付　属　資　料

１．ミニッツ（合同評価報告書含む）

２．評価結果要約表

３．プロジェクト・デザイン・マトリックス

４．業務計画表

５．評価グリッド

MINUTES OF MEETING
BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
AUTHORITIES CONCERNED WITHIN THE GOVERNMENT OF
THE REPUBLIC OF SOUTH AFRICA
FOR THE PROJECT ON CAPACITY BUILDING OF MEDICAL EQUIPMENT MAINTENANCE
AND MANAGEMENT IN SOUTHERN AFRICA

The Joint Final Evaluation Team (hereinafter referred to as "the Team"), jointly organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the Department of Health (hereinafter referred to as "DOH"), conducted the Joint Final Evaluation on the achievement of the JICA Technical Cooperation Project on Capacity Building of Medical Equipment Maintenance and Management in Southern Africa (hereinafter referred to as "the Project") from 19 November 2012 to 2 December 2012.

During this period, the Team assessed the achievements of the Project since its commencement on 9 June 2009 by reviewing documents, interviewing relevant individuals and observing project activities. The Team also exchanged views regarding the Project with the authorities concerned of the Republic of South Africa.

Through these exercises, both South African and Japanese parties came to an agreement on the evaluation results and recommendations as described in the Joint Final Evaluation Report and its Annexes attached hereto.

East London, South Africa
30 November 2012

Mr Toshiyuki Nakamura
Chief Representative
JICA South Africa Office
Japan International Cooperation Agency

Dr Thobekile Mjekevu
Chief Director
Strategy and Organizational Performance
Eastern Cape Department of Health
Republic of South Africa

Mr Sam Bakhane
Director of Health Technology
National Department of Health
Republic of South Africa

Attached Document

THE JOINT FINAL EVALUATION REPORT
ON
CAPACITY BUILDING OF MEDICAL EQUIPMENT MAINTENANCE AND MANAGEMENT IN SOUTHERN AFRICA

30 November 2012

East London
South Africa

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Abbreviations

CEO	Chief Executive Officer
CMMS	Computerized Maintenance Management System
DHTC	District Healthcare Technology Committee
ECDOH	Eastern Cape Department of Health
HTM	Healthcare Technology Management
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
MEMM	Medical Equipment Maintenance and Management
MOU	Memorandum of Understanding
NDOH	National Department of Health
ODA	Official Development Assistance
OJT	On the Job Training
PCM	Project Cycle Management
PDM	Project Design Matrix
PHTC	Provincial Healthcare Technology Committee
PO	Plan of Operation
SAFHE	South African Federation of Hospital Engineering
SC	Steering Committee
TCA Training	Technical Competency Assessment Training
TOR	Terms of Reference
TUT	Tshwane University of Technology
UCT	University of Cape Town

1. Introduction

1-1 Purposes of the Joint Final Evaluation

The Project started on 9 June 2009 and will be completed on 28 February 2013. The Joint Final Evaluation Team (hereinafter referred to as "the Team") was composed of both South African and Japanese members, and was assigned by the Japan International Cooperation Agency (JICA) South Africa Office from 19 November 2012 to 2 December 2012, visiting the Eastern Cape Province to evaluate the achievements of the Project.

The purposes of the evaluation were as follows:

1) To grasp the inputs from both the South African and Japanese side to the Project and to summarize the achievements of the Project compared to those planned (achievements of Inputs, Outputs, and Project Purpose);
2) To execute a comprehensive evaluation on the achievements of the Project from the viewpoint of the five criteria of evaluation (explained later in this document); and
3) To make recommendations to the Project and authorities of both Governments concerned on their future operations, and to extract lessons learnt from the Project for the same or similar fields of technical cooperation.

1-2 Members of the Joint Final Evaluation Team

1) South African Side: Government of South Africa

Several government officials participated in the Joint Final Evaluation, however, to keep the group small in view of promoting a conducive environment for consultations, the following officials were regarded as main players:

List 1: Members of the South African Side

Name	Position
Ms Nellie Malefetse	Director, Health International Relations, National Department of Health (NDOH)
Mr Sam Bakhane	Director, Health Technology, NDOH
Mr Andile Kuzwayo	Director, Social and Governance Cluster, International Development Cooperation, National Treasury
Dr Thobekile Mjekevu	Chief Director, Strategy and Organizational Performance, Eastern Cape Department of Health (ECDOH)
Mr Zola Hloma	Acting Director, International and Intergovernmental Relations, ECDOH

2) Japanese Side: JICA

Four officials from the JICA South Africa Office participated in the Joint Final Evaluation and one JICA Consultant was dispatched to South Africa for conducting the consulting service on evaluation and analysis.

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List 2: Members of Japanese Side

Name	Position
Mr Toshiyuki Nakamura	Chief Representative JICA South Africa Office
Mr Shigeo Honzu	Representative JICA South Africa Office
Mr Keiji Mochida	Project Formulation Advisor (Health) JICA South Africa Office
Ms Janet McGrath	Programme Officer JICA South Africa Office
Mr Kazuhiro Ajiki	JICA Consultant TA Networking Corp.

1-3 Evaluation Methodology

1-3-1 Evaluation Framework

The evaluation study was conducted by the Team in accordance with the JICA Project Cycle Management (PCM) method which consists of the following three parts:

1) Verification of the project performance comparing the actual results of the Project with the project design summarized in the revised version of the Project Design Matrix (PDM) agreed to on 16 May 2012, shown in Annex 1. The PDM was revised according to the result of the Joint Coordinating Committee (JCC) of the Project and is being implemented thereby;
2) Value judgment of the Project from the viewpoint of the five evaluation criteria, being relevance, effectiveness, efficiency, impact and sustainability; and
3) Recommendations to the Project on its future and lessons learnt for the planning and implementation of other projects.

The Evaluation Grid is attached as Annex 3. The following materials were used for the evaluation: the Memorandum of Understanding (MOU) of 3 March 2008, a series of minutes of discussions, reports generated through the Project, and results of meetings, interviews, questionnaire surveys and observations made by the Team during their evaluation in the Eastern Cape Province.

1-3-2 Criteria of Evaluation

1) Relevance
The relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in relation to both the development policy of the Government of the Republic of South Africa and the aid policy of the Government of Japan.

2) Effectiveness
The effectiveness of the Project is assessed by examining the extent to which the Project has achieved its purpose, and further by clarifying the relationship between the purpose and outputs.

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3) Efficiency
The efficiency of implementation of the Project is analyzed with emphasis on the relationship between outputs and inputs in terms of timing, quality and quantity.

4) Impact
The impact of the Project is assessed by either positive or negative influences caused by the Project and the likelihood of achieving the Overall Goal of the Project within three to five years after the Project's completion.

5) Sustainability
The sustainability of the Project is assessed in terms of institutional, financial and technical aspects by examining to what extent the achievements of the Project would be sustained or maintained after the Project's completion.

1-4 Schedule of the Team

List 3: Schedule of the Joint Final Evaluation Team

Date	Schedule
19 November 2012	● Arrival of JICA Consultant in South Africa ● Courtesy call to Embassy of Japan
20 November 2012	● Courtesy call to NDOH (International Health Relations and Health Technology) ● Moving to Eastern Cape
21 November 2012	● Interview to Project Team Members
22 November 2012	● Courtesy call to ECDOH (International and Intergovernmental Relations, Strategy and Organizational Performance, Health Infrastructure) ● Visit to Technical Competency Assessment (TCA) Training at Frere Hospital Clinical Engineering Lecture Room
23 November 2012	● Interview at Port Elizabeth Health Complex ● Interview at Dora Nginza Hospital ● Interview with Cacadu District Health Officers and District Healthcare Technology Committee (DHTC) Members
24 November 2012	● Interview at Mthatha Health Complex ● Report Writing
25 November 2012	● Report Writing
26 November 2012	● Interview at Mthatha Health Complex ● Interview with OR Tambo DHTC Members
27 November 2012	● Interview at East London Health Complex ● Report Writing
28 November 2012	● Interview to Project Team Members ● Report Writing
29 November 2012	● Discussion of Draft Report within Evaluation Team
30 November 2012	● JCC Meeting
1 December 2012	● Internal Report Writing
2 December 2012	● Departure of JICA Consultant

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1-5 Major Interviewees

List 4: Major Interviewees

Name	Position
Mr Mlamli Tuswa	Chief Director , Health Infrastructure, ECDOH
Ms Nomfusi Magugu	Deputy Director, Healthcare Technology Management, ECDOH
Mr Michael Godana	Deputy Director, Healthcare Technology Management, ECDOH
Ms Didika Papu	Assistant Director , International and Intergovernmental Relations
Mr Erich Venter	Facility Manager, Mthatha Health Complex
Mr Solly Pretorius	Facility Manager, Port Elizabeth Health Complex
Mr Leslie Harker	Head of Clinical Engineering, Port Elizabeth Health Complex
Mr Jackie Cloete	Head of Clinical Engineering, East London Health Complex
Mr Malcolm MacSherry	Clinical Engineering Training Officer, East London Health Complex
Mr Andre Howard	Clinical Engineering Workshop Officer, East London Health Complex
Ms Modesra Ngumbela	Chief Executive Officer (CEO), Holy Cross Hospital
Ms Sylvia Sotsopo	Hospital Manager, Dr Malizo M Hospital
Ms Zanele Mpingwane	Clinical Technician, Port Elizabeth Health Complex
Ms Sinazo Lugabazi	Clinical Technician, Mthatha Health Complex
Ms Babalwa Nyoka	Clinical Technician, Mthatha Health Complex
Ms Babalwa Zungula	Clinical Technician, Mthatha Health Complex
Mr Mike Whittal	Clinical Technician, East London Health Complex
Mr Roy Yendall	Clinical Technician, East London Health Complex

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2. Outline of the Project

2-1 Background of the Project

The Government of the Republic of South Africa has acknowledged that health remains a basic requirement for social and economic growth of the country. Therefore, NDOH is making efforts to strengthen the health system in South Africa, with capacity building of medical equipment maintenance and management one of the priorities for the improvement of health service delivery in terms of both quality and quantity.

In South Africa, medical equipment maintenance services provided by private companies are generally expensive and also require technical verification of the service provided. Therefore, public health facilities are required to execute preventive and first line maintenance by themselves to manage their equipment. However, there is a serious shortage of clinical technicians. Many health facilities remain without Clinical Engineering workshops, especially in rural areas, which results in a gap in the quality of health service. Despite the strengthening of Healthcare Technology Management including human resources development being listed as one of the priorities in the National Health Policy, the public sector is seeking the best modality to ensure the safe use of medical equipment in a cost effective manner. Research conducted prior to commencement of the Project revealed that only one out of six resource persons for medical equipment was deployed in the public sector in 2002.

In 2004, NDOH directed a request for support to the Government of Japan, which resulted in a series of discussions and studies between NDOH and JICA. After signing the MOU on 3 March 2008, the Project was launched on 9 June 2009 with the primary objective of developing a good practice model for Medical Equipment Maintenance and Management (MEMM). NDOH and JICA agreed that the Project should endeavor to distribute the model developed in the pilot province to other provinces in South Africa and even the Southern African region. The Eastern Cape was selected as pilot province due mainly to the severity of medical equipment maintenance challenges compared to the national average.

In July 2011, the Government of the Republic of South Africa and JICA jointly organized the Joint Mid-Term Review to assess achievements of the Project. On 16 May 2012, a nine-month extension was requested by the Government of the Republic of South Africa to achieve the Project Purpose, with the request granted. As the Project is scheduled for completion in February 2013, the Government of the Republic of South Africa and JICA jointly organized the Joint Final Evaluation in November 2012 to reflect on the overall performance of the Project and the sustainability of MEMM beyond the termination of the Project.

2-2 Summary of the Project

The original Master Plan of the Project as attachment to the MOU, was signed. During the discussion in the JCC meeting in May 2012, the Master Plan was adjusted in accordance with the scenario at the time. The Overall Goal, Project Purpose and Outputs of the Project are as follows:

1) Overall Goal

Good practice models in South Africa make an impact on the improvement of MEMM practices in the country.

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2) Project Purpose

A holistic provincial model to improve MEMM is developed, which is applicable to other provinces in South Africa.

3) Outputs

1. A MEMM training package is developed in the pilot province based on evidence of the effectiveness of a training package model (Support the establishment of a provincial practical training institute for clinical engineering in the Eastern Cape).
2. The organizational structure of MEMM in the pilot province is reinforced (Strengthen the Healthcare Technology Management (HTM) function in the Eastern Cape).
3. Enabling environment is prepared to disseminate the MEMM improvement model (Contribute towards the finalization of national standards and its application at provincial level).

2-3 Project Committees

The Project established the JCC and the Steering Committee (SC) for making decisions at both national and provincial levels, and for monitoring the Project's implementation. The Project Team serves as catalyst for the Project and serves on both the JCC and the SC.

List 5: Joint Coordinating Committee Members

Health Technology Directorate, NDOH
Health International Relations Directorate, NDOH
ECDOH
JICA South Africa Office
Project Team Members

List 6: Steering Committee Members

Strategy and Organizational Performance Directorate, ECDOH
International Health Liaison and Intergovernmental Relations Directorate, ECDOH
Clinical Governance Management Directorate, Health Complexes and Hospitals
JICA South Africa Office
Project Team Members

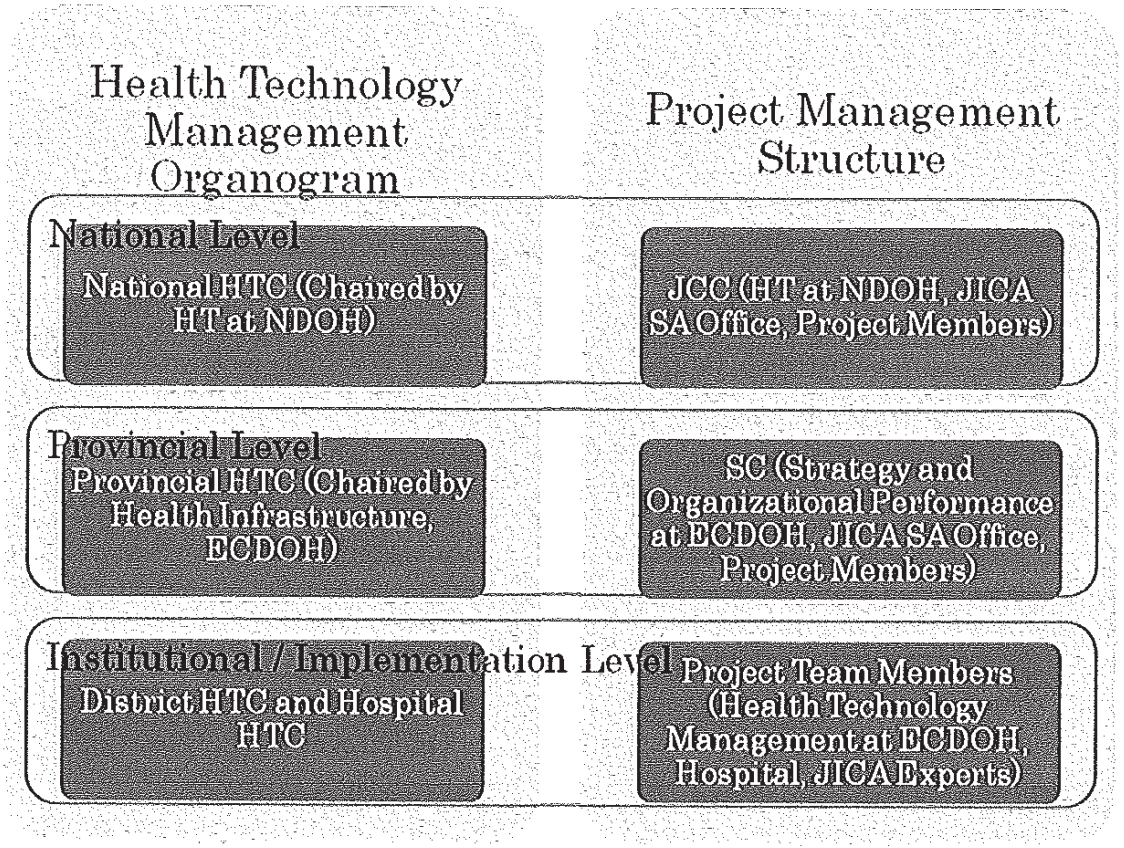

Figure 1: Macro Organogram for Project

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3. Achievements of the Project

3-1 Inputs

The Team confirmed that the inputs have generally been provided appropriately in line with the plan of the Project.

3-1-1 South African side

1) Counterpart personnel assigned to the Project

Two counterparts from ECDOH and five from health facilities were assigned as members of the Project Team, which spearheads the implementation of the Project in close collaboration with the Project Coordinator and Project Consultant provided by the Japanese side.

Table 7: South African Counterparts

Project Team Members (ECDOH)

Name	Position
Ms Nomfusi Magugu	Deputy Director, HTM / Infrastructure, ECDOH
Mr Michael Godana	Deputy Director, HTM / Infrastructure, ECDOH

Project Team Members (Health Facilities)

Name	Position
Mr Solly Pretorius	Facility Manager, Port Elizabeth Health Complex
Mr Erich Venter	Facility Manager, Mthatha Health Complex
Mr Jackie Cloete	Head of Clinical Engineering, East London Health Complex
Mr Leslie Harker	Head of Clinical Engineering, Port Elizabeth Health Complex
Mr Malcolm MacSherry	Clinical Engineering Training Manager, East London Health Complex

2) Provision of facilities for the Project

The South African side provided sufficient office space with necessary furniture and air conditioning for the Japanese experts to conduct their assigned tasks at ECDOH.

3) Operational cost

ECDOH spent ZAR 142,700.00 for the implementation of technical training, equipment audit and participation in the South African Federation of Hospital Engineering (SAFHE) Conference. Human Resources Development, ECDOH received a request from Frere Hospital for the budget for TCA training in FY2011/12.

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Table 8: Cost for Project Activities Borne by South African Side (ZAR)

FY2009	0
FY 2010	34,500.00
FY 2011	91,700.00
FY 2012 (by Nov.)	16,500.00
Total	142,700.00

3-1-2 Japanese side

1) Allocation of Experts and Consultants

Since the commencement of the Project, two Japanese long-term experts have been dispatched as Project Coordinators.

Table 9: Japanese Long-term Experts

Name	Position	Duration
Mr Kazuyuki Kobayashi	Medical Equipment Maintenance and Management / Project Coordinator	7 June 2009 – 18 February 2010
Ms Akiko Niwa	Medical Equipment Maintenance and Management / Project Coordinator	9 December 2010 – 8 March 2013 (planned)

A Japanese short-term expert conducted a two-week consultation for the Project.

Table 10: Japanese Short-term Expert

Name	Position	Duration
Prof Takuji Date	Consultative Visit	22 May 2010 – 4 June 2010

Consultants have been stationed on a short-term basis for technical advisory on medical equipment maintenance and management. They have played a key role during project implementation, especially at times when Japanese long-term experts were absent.

Table 11: Consultants

Name	Position	Duration	
Mr Yao Feng Juan	Technical Advisor	FY2009	0.40M/M
		FY2010	2.27M/M
		FY2011	4.26M/M
		FY2012 (Planned)	4.00M/M
Mr Peter Ma	Test Equipment Advisor	FY2012	2.53M/M

In addition, the Japanese side deployed a Project Assistant since commencement of the Project.

Table 12: Project Assistant

Name	Position	Duration
Ms Anele Raziya	Project Assistant	21 September 2009 – 28 February 2013

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2) Equipment Provision and Facility Renovation

Equipment procured by the Japanese side amounted to ZAR 16,801,941.66. The detailed list of equipment is shown in following Tables. Moreover, the clinical engineering lecture room at Frere Hospital, East London Health Complex, was renovated.

Table 13: Office Equipment (ZAR)

Description	QTY	Total Price
Laptop PC	3	38,999.85
Projector	1	6,999.95
Printer	1	9,045.00
Total		55,044.80

(Calculated the rate 1 ZAR = 9.464 Yen)

Table 14: Test Equipment (ZAR)

Description	QTY	Total Price
Electrosurgical Analyzer	12	1,391,303.52
Defibrillator Analyzer	12	1,100,437.68
Phototherapy Radiometer	12	302,435.52
Electrical Safety Analyzer	12	750,505.56
Non-invasive Blood Pressure Analyzer	12	1,408,935.19
Incubator Analyzer	12	1,655,456.04
Pulse Oximeter Simulator	12	1,664,126.28
Patient Simulator (ProSim 8 Vital Signs Simulator)	12	3,539,340.19
Infusion Pump Analyzer (Infusion Device Analyzer)	12	1,634,403.77
Ventilator Analyzer (Gas Flow Analyzer Premium Precision Ventilator Test Kit VT Mobile)	12	1,327,197.24
Ventilator Analyzer (Gas Flow Analyzer Premium Precision Ventilator Test Kit VT Plus HF)	3	420,800.48
Fetal Monitor Simulator (PS320Fetal Simulator)	12	1,308,384.68
Total		16,503,326.15

(Calculated the rate 1 ZAR = 9.464 Yen)

Table 15: Hand Tools for Medical Equipment Maintenance (ZAR)

Description	QTY	Total Price
Electronic Tool Kit	25	149,732.81
Cordless Drill Machine	12	22,925.40
Digital Multimeter	25	70,912.50
Total		243,570.71

(Calculated the rate 1 ZAR = 9.464 Yen)

Table 16: Renovation of the Clinical Engineering Lecture Room at Frere Hospital (ZAR)

Work Description	Price
Supply, Delivery, Erection & Completion as per specification of new class/lecture room building, Plumbing & Civil Works	432,510.49
Carpeting, Vinyl Flooring & Tiles Supplied & Fitted	23,448.36
Aluminium Doors & Chromadek Awnings & Windows Supplied and Fitted	46,141.60
Painting, Exterior and Interior	18,785.30
Electrical works, new data lines, plugs, lights & trunking	22,005.20
Total	542,890.95

(Calculated the rate 1 ZAR = 9.464 Yen)

3) Operational cost

The Japanese side spent ZAR 5,576,173.99on operational cost since commencement of the Project.

Table 17: Operational Cost Borne by Japanese Side (ZAR)

FY	Cost
2009	222,828.40
2010	1,323,188.75
2011	2,541,934.91
2012 (Apr. - Sep.)	1,488,221.93
Total	5,576,173.99

(Excluding personnel and equipment; calculated the rate 1 ZAR = 9.464 Yen)

3-2 Achievement of Outputs

The Team confirmed that most of the project activities as reflected in the PDM have been implemented to fulfill the following Outputs, with the reasoning outlined below.

Output 1: A MEMM training package is developed in the pilot province based on evidence of the effectiveness of a training package model (Support the establishment of a provincial practical training institute for clinical engineering in the Eastern Cape)

This output is likely to have been achieved partially at the time of the Joint Final Evaluation and will be achieved further towards and even after the end of the project period by accelerating the hiring of new recruits to be trained. The Project developed a training package (draft) for new recruits. Even though the number of new staff trained by this package has not reached the target yet (four of the eight staff members targeted were trained), the foundation for practical training was established by this package and the training is likely to be accelerated by hiring new recruits to be trained.

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Table 18: Verifiable Indicators and Activities for Output 1

Verifiable Indicators	Result
Verifiable Indicators 1-1: Practical training institute is established	In 2012, the Project renovated training space at Frere Hospital. Moreover, through a series of On the Job Training (OJT), the Project established a training package (draft) for new recruits.
Verifiable Indicators1-2: Number of new staff trained by the institute	Through the training package (draft) for new recruits, four new staff were trained until now. After one year OJT Training, they started working at Frere Hospital as clinical technicians.
Activities	**Result**
Activities 1-1: Start practical OJT at Frere Hospital for eight technicians who are holding electrical or electronic engineering diplomas	In 2011/12, the Project conducted practical OJT at Frere Hospital for four technicians who are newly hired.
Activities 1-2: Continue technical TCA training for test equipment, electrical and mechanical hands skills, anesthesia units, and defibrillators / monitors	The Project hosted TCA training for test equipment, electrical or mechanical hand skills for existing clinical technicians in the province by the time of the Joint Final Evaluation. TCA training for anesthesia units is planned for November 2012 and defibrillators / monitors for February 2013.

The Project conducted TCA training for existing clinical technicians in the province, and most participants were certified by manufacturers or accredited service providers. This training and these trained technicians have contributed to a significant improvement of first-line maintenance skills and reduction of down-time. In addition, the training has strengthened training management capacity and the network between clinical engineering units and manufactures or accredited service providers. Utilization of locally available resources as opposed to resources from abroad offered an added advantage to the conduciveness of the training environment.

Table19: Training Package for Newly Recruited Technician

Targeted people	Electrical Engineering Technicians (Diploma holders)
Training Period	One year
Training Venue	Frere Hospital Clinical Engineering Department (May be extended to other health complexes at a later stage)
Maximum number of trainees	Eight
Course Contents	On-the-job training at Frere Hospital Training to be conducted by the manufacturer's accredited trainer Including: (1) Theory (2) Hands-on training for Medical Equipment (3) Paper Examination (4) Practical Skill Evaluation (5) Service Capacity Certification (if trainees pass the test) The training should cover at least all life support medical equipment and critical diagnostic equipment such as: (1) Anesthesia Unit (2) Ventilator (3) Monitor (4) Defibrillator (5) Electrical / Mechanical hand skills (6) Test Equipment

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Table 20: Technical Competency Assessment Training

Item	Date	Course Period	# of Participants	Pass Rate	Trainer (Manufacturer)	# of Medical Devices	# of Trainers
Anaesthesia Unit	Nov. 2010	3 days	17	100%*	Medhold (GE)	1 unit, 3 modules	1
Ventilator	Mar. 2011	2 days	16	65%	RCA (VELA)	1 unit	1
Monitor, BP Machine, etc Wide Range of products	Jun. 2011	5 days	19	95%	Welch Allyn	7	2
Infusion and Syringe Pump	Oct. 2011	5 days	21	86%	Care Fusin (Alais)	4	3
Incubators and Phototherapy Units	Nov. 2011	3 days	21	86%	Brittan Healthchare (Various Manufacturers)	7	4
Mechanical hand skills Training	Dec. 2011	5 days	15	88%	Master Artisan	-	3
Electrical hand skills Training	Mar. 2012	5 days	15	88%	Master Artisan	-	3
Test Equipment	May. 2012	19 days	19	100%	Brittan Healthcare (Fluke)	12	3
Anaesthesia Unit	Nov. 2012	10 days	10	To be confirmed	Drager	1	1
Monitor	Nov. 2012	10 days	10	To be confirmed	Drager	2	1

* Trainee failed the first course, but attended consequent courses and passed.

Output 2: The organizational structure of MEMM in the pilot province is reinforced (Strengthen HTC function in the Eastern Cape)

This Output was already achieved by developing the Provincial Healthcare Technology Committee (PHTC) / DHTC reinforcement model. Currently, lively discussions have been conducted in PHTC technical sub-committees such as the Specifications Committee. To strengthen HTC function further, a workshop for PHTC and DHTCs is being

planned within the remaining project period.

Table 21: Verifiable Indicators and Activities for Output 2

Verifiable Indicators	Result
Verifiable Indicators 2-1: Number of established DHTC (Target: 3 DHTCs)	6 DHTCs have already been established in the Eastern Cape.
Activities	**Result**
Activities 2-1 Support the finalization of the Terms of Reference (TOR) for PHTC	The Project supported the strengthening of PHTC by developing the Work Flow and has already finalized its TOR.
Activities 2-2 Support the strengthening of the DHTCs	6 DHTCs have already been established and the Project has continued to support their activities through inputs at related meetings.
Activities 2-3 Conduct at least one workshop to strengthen the Healthcare Technology decision-making function for the PHTC and all DHTCs	A workshop for PHTC and DHTCs is being planned in February 2013 to share the Work Flow and TOR which the Project finalized.

Table 22: Training / Workshop for Healthcare Technology Management

Participants	Date	Trainer	No. of Participants
Clinical Technicians	Sep. 2010 (3 days)	Tshwane University of Technology (TUT)	22
Hospital CEO and Hospital Manager	Nov. 2010 (2 days)	TUT	16
PHTC and DHTC	Oct. 2011 (2 days)	University of Cape Town (UCT)	60
PHTC and DHTC	Feb. 2012 (2 days)	UCT	99
PHTC and DHTC	Feb. 2013 (planned)	UCT	-

The Project enabled the strengthening of the DHTC function, which in turn prompted districts and facilities to reconsider and apply increased awareness on HTM to support clinical technicians on the ground faced with everyday MEMM challenges. Scope for utilizing academic resources in the country, especially those with a good understanding of MEMM practices on the ground, has contributed to training participants acquiring a deeper understanding of HTM and MEMM challenges, which in turn has accelerated the DHTC implementation process.

Table 23: Activities at District Healthcare Technology Committees

DHTC	# of Sub District	Activities
Cacadu DHTC	3	● Had officially appointed members and held regular monthly meetings. ● Conducted Medical Equipment Inventory and developed Maintenance Plan in the respective health institutions.
Amatole DHTC	5	● Had officially appointed members and conducted medical equipment inventory at various level health facilities with a clinical technician at Frere Hospital.
OR Tambo DHTC	3	● Had officially appointed members and conducted Medical Equipment Inventory still in progress. The committee is appointed as a sub-committee of the National Health Insurance committee as the OR Tambo District is selected as a pilot district for National Health Insurance implementation.
Chris Hani DHTC	6	● Participated in the planning meeting for transversal procurement initiated by Multi-Agency Working Group.
Alfred Nzo DHTC	4	● Had officially appointed members and held meetings regularly.
Joe Gqabi DHTC	3	● Had officially appointed members and held meetings regularly. ● Assisted by "Rural Doctors' Support Programme" supported by Africa Health Placements (AHPs).

Output 3: Enabling environment is prepared to disseminate the MEMM improvement model (Contribute towards the finalization of national standards and its application at provincial level)

This output is likely to have been achieved partially at the time of the Joint Final Evaluation. The Project developed the standard test procedure for various medical equipments. Through the DHTC activity, the medical equipment inventory exercise and survey were done at nine hospitals. Moreover, medical equipment inventory at another hospital is being planned for the remaining project period. Although the Project has contributed to creating an "evidence based" MEMM environment, the Project should continue to promote regular medical equipment surveys to ensure that MEMM is discussed at PHTC/DHTC based on survey results.

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Table 24: Verifiable Indicators and Activities for Output 3

Verifiable Indicators	Result
Verifiable Indicators 3-1: Number of hospitals taken medical equipment inventory	Medical equipment inventory was done at nine of the ten targeted hospitals so far, and plans on completing the exercise before conclusion of the Project.
Activities	**Result**
Activities 3-1: Complete the Equipment Audit exercise at least in 10 hospitals (Subject to availability of clinical technicians to execute)	The Project has already conducted a medical equipment inventory at nine hospitals, and plans on doing the same at another hospital within the remaining project period.
Activities 3-2: Research and analysis of the series of Training and Practice on utilization of Test Equipment	The Project has been developing standard testing procedures for medical equipment. The medical equipment inventory is scheduled for completion in January 2013.
Activities 3-3: Support health institutions to establish appropriate clinical engineering workshops	The Project has advised on budgeting for the establishment of clinical engineering workshops at two health facilities.
Activities 3-4: Support implementation of the Computerized Maintenance Management System (CMMS) Clinical Engineering Module in view of roll-out	To support implementation of the CMMS, the Project has considered data conversion to facilitate retrieval of data from medical equipment inventory to CMMS.

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Table 25: Standard Performance Test Procedure Module

Medical Equipment	Template to develop with source of reference
Defibrillator	General Test procedure including ECG function Optional procedure combined with general procedure for SpO2 and Pacing
Infusion Pump	General test procedure with (i) adjustable occlusion pressure test, and (ii) High flow rate and low flow rate
Ventilator	Include SpO2 test as general procedure 1. General test procedure for adult ventilator 2. General test procedure for neonatal ventilator
Phototherapy Unit	General test procedure with low limit of radiometry power.
Incubator (closed)	General test procedure including temperature, humidity, noise, and air flow
Incubator (open)	General test procedure including temperature, humidity, noise, and air flow
Fetal Monitor	General test procedure with different fetal beat. Lower end sensitivity should be included with the setting reference
Electrical Safety Test for Class I	To be designed according to IEC-62353 Class I
Electrical Safety Test for Class II	To be designed according to IEC-62353 Class II
Sphygmomanometer	General test procedures of "Standard BP simulations" "Patient condition simulations" "Arrhythmia simulation" "Respiratory artifact simulations" "Neonatal simulations with wrist cuff" Limit should be set with reference (e.g. IEC device specific standard)
Pulse Oximeter	General test procedures Limit should be re-examined with reference (e.g. IEC device specific standard)
Vital Sign Monitor	General test procedure of "pre-defined patient simulations". Set Function for ECG, Respiration, Temperature, IBP should be selectable or Test Procedure for "NIBP & SpO2" "NIBP, SpO2 & Temperature" "NIBP, SpO2, ECG & Respiration" "NIBP, SpO2, ECG, Respiration & Temperature" "NIBP, SpO2, ECG, Respiration, IBP& Temperature"
Electrosurgical Unit	General Test Procedure

3-4 Achievement of the Project Purpose

Project Purpose: A holistic provincial model to improve MEMM is developed, which is applicable to the other Provinces in South Africa

The Project proposed the holistic provincial model to improve MEMM which consists of Output1: Individual Capacity Development, Output2: Organizational Capacity Development, and Output3: Environmental Development. The Project Purpose was partially achieved. Although the Project managed to develop a model, it is likely to further evolve prior to adoption. Further, the model requires a conducive environment before its functionality could be determined for consequent application, and it is likely that such an environment is

lacking in certain aspects in relation to the dynamics of the Project.

Table 26: Verifiable Indicators for Project Purpose

Verifiable Indicators	Result
Verifiable Indicators: Upon completion of the Project, a holistic model to improve MEMM developed in the pilot province is adopted as a model for application to other provinces.	Some of the Project's models or achievements have been recognized in policy documents or guidelines developed by both NDOH and ECDOH, especially the National Health Technology Management Policy, A Framework for Health Technology Policies, Strategy for Health Technology, and Annual Performance Report 2009-2012 in ECDOH. Moreover, to accelerate the application of the model further, the Project plans on holding a seminar with participation from stakeholders from both NDOH and other provinces.

-Input: Hand tools and test equipment are necessary to ensure the safety of medical equipment as outlined in MEMM policy documents
-> Procurement of hand tools and test equipment for use by clinical technicians to contribute to compliance of medical-legal issues is emphasized to ensure the safety use of medical equipment for preventive maintenance, ultimately for patient safety.

-Output 2: Organizational Level "Strengthening HTC's Function Model"
->To establish PHTC and DHTC and to strengthen their functions as technical advise on MEMM is considered one of the priorities.

-Output 3: Environmental Level "Evidence based MEMM" model by Equipment Inventory Audit:
-> The importance of the Equipment Inventory Audit is recognized so that MEMM is planned, monitored and evaluated based on information collected.

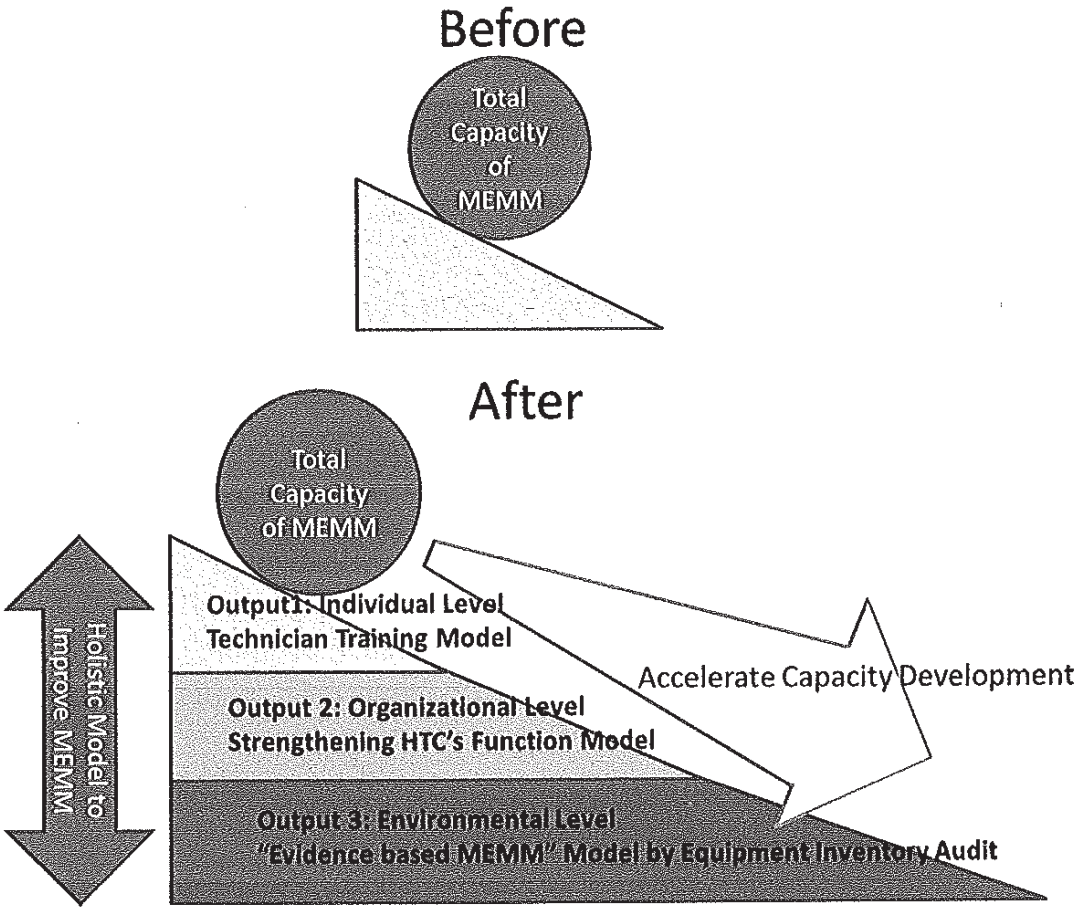

Figure 2: Holistic Model to Improve MEMM

South Africa has three types of MEMM approaches, namely (1) Three-step maintenance approach (2) Outsourced maintenance approach, and (3) Central workshop-focused maintenance approach. The Eastern Cape adopts the (1) Three-step maintenance approach and the holistic model which the Project developed is likely to be applicable to other provinces which adopt the same maintenance approach.

Table 27: Three Types of MEMM Approaches

Three-step Maintenance Approach (Eastern Cape)

First Step
User Maintenance

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Second Step
In-House Maintenance

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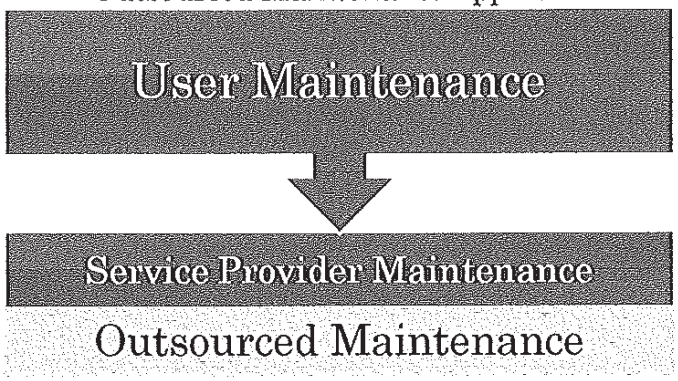
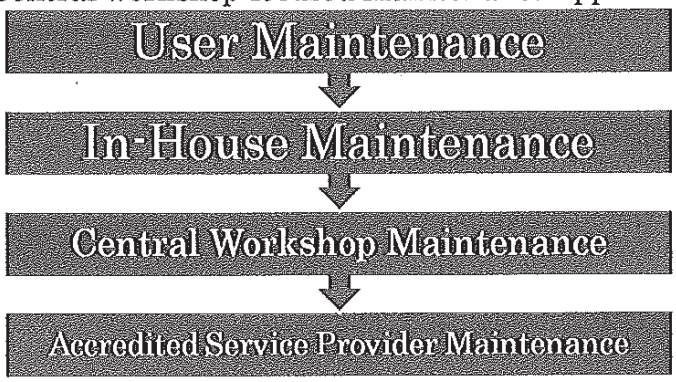
Third Step
Accredited service provider maintenance

Outsourced Maintenance Approach



Central workshop-focused Maintenance Approach



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4. Results of Evaluation by Five Criteria

Through the Joint Final Evaluation, the Team assessed the Project's relevance, effectiveness, efficiency, impact, and sustainability.

4-1 Relevance

The relevance of the Project is reviewed by the validity of the Project Purpose and the Overall Goal in line with the development policy of the Government of the Republic of South Africa and the aid policy of the Government of Japan. The Project was highly relevant to the needs of South Africa and its government policy and Japan's aid policy to South Africa.

1) Relevance to the national policy

The status of the NDOH Strategic Plan 2010/11 – 2012/13 has not changed since the Joint Mid-Term Review of the Project in July 2011. At national level, the NDOH recognizes the importance of MEMM as it prioritized three points from ten priorities regarding MEMM, being (firstly) "Overhauling the health care system and improving its management", (secondly) "Improving human resources management, planning and development, and (thirdly) "Revitalization of infrastructure".

2) Relevance to the needs of the target group

JICA and NDOH agreed that the Project would aim to distribute the model developed in the pilot province to other provinces in South Africa and the Southern African Region. The Eastern Cape was selected as pilot province given the severity of medical equipment maintenance challenges compared to the national average.

3) Relevance to Japan's aid policy to South Africa

The Project is positioned as part of the "Promotion of Human Security through Improvement of Basic Human Needs" approach in Japan's Official Development Assistance (ODA)'s Country Assistance Program for South Africa (drafted in April 2012).

4-2 Effectiveness

Effectiveness is assessed by examining the extent to which the Project has achieved its purpose, and clarifying the relationship between the Project Purpose and Outputs. The effectiveness of the Project is moderate. The following points are noteworthy:

1) Degree of achievement of Project Purpose

At the time of the Joint Final Evaluation, the Project Purpose, namely "A holistic provincial model to improve MEMM is developed, which is applicable to the other Provinces in South Africa" has been partially achieved. Although the Project managed to develop a model, it is likely to further evolve prior to adoption. Further, the model requires a conducive environment before it could be applied and its functionality determined, and it is likely that

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such an environment is lacking in certain aspects in relation to the dynamics of the Project.

2) Project design and monitoring

Within the framework of the Project, its strategy was appropriate. All three Outputs are essential for the Project Purpose to be realized, and they have been contributing to the achievement of the Project Purpose. However, the description of each Output had not been clear at inception, therefore the Project defined or refined its intention and indicators by adding subtitles when the Joint Mid-Term Review was conducted. In addition, monitoring each activity and its modification have been well conducted in accordance with the Plan of Operation (PO) at Project Team Meetings and SC meetings.

3) Factors that promoted realization of effects

Sustainability, continuity and consistency, in prioritizing HTM from the previous to the current national health policy has contributed to the achievement of the Project Purpose.

4) Factors that impeded realization of effects

The brain drain concept is prevalent in the Eastern Cape. Since project commencement, five clinical technicians were newly recruited. On the other hand, eight clinical technicians have left their posts, with the total number of clinical technicians decreasing.

4-3 Efficiency

Efficiency of the Project implementation is analyzed with emphasis on the relationship between outputs and inputs in terms of timing, quality and quantity. The efficiency of the Project is high as inputs made by both South African and Japanese sides were appreciated.

1) Input

Input from the South African side

Allocation of counterpart personnel, office space and operational cost were appropriately allocated from the ECDOH. In addition, the Project utilized opportunities such as the JCC and the SC for sharing information and exchanging views.Especially, the formation of the Project Team contributed immensely to joining forces of major stakeholders to facilitate the implementation of project activities. Participation by and cohesion between all stakeholders and all staff from all cadres, allowed for a better understanding and appreciation of the project milieu. The composition and functionality of the Project Team serves as evidence thereof.

Input from the Japanese side

Allocation of personnel was appropriately allocated by JICA. Even though there was partial absence of the Japanese long-term expert, the Project optimally utilized locally available human resources in the form of a technical advisor and a training coordinator. However, the Project procured much equipment for testing medical equipment in the second year, such test equipment being well utilized to achieve Output 3, namely "Enabling environment is prepared to disseminate the MEMM improvement model (Contribute towards the finalization of national standards and its application at provincial level)." The environment for "evidence based" MEMM was improved through medical equipment inventory by such

test equipment.

2) Degree of achievements of Output 1-3

(See 3-3)

4-4 Impact

The impact of the Project is assessed by either positive or negative influences caused by the Project and the likelihood of achieving the Overall Goal of the Project within three to five years after the Project's completion.

The Project managed to develop a holistic model for MEMM for replication to those provinces which adopt the same or similar maintenance approach as the Eastern Cape, and the model is likely to impact on the improvement of MEMM practices there. However, it could not be determined whether the same model would be relevant to scenarios in other provinces given discrepancies in the level of achievements and challenges within healthcare technology. Individual capacity building was successful, and despite challenges with the retention of clinical technicians, such skills remain within the country.

The introduction of CMMS as a result of efforts made through the Project, would eventually contribute towards a more structured and well-maintained medical equipment inventory and CMMS.

As indication of a positive impact, the Team found an improvement in relationships between clinical engineering units and medical equipment manufacturers / agencies, with MEMM being discussed from various angles.

4-5 Sustainability

The sustainability of the Project is assessed in terms of institutional, financial and technical aspects by examining to what extent the achievements of the Project is to be sustained or maintained after the Project's completion. The sustainability of the Project is likely to be high in the aspect of technical, institutional and financial aspect.

1) Technical sustainability

JICA Experts and project stakeholders agreed that the MEMM and HTM training supplemented the technical capacity of both managers and clinical technicians, although continuous refresher training should be pursued.

2) Institutional, organizational sustainability

Ideally, clinical technicians trained through the Project should be retained within the province itself, however, due to lack of incentives in relation to the pursuit of better prospects elsewhere, this has proven to be challenging and in essence detrimental to the strengthening of healthcare technology in the province.

3) Financial sustainability

Financial and personnel sustainability of the Project should be secured. Even though the Project is unable to control the budget and personnel, it could continuously make recommendations to both national and provincial authorities to motivate for the improvement of budget implementation, and personnel recruitment and retention for healthcare technology.

5. Conclusion and Recommendations

5-1 Conclusion

Through the achievement of each Output, the Project Purpose is likely to be achieved by the end of the project period. Technical skill transfer was appropriately made, especially through training of clinical technicians, enhanced by strong partnerships of South African counterparts and Japanese experts. The securing of human resources for MEMM contributed to project achievements, and may further enhance project outcomes after conclusion of the project.

5-2 Recommendations

The Joint Evaluation Team recognized some issues to be addressed in the remaining project period, and other issues to be recommended for further enhancement of the benefits and effects of the Project after its termination.

<NDOH>

1. NDOH is recommended to continuously support and advise ECDOH on the allocation of clinical engineering staff for adequate MEMM.
2. NDOH is recommended to continuously deliberate with ECDOH, in particular hospital and facility management as well as clinical engineering staff, also including training institutions such as universities and FET colleges, to improve MEMM.
3. NDOH is recommended to provide the essence of a MEMM good practice model developed by the Project to other provinces. Therefore, it is proposed that NDOH initiate periodical reporting sessions with provincial health departments to explain and disseminate policy developments on HTM for intended alignment, with national standards a priority.
4. NDOH is recommended to brief NDOH leadership, also extending to MOU signatories, on the achievements of and challenges identified through the Project, for example through utilizing tools such as the NDOH Annual Report. Moreover, NDOH should explore and seize opportunities for sharing the experiences of the Project.

<ECDOH>

1. ECDOH is recommended to nurture a conducive environment for the training package by considering both infrastructure improvements and human resources deployment for continuous training of new recruits and refresher training.
2. ECDOH is recommended to support both PHTC and DHTC for better understanding and appreciation of the importance and necessity of having a functional DHTC in all districts for eventual adoption and application at facility level.
3. ECDOH is recommended to encourage DHTC to regularly update and utilize the medical equipment inventory at facility level. In addition, ECDOH should monitor the functionality of medical equipments and the quality of maintenance by using test equipment and further requesting and analyzing periodical reports submitted by target hospitals.
4. ECDOH is recommended to expand capacity building by creating awareness on clinical engineering as profession with a potential career path, by creating new posts and filling vacant posts for clinical technicians, by seeking ways to retain existing clinical

technicians, by offering continuous refresher training, and by ensuring budget allocation for both human resources and infrastructure, the latter not excluding refurbishment of existing clinical engineering workshops and constructing new ones where there are none.

<Target Hospitals>
1. Target hospitals, with staff from all cadres, are recommended to mainstream clinical engineering for further enhancement of MEMM, which could result in a better understanding and appreciation of the safe use of medical equipments as example.
2. Clinical engineering sections in target hospitals are recommended to improve the quality of MEMM by optimally utilizing records generated by test equipment for onward reporting to ECDOH health care management.

<Project Team>
1. The Project Team is recommended to address outstanding activities within the remaining project period.
2. The Project Team is recommended to sensitize both NDOH and ECDOH on sustaining the project outcome after its conclusion.
3. The Project Team is recommended to seek opportunities to showcase project achievements on especially skills transfer through consideration of sharing-and-learning platforms within the Eastern Cape and for other South African provinces.

<JICA>
1. JICA is recommended to explore the possibility of following up the sustainability of particularly test equipment result utilization at target hospitals.
2. JICA is recommended to earmark and prioritize ECDOH candidates for MEMM group training courses being offered to the South African Government in the near future to add value to the project outcome. Furthermore, JICA is recommended to strengthen the network of clinical technicians in South Africa and Southern African Region by interfacing with graduates (alumni) of MEMM training courses in Japan and third countries.

5-3 Lessons learnt

For the effective implementation of future projects, the following lessons were learnt from this Joint Final Evaluation of the Project:

1) Ratio consideration of project scope versus inputs

In case of a project targeting more than one province or country, it is recommended that adequate inputs, such as JICA experts, counterparts and operational costs, should be allocated.

2) Formulation of project implementation team by various stakeholders

The Project established the Project Team composed of administrative officers at ECDOH and facility/clinical engineering managers at health facilities. Through this Project Team, discussions and consequent implementation of MEMM was promoted by having various points of view. This particular project reaffirmed the necessity of having a project implementation team for coordination between and among all stakeholders to ensure smooth

implementation of project activities. Participation by and cohesion between all stakeholders and all levels, ranging from decision makers to clinical technicians on the ground, allows for a better understanding and appreciation of the project milieu.

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