

Country Name	The Project for Improvement of Medical Equipment in General Hospitals in Yangon
The Republic of the Union of Myanmar	

I. Project Outline

Background	Yangon General Hospital (YGH) and New Yangon General Hospital (NYGH) were tertiary hospitals in Lower Myanmar, which provided medical treatment to serious patients. They also provided free medical services to the poor as public medical facilities. However, their aging equipment frequently failed, making it difficult to maintain the quality of medical services. The maintenance system for safe and long-term use of medical equipment was insufficient, too.		
Objectives of the Project	The project aimed to improve quality of services of YGH and NYGH by procuring medical equipment and implementing technical assistance on operation and maintenance (O&M) of the procured equipment, thereby contributing to improvement of tertiary medical services and stabilization of referral system in Lower Myanmar.		
Contents of the Project	<ol style="list-style-type: none"> 1. Project Site: YGH, NYGH, and Yangon Specialist Hospital (YSH)¹ 2. Japanese side: (i) Procurement of 37 items of medical equipment (163 pieces in total) such as Magnetic Resonance Imaging (MRI) (1 piece), Computed Tomography (CT) scanners (2 pieces), laparoscopes (4 pieces), X-ray machine (digital, general) (1 piece), ultrasound machine (2 piece), various types of endoscopes (20 pieces), patient monitors (23 pieces), ambulances (4 pieces), etc.; (ii) Technical assistance (soft component of Grant Aid) on operation and maintenance of the provided equipment. 3. Myanmar side: To ensure the proper use of the provided equipment, to provide renovation work cost related to the provided equipment, etc. 		
Project Period	E/N Date	February 20, 2014	Completion Date (Actual date of completion of soft component was not available.)
	G/A Date	February 28, 2014	
Project Cost	E/N Grant Limit / G/A Grant Limit: 978 million yen, Actual Grant Amount: 932 million yen		
Executing Agency	Department of Medical Service (DoMS)*/Ministry of Health and Sports (MoHS) *Department of Health at the time of ex-ante evaluation. It was changed to DoMS in April 2015.		
Contracted Agencies	Main Contractor: Mitsubishi Corporation Main Consultant: Binko International Ltd.		

II. Result of the Evaluation

<Special Perspective Considered in the Ex-Post Evaluation>

- Since the actual completion date of soft component could not be confirmed from the existing documents and the field survey, in this ex-post evaluation, the planned date of the last session of soft component at the time of completion of equipment procurement (i.e. May 2016) shall be used as the completion date. (It is clear from the Ex-Ante Evaluation Sheet and the Preparatory Survey Report that the soft component was included in the project period at the planning stage).
- Effectiveness, Impact, and institutional and technical aspects of Sustainability include both outcomes/impacts of this project and the succeeding technical cooperation of JICA, namely, dispatch of a Senior Volunteer at NYGH in the field of Medical Engineering (2016-2018) and “The Project for Human Resource Development of Medical Engineering” (2018-2023). It is difficult to separate outcomes/impacts of this project from those of the succeeding technical cooperation.
- Regarding quantitative effects, the target values of the Indicators were calculated based on the expected increment for the period of 5 years. Effects of the relocation of part of the medical departments of YGH and NYGH to YSH shall not be considered in making judgement because the target values of the Indicators were decided in consideration of the expected relocation. As for utilization of the procured equipment, utilization status of the equipment items including the ones listed in the Ex-ante Evaluation Sheet and the ones listed as the major equipment in a JICA document shall be examined.

1 Relevance

<Consistency with the Development Policy of Myanmar at the Time of Ex-Ante and Ex-Post Evaluation>

At the time of ex-ante and ex-post evaluation, the project was consistent with development policy of Myanmar to prioritize improvement of quality of health services, as set forth in “Hospital Care Program” under “National Health Plan” (2011-2016) and in “Improving Hospital Care Program” under “National Health Plan” (2017-2021).

<Consistency with the Development Needs of Myanmar at the Time of Ex-Ante and Ex-Post Evaluation>

The project was consistent with development needs of Myanmar for upgrading of medical equipment in the target hospitals as described in “Background” at the time of ex-ante evaluation. Continuous needs were confirmed by the Executing Agency at the time of ex-post evaluation.

<Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation>

The project was consistent with “Economic Cooperation Policy for Myanmar” (2012), which included “assistance for improvement of people’s livelihood” as one of the three Priority Areas.

<Evaluation Result>

¹ At the time of ex-ante evaluation, the project sites were YGH and NYGH. YSH was added to the project sites in January 2015 to provide 5 items of the medical equipment originally planned for YGH and NYGH (7 pieces in total) due to relocation of some of the medical departments of these hospitals to YSH.

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Effectiveness>

The project partially achieved its objective of improving quality of services of YGH and NYGH in 2018 and the achievement status is likely to continue in 2019 (target year). As to quantitative effects, 23 out of 27 items (or 101 out of 107 of pieces) of the major equipment procured under the project has been utilized as originally intended². In 2018, all of the 4 Indicators for YGH achieved the respective targets at much higher level than planned; however, none of the 4 Indicators for NYGH achieved the targets because the actual results fell below the respective baseline figures in 2012. According to YGH, the actual results largely exceeded the target figures due to introduction of free of charge (FOC) services for diagnosis and basic medicine to the general public³. NYGH stated the actual results did not increase but decreased from 2012 due to effects of transfer of Urology Department to newly established YSH in 2015. Details were not clear, however. With respect to qualitative effects, maintenance capacity of the procured equipment has been improved at the target hospitals as a result of soft component of the project and the succeeding technical cooperation of JICA as described in “Sustainability”. The target hospitals confirmed that quality of diagnosis and treatment of serious patients has been improved because the provided equipment enabled them to provide early and certain diagnosis as well as early and effective treatment.

<Impact>

The assumed impact has been produced. According to the target hospitals, their function and credibility as top-level referral hospitals have been maintained or enhanced through the project because quality of diagnosis and treatment of serious patients has been improved as described in “Effectiveness”. They have continuously received referral patients from other general hospitals in Yangon and other regions in Lower Myanmar. The number of advanced surgical procedures such as open heart surgery, cardiac catheterization, neurosurgery, and endoscopic surgery, have increased in the target hospitals. In addition, the project has contributed to improvement of health care services to the poor as the target hospitals can give FOC service for poor patients on both diagnosis and intensive care services with the equipment procured under the project. Meanwhile, no negative impacts have been observed.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is fair.

Quantitative Effects

<YGH>

Indicators	Baseline 2012	Target 2019	(Ref) Target	Actual 2015	Actual 2016	Actual 2017	Actual 2018	(Ref) Actual
	Baseline Year	3 years after Completion	Increment Rate 2019	Year of equipment handover	Year of Completion	1 year after Completion	2 years after Completion	Increment Rate 2018
Indicator 1: Number of operation (cases/year)	15,415	16,200	5% (*1)	19,794	23,519	23,745	23,629	53%
Indicator 2: Number of Intensive Care Unit (ICU) patients (persons/year)	389	400	0.28% (*2)	691	711	691	643	65%
Indicator 3: Number of CT examinations (cases/year)	10,282	11,000	7.0% (*3)	24,566	33,231	36,333	41,070	299%
Indicator 4: Number of clinical (biochemical) examinations (cases/year)	217,820	230,000	5.6% (*4)	N/A	N/A	N/A	1,065,565	389%

*1: An increment of about 1%/year and about 5% by the target year is anticipated. *2: A patient increase of about 0.05%/year and about 0.28% by the target year is anticipated. *3: An increase in examinations about 1.4%/year and about 7.0% by the target year is expected. *4: An increase of 12,000 cases or about 5.6% by the target year is anticipated.

<NYGH>

Indicators	Baseline 2012	Target 2019	(Ref) Target	Actual 2015	Actual 2016	Actual 2017	Actual 2018	(Ref) Actual
	Baseline Year	3 years after Completion	Increment Rate 2019	Year of equipment handover	Year of Completion	1 year after Completion	2 years after Completion	Increment Rate 2018
Indicator 5: Number of operation (cases/year)	4,362	4,600	5.5% (*1)	3,032	3,289	2,951	3,284	-25%
Indicator 6: Number of ICU/Coronary Care Unit (CCU) patients (persons/year)	478	500	4.5% (*2)	365	313	299	308	-36%
Indicator 7: Number of X-Ray	9,978	10,500	5.0%	7,499	9,397	8,450	8,398	-16%

² Although most of the equipment is utilized, an automatic biochemistry analyzer at YGH, for example, is not utilized after being used a few times mainly because its capacity became too small for the increased workload of YGH after introduction of FOC service for diagnosis and hospital water resource is not enough to use the machine (For details, please see “Recommendations to Executing Agency”). Some equipment at the target hospitals is not utilized due to technical failure, poor resolution, etc. It is noted the target hospitals manage the related examinations either by procuring another type of machine with MoHS’s budget (in the case of the automatic biochemistry analyzer) or by using available equipment (in the case of the others). In addition, a CT scanner at YGH went out of order in July 2019 so that YGH requested MoHS to allocate the budget for replacement in the same month. Tender process is expected to start after getting the budget approval in October 2019.

³ FOC services for diagnosis and basic medicine was gradually introduced after the project started.

examinations (cases/year)			(*3)					
Indicator 8: Number of CT examinations (cases/year)	2,228	2,400	7.7% (*4)	1,443	2,492	2,082	1,449	-35%

*1: An increment of about 1.1%/year is anticipated and the objective is to increase about 5.5%. *2: An increase of about 0.9% /year is anticipated and the objective is to increase by about 4.5%. *3: It may be possible to increase by about 1.0% a year and the objective is to increase by about 5.0%. *4: It may be possible to increase by about 1.5% a year and the objective is to increase by about 7.7%.

Source: Ex-ante Evaluation Sheet; Preparatory Survey Report; YGH; NYGH

3 Efficiency

While the project cost was within the plan, the project period exceeded the plan (ratio against plan: 95% and 117%⁴ respectively). The project period was extended because some of the procured equipment had to be relocated after the initial installation due to inconvenience. The outputs of the project were produced as planned. Therefore, the efficiency of the project is fair.

4 Sustainability

<Institutional Aspect>

Recognizing the importance of maintenance system for the medical equipment, MoHS assigns engineers to tertiary hospitals, state and regional hospitals as biomedical engineers (BMEs). At the target hospitals, BMEs conduct daily maintenance and management of the medical equipment with the help of the nurses and medical technicians who use the equipment. Repair of the complicated malfunctioning and maintenance of some equipment, including the advanced medical equipment, are outsourced to local agents. As for the advanced medical equipment procured under the project, NYGH has an annual maintenance contract with the local agents and YGH is in the process of making one to ensure long-term utilization of the equipment. Further, Maintenance Department has been established at NYGH and YGH. Distribution and the number of the staff at the target hospitals is sufficient to provide medical services using the procured equipment because diagnosis and treatment using the procured equipment have been implemented without a serious problem and the equipment has been kept in good condition in general.

<Distribution of the relevant staff at the target hospitals as of June 2019>

Positions	YGH	NYGH	YSH
Doctors	522	6	11
Nurses	876	15	7
Medical technicians	192	21	N/A
Engineers (BMEs) in charge of maintenance of the medical equipment	1(*1)	2 ⁵	3

*1: It was increased to 6 in July 2019.

Source: YGH, NYGH and YSH

<Technical Aspect>

The target hospitals have necessary technical capacity to sustain the effects of the project. The BMEs and the concerned medical staff are able to conduct daily maintenance using the manuals and materials distributed and/or prepared under the soft component without a serious problem. Capacity of the BMEs has been enhanced through the succeeding technical cooperation of JICA. Two BMEs at NYGH have been trained by a Senior Volunteer in the field of Medical Engineering (2016-2018). Moreover, one-year post-graduate diploma course in medical engineering has been developed at University of Medical Technology, Yangon, under "The Project for Human Resource Development of Medical Engineering" (2018-2023). All of the six BMEs at YGH and one of the BMEs at YSH completed the course already. After the completion of the courses, five BMEs are on duty. Also, one of the BMEs at NYGH is taking the course in 2019. These trained BMEs in turn provide in-house training to their colleagues and other relevant staff so that technical capacity of the target hospitals is expected to be maintained.

<Financial Aspect>

Operation and maintenance (O&M) cost of medical equipment is provided by the budget allocated by MoHS. Except for the advanced medical equipment covered by annual maintenance contract, maintenance budget for the provided equipment is requested on ad-hoc basis

<Budget of NYGH for maintenance of the advanced medical equipment > (Unit: kyat)

	2016	2017	2018
Budget	47,500,000(*1)	79,800,000(*2)	234,900,000(*3)
Expenditure	47,500,000	79,800,000	234,900,000

*1: For change of UPS of CT. *2: For maintenance of MRI. *3: For maintenance of MRI, CT, and X-ray machine.

Source: NYGH

when the equipment is broken down, etc. For example, YGH received 1,960 million kyat for O&M of the medical equipment and NYGH secured 235 million kyat for maintenance contract of the advanced medical equipment in 2018. Data for O&M budget of the provided equipment were not available. According to the target hospitals, the necessary budget has been secured by MoHS.

<Current Status of Operation and Maintenance>

From interview to the target hospitals and field observation, it was confirmed that most of the equipment procured under this project is in good condition and necessary spare parts and consumables are properly managed. As described in <Effectiveness>, a few pieces of equipment are not utilized due to poor resolution or technical failure, but the end users have not reported the problems to the responsible persons (BMEs and/or Medical Superintendents (MSs)) for some reason. During the field observations, staff accompanying the ex-post evaluator mentioned they would report to the responsible persons to take actions.

<Evaluation Result>

Therefore, the sustainability of the project effect is high.

5 Summary of the Evaluation

The project partially achieved its objective of improving quality of services of YGH and NYGH because quantitative targets at NYGH such as numbers of operations, ICU/CCU patients etc. were not achieved; but the assumed impact of improving tertiary medical services and stabilization of referral system in Lower Myanmar has been observed. Regarding the sustainability, no particular problems have been

⁴ Please see the first point of <Special Perspective Considered in the Ex-Post Evaluation>.

⁵ At NYGH, four engineers are assigned but three are responsible for medical equipment. In addition, one of the three is on leave to attend the diploma course in medical engineering as described in <Technical Aspect>.

observed in terms of institutional, technical, and financial aspects of the executing agency. As for efficiency, the project period exceeded the plan. Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations to Executing Agency:

- Most of the equipment provided to the target hospitals are properly maintained and utilized. However, it is recommended that management level of the target hospitals instruct all the end users to report to the concerned departments in the hospitals immediately after their finding any equipment malfunctioning, to make sure that the hospitals can take appropriate actions such as replacing, repairing, or requesting MoHS for budget allocation.
- It is recommended that MoHS analyze the factors why the project effects were not achieved at NYGH.

Lessons Learned for JICA:

- An automatic biochemistry analyzer at YGH is not utilized after being used a few times because (1) the capacity is too small if comparing with work load of YGH, which increased due to introduction of FOC service of diagnosis; (2) Sample tube size is too small; (3) hospital water resource is not enough to use the machine; and (4) YGH has procured another type of machine under MoHS' budget which is convenient to use for. In a future Grant Aid project for medical equipment procurement, during the formulation stage and detail designing stage, JICA should closely communicate with the executing agency and recipient hospitals on expected conditional changes which may affect utilization of the procured equipment. During the hand-over stage and the defect liability period, JICA should carefully monitor the procured equipment being utilized appropriately and remind the recipient hospitals and the executing agency to report on any problems arisen from the equipment.



Ambulance procured by the project in YGH



Safety Cabinet procured by the project in Clinical Laboratory at NYGH