

Country Name	The Project for Improvement of Medical Equipment in National, Municipal and Provincial Referral Hospitals
Kingdom of Cambodia	

I. Project Outline

Background	Health sector indicators of Cambodia had much improved by financial and technical cooperation of donors including Japan since the end of the civil war. However, the health sector indicators still remained on a low level compared with the Indochinese peninsula countries. Cambodia still had many difficulties in the health sector. The Ministry of Health (MOH) had been struggling for the improvement of the quality of health services as one of the strategies in the health sector. MOH had been improving medical equipment based on the standard equipment list by each provincial referral level. Nevertheless, medical equipment for providing basic health services had not yet been equipped even in the National Hospitals (NHs) and the tertiary referral hospitals (RHs) in provinces.		
Objectives of the Project	To improve health services by procuring medical equipment to 4 NHs, Phnom Penh Municipality Hospital and 16 tertiary RHs		
Contents of the Project	<p>1. Project Site: Phnom Penh Municipality and capitals of 16 provinces (Banteay Meanchey, Battambang, Kampong Chhnang, Kampong Speu, Kampong Thom, Kampot, Kandal, Koh Kong, Kratie, Prey Veng, Pursat, Siem Reap, Preah Sihanouk, Stung Treng, Svay Rieng, Takeo)</p> <p>2. Japanese side: (1) Procurement of General X-ray (13 pieces), Patient Monitor (39 pieces), Ultrasound Machine (16 pieces, of which 6 pieces are for Obstetrics & Gynecology), X-ray Protection Box (9 pieces) and others. (2) Technical Assistance (soft component) on operation and maintenance of the equipment and on the diagnostic techniques (Originally, General X-ray was planned to be procured to 14 hospitals, but procurement to Sihanouk Ville Hospital was canceled by the time of the Detailed Design. X-ray Protection Box to Kompot Hospital was also canceled.)</p> <p>3. Cambodian side: To ensure that the products be maintained and used properly and effectively for the implementation of the project</p>		
Project Period	E/N Date	March 20, 2012	Completion Date May 24, 2013 (Completion of soft component)
	G/A Date	March 29, 2012	
Project Cost	E/N Grant Limit / G/A Grant Limit : 374 million yen		Actual Grant Amount: 214 million yen :
Executing Agency	Ministry of Health (MOH), 4 NHs, Phnom Penh Municipal Hospital and 16 tertiary RHs		
Contracted Agencies	Main Contractor(s): NISSEI TRADING CO., LTD. Main Consultant(s): INTEM Consulting, Inc.		

II. Result of the Evaluation

<Constraints on Evaluation>

- The survey team was only able to collect data from 8 hospitals out of 21 target hospitals.
- There were some constraints in data collection as follows: (1) Some focal persons who had clear technical knowledge of the field and can answer the questionnaires have changed. (2) It was technically difficult for hospitals at the provinces to respond to the questionnaire because they lack capacity and access to use internet to response via email. For this reason, the questionnaires were also sent in hard copy. Response was not completely received from all the target hospitals due to their physical distance from the capital city.

1 Relevance

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

The project has been consistent with Cambodia's development policy. At the time of ex-ante evaluation, health was one of the prioritized sector under "the National Strategic Development Plan (NSDP 2009-2013)", and the Royal Government aimed at continuing to take measure to increase investment in physical infrastructure, medical equipment and technologies. At the time of ex-post evaluation, under "the National Strategic Development Plan (2014-2018)", health remains highlighted point of priority sector. The Royal Government recognizes that the current health service delivery system has not yet met the goals both in terms of quantity and quality. Health centers and referral hospitals have not yet provided a full range services due to lack of medical equipment and medical technology, shortage of medical staffs. Also, "the National Policy on Medical Equipment Management in Cambodia (2015)" emphasizes needs on strengthening and improvement of standardization of medical equipment management throughout the country.

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

The project has been consistent with Cambodia's development needs for medical equipment. At the time of ex-ante evaluation, MOH had been improving medical equipment based on the standard equipment list by each provincial referral level. However, medical equipment for providing basic health services had not yet been equipped even in the NHs and the tertiary RHs in provinces. At the time of ex-post evaluation, based on interview with the Department of Health Service of MOH and the hospitals surveyed by this ex-post evaluation, the number of patients has increased at NHs and RHs and the equipment procured under the project is needed for operating treatment and patient diagnosis services.

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

The project was consistent with Japan's ODA policy, as Country Assistance Program to Cambodia (2002) prioritized the support for the vulnerable (education, health and others).

<Evaluation Result>

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

2 Effectiveness/Impact

<Effectiveness>

The project has mostly achieved its objectives, “to improve health services by procuring medical equipment to 4 NHs, Phnom Penh Municipality Hospital and 16 tertiary RHs” as the indicators set to measure the effectiveness, such as “the number of patients who take X-ray examination” and “the number of patients who take ultrasound machine” are deemed to achieve the targets, according to the 8 hospitals which responded to the questionnaire, though the number of respondents was limited.

In general, the condition of the equipment procured under the project continues to operate properly although some of machines including X-ray machines (2) and ultrasound machines (3) were reported that they are not operating.

The average number of patients utilizing the ultrasound and X-ray machine has remarkably increased above the expected targets. Members of medical equipment management team of the target hospitals (8 respondents) mentioned that the capacity of doctors and medical equipment operators for diagnostic care to patients has improved with confidence and accuracy to provide appropriate patient care and treatment, following the completion of the soft component of the project at the targeted hospitals. Some hospitals mentioned that patients chose the hospitals because they heard about hospital equipped with the modern medical equipment. Three hospitals specifically mentioned that reliable level of security was reported as the project envisaged, with installment of x-ray protection box to prevent radiation diffusion to X-ray technicians and external surrounding environment. Eight hospitals responded that as a result of implementation of the soft component, ability of medical technicians has been upgraded with basic competence to conduct troubleshooting against minor technical error and simple repair.

<Impact>

Although the project aimed at improving the referral system at the time of ex-ante evaluation, the number of referred patients is not realistically available since patients in Cambodia visit upper referral hospitals by themselves without going through the referral system. However, the increasing trend of service utilization (outpatients and inpatients) could indicate positively correlated impact on referral system under the project.

The number of patients who use X-ray and ultrasound is generally recorded in aggregate term, which is not categorized by gender. However, ultrasound machines procured under the project include pieces for Obstetrics & Gynecology and therefore, the increase in trend of ultrasound utilization over the last three years indicates a positive impact on improvement in quality of service delivery and hospital visits by female patients.

No negative impacts on natural environment were observed and no land acquisition occurred under this project.

<Evaluation Result>

In light of the above, a certain effect of the project has been observed. Therefore, the effectiveness/impact of the project is high.

Quantitative Effects

Indicator 1	Baseline 2009 Baseline Year	Target 2016 3 Years After Completion	Actual 2013 Completion Year	Actual 2014 1 Year After Completion	Actual 2015 2 Years After Completion	Actual 2016 3 Years After Completion
1-1 The number of patients who take X-ray examination	45,326 (Avg: 3,022)	47,592 (Avg: 3,172)	(Average) 5,770	(Average) 6,212	(Average) 7,571	(Average) 8,752
1-2 The number of patients who take ultrasound machine	37,919 (Avg: 2,917)	45,502 (Avg: 3,500)	(Average) 6,907	(Average) 6,891	(Average) 7,883	(Average) 8,883

*The number of respondents: 8 hospitals for 1-1 and 6 hospitals for 1-2

Source : JICA internal documents, questionnaire and interviews with MOH, and questionnaire survey with the target hospitals, interviews with 1 national hospitals and 3 provincial hospitals

3 Efficiency

Both the project cost and the project period were within the plan (ratio against the plan: 57%, 100%). Therefore, the efficiency of the project is high.

4 Sustainability

<Institutional Aspect>

Operation and Maintenance (O&M) of the equipment procured under the project is carried out by the target hospitals of the project. Institutional arrangement for medical equipment management team which is composed of three staff members has been established at the targeted hospitals following the National Policy on Medical Equipment Management in Cambodia (2015). Operational tasks for the medical equipment maintenance are addressed through dispatch of medical technicians for technical follow-up maintenance and inspection. For major repairs, the medical equipment management teams contact contracted agents for the service through reporting to MOH and by the hospitals by their own in some cases.

<Technical Aspect>

Medical technicians are basically able to diagnose the errors with the machine operation, but the ability to repair the complicated machine malfunctioning is still limited. When complicated errors happen, the hospital medical equipment team contact the agents for trouble shooting and repairs. However, it is also difficult for the agent to repair due to lack of local engineers and spare-parts for replacement the damaged parts. Insufficient and uncertain budget planning and execution on capacity building through refresher training on medical equipment management skills significantly limits opportunities for national and provincial referral hospitals to upgrade capacity of the staff in charge of medical equipment.

<Financial Aspect>

The hospitals collected user fee as the main source of revenue for spending on maintenance cost of medical equipment although some small portion of budget was allocated by MOH. Over the last three years, the financial flow shows availability of financing on maintenance, which is disbursed when machines break down on ad hoc basis. However, maintenance cost of medical equipment, especially costly broken equipment that bears high expenditure on spare part procurement and repair, makes it difficult over the capacity of hospitals to handle.

Revenue and Expenditure of the target hospitals

(Unit: Million KHR)

	2014	2015	2016
Revenue (Total)	2,051	2,812	2,987
Breakdown: MOH	1,547	2,003	2,107
Breakdown: Patient Fee	504	809	880
Expenditure (Total)	N/A	N/A	N/A
Breakdown: Maintenance cost of medical expense	23	32	47
Balance	N/A	N/A	N/A

Note: The figures in the table above shows average of the 8 respondents.

<Current Status of Operation and Maintenance>

Periodic follow-up inspection was observed against inventory list of equipment maintained by the medical equipment management team at the hospitals with purpose for maintenance and repair. However, repair and spare-part procurement for the broken equipment remain limited. As mentioned above, some equipment items procured under the project were not operating. The reasons are due to technical failure and lack of skills to provide holistic maintenance as well as lack of budget. So far, any measures for the repair were not confirmed.

<Evaluation Result>

In light of the above, slight problems have been observed in terms of the technical, and financial aspects of the executing agency, such as lack of technical capacity for the complicated repair, lack of maintenance costs and limited repair and spare-parts procurement. Therefore, the sustainability of the project effect is low.

5 Summary of the Evaluation

The project has mostly achieved its objectives, “to improve health services by procuring medical equipment to 4 NHs, Phnom Penh Municipality Hospital and 16 tertiary RHs” as the indicators set to measures the effectiveness, such as “the number of patients who take X-ray examination” and “the number of patients who take Ultrasound Machine” are deemed to achieve the targets.

As for the sustainability, slight problems have been observed in terms of the technical and financial aspects of the executing agency, such as lack of technical capacity for the complicated repair, lack of maintenance costs and limited repair and spare-parts procurement, however, there is no problem in the institutional aspect.

Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned

Recommendations to Executing Agency:

- As soon as possible, particularly at the onset of budget planning stage by MOH, MOH, NHs and RHs at tertiary level are recommended to secure sufficient recurrent budget from the central level for maintenance expenditure which plays important role to support durable operation and effective management of medical equipment.
- In order to fix the equipment items that haven't functioned, the executing agencies are recommended to contact JICA to identify expert/technicians.

Lessons Learned for JICA:

- Some of the equipment items which haven't functioned remained unfixed due to the lack of basic technical skills and knowledge. The project should have included longer and more detailed soft component to technicians on how to diagnose the condition of medical equipment and refer to the local agents at appropriate timing.
- Staff members in charge of medical equipment maintenance lack of opportunities to brush up their capacity to perform standard maintenance of medical equipment. According to the interviews with hospital staff members who were trained under the soft component, their understanding and capacity for machine maintenance was upgraded. And they noticed that without periodic refresher training, their knowledge and capacity might deteriorate. Refresher training on technical skills on medical equipment management could be effective as a supportive component to strengthen capacity building of medical equipment management staff for smooth, efficient control of equipment operation and management. Consideration of supporting refresher training under other schemes such as follow-up cooperation or knowledge co-creation programs is recommendable.
- Although its impact was set as "to establish referral system among national and tertiary referral hospitals at provincial level ". there was no support to establish the referral system in this project. In order to build a functional referral system, some technical assistance needs to be provided, such as providing seminar or workshop among staff to teach how to make referral or how to record the patients separately from those who are referred and those who are not, etc. Thus, when establishing a project logic, it is suggested to make an impact that can be achieved from the outputs.



X-ray theater, Siem Reap Provincial Referral Hospital



Patient Monitor, Battambang Provincial Referral Hospital