Ex-Post Evaluation of Japanese Grant Aid Project The Project for Improvement and Transfer of Asunción University Hospital (El Proyecto del Traslado y del Fortalecimiento del Hospital de Clínicas de la Universidad Nacional de Asunción) External Evaluator: Haii

External Evaluator: Hajime Sonoda Global Group 21 Japan, Inc.

0. Summary

The Project for Improvement and Transfer of Asunción University Hospital (hereinafter referred to as "the Project") was implemented to achieve (i) qualitative and quantitative improvement of the health and medical services at the "Hospital de Clínicas" of the National University of Asuncion (hereinafter referred as "UNA Hospital") and (ii) expansion of the research and educational activities of the Faculty of Medical Science of the National University of Asuncion (UNA) by means of realizing the relocation of the UNA Hospital through the construction of hospital facilities and procurement of medical equipment. While the size of facilities was relatively smaller compared to the demand for medical services at the relocation site, the necessity and urgency of the Project were both high. The Project was relevant to the development policy of Paraguay and the ODA policy of Japan, therefore its relevance is high. Meanwhile, the number of patients using the UNA Hospital has rapidly increased since the full-scale relocation and the capacity of the hospital to diagnose and treat patients has already reached its limit, reducing the efficiency of the medical services. Moreover, the efficiency of the medical services has been partially decreased by unplanned building extension / alteration works and the rational layout of facilities in the original plan was altered. There is room for improvement in regard to the hospital facilities and hospital management. Improvement of the research and educational facilities has not been fully sufficient. The massive increase of the number of patients has had both positive and negative impacts on the quality of medical education at the UNA Hospital. The UNA Hospital provides advanced and specialized treatment with a low payment burden for patients and its benefits reach all corners of the country. However, because of the inadequate functioning of the referral system, the medical diagnosis and treatment capacity of the hospital is not effectively utilized. Although the project cost was roughly within the plan, the period of implementation was significantly exceeded the plan, therefore the efficiency of the project is fair. The operation and maintenance of the buildings, building services and general equipment have been adequate. However, there is concern in regard to secured funding for operation and maintenance. Moreover, the operation and maintenance of the electronic medical equipment provided under the project are facing some institutional and technical problems. Therefore, the sustainability of the Project is fair. In the light of the above, this project is evaluated to be partially satisfactory.



Project Location



Building constructed under the Project

1.1 Background

The UNA Hospital in the Republic of Paraguay (hereinafter referred to as "Paraguay") is the highest 4th tier level general hospital in the country and also plays a core role in medical research and education. The UNA Hospital used to be located on an old campus at the remotest corner of the Old Town of Asunción and provided advanced medical services for the people of Paraguay as the country's sole university hospital while training excellent medical specialists equipped with the latest medical skills as the hospital was in possession of information on the most advanced medical care in the world. Its history of more than 115 years meant that the facilities and equipment had deteriorated and the quality of both the medical care and educational services had declined due to a lack of essential equipment for diagnosis and treatment, shortage of hospital beds, excessive concentration of patients and other reasons. Confusing lines of flow resulting from a series of building extension and alteration works aggravated the disorderly state of the hospital. To improve these situations, the UNA made a decision in 1996 to relocate and improve the UNA Hospital from the old campus to San Lorenzo in a suburb of Asunción (hereinafter referred to as the "new campus") which is 28 km away from the old campus and made a request to the Government of Japan for the provision of assistance for this plan. In response to this request, the Government of Japan constructed the UNA Hospital Japan-Paraguay Friendship Maternal and Child Health Center (Centro Materno Infantil: CMI) from FY1997 to FY1998 under a grant aid project. Following the completion of the CMI, the Obstetrics and Gynecology Department and the Pediatrics Department of the UNA Hospital were relocated to the CMI.

However, the planned simultaneous full-scale relocation of the UNA Hospital with funding by the Government of Paraguay did not materialize due to a change of the administration and budget shortfall. This meant that the UNA Hospital would operate on two sites, i.e. the old campus and the new campus. Hospital activities under this new arrangement were quite inefficient as patients on the new campus often had to travel to the old campus for medical testing. Medical students and doctors in training of the Faculty of Medical Science also had to travel between the two campuses for their training. This situation called for the full-scale relocation of the UNA Hospital to the new campus as quickly as possible.

In the midst of the further deterioration of the facilities on the old campus, the UNA once again decided in 2005 on a policy of relocating the entire hospital as well as the Faculty of Medical Science to the new campus and made a request to the Government of Japan for the provision of grant aid for the construction of the necessary facilities and procurement of equipment. In response to this request, the Government of Japan implemented the Project for Improvement and Transfer of Asunción University Hospital in two phases in FY 2007 and FY 2008. The Project envisaged the construction of a building to house general outpatients, emergency outpatients (Accident and Emergency: A&E), medical testing, operating theaters and other areas to be constructed by the Japanese side (hereinafter referred to as the "Facilities by Japan") along with facilities to house the hospitalization, administration and service areas (hereinafter referred to as the "Ward Building") and the Faculty of Medical Science Building, both of which would be constructed by the Paraguayan side.

1.2 Project Outline

The Project aimed at realizing the relocation of the UNA Hospital, qualitative and quantitative improvement of the health and medical services and improvement of the research and educational activities of the UNA Faculty of Medical Science by means of providing hospital facilities and medical equipment at the UNA San Lorenzo Campus.

Loan Approved Amount/	(I) ¥1,370 million, (II) ¥419 million /
Disbursed Amount	(I) ¥1,228 million, (II) ¥412 million
Exchange of Note Date	(I) June, 2006, (II) August, 2017
Executing Agency	National University of Asunción
Project Completion Date	(I) March, 2008, (II) January, 2009

Main Contractors	Tokura Corporation, Mitsubishi Corporation
Main Consultant	Azusa Sekkei Co., Ltd.
Basic Design Study	March, 2006
Related Projects	Project for Construction of Japan-Paraguay Friendship
	Maternal and Child Health Center of the National University
	of Asunción Hospital (Grant Aid, FY1998-FY1999)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hajime Sonoda (Global Group 21 Japan, Inc.)

2.2 Duration of the Evaluation Study

The ex-post evaluation study for the project was conducted over the following period.¹

Duration of Study:	January, 2013 - December, 2013
Duration of the Field Study:	March 17- April 22 and August 1 - 16, 2013

3. Results of the Evaluation (Rating: C^2)

3.1 Relevance (Rating: ⁽³⁾)

3.1.1 Relevance to the Development Plan of Paraguay

At the time of the planning of the Project, the Government of Paraguay had formulated the National Development Plan 2003 – 2008 and was proceeding with "the establishment of health and medical care system" and "improvement of the health and medical services" as components of "the Alleviation of Poverty and Corruption and Security Measures" which was one of the four pillars of development. The National Health Plan 2003 – 2008 was also formulated with the overall goal of "expanding and ensuring the fairness of social protection in the health and medical care sector". This plan adopted two specific objectives: (a) improved care by the health and medical services and (b) provision of high quality services for the poor. The priority issues identified by the plan included "strengthening of the referral system", "improvement of national hospitals under the jurisdiction of the Ministry of Public Health and Social Welfare" and "training and nurturing of health workers".⁴

At the time of the ex-post evaluation, the Ministry of Public Health and Social Welfare is calling for "the improvement of regional hospitals, district hospitals, mother and child health hospitals and special hospitals capable of providing professionally, technically, physically and financially appropriate hospital functions required by their service areas. Meanwhile, President Horatio Cartes

¹ For this ex-post evaluation, a number of interviews were conducted with people working at the UNA Hospital (doctors, nurses and administrative staff members), doctors in training and medical students in addition to information gathering at the UNA Faculty of Medical Science. Moreover, a questionnaire survey was conducted with 40 outpatients, 43 inpatients, 20 doctors, 20 nurses, 20 doctors in training and 20 students).

² A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

³ ③: High, ②: Fair, ①: Low

⁴ A referral system is a system whereby a patient is introduced and smoothly transferred to a suitable facility depending on the type and severity of the illness and the medical care capability of a medical facility through liaising with health centers, clinics, regional core hospitals and general/specialist hospitals. The introduction and transfer of a patient from a lower tier medical facility to an upper tier medical facility is called referral. Patient movement in the opposite direction is called counter-referral. The smooth functioning of the referral system enables higher tier medical care facilities to perform to the maximum capacity as the medical care needs of patients are matched with the required levels of care provided by medical care facilities of different tiers.

who leads the new government formed in August, 2013 recognizes the importance of health and medical care and has expressed his intention of widely providing low cost medical services for the people of Paraguay.

To summarize, the health and medical care sector has been continually emphasized in Paraguay's development plans since the time of the ex-ante evaluation to the time of the ex-post evaluation.

3.1.2 Relevance to the Development Needs of Paraguay

As already described in 1.1 Background, completion of the relocation of the UNA Hospital to the new campus was both highly necessary and urgent at the time of the planning of the Project.

In general, a university hospital not only provides advanced medical services for the public as a high tier medical institution but also plays the role of a medical research and educational institution for the training of doctors. In Paraguay, 15 universities have their own faculty of medicine and three medical institutions accept doctors in training. The UNA Hospital is the only university hospital in Paraguay and its role as a research and educational institution for advanced medical care is extremely important.⁵ As continuous improvement of the facilities and equipment is essential to enable the latest treatment as well as advanced research and educational activities in line with the advancement of medical technologies, the Project sufficiently met such needs at the time of its planning and also at the time of the ex-post evaluation.

However, the scale of the facilities constructed by the Japanese side was smaller than the actual demand for medical care at the relocation site. As explained in more detail in 3.2.1.1 Quantitative Improvements of the Medical-Care Service, the number of outpatients after the full-scale relocation of the UNA Hospital to the new campus in December, 2012 has been more than double the number of patients at the time of planning. Moreover, the number of emergency patients is more than three times as planned , forcing the Surgical Center to work at full capacity (see 3.2.1.1-(3)). The Laboratory can no longer cope with the demand and congestion caused by people awaiting their turn has reduced the efficiency with many patients having to visit other medical institutions for testing. A change of use of some of the facilities and the construction of additional facilities for the Outpatient, Emergency, Laboratory and Surgical Center are already pressing issues. There were several reasons why the original planning scale was modest.

- The basic design of the Project was based on the Master Plan prepared by the UNA Faculty of Medical Science and this Master Plan did not predict a future increase of the number of patients.⁶
- In the Basic Design Study, the planning policy for facilities "focused on the education and training of doctors" and the scale of facilities was based on "the current number of patients", ignoring a possible increase or decrease of the number of patients due to demographic changes.⁷ Any change of the accessibility to the hospital due to its relocation was also not taken into consideration.⁸

⁵ The most advanced medical care in Paraguay can be studied at the UNA Faculty of Medical Science as it gathers information on international medical research and medical technologies. The faculty is capable of accepting its graduates and doctors in training at its own hospital.

⁶ Plan Director del Proyecto: Nueva sede para la Facultad de Ciencias Medicas y el Hospital de Clinicas en el Campus Universitario de la U.N.A.- San Lorenzo (2005).

⁷ The Basic Design Study Report for the Project for Relocation and Improvement of the National University of Asunción Hospital in the Republic of Paraguay, March, 2006, pp. 3–7. Although the site plan in the Basic Design Study allowed some room for future *extension* of the general Outpatient, Laboratory and Surgical Center, the site itself was not large enough for the actually required scale of extension after relocation.

⁸ Compared to the old campus which was located along a river in a rather remote area, the new campus is near the demographic center of Asunción Capital City *and* is located along a trunk road linking various parts of the country to the Capital City.

- The number of outpatient examination rooms and operating theaters was calculated on the basis of the actual performance in 2000 through 2004. However, the actual figures used did not include some of the hospital departments which should have been included and were, therefore, underestimated by some 20%.⁹ The Basic Design Study could not assume a subsequent need for additional outpatient examination rooms due to a need for new hospital departments in line with advancements in medicine.
- Although the UNA Hospital was the supreme referral hospital (hospital at the highest level of the referral system), it has a statutory obligation to unconditionally admit a patient without a referral from the lower tier medical institution like any other hospitals in Paraguay as long as there is an empty bed on the ward.¹⁰ This means that the UNA Hospital finds it difficult to restrict visiting outpatients when many outpatients simply arrive at the hospital seeking diagnosis and treatment. The Basic Design Study Report did not mention such situation, suggesting that this kind of situation was not taken into proper consideration.

Based on the above, it is clear that the medical needs to be met by the UNA hospital were not fully examined at the planning stage of the Project. In particular, it can be pointed out that examination of the possibility of an increase of the number of patients due to a change of accessibility resulting from relocation was insufficient along with a lack of consideration of the situation of the UNA Hospital being unable to restrict the number of patients despite it being a supreme referral and educational hospital.

In short, the urgency of the Project to respond to the important need for the provision of an advanced medical service and the training of doctors was strong. However, the relevance to the needs was slightly lacking as the required scale of the Facilities by Japan was under-estimated at the time of planning.

3.1.3 Relevance to Japan's ODA Policy

Having considered the national strategy and development tasks of Paraguay, the Government of Japan held its first policy dialogue involving the ODA Task Force in August, 2004. This dialogue confirmed four priority fields for assistance of agriculture, health and medical care, human resources development and the environment. The Project fell in the category of cooperation for "the consolidation of health care and education principally targeting the poor" and was consistent with the ODA policy of Japan.

Based on the above, while it can be pointed out that the facility was relatively smaller than the needs at the relocation site, as the necessity and urgency of the Project were high and it was relevant to the development policy of Paraguay as well as Japan's ODA policy. Therefore, its relevance is judged to be high.

⁹ It is inferred that the number of outpatients *and* operations relating to the Respiratory, Cardiovascular, Neurology, Nephrology, Oncology and Neuropsychiatry Departments were not taken into consideration for calculation of the facility scale.

¹⁰ According to doctors of the UNA Hospital, there is a general tendency among hospital doctors in Paraguay to try to squeeze in patients even if there are no vacant beds because of their fear of criticism by the mass media or even fear of a lawsuit.

UNA Hospital: Outline of the Facilities and Background of the Relocation

Various facilities have been constructed in stages at the UNA Hospital since the construction of the CMI to the time of the ex-post evaluation with the slow progression of the hospital's relocation. Here, the main facilities at the UNA Hospital are outlined and the progress of relocation up to the time of the ex-post evaluation is described following the sequence of facility construction. The scope of the present ex-post evaluation includes all facilities which have been constructed, are in the middle of construction or are planned after the construction of the Facilities by Japan.

- 1. CMI (completed in 2000): This facility was constructed with Japan's grant aid cooperation. It houses the Obstetrics and Gynecology Department (outpatient, emergency, operation and inpatient facilities), the neonatal ICU and the ward for the Pediatrics Department. At the time of its construction, it was planned to relocate all of the hospital functions, excluding the CMI-related functions, to new facilities to be constructed by the Paraguayan side. However, only the Outpatient Building for the Pediatrics Department (to be described next) was constructed and full-scale relocation was not completed.
- 2. Outpatient Building for the Pediatrics Department (completed in 2005): Although the work was started to construct an accommodation facility for doctors in training and family members visiting inpatients, the building was converted to allow the reception of general and emergency outpatients at the Pediatrics Department because of the lack of progress of the relocation of the hospital proper. Since the full-scale relocation of the hospital in December, 2012, the building has also been used to receive outpatients, excluding those of the Ophthalmology, Otorhinolaryngology (Ear, Nose and Throat: ENT) and Dermatology Departments.
- 3. Facilities by Japan (completed in 2009): The Facilities by Japan were originally supposed to house almost of all the hospital departments (including general outpatients, emergency outpatients, general testing and diagnostic imaging, operation, ICU, etc.) other than the hospitalization function. Because of the delayed construction of the Ward Building, only the Ophthalmology, Otorhinolaryngology and Dermatology Departments moved into this building in 2009 and 2010.
- 4. Intermediate Building (completed in 2008): Because of the delayed construction of the Ward Building, this building was constructed as a small ward building so that the operation function of the Facilities by Japan could be used by some departments. Since the full-scale relocation of the hospital in December, 2012, this building has been used to house an emergency unit and ICU.
- 5. Ward Building (completed in 2011): This building houses wards for all departments except the Obstetrics and Gynecology Department and Pediatrics Department, dialysis treatment unit, rehabilitation unit, mortuary, such auxiliary facilities as canteen and laundry, educational facilities (classrooms, lecture hall, conference rooms, library and others) and administrative offices of the hospital. Full-scale relocation from the old campus took place in December, 2012.
- 6. Outpatient Building (planned completion in 2013): This four story Outpatient Building is under construction at the time of ex-post evaluation to compensate for the shortage of outpatient examination rooms.
- 7. Faculty of Medical Science Building (planned and with a floor area of 24,000 m³): Although the basic concept has been developed, no plan for its construction has been finalized.



Fig. 1 UNA Hospital: Layout of Facilities on the New Campus

3.2 Effectiveness¹¹ (Rating:⁽²⁾)

The Project had two objectives: (i) qualitative and quantitative improvement of the health and medical services and (ii) expansion of the research and educational activities of the UNA Faculty of Medical Science. Here, the quantitative improvement (increase) of the health and medical services is analyzed primarily in terms of the quantitative effects. The qualitative improvement of the health and medical services and expansion of the research and educational activities are analyzed primarily in terms of the quantitative of activities are analyzed primarily in terms of the qualitative of activities are analyzed primarily in terms of the qualitative of activities are analyzed primarily in terms of the qualitative effects.

¹¹ Sub-rating for Effectiveness is to be put with consideration of Impact.



Intermediate Building (left) and Ward Building (right)

CMI (front) and Outpatient Building for Pediatrics Department (rear)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

The Basic Design Study listed several indicators to assess the effects of the Project on the qualitative and quantitative improvement of the health and medical services. These were increases of the number of outpatients, number of medical tests, number of emergency patients and increase of the number of operations. The indicators for the expansion of the research and educational activities were increases of the number of patient examinations as well as number of image projections by doctors in training and number of conferences between professors and medical students. However, none of these indicators were given a target value. Some indicators had no reference value (i.e. actual value before the Project). For some indicators, it was difficult to obtain the relevant data. For these reasons, the present evaluation is not restricted to the above indicators and various types of quantitative data obtained are used to analyze the situation of achievement of the two objectives of the Project.

3.2.1.1 Quantitative Improvements of the Medical-Care Service

The performance of the medical services at the UNA Hospital since 2000 is shown in Fig. 2 through Fig. 8. The Project (consisting of the Facilities by Japan, Intermediate Building and Ward Building) targeted all the hospital departments except for the Obstetrics and Gynecology Department and the Pediatrics Department. For the targeted departments, all actual clinical activities were conducted at the old campus until the full-scale relocation of the hospital in December, 2012 (although some diagnosis and treatment activities were conducted at the new campus after the partial relocation of some departments). The numerical values for 2013 in these figures are estimates based on the actual performance from January to July, 2013.¹²

(1) Number of Outpatients

The Basic Design Study for the Project assumed that the number of outpatients covered by the scope of the Project would be 97,640 a year. The number of outpatients gradually increased towards 2012. In the period from January to July, 2013, the actual number reached nearly 250,000, recording an increase of some 30% on the same period in 2013 and was some 2.6 times the estimated figure by the Basic Design Study (Fig. 2). It is inferred that this massive increase in 2013 can be attributed to the hospital's improved accessibility following its full-scale relocation to the new campus.

The outpatient facility in the Facilities by Japan has served outpatients of the Ophthalmology, Otorhinolaryngology and Dermatology Departments (some 40,000 outpatients a year) since the partial relocation. While the Facilities by Japan has 28 outpatient examination rooms, these are entirely

¹² Because the diagnosis and treatment performance shows *seasonal* fluctuations, the comparative ratio of the performance for the period from January to July, 2013 vis-à-vis the same period in 2012 was calculated and the actual performance in 2012 was multiplied by this ratio to estimate the actual performance in 2013.

occupied by the Ophthalmology, Otorhinolaryngology and Dermatology Departments which began to use these rooms after their relocation to the new campus under the partial relocation of the hospital. Since the full-scale relocation, outpatient examination rooms for other departments have been temporarily set up in the Outpatient Building for the Pediatrics Department. By the end of 2013, the new Outpatient Building with 64 rooms will have been constructed and departments other than the three departments mentioned above are expected to have their outpatient examination rooms in this building.



Fig. 2 Number of General Outpatients Treated at the UNA Hospital (2000 – 2013) Source: UNA Faculty of Medical Science

Note: The figure for 2013 is an estimated value based on the actual performance from January to July, 2013

(2) Number of Emergency Outpatients

The number of emergency outpatients covered by the scope of the Project showed a slight annual increase until 2011 but the increase was more noticeable in 2012, followed by a projected massive increase in 2013 (Fig. 3). These increases were primarily the result of the hospital's improved accessibility. In addition, a major outbreak of dengue fever in early 2013 is one factor for the massive increase of emergency outpatients in 2013. Since the partial relocation, emergency outpatient units of the Ophthalmology, Otorhinolaryngology and Dermatology Departments have been operating in the Facilities by Japan (some 14,000 patients in 2012). Since the full-scale relocation, all departments except for the Obstetrics and Gynecology Department and Pediatrics Department have emergency outpatient units (an estimated some 90,000 patients in 2013) in the Facilities by Japan.





Note: The figure for 2013 is an estimated value based on the actual performance from January to July, 2013





Waiting room of the expanded emergency outpatient unit







In 2012, the UNA Hospital undertook major expansion of the Emergency Department in the Facilities by Japan.¹³ Despite this expansion, however, there is clearly a shortage of space at the time of the expost evaluation as emergency beds are observed in such areas as treatment rooms and preparation rooms where patient beds should not normally be found.¹⁴

(3) Number of Operations

The Basic Design Study for the Project assumed that the number of operations covered by the Project would be 5,211 a year. The number of operations has gradually increased to reach 8,244 in 2012 which was approximately 1.6 times more than the assumption made by the Basic Design Study. In 2013, the number is expected to grow to approximately 9,900 (Fig. 4). While the maximum number of operations assumed by the Basic Design Study was 6,180 a year, the actual number since the full-scale relocation has substantially exceeded this level. At the time of the ex-post evaluation, the operating theaters appear to be fully occupied all of the time. As a shortage of operating theaters is expected to occur sooner rather than later because of the rapid increase of the number of patients and introduction of new technologies (including the introduction of new equipment and the implementation of

¹³ As the Basic Design Study did not assume such expansion, this expansion work used part of the area reserved for a car park.

¹⁴ While the number of emergency beds to be introduced under the Project was 12, 70 beds were available at the time of the ex-post evaluation.

pioneering operations), the UNA Hospital plans to establish a new surgical facility of the similar scale as the current facility in the Ward Building by the end of 2013.¹⁵





(4) Number of Hospital Admissions

The number of hospital admissions covered by the Project gradually increased to reach 17,426 in 2012. The figure has phenomenally increased in 2013 and is estimated to reach some 39,000, nearly three times the figure for 2012 (Fig. 5). At the time of the ex-post evaluation (August, 2013), the UNA Hospital has a total of 510 beds. It is planned to introduce 200 extra beds in the Ward Building by the end of 2013 to cope with the rapid increase of the number of hospital admissions.

(5) Number of Laboratory Examination, Efficiency of Laboratory Examination

The number of examinations conducted by the Laboratory Examination Department in old / new campuses increased in 2012 to some 680,000 compared to an annual average of some 460,000 in the period from 2000 to 2004 (Fig. 6). The number of examination conducted at the new campus (those associated with the Project and CMI) did not record much of an increase after the partial relocation in 2010. One likely reason for this is that the Ophthalmology, Otorhinolaryngology and Dermatology Departments which moved to the new campus under the partial relocation do not often require medical testing.

Interviews with those working in the Laboratory in the Facilities by Japan found that the number of patients dealt with trebled after the full-scale relocation compared to the pre full-scale relocation



Fig. 6 Number of Tests Conducted at the UNA Hospital (2000 – 2012)

Source: UNA Hospital

Note: The figure for the new campus includes tests conducted at the CMI.

¹⁵ The planned number of operating theaters to be set up under the Project was 8. A further 9 operating theaters are planned in the new surgical facility.

period. Because of this, the time to obtain examination results has lengthened to approximately four hours since the full-scale relocation compared to some 15 minutes before. Such congestion in the Laboratory means that approximately two-thirds of patients have to have some examinations done outside the UNA Hospital.¹⁶ There is no concrete plan to expand the Laboratory in the Facilities by Japan at the time of the ex-post evaluation, partly because of the little availability of extra space within this building.

The number of ultrasonic examinations and X-ray examinations on the new campus has increased since the partial relocation (Fig. 7 and Fig. 8), presumably because the Facilities by Japan responds to the testing needs of the Obstetrics and Gynecology Department and Pediatrics Department. Since the full-scale relocation, however, the Diagnostic Imaging Unit can only meet some 60% of the actual demand, forcing approximately half of the patients to undergo part or entire image diagnostic examination outside the UNA Hospital.¹⁷



Fig. 7 Number of Ultrasonic Examinations at the UNA Hospital (2007 – 2012)

Source: UNA Hospital Note: The figure for the new campus includes tests conducted at the CMI.

Fig. 8 Number of X-Ray Examinations at the UNA Hospital (2007 – 2012)

Source: UNA Hospital Note: The figure for the new campus includes tests conducted at the CMI.



Examination room

ICU patient room and medical students

¹⁶ Based on the results of the questionnaire survey with patients.

¹⁷ Based on the results of the questionnaire survey with a professor (a doctor) of the Diagnostic Imaging Unit and patients.

3.2.1.2 Improvement of Educational and Research Activities

No data allowing analysis of the effectiveness of the Project was obtained for such indicators put forward by the Basic Design Study as the number of patient examinations and number of image projections by doctors in training and increase of the number of conferences between professors and medical students. Moreover, no reference values or target values for these indicators were given in the Basic Design Study. The UNA Faculty of Medical Science has been implementing a curriculum reform project¹⁸ since 2011 and the determination of indicators and reference values for evaluation of the educational processes is planned in the course of this Project.

3.2.2 Qualitative Effects¹⁹

3.2.2.1 Qualitative and Quantitative Improvements of the Medical-Care Service

The Obstetrics and Gynecology Department and the Pediatrics Department of the CMI used to rely on the facilities on the old campus for part of their imaging tests, causing an additional burden for patients who had to travel between the new campus and the old campus. With the relocation of the Diagnostic Imaging Unit to the new campus under the Project, this burden has been eliminated. As the Testing Department which has been improved under the Project has become available for tests required by these departments, quick testing is now possible. Moreover, the introduction of the ICU has enabled a quick response to emergency patients (especially those in the Obstetrics and Gynecology Department).

The following positive effects have been reported since the full-scale relocation of the hospital functions to the new campus in December, 2012.

- The old hospital was congested and chaotic like a market due to crisscrossing lines of flow and narrow passages. The realization of the separation and integration of various hospital functions such as outpatient examination, testing and operation under the Project has led to the improved efficiency of medical care and easier management of hospital hygiene.²⁰
- The improvement of the emergency facilities and ICU, including their expansion after the completion of the Facilities by Japan, has led to a qualitative as well as quantitative improvement of the medical service for emergency patients and others.
- The centralization of the operating theaters (i.e. integration of the operating theaters which used to be located in each department into one place) has enabled an increase of the number of operations due to the improved efficiency of operations and better hygiene in the operating theaters.
- The replacement of large wards with 20 or more patients each to smaller rooms with 3 4 patients each has improved the privacy for patients as well as the general conditions for inpatients.
- As all departments have been relocated to the new hospital, communication between departments has become much easier, resulting in the improved efficiency of comprehensive diagnosis and treatment.

¹⁸ This project aims at improving the educational curriculum, management method for education and teacher training method for the purpose of producing excellent doctors to meet the international standards for medical care and medical education.

¹⁹ The analysis results of the qualitative effects here are mainly based on the results of interviews and the questionnaire survey with those linked to the UNA Hospital and Faculty of Medical Science.

²⁰ At the time of the ex-post evaluation, the Outpatient Department operates in both the Facilities by Japan and the Emergency Building for the Pediatrics Department. Once the construction of the Outpatient Building has been completed, it will be feasible to integrate all of the outpatient examination rooms in one building.

Meanwhile, the following problems have been found at the time of the ex-post evaluation.

- The area of the Laboratory is small with no extra space to install additional testing equipment. A long time is required to produce test results because of the high demand. The storage of consumables and washing of tools and equipment have to be conducted elsewhere.
- Because of the large number of operations, the sterilization equipment is used beyond its design capacity.
- As corridors of the Facilities by Japan are open, patients and accompanying family members who wait in the corridors for a long time are exposed to occasional harsh weather such as strong winds and low temperature.
- The absence of a well-organized car park means disorderly parking on the hospital premises.
- The complicated layout of the hospital facilities is confusing for visitors and there is not sufficient guidance (information signs, etc.) on the facility layout.
- Because of the absence of an extension telephone system, doctors and nurses communicate with each other using their own mobile phones. The number of external telephone lines is small.
- Because of the absence of a LAN system, Internet connection is unavailable in most places in the hospital.²¹ The management of such data as treatment records, etc. is conducted manually.
- There is a long queue for payment. There is a lack of appropriate operational management in response to the rapid increase of the number of patients. One example is a patient spending three weeks in an A & E bed. There is neither a reception desk nor a pharmacy of which the functions are worthy of a general hospital.
- Half of the patients are unhappy about the long waiting time for outpatient examinations and the limited opening hours for outpatients.²²

The general outpatient, emergency, operation and ICU areas have undergone a series of building extension and alteration work which is not part of the original plan. The result is that some spaces are now used for purposes which were not originally planned, including the introduction of beds in rooms which are not designed to house inpatients and the use of available space as storage space regardless of its distance from the relevant department. Accordingly, the original concepts of the separation and concentration of functions and of the separation and rationalization of lines of flow at the time of the Basic Design Study have been forcibly revised. This situation suggests that some effects relating to improvement of the efficiency of medical care and improved management of hygiene have been eroded.

3.2.2.2 Improvement of Educational and Research Activities

The results of interviews and questionnaire survey with professors (doctors), doctors in training and medical students indicate that the general improvement of the buildings, building services and medical equipment has improved not only the quality of medical services but also the quality of research and education as it is now possible to learn advanced medical treatment techniques, etc. using the latest

²¹ The UNA Faculty of Medical Science has begun the work to *install* a LAN system and is also preparing to establish an integrated hospital management system (*Systema Integrado de Gestión Hospitalaria*) over a period of several years to manage the pharmacy, electronic patient records, testing records, imaging results and other patient treatment information.

²² Outpatient treatment is available in both the morning and afternoon or only in the morning depending on the department.

equipment in an adequate learning environment. However, many have also expressed the opinion that the training and educational environment for medical students and doctors in training is not fully adequate because of the following reasons.

- There are no meeting rooms where doctors and medical students can discuss the treatment policy away from a patient or his/her family members.
- The outpatient examination rooms are too small for several medical students to be present at the same time.
- There are not enough places for night-shift personnel to rest.
- There are no spaces for medical students to spend their spare time. The absence of a restaurant or cafeteria on the hospital premises is inconvenient.
- The library is short of equipment, including PCs with Internet connection and copiers.
- The classrooms are too small to accommodate all of the students in a class. There are no shelves which the students can use.

It has been reported that the massive increase of the number of patients since the full-scale relocation has had both positive and negative impacts on the quality of education. The positive impacts include practical group training with a smaller number of students and the existence of a wide variety of diseases for practical training. The negative impacts include decreased opportunity for education as a result of (i) less communication between experienced doctors and doctors in training as well as students due to the difficulty of spending sufficient time for medical examination and practical training involving each patient as a result of reduced time available for doctors to attend each patient due to the increase of patients, and (ii) the necessity for doctors in training to examine patients without supervision of specialized doctors.

It is still inconvenient for professors and students to travel between the two campuses as the planned relocation of the Faculty of Medical Science has not yet materialized.

In summary, although the relocation (better accessibility) and improvement of hospital facilities have achieved qualitative and quantitative improvement of the health and medical services, the efficiency of diagnosis and treatment has been partially reduced due to the rapid increase of the number of patients. There is also room for improvement of the hospital facilities and hospital management. In regard to improvement of the research and educational activities, while the qualitative improvement of diagnosis and treatment has led to a qualitative improvement of education, improvement of the facilities is still insufficient. Therefore, the rapid increase of the number of patients has had both positive and negative impacts on the quality of education at the UNA Hospital.

3.3 Impacts

3.3.1 Intended Impacts

How the Project has contributed to the health and medical care sector in Paraguay is analyzed here in reference to the two objectives of a university hospital, i.e. provision of advanced health and medical services and training of doctors.

(1) Contribution to Improvement of Medical Services in Paraguay.

The UNA Hospital has 510 beds at the time of the ex-post evaluation in August, 2013. The total number of beds at hospitals run by the Ministry of Public Health and Social Welfare of which the

diagnosis and treatment standards are comparable to those of the UNA Hospital (meaning a fourth tier special hospital or general hospital) is 1,595. All of these hospitals provide advanced medical services without requiring the payment of a large amount of money by patients and the UNA Hospital accounts for approximately one-quarter of such services with totally 2,105 beds. The fully relocated UNA Hospital is situated at the heart of Asunción Metropolitan Area and the site is appropriately located to accept patients from all over the country as it is directly linked to a trunk road which links Asunción to many parts of the country. While the number of patients has rapidly increased since the full-scale relocation, some 30% of these patients come from local areas (other than the Capital City and Central Department).²³

As the various figures mentioned above indicate, the UNA Hospital plays an important role in Paraguay as a hospital which provides advanced and specialized treatment with a low payment burden for the patients. The benefit of the Project in the form of improved medical services at the UNA Hospital is considered to be felt nationwide.

On the other hand, according to people working at the UNA Hospital, the referral system at hospitals run by the Ministry of Public Health and Social Welfare is not properly functioning and the number of referrals and counter-referrals between the UNA Hospital and other hospitals is small. The questionnaire survey with patients at the UNA Hospital found that approximately one-third of patients "were sent" by other medical institutions. Half of those who were sent involved an unofficial referral without having undergone the official referral and transfer procedure. This means that the UNA Hospital receives many patients who do not require advanced diagnosis and treatment. It is reasonable to say that the advanced diagnosis and treatment capacity of the UNA Hospital has not been fully exploited because of the insufficient functioning of the referral system. Another problem is that the diagnosis and treatment capacity has not sufficiently kept pace with the increase of the number of patients (see 3.2 Effectiveness and Impacts). These drawbacks have limited the positive effects of the Project on medical services.

(2) Contribution to Training of Specialized Doctors

As of 2013, Paraguay has some 10,000 registered doctors and the ratio to the population of some 16 doctors per 10,000 people is fairly adequate.²⁴ This means that there is no significant shortage of doctors in Paraguay. However, the UNA Hospital is expected to train highly capable doctors equipped with superior specialized knowledge and familiar with the latest medical technologies and techniques.

In Paraguay, 15 universities have a faculty of medicine and three organizations, i.e. UNA Hospital, Social Insurance Hospital and Ministry of Public Health and Social Welfare accept doctors in training. In 2012, the UNA Hospital was responsible for some 40% (306 persons) of the nationwide places for doctors in training (approximately 760 persons). Some 140 doctors become specialized doctors from doctors in training each year after completing the training period at the UNA Hospital. The UNA Faculty of Medical Science admits 150 students a year but is the most difficult faculty to enroll because of its extreme popularity based on high level of education and existence of an affiliated hospital.

In summary, although the UNA Hospital has been playing an important role in the training of doctors in Paraguay, analysis of the impacts of the Project is judged to be premature given the fact that the full-scale relocation of the hospital took place only a short time ago.

3.3.2 Other Impacts

²³ Results of the questionnaire survey with patients.

²⁴ The guidelines of the Pan American Health Organization (TAHO) sets the adequate level of doctors to be aimed at by a doctor training program at 8–10 per population of 100,000. For reference, OECD data for 2008 puts the number of doctors per population of 10,000 at 22 in Japan, 20 in Mexico and 19 in South Korea.

(1) Environmental and Social Impacts

An environmental impact survey was conducted in preparation for the relocation of the UNA Hospital and no environmental problems affecting the implementation of the Project were found. Medical waste discharged by the UNA Hospital is not thought to have any negative impact on the environment as it is handed over to a specialized company after its re-separation at the hospital site from ordinary waste, as they are not well separated at sources. Further, wastewater treatment is adequately carried out.

As the site of the UNA Hospital is actually owned by the UNA, land acquisition or the resettlement of local residents was not observed.

(2) Other Positive and Negative Impacts: None

Based on above, the Project has somewhat achieved its objective, therefore its effectiveness is fair.

3.4 Efficiency (Rating: ⁽²⁾)

3.4.1 Project Outputs

The planned and actual outputs of the Project are listed in Table 1 below.

Planned	Actual (as of August, 2013)		
< Work by the Japanese Side >	< Work by the Japanese Side >		
• Outpatient Department (28	(Mostly as planned)		
examination rooms)			
 Surgical Center (8 operating 			
theaters)			
• ICU (12 beds)			
• Laboratory			
 Diagnostic Imaging Unit 			
 Emergency Department 			
 Part of Administration 			
Department			
< Work by the Paraguayan Side >	< Work by the Paraguayan Side >		
• Wards (400 beds)	• Auxiliary facilities for the work by the Japanese side:		
 Faculty of Medical Science 	sewerage, landscaping and others		
Building	• Ward Building		
 Administration Department 	- 510 beds for inpatients (additional 200 planned)		
 Service Department 	- Educational facilities, including 4 large classrooms		
 Rehabilitation Department 	- Administration Department		
 Dialysis Treatment Department 	- Service Department: Canteen, Laundry and others)		
• Mortuary	- Rehabilitation Department		
	- Dialysis Treatment Department		
	- Mortuary		
	• Intermediate Building: 40 inpatient beds (not included in the		
	original plan)		
	• Corridor to CMI		
	• Expansion of Emergency Department (not included in the		
	original plan)		
	• Construction of Outpatient Building (65 examination rooms;		
	not included in the original plan; currently in progress)		
	• Second Surgical Center (9 operating theaters; not included in		

the original plan; currently in progress)
• Expansion of Diagnostic Imaging Unit (not included in the
original plan; currently in progress)
• Expansion of ICU (10 extra beds; not included in the original
plan; planned)
• Faculty of Medical Science Building (source of funding
undecided)

The work of the Japanese side was completed mostly as planned except for some minor building design modifications. According to the UNA Hospital, the layout plan and floor plan were generally appropriate and the quality of the construction work was very high. However, a shortage of space was pointed out in regard to the provision of resting places for doctors on the night shift, changing areas for doctors and nurses and administrative work. While the selection and specifications of the medical equipment were generally appropriate, some X-ray equipment has specifications which are unsuitable for children, making the use of external facilities necessary. The monitor for an endoscope is installed outside the room and it is impossible for a doctor to manipulate the endoscope while looking at the monitor.

Because it was forecast that the completion of the Ward Building would be delayed, the UNA commenced with the construction of the Intermediate Building to accommodate inpatients of the Ophthalmology and Otorhinolaryngology Departments scheduled to be relocated to the new campus before other departments. The completion of the Intermediate Building was followed by the Ward Building housing large classrooms and an underground car park in addition to facilities for inpatients. This Ward Building has a floor area of some 50,000 m² which is almost double the floor area assumed by the Master Plan for the UNA Faculty of Medical Science which was referred to in the Basic Design Study. The UNA side also conducted the work to almost double the Emergency Department and began the construction of the Outpatient Building with 65 examination rooms. Furthermore, the UNA side conducted the introduction of the Second Surgical Center (with 9 operating theaters), expansion of the Diagnostic Imaging Unit and expansion of the ICU (10 additional beds). As far as medical equipment is concerned, the UNA Hospital has office equipment and medical equipment which it has procured with its own funding in addition to that procured under the Project and that relocated from the old hospital.

While the construction of a six story Faculty of Medical Science Building with a floor area of 24,000 m^2 is planned, no concrete funding source has been secured at the time of the ex-post evaluation.

	(Uni	t: ¥ million)
	Planned	Actual
Work by the Japanese side (including auxiliary facilities)	1,790	1,705
Work by the Paraguayan side (excluding the Faculty of Medical Science Building)	1,879	2,158
Total	3,669	3,863

Table 2 Planned and Actual Project Costs

Source: Basic Design Study Report; data of the Faculty of Medical Science

Notes: The planned cost of the work by the Paraguayan side is based on the Master Plan for the Faculty of Medical Science (2006) due to incomplete data in the Basic Design Study Report.

Exchange rates: Planned: \$1 = 41.5Gr.; US\$1 = \$116

Actual: \$1 = 49.2Gr. (average rate during the project implementation period)

3.4.2 Project Inputs

3.4.2.1 Project Cost

While the total cost of the Project, excluding the Faculty of Medical Science Building, was planned to be \$3,669 million, the actual cost of \$3,863 million was equivalent to 105% of the original budget. This slight increase of the total project cost was due to the increased volume of work by the Paraguayan side. Given the facts that the outpatient, emergency and operation facilities have been expanded and that the floor area of the Ward Building is double the planned floor area, substantially increasing the number of beds, the efficiency in terms of the project cost is high.²⁵

3.4.2.2 Project Period

The planned construction period for the work by the Japanese side was a maximum of 31 months, including the design period, in preparation for the completion of the full-scale relocation of the hospital by August, 2009. In reality, however, although the work by the Japanese side was completed in 26 months from the signing of the construction contract in January, 2007 to February, 2012, the work by the Paraguayan side was delayed. As a result, full-scale relocation only took place in December, 2012. The length of the period to full-scale relocation was more than double the planned period.²⁶ Taking into account that the construction of the Faculty of Medical Science Building has not materialized, the efficiency in terms of project period is judged to below.

The Ward Building was completed based on six separate contracts (foundations, structure 1, structure 2, walls and building services, finishing and building services, and additional work). The work based on the last contract only started in April, 2011. The main reason for the lengthy construction period involving multiple contracts was insufficient budgetary appropriation by the Paraguayan side.²⁷ For the planned three year project period from 2007 to 2009, the funding amount by the Paraguayan side for the construction of the new Ward Building was as small as 40% of the planned cost. Moreover, the change of the faculty dean in 2010 necessitated an internal audit and checking of the accounts, temporarily suspending the construction work. This suspension was also caused by a budget shortfall and other reasons.

Although the project cost was roughly within the planned cost when the actual outputs are taken into consideration, the project period was significantly longer than planned and, therefore, the efficiency of the Project is fair.

3.5 Sustainability (Rating:⁽²⁾)

3.5.1 Institutional Aspect of Operation and Maintenance

According to the Basic Design Study Report, the total number of staff members at the Faculty of Medical Science prior to the Project was 2,762. The faculty has continually expanded its staff strength in subsequent years and further recruitment since the full-scale relocation of the hospital has led to a much increased total number of staff members of 5,117 (Table 3) as of May, 2013 (including 1,118 employees on contract). This number is 1.9 times of the staff strength in 2005.

²⁵ The number of beds in the Ward Building is planned to increase to 710 which is 178% of the originally planned 400 beds.

²⁶ While the planned period from building planning to full-scale relocation was 32 months from January, 2007 to August, 2009, the actual period was 72 months from January, 2007 to December, 2012.

²⁷ The Ministry of Finance in Paraguay sets the upper limit for the budget allocation in the face of a budget request by each ministry and the actual disbursement may be much lower than the upper limit depending on the revenue situation of the government.

		(U1	nt: persons)
	Staff	Staff on	Total
	Members	Contract	
Administration	571	255	826
Doctors	1,550	78	1,628
Instructors (other than doctors)	69	12	81
Nurses	989	269	1,258
Assistant Nurses	175	131	306
Maintenance Engineers	24	8	32
Maintenance Assistants	19	7	26
Medical Assistants	412	154	566
Others (Security Guards, Laundry Assistants and	190	204	394
Cleaners, etc.)			
Total	3,999	1,118	5,117

Table 3 Staff Strength of the UNA Hospital (May, 2013)

Source: UNA Faculty of Medical Science



Medical equipment awaiting repair (Electro-Medical Department)

Long queue for payment (the Facilities by Japan)

At the time of the full-scale relocation of the hospital, the Electro-Medical Department was established for the maintenance of electro-medical equipment. Up to four engineers with a department head work in each shift in this department. According to the department head, the shortage of engineers in the face of a large number of electro-medical equipment means that the department cannot respond quickly enough to requests for repair. The department is located in the CMI but the space is extremely small and there is a shortage of maintenance tools.

The maintenance of the buildings, etc. is the responsibility of the Maintenance Department which has some 40 engineers to conduct maintenance inspection and repair under the guidance of seven coordinators. According to the head of this department, the manpower is insufficient. Because of insufficient manpower, the department is too busy with pressing repair work to implement the existing preventive maintenance program.

The Basic Design Study made a series of recommendations for hospital operation and management to enhance the effects of the Project. These were (i) extension of the opening hours of outpatient clinics to all day, (ii) introduction of a centralized laboratory, (iii) review of the surgical operation management method and (iv) integrated operation and management with the CMI. Of these, extension of the opening hours of outpatient clinics has been introduced for some departments. According to professors of the Faculty of Medical Science and others, many doctors working at the UNA Hospital are also involved in private medical activities. Many doctors conduct these activities in the afternoon, leaving the morning for work at the UNA Hospital. Therefore, it is generally difficult to secure doctors

who are willing to work at the UNA Hospital in the afternoon. The other recommendations (ii, iii and iv above) are judged to have been realized.

In summary, while the staff strength at the UNA Hospital has increased since full-scale relocation, the existing manpower level for facility and equipment maintenance is insufficient.

3.5.2 Technical Aspect of Operation and Maintenance

The Maintenance Department of the UNA Hospital is responsible for the general maintenance of facilities and equipment, including air-conditioning units. According to the head of the Department, there are no specific technical problems in regard to maintenance work.

According to the Electro-Medical Department responsible for the maintenance of electro-medical equipment, the technical manuals provided by Japan have gone missing, causing some problems with the maintenance and repair work for this type of equipment. For some of the equipment made in Japan, it is difficult to obtain technical services because the agents stopped providing services for them in Paraguay. All personnel who were trained at the time of the handing-over of the equipment have since left the hospital and the head of Department believes that it is necessary for his engineers to undergo proper training.

Similarly, the user manuals for the electro-medical equipment have gone missing. Some equipment (including cleaning equipment and the instrumentation panel for the ventilator device in the Surgical Center) are not fully utilized on the front line because of the lack of manuals even though the number of such equipment is small. The manuals have been properly handed over but lost due to inadequate handing over when the dean of the Faculty of Medical Science was replaced.

In summary, the UNA has the technical capability to conduct the general maintenance of the facilities and equipment but the operation and maintenance of the hospital is hampered by the inability to fully utilize electro-medical equipment because of the missing manuals.

3.5.3 Financial Aspect of Operation and Maintenance

Apart from government funding by the Ministry of Education via the UNA and Faculty of Medical Science, the UNA Hospital has its own income source. As shown below, the government budgetary allocation almost doubled between 2005 and 2012. Meanwhile, government funding for the maintenance increased by some 70% between 2005 and 2012.





Fig. 10 Government Funding for Maintenance of the UNA Hospital (2005 – 2012; Unit: million Gr.) Source: UNA Faculty of Medical Science It must be noted that the amounts shown in the above figures represent the upper limits and that the entire amounts are not necessarily disbursed for spending because of constraints reflecting the actual level of revenue of the government. In the case of 2012 for example, only 78% of the budget allocated to the hospital was actually disbursed. When the actual disbursement is below the budgetary allocation, priority is given to covering the personnel cost, reducing the disbursement amount for facility maintenance and supplies, including drugs.²⁸ The actual disbursement in 2012 was 69% of the allocated budget for the maintenance and 62% for supplies. Income from the hospital's medical services was approximately one-twentieth of the allocated government budget and was mainly used to cover the personnel cost and facility maintenance cost.

As the UNA Hospital offers a means-tested subsidy up to 100% for patients who are unable to pay the medical cost in full, it has to bear the cost of supplies and drugs. Because of the massive increase of the number of patients since full-scale relocation, the current level of disbursement is insufficient to cover these costs. The new Ward Building is quite large and all of the bedrooms have an air-conditioning system, increasing the hospital's electricity cost. Moreover, the large number of toilets means an additional personnel cost to keep them clean. The present budgetary allocation for 2013 falls short of the required level and the hospital management has made a request to the government for increased budgetary allocation.

In short, the current amount of budget disbursement is insufficient for the UNA Hospital to cope with the much expanded facilities and increased number of patients. Although an application for an increase of actual amount of disbursement has been made, its prospect of success is uncertain. If a sufficient budgetary disbursement is not approved, there is a chance that there will be a budget shortfall for facility maintenance and also for supplies, including drugs.

3.5.4 Current State of Operation and Maintenance

According to the results of interviews with staff members of the Maintenance Department during the field survey as part of the ex-post evaluation, the buildings constructed under the Project have generally been maintained to an adequate level. No problems have emerged in regard to such building service systems as water, electricity and gas supply and the air-conditioning system. However, in response to the questionnaire survey, some staff members of the hospital expressed the opinion that the cleaning of toilets, waiting rooms and courtyard could be improved.

According to information provided by the Electro-Medical Department, of the 75 pieces of principal medical equipment provided under the Project, 12 are not fully functioning due to partial breakdown or lack of replacement parts, 2 are out of use due to breakdown and one is missing. Almost all of the functioning medical equipment is fully utilized. As mentioned earlier, some of the Japanese medical equipment provided under the Project are being used without repair despite their partial breakdown or are seldom used because of the lengthy time and high cost of obtaining replacement parts, in turn caused by the discontinuation of services for certain Japanese manufacturers by the local agents.

As explained above, while the maintenance of the buildings, building services and general equipment is adequate, some of the principal medical equipment is not fully functioning.

In summary, the operation and maintenance of the buildings, building services and general equipment is adequate. However, there is concern regarding secured funding for operation and maintenance. Moreover, the operation and maintenance of the electro-medical equipment provided under the Project faces some institutional and technical problems. Therefore, the sustainability of the Project is fair.

²⁸ When there is a shortfall of the budget for drugs at the UNA Hospital, a prescription is issued to each patient for the patient's own purchase of the necessary drug(s). In the case of a budget shortfall for the maintenance of medical equipment, the priority of the in-house allocation of the maintenance budget is given to the Surgical Center and ICU of which the *level* of importance and urgency is higher than other departments.

4. Conclusion, Recommendations and Lessons Learned

4.1 Conclusion

The Project was implemented to achieve (i) gualitative and guantitative improvement of the health and medical services at the UNA Hospital and (ii) expansion of the research and educational activities of the Faculty of Medical Science of the UNA by means of realizing the relocation of the UNA Hospital through the construction of hospital facilities and procurement of medical equipment. While the size of facilities was relatively smaller compared to the demand for medical services at the relocation site, the necessity and urgency of the Project were both high. The Project was relevant to the development policy of Paraguay and the ODA policy of Japan, therefore its overall relevance is high. Meanwhile, the number of patients using the UNA Hospital has rapidly increased since the full-scale relocation and the capacity of the hospital to diagnose and treat patients has already reached its limit, reducing the efficiency of the medical services. Moreover, the efficiency of the medical services has been partially decreased by unplanned building extension / alteration works and the rational layout of facilities in the original plan was altered. There is room for improvement in regard to the hospital facilities and hospital management. Improvement of the research and educational facilities has not been fully sufficient. The massive increase of the number of patients has had both positive and negative impacts on the quality of medical education at the UNA Hospital. The UNA Hospital provides advanced and specialized treatment with a low payment burden for patients and its benefits reach all corners of the country. However, because of the inadequate functioning of the referral system, the medical diagnosis and treatment capacity of the hospital is not effectively utilized. Although the project cost was roughly within the planned cost, the period of implementation was significantly exceeded the planned, therefore, the efficiency of the project is fair. The operation and maintenance of the buildings, building services and general equipment have been adequate. However, there is concern in regard to secured funding for operation and maintenance. Moreover, the operation and maintenance of the electronic medical equipment provided under the project are facing some institutional and technical problems. Therefore, the sustainability of the Project is fair. In the light of the above, this project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Relevant Organizations in Paraguay

(1) Recommendations to the National University of Asunción

The UNA should tackle the following issues in view of the more effective utilization of the newly relocated UNA Hospital.

- Continual improvement and upgrading of facilities: installation of an extension telephone system and increase of the number of external lines; improvement of the Outpatient Building, Second Surgical Center, Laboratory, Diagnostic Imaging Unit, Hospital Reception, Pharmacy, Car Park and Guiding Signs.
- Appropriate deployment of personnel and securing and execution of the necessary budget for operation and maintenance.
- Improvement of facilities and equipment at the Electro-Medical Department and training of Department engineers.
- > Improvement of the medical services through improved hospital management
- > Improvement of education based on the achievements of the curriculum reform project

- Steady achievement of the integrated hospital management system (Systema Integrado de Gestión Hospitalaria)
- Securing of a funding source for the construction of the Faculty of Medical Science Building and early realization of the relocation of the faculty.

(2) Recommendations to the Ministry of Public Health and Social Welfare

Although the UNA Hospital is the supreme referral hospital, it is congested with patients who do not necessarily require advanced treatment. As a result, the capacity of the hospital as a highest level medical institution is not fully utilized and the undesirable effects of this situation are felt on medical education at the hospital. To improve the situation, the Ministry of Public Health and Social Welfare should make the referral system involving the UNA Hospital function properly and should continue its efforts to improve the diagnosis and treatment capacity of lower tier medical institutions run by the Ministry.

4.2.2 Recommendations to the JICA

None

4.3 Lessons Learned

- ➤ When planning a relocation of a facility which provides a service for the public in general, it is essential to forecast the future demand for the facility in question as accurately as possible, taking any change of accessibility and the trends of users of the service into consideration. When the government of a recipient country does not conduct a sufficient demand forecast, the donor must conduct a demand forecast in an appropriate manner, including detailed review of the existing demand forecast, prior to the planning of the project details.
- ➤ For a university hospital to achieve its two objectives, i.e. (i) provision of appropriate medical services for patients requiring advanced medical care and (ii) implementation of high quality medical research and education, it is important to control the number of patients to accept at an adequate level on the basis of the criterion regarding the severity of the diseases. To achieve such control, it is essential to develop an effective nationwide referral system where lower tier medical institutions have sufficient diagnosis and treatment capacity.