

Socialist Republic of Viet Nam

FY2022 Ex-Post Evaluation Report of
Japanese ODA Loan

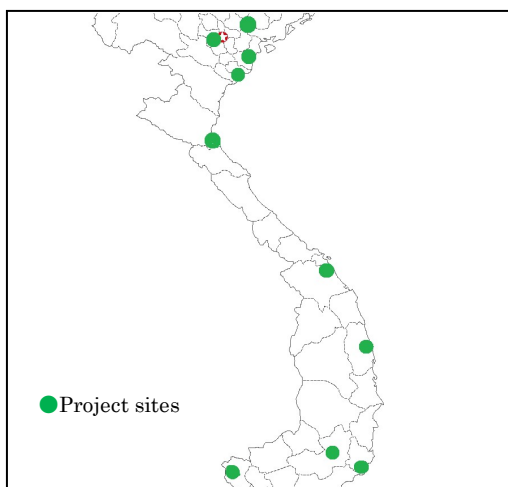
“Regional and Provincial Hospital Development Project (II)”

External Evaluator: Nomoto, Ayako, International Development Center of Japan Inc.

0. Summary

This project was implemented to improve the quality of the medical service system in 10 provinces and cities in Vietnam by strengthening the overall capacity of provincial hospitals through the provision of medical equipment and the development of human resources, thereby contributing to improving people’s health. The project is consistent with Vietnam’s development plan and needs at both the times of appraisal and ex-post evaluation, and its relevance can be confirmed. Although no specific collaborations or outcomes are planned or implemented with other projects of the Japan International Cooperation Agency (JICA) and development partners, the project is consistent with Japan’s ODA policy for Vietnam. Therefore, the relevance and coherence are high. The project produced outputs in line with the revised plan, and although the project period slightly exceeded the plan, the project cost was within the plan, and therefore, the efficiency is high. Among the expected effects, the “annual number of surgical operations,” “annual number of inpatients,” and the “number of trainees from lower-level hospitals who attended training” achieved their target values in the target year, and the “number of patients referred to upper-level hospitals” also achieved its target value in the following year. In addition, “average length of hospital stay” and “hospital infection rate” as additional indicators also showed improvement, and “utilization of equipment” was favorable. As for the impact, the project is considered to have contributed to improving residents’ health by improving the “hospital mortality rate” and responding to COVID-19. Thus, the effectiveness and impacts are high. Although there are some minor problems in the operation and maintenance of the project equipment in terms of institutional/organizational and financial aspects as well as operation and maintenance status, the prospects for improvement and resolution are high. Therefore, the sustainability of the project’s effects is high. In light of the above, the project is evaluated to be highly satisfactory.

1. Project Description



Project Locations (source: provided by JICA)



Image 1: CT scanner
(source: taken by the evaluator)

1.1 Background

Various health indicators were improving in Vietnam; however, the improvement was witnessed mainly in urban areas, and disparities between urban and rural areas remained an issue. In addition, the structure of diseases had been changing, coupled with improvements in the living environment due to economic growth and other factors, and there was a growing need for advanced diagnostic and treatment services, especially for non-communicable diseases (lifestyle-related diseases such as cancers, heart disease, hypertension, and diabetes), which had been on the increase significantly.

The regional medical system in Vietnam (a coordinated network of medical institutions) comprises three layers: the 1st layer (commune and county level), the 2nd layer (provincial level), and the 3rd layer (central level). Upper-level hospitals are responsible not only for accepting patients transferred from lower-level hospitals located in their coverage areas but also for providing instruction and assistance to the lower-level hospitals. In reality, however, many provincial hospitals lacked both in terms of quality and quantity in terms of facilities, equipment, and medical personnel and could not meet local medical needs. As a result, major national hospitals in urban areas were experiencing excessive congestion, with the occupancy rate approaching 200%, and this was causing severe dysfunction in the overall medical system, in addition to a decline in the quality of medical services at each hospital.

1.2 Project Outline

The objective of this project is to improve the quality of the medical service system in the target provinces by strengthening the overall capacity of provincial hospitals through the provision of medical equipment and the development of human resources, thereby contributing to improving people's health.

Loan Approved Amount/ Disbursed Amount	8,693 million yen / 8,558million yen
Exchange of Notes Date/ Loan Agreement Signing Date	March 2012 / March 2012
Terms and Conditions	Interest Rate 0.2% (0.01% for the consulting services) Repayment Period 40 years (Grace Period 10 years) Conditions for Procurement Tied (Special Terms for Economic Partnership (STEP))
Borrower / Executing Agency	The Government of the Socialist Republic of Viet Nam / Ministry of Health (MOH)
Project Completion	July 2017
Target Areas	Bac Giang Province, Hanoi, Thai Binh Province, Nam Dinh Province, Nghe An Province, Da Nang, Binh Dinh Province, Lam Dong Province, Tay Ninh Province, and Ninh Thuan Province
Main Contractors (Over 1 billion yen)	Mitsubishi Corporation (Japan), Miyano Medical Instruments Co., Ltd. (Japan)
Main Consultants (Over 100 million yen)	International Total Engineering Corporation (Japan) / Mediconsult Joint Venture Company Ltd. (Vietnam, JV)
Related Studies (Feasibility Studies, etc.)	“Special Assistance for Project Formation for Provincial and Regional Hospital Development Project (Phase II) in the Socialist Republic of Viet Nam” (2011)

2. Outline of the Evaluation Study

2.1 External Evaluator

Nomoto, Ayako, International Development Center of Japan Inc.

2.2 Duration of Evaluation Study

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

Duration of the Study: October 2022 – January 2024

Duration of the Field Study: February 12, 2023 – March 7, 2023, June 18, 2023 – June 22, 2023

3. Results of the Evaluation (Overall Rating: A¹)

3.1 Relevance/Coherence (Rating: ③²)

3.1.1. Relevance (Rating: ③)

3.1.1.1 Consistency with the Development Plan of Vietnam

At both the times of the appraisal and the ex-post evaluation, strengthening medical and health services was included in the development plan. Therefore, the project is highly consistent with the development plan.

At the time of the appraisal, the *10-Year Socio-Economic Development Strategy (2010-2020)* identified improving healthcare services as one of the priority issues. The *Five-Year Socio-Economic Development Plan (2011-2015)* set numerical targets, such as extending life expectancy (74 years or more by 2015), maternal mortality rate (60 cases per 100,000 live births), and infant mortality rate (12 cases or less for infants and 20 cases or less for children under five years old per 1,000 live births). The Plan articulated that achieving these targets requires enhancing medical facilities and equipment as well as strengthening human resources. In addition, the *Health and Medical Care Master Plan (2010-2020)*, approved in 2006, stated that to achieve the above plans and strategies, it is essential to strengthen medical institutions offering diagnosis, treatment, and rehabilitation and to consolidate and complete the medical network at the local level. Specific measures included the construction of new medical facilities, financial reinforcement for health and medical care, and the development of human resources.

At the time of the ex-post evaluation, the *Five-Year Plan for Socio-Economic Development (2021-2025)* aimed for strong and comprehensive innovation and improvement of the quality of medical and health services for people. The plan included promoting preventive medicine, improving health, preventing and controlling infectious and non-communicable diseases, developing hospital networks, researching and producing medicines for disease treatment and medical equipment, and implementing a roadmap for universal health insurance. In addition, in the *National Action Plan for the implementation of the 2030 sustainable development agenda* (formulated in 2017), under Goal 3: “Ensure a healthy life and enhance welfare for all citizens of all age groups,” it is stated that “By 2030, reduce by 20-25% the death rate before 70 years of age as a result of non-communicable diseases, through prevention and treatment measures as well as the promotion of mental health and well-being.” This project, which aims to improve medical services by upgrading medical equipment, mainly for non-communicable diseases, aligns with this goal.

3.1.1.2 Consistency with the Development Needs of Vietnam

The need for medical equipment for this project was high both at the time of the appraisal and

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

² ④: Very High, ③: High, ②: Moderately Low, ①: Low

at the time of the ex-post evaluation, given the disparities in medical care between rural and urban areas and the structure of diseases.

At the time of the appraisal, Vietnam had improved various health indicators; however, the improvement was mainly in urban areas, and the disparities between urban and rural areas in terms of maternal mortality rate, under-five mortality rate, number of beds, and number of doctors per 10,000 population were still an issue. In addition, as shown in Table 1, non-communicable diseases were increasing in the disease structure, and there was a growing need for advanced diagnostic and treatment services. Furthermore, as shown in Table 3, the occupancy rate of major national hospitals in urban areas at the tertiary level was close to 200%, indicating excessive congestion.

Although data showing regional disparities in health indicators were not available at the time of the ex-post evaluation, as shown in Table 2, the percentage of inpatient cases in the target hospitals indicates that there is still a high need for the project's equipment, which was procured mainly for non-communicable diseases.

Table 1: Percentage of inpatient cases in public hospitals nationwide at the time of the appraisal (%)

Percentage of cases of inpatients	1986	2008
Communicable diseases	59.2	25.2
Non-communicable diseases	39.0	63.1
Accident, trauma, poisoning	1.8	11.7

Source: MOH

Table 2: Percentage of inpatients cases in the target hospitals at the time of the ex-post evaluation (%)

Percentage of cases of inpatients	2021
Communicable diseases	7.8
Non-communicable diseases	69.8
Accident, trauma, poisoning	22.4

Source: Questionnaires to the target hospitals (Number of respondents = 9)

In addition, the upper-level major national hospitals, Bach Mai Hospital (Hanoi City), Hue Central Hospital (Hue City), and Cho Ray Hospital (Ho Chi Minh City), showed improvement compared to the time of the appraisal; however, they were still crowded at the time of ex-post evaluation, as shown in the table below, indicating that the need to reduce congestion at upper-level hospitals remains high.

Table 3: Congestion at major national hospitals at the times of appraisal and ex-post evaluation

Hospital	2009		2022	
	Number of beds	Occupancy rate (%)	Number of beds	Occupancy rate (%)
Bach Mai Hospital	1,800	177	3,600	150
Hue Central Hospital	1,400	182	3,201	106
Cho Ray Hospital	1,800	193	3,201	107

Source: MOH

3.1.1.3 Appropriateness of the Project Plan and Approach

No problems were found in the project plan and approach.

Regarding lessons learned from similar preceding projects, it was pointed out that increasing support from consultants would promote the smooth implementation of the project and that clarifying the division of responsibilities among agencies by concluding project implementation contracts between the Ministry of Health (hereinafter referred to as “MOH”) at the central level and the Provincial People’s Committees would be essential. In this project, project implementation contracts were signed between MOH and the Provincial People’s Committees to clarify the division of responsibilities among the agencies. In addition, interviews with each target hospital revealed that this was the first time for them to implement an ODA loan project. Many said that it would have been impossible to implement the project without support from consultants and the Central Project Management Unit (hereinafter referred to as “CPMU”) of MOH, including the preparation, implementation, and evaluation of bidding documents, contracts with suppliers, management of counterpart funds, and reporting to authorities in compliance with JICA procurement guidelines and Vietnamese domestic procedures, contracts with suppliers, management of counterpart funds, and reporting to authorities. Thus, the project implementation system was appropriate.

On the other hand, the project’s training component was canceled due to difficulties in procurement in line with the STEP rules and the expected contract format, as described in “3.2.1 Project Outputs.” As a result, additional procurement for the medical equipment was conducted using the unused ODA loan balance of the canceled training component. Although the increased number of procured equipment items led to a high level of effectiveness, there needed to be more consideration of the project component in line with the STEP rules concerning the training component.

3.1.2 Coherence (Rating: ②)

3.1.2.1 Consistency with Japan’s ODA Policy

At the time of the appraisal, this project aligned with Japan’s ODA policy. The *Country Assistance Policy for Viet Nam (July 2009)* set “enhancing social and living conditions and narrowing internal disparities” as one of the four pillars, and the “improving basic social services” positioned the consolidation of medical care facilities and equipment at central and provincial levels as a key issue. In addition, the *Rolling Plan for the Socialist Republic of Viet Nam* aimed to strengthen local healthcare systems by enhancing the capacity of healthcare personnel and improving the facilities and equipment of local medical institutions, centered on the program for quality improvement of healthcare services.

3.1.2.2 Internal Coherence

There are no specific collaborations planned or implemented or outcomes achieved with other JICA projects. However, based on interviews with each target hospital, three hospitals (Lam Dong Provincial General Hospital, Bac Giang Provincial General Hospital, and C Da Nang Central General Hospital) have received training at Cho Ray Hospital, Bach Mai Hospital, and Hue Central Hospital, the three base hospitals where Japan has provided grant aid and technical cooperation. In addition, Binh Dinh Province General Hospital participated in the teacher training course of the technical cooperation project “Project for Strengthening Clinical Training System for New-Graduate Nurses” (2016-2020), which together with this project contributed to improving medical technicians’ skills.

3.1.2.3 External Coherence

There are no specific collaborations planned or implemented or outcomes achieved with other development partners.

Thus, the project is consistent with the development plan of Vietnam and with the development needs (for medical equipment). No problems were found in the project plan and approach. Regarding consistency, although no specific collaborations or outcomes with other JICA projects or development partners were found in terms of internal and external consistency, the project is highly consistent with Japan's ODA policy. Therefore, its relevance and coherence are high.

3.2 Efficiency (Rating: ③)

3.2.1 Project Outputs

The outputs were in line with the plan after the change (cancellation of the training program and procurement of additional equipment using the resulting unused balance of the ODA loan), as shown below. Although there was some additional procurement of medical equipment, the breakdown of the equipment was almost as expected, and the project was implemented as planned, including consulting services.

1) Medical Equipment Procurement

At the time of the appraisal, the ten target hospitals had planned to procure medical operation/consultation equipment (operating tables, endoscopes, laparoscopes, anesthesia equipment, etc.), intensive care unit (ICU) equipment (ventilators, monitors, etc.), diagnostic imaging equipment (CT scanners, X-ray equipment, etc.), laboratory and analysis equipment (blood analyzers, electrophoresis equipment, etc.), sanitation control equipment (sterilization equipment, etc.), and other equipment totaling about 1,486 pieces. After the start of the project, a final confirmation of the equipment list was to be made according to the latest status of each

hospital.

Actually, a total of 2,001 pieces of equipment were procured in the types of equipment that had been anticipated at the time of the appraisal. As described below (“2) Training Programs”), the number of procured equipment increased due to additional procurement by three hospitals (Bac Giang Provincial General Hospital, Thai Binh Provincial Pediatrics Hospital, and Nghe An Obstetrics and Pediatrics Hospital) using unused ODA loan balance from the cancellation of the training programs, in addition to the equipment initially procured. The additional equipment procurement was in line with the project’s original purpose.

Table 4: Number of equipment procured

Hospital	Plan	Actual
Bac Giang Provincial General Hospital	130	97
Son Tay Inter-District General Hospital	91	68
Thai Binh Provincial Pediatrics Hospital	66	88
Nam Dinh Provincial Obstetric Hospital	103	156
Nghe An Provincial Pediatrics Hospital (Currently Nghe An Obstetrics and Pediatrics Hospital)	139	228
C Da Nang Central General Hospital	99	162
Binh Dinh Provincial General Hospital	184	626
Lam Dong Provincial General Hospital	137	167
Tay Ninh Provincial General Hospital	111	193
Ninh Thuan Provincial General Hospital	212	216
Ministry of Health	214	—
Total	1,486	2,001

Source: Documents provided by JICA, MOH, and the target hospitals

2) Training Programs

At the time of the appraisal, training programs (medical care skills, equipment maintenance/management, hospital management, etc.) were planned for the ten target hospitals. However, after the start of the project, it was found that (1) the STEP (Special Terms for Economic Partnership) rules³ require that the main contractors be Japanese companies or institutions; however, the possibility of Japanese companies showing interest in organizing a large number of training courses consisting of training in Vietnam and Japan was low, which would consequently violate to the STEP rules, and (2) the Minutes of Discussion stipulates that the MOH will conclude a contract with the target hospitals jointly; however, since the counterpart budget is allocated directly to the ten hospitals by each province and not to the MOH, it was impossible to conclude the contract as stipulated in the Minutes of Discussion.

³ STEP promotes Japan’s “face-to-face assistance” through technology transfer to partner countries by utilizing Japan’s superior technology and know-how.

3) Consulting Services

As mentioned above, the cancellation of the training programs resulted in changes in the work content; however, the consulting services were generally implemented as planned.

Table 5: Consulting services

Plan	Actual
- Detailed design	- Detailed design
- Support for equipment procurement, installation, and operation management	- Support for equipment procurement, installation, and operation management
- Support for coordination and implementation supervision related to training	- Environmental control and infection control
- Technical advice and coordination support for overall project operation	- Support for project operation and monitoring
- Support for project monitoring and evaluation	- Support for additional procurement

Source: Documents provided by JICA and the executing agency

3.2.2 Project Inputs

(For details, please refer to the “Comparison of the Original and Actual Scope of the Project” on the last page of the report.)

3.2.2.1 Project Cost

Table 6 shows the planned and actual project costs. The planned project cost was 9,803 million yen (of which the ODA loan covered 8,312 million yen), excluding the canceled training expenses. The actual cost was 8,703 million yen (of which the ODA loan covered 7,780 million yen), excluding the additional equipment procurement (778 million yen for both overall and under the ODA loan), which was within the plan (89% of the plan).

Table 6: Project cost

(Unit: million yen)

	Plan (at the time of Ex-ante evaluation)						Actual					
	Foreign Currency		Local Currency		Total		Foreign Currency		Local Currency		Total	
		ODA Loan		ODA Loan		ODA Loan		ODA Loan		ODA Loan		ODA Loan
Equipment Procurement	7,076	7,076	0	0	7,076	7,076	7,574	7,574	683	683	8,275	8,275
Training	65	65	317	317	381	381	0	0	0	0	0	0
Consulting Services	190	190	73	73	262	262	149	149	65	65	214	214
Price Escalation	349	349	126	126	475	475	0	0	0	0	0	0
Contingency	374	374	22	22	397	397	0	0	0	0	0	0
Interest during Construction	50	50	0	0	50	50	45	45	0	0	45	45
Commitment Charge	52	52	0	0	52	52	42	42	0	0	42	42
Land Acquisition	0	0	0	0	0	0	0	0	0	0	0	0
Admin Cost	0	0	430	0	430	0	0	0	466	0	466	0
Tax	0	0	1,062	0	1,062	0	0	0	457	0	457	0
Total	8,155	8,155	2,029	538	10,184	8,693	7,810	7,810	1,671	748	9,481	8,558

Source: Data for the time of the appraisal and the actual cost of the foreign currency portion provided by JICA; data for the actual local currency portion provided by the executing agency.

Note: (1) exchange rate at the time of appraisal: 1 USD = 83.4 yen = 18,932 VND, (2) exchange rate at the time of ex-post evaluation: 1 yen = 209.88 VND (the average of IFS rates between 2012 and 2020).

3.2.2.2 Project Period

The project period was planned to be until the “completion of the training programs”; however, the training programs were canceled. Therefore, the actual project period was 65 months compared to the planned 58 months, slightly exceeding the plan (112%) when assuming the project completion as “the completion of the installation of the originally procured equipment.” The additional time required for equipment installation was due to the fact that the target hospitals had no experience in international competitive bidding, which took time to confirm the procurement conditions, specifications, etc. Delays were also caused by Vietnamese customs procedures and letter of credit issuance processes.

Table 7: Project period

Item	Plan	Actual
Consultant selection	February – November 2012	August 2012 – April 2013
Consulting services	December 2012 – November 2016	June 2013 – November 2019
Bidding and contract	April 2013 – October 2015	June 2013 – October 2016
Procurement and installation of equipment	September 2014 – September 2016	Original procurement: January 2015 – July 2017 Additional procurement: May 2018 – June 2020
Implementation of training	September 2013 – November 2016	–

Source: Documents provided by JICA and the executing agency

3.2.3 Results of Calculations for Internal Rates of Return (Reference only)

The internal rates of return were not calculated at the time of the appraisal, and therefore, they are not calculated in this ex-post evaluation.

As described above, although there were changes in outputs, such as the cancellation of the training programs and additional equipment procurement using the unused balance of the ODA loan, the necessity and appropriateness of the change were recognized, and the outputs were produced as planned (after the change of plan). Although the project period slightly exceeded the plan, the project cost was within the plan. Therefore, the efficiency of the project is high.



Image 2: Radiotherapy equipment installed at C Da Nang Central General Hospital



Image 3: An automated biochemical analyzer installed at Thai Binh Provincial Pediatrics Hospital



Image 4: Magnetic resonance imaging (MRI) equipment installed at the Tay Ninh Provincial General Hospital

3.3 Effectiveness and Impacts⁴ (Rating: ③)

3.3.1 Effectiveness

3.3.1.1 Quantitative Effects (Operation and Effect Indicators)

1) Operation and Effect Indicators

Tables 8-1 and 8-2 show the baseline and target values at the time of appraisal and actual values

⁴ When providing the sub-rating, Effectiveness, and Impacts are to be considered together.

after the completion of the project for the operation and effect indicators set at the time of appraisal. The following operational and effect indicators were set for the project: “annual number of surgical operations,” “annual number of inpatients,” “annual number of outpatients,” “number of patients referred to upper-level hospitals,” “number of medical personnel of the target hospitals who attended training courses provided by upper-level hospitals,” and “number of trainees from lower-level hospitals who attended training.” The “number of medical personnel of the target hospitals who attended training courses provided by upper-level hospitals” was excluded from the quantitative effect due to the cancellation of the training component and will be considered as the impact. Of the four indicators, excluding the “annual number of outpatients,” for which the numbers are inconsistent⁵, three indicators, including the “annual number of surgical operations,” “annual number of inpatients,” and “number of trainees from lower-level hospitals who attended training” achieved the targets in the target year. The target for the “number of patients referred to upper-level hospitals” was achieved in 2021, although there was an increase in the target year. The achievement of all these indicators can be attributed to the fact that the target hospitals have improved their capacity for examination, diagnosis, and treatment techniques, as well as their ability to accept patients, as a result of the equipment provided by the project.

In addition, each hospital has dispatched staff (medical personnel) for training, as shown in “3.3.2.1 Intended Impacts,” and no impact of the cancellation of the training component was observed.

Table 8-1: Percentage increase/decrease from baseline (average of target hospitals)

	Baseline value	Target value	Actual value	
	2009	2018	2020	2021
		2 Years After Completion	2 Years After Completion	3 Years After Completion
Indicator 1: Annual number of surgical operations (cases)	As shown in the table below	Increase by 20%	95.90%	61.76%
Indicator 2: Annual number of inpatients (persons)		Increase by 20%	44.59%	14.17%
Indicator 3: Annual number of outpatients (persons)		Increase by 20%	-	-
Indicator 4: Number of patients referred to upper-level hospitals (cases)		Decrease by 10%	18.93%	-16.91%
Indicator 5: Number of medical personnel of the target hospitals who attend training courses provided by upper-level hospitals (persons)		Increase by 10%	See “3.3.2.1 Intended Impacts”	
Indicator 6: Number of trainees from lower-level hospitals who attended training 1 (persons)		Increase by 5%	132.13%	196.62%

⁵ It was unclear whether the numbers in the ex-ante evaluation sheet were the total number of examinations and consultations. In addition, at the time of ex-post evaluation, the annual count of outpatients was not consistent, as some hospitals counted only consultations, while others counted consultations and examinations combined. Thus, it made comparison based on the same definition impossible.

Source: Documents provided by JICA (target values), documents provided by the target hospitals (actual values)
Notes: (1) Indicator 4: Average of 9 hospitals except for Tay Ninh Provincial General Hospital, for which the figures are inconsistent. (2) Indicators 6: An average of 8 hospitals, excluding Bac Giang Provincial General Hospital and Nam Dinh Provincial Obstetric Hospital that did not respond.

Table 8-2: Baseline values of operation and effect indicators (2009)

Hospital	Annual number of surgical operations	Annual number of inpatients (persons)	Annual number of outpatients (persons)	Number of patients referred to upper-level hospitals (cases)	Number of medical personnel of the target hospitals who attended training courses provided by upper-level hospitals (persons)	Number of trainees from lower-level hospitals who attended training (persons)
Bac Giang Provincial General Hospital	4,168	29,057	36,015	5,310	68	104
Son Tay Inter-District General Hospital	3,227	27,461	25,921	7,689	11	18
Thai Binh Provincial Pediatrics Hospital	-	17,014	26,292	2,740	23	18
Nam Dinh Provincial Obstetric Hospital	3,603	13,949	13,488	860	11	15
Nghe An Obstetrics and Pediatrics Hospital	4,018	27,791	18,074	2,143	28	68
C Da Nang Central General Hospital	2,051	12,617	230,314	1,910	30	25
Binh Dinh Provincial General Hospital	15,022	55,217	474,252	2,065	98	98
Lam Dong Provincial General Hospital	6,256	30,314	31,047	5,069	32	34
Tay Ninh Provincial General Hospital	11,903	39,549	36,650	1,972	93	88
Ninh Thuan Provincial General Hospital	2,393	34,192	35,421	4,249	64	29

Source: Documents provided by JICA

2) Additional Indicators

Although not set as operational/effect indicators, data were collected on (1) “average length of hospital stay” and “hospital infection rate,” for which data had been collected at the time of project completion, and (2) “equipment utilization,” which could be measured as a direct effect of this project.

(1) Average Length of Hospital Stay and Hospital Infection Rate

Table 9 shows the average values for the length of hospital stay and hospital infection rate for the target hospitals. The average length of hospital stay has improved from before the project

implementation (2012). According to interviews with each hospital, the provision of equipment has led to changes in surgical techniques (endoscopic and laparoscopic surgeries, etc.), resulting in reduced treatment times. In addition, concerning the hospital infection rate, the introduction of sterilizers, washing machines, dryers, etc., installed under the project has strengthened infection control measures in hospitals, contributing to a reduction in the hospital infection rate.

Table 9: Average values for the length of hospital stay and hospital infection rate at target hospitals

	2012	2020	2021
Average length of hospital stay (days)	7.55	6.26	6.57
Hospital infection rate ((%)	7.39	2.89	2.12

Source: Questionnaires and interviews with the target hospitals

Note: (1) Responding hospitals were ten hospitals for the average length of stay and seven for the hospital infection rate. (2) The hospital infection rate is the ratio of patients with infection to the total number of inpatients.

(2) Equipment Utilization

Figures 1 and 2 show the utilization of equipment. Each hospital was asked to rate its use of the three most expensive equipment items and all equipment items on a four-point scale (1. fully utilized, 2. mostly utilized, 3. not well utilized, and 4. not utilized at all). The “fully utilized” and “mostly utilized” categories accounted for 97% of the respondents for the expensive equipment, while “fully utilized” and “mostly utilized” accounted for 94% of the respondents for all equipment, indicating that the utilization situation is favorable. Regarding expensive equipment, the most frequently answered items were CT scanners, digital X-ray equipment, magnetic resonance imaging (MRI) equipment, digital subtraction angiography (DSA) equipment, sterilizers, automated biochemistry analyzers, and laparoscopic surgery equipment.

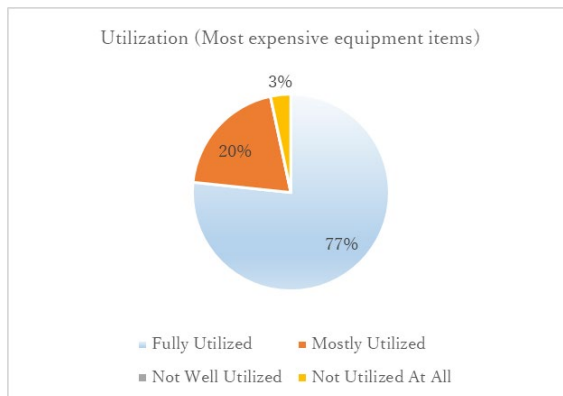


Figure 1: Utilization of expensive equipment items

Source: Questionnaire to the target hospitals
Note: n = 30 (10 hospitals, each with top 3 equipment)

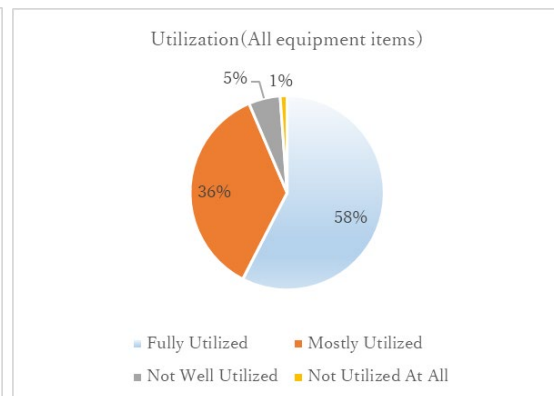


Figure 2: Utilization of all equipment items

Source: Questionnaire to the target hospital
Note: 9 hospitals except Bac Giang Provincial Hospital, n = 778 (responses by equipment type)

As described above, the utilization situation is good; however, the reasons for some of the equipment not being used include (a) high running costs (the cost of reagents and consumables is high) for equipment such as immunoassay analyzer, and autoclave. (Molecular adsorbent recirculating system and high dose rate brachytherapy are even more costly because of the small number of cases), (b) unavailability of spare parts or repair services, due to the absence of the manufacturer or distributor in Vietnam for equipment such as anesthesia apparatus, (c) discontinuation of spare part production during the long period between the time of appraisal for this project and the time of delivery for equipment such as ventilators, (d) replacement with higher-spec equipment due to the model becoming obsolete for equipment such as operating microscope for ophthalmology and , operating microscope for ENT., (e) lack of doctors, or retirement of doctors who can handle the equipment such as heart-lung bypass machine, high-performance liquid chromatography machine and, transcranial doppler ultrasound (all hospitals plan to send doctors for training to obtain certificates to handle the equipment), and so on.

3.3.1.2 Qualitative Effects (Other Effects)

Other effects of the project include the introduction of new medical technology using the equipment installed under the project and the transfer of technology to lower-level hospitals using the equipment installed under the project.

1) Introduction of New Medical Technology

According to interviews with each hospital, much of the equipment installed under the project has been useful in introducing new medical technologies to the hospitals; including 128-slice CT scanners for diagnosis of coronary artery disease and other vascular diseases; 3.0 Tesla MRIs for diagnosis of abdominal, pelvic, and fetal diseases; DSA equipment for cardiac catheterization, vascular ultrasound treatment, congenital heart treatment, pacemaker insertion, and renal treatment; endoscopic surgery equipment for cardiovascular treatment and renal treatment, and radiation equipment for treatment of malignant tumors. In particular, many hospitals revealed that the endoscopic surgical equipment and DSA equipment for cardiovascular and renal treatment have reduced the burden on patients by eliminating the need for incision, eliminated the need to refer patients to upper-level hospitals for cancer treatment, and attracted patients for DSA treatment not only from the hospital's surrounding areas but also from other areas and other provinces. Many hospitals also reported that patients are now coming for DSA treatment not only from the hospital's location but also from neighboring areas and other provinces. In addition, Nam Dinh Obstetrics and Gynecology Hospital is now able to perform many laparoscopic obstetrics and gynecology techniques. Furthermore, according to the hospitals, the introduction of sterilizers has strengthened awareness and behavior regarding hospital infections.

2) Technology Transfer to Lower-Level Hospitals

The target hospitals in the project are actively transferring clinical skills to lower-level hospitals, assisting them in treating complex cases, and providing training for their staff, using the equipment installed under the project as teaching materials. The equipment used for training at the lower-level hospitals includes endoscopic surgical equipment, CT scanners, MRIs, ventilators, ultrasound equipment, and automated biochemistry analyzers.

3.3.2 Impacts

3.3.2.1 Intended Impacts

As an impact of the Project, changes in hospital mortality rates are shown below. According to each hospital, improving diagnostic and treatment (including resuscitation techniques) capabilities through introducing equipment under the project and training at each hospital has resulted in a certain degree of decrease in the mortality rate. On the other hand, the acceptance of critically ill patients has increased at the target hospitals due to the improved technology, and the hospital mortality rates also increased in 2020 due to COVID-19.

Table 10: Hospital mortality rate

	2012	2018	2019	2020	2021
Hospital mortality rate	0.46%	0.11%	0.35%	0.38%	0.17%

Source: Questionnaire and interviews with target hospitals

Note: Responses from 7 hospitals

Other impacts include the response to the COVID-19. Many of the hospitals in the project played a central role in the response to COVID-19. During the outbreak, Tay Ninh Provincial General Hospital functioned as a dedicated hospital for COVID-19 for six months, and Bac Giang Provincial General Hospital established a COVID-19 center and also treated patients in the ICU. Thai Binh Provincial Pediatrics Hospital also served as a COVID-19 center for six months, accepting both children and adults. In these hospitals, ventilators, patient monitors, automatic biochemical analyzers, PCR equipment, ELISA analyzers (immunological analyzers using antibodies), X-ray equipment, diagnostic ultrasound equipment, color Doppler ultrasound equipment, and infection control-related equipment (sterilizers, washing machines), all of which were provided under this project, were utilized.

In addition, although the “training component” of the project was canceled, each hospital dispatched its staff (medical personnel) to training programs at upper-level hospitals and other institutions to improve its skills.

Table 11: Number of medical personnel of the target hospitals who attended training courses provided by upper-level hospitals (Percentage increase from baseline value)

	2009	Target value	2020	2021
Number of medical personnel of the target hospitals who attended training courses provided by upper-level hospitals	See Table8-2	Increase by 10%	16.28%	55.07%

Source: Questionnaire and interviews with target hospitals

Note: An average of 8 hospitals

3.3.2.2 Other Positive and Negative Impacts

1) Impacts on the Environment

The project was judged to have minimal undesirable impact on the environment under the *JICA Guidelines for Environmental and Social Considerations* (formulated in 2010) and was classified as Category C. In the target hospitals, medical waste and wastewater are appropriately disposed of, and no negative environmental impact is observed. Regarding medical waste, each hospital classifies medical waste according to the regulations of MOH and the Ministry of Natural Resources and Environment. The waste is disposed of either by contracting with a third party or by incineration at the hospitals. Regarding wastewater treatment, equipment has been installed, and each hospital conducts quarterly water quality inspections and monitoring. According to the survey results, the indicators for wastewater treatment are adequate.

2) Resettlement and Land Acquisition

Land acquisition and resettlement have not occurred.

3) Gender Equality, Marginalized People, Social Systems and Norms, Human Well-being and Human Rights

Based on the policy of prioritizing women and children, the project is providing medical equipment to obstetrics and pediatrics hospitals such as Nam Dinh Provincial Obstetrics Hospital, Nghe An Provincial Obstetrics and Pediatrics Hospital, and Thai Binh Provincial Pediatrics Hospital, as well as obstetrics and pediatrics departments in general hospitals.

In terms of the impact on women in particular, the introduction of mammography has improved the accuracy of diagnosis, and laparoscopic obstetrics and gynecology techniques (total laparoscopic hysterectomy, laparoscopic ovarian cyst removal, laparoscopic treatment of ectopic pregnancy and endometriosis, etc.) can now be performed using laparoscopic surgical equipment, reducing the burden on the body. Thus, in addition to general medical services, services for women's diseases have been improved.

As for the marginalized people, the poverty rate in Nghe An and Ninh Thuan provinces was higher than the national average among the provinces where the target hospitals are located at the

time of the ex-post evaluation (the poverty rate was 10.9, 9.0, and 4.8, respectively).⁶ Interviews with the hospitals revealed that many poor people visited the target hospitals and benefited from the improved medical services provided through this project. In addition, improving each hospital's capacity and ability to receive patients has led to equitable access to medical care for people with low incomes.

As described above, in terms of quantitative effects, three out of the four indicators (excluding one inconsistent indicator) achieved their target values in the target year, and the status of equipment utilization is also favorable. As qualitative effects, technical guidance and training were provided to lower-level hospitals using equipment from the project, and new technologies were put into practice as a result of the project. Regarding the impact of the project, the hospital mortality rate has decreased, and the project has contributed to improving the health of the local population, including the response to COVID-19. There have been no negative impacts on environmental and social aspects, and the project has brought a certain amount of positive benefits to gender equality and marginalized people.

In conclusion, this project has mostly achieved its objectives.

Therefore, effectiveness and impacts of the project are high.

3.4 Sustainability (Rating: ③)

3.4.1 Policy and System

As indicated in “3.1.1.1 Consistency with Development Plan of Vietnam,” sustainability in terms of policy and system is ensured through the *Five-Year Socio-Economic Development Plan (2021-2025)*, which includes priority on prevention and control of infectious and non-communicable diseases and the development of hospital networks.

3.4.2 Institutional/Organizational Aspect

Each target hospital is responsible for the operation and maintenance of the medical equipment installed under the project. Each hospital has an equipment maintenance and management department, and technicians are assigned to this department. For expensive equipment (MRIs, CT scanners, DSA equipment, etc.), a maintenance contract is concluded with an outside equipment maintenance company, and regular maintenance services are provided. The average number of equipment maintenance personnel at each hospital is five. Although some hospitals have found it challenging to hire new technicians due to competition from the private sector, and the number of technicians is not always sufficient, the current number of technicians is generally sufficient to

⁶ Source: *RESULTS OF THE VIET NAM HOUSEHOLD LIVING STANDARDS SURVEY 2020* (General Statistics Office of Vietnam)

maintain the equipment without any problems.

Based on the above, the operation and maintenance structure of each hospital is clear, and the number of necessary staff is generally secured, which indicates that sustainability in terms of institutional/organizational aspect is generally ensured.

3.4.3 Technical Aspect

The target hospitals have full-time maintenance and management staff. Most of them are electrical engineers; however, they regularly receive training in medical equipment maintenance and management from Hanoi University of Science and Technology and other institutions. Young staff members have been in their positions for about five years, while those at the management level have been with the hospitals for 15 to 20 years or more, which indicates that they have a wealth of experience. They are fully capable of performing minor repairs, identifying problems, and ordering repairs to specialized vendors and supervising their work. As mentioned above, expensive equipment has regular maintenance contracts and is cleaned and inspected by specialized contractors regularly.

As described above, the engineers are experienced, their capacity has been regularly updated, and their skills in maintenance and management are secured.

3.4.4 Financial Aspect

In *Decree 43/2006/ND-CP*, which came into effect in August 2006, the Government of Vietnam stipulated an autonomous status for public medical institutions and encouraged self-help efforts to improve profitability. At the time of the ex-post evaluation, the target hospitals were not fully autonomous but partially autonomous, and their primary sources of funding were copayment, reimbursement of medical fees, and some government subsidies. The Vietnamese government's initiatives to promote self-help efforts to improve the profitability of public medical institutions under independent accounting system and to promote full coverage of medical insurance have resulted in an improved profit structure at the time of project completion compared to before the project implementation. At the time of ex-post evaluation, it was confirmed that the average amount of copayment and reimbursement of medical fees of the ten hospitals increased from 75,801 million Vietnamese dong (VND) in 2012 to VND 246,353 million in 2018 and VND 290,244 million in 2021, which indicates that their independent revenue resources have continued to increase significantly. These financial resources can be used to cover the cost of equipment maintenance. At the same time, since the hospitals are not completely autonomous, they could obtain funds from the Provincial Department of Health when they need to spend high amounts on facilities and equipment.

Maintenance costs vary from hospital to hospital, but they aim to allocate about 1.0% of income or 1.0% of the value of equipment. According to the questionnaires and interviews, nine of the

ten hospitals indicated that their maintenance budget are sufficient.

As a result of the above, financial sustainability is generally ensured, as the hospitals expect to increase their own resources in terms of income and receive funds from the Provincial Department of Health as needed.

Table 12: Income and expenditure of the target hospitals (Average of 10 Hospitals)

(Unit: million VND)

	2019	2020	2021
Total Income	326,810	356,764	347,801
Of which copayment	50,392	53,744	73,226
Of which reimbursement of medical fees	223,035	232,551	217,017
Total of copayment and reimbursement of medical fees	273,427	286,295	290,244
Total Expenses	296,155	316,797	332,212
Of which expenses for O&M	2,293	3,400	2,444
Surplus/Deficit	30,655	39,967	15,589

Source: Questionnaire and interviews with the target hospitals, documents provided by JICA

3.4.5 Environmental and Social Aspects

No significant risks to the sustainability of the project effects from an environmental and social aspects are observed.

3.4.6 Preventative Measures to Risks

No risks that were not foreseen at the time of the appraisal have occurred during the project implementation.

3.4.7 Status of Operation and Maintenance

Figures 3 and 4 show the physical condition of the three most expensive equipment and all equipment at each hospital. When the respondents were asked to rate the physical condition of the equipment on a three-point scale (1. Good, 2. Not good, but can be used, 3. Failure), more than 90% of the equipment in both categories was in good condition. As mentioned in “3.3.1.1 Quantitative Effects,” some equipment cannot be repaired, and spare parts are not produced. Still, in general, replacement is carried out without problems in securing and purchasing spare parts, and equipment that has failed in the past is repaired appropriately.

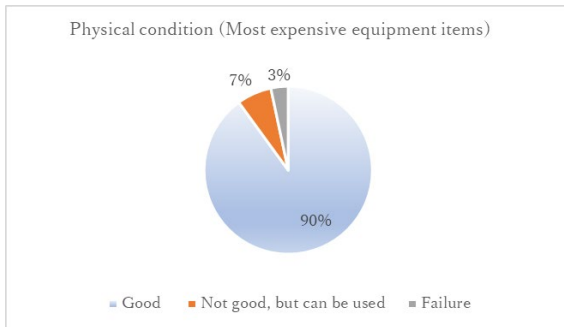


Figure 3: Physical condition of expensive equipment items

Source: Questionnaire to the target hospitals
 Note: n = 30 (10 hospitals, each with top 3 equipment)

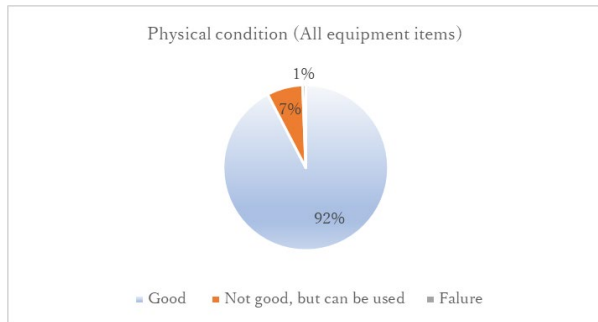


Figure 4: Physical condition of all equipment items

Source: Questionnaire to the target hospital
 Note: 9 hospitals except Bac Giang Provincial Hospital, n = 814 (responses by equipment type)

In each hospital, daily inspections are conducted by each medical department, and any problems are communicated to the equipment maintenance department. Each hospital records the condition of the equipment in a record book each time it is used. During the field visit at the time of ex-post evaluation, it was confirmed that all ten hospitals recorded the use and condition of each piece of equipment in a record book. In all of the hospitals, the equipment maintenance departments have established annual maintenance plans and perform periodic (weekly, monthly, every three months, etc.) inspections and maintenance.

For actual repairs, minor repairs are handled by hospital technicians, while other repairs are outsourced to manufacturers or outside contractors. CT scanners, X-ray equipment, DSA, and other expensive equipment have annual maintenance contracts, which include cleaning, inspection, spare parts replacement, monitoring, and problem detection. Significant repairs are outsourced separately.

Thus, the physical condition of each piece of equipment, and its operation and maintenance status, including daily inspections, are generally good.

Slight issues have been observed in the institutional/organizational and financial aspects, including the current status of operation and maintenance; however, there are good prospects for improvement/resolution. Therefore, sustainability of the project effects is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented to improve the quality of the medical service system in 10 provinces and cities in Vietnam by strengthening the overall capacity of provincial hospitals through the provision of medical equipment and the development of human resources, thereby contributing to improving people's health. The project is consistent with Vietnam's development

plan and needs at both the times of appraisal and ex-post evaluation, and its relevance can be confirmed. Although no specific collaborations or outcomes are planned or implemented with other projects of JICA and development partners, the project is consistent with Japan's ODA policy for Vietnam. Therefore, the relevance and coherence are high. The project produced outputs in line with the revised plan, and although the project period slightly exceeded the plan, the project cost was within the plan, and therefore, the efficiency is high. Among the expected effects, the "annual number of surgical operations," "annual number of inpatients," and the "number of trainees from lower-level hospitals who attended training" achieved their target values in the target year, and the "number of patients referred to upper-level hospitals," also achieved its target value in the following year. In addition, "average length of hospital stay" and "hospital infection rate" as additional indicators also showed improvement, and "utilization of equipment" was favorable. As for the impact, the project is considered to have contributed to improving residents' health by improving the "hospital mortality rate" and responding to COVID-19. Thus, the effectiveness and impacts are high. Although there are some minor problems in the operation and maintenance of the project equipment in terms of institutional/organizational and financial aspects as well as operation and maintenance status, the prospects for improvement and resolution are high. Therefore, the sustainability of the project's effects is high. In light of the above, the project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

None.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

Need for selection of the latest equipment and flexible adjustment of package contents under medical equipment procurement projects

Although there was not a significant delay in the project period of this project, the preparatory survey was conducted in March 2010, and the actual delivery was in 2016-2017, six to seven years after the initial equipment selection. There were cases where the procured equipment (models) was insufficient to handle the needs of the target hospitals due to the expansion of their functions as a result of population growth during that period or due to the relatively rapid technological progress and obsolescence of medical equipment. Since this was the first time each target hospital was involved in an ODA loan project, it was difficult to predict how long it would take to deliver the equipment, but many said that they would have selected more advanced models if they had known it would take such a long time. To effectively use equipment, it is desirable to

choose the latest specifications and models when selecting equipment, especially concerning highly specialized equipment. It is also desirable to implement assistance to facilitate first-time ODA loan procurement. Alternatively, it is desirable to flexibly adjust package contents to accommodate frequent model changes of equipment.

Need to understand the problems that may arise in STEP projects for hospital projects

This project was implemented as a STEP project; however, the training component was canceled due to the lack of prospects for bids from Japanese companies. In addition, there were cases where the procured equipment could not be repaired because there was no after-sales service due to the lack of a manufacturer or distributor. For STEP projects, it is necessary to adopt them after assuming that such problems may arise and considering how to deal with them if they do occur. At the same time, it is necessary to set up the project component in a way that meets the STEP procurement conditions, for example, by providing training in other forms, such as technical assistance under finance and investment accounts.

5. Non-Score Criteria

5.1. Performance

5.1.1 Objective Perspective

According to MOH, JICA provided prompt and positive support, including responses to inquiries and consent. Since the project covered multiple provinces, the CPMU was established as the contact point to supervise the implementation of the project, and this system worked efficiently and effectively with no significant problems. However, since the CPMU was to be dissolved after the project was completed, closer contact with the Provincial People's Committees would also have been necessary during the implementation of the project.

(End)

Comparison of the Original and Actual Scope of the Project

Item	Plan	Actual
1. Project Outputs	<p>1) Procurement of medical equipment to the target hospitals:</p> <p>Medical operation/consultation equipment (operating tables, endoscopes, laparoscopes, anesthesia equipment, etc.), ICU equipment (ventilators, monitors, etc.), diagnostic imaging equipment (CT scanners, X-ray equipment, etc.), laboratory and analysis equipment (blood analyzers, electrophoresis equipment, etc.), sanitation control equipment (sterilization equipment, etc.), and other equipment totaling about 1,486 pieces.</p> <p>2) Training programs for the ten hospitals (medical care skills, equipment maintenance/management, hospital management, etc.)</p> <p>3) Consulting services</p>	<p>1) Procurement of medical equipment: a total of 2,001 pieces of equipment assumed at the time of planning</p> <p>2) Training programs: Cancelled</p> <p>3) Consulting services: as planned</p>
2. Project Period	February 2012 – November 2016 (58 months)	March 2012 – July 2017 (65 months) (Completion of installation of originally procured equipment)
<p>3. Project Cost</p> <p>Amount Paid in Foreign Currency</p> <p>Amount Paid in Local Currency</p> <p>Total</p> <p>ODA Loan Portion</p> <p>Exchange Rate</p>	<p>8,155million yen</p> <p>2,029million yen (460,587million VND)</p> <p>10,184million yen</p> <p>8,693million yen</p> <p>1VND = 0.004405 yen (As of June 2011)</p>	<p>7,810million yen</p> <p>1,671million yen (350,709million VND)</p> <p>9,481million yen</p> <p>8,558million yen</p> <p>1VND = 0.004765 yen (Average between 2012 and 2020)</p>
4. Final Disbursement	June 2020	