

Kingdom of Cambodia

FY2019 Ex-Post Evaluation of Japanese Grant Aid Project

“The Project for Expansion of National Maternal and Child Health Center”

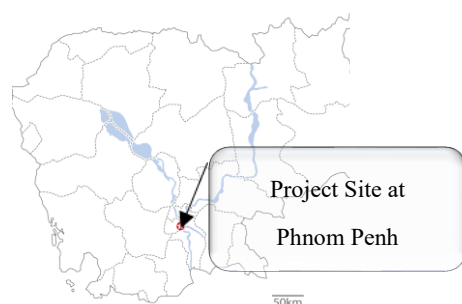
External Evaluator: SASAKI Atsushi, Katahira & Engineers International

0. Summary

The project was implemented aiming at expanding the training function and improving the quality of perinatal care at the National Maternal and Child Health Center, hereinafter referred as “NMCHC,” by constructing a new training center, renovating the existing facilities and providing equipment, thereby contributing to enhancing its function as the top institution for maternal and child health care in Cambodia. The project has been highly consistent with the Cambodian development plan and needs which emphasize maternal and child health as one of the priority issues, and Japan’s ODA policy. Therefore, the relevance of the project is high. In the course of its implementation, although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair. With regard to the effectiveness, the project achieved in 2018 its quantitative targets for the year 2020 in each aspect of clinical function, inpatient ward and training function. Qualitative effects were found to improve the quality of emergency obstetric care and trainings. Positive impacts were also confirmed such as geographical ripple effects. Therefore, effectiveness and impacts of the project are high. As for the operation and maintenance, there are two kinds of equipment not utilized because the NMCHC selected to use a new external institution for these types of analysis to save on its operation cost, but the project related facilities and equipment are well maintained in general. No major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

In light of the above, this project is evaluated to be highly satisfactory.

1. Project Description



Project Location



NMCHC

(Left: Training Center)

1.1 Background

In Cambodia, a remarkable improvement of pregnancy-related mortality ratio per 100 thousand births has been achieved, from 437 in the year 2000 to 170 in the year 2014¹. However, key indices of maternal and child health, hereinafter referred as “MCH,” still needed further improvements when compared to the levels of neighboring countries at the time of the project planning. The NMCHC was constructed in 1997 by the Grant Aid of the Government of Japan as the top national institution for MCH. It provides three types of functions, i.e., clinical care, training and policy (secretariat for national MCH programs). With regard to the clinical care function of the NMCHC, perinatal care services at a higher level became necessary to cope with increasing high-risk patients, such as increasing number of surgical operations. As for the training function of the NMCHC, expansion of its facilities became urgent to provide appropriate trainings in line with increased and diversified needs for both pre-service and in-service trainings. Under such circumstances, the Government of Cambodia requested a Grant Aid to the Government of Japan for the improvement of the clinical and training function of the NMCHC.

1.2 Project Outline

The objective of this project is to expand the training function and to improve the quality of perinatal care at the NMCHC by constructing a new training center, renovating the existing facilities and providing equipment, thereby contributing to enhancing its function as the top institution for MCH in Cambodia.

Grant Limit / Actual Grant Amount	1,193 million yen / 1,091 million yen
Exchange of Notes Date / Grant Agreement Date	March 2014 / March 2014
Executing Agency	Ministry of Health, NMCHC
Project Completion	October 2016
Target Area	NMCHC at Phnom Penh
Main Contractors	Construction: Taisei Corporation Equipment: Mitsubishi Corporation
Main Consultants	Consortium of Nihon Sekkei, Inc. and Fujita Planning Co., Ltd.
Preparatory Survey	July 2013 – March 2014

¹ Source: Cambodia Demographic and Health Survey 2014

Related Projects	<ul style="list-style-type: none"> ➤ “The Project for Construction of the National Maternal and Child Health Center,” Grant Aid, Exchange of Notes in 1995 ➤ “Project on Promotion of Medical Equipment Management System,” Technical Cooperation, Cooperation Period from Jan. 2006 to Dec. 2008 ➤ “Project for Improving Continuum of Care with focus on Intrapartum and Neonatal Care (IINeoC Project),” Technical Cooperation, Cooperation Period from May 2016 to May 2021
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2. Outline of the Evaluation Study

2.1 External Evaluator

SASAKI Atsushi, Katahira & Engineers International

2.2 Duration of Evaluation Study

This ex-post evaluation study was conducted with the following schedule.

Duration of the Study: September 2019 – November 2020

Duration of the Field Study: December 1, 2019 – December 20, 2019,
March 2, 2020 – March 6, 2020

3. Results of the Evaluation (Overall Rating: A²)

3.1 Relevance (Rating: ③³)

3.1.1 Consistency with the Development Plan of Cambodia

At the time of planning, the Government of Cambodia emphasized the health sector as the priority issue in its *National Strategic Development Plan 2009-2013*. In the *Health Strategic Plan 2008-2015*, MCH was mentioned as one of the top priorities in the health sector. At the time of ex-post evaluation, health improvement was emphasized as the key basis for human resource development, both in the *Rectangular Strategy for Growth, Employment, Equity and Efficiency Phase IV 2019-2023*, the supreme development strategy of the nation, and the *National Strategic Development Plan 2019-2023*, formulated under the said Rectangular Strategy. In the *Third Health Strategic Plan 2016-2020*, MCH was mentioned as one of the top priorities in the health sector. Therefore, the project has been consistent with the development plan of Cambodia throughout the periods of planning and ex-post evaluation.

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

³ ③: High, ②: Fair, ①: Low

3.1.2 Consistency with the Development Needs of Cambodia

With regard to the clinical care function of the NMCHC at the time of planning, perinatal care services at a higher level became necessary to cope with the increasing number of high-risk patients who are referred to the NMCHC under the strengthened referral system⁴ of the country. As for its training function of the NMCHC, the expansion of the training facilities became urgent to provide appropriate trainings in line with diversified and increased training courses. At the time of ex-post evaluation, high level perinatal care services continue to be important to cope with high-risk patients, e.g., number of surgical operations in 2018 exceeds the 2020 target by 16% as described in detail in section 3.3.1.1(a). Training facilities continue to be important to meet increasing and diversifying training needs, e.g., number of trainees in 2018 exceeds the 2020 targets for pre-service training by 22% and for in-service training by 92%, respectively, as described in detail in section 3.3.1.1(c). From the above, the project is in line with the development needs of Cambodia's MCH services through the NMCHC both at the time of planning and ex-post evaluation.

3.1.3 Consistency with Japan's ODA Policy

The *Country Assistance Policy for Cambodia, April 2012*, of the Government of Japan included the "Promotion of Social Development" as one of the priority areas, where strengthening of health system was stated as a key program. Among the health sector support, MCH care was clearly indicated as a focus area. Therefore, the project was consistent with Japan's ODA policy at the time of planning.

This project has been highly relevant to the country's development plan and development needs, as well as Japan's ODA policy. Therefore, its relevance is high.

3.2 Efficiency (Rating: ②)

3.2.1 Project Outputs

At the NMCHC, the project constructed a new training center, renovated the existing facilities and provided equipment. Table 1 shows details of the project outputs. It was confirmed through hearings and a field survey at the NMCHC that all the planned contents for each item of the project were fully implemented. As for the renovation works of the sewerage, in addition to the original plan to replace the damaged part of the septic tank, pumps were replaced because they were found to be broken before starting the renovation works. This replacement of broken pumps is considered to be a reasonable addition of works since it was necessary to restore the sewerage function for the existing main building.

⁴ Referral system of the health sector means sending (referring) a patient to a higher-level institution from a lower-level institution which cannot properly treat that patient.

Table 1 Outputs of the Project

Item	Actual Outputs	Remarks
Construction of a New Training Center	<ul style="list-style-type: none"> ➤ Four-story building with total area of 2,900 m² ➤ Training rooms: 40 seats x 1 room, 20 seats x 4 rooms ➤ Problem Based Learning Rooms⁵: 10 seats x 4 rooms ➤ Clinical Simulation Lab x 1 room ➤ Dormitory ➤ Management office, etc. 	A new training center was constructed as planned.
Renovation of the Existing Facilities	<ul style="list-style-type: none"> ➤ Renovation of South Wing 3rd floor and North Wing 2nd floor with total area of 1,754 m² ➤ Neonatal Care Unit⁶ with 20 beds ➤ Intensive Care Unit⁷ with 6 beds ➤ Recovery Room with 10 beds ➤ Kangaroo Care Room with 4 beds ➤ Inpatient ward rooms: 8-bed x 12 rooms, 4-bed x 6 rooms, 2-bed x 3 rooms, 1-bed x 8 rooms, Total 134 beds in 29 rooms ➤ Installation of stretcher elevators ➤ Replacement of damaged part of sewerage ➤ Replacement of broken part of incinerator 	<p>The existing facilities were renovated as planned. In addition, the pumps of the sewerage were replaced because they were found to be broken.</p> <p>Total number of ward beds is maintained at 134 while the share of 8-bed rooms was reduced by this renovation.</p>
Medical and Training Equipment	<p>42 kinds of equipment including the following major equipment:</p> <ul style="list-style-type: none"> ➤ General X-ray Unit ➤ Mobile X-ray Unit ➤ Electrolyte Analyzer⁸ ➤ Blood Gas Analyzer⁹ ➤ CRP Analyzer for Micro Sample¹⁰ ➤ Simulation Models for training 	42 kinds of equipment were supplied as planned.
Outputs by the Cambodian side	Installation of general furniture, curtains and blinds at the new training center	Cambodian side also completed as planned.

Source: Questionnaire answers by the NMCHC

⁵ Problem Based Learning (PBL) rooms are used for group discussions.

⁶ Neonatal Care Unit, NCU, is a special facility for the intensive care of neonates.

⁷ Intensive Care Unit, ICU, is a special facility for the intensive care of mothers.

⁸ Blood analyzer for measuring electrolytes in specimen materials.

⁹ Measures electrolyte and partial pressure of blood gas for diagnosis of newborn respiratory functions.

¹⁰ Measures CRP reaction for diagnosis of infections.

3.2.2 Project Inputs

3.2.2.1 Project Cost

The project cost was planned to be 1,193 million yen on the Japanese side and 9 million yen on the Cambodian side. The actual cost born by the Cambodian side for furniture, curtains, etc., was not available because it was not recorded separately from the other routine expenditure of the NMCHC. Consequently, the project cost was evaluated by comparing the planned and actual cost born by the Japanese side. The actual cost by the Japanese side was 1,091 million yen, falling within the plan and accounting for 91% of the planned cost. The competition at the time of bidding resulted in a lower contract price than the original estimation, even after the contract amount increased around 2 million yen to cover the cost for replacing the sewerage pumps.

3.2.2.2 Project Period

The project period from the commencement of detailed design until the completion of civil works was planned to be 24 months, from April 2014 until March 2016. According to the NMCHC, start of tendering was delayed by four months to determine the details of the correction since a reinforcement bar mis-arrangement in the floor of the existing facility was found after starting the detailed design. In addition, construction work was suspended for three months until the determination of the countermeasures to reinforce the footing beam because of the insufficient bearing capacity of one of the piles caused by faulty construction. Due to the two factors mentioned above, total project period was delayed by seven months. As a result, the actual project period exceeded the plan and amounted to 31 months, from April 2014 until October 2016 (accounting for 129% of the planned period).

Although the project cost was within the plan, the project period exceeded the plan. Therefore, efficiency of the project is fair.

3.3 Effectiveness and Impacts¹¹ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

At the time of planning, quantitative indicators with baseline and target figures were set for (a) clinical function, (b) inpatient ward and (c) training function, respectively. For the ex-post evaluation, some indicators are added and actual data after the completion year are analyzed. The targets were set for the year 2020 but the ex-post evaluation was conducted in fiscal year 2019 which is three years after the project completion.

(a) Quantitative effects for the clinical function

Table 2 shows quantitative indicators of the NMCHC perinatal care function comparing data for baselines, targets and actual figures.

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

Table 2 Clinical Function Indicators

	Baseline	Target	Actual		
	2010-2012 Average	2020	2016	2017	2018
		4 Years After Completion	Completion year	1 Year After Completion	2 Years After Completion
(1) Number of Operations (cases/year)	2,337	2,500	2,303	3,190	2,906
(2) Number of Neonates Treated at NCU (cases/year)	723	1,400	1,148	990	882
(3) Share of Neonates Treated at NCU out of Total Deliveries (%)	11	20	15	14	12
(4) Average Bed Occupancy Rate (BOR) ¹² at NCU (%)	66 (2010-2011 average)	Max. 80	113	72	70

Source: Preparatory Survey Report, Questionnaire answers by the NMCHC

Note: The NMCHC revised its criteria to select neonates to be treated at NCU after 2017. Further details are described in the main text below.

The number of surgical operations in both 2017 and 2018 exceeded the target for the year 2020. Since the patients to undergo operations are high-risk patients, this indicator shows that the NMCHC continues to cope with increasing high-risk patients. As for the number of neonates treated at NCU and its share out of total deliveries, actual figures were below the targets because the NMCHC revised its criteria to select neonates to be treated at NCU after 2017. Until 2016, neonates of premature¹³ delivery were all treated at NCU. Since it became possible to treat neonates of premature delivery without complications at the ward, the selection criteria of neonates were revised to reflect this improvement of the care system. The lowering indicators of neonates treated at NCU do not imply lowered needs to treat high-risk neonates but they reflect the above-mentioned revision of selection criteria. Therefore, figures below the targets are not considered to be negative signs in view of the project effects. The Bed Occupancy Rate, BOR, at NCU in 2016 was at a critical level of 113% with a possible risk of nosocomial infections. After 2017, it was improved to the proper level below the maximum target of 80% as a result of almost doubling the number of NCU beds from 11 to 20 by the project as well as due to the above-mentioned revision of criteria.

¹² Bed Occupancy Rate, BOR, is the percentage share of days a bed is occupied out of 365 days in a year.

¹³ Deliveries before the 37th week of pregnancy.

(b) Quantitative effects for the inpatient ward

Table 3 shows quantitative indicators of the NMCHC's patient ward comparing data for baselines, targets and actual figures.

Table 3 Inpatient Ward Indicators

	Baseline	Target	Actual		
	2010-2012 Average	2020	2016	2017	2018
		4 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion
Bed Occupancy Rate, BOR (%)					
8-bed rooms	65	Max. 90	75	87	88
4-bed rooms	72	Max. 90	89	79	83
2-bed rooms	76	Max. 90	87	79	81
1-bed rooms	84	Max. 90	77	74	77
Number of poor ¹⁴ patients whose ward fee was covered by NMCHC or HEF ¹⁵ (persons/year)	818 (2011)	No target set	742	659	772
Amount of ward fee covered by NMCHC or HEF for the poor patients (thousand US\$/year)	46.4 (2011)	No target set	57.2	53.0	84.6
Total amount of inpatient ward fee (thousand US\$/year)	419.3 (2012)	502.6	932.5	1,074.9	1,348.3

Source: Preparatory Survey Report, Questionnaire answers by the NMCHC

Actual BOR figures in 2018 were in the range between 77% and 88% for all types of rooms from 8-bed to 1-bed. The ward rooms renovated by the project are, therefore, well utilized at a proper level below the maximum target of 90%. With regard to the ward fee support for poor patients, it was originally covered by the NMCHC's own budget at the time of planning but a new support scheme has been started since the system amendment of the national HEF in 2018. The

¹⁴ Poor people are either the members of households identified as poor by the survey of the Ministry of Planning, effective for 3 years, or those who are identified as poor by the survey of a medical institution effective for 1 year.

¹⁵ The Health Equity Fund, hereinafter referred as HEF, is a national grant scheme to support medical expenses of the poor people financed by a pool fund of the government budget and development partner contributions. The NMCHC started to receive HEF benefits after 2018.

inpatient ward fee for 772 poor patients in 2018, accounting for 94%¹⁶ of the baseline of 818 patients in 2011, were covered by either the NMCHC's own budget or the HEF benefits. In terms of amount, it increased notably from the baseline of US\$ 46.4 thousand in 2011 to US\$ 84.6 thousand in 2018, reflecting the additional support from the HEF. These indicators show that the NMCHC is extending sufficient services for poor patients. The total amount of inpatient ward fee income of the NMCHC reached US\$ 1,348.3 thousand in 2018, more than double of the target amount for 2020. This large increase was realized by the new medical insurance benefits from the National Social Security Fund, NSSF¹⁷ added after 2017, in addition to the above mentioned HEF benefits for the poor.

(c) Quantitative effects for the training function

Table 4 shows quantitative indicators of the NMCHC training function comparing data for baselines, targets and actual figures.

Table 4 Training Function Indicators

	Baseline	Target	Actual		
	2011-2012 Average	2020	2016	2017	2018
		4 Years After Completion	Completion Year	1 Year After Completion	2 Years After Completion
Number of pre-service trainees (persons/year)	522	650	869	953	793
Number of in-service trainees (persons/year)					
Total	1,316	2,050	N.A.	N.A.	3,927
Excluding short-term workshops	463	788	N.A.	740	800
Available number of training room seats (seats)	80	120	120	120	120
Available number of PBL room seats (seats)	-	40	40	40	40

Source: Preparatory Survey Report, Questionnaire answers by the NMCHC

Actual number of trainees for pre-service students in 2018 was 793 persons, exceeding the 2020 target of 650 persons by 22%. Actual number of trainees for in-service medical doctors and

¹⁶ The number of poor patients is not increasing although they do not need to pay their medical fees. According to the NMCHC explanations, poor patients feel it is a burden to pay transportation costs and worry about reduced income by taking a leave to go to a hospital. To cope with these situations, the government introduced a new scheme in 2019 to provide cash for poor mothers and children if they visit a medical institution for their scheduled check-ups.

¹⁷ The National Social Security Fund, NSSF, managed under the Ministry of Labor and Vocational Training is a social security system which started accident compensation insurance for employees in 2008. The NSSF started its medical insurance nationwide from 2016, and the NMCHC became eligible to benefit from it after 2017.

midwives in 2018 was 3,927 persons, close to double the target of 2,050 persons and exceeding by 92%. Out of this total number of in-service trainees, actual number of trainees, excluding short-term (one day) workshops¹⁸, in 2018 was 800 persons; exceeding the 2020 target of 788 persons. The number of available seats for both training rooms and PBL rooms are maintained as planned. The quantitative effects for trainings are achieved by number of trainees exceeding the plans for both pre-service and in-service trainings.

As explained in the above sections (a) through (c), the actual figures for the year 2018 exceeded the targets (or remained at a proper level less than the maximum figures) for the year 2020 in each aspect of clinical function, inpatient ward and training function. Therefore, quantitative effects of the project are achieved.

¹⁸ Almost a half of the in-service trainings excluding short-term (one day) workshops is technical trainings for clinical services, and the remaining half is trainings on the contents of the national MCH programs. Short-term (one day) workshops include various activities for the national MCH programs such as development and revision of program guidelines, development of training materials and discussions with partners related such as donors and NGOs.



Patient Monitor used at the ICU



8-bed Room



Training Room used for an In-Service Training



Number of Daily Deliveries Displayed with Different Colors by Gender

[Box] Efforts by the Cambodian Government to Reduce the Patients' Burden for their Medical Expense

The Government of Cambodia has realized a series of efforts in recent years to reduce the patients' burden for their medical expense. The evaluator considers that these policy reforms have contributed as a good basis to improve the positive effects of the project. As previously mentioned in section 3.3.1.1(b), the NMCHC became eligible to receive benefits from the medical insurance of the NSSF after 2017. Poor patients do not need to pay their medical expense by themselves while the NMCHC started to receive benefits from the HEF to cover the medical cost for the poor patients after 2018. These schemes by the government ease the burden of patients for their medical expense and contribute to increasing the number of patients for the NMCHC while they also contribute to improving the financial status of the NMCHC by receiving benefits from these schemes. In addition, a new conditional cash transfer program has been started by the government in 2019 for the mothers and children of poor families to provide cash for scheduled check-ups during the period of pregnancy and children up to 2 years old. This new scheme will contribute to increasing the check-ups of poor families and it is expected to further improve key MCH indices in Cambodia.

3.3.1.2 Qualitative Effects (Other Effects)

At the time of planning, the project was expected to have qualitative effects on two aspects, i.e., (a) quality improvement of the emergency obstetric care for mothers and newborns of the poor families, and (b) quality improvement of pre-service and in-service trainings. In order to obtain information on these qualitative effects and impacts to be stated later in section 3.3.2, the evaluator conducted individual interviews with key informants of the project. The interviewees, 17 persons in total, consisted of 2 managements of the NMCHC (Deputy Director and Chief of Training Unit), Chief Advisor of the JICA technical cooperation “Project for Improving Continuum of Care with focus on Intrapartum and Neonatal Care (IINeoC Project),” 7 medical doctors and 7 midwives who were trained at the NMCHC.

(a) Quality improvement of the emergency obstetric and newborn care for the poor

According to the interviews with 14 doctors and midwives working at 4 hospitals, pregnant women from the poor families tend to have common problems such as malnutrition, unbalanced diet, unsanitary living environment, lack of knowledge on health and insufficient prenatal check-ups. These situations increase the risk of their deliveries to be associated with complications such as severe bleeding, convulsions and mother-to-child transmission. Therefore, the Emergency Obstetric and Newborn Care, hereinafter referred as “EMONC,”¹⁹ is crucially important to manage the monitoring and treatment of emergencies based on a proper protocol for their deliveries and postpartum periods.

The project improved the environment to properly implement EMONC services for the deliveries with complications, common risk of patients from poor families, by expanding NCU/ICU which also contributes to controlling the risk of nosocomial infections, and by supplying medical equipment which was improved in terms of both quality and quantity. In addition, EMONC training courses has been continuously implemented utilizing the training center constructed by the project and the training equipment supplied by the project. Many of the interviewees mentioned that these EMONC training courses had positive effects to improve the knowledge and skills of not only the NMCHC staff but also many medical doctors and midwives in provinces thereby contributing to improving the quality of EMONC services which meet the risk characteristics of the patients from the poor families.

In sum, the project contributed to improving the quality of EMONC services which are necessary to properly manage deliveries associated with complications common to patients from the poor families, by expanding necessary facilities and equipment as well as training human resources for EMONC services.

¹⁹ The NMCHC training course for midwives on the Basic EMONC includes 7 skills, i.e., (1) administration of antibiotics, (2) administration of uterotonic drugs, (3) administration of anticonvulsants, (4) manual removal of placenta, (5) removal of retained products, (6) assisted delivery and (7) neonatal resuscitation. The NMCHC training course for medical doctors on the Comprehensive EMONC includes, in addition to the above 7 skills, 2 more skills, i.e., (8) cesarean section operation and (9) blood transfusion.

(b) Quality improvement of pre-service and in-service trainings

In 2012 before the project, all the pre-service trainees were students of national universities. At the time of planning, the target trainees for pre-service training in 2020 was also planned to be the same. According to the actual 2018 data, after the project constructed the training center and the number of trainees was expanded, it became possible for the NMCHC to meet with diversifying needs of pre-service training by receiving many students from private universities.

With regard to the in-service training for medical doctors and midwives, number of participants for the EMONC Training-of-Trainers Course was 61 persons in 2018 exceeding the 2020 target of 48 persons which contributes to improving training capacities of the other institutions including those in provinces (further details on geographical ripple effects will be described later on the impacts in section 3.3.2). According to explanations by the NMCHC, this trend is in line with the government policy to decentralize the training function. This support by the NMCHC to decentralize EMONC trainings contribute to managing the risk factors common to the mothers and children from poor families as described in the above section (a). As for the short-term in-service activities such as one day workshops on national MCH programs, more than 3 thousand persons participated in 2018, far surpassing the 2020 target of 1,264 persons. According to explanations by the NMCHC, they include various activities, e.g., development and revision of national MCH program guidelines, development of training materials and strengthening the cooperation with partners related such as donors and NGOs.

With respect to facilities and equipment for trainings, PBL rooms for group discussion were newly constructed other than lecture rooms and simulator models were supplied for trainings of assisted delivery and resuscitation. Several midwife interviewees mentioned that group discussions at the PBL room after lectures and simulations using simulator models were effective to learn each skill for the emergency obstetric care in a practical manner.

In sum, the project contributed to improving the quality of both pre-service and in-service trainings at the NMCHC such as meeting with diversifying needs to receive students of private universities and also the needs to increase the Training-of-Trainers for provinces, strengthening cooperation with development partners through short-term workshops on national MCH programs, and utilizing training equipment supplied by the project for practical trainings.

3.3.2 Impacts

3.3.2.1 Intended Impacts

At the time of planning, there was no concrete item explicitly indicated as an impact. In view of the NMCHC's position as the top referral hospital and the new training center constructed as a main component of the project, the ex-post evaluation analyzed the following two aspects as impacts; (a) contributions as the top referral hospital for MCH by receiving increasing number of patients referred from the other medical institutions, and (b) contributions to improve MCH services in provinces with the expanded training function of the NMCHC.

(a) Contributions as the top referral hospital

As the top referral hospital for MCH, the NMCHC has been receiving patients who cannot be properly treated by the other medical institutions since the time before the project. According to explanations by the NMCHC, the project contributed to enhancing its function as the top referral hospital through the improved clinical function and inpatient environment owing to facilities and equipment developed by the project. The total number of inpatients at the NMCHC before the project was close to an average of 8.5 thousand persons/year during 2010-2012. It increased by 30% after the project completion year to around 11 thousand persons/year. Out of this increasing total inpatients, actual number of inpatients referred from other institutions has continued to increase every year since 2016, and the share of inpatients referred from other institutions out of total inpatients has also increased from 10% in the project completion year of 2016 to 13 % in 2018.

Table 5 Inpatients Referred from Other Institutions

	Baseline	Actual		
	2010-2012 Average	2016	2017	2018
		Completion Year	1 Year After Completion	2 Years After Completion
Total Number of Inpatients (persons/year)	8,490	11,230	10,851	11,322
Number of Inpatients Referred from Other Institutions (persons/year)	N.A.	1,074	1,303	1,485
Share of Inpatients Referred from Other Institutions (%)	N.A.	10	12	13

Source: Questionnaire answers by the NMCHC

Note: Baselines and targets were not set for the inpatients referred from outside at the time of planning.

(b) Contributions to improve maternal and child health services in provinces

With regard to the MCH services in provinces out of the capital city, many of the interviewed doctors and midwives mentioned that common problems were prevailing in the service supplier side such as limited medical facilities (e.g. no operating theater nor NCU), limited capacity of medical staff (e.g. cesarean section is possible but uterus operation is not possible) and lack of necessary systems (e.g. transfusion is not possible because a blood bank system is lacking). The interviewees also mentioned that common problems of pregnant women in provinces, particularly serious for those from poor families in remote areas, included malnutrition, unsanitary living environment, lack of knowledge on health and insufficient prenatal check-ups. While these problems of pregnant women in provinces are common to the problems of pregnant

women from the poor families in the capital city as already described in section 3.3.1.2(a), the limitations of the service supplier side are more serious in provinces.

According to hearings with several management members of the NMCHC, EMONC skills are most needed to deal with the above MCH situations in provinces. The NMCHC is contributing to improving human resources for health services in provinces through EMONC training courses where almost 90% of trainees participate from provinces. While the share of trainees from provinces has been constantly high even before the project, actual numbers of trainees from provinces have increased because the total number of trainees has increased after the project constructed the new training center building. The NMCHC is responsible for the assessment works²⁰ of provincial institutions to evaluate if they are capable of providing the essential EMONC services as a whole team, and six medical institutions were regarded as upgraded EMONC facilities after 2016. In line with the government policy to decentralize training functions to all provinces, the first training units were established to improve medical human resources nationwide at three provincial hospitals in the provinces of Kampong Cham, Battambang and Takeo. The NMCHC has been continuously supporting staff trainings and Training-of-Trainers for provincial hospitals and provincial health departments. The NMCHC is also currently implementing the JICA technical cooperation “Project for Improving Continuum of Care with focus on Intrapartum and Neonatal Care (IINeoC Project)” to support health professionals in the provinces of Kampong Cham and Svay Rieng. For the establishment of a new NCU at Svay Rieng provincial hospital in August 2018, related trainings were provided at the NMCHC. Through various activities mentioned above, the project has geographical ripple effects contributing to improving MCH services in provinces.

3.3.2.2 Other Positive and Negative Impacts

(a) Impacts on the Natural Environment

“JICA Guidelines for Environmental and Social Considerations” proclaimed in April 2010 is applied to the project and it is classified as a Category-C project. It was confirmed through hearings at the NMCHC and a field survey that wastewater from the main building was treated at the treatment plant repaired by the project and connected to the municipal sewerage system. Wastewater from the new training center building was also treated at the new treatment plant and connected to the municipal sewerage system. Wastewater was all connected to the municipal sewerage as planned without any other discharge. As for wastes from the NMCHC, medical waste was separated from general waste and incinerated at the incinerator whose parts were replaced by the project. General waste was collected by Phnom Penh municipality. Both wastewater and wastes were treated as planned and no specific negative impact on natural environment was observed.

²⁰ This assessment evaluates whether a medical institution is capable as an organization to implement EMONC services, in addition to personal skills of its staff for EMONC services.

(b) Resettlement and Land Acquisition

No resettlement nor land acquisition was necessary since the expansion project was implemented within the existing area.

This project has achieved its objectives. Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Institutional/Organizational Aspect of Operation and Maintenance

At the time of ex-post evaluation, the NMCHC continues to be, as was the case at the time of planning, the top national institution for MCH and provides three types of functions, i.e., clinical care, training and policy.

Table 6 Staff Allocation of the NMCHC

(Unit: persons)

Department	Position/Specialty	Baseline 2013		Actual 2019	
		Permanent	Contract	Permanent	Contract
Director		1	-	1	-
Deputy Director		3	-	5	-
Technical Bureau	Medical Doctors	76	-	80	4
	Nurses	55	-	47	12
	Midwives	79	-	92	16
	Other technical staff	25	-	15	14
National MCH Programs	Director	5	-	2	-
	Administrative staff	63	29	41	7
Training Center	Chief of Center	-	-	-	-
	Administrative staff	3	-	7	1
Administration Bureau	Head of Department	1	-	1	-
	Administrative staff	10	88	7	62
	Internship/Leave	17	-	7	-
Accounting Bureau	Director	1	-	1	-
	Administrative staff	11	11	12	14
Total		350	128	318	130
		478		448	

Source: Preparatory Survey Report, Questionnaire answers by the NMCHC

Table 6 shows staff allocation of the NMCHC comparing allocations at the time of planning and ex-post evaluation. The NMCHC is operated by 448 staff including contract staff as of 2019. Total number of staff decreased from the baseline in 2013 reflecting the policy of the Ministry of Health in recent years to allocate newly employed staff in principle only to provincial medical institutions. The NMCHC is coping with this situation by streamlining the administration function while the number of technical staff such as medical doctors and midwives, as well as staff

allocated for NCU/ICU, has been secured and increased. Number of staff for the training center has also increased. According to explanations by the executing agency, total staff number has been agreed to slightly increase from the year 2020. Therefore, no major problems are observed in the institutional and organizational aspects of the operation and maintenance.

3.4.2 Technical Aspect of Operation and Maintenance

The project related facilities and equipment, except for some advanced equipment, are maintained by the Engineering/Medical Workshop of the NMCHC as planned. This workshop consists of 8 members, and 7 core engineering staff remain the same members since the time of planning while only 1 staff changed. They were trained in various occasions including the JICA technical cooperation “Project on Promotion of Medical Equipment Management System,” and they sometimes instruct provincial institutions on technical maintenance. No major problems are observed in the technical aspect of the operation and maintenance.

3.4.3 Financial Aspect of Operation and Maintenance

Table 7 shows financial data of the NMCHC.

Table 7 Financial Data of the NMCHC

(Unit: US\$ thousand)

	2012	2016	2017	2018
Government Budget	2,763	3,957	9,010	9,835
Medical Service User Fee	870	1,041	1,175	1,442
Others	13	15	13	6
Total Annual Income	3,646	5,013	10,197	11,283
Staff Salary, Drugs, etc.	3,261	4,646	9,601	10,798
Facility/Equipment Expenditure	391	304	552	345
Total Annual Expenditure	3,652	4,951	10,153	11,143

Source: Preparatory Survey Report, Questionnaire answers by the NMCHC

Note: Facility/Equipment Expenditure includes outsourcing cost for maintenance.

Totals may not be exact due to rounding.

Total annual income of the NMCHC increased mainly due to the substantial increase of government budget allocated for vaccines, etc., and total annual expenditure also increased within the increase of its income level. Therefore, financial status of the NMCHC is sound. Medical service user fee income also increased mainly by the new source of income from NSSF after 2017 as mentioned in section 3.3.1.1(b). The project renovated the inpatient ward and reduced the share of 8-bed rooms. This renovation of ward contributed to meeting the growing demand for ward rooms with smaller number of beds reflecting the improved national level of living standards, but

financial contributions by this renovation was limited in comparison to the contributions of increased income from the medical insurance. In sum, the financial position of the NMCHC is healthy and sound.

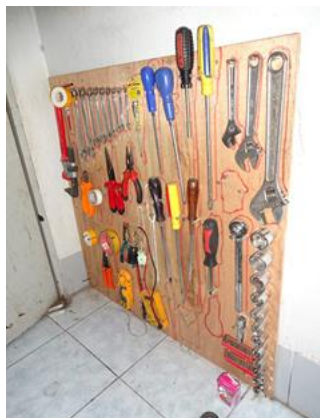
3.4.4 Status of Operation and Maintenance

Through hearings at the Engineering/Medical Workshop of the NMCHC and a field survey at related facilities, it was confirmed that maintenance equipment was stored well in order, and necessary documents such as manuals and ledgers were properly managed and utilized. Regular maintenance records were displayed at the walls of the power generator room and the transformer room. The project related facilities and equipment are generally well maintained.

At the time of final draft explanation of the JICA preparatory survey, it was agreed and recorded in the Minutes of Discussions that the Cambodian side would outsource periodical maintenance, in view of its technical level, through contracts with local agents for five of the total 42 kinds of equipment supplied by the project. The evaluator surveyed the current status and confirmed that following three kinds of equipment were properly utilized and maintained regularly by local agents based on the contract as planned: (a) General X-ray Unit, (b) Mobile X-ray Unit and (c) Electrolyte Analyzer. The original Electrolyte Analyzer was not utilized in the beginning because the equipment could not analyze small number of samples without showing an error result. After consulting with the agent, a new Electrolyte Analyzer applicable for only one sample was supplied in exchange and has been well utilized since then. The remaining two kinds of equipment, (d) Blood Gas Analyzer and (e) CRP Analyzer for Micro Sample, were not utilized and no contract was made for their maintenance. The operating cost including their reagents and special detergents after use were higher, at around US\$ 30 per analysis, than outsourcing the same analysis to an external institution, 'Clinique Centrale,' at the cost of US\$ 10-15 per analysis. These two kinds of equipment are not utilized because of this operating cost difference compared with the external institution. According to hearings with several management members of the NMCHC, no external institution to outsource these analyses existed in Cambodia at the time of planning. Therefore, it is considered to be an unforeseeable change of situation. NMCHC management members had a concern if the external institution could continue its analysis in a timely manner at a low price, and they expressed their intention to continue searching for cheaper suppliers of consumables such as reagents so that those two kinds of equipment could resume to be utilized again. The NMCHC decided not to utilize them in view of their operation cost, and it is considered to be an unavoidable choice. The NMCHC is expected to continue its investigation searching for the other suppliers of consumables and their price regularly, and consider utilization of these two kinds of equipment again.

In sum, two kinds of equipment were not utilized because the NMCHC decided to outsource to an external institution in view of the cost for the analysis as an unavoidable choice, but the project related facilities and equipment are generally well maintained without problems.

No major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.



Maintenance equipment in good order



CRP Analyzer for Micro Sample (left)
and Blood Gas Analyzer (right)

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The project was implemented aiming at expanding the training function and improving the quality of perinatal care at the NMCHC by constructing a new training center, renovating the existing facilities and providing equipment, thereby contributing to enhancing its function as the top institution for maternal and child health care in Cambodia. The project has been highly consistent with the Cambodian development plan and needs which emphasize maternal and child health as one of the priority issues, and Japan's ODA policy. Therefore, the relevance of the project is high. In the course of its implementation, although the project cost was within the plan, the project period exceeded the plan. Therefore, the efficiency of the project is fair. With regard to the effectiveness, the project achieved in 2018 its quantitative targets for the year 2020 in each aspect of clinical function, inpatient ward and training function. Qualitative effects were found to improve the quality of emergency obstetric care and trainings. Positive impacts were also confirmed such as geographical ripple effects. Therefore, effectiveness and impacts of the project are high. As for the operation and maintenance, there are two kinds of equipment not utilized because the NMCHC selected to use a new external institution for these types of analysis to save on its operation cost, but the project related facilities and equipment are well maintained in general. No major problems have been observed in the institutional/organizational, technical, financial aspects and current status of the operation and maintenance system. Therefore, sustainability of the project effects is high.

In light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Among various equipment supplied by the project, the Blood Gas Analyzer and CRP Analyzer for Micro Sample are not currently utilized. They are not utilized because the cost for the new choice to outsource the same analysis to an external institution became cheaper than the operating cost of the equipment such as the cost of reagents. This is considered to be an unavoidable choice under a change in the situation which was unforeseeable at the time of planning. The NMCHC managements have the intention to resume the utilization of the supplied equipment if possible.

Based on the above situation, the NMCHC is recommended to continue searching for suppliers of consumables for these two kinds of equipment and their price regularly, at least once a year. The result of this research should be compared with the price and speed of the analysis provided by the external institution as a basis of its consideration to resume utilization of the equipment. It is also necessary to keep the equipment in good condition for possible re-utilization.

4.2.2 Recommendations to JICA

The JICA technical cooperation “Project for Improving Continuum of Care with focus on Intrapartum and Neonatal Care (IINeoC Project)” is currently implemented as a related project at the NMCHC to improve MCH care through capacity building of health professionals in the provinces of Kampong Cham and Svay Rieng as mentioned in section 3.3.2.1(b) Intended Impacts. Japan also has been providing grant aid for the expansion projects of provincial hospitals in the same provinces.

In view of continuous cooperation between the two countries for MCH in these provinces, an evaluation analysis covering all the related projects, in addition to each ex-post evaluation on a project-by-project basis, may provide a good opportunity to obtain knowledge on comprehensive impacts or important lessons from such viewpoints as synergistic effects realized or missing components for further positive effects. JICA is, therefore, recommended to consider the possibility to conduct a comprehensive evaluation analysis covering the related projects after completion of the IINeoC Project.

4.3 Lessons Learned

None