer	1		1						
Pulse Oximeter	2	2							
ICU / Neonatal Department									
Infant Incubator	4	4							
Ventilator for Neonate	1	1							
Infant Care Unit	1	1							
Bedside Monitor	1	1							
Laboratory									
Centrifuge	2	2							
Water Bath	1	1							
Microscope	2	2							

Table 2.3 List of Planned Equipment / Ma'an Hospital

Department / Equipment	Q'ty	Replace	Supple.	Newly	A	B	C	D	E
Radiology / Diagnostic									
General X-ray Machine	1	1							
Fluoroscopic X-ray Machine	1	1							
Ultrasound, Color Doppler	1	1							
ENT									
ENT Treatment Unit	1	1							
Hemodialysis									
Hemodialysis Machine	1		1						
Obstetrics & Gynecology									
Cardio Tocograph	2	2							
Cryosurgery Unit	1	1							
Hysteroscope Set	1			1					
Laparoscope Set	1	1							
Operating Table	2	2							
Operating Light	2	2							
Ultrasound Apparatus	1	1							
Delivery Table	2	2							
Vacuum Extractor	1	1							
Drying Oven	1	1							
Anesthesia Apparatus	1	1							
ICU / Pediatric Department									
Ventilator for Neonate	2	2							
Blood Gas Analyzer	1	1							
Phototherapy Unit	2	2							
Resuscitation Set	2	2							
Mobile X-ray machine	1	1							
Bilirubin Meter	1		1						
Operation Rooms / General Surgery									
Operating Microscope for Ophthalmology	1	1							
Operating Table	1	1							
C-arm X-ray Machine	1	1							
Instruments Set for Mastoidectomy	2		2						
Instruments Set for Circumcision	2		2						
Instruments Set for Pediatrics	2		2						
Instruments Set for Orthopedic	2		2						
Instruments Set for Thyroidectomy	2		2						
Instruments Set for Hemorrhoidectomy	2		2						
Instruments Set for Cholo-cystectomy	2		2						
Instruments Set for Craniotomy	2		2						
Instruments Set for Ophthalmology	2		2						
ICU									
Ventilator	1	1							
Electrocardiograph	1	1							
Endoscopy									
Video Endoscope Set (Upper & Lower)	1			1					
Blood Bank									
Blood Bank Refrigerator	1	1							

4) Specifications of Planned Equipment

Table 2.4 shows the specifications of the main equipment that is planned.

Table 2.4 Specifications of Major Equipment, 1/2

No.	Equipment	Q'ty	Components / Major Specifications	Purpose of Use
1	Fluoroscopic X-ray Machine	2	System: Remote control, with local controller Generator: Inverter, Min. 50kW Radiography: Tube Voltage: 40-150kV Fluoroscopy: Tube Voltage: 50-110kV Program Function: Provided Components: TV monitor	Used especially for fluoroscopy and radiography of the digestive system.
2	General X-ray Machine	5	Generator: Output: Min. 32kW, 500mA X-ray Tube: Anode Heat Storage: Min. 200 kHU X-ray Tube Support: Floor Loading Components: Bucky Table and Bucky Stand	Used for observing orthopedic as well as head, breast and abdomen. Equivalent grade to the present one.
3	Mobile X-ray Machine	4	Generator: Type: Inverter, cordless Tube Voltage: 40-125kV X-ray Tube Anode Heat Capacity: Min. 140kHU Driving Unit: Motor-driven, Battery Powered	Used for inpatients, equivalent grade to the present one.
4	Ultrasound Apparatus, Color Doppler	1	Mode: B, M, B/M Doppler Monitor: color, more than 12" Probe: 3 probes provided	Used for imaging diagnosis of disease morphology and tissue conditions by sending ultrasound to the patient's body and analyzing the transmitted or reflected waves.
5	Ventilator for Adult	7	Ventilation Mode: CMV, ASSIST, SIMV, FLOW, etc. Ventilation Rate: CMV; Approx. 5-40 breaths/min. IMV; Approx. 1-40 breaths/min.	Used to take over respiration in a patient who lacks or has lost the ability to breathe after a surgical operation, etc.
6	Ventilator for Neonate	10	Ventilation Mode: CMV, ASSIST, SIGH, etc. Ventilation Rate: 6-40 BPM I/e ratio: Approx. 1:1-1:99 O2 Concentration: 21-100% High Pressure Limit: Min. 10-70cmH2O	Used for assist-control ventilation of a newborn patient with spontaneous respiration.

Table 2.4 Specifications of Major Equipment, 2/2

No.	Equipment	Q'ty	Components / Major Specifications	Purpose of Use
7	Anesthesia Apparatus	2	Gas Application: Air, N2O, O2 for adult and pediatrics Vaporizer: Halothane and Isoflurane Safety Mechanism: Low-oxygen, etc. Tidal volume: Approx. 20–1,400ml/min Mode for respiration: SIMV, CMV, PEEP, CPAP, etc. Components: Humidifier	For carrying out surgical operations safely without pains to patients. A ventilator carry out ventilation for patients who can't do spontaneous breathing.
8	Central Patient Monitoring System	2	Central Monitor: Connected Bedside Monitor: 8-10 units Measuring Parameter: ECG, Respiration, BP, HR, SpO2, etc. Bedside Monitor: Display Size: Min. 10 inch	Used for monitoring vital signs of patients.
9	Cardio Tocograph (CTG)	3	Fetal Heart Rate Measurement: Method: Pulse Doppler HR Connecting Range: Min. 50-210 bpm Input Mode: 2-ch for twins Display: Digital Uterine Contraction Measurement: Tocotransducer provided Components: with Recorder	Monitoring the pregnant woman during the labor and delivery.
10	Bronchoscope	1	Type: Flexible Endoscope, Side Hole Type Components: Light Source, Suction Pump, TV Monitor, Cart / Rack for Main Components	Used for diagnosing conditions of upper and lower gastrointestinal through the endoscope.
11	Video Endoscope (Upper & Lower)	2	Type: Flexible Endoscope, Video Type Application: Lower and Upper Gastrointestinal Components: Light Source, TV Monitor, Cart / Rack for Components	Used for diagnosing conditions of bronchial tube through the endoscope.
12	Laparoscope Set	3	Components: 2 kinds of Telescope, Light source, Camera Control Unit / Head, TV Monitor, Cart for Components, etc.	Rigid endoscope is used for surgical operations without celiotomy incision, especially for gynecological fields.

2-2-3 Implementation Plan

2-2-3-1 Implementation Policy

(1) Standard Implementing Procedure of the Grant Aid Project

Based on this report, related governmental agencies of Japan reviews the contents of this proposed Project, and, following the approval of the Japanese Cabinet, the Exchange of Note (E/N) will be officially conducted by and between the governments of Japan and Jordan under the framework of the Grant Aid system of the Japanese government. In accordance with the E/N, the consultant and the equipment supplier of this Project will conclude agreement / contract with the government of Jordan, then the Grant Aid Project will be implemented. The above-mentioned agreement / contract are to be approved by the Japanese government.

(2) Project Implementation System

This project will be implemented under the supervision of the MOH. The Directorate of Planning and Project Management of the MOH will be the party to the Design/Supervision Contract, Equipment Procurement Contract, Banking Arrangement (B/A), and other such agreements to be concluded for this Project. The Directorate of Bio-medical Engineering will be in charge of arranging discussions and coordinating technical details and other matters concerning the specific contents of the Project.

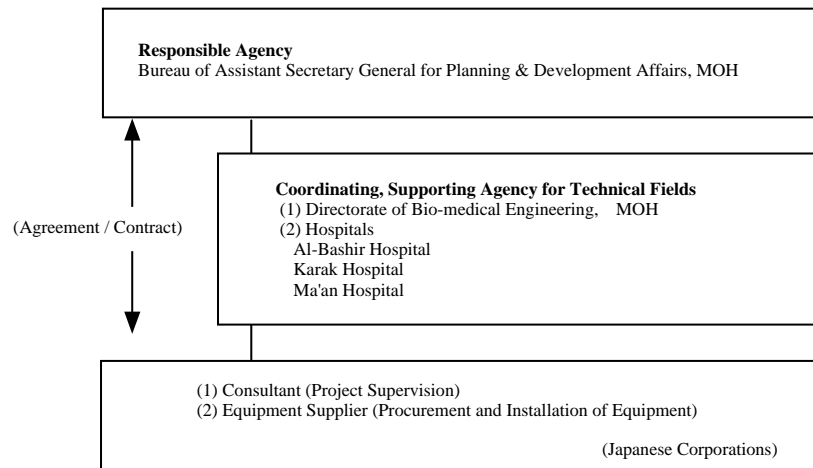


Figure 2.1 Project Implementing System

(3) Consultant

Following the signing of the E/N, the MOH shall conclude a consultancy agreement with the Japanese consultant firm, with regard to the Detail Design (including tender-related works) and the Supervision of the procurement / installation. Said agreement is subject to verify of the Japanese government. For the smooth implementation of the Project, it is important to conclude the agreement immediately after the signing of the E/N. Upon conclusion of the agreement and Japanese government verifies the said agreement, the consultant will immediately start services based on this Basic Design Study Report with the MOH and related authorities concerned, then, prepare tender documents, obtain the approval, conduct the public tender, and supervise the procurement / installation works following to the scope of works under the tender conditions.

(4) Equipment Supplier

The equipment supplier to procure and install the equipment for the Project shall be selected through public tender. As a rule for the tender, the bidder offering the lowest price as well as technical consistencies shall be successful bidder. The MOH will then conclude the supply contract with the successful bidder of the equipment and obtain the verification of the Japanese government. The

equipment supplier shall complete required works within the period specified in the contract, and handover the equipment to the MOH after conducting final inspection at the each hospital.

2-2-3-2 Implementation Conditions

In implementing the Project, special attention should be paid to the following points:

(1) To minimize the Interruption of Clinical Services during Installation Period

Because the hospitals covered by the Project need to continue their routine clinical services during the installation period, the period in which the services are interrupted must be minimized. In order to minimize the interruption, the procurement process of the equipment should be strictly supervised, and the installation and inspection schedule should be formulated through discussion in advance and strictly observed with those related to the respective hospitals. In addition, certain measures should be taken to ensure the safety of patients and medical staff at each hospital.

(2) Inland Transportation Routes in Jordan

Although the respective hospitals are located across the southern part of Jordan, the equipment will undergo customs clearance at Aqabah Port and then unloaded, where the equipment transported to the respective hospitals by container truck.

2-2-3-3 Scope of Works

The Project will be implemented under the cooperation of the governments of Jordan and Japan. The works to be borne by both parties are as follows.

(1) Works to be carried out by the Government of Japan

- execute the procurement of the equipment on the Project,
- transport the equipment to the respective hospitals, which includes marine and inland transportation in Jordan,
- install and set up the equipment, and
- perform the test run, give instructions / training for operation and maintenance and do final inspection for all equipment.

(2) Works to be carried out by the Government of Jordan

- present data, documents, and other information necessary for the installation and set up of the equipment,
- remove old equipment and prepare the rooms to which the new equipment is to be installed,
- prepare facility infrastructures, such as electricity, water supply / drainage, in the sites where the

new equipment will be installed,

- provide places to unload the equipment,
- temporary storage spaces for the equipment until the installation, and
- secure delivery routes for the equipment.

2-2-3-4 Consultant Supervision

Based on the Japanese Grant Aid scheme, the Japanese consultant shall conclude the consultancy agreement with the MOH, according to which the consultant will render Detailed Design (including tender-related works) and perform procurement supervisory services. The purpose of consultant supervision is to make certain that the equipment supplier selected through public tender is properly carrying out its assigned obligations according to the contract concluded with the MOH and to give guidance and make necessary adjustments from an objective viewpoint to ensure proper execution. The supervisory work consists of the following services.

(1) Assistance with Tender Procedure and Contracting

To select a Japanese trading company to take charge of the equipment procurement / installation, the consultant will prepare tender documents, announce the tender publicly, distribute the tender documents to bidders, accept and evaluate tenders offered, and give advice with regard to the contract to be concluded between the MOH and the selected supplier.

(2) Instructions, Advice, and Coordination for the Supplier

The consultant will examine the procurement / installation plan and give instructions and advice to the supplier to make certain adjustments if necessary.

(3) Inspection and Approval of Related Documents

The consultant will examine the equipment procurement / installation schedule and its management structure by staff concerned, technical documents related to the equipment, and other necessary documents to be submitted from the supplier, give advice as necessary, and approve the documents.

(4) Report on the Progress of the Work

The consultant will monitor the progress of actual work against the proposed plan, and report to the related parties in Japan and Jordan.

(5) Inspection and Testing upon Completion

Upon completion of the work, the consultant will attend the on site inspection and test-run of

the equipment in order to confirm that the equipment is consistent with provisions of the contract. Final inspection report will be submitted to authorities concerned on the Jordanian side.

(6) Training in Operation and Maintenance of the Equipment

Equipment to be procured in the Project requires basic maintenance and operation skills. It will be necessary to train the clinical staff and maintenance staff in operation and troubleshooting of the equipment during the period of installation, adjustment, and test running. The consultant will give the necessary instructions of the training program implemented by the equipment supplier.

In providing the above-mentioned services, the consultant will organize a team of three (3) engineers consisting of a chief engineer and two (2) equipment planners to supervise procurement works in Japan and Jordan.

2-2-3-5 Procurement Plan

In procuring the equipment for the Project, the following points should be noted:

(1) Guidelines for Origin of the Equipment

The equipment for this Project will be procured from Japan, as well as certain third countries. As third-country products Electrocardiographs, Patient Monitors, Cardiotocographs, Electrosurgical Units, and Anesthesia Apparatus will be considered for the sustainable operation and maintenance of the equipment at target hospitals as well as faire competition on the public tender.

(2) Transportation Period

It is estimated to take a total of about 35 to 40 days to transport the equipment. It will take 20 to 25 days to transport the items to be procured from Japan and third countries, and additional 10 days or so for customs clearance procedure and inland transportation.

2-2-3-6 Implementation Schedule

After the signing of the E/N by both governments, the Project will be implemented in the following two (2) stages; tender and tender-related works and procurement and installation of the equipment.

(1) Tender and Tender-related Works

After signing of the consultancy agreement between the MOH and the consultant, and after verification of the said agreement by the government of Japan, the preparation of tender and tender-related works will start. Tender and tender-related works include final confirmation of the

technical specifications of the equipment and preparation of the instruction to tenderer(s). This set of documents needs to be approved by the Jordanian side. Then, the consultant will announce applicants, hold the tender, evaluate the submitted documents from applicants, nominate the winner and help to conclude the supply contract between the MOH and the supplier. This stage takes about four (4) months.

(2) Procurement and Installation of Equipment

After the Japanese government verifies the supply contract between the MOH and the equipment supplier, the supplier starts procuring the equipment in compliance with the contract documents. The works related to the equipment procurement, transportation and installation in the respective hospitals takes about eight (8) months.

Based on the above, the work process after the signing of the E/N is outlined in Figure 2.2 below:

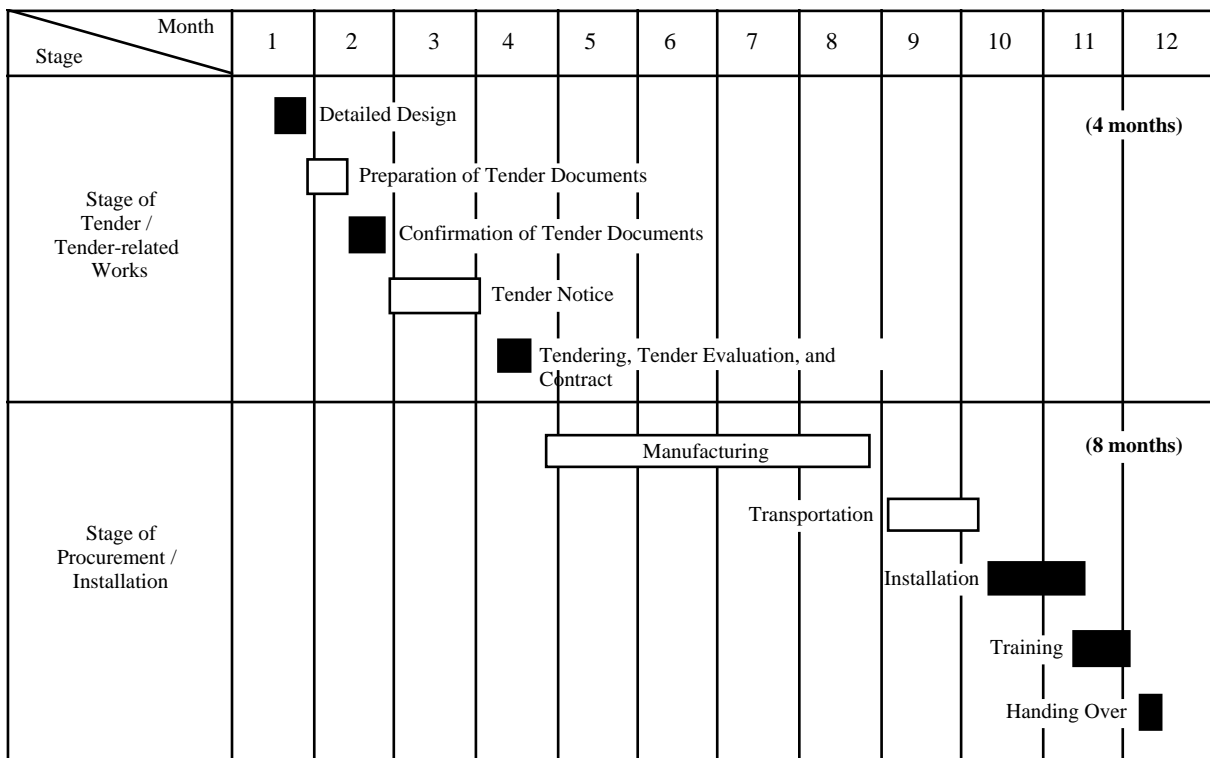


Figure 2.2 Project Implementation Schedule

2-3 Obligations of the Government of Jordan

General obligations of the government of Jordan in relation to the implementation of the Project are as follows:

- to provide the necessary information and data for the Project,
- to provide support for the supplier, such as prompt customs clearance of the equipment under the Project at ports of disembarkation in Jordan,
- to exempt Japanese nationals who are staying in Jordan for providing services in connection to the implementation of the Project, from customs duties, internal taxes and fiscal levies which may be imposed in Jordan,
- to accord necessary security and protection to Japanese nationals entering or staying in Jordan for the purpose of providing services and to their equipment brought in for the implementation of the Project,
- to conduct the Banking Arrangement (B/A), and to pay commissions associated with the issuance of the Authorization to Pay (A/P),
- to allocate the personnel / budget required for the effective implementation of this Project (including operation and maintenance costs of equipment procured using Grant Aid),
- to bear all other expenses except covered by Japan, associated with the implementation of the Project.

2-4 Project Operation Plan

The executive body responsible for this Project and matters to be included in the cooperation is the Bureau of Assistant Secretary General for Planning & Development Affairs of the MOH. The Bureau consists of three directorates: the Directorate of Planning & Project Management, the Directorate of Human Resources Development, and the Directorate of Information, Studies & Research. The actual contact organization for the Project will be the Directorate of Planning & Project Management, which is in charge of coordination and support between donor organizations and countries relating to the field of health care.

Since the Project involves assistance for the procurement of medical equipment, technical support is to be provided by the Directorate of Bio-medical Engineering, which comes under the Bureau of Services and is in charge of the procurement, maintenance and management of medical equipment.

Although the three target hospitals come under the organization of the MOH and are ranked under the Bureau of Hospitals & Specialized Centers, the final confirmation and coordination of equipment plans and specifications will be the responsibility of the Directorate of Bio-medical Engineering.

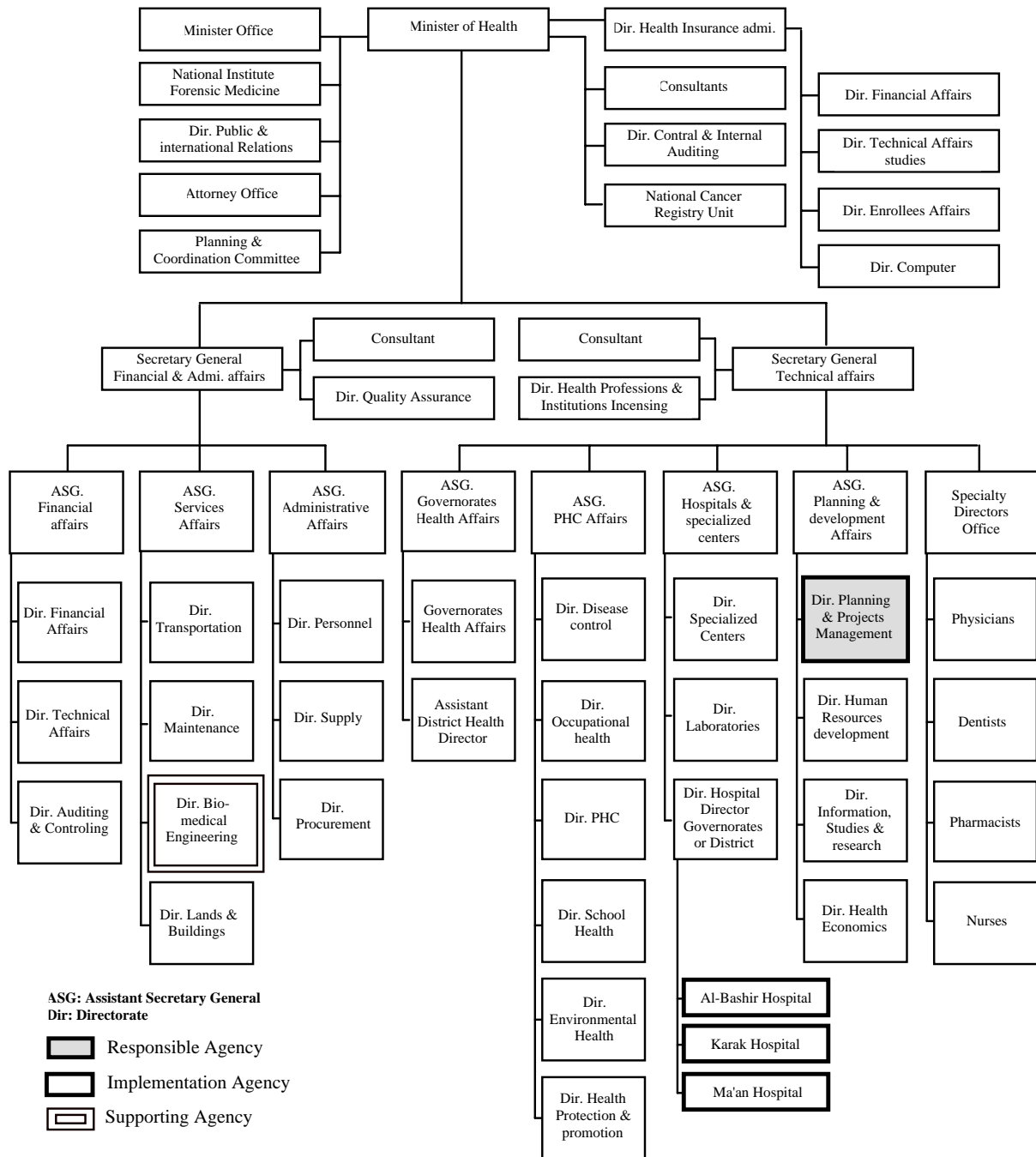


Figure 2.3 Organization Chart of the MOH, and related Directorates as well as three Hospitals

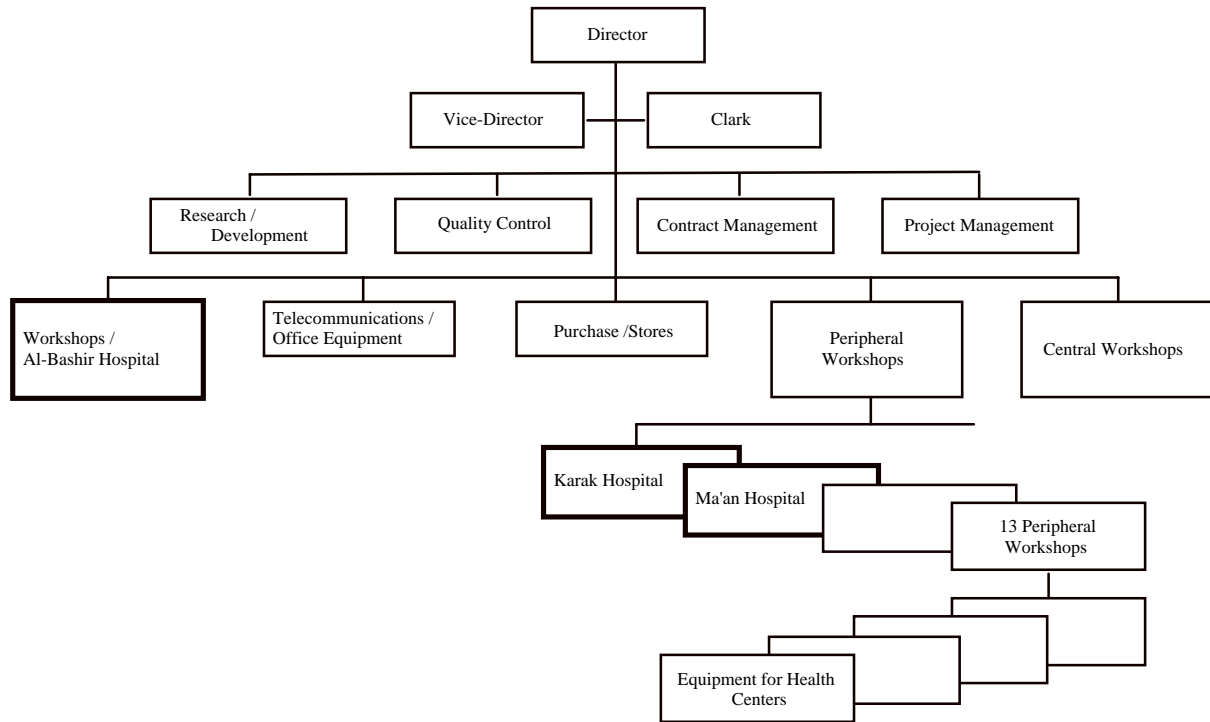


Figure 2.4 Organization Chart of the Directorate of Bio-medical Engineering and Structure of the Equipment Maintenance

2-5 Cost Estimation of the Project

2-5-1 Cost Estimation of the Project

The cost estimation of the Project is calculated as following table. The estimated cost of the Japanese assistance (Table 2.5) is provisional and would be further examined by the Government of Japan for the ceiling amount shown on the E/N.

Table 2.5 Estimated Cost of the Japanese Assistance

Total Estimated Cost: Approx. 523.92 Million Yen

Name of Hospital	Department	Estimated Costs (Million Yen)	
(1) Al-Bashir Hospital	Imaging Department (X-ray & Ultrasound)	57.72	300.87
	Operating Theatre, ICU	203.29	
	Other Departments	39.86	
(2) Karak Hospital	Imaging Department (X-ray & Ultrasound)	7.46	66.07
	Operating Theatre, ICU	52.85	
	Other Departments	5.76	
(3) Ma'an Hospital	Imaging Department (X-ray & Ultrasound)	42.97	136.43
	Operating Theatre, ICU	52.22	
	Other Departments	41.24	
Consultants' Supervision (Detailed Design, Supervision for Procurement & Installation)			20.55

Condition of the Estimation

Date of estimation	:	December 2005
Currency exchange rate	:	1US\$=114.26 Japanese Yen, 1Euro= 137.58 Japanese Yen, 1JD=154.67 Japanese Yen
Duration of Project Implementation	:	Approx. 12 months
Other	:	This Japanese assistance will be implemented according to the Japanese Grant Aid System.

2-5-2 Financial Feasibility on the Target Hospitals

(1) Operating and Maintenance Costs in the Ministry of Health Expenditures

Table 2.6 shows changes in the MOH expenditures over the three years from 2002. In 2004, 153 million JD was appropriated, accounting for about 6% of the national budget. If we look at the breakdown, about 60% or about 100 million JD was allocated to hospital medical services (Secondary and Tertiary Medical Care Services), while about 30% or 45 million JD was allocated to Primary Health Care Services.

Table 2.6 Records of Expenditures of the MOH (Unit: JD)

Category	Year of 2002	Year of 2003	Year of 2004
National Budget	2,413,000,000	2,511,000,000	2,670,000,000
Recurrent Expenditures	114,885,000	122,498,800	136,406,468
Capital Expenditures	16,774,000	22,081,400	16,966,899
Socio-economic Development Program	0	2,800,000	0
Total	131,659,000	144,580,200	153,427,367
MOH Budget / National Budget (%)	5.45%	5.75%	5.75%

Source: Directorate of Planning & Project Management, Ministry of Health

Table 2.7 shows a breakdown of the hospital medical service cost (Secondary and Tertiary Medical Care Services) in the MOH expenditures. Expenses can be divided into recurrent expenditures and capital expenditures; Personnel Expenses account for about 50% of the total and Operational Costs, including medical supplies, covering drugs and consumables, account for about 35%. Medical equipment operating costs mostly cover service contracts with the Royal Medical Service (RSS) and the agents of medical equipment manufacturers, purchase of spare parts, and purchase of consumables, which are essential in the operation of the equipment (see Table 2.8). Basically, spending at medical institutions under the MOH is not managed by institution but by expenditure category.

Table 2.7 Breakdown of Cost of Hospital Medical Care in the MOH Budget (Unit: JD)

Category	Year of 2002	Year of 2003	Year of 2004
Recurrent Expenditures			
100 Human Resources	42,651,107	44,087,503	51,419,746
200 Operational costs*	28,808,464	32,773,171	37,802,391
300 Transfer (social security, medicare, etc.)	4,948,048	3,333,887	3,386,869
Total Recurrent Expenditures	76,407,619	82,194,561	92,609,006
Capital Expenditures			
503 Consumables & Spare Parts	3,387,177	3,693,088	4,367,471
504 Studies & research	92,976	111,944	24,140
505 Medical & non-medical equipment	1,109,427	740,067	1,026,868
506 Vehicles, ambulances	247,294	49,225	182,080
507 Lands & buildings	54,000	0	11,800
508 Construction	1,578,073	1,575,007	1,380,223
510 Facility maintenance	2,619,058	2,497,405	2,612,851
511 Furniture (medical & non-medical)	1,930,634	3,531,638	515,956
512 Miscellaneous	3,794,255	3,877,246	3,837,314
Total Capital Expenditures	14,812,894	16,075,647	13,958,703
Grand Total	91,220,513	98,270,208	106,567,709

Source: Directorate of Planning and Project Management, Ministry of Health

Table 2.8 Breakdown of Running Cost of Equipment in the MOH Budget (Unit: JD)

Category	Year of 2002	Year of 2003	Year of 2004
Contract with RSS	855,600	919,488	1,161,402
Contract with Private Companies (related with X-ray Equipment)	700,000	831,711	785,082
Procurement of Spare Parts	459,000	442,587	354,958
Related with X-ray Equipment	288,790	199,475	195,133
Others, for General Equipment	170,210	243,112	159,825
Procurement of Consumables	2,810,640	3,162,308	3,913,768

Source: Directorate of Planning and Project Management, Ministry of Health

(2) Pertinence of Maintenance and Management Budget Allocation in Relation to the Planned Equipment

The maintenance of procured equipment shall be conducted, as it has been, by the RSS engineers as well as contractors (local agents of medical equipment manufacturers) under contract.

Table 2.9 lists the purchase costs for consumables required for the operation of equipment to be procured under this Project, which are estimated to mark a net increase of 32,264 JD (about five million yen) for the three hospitals. However, we conclude that the increased costs due to this Project can be met because: none of the equipment requires a new servicing contract with contractors; the purchase costs for spare parts are likely to decrease because the existing superannuated equipment will be renewed and improved; the MOH has committed to budget allocation for the increased purchase cost for consumables, which is expected to mark a growth of 0.81% (over the actual cost of 2004) (see the minutes of discussions attached to as Appendices); and the increased cost that needs to be met is likely to come under the increase limit seen in the actual spending that grew in succession in the past (the rates of increase in 2003 and 2004 over the previous fiscal years are 12.5% and 23.7%, respectively).

Table 2.9 Consumable Procurement Costs related to the Operation of Equipment to be Supplemented / Newly Introduced (Unit: JD)

Hospital/Equipment	Q'ty		Contents	Price	
	Suppl.	New / Int.		Unit	Total
Al-Bashir Hospital					
Ultrasound for Intraoperative		1	Jelly, recording paper	706	706
Resectoscope		1	Light source	320	320
Arthroscope		1	Light source	320	320
Syringe Pump		2	Syringe, infusion set	513	1,026
Suction Unit	2		-	-	-
Operating Microscope	1		Light source	385	385
Ultrasound Surgical Unit	1		-	-	0
Infusion Pump	6		Infusion set	513	3,078
Patient Monitor	7		Electrodes, recording paper, lead wire, etc.	770	5,390
Bilirubin Meter	2		Battery	19	38
Total					11,263
Karak Hospital					
Colposcope		1	Light source	320	320
Hysteroscope		1	Light source	320	320
Bronchoscope		1	Light source	320	320
Patient Monitor	1		Electrodes, recording paper, lead wire, etc.	770	770
Ventilator	1		Filter, humidication chamber, circuits, etc.	1,925	1,925
Blood Gas Analyzer	1		Reagents, recording paper, gases, etc.	7,060	7,060
Total					10,715
Ma'an Hospital					
Hysteroscope		1	Light source	320	320
Endoscopes		1	Light source	320	320
Hemodialysis Unit	1		Dialyzer	9,627	9,627
Bilirubin Meter	1		Battery	19	19
Surgical Instruments Ste	2		-	-	-
Total					10,286
Grand Total (3 Hospitals)					32,264

Table 2.10 Ratio of Increase in Medical Equipment Operating Costs (Year of 2007) in comparison with the Actual Spending in Year of 2004

Items	Records of 2004 / (1)	Estimated Cost / (2) (for Year of 2007)	Increasing Ratio (2) / (1)
(1) Contract Fees	1,946,484 *1)		
- RSS	1,161,402	Same as 2004	0%
- Private Companies	785,082	Same as 2004	0%
(2) Procurement of Spare Pars	354,958 *1)		
- X-ray Equipment	159,825	Assumed decreasing *2)	Less than 0%
- Other, General Equipment	195,133		
(3) Procurement of Consumables	3,913,768 *1)	(Total: 32,264 for 3 hospitals) 3,913,768 + 32,264 *3)	0.81 % (for Total)

*1) : Source from Table 2.8

*2) : for 3 hospitals

*3) : Source from Table 2.8 and 2.9

Chapter 3 Project Evaluation and Recommendations

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effect

The implementation of this Project will benefit a total of about 2.35 million people, about two million residents in the metropolitan area of Amman and about 350 thousand residents in the two governorates of Karak and Ma'an in the southern part of Jordan. Improving the basic medical equipment related to the major departments of Al-Bashir Hospital in charge of the tertiary medical service of Jordan and Karak and Ma'an Hospitals (both secondary level), central hospitals in the southern region is expected to have the following effects:

Table 3.1 Expected Benefit from the Project

Status quo and problems	Solution provided in the Project (cooperation project)	Effects and degree of improvements
(Direct effects)		
None of the three target hospitals have sufficient basic equipment to be used in the major departments and can properly meet the needs of patients for medical services.	Improvement of equipment related to diagnostic imaging (X-ray and ultrasound machines)	(1) Improving the accuracy of diagnosis and enabling the supply of appropriate and efficient services to patients will shorten the time for waiting for X-ray imaging and diagnosis, which is currently two to three days (Al-Bashir Hospital). (2) Improving the accuracy of diagnosis, enabling the supply of appropriate and efficient services to patients, and expanding the scope of treatment and medical care that can be supplied at the institutions will increase the number of patients who can receive X-ray imaging and diagnosis (currently 36,165 at Karak and 27,075 at Ma'an).
	Improvement of equipment related to operating rooms	(3) Contributing to making operations safer and improving the efficiency of surgical operations and manipulations will shorten the waiting time for operations, which is currently five to seven days. (4) Contributing to making operations safer, improving the efficiency of surgical operations and manipulations, and expanding the scope of treatment and medical care at the target institutions will increase the number of operations (currently 2,452 at Karak and 1,068 at Ma'an).
(Indirect effects)		
The reliability of the hospitals for the local residents is damaged because, e.g., hands-on training for medical workers cannot be conducted appropriately or the medical referral system is not working appropriately.	Improvement of equipment related to diagnostic imaging (X-ray and ultrasound machines), surgical operations, intensive care units (ICUs), and obstetrics and gynecology department	(1) Recovering the functionality that the three target hospitals are supposed to have will allow them to fulfill their duties as secondary and tertiary hospitals such as providing appropriate medical services to introduced patients and better technical guidance to other health care institutions.
		(2) Achieving the qualitative and quantitative improvement of services for patients and their families at the three target hospitals will improve the reliability of these hospitals for local residents in the entire community.
		(3) Improving the three target hospitals, being major medical institutions in Jordan, will enhance the medical service system of the entire country.

3-2 Recommendations

For smoother and more effective improvement of the functionality of the target medical institutions, the following issues and proposals must be earnestly dealt with.

(1) Securing Procurement Budgets for Appropriate Renewal and Improvement of Medical Equipment

The MOH is thinking of evaluating at present values the medical equipment procured and installed at the medical institutions (hospitals and health centers) under its jurisdiction as tangible fixed assets and thus implementing renewal and improvement of the equipment by applying the concept of depreciation to it. As of 2005, the total present value is estimated to be about 82 million JD (about 13 billion yen). Using the depreciation rates specified for different models of medical equipment (an average of about 10% per year), the annual depreciation amount for present values is estimated to be about 8.2 million JD (about 1.3 billion yen).

Looking at the actual purchase of the new medical equipment over three years from 2002 to 2004, however, the spending was only 900 thousand to 1.2 million JD (about 142 million to 197 million yen) every year. These amounts are equivalent to only 10.9% to 15.1% of the annual depreciation amount of present values estimated earlier. This status quo, although hinting at a difficult financial situation, can be understood as a necessity that calls for an increase of budgets to be spent on the purchase of new equipment, with which we hope that the Jordanian government will tactfully deal.

(2) Diversification of Medical Equipment Procurement System

The Jordanian government procures and installs medical equipment with emphasis on financial efficiency by classifying equipment to be procured, selecting suppliers through tendering, and having them deliver the equipment to the medical institutions. Such a procurement system is accompanied by difficulties in purchasing one or two inexpensive machines or meeting individual needs of each institution and tends to create and prevent elimination of an imbalance in an institution, i.e., a situation in which some departments have expensive equipment while others have mostly superannuated equipment.

Although the apprehension that financial efficiency may be impaired is understandable, we propose that the Jordanian government should supplement the current system by adopting also a procurement system and budget means for procuring one or two inexpensive machines or meeting individual needs of each institution.

(3) Consciousness-Raising for Operations of Institutions

For all the medical institutions under the jurisdiction of the MOH, the ministry controls the purchase of all the articles for each expense item (category). Such a system of budget control seems efficient. If, however, the Ministry of Health adopts a policy of reducing the operating expenses of the institutions under its control, it would have difficulty in offering incentives for improving the efficiency and productivity to each medical institution (medical care provider) because the system lacks flexibility

in operation of the institution and applications of budgets. Rather, there is even a possibility that a medical care provider may derive an undesirable incentive to encourage spending of the budget of the MOH up to its upper limit (by demanding articles).

Although some moves have been observed to transfer some of discretion in operations to each hospital, we recommend promoting flexible transfer of some of powers concerning operations in view of collaboration between the MOH and each medical institution in a way that does not impair the awareness-raising for added value productivity in medical services.

Appendices

1. Member List of Study Team
2. Study Schedule
3. List of Parties Concerned in Jordan
4. Minute of Discussions

Appendix 1 Member List of the Study Team

Basic Design Study

Ako Muto	Leader	Health Team, Management Group II, Grant Aid Management Dept., JICA
Toshio Shimizu	Technical Advisor	Vice Director, International Medical Center of Japan, Ministry of Health, Labour and Welfare
Tamotsu Nozaki	Chief Consultant / Hospital Operation Planner	Fujita Planning Co., Ltd.
Akio Kaneko	Equipment Planner	Fujita Planning Co., Ltd.
Ryoji Yamaguchi	Facility Planner	Fujita Planning Co., Ltd.
Shuichi Suzuki	Cost & Procurement Planner	Fujita Planning Co., Ltd.

Explanation of Draft Basic Design

Naoyuki Ochiai	Leader	Deputy Resident Representative, JICA Jordan Office
Tamotsu Nozaki	Chief Consultant / Hospital Operation Planner	Fujita Planning Co., Ltd.
Akio Kaneko	Medical Equipment	Fujita Planning Co., Ltd.

Appendix 2 Study Schedule

Basic Design Study

No.	Date	Schedule	Stay
1	Aug. 20 (S)	Lv. Haneda Kanku (Consultant members)	
2	Aug. 21 (S)	Lv. Haneda Kanku (Official members) Av. Amman via Dubai (Consultant members) Meeting with JICA, MOH	Amman
3	Aug. 22 (M)	Av. Amman via Dubai (Official members) Meeting with MOPIC, MOH, Embassy of Japan (Official members) Meeting with Al-Bashir Hospital (Consultant members) Meeting with JICA (All members)	Amman
4	Aug. 23 (T)	Meeting with Al-Bashir Hospital, and USAID	Amman
5	Aug. 24 (W)	Lv. Amman Karak, Meeting with Karak Hospital (All members)	Karak
6	Aug. 25 (T)	Meeting with Karak Hospital, Lv. Karak Wadi Musa	Wadi Musa
7	Aug. 26 (F)	Documentation	Wadi Musa
8	Aug 27 (S)	Lv. Wadi Musa Ma'an, Meeting with Ma'an Hospital Lv. Ma'an Amman (Official members, Nozaki) Lv. Haneda Kanku (Suzuki)	Wadi Musa Amman
9	Aug. 28 (S)	Meeting with Al-Bashir Hospital (Shimizu, Nozaki,) Meeting with MOH (Muto, Shimizu, Nozaki) Meeting with Ma'an Hospital (Kaneko, Yamaguchi), Lv. Ma'an Amman Av. Amman via Dubai (Suzuki), Meeting with MOH	Amman Wadi Musa
10	Aug. 29 (M)	Meeting with MOH (Consultant members) Meeting with MOH for Minutes of Discussions (M/D) Lv. Amman Dubai (Shimizu)	Amman
11	Aug. 30 (T)	Signing on Minutes of Discussions (M/D) Report to Embassy of Japan (Muto, Nozaki) Meeting with Karak Hospital (Kaneko, Yamaguchi) Lv. Amman Dubai (Muto), Av. Haneda via Kanku (Shimizu)	Amman
12	Aug. 31 (W)	Meeting with Karak Hospital (Nozaki, Yamaguchi), Al-Bashir Hospital (Kaneko) Agents survey (Suzuki), Av. Haneda via Kanku (Muto)	Amman
13	Sep. 1 (T)	Documentation	Amman
14	Sep. 2 (F)	Documentation	Amman
15	Sep 3 (S)	Meeting with Ma'an Hospital (Nozaki, Kaneko, Yamaguchi) Agents survey (Suzuki)	Amman Wadi Musa
16	Sep. 4 (S)	Meeting with MOH (Nozaki, Kaneko), Meeting with Ma'an Hospital (Yamaguchi) Agents survey (Suzuki)	Amman
17	Sep. 5 (M)	Meeting with MOH (Nozaki) Meeting with MOH; Bio-medical Engineering (Kaneko) Meeting with Al-Bashir Hospital (Yamaguchi), Agents survey (Suzuki)	Amman
18	Sep. 6 (T)	Meeting with MOH (Nozaki, Kaneko) Agent survey (Suzuki, Yamaguchi)	Amman
19	Sep. 7 (W)	Meeting with WHO & MOH (Nozaki, Kaneko) Al-Bashir Hospital (Yamaguchi), Agent survey (Suzuki)	Amman
20	Sep. 8 (T)	Meeting with MOH (Nozaki, Kaneko), Ma'an Hospital (Yamaguchi) Agents survey (Suzuki) Report to Embassy of Japan in Jordan, JICA Office (Nozaki, Kaneko)	Amman
21	Sep. 9 (F)	Documentation	Amman
22	Sep. 10 (S)	Agents survey (Suzuki), RMS & Private Hospitals (Nozaki, Kaneko, Yamaguchi)	Amman
23	Sep. 11 (S)	Lv. : Amman Dubai Kanku	
24	Sep. 12 (M)	Av. : Kanku Haneda	

Explanation of Draft Basic Design

No.	Date	Schedule	Stay
1	Nov. 21 (M)	Lv. Haneda Kanku	
2	Nov. 22 (T)	Av. Amman via Dubai, Meeting with JICA	Amman
3	Nov. 23 (W)	Meeting with Embassy of Japan and MOPIC Meeting with MOH explanation of Draft Basic Design	Amman
4	Nov. 24 (T)	Meeting with MOH explanation of Draft Basic Design	Amman
5	Nov. 25 (F)	Documentation	Amman
6	Nov. 26 (S)	Documentation	Amman
7	Nov. 27 (S)	Meeting with Al-Bashir Hospital	Amman
8	Nov. 28 (M)	Meeting with MOH ; Technical Specifications of Equipment Meeting with MOH; Discussion for Draft Minutes of Discussions (M/D)	Amman
9	Nov. 29 (T)	Meeting with Al-Bashir Hospital; Technical Specifications of Equipment Meeting with MOH; Technical Specifications of Equipment	Amman
10	Nov. 30 (W)	Meeting with MOH Signing on M/D	Amman
11	Dec. 1 (T)	Report to Embassy of Japan, JICA Lv. Amman Dubai	
12	Dec. 2 (F)	Av. Haneda via Kanku	

Appendix 3 List of Parties Concerned in Jordan

(1) Ministry of Health

Dr. Sa'ad Kharabsheh	Secretary General, Technical Affairs
• Planning & Development Affairs	
Dr. Taher Hamdi Taufiq	Assistant Secretary General
Ms. Arch. Manal Anani	Director, Planning & Project Management
Dr. Kasem Al-Rabee	Assistant Director, Planning & Project Management
Dr. Nuha A. Ikhdare	Head, Operational Planning
Ms. Arch. Muna Issa	Head, Project Management
• Directorate of Bio-medical Engineering	
Mr. Iyad Malkawi	Director
Dr. Walid Tarawneh	Vice-Director
Mr. Naser Titi	Head, Studies & Projects Department
Dr. Ali H. Al-Shakalebch	Studies & Project Department

(2) Ministry of Planning & International Cooperation

Ms. Wafa Assakit	International Cooperation, Head of East Asia Department
Ms. Feda Jaradat	Health Sector Researcher, Project Department

(3) Al-Bashir Hospital

Dr. Defcelod Al-Lwzi	Director
Dr. Awni Hamid	Administrative Vice-Director
Dr. Mahamd Al-Zfour	Director, Nuclear Medicine Department
Dr. Heatham Hjazez	Director, Imaging Diagnosis (X-ray / Ultrasound)
Dr. Mazen Nusair	Director, Surgical Department
Dr. Mohammad Al-Masri	Specialist, Respiratory Apparatus
Dr. Mustapha Alfallah	Pediatrician
Dr. Karim Lulfi	Specialist, Gastroenterology
Dr. Briezat Abdel-Hadi	Surgeon
Dr. Firas Abu-Dalou	Head of Workshop Department
Mr. Mohamad Agll	Workshop Engineer
Mr. Shaker Al-Ace Bay Ba	Workshop Engineer
Mr. Hamdallah H. A. Haj Ibrahim	Workshop Engineer
Mr. Asad Al-Bahar	Workshop Engineer

(4) Karak Hospital

Dr. Tarawneh Sultan	Director
Mr. Saryereh Naser	Administrative Vice-Director
Dr. Yousef Sarayreh	Gynecologist
Dr. Sayel Al-Khitan	Urologist
Dr. Hani M. D Sugilir	Specialist for ENT
Ms. Mahdieh Akkan	Head, Nursing Department
Mr. Hani Jawabreh	Workshop Engineer
Ms. Ohoud Lmoon	Workshop Engineer

(5) Ma'an Hospital

Dr. Tagseer Kreshan	Director
Dr. Waleed Al. Rawad	Administrative Vice-Director
Mr. Mahmoud Al. Qaisis	Workshop Engineer

(6) USAID

Mr. David L. Piet	Consultant, Population and Family Planning
Dr. Sabry Hamza	Consultant, Head of HSS Project
Dr. Ayman	Consultant, Reproductive Health

(7) WHO

Dr. Ali Odattallah	Consultant
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(8) Embassy of Japan

Matahiro Yamaguchi	Councillor
Yateyuki Ikeda	First Secretary / Economic Section
Fumiko Nohara	Second Secretary

(9) Japan International Cooperation Agency (JICA) Jordan Office

Hideo Morikawa	Resident Representative
Naoyuki Ochiai	Deputy Resident Representative
Yoshimasa Takemura	Assistant Resident Representative

Appendix 4 Minutes of Discussions

〈Basic Design Study〉

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY ON THE PROJECT
FOR PROVISION OF MEDICAL EQUIPMENT FOR HOSPITALS OF MINISTRY OF
HEALTH IN HASHEMITE KINGDOM OF JORDAN

In response to a request from the Government of Hashemite Kingdom of Jordan (hereinafter referred to as "Jordan"), the Government of Japan decided to conduct a Basic Design Study on the Project for Provision of Medical Equipment for Hospitals of Ministry of Health (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Jordan the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Ms. Ako MUTO, Project Management Group II, Grant Aid Management Department, JICA, and is scheduled to stay in the country from August 21 to September 11, 2005.

The Team held discussions with the officials concerned of the Government of Jordan and conducted a field survey in the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Amman, August 30, 2005

武藤 亜子

Ms. Ako MUTO
Team Leader
Project Management Group II
Grant Aid Management Department
JICA
Japan



Dr. Sa'ad KHARABSHEH
Secretary General
Ministry of Health
Hashemite Kingdom of Jordan

ATTACHMENT

1 Objective of the Project

The objective of the Project is to assist improvement of medical services at Al-Basheer Hospital, Karak Hospital, and Ma'an Hospital through supplying standard medical equipment.

2 Project site

The Project sites are as follows;

Al-Basheer Hospital is located in Amman.

Karak Hospital is located in Karak Governorate.

Ma'an Hospital is located in Ma'an Governorate.

3 Responsible Agency and Implementing Agency

The responsible agency is Ministry of Health and the implementing agency is Al-Basheer Hospital, Karak Hospital, and Ma'an Hospital.

4 Items requested by the Government of Jordan

The Jordanian side proposed the equipment list as Annex-1, and requested that the Japanese Government looks into the special need for the following items from Annex-1;

1) Mass Chest

2) Gamma Camera

3) Bone Densitometer

This list was revised by the Team, taking into account of appropriateness under the Japan's Grant Aid Scheme as Annex-2. The Team explained that above mentioned 3 items are not appropriate for the Japan's Grant Aid Scheme. The Jordanian side preliminary accepted Annex-2.

JICA will assess further appropriateness of Annex-2 and will recommend to the Government of Japan for approval. However, the final components of the Project will be decided after further studies.

5 Japan's Grant Aid Scheme

5-1 The Jordanian side understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-3 and 4.

5-2 The Jordanian side will take the necessary measures, as described in Annex-5, for smooth implementation of the Project, as a condition for the Japan's Grant Aid to be implemented.

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6 Schedule of the Study

- 6-1 The consultants will proceed to further studies in Jordan until September 11, 2005. The Jordanian side promised to provide the answer of the questionnaire by September 4.
- 6-2 JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around November 2005.
- 6-3 JICA will complete the final report in accordance with confirmed items and send it to Jordan around January, 2006.

7 Other relevant issues

- 7-1 Based on the objective of the Project, the criteria to select the equipment were summarized in Annex-6.
- 7-2 The Team explained that the Technical Cooperation "Integrated Women's Health and Gender Project (tentative title)" has approved by the Government of Japan and that both Projects would be closely related for improving medical services in southern region of Jordan. The Jordanian side promised to take necessary measures for effective referral system between the two Projects.
- 7-3 The Ministry of Health confirmed the coordination among donors to avoid the duplication of the equipment.
- 7-4 Both sides agreed that equipment provided under the Project will not be shifted.
- 7-5 The Jordanian side agreed to allocate enough budgets to manage three hospitals, to operate the equipment supplied by the Project, and to cover the provision of spare parts, consumables, reagents, and periodical maintenance contract.
- 7-6 The Jordanian side agreed to secure infrastructure such as electricity, central piping and water supply and drainage etc.
- 7-7 The Team strongly emphasized the importance of accumulating necessary budget for renewal of the equipment and the Jordanian side shared the idea.
- 7-8 The Team encouraged the Ministry of Health to take necessary steps to enhance and comply with the environmental law regarding medical waste management.

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7-9 Both sides confirmed that the detailed specifications of the equipment and other technical information shall not be released before the tender to be held in the implementation stage of the Project.

Annex-1: Proposed Equipment list from the Government of Jordan

Annex-2: List of the Equipment preliminary accepted by both sides

Annex-3: Japan's Grant Aid Scheme

Annex-4: Flow Chart of Japan's Grant Aid Procedure

Annex-5: Major Undertakings to be taken by Each Government

Annex-6: Criteria to select the Equipment



Annex 1

List A: KARAK HOSPITAL NEEDS

No.	Description	Qty.	Unit Price (J.D)	Total Price (J.D)	Location	Notes
1	Adult scale with measuring rod	4	500	2,000	Artificial Kidney	
2	Adult ventilator	4	15,000	60,000	I.C.U	
3	Ambulance	1	40,000	40,000	I.C.U	
4	Anesthesia machine	2	20,000	40,000	I.C.U	
5	Angiography system	1	400,000	400,000	X-Ray	
6	Argon laser	1	50,000	50,000	Ophthalmic	
7	Automatic Film Processor	2	15,000	30,000	X-Ray	
8	Central station monitor for 10 beds	1	100,000	100,000	I.C.U	
9	Ultrasound for ophthalmology	1	40,000	40,000	Ophthalmic	
10	Capnograph	1	3,000	3,000	I.C.U	
11	Centrifuge	1	1,000	1,000	Lab.	
12	Defibrillator with monitor	2	4,000	8,000	Emergency	
13	Digital Fluoroscopy	1	350,000	350,000	X-Ray	
14	Dry Imager	1	20,000	20,000	X-Ray	
15	Echo cardiograph	1	70,000	70,000	Internal	
16	Electrolyte analyzer	1	5,000	5,000	Lab.	
17	Electro surgical unit	3	3,000	9,000	Operation theaters	
18	Emergency trolley	2	5,000	10,000	Emergency	
19	Fully automated chemistry analyzer	1	100,000	100,000	Lab.	
20	Fully automated hematology analyzer	1	10,000	10,000	Lab.	
21	Gamma camera	1	300,000	300,000	Nuclear Med.	
22	Hot air oven	2	1,000	2,000	Dental	
23	ICU/ CCU Beds	8	3,000	24,000	I.C.U	
24	Infant ventilator	2	18,000	36,000	N.I.C.U	
25	Infusion pump	2	750	1,500	I.C.U	
26	IV stand	10	100	1,000	I.C.U	
27	Laparoscope system for gyn. + for gen. Surgery	1	100,000	100,000	GYN.	

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Annex 1

28	Mass chest x-ray system	1	150,000	150,000	X-Ray	
29	Medication trolley	3	500	1,500	General	
30	Nebulizer / U/S	1	2,000	2,000	Pediatric	
31	Operating table, General	2	20,000	40,000	Operating theatre	
32	Operating table, Gynecology	1	20,000	20,000	Operating theatre	
33	Operating table, Orthopedic	1	25,000	25,000	Operating theatre	
34	Photo therapy unit	4	1,500	6,000	Pediatric	
35	Pulse Oximeter	2	1,500	3,000	I.C.U	
36	Spectrophotometer	2	5,000	10,000	Lab.	
37	Sphygmanometer	10	50	500	General	
38	Suction	2	1,000	2,000	Emergency	
39	U / S for abdomen general purpose	1	25,000	25,000	Internal	
40	U / S for Gynecology Appl.	1	45,000	45,000	GYN.	
41	U / S for radiology App. With color Doppler	1	70,000	70,000	X-Ray	
42	Urodynamic system	1	50,000	50,000	Internal	
43	Electronic blood pressure monitor	1	3,000	3,000		
44	Defibrillator	1	3,000	3,000		
45	Vacuum extractor	1	2,000	2,000	GYN.	
46	Washer disinfectant	1	25,000	25,000	Sterilization	
47	Wheel chair	6	200	1,200	Emergency	
48	X-Ray Q.A Kit	1	50,000	50,000	X-Ray	
49	Yag laser	1	50,000	50,000	Ophthalmic	
Estimated Total Price (J.D)					2,396,700	

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Annex 1

List B: Ma'an Hospital Needs

No.	Description	Qty.	Unit Price (J.D)	Total Price (J.D)	Location	Notes
1.	1- Biliruben analyzer	1	1,000	1,000	Premature Ward	
	2- Blood gas analyzer	1	20,000	20,000		
	3- Pediatric monitor	2	5,000	10,000		
	4- Pediatric ventilator	2	8,000	16,000		
	5- Resuscitation unit	2	4,000	8,000		
	6- Photo therapy unit	2	1,000	2,000		
2.	1- Fetal heart monitor	2	4,000	8,000	Gynecology Ward	
	2- Cryo unit for Gyn.	1	5,000	5,000		
	3- Laproscope system	1	30,000	30,000		
	4- Histroscope system	1	30,000	30,000		
3.	1- Portable kidney dialysis	1	5,000	5,000	Kidney dialysis Ward	
	2- Kidney dialysis machine	3	5,000	15,000		
	3- Kidney dialysis chair	4	1,000	4,000		
4.	ENT table complete	1	20,000	20,000	E.N.T Ward	
5.	1- Endoscopy system	1	30,000	30,000	Medical & Surgical Ward	
	2- Emergency trolley with defibrillator	5	7,000	35,000		
	3- ECG recorder	5	1,000	5,000		
	4- Patient bed	40	500	20,000		
	5- PUVA treatment unit for dermatology	2	500	1000		
	6- Electrocautery for dermatology	2	1000	2000		
6.	1- C. Arm X-Ray	1	35,000	35,000	Operation theater Ward	
	2- Ultrasound cleaner	2	1,000	2,000		
	3- Blood warmer	3	1,000	3,000		
	4- Electrical drill	1	5,000	5,000		
	5- External fixation (adult and pediatric)	1	2,000	2,000		
	6- Cryo- cautery	1	5,000	5,000		

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Annex 1

	7- Instrument surgical set: A/ mastoidectomy B/ circumcision C/ pediatric D/ orthopedic E/ thyroidectomy F/ heamo – roidectomy G/ cholo – cystectomy H/ craniotomy I/ stapler set for gen-surgery J/ ophthalmic surg.	2	20,000	40,000		
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No.	Description	Qty.	Unit Price (J.D)	Total Price (J.D)	Location	Notes
7.	1- Anesthesia machine	1	15,000	15,000	Anesthesia with ICU Ward	
	2- Defibrillator with monitor	2	1,000	2,000		
	3- Pulse oximeter	2	1,000	2,000		
	4- Capnograph	2	2,000	4,000		
	5- ICU beds	6	2,000	12,000		
8.	1- Ambulance	1	40,000	40,000	Emergency	
	2- Blood bank refrigerator	2	3,000	6,000	Lab. Blood Bank	
	3- Endoscopic lithotripter system	1	20,000	20,000	Urine ward	
	4- Aerodynamic system	1	50,000	50,000	Urine ward	
	5- Ultrasound for Gyn.	2	30,000	60,000	Gynology	
	6- Ultrasound for radiology applications	1	50,000	50,000	X-Ray	
	7- Echocardiograph	1	70,000	70,000	Internal med.	
Estimated Total Price (J.D)					690,000	

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List C: Al- Basheir Hospital Needs

No.	Description	Qty.	Unit Price (J.D)	Total Price (J.D)	Location	Notes
1	Dry Laser Imager	2	15,000	30,000		
2	Automatic film processor	2	7,500	15,000		
3	Laparoscope for general surgery	1	50,000	50,000		
4	Laproscope for Gyn. /Obs.	2	15,000	30,000		
5	Arthroscope complete system	1	40,000	40,000		
6	Complete video system + 2 bronchoscopes	1	55,000	55,000		
7	Urodynamic studying machine	1	50,000	50,000		
8	Bone densitometry	1	40,000	40,000		
9	8- bed side monitor with central station	2	100,000	200,000		
10	E .S .U	3	2,500	7,500		
11	Portable Suction Machine	6	500	3,000		
12	Dressing Trolley	6	150	900		
13	Table Mayo Tray	2	200	400		
14	Basin Stand	6	100	600		
15	I . V Stand	20	50	1,000		
16	Baby Scale	1	100	100		
17	Ultrasonic Cleaner	3	1,500	4,500		
18	Ped. Hospital Bed	100	850	85,000		
19	Over bed table	100	100	10,000		
20	Child bed	40	300	12,000		
21	Emergency trolley with defibrillator	4	5,000	20,000		
22	E.C.G	4	1,200	4,800		
23	I.C.U bed for pediatric	8	2,000	16,000		
24	Ped. Ventilator	6	15,000	90,000		
25	Infusion pump	10	1,500	15,000		
26	Pulse oximeter	6	1,500	9,000		
27	Mobile X-ray	2	15,000	30,000		
28	Bronchoscope complete system	1	40,000	40,000		

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Annex 1

No.	Description	Qty.	Unit Price (J.D)	Total Price (J.D)	Location	Notes
29	Infant Incubator	30	4,000	120,000		
30	Baby Cot	10	200	2,000		
31	Photo therapy unit	10	2,000	20,000		
32	Billirubin meter	2	2,500	5,000		
33	Blood gas analyzer	2	15,000	30,000		
34	Apnea monitor	5	1,000	5,000		
35	Electronic blood pressure monitor	4	2,500	10,000		
36	C-Arm	1	40,000	40,000		
37	Fluoroscopy X-Ray Unit	2	250,000	500,000		
38	Radiographic Bucky X-Ray	3	175,000	525,000		
39	Multi-slice Computed Tomography Unit CT	2	950,000	1,900,000		
40	Computed Radiography CR	3	60,000	180,000		
41	Computed Radiography CR for Mammography	1	80,000	80,000		
42	Mass Chest	2	200,000	400,000		
43	Anesthesia	3	20,000	60,000		
44	Operating Table	3	12,000	36,000		
45	Hospital Beds	200	1,000	200,000		
Estimated Total Price (J.D)					4,972,800	

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