

Medical Equipment Rehabilitation Project

Report Date: November, 2002

Field Survey: September, 2001

1. Project Profile and Japan's ODA Loan



Location Map of the Project



Medical Equipment Supplied Under This Project

1.1. Background

As of the late 1970s, medical care in Indonesia was not sufficient compared to the situation in other Asian countries, especially in the three provinces of Northern Sumatra, South Sulawesi and North Sulawesi. In order to upgrade the medical facilities in these three provinces, and thereby improve medical services in the areas, the Government of Indonesia (GOI) requested the Japanese Government (GOJ) for its cooperation. As a result, the preceding project, "Development of Medical and Hospital Facilities Project," was implemented with financing from Japan's ODA loan agreed to in 1979, to supply medical equipment to 20 hospitals in North Sumatra, South Sulawesi and North Sulawesi (hereafter referred to as the "target provinces").

However, some of the procured equipment was left abandoned for more than two years owing to delays in construction of hospital buildings and arrangement of other infrastructure such as electricity, due to insufficient local funds¹. The equipment supplied under the preceding project was, therefore, not effectively utilized, mainly as a result of deterioration resulting from abandonment. Other problems contributing to inadequate equipment utilization were insufficient infrastructure, insufficient knowledge concerning the equipment, and inadequate operational manuals.

There were no alternative medical facilities near 20 hospitals where the medical equipment supplied; therefore, rehabilitation of the existing equipment in these hospitals was urgently needed in order to facilitate its intended effect and thereby to improve medical services in the target provinces.

1.2. Project Objective

To ensure the utmost utilization of medical equipment supplied under the preceding project and to examine

¹ Japan's ODA loan in the preceding project was subject to the total amount of foreign cost (procurement of medical equipment and facilities), while the total amount of local cost (construction of a hospital building and other infrastructure) was to be financed by the GOI.

measures to further facilitate it, and thereby to improve medical services in North Sumatera, South Sulawesi and North Sulawesi.

1.3. Project Scope

After conducting a detailed field study on the 20 hospitals subject to the previous project, the following rehabilitation programs were to be planned and implemented:

- (1) Infrastructure Arrangement (construction of workshops and arrangement of electricity and water supply)
- (2) Equipment Repair and Relocation
- (3) Provincial Maintenance Center (PMC) Construction and Operation
- (4) Training Program for Operation and Maintenance (including making medical equipment manuals in Indonesian and on-the-job training)
- (5) Hospital Resource Management (strengthening of solidarity within and among organizations, exchange of knowledge and skills among hospitals, and utilization of medical personnel and technicians)

Japan's ODA loan was to cover the total project cost (1,935 million Yen), i.e., the total amount of both foreign cost (1,456 million Yen) and local cost (5,096 million Rupiah).

1.4. Borrower/Executing Agency

The Government of the Republic of Indonesia(GOI) / Directorate General of Medical Care(DGMC), Ministry of Health

1.5. Outline of Loan Agreement

Loan Amount	1,935 mil. Yen
Loan Disbursed Amount	1,930 mil. Yen
Exchange of Notes	Apr. 1988
Loan Agreement	Jul. 1988
Terms and Conditions	
Interest Rate	3.0%
Repayment Period (Grace Period)	30 Years (10 Years)
Procurement	General Untied
Final Disbursement Date	Dec. 1995

2. Results and Evaluation

2.1. Relevance

From the 1970s through the 1980s, GOI intended to improve the quality of medical services in Indonesia in line with the Five-Year National Development Plan, Repelita II-IV. In Repelita III (1979~84), the GOI set goals for improving hospital facilities, increasing the number of medical staff, and developing the Referral System.² The main objectives of Repelita IV (1984~89), on the other hand, were to improve the quality of

² A systematic hospital organization. Government owned general hospitals are classified by the class, from A class as a top to D class as

hospitals, to promote the development of the Referral System, and to construct workshops for repair and maintenance of the existing medical equipment. This project (hereafter referred to as the “Project”) was designed to achieve the objectives of both Repelita III and IV simultaneously, and therefore, the objective of the Project was relevant at the time of appraisal.

Currently, the national health development policy has been implemented in accordance with PROPENAS (National Development Program, 2000-2004). PROPENAS mentions the development of hospitals, promotion of the Referral System, and improvement of health services. Therefore, the objective of the Project is still relevant to the national health development policy at present.

2.2. Efficiency

2.2.1. Project Scope

There was no specific amount of equipment identified for repair or supply at the time of appraisal. Rather, the relevant numbers were supposed to be decided by the consultants on the Project after a detailed study on the target hospitals. Table 1 shows the results of project implementation.

Table 1: Actual Output of the Project

Scope/Program	Actual Output
Equipment supplied	
Consumable medical equipment:	609 items
Non-consumable medical equipment:	517 items
* ¹ Non-medical equipment:	2,044 items
Equipment repaired	
Medical equipment (non-consumable):	120 items
Non-medical equipment:	6 items
*²Infrastructure Arrangement	
New building:	13 Workshops, Hospital Facilities, Roads and Bridges (2,532 m ²)
Renovation:	1 Workshop and Hospital Facilities (4,035 m ²)
PMC Construction:	3 PMCs in each target province (1,378m ²)
Training Program	
Overseas:	72 persons
Domestic:	229 persons
Manual Arrangement:	142,819 sets
Hospital Resource Management:	Research and Development Program

Source: Ministry of Health

*¹ Non-medical equipment includes general tools for equipment maintenance, generator, water supply pump, kitchen and boiler.

*² Insufficient electricity and water supply were already improved under the previous project. Therefore, this project focused on renovation and construction of infrastructure for supporting hospital services.

The Project was to be planned and implemented in accordance to the needs of the 20 target hospitals, which had received medical equipment and facilities under the previous project. During the project implementation, two hospitals, namely Dadi Ujung Pandang Hospital and Gunung Wenang Manado Hospital, were closed because of their old buildings, and all equipment was relocated to newly built hospitals, namely Wahidin Ujung Pandang Hospital and Malalayang Manado Hospital. Two other new hospitals, Adam Malik

a bottom in Indonesia. In the Referral System, patients are transferred to a high class of hospital depending on the level of injury.

Class A: general hospitals that have extensive facilities and abilities of medical specialties and subspecialties.

Class B: general hospitals that have extensive facilities and abilities of medical specialties but limited subspecialties.

Class C: general hospitals that have facilities and abilities minimum of the four basic medical specialties.

Class D: general hospitals that have facilities and abilities minimum for the basic medical services.

Hospital and Makale Hospital, were built in the project site, and were also included in the project scope³. Finally, the Project covered 22 hospitals (9 in North Sumatera, 8 in South Sulawesi and 5 in North Sulawesi).

2.2.2. Implementation Schedule

The entire undertaking was originally scheduled for completion within 4 years. Implementation actually required approximately 7 years, including a 33-month delay due to tendering process complications in the procurement of equipment. Four attempts were made to secure a contract in the tendering process, in which the first and second tender with the Local Competitive Bidding (LCB) method failed owing to an excess of the bid price ceiling. The third tender, floated with the Direct Appointment method, also failed in negotiation. With the help of the Special Assistance for Project Implementation (SAPI)⁴ of the JBIC, the fourth tender floated with the Limited International Bidding (LIB) method succeeded, and the contract was executed on March 1993. Procurement and installation of equipment and construction work were conducted within the range of the original schedule.

2.2.3. Project Cost

At the time of appraisal, the project cost was estimated at 1,935 million Yen, all of which was to be financed by the Japan's ODA loan. The actual project cost amounted 1,930 million Yen, comprising the foreign cost, which ran over budget by 13% (184 million Yen), and the local cost, which ran over by 36% (1,833 million Rp.). These cost overruns were attributed to the delay in project implementation and the modification of the project scope. Despite the cost overruns for both the foreign and local portion, the actual project cost remained within the range of the original estimate because of the depreciation of the Rupiah against the Yen (the exchange rate shifted from 1 Yen=Rp.12.50 to 1 Yen=Rp.23.00), which resulted in significant savings in the local cost in Yen terms (savings of 189 million Yen).

2.2.4. Performance of the Executing Agency

The project sites were scattered all over the three provinces and the project scope included a wide range of works, making coordinated implementation complicated. To cope with the difficulties, the executing agency established a Task Force Team, which was tasked with supporting the executing agency by supervising and coordinating the related organizations. Consultants also played a major role in this diversified project in planning, implementing and promoting relevant objectives.

2.3. Effectiveness

2.3.1. Equipment Utilization

During the project implementation, a total of 120 items of medical equipment were repaired, and 609 items of consumable equipment and 517 items of non-consumable medical equipment were procured and distributed to the 22 target hospitals.

The majority of repaired equipment consisted of damaged X-ray apparatuses and dental equipment (mostly

³ A Provincial Maintenance Center (PMC) was supposed to be built in the top Referral Hospital (central hospital) in each province. Since Adam Malik Medan Hospital newly became the central hospital in North Sumatera, it was included in the Project. Makale Hospital newly built in Rantepao, South Sulawesi, was received new equipment, which originally planned for Elim Rantepao Hospital. Elim Rantepao Hospital only received rehabilitation of the equipment procured under the preceding project.

⁴ SAPI is designed to assist the executing agency in implementing and supervising the project effectively and efficiency.

dental chairs), which had seen the heaviest use in the targeted hospitals. During the field surveys on 5 of the target hospitals, a total of 7 X-ray apparatuses and 9 pieces of dental equipment were still being used.

The project supplied new medical equipment essential for various medical department, such as resuscitators, endotracheal set, ECG (electrocardiogram) and spectrophotometer, for the purpose of strengthening hospital services further. Moreover, 2,044 items of non-medical equipment, mainly consisting of general tools and equipment for workshops and Provincial Maintenance Centers (PMCs), were supplied to each targeted hospital in order to facilitate maintenance work.

In order to inventory and assess the current condition of the medical equipment procured under the Project, questionnaires⁵ were sent to the 21 target hospitals (excluding Adam Malik Hospital⁶). Out of 21 hospitals, 13 provided the required data. The results are shown in the table below.

Table 2: Current Condition of Medical Equipment Supplied Under The Project (13 Target Hospitals)

Name of Hospital	Equipment Received	Equipment In Use	No Answer (Blank)	Equipment Repairable*	Equipment Not Repairable*	* ¹ Equipment Utilization (%)
North Sumatera						
Pematang Siantar	48	29	0	3	16	60
Tarutung	35	21	14	0	0	100
Kisaran	25	19	2	3	1	83
Tebing Tinggi	18	15	0	1	2	83
Tanjung Balai	20	13	0	3	4	65
South Sulawesi						
Wahidin Ujung Pandang	57	26	10	1	20	55
Palopo	13	9	0	1	3	69
Soppeng	16	11	0	2	3	69
Bantaeng	11	9	0	0	2	82
North Sulawesi						
Malalayang Manado	52	30	7	12	3	67
Golontalo	30	20	0	2	8	67
Kotamubago	15	14	0	1	0	93
Total in the 3 Provinces	340	216	33	29	62	70

Source: Data from each hospital

* Equipment Repairable: Equipment which are currently non-functional, but repairable.

Equipment Not Repairable: Equipment which are non-functional and non-repairable, will be abandoned.

*¹ Equipment Utilization (%) = Equipment in Use / (Equipment Received – No Answer)

At least 216 out of 340 medical equipment items received were effectively used in the 13 hospitals. While 29 out of 91 items of inoperative medical equipment could be repaired as soon as appropriate budget allocations and spare parts were made available, 62 items were or would be abandoned because of malfunction or expiration of their service life⁷. Most of the respondent hospitals reported that the supplied medical equipment had effectively contributed to the improvement of medical services in their hospital.

⁵ Questionnaires were designed to look over the current condition of equipment consists of medical equipment repaired and procured under the Project (excluding consumable equipment). Most of the hospitals did not provide the information of the repaired equipment that was originally procured under the preceding project. Therefore, the utilization of repaired equipment was excluded in this survey.

⁶ Adam Malik Hospital received only non-medical equipment for the PMC.

⁷ The service life of medical equipment varies in types of equipment. According to the MOH, the service life of general medical equipment is approximately 5-10 years, depending on the frequency of use, ability of maintenance and availability of spare parts.

2.3.2. Medical Service Condition

Effective use of supplied equipment tends to be affected by the number or skills of medical staff in each hospital. Before the project implementation, insufficient number of medical staff (particularly doctors) was considered one of the factors contributing to the low utilization of medical equipment procured under the preceding project. The table below compares the number of medical staff in 1986 (before the Project) and in 2000 (at present) in order to measure the improvement of medical service conditions.

Table 3: Availability of Medical Staff in the Target Hospitals (1986 and 2000)

	1986				2000			
	Class	Doctor	Nurse	* ¹ Engineer	Class	Doctor	Nurse	Engineer
North Sumatera								
Pirngadi Madan	B	177	407	3	B	286	762	37
Pematang Siantar	C	27	81	1	B	36	192	6
Rantau Prapat	C	8	22	1	C	13	94	1
Kisaran	C	14	31	1	C	24	93	3
Tebing Tinggi	D	11	45	1	C	18	54	1
Tanjung Balai	D	5	8	1	C	13	64	1
Tarutung	C	5	72	1	C	8	102	3
Porsea	D	1	13	1	C	4	36	7
South Sulawesi								
Wahidin Ujung Pandang	B	244	307	2	A	486	508	14
Pare-pare	C	6	41	1	C	16	109	1
Watampone	D	4	17	1	C	15	94	3
Palopo	D	4	47	1	C	16	83	1
Elim Rantepao	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Makale	C	3	30	1	C	8	67	1
Bantaeng	D	1	21	1	D	5	36	1
Soppeng	D	1	17	1	C	8	45	2
North Sulawesi								
Malalayang Manado	B	98	33	1	B	140	413	23
Tondano	C	7	52	1	C	8	64	3
Kotamubago	C	7	112	1	C	10	119	3
Golontalo	C	9	38	1	C	17	105	2
Liun Kandage	D	10	121	1	C	7	89	1
Average		32	76	1		57	156	6

Source: MOH

*Adam Malik Hospital was excluded. Data of the Elim Rantepao Hospital were not available.

*¹ Engineer means maintenance engineer, including medical equipment engineer and building maintenance engineer.

The average number of doctors in the target hospitals increased from 32 to 57 between 1986 and 2000. Accordingly, the average number of nurses and engineers increased, from 76 to 156 and from 1 to 6, respectively. In particular, the number of doctors who could use special equipment, such as incubators, spectrophotometers and Doppler fetus detectors, increased after the Project. As a consequence, many of the target hospitals opened new medical departments, providing more medical services to the residents. Moreover, 9 target hospitals were successfully upgraded to the next level of class⁸ as a consequence of these having more medical staff and improved equipment and facilities.

2.3.3. Infrastructure Arrangement and Provincial Maintenance Center Construction and Operation

As a consequence of the project implementation, 16 workshops, including 3 Project Maintenance Centers

⁸ Two hospitals were upgraded from C to B class and B to A class. The remaining 7 hospitals were upgraded from D to C class.

(PMCs), were newly constructed and one workshop was renovated. Before the project, only 5 out of 20 target hospitals had workshops, which resulted in the abandonment of equipment and inadequate equipment utilization from the previous project. After this project, all 22 hospitals had workshops and were subsequently able to autonomously repair and maintain their facilities at a basic level.

The construction of PMCs⁹ further strengthened the maintenance capability of each target hospital by providing technical assistance. For instance, Tebing Tinggi Hospital received technical assistance from the PMC in Adam Malik Hospital several times to repair various pieces of medical equipment since the hospital did not have any maintenance engineer for medical equipment.¹⁰ Therefore, it is conceivable that the construction and renovation of workshops and PMCs effectively facilitated the utilization of medical equipment supplied by the project. In addition, construction and renovation of hospital buildings, such as laboratories, ICUs and delivery rooms, contributed to the expansion of medical services and hospital upgrades.

2.3.4. Effects of Training Program and Manual Arrangement

Overseas training and domestic training were conducted simultaneously with the project implementation. The overseas training provided the participants with technology and knowledge that would have been difficult for them to acquire within Indonesia; it was designed to facilitate the transfer and dissemination of skills and knowledge, thereby upgrading the level of medical skill at the target hospitals. There were 72 persons who received overseas training in the various fields. Domestic training provided more practice-oriented training, such as hospital medical care, management and maintenance. A total of 229 persons from each hospital participated in domestic training.

According to the results of an interview survey¹¹ conducted in 2000, all respondent hospitals that received training in medical care reported that the training program effectively contributed to the improvement of hospital services. Such training programs, including perinatology, radiology and laboratory skills, provided instruction on operating equipment, such as incubators, spectrophotometers and electrical surgical units, that had not been used effectively in the preceding project because of insufficient knowledge.

On the other hand, 4 out of 12 respondent hospitals reported that training for equipment maintenance was not effective because the training participants could not apply what they learned. In addition, according to the MOH, some of the persons who received maintenance training were not maintenance specialists for medical equipment, but were temporary staff members sent from other medical departments. Such people were not fully involved in maintenance work, and the knowledge they acquired from the training was not effectively transferred to maintenance engineers.

⁹ The PMC was under the KANWIL Office, provincial offices of the MOH, and was constructed in the central hospital of each province, namely Adam Malik, Wahidin Ujung Pandang and Malalayang Manado Hospitals. The functions of PMC were: administering a technical resources center for the maintenance referral system, in which referral hospitals could directly contact the PMC and receive services from it, and providing support for a part of an engineering department of the central hospitals.

¹⁰ Repair and maintenance of medical equipment in this hospital had been, since 2000, undertaken by an engineer who had special training for equipment maintenance.

¹¹ The interview survey was conducted based on questionnaires sent to the 22 target hospitals. Out of 22 hospitals, 12 hospitals responded to the questionnaire.

¹² Adam Malik Medan Hospital was excluded because the hospital received only non-medical equipment for PMC, and Elim Rantepao Hospital was also excluded because the hospital only received rehabilitation of the equipment procured by the previous project.

2.3.5. Effects of Manual Arrangement

Maintenance manuals for a total of 59 items of medical equipment supplied by the preceding project and 76 items supplied by the Project were translated into Indonesian and distributed to 20 target hospitals¹². The manuals contained instructions for operation, maintenance and installation, and a list of spare parts. A total of 142,819 sets of manuals were provided to the hospitals. According to the interview survey results, the manuals promoted the utilization of the medical equipment, particularly frequent-used equipment such as spectrophotometers, ECG monitors, incubators and electrical suction units at 8 out of 12 respondent hospitals. Previously this equipment was not used effectively because the manuals were not available or had not been translated. The manuals were effective at least to the extent that they helped solve the problems seen in the preceding project, as described above.

2.3.6. Hospital Resource Management

Hospital resource management activity was conducted as a Research and Development (R&D) Program under the Project. The objective of the program was to improve the quality and scope of medical services, as well as management in the target hospitals, by encouraging discussion and the exchange of knowledge and skills among the hospitals. As a consequence, the participant hospitals developed guidelines to manage hospital activities, such as emergency care, medical record keeping and operation and maintenance. The hospitals also established standard operating procedures (SOP) for medical services and hospital management. The SOP and R&D guidelines are currently being used to guide management in the hospitals. The table below indicates management efficiency at 21 target hospitals between 1986 and 2000.

Table 4: Efficiency of 21 Target Hospitals (Average) (1986 and 2000)

1986			2000		
BOR	LOS	TOI	BOR	LOS	TOI
48.7%	6	8	47.2%	5	7

Source: MOH

*BOR=Bed Occupancy Rate, LOS=Length of Stay, TOI=Turn Over Interval *Adam Malik Hospital was excluded.

Despite a decrease in the Bed Occupancy Rate (BOR) from 48.7% in 1986 to 47.2% in 2000, the Length of Stay (LOS) and Turn Over Interval (TOI) were successfully lowered from 6 days and 8 days in 1986 to 5 days and 7 days in 2000, respectively. The decrease of LOS and TOI suggests that the management of the target hospitals improved steadily between 1986 and 2000. The management of Rantau Prapat Hospital, Tarutung Hospital, Bantaeng Hospital and Soppeng Hospital, among others, improved significantly between 1986 and 2000 (BOR increased from 30.5% to 60.9%, LOS decreased from 5 days to 4 days, and TOI decreased from 16 days to 3 days in 4 hospital average). It is assumed that the R&D contributed to the improvement of hospital management. Nevertheless, the management of the target hospitals is still below MOH standards (BOR: under 75%, TOI: within 3 days), so further effort is indispensable for providing better medical services.

2.4. Impact

The number of outpatients and inpatients in the target hospitals can measure direct impact of the Project. An average number of outpatients in the 14 target hospitals¹³ increased from 55,590 to 71,865 between 1988

¹³ The number of target hospitals was selected based on the availability of required data.

¹⁴ The plan was made by the MOH in 1983, in which it was described that the Life Expectancy at birth should be increased to 68 years

and 2000, representing approximately a 29% increase. The average number of inpatients in the 17 target hospitals increased from 4,545 to 7,146 over the same period, representing an approximate 57% increase (refer to Table 5). These increases were considered a consequence of the increase of medical equipment and the number of medical staff, the expansion of hospital facilities and the improvement of hospital management.

Table 5: Average Number of Outpatients and Inpatients (1988 and 2000)

	1988	2000	Increase Rate (%)
Outpatient	55,590	71,865	29
Inpatient	4,545	7,146	57

Source: MOH

The Life Expectancy at birth and the Infant Mortality Rate (IRM) were used as health indicators since they normally reflect general health conditions. IRM is also a useful indicator for the assessment of environmental conditions that have an impact on the health of infants, such as nutrition, sanitation and the presence of communicable diseases. Figure 1 and 2 illustrate the Life Expectancy at birth and the IMR in the target provinces between 1990 and 2000.

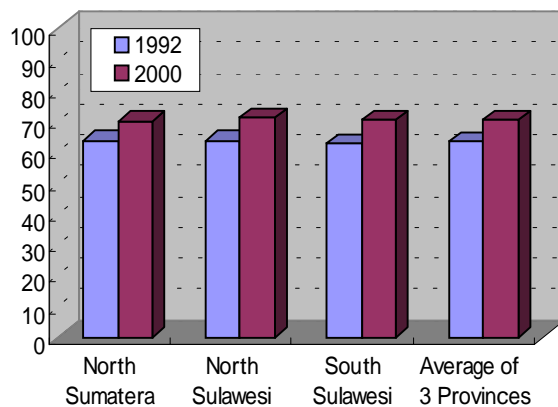


Figure 1:

Estimated Life Expectancy 1992 and 2000

Source: Indonesia Health Profile 1992, 1996 and 2000

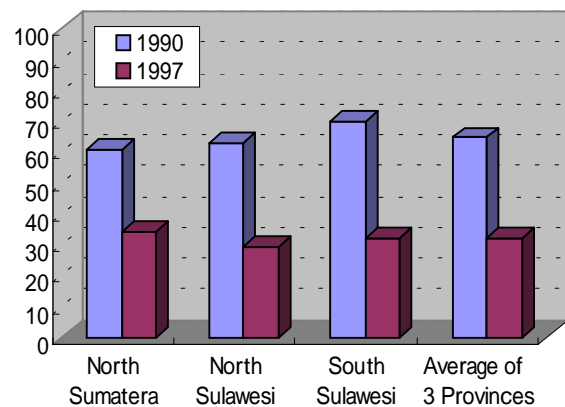


Figure 2:

Infant Mortality Rate* (IMR) 1990 and 1997

* IMR = Number of infant deaths per 1,000 live births.

As can be seen in the Figures, the Life Expectancy at birth increased steadily, from an average of 63.3 years in 1992 to 70.4 years in 2000, while the IRM significantly decreased from 64.7 per 1,000 live births to 32.0 per 1,000 live births between 1990 and 1997. This is representing an average reduction of 50% in the respective provinces. As a consequence of the improvement, all three-target provinces achieved the target level set in the “Long-Term Plan Toward The Year 2000.”¹⁴

Another indicator to show the improvement of medical conditions is the Number of Doctors per 100,000 people. This indicator generally indicates the adequacy of medical services in terms of quantity. The Number of Doctors per 100,000 people in the target provinces increased, on average, from 8.6 to 14.4 doctors per 100,000 people between 1990 and 1999, representing 68% increase (refer to Figure 3). This average increase is significantly higher than the national average of 20.6%.

while the IMR should be decreased to 35 per 1,000 live births by the year 2000.

Among the three provinces, the medical conditions in South Sulawesi saw the greatest improvement after the Project, although the improvement was not a direct result of the Project. However, it is conceivable that the Project indirectly contributed to the improvement of medical conditions in those areas since the expansion of medical equipment, facilities and medical staff, as well as the improvement of medical services, in the target hospitals provided broad opportunities to the provincial residents for taking medical services.

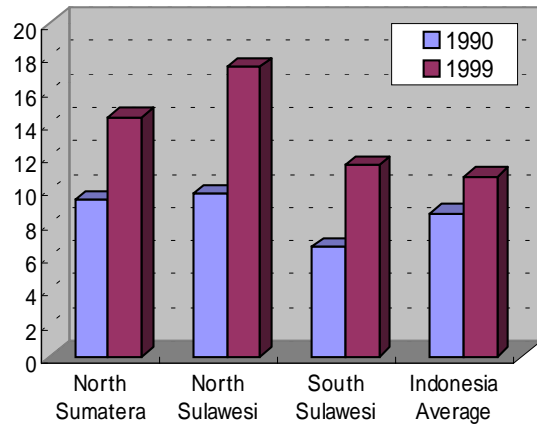


Figure 3: Number of Doctors Per 100,000 People, 1990 and 1999

Source: Indonesia Health Profile 1992 and 2000

2.5. Sustainability

2.5.1. Organizational Structure for Operation and Maintenance

Operation and Maintenance (O&M) of medical equipment is performed by each hospital. The organizational structure for O&M varies among the target hospitals. For instance, Wahidin Ujung Pandang Hospital (Class A) has a medical equipment maintenance unit, a non-medical equipment maintenance unit and a sanitation unit under the maintenance division, whereas other hospitals, such as Kisaran Hospital (Class C), have no maintenance division. At some hospitals, such as Bantaeng Hospital (Class D), maintenance is consigned to a private technical engineer. In general, the lower the class of the hospital, the weaker the organizational structure for O&M tends to be.

As part of the interview survey, each respondent hospital evaluated its own organizational structure for O&M as follows: Good = 1 hospital, Fair= 5 hospitals, Inadequate = 1 hospital, and Poor = 5 hospitals. About half of the respondent hospitals evaluated its organizational structure for O&M as poor. Therefore, strengthening the organizational structure for O&M is a critical issue for the target hospitals, particularly those identified as Class C and D.

2.5.2. Manpower and Technical Skill

Each provincial or district hospital usually has 1 to 7 maintenance personnel, though most of them are for building and facility maintenance. The majority of the target hospitals lack maintenance personnel and technical skills, so repair and maintenance work for medical equipment in each hospital is very limited. Basically, technical engineers in each hospital repair and maintain the medical equipment at the workshop. In case of that technical engineers cannot handle a problem, they either call the PMC for technical assistance or send malfunctioning equipment to local suppliers.

According to the interview survey results, 58% of the respondent hospitals evaluated its own manpower for O&M as either inadequate or poor, and 67% of those evaluated the technical skill needed to complete O&M work as either inadequate or poor. While each provincial or district hospital can request technical assistance from the PMC, the number of maintenance specialists for medical equipment in each PMC is not sufficient to serve all hospitals in each province. Insufficient spare parts also complicate repair and maintenance of the equipment in each hospital.

2.5.3. Financial Status

Funds for operating the central hospitals (Adam Malik, Wahidin Ujung Pandang and Malalayang Manado Hospitals) come from the central government budget, called the ‘OPRS,’ while those for provincial or district hospitals come from the local government, called the ‘APBD I’ (Provincial Income and Expenditure Budget) or ‘APBD II’ (District Income and Expenditure Budget). Since local government budgets are limited, each provincial or district hospital also receives funding from the central government (OPRS and ‘SBBO’ (Subsidy for Operational Cost)).¹⁵ Two (2) out of the 22 target hospitals, namely Malalayang Manado and Wahidin Ujung Pandang Hospitals, are financially independent, which means they can use their own revenue from patients for O&M.¹⁶

The budget allocation of the Government to each target hospital between 1995 and 2000 ranged from 88 million Rupiah to 3,731 million Rupiah, depending on the class of each hospital. Generally, the government budget allocation is not sufficient, so most of the target hospitals are suffering from chronic financial difficulties. In the interview survey 10 out of 12 respondent hospitals complained that the budget is either inadequate or poor, and some of the hospitals also complained that they only received approximately 15%~60% of the required budget. An annual O&M budget and the expenditures of Adam Malik Hospital are shown as an example in the table below.

Table 6: Annual O&M Budget and Expenditures of Adam Malik Hospital (*FY1995-1999)

Unit: Million Rupiah

		FY1995	FY1996	FY1997	FY1998	FY1999
O&M Budget	Required	1,776	1,770	1,478	2,751	3,909
	Actual	770	902	1,139	1,906	2,016
O&M Expenditures	Operation	693	812	1,025	1,715	1,814
	Maintenance	77	90	114	191	202

Source: Adam Malik Hospital

* Fiscal Year (FY) starts on 1 April and ends on 31 March.

Since the budget is limited, most of the hospitals place a priority on allocating available funds to operation; therefore only a small amount is available for maintenance. Generally, most of the maintenance budget is used for building and facility maintenance, not for medical equipment repair and maintenance. Most hospitals are waiting for the allocation of funds sufficient for repairing malfunctioning equipment. The current economic instability of Indonesia has constrained the maintenance activities of the target hospitals further.

In 2000, “Regional Autonomy Law” was established and the budget allocation system for provincial or district hospitals was changed. As a result, the government budget, such as OPRS and SBBO, now called ‘DAU’ (General Allocation Budget), is distributed to and controlled by the local government. The amount of budget allocation now depends on the priorities of the local government. Some hospitals reported that they received more funding than before since they could make requests directly to the local government.

¹⁵ All hospitals sometimes receive special government budget, such as ‘DIP’ (Project Development Budget including Foreign Aids and Loans) and ‘INPRES’ (Presidential Instruction).

¹⁶ The rest of hospitals have to submit the revenue to the Ministry of Finance and wait to receive the budget allocation from the Government. Financially independent hospitals also receive the budget allocation from the Government.

2.5.4. Prospective Sustainability

The interview survey results reveal that the majority of the respondent hospitals lack proper organizational structure (particularly maintenance section), maintenance personnel, technical skill and adequate budget for maintaining the existing medical equipment. Since the service life of supplied equipment had already expired or was getting short at the time of this evaluation, each hospital will be required to repair or replace old equipment in the near future. Because of the current financial difficulties and lack of technical skills, however, the majority of the target hospitals are unable to repair or replace the malfunctioning equipment, particularly equipment requiring expensive parts or special knowledge.

For prospective project sustainability, each hospital will be required to secure the minimum number of maintenance specialists for medical equipment, to improve technical skill of the maintenance personnel, and to manage operation and maintenance capabilities to the extent possible with their limited budget allocations.

Comparison of Original and Actual Scope

Items/Activities	Original Scope (At time of Appraisal)	Revision/Modification
I. Project Scope		
A. Making of detailed implementation plan at the 20 hospitals including manning schedule. 1. Infrastructure Arrangement 2. Equipment Repair and Relocation 3. PMC Construction and Operation 4. Training Program for Operation and Maintenance (including manual arrangement) 5. Hospital Resource Management	<u>8 hospitals in North Sumatera</u> - Pirngadi Mcdan - Pematang Siantar - Rantau Prapat - Kisaran - Tebing Tinggi - Tanjung Balai - Tarutung - Porsea	<u>9 hospitals in North Sumatera</u> - As planned - As planned - As planned - As planned - As planned - As planned -As planned -As planned - Adam Malik Medan (PMC was built in this hospital)
B. Consulting Services	<u>7 hospitals in South Sulawesi</u> - Dadi Ujung Pandang - Pare-pare - Watampone - Palopo - Elim Rantepao - Bantaeng - Soppeng <u>5 hospitals in North Sulawesi</u> - Gunung Wenang Manado - Tondano - Kotamubago - Gorontalo - Liun Kendage	<u>8 hospitals in South Sumatera</u> - Closed - As planned - As planned - As planned - Received only rehabilitation -As planned -As planned - Makale (New Hosptal) - Wahidin Ujung Pandang (New Hosptal)
	(Total: 20 hospitals)	(Total: 22 hospitals)
II. Implementation Period		
1. Infrastructure Arrangement	Apr. 1989 to Mar. 1991	Mar. 1991 to Sep. 1995
2. Procurement and installment of additional equipment	Oct. 1989 to Dec. 1992	Mar. 1995 to Dec. 1995
3. Rehabilitation and coordination of the equipment	Oct. 1989 to Mar. 1991	Mar. 1993 to Dec. 1995
4. Manual Arrangement	Oct. 1989 to June 1990	Nov. 1993 to May 1994
5. Training for Operation and Maintenance	July 1989 to Dec. 1992	Sept. 1991 to June 1994
6. Consulting Services		
- Selection	Jan. 1988 to Sep. 1988	Apr.1988 to Dec. 1988
- Detailed field study & design	Oct. 1988 to June 1989	January 1989 to Feb. 1990
- Implementation	July 1989 to Dec. 1992	March 1990 to Dec. 1995
III. Project Cost		
Foreign currency	1,456 mil. Yen	1,640 mil. Yen
Local currency	5,096 mil. Rp	6,929 mil. Rp
Total	1,935 mil. Yen	1,930 mil. Yen
ODA Loan Portion	1,935 mil. Yen	1,930 mil. Yen
Exchange Rate	1 Rp. = ¥0.094 (As of Feb. 1987)	1 Rp. = ¥0.0419 (The Weighted Average)

Source: MOH and data from JBIC

Independent Evaluator's Opinion on Medical Equipment Rehabilitation Project

Pande Radja Silalahi
Head of the Department of Economic Affairs, CSIS, Jakarta

This report is thorough, presenting a range of relevant subjects as mentioned in the DAC evaluations.

Development of medical and hospital facilities through improvement the quality of hospitals and construction of workshops for repair and maintenance has very high relevance. The increasing importance of medical care in order to develop human resources will pay an increasingly vital role in the future. Therefore development of medical and hospital facilities is still relevant for Indonesia at present as well as in the future.

As result of this project the utilization of equipment increased significantly, the maintenance equipment capability improved, the number of people using the equipment increased, and management of hospital improved as shown by the decreasing of Length of stay (LOS) and Turn Over Interval (TOI)

As results of this projects the average number of outpatients and inpatients increased significantly. However since all benefits and or impact of these projects have not been quantified, it is very difficult to reach any conclusions on project efficiency. An appropriate tool of measurement to quantify the benefit is sill needed because such kinds of this project need to be put on priority in the future.

It is difficult to draw any conclusions about cause-effect relationship between hospitals and its equipments improvements and increased Life expectancy and Infant Mortality rate, even though no doubt that these improvement contributed to the improvement of medical conditions in the targeted area.

Given the current condition of hospital or medical care in Indonesia there will a sustained need for development of medical and hospital facilities. Because of the budget constraint, funding from external sources remains an important need.