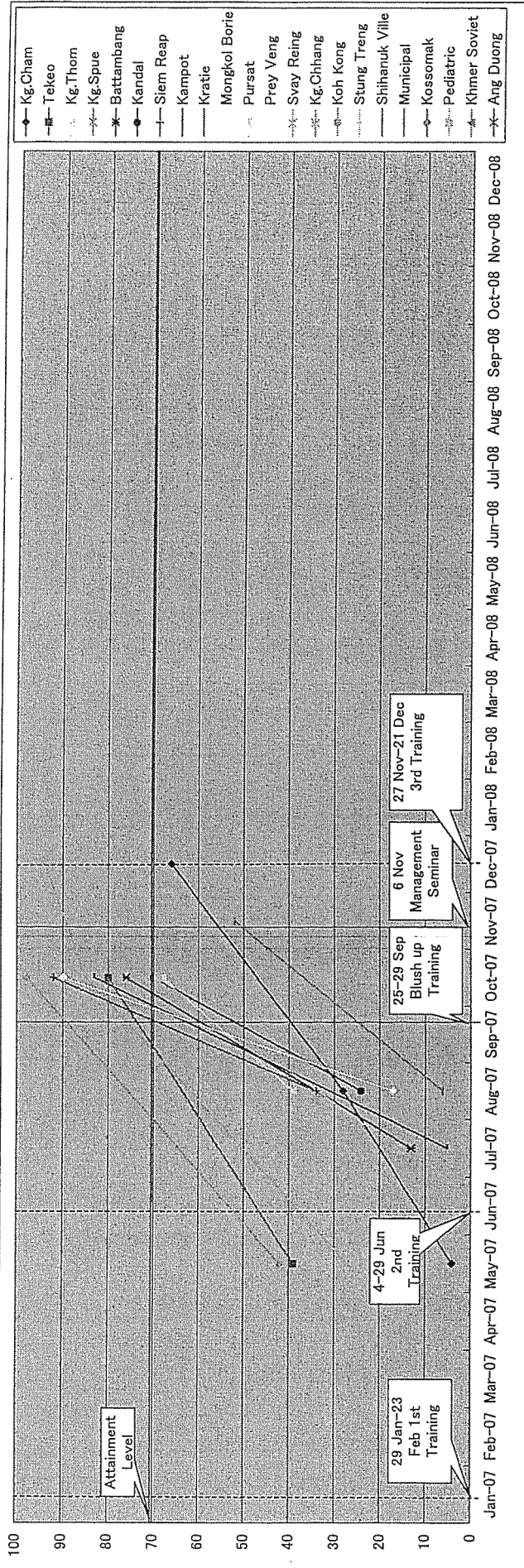


## Score Criterion of the Follow up for Ex-trainee

No	Description	How to make a score	Full score
<b>I</b>			
<b>Planned Preventive Maintenance</b>			
1	Develop Preventive Maintenance Schedule	No start: 0, <25%: 1, 25-50%: 2, 50-75%: 3, 75-99%: 4, Perfect : 5	5
2	Perform Preventive Maintenance following the schedule	No start: 0, <25%: 1, 25-50%: 2, 50-75%: 3, 75-99%: 4, Perfect : 5	5
3	Utilizing the Maintenance Check List	No start: 0, <25%: 1, 25-50%: 2, 50-75%: 3, 75-99%: 4, Perfect : 5	5
4	Keep & File Maintenance Check List	Yes: 4, No: 0	4
5	Utilizing of the Maintenance Job record	No start: 0, <25%: 1, 25-50%: 2, 50-75%: 3, 75-99%: 4, Perfect : 5	5
6	Keep & File the Maintenance Job record	Yes: 4, No: 0	4
7	Submit Maintenance Job record to ME manager	Yes: 4, No: 0	4
<b>II</b>			
<b>Up dating of the ME inventory data</b>			
1	Sticking ID number for each ME	No start: 0, <25%: 1, 25-50%: 2, 50-75%: 3, 75-99%: 4, Perfect : 5	5
2	Perform up-date about condition of ME	Yes: 4, No: 0	4
3	Submit Up-date data to ME manager every 6 months	Yes: 4, No: 0	4
<b>III</b>			
<b>Report work</b>			
1	Make the Annual action plan (Form 3-1) about ME technician	Yes: 4, No: 0	4
2	Submit the Annual action plan (Form 3-1) to ME manager	Yes: 4, No: 0	4
3	Make the Semi-annual report (Form 3-2 & 3-3) about ME technician	Yes: 4, No: 0	4
4	Submit the Semi-annual report (Form 3-2 & 3-3) to ME manager	Yes: 4, No: 0	4
5	Keep & File above reports	Yes: 4, No: 0	4
<b>IV</b>			
<b>Action taken for failure equipment</b>			
1	Follow the ME Service request flow	Yes: 4, No: 0	4
2	When Technician can't repair the broken ME, do you contact with ME manager?	Yes: 4, No: 0	4
<b>V</b>			
<b>Utilizing of ME maintenance guidebook</b>			
1	Utilizing of ME maintenance guidebook	Yes: 4, No: 0	4
<b>VI</b>			
<b>Clean &amp; arrange of Maintenance workshop</b>			
1	Condition of cleaning & organizing workshop	Yes: 4, No: 0	4
2	Condition of ME workshop	Excellent: 4, Good: 3, Moderate: 2, Poor: 1	4
<b>VII</b>			
<b>Management matter</b>			
1	Official assignment by Hospital Director	Not yet: 0, Assigned w/o evidence: 3, Assigned officially: 5	5
2	Relation ship with ME manager / Deputy ME manager	Good: 5, Moderate: 3, Poor: 1	5
3	Relation ship with Clinical department	Good: 5, Moderate: 3, Poor: 1	5
<b>TOTAL</b>			<b>100</b>

Result of Evaluation on ME maintenance



Form-1-1 Annual Action Plan of ME Manager Issue No.( F-1-1 )

Year of Plan		Date	
Hospital Name		Name and signature	
Province Name		Position	

January

Week	Activity	Where	Day	Ref
1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

February

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

March

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

April

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

May

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

June

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

July

Week	Activity	Where	Day	Ref
1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

August

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

September

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

October

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

November

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

December

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

Reference No. and mention any issues

--

## Form-1-2          Semiannual ME Manager Report (F-1-2          )

Financial term (July to December) / Review term (January to June)

Year		Date	
Hospital Name		Name and signature	
Province Name		Position	

Ref	Main 3 Problems of ME Management (Only Fill up Title of Problem, Detail write Back side)
1.	
2.	
3.	

## Demand of ME

Ref	3 Highest Demand ME Name and Short Specification at this team	Department Name	Q'ty
4			
5			
6			

Condition	Good	Fair	Bad	Unknown	Total
Maintenance condition					
Percentage	%	%	%	%	100 %
	Daily use	Sometime use	Not in Use	Unknown	Total
Operation condition					
Percentage	%	%	%	%	100 %

## 7. Result of Monitoring ME maintenance and operation Conditions

## 8. Evaluation of Activities of Deputy ME Manager

Very Good	Good	Fair	Bad	Very Bad
Reason / Comment				

## 9. Evaluation of Activities of ME Technician

Very Good	Good	Fair	Bad	Very Bad
Reason / Comment				

10. Evaluation of Activities of ME Management Working Group

Very Good	Good	Fair	Bad	Very Bad
Reason / Comment				

Ref. No.	Detail and or Comment of References

	Opinion or Impression of ME Manager

Form-2-1 Annual Action Plan of Deputy ME Manager (F-2-1 )

Year of Plan		Date	
Hospital Name		Name and signature	
Province Name		Position	

January

Week	Activity	Where	Day	Ref
1st				
2nd				
3rd				
4th				
5th				

February

1st				
2nd				
3rd				
4th				
5th				

March

1st				
2nd				
3rd				
4th				
5th				

April

1st				
2nd				
3rd				
4th				
5th				

May

1st				
2nd				
3rd				
4th				
5th				

June

1st				
2nd				
3rd				
4th				
5th				

July

Week	Activity	Where	Day	Ref
1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

August

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

September

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

October

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

November

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

December

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

Reference No. and mention any issues

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## Form-2-2      Commissioning of ME Report      (F-2-2      )

Department		Date	
Hospital Name		Name and signature of Inspector	
Province Name		Position	

### Inspection of Medical Equipment (ME) Fill up Essential Information

	Information	Khmer	English
1	General Name		
2	Special Name		
3	Manufacture		
4	Agent		
5	Provider		

### 6. English Information Only (ID No.      )

Model		Expire Date of Warranty	
Serial No.		Product Year	
Voltage	3 Phase / Single Phase, 220 to 240 V / 100 to 110	Electric Power / Current	(W / A)

(If Product Year is not clear, New Equipment 1year before of this time, Second hand required estimation.)

### 7. Components (If there is no Components, write NON in the below box)

Ref	Name/ Model/ Serial No/ Etc All component's Unit. If can't write in this box all, write back side

### 8. Accessories (If there is no Accessories, write NON in the below box)

Ref	Name / Model / Q'ty / Etc. If can't write in this box all, write back side

### 9. Consumables (If there is no Consumables, write NON in the below box)

Ref	Necessary Consumables for Normal Use or Preparation. If can't write in this box all, write back side

10. Function Test (If all of function is good and good quality, write OK in the below box)

Ref	Function or condition of quality

11. User Training (If there is no training, write NON in the Contents of Training)

Date	Name of Users	Contents of Training	By Whom	Satisfaction
Comment by Users:				

(User and Maintenance Satisfaction: A Excellent, B Enough, C Fair, D Not enough, E Bad)

12. Maintenance Technician Training (If there is no training, write NON in the Contents of Training)

Date	Participant's Name	Contents of Training	By Whom	Satisfaction
Comment by Participants:				

13. Reference and or Problems of Installation / Inspection

Ref. No	Detail of References and Problems

Form-2-3  
Update of ME Condition

Year  
Team: 1st / 2nd

(F-2-3  
Date:

) Annex-3

Name:

Signature:

Province :

Hospital :

No	Department Name	No. of Maintenance Condition				Total No.	No. of Operation Condition			
		Good	Fair	Bad	Unknown		Daily	Sometime	Not	Unknown
1	Internal Medicine									
2	Surgical									
3	OT									
4	Lab									
5	X-ray									
6	Obstetric/Gynecology									
7	Pediatric									
8	ICU									
9	Dental									
10	ENT									
11	Eye									
12	Pharmacy									
13										
14										
15										
16										
17										
18										
19										
20										
	Total Number									
	Percentage(%)									

(Total Number and Percentage should copy to Form-2 Semiannual ME manager report)

Estimation of Cost	US \$	Cambodia Riel
Total Price of ME (From M		
Calculation Cost of Repair	= Total Price of ME x {(Fair%) x 0.15 + (Bad%) x 0.25}	
Total Repair	( ) x {( ) x 0.15 + ( ) x 0.25} =	
Calculation of Replace	= Total Price of ME x {(Fair but too old%)x0.4 +(Bad and can't repair%)x0.8 }	
Total Replacement	( ) x {( ) x 0.4 + ( ) x 0.8} =	

Indicator of Utilization	Formulation	Caricuration
Indicator of Operation & Maintenance Activity (Target Percentage is more than 70%)		
Operating Percentag	= Daily% + Sometime%	= ( ) + ( ) =
Indicator of Maitenance Activity (Target Percentage is more than 80%)		
Operatable Percentag	= Good% + Fair %	= ( ) + ( ) =
Indicator of Operation Activity (Target Percentage is more than 87.5%)		
Operational Percentag	= Operating % / Operatable % x 100	= ( ) / ( ) x 100 =

## Explanation of Changing of ME Condition:

Annex-3

Ref	Detail of Explanation

## Main Problems of Maintenance and Operation

Ref	Detail of Problems

### Additional ME List in This Term

Ref	ID No.	Khmer General Name	English General Name	Q'ty	Price	Provider

Form-2-4

**Minutes of QI Meeting for ME (F-2-4 )**  
**Financial term (December) / Review term (June)**

Place		Date	
Hospital		Name & signature of recorder	
Province		Name & signature of the chairman	

Participants

No.	Name of Participants	Title	Organization / Department

Objectives

Ref No.	Main 3 Objectives ME Management at This Term

Ref. No	Minutes of Discussion
	Topic:
	Conclusions:
	Remaining Issue:

Form-2-5 Semiannual Deputy ME Manager Report (F-2-5 ) <sup>Annex-3</sup>

Financial term (July to December) / Review term (January to June)

Year		Date	
Hospital Name		Name & Signature	
Province Name		Position	

Ref. No	Main 3 Problems of Deputy ME Management at This Team
1	
2	
3	

Procurement Problems

Ref.No	Main 3 Problems of Procurement at This Team
1	
2	
3	

Ref.No	Opinion or Impression of ME Manager

Expenses for ME Semiannually ( 2 0 \_ \_ Year)

Annex-3

Review term (January to June) Cambodia Riel

No.	Description	Exepnse	MoH		Doner		Hospital User Fee
			Funds	Goods	Funds	Goods	
1	Medical Equipment	0					
2	Furniture/ Instrument	0					
3	Plants	0					
4	Medical Consumables	0					
5	Reagents	0					
6	ME Repair Service	0					
7	Others (Spare Parts)	0					
8	Total	0	0	0	0	0	0

Financial term (July to December)

9	Medical Equipment	0					
10	Furniture/ Instrument	0					
11	Plants	0					
12	Medical Consumables	0					
13	Reagents	0					
14	ME Repair Service	0					
15	Others (Spare Parts)	0					
16	Total	0	0	0	0	0	0

Grand Total (Annual Expenses)

17	Annual Total	0	0	0	0	0	0
18	Total US Dollar	0	0	0	0	0	0
19	Annual Percentage	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
20							

US\$ 1= 4,100 Riels



## Form-3-1 Annual Action Plan of ME Technician (F-3-1 )

Year of Plan		Date	
Hospital Name		Name	
Province Name		Position	

## January

Week	Activity	Where	Day	Ref
1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## February

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## March

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## April

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## May

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## June

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				

5th				
-----	--	--	--	--

## July

Week	Activity	Where	Day	Ref
1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## August

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## September

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## October

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## November

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

## December

1 <sup>st</sup>				
2 <sup>nd</sup>				
3 <sup>rd</sup>				
4 <sup>th</sup>				
5 <sup>th</sup>				

Reference No. and mention any issues

Form -3-2  
**Check Sheet for Monitoring of ME Condition**  
 Province Name \_\_\_\_\_  
 Hospital Name: \_\_\_\_\_

Monitoring Date: \_\_\_\_\_

Inspector Name & signature: \_\_\_\_\_

No	Department	ID No.	General Khmer Name	General English Name	Model Name	Serial No	Manufacturer	Product Date	Condition	
									Maintenance	Operation

Maintenance Condition : **A** Good, **B** Fair, **C** Bad, **D** Unknown      Operation Condition : **a** Daily Use, **b** Sometime Use, **c** Not in Use, **d** Unknown

**Form -3-2**

**Check Sheet for Monitoring of ME Condition**  
Province Name  
Hospital Name:

Monitoring Date:

Annex-3

Inspector Name & signature:

No	Department	ID No.	General Khmer Name	General English Name	Model Name	Serial No	Manufacturer	Product Date	Condition	
									Maintenance	Operation

Maintenance Condition : **A** Good, **B** Fair, **C** Bad, **D** Unknown      Operation Condition : **a** Daily Use, **b** Sometime Use, **c** Not in Use, **d** Unknown

Form 3-3 SEMI-ANNUAL REPORT BY ME TECHNICIAN

Terms:	1st / 2nd
Year:	

Date:	
Name:	

Province:	
-----------	--

Hospital :	
------------	--

Up date information for Medical Equipment

No. of Maintenance condition				Total No.	No. of Operation condition			
Good	Fair	Bad	Unknown		Daily	Sometimes	Not use	Unknown

Problem report about particular ME

Ref.	ID No.	Name of ME	Model	Install place	What problem

Comment by ME technician

Ref.	Contents

## ME Management Follow up Check Sheet (in-house)

Hospital Name: \_\_\_\_\_

Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

Province Name: \_\_\_\_\_

By: \_\_\_\_\_

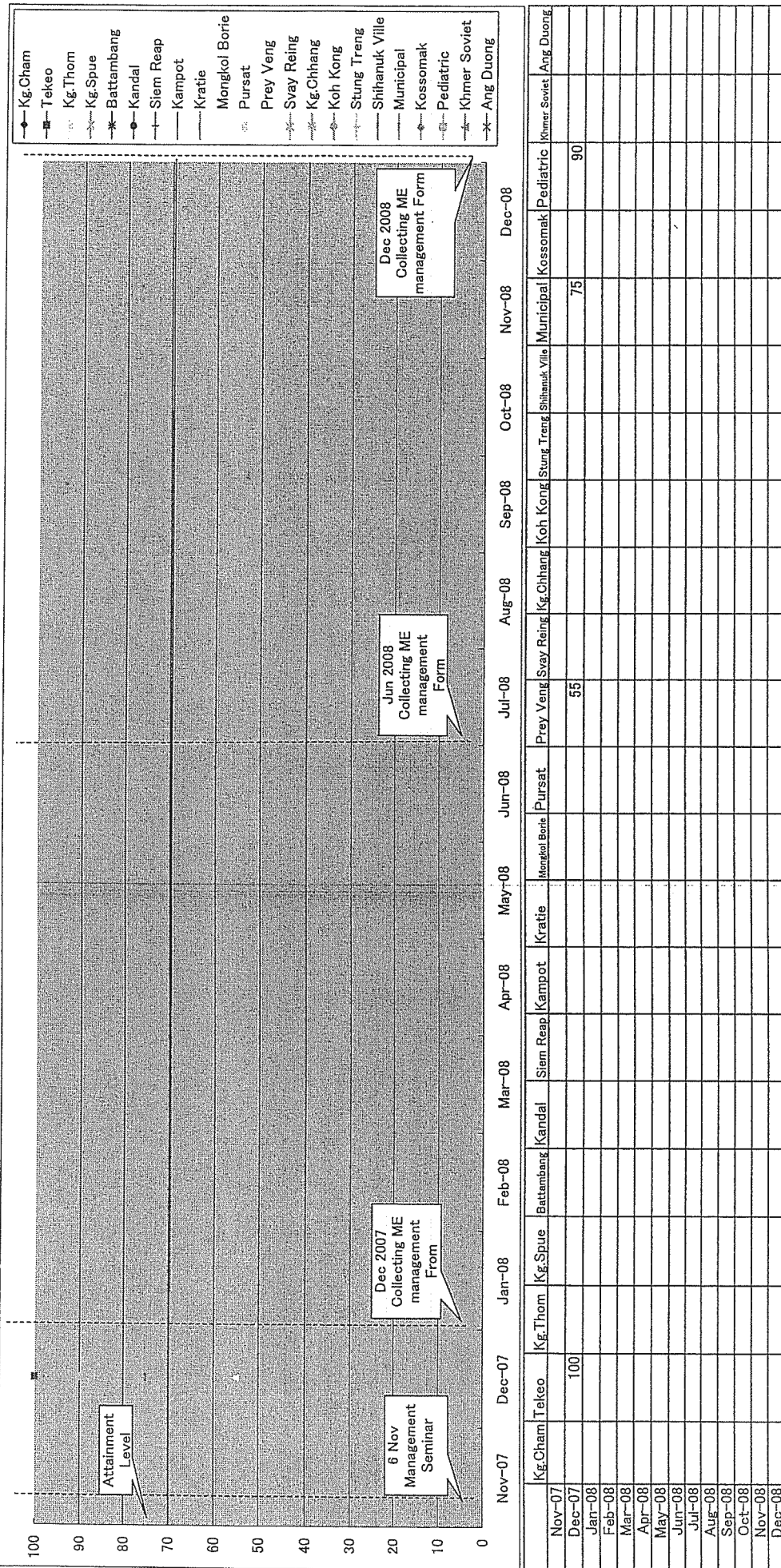
Form	Check points	Criteria	Highest score
All forms	Submission of the form to MoH	Full necessary set on time: 40; On time but not full: 30; Full but delay: 20; Not full and delay: 10; Not submit = 0	40
F1-2	Evaluation of DMEM activities	Reasonable:5, Not reasonable: 0	5
	Evaluation of MET activities	Reasonable:5, Not reasonable: 0	5
	Evaluation of MEMWG activities	Reasonable:5, Not reasonable: 0	5
F2-3	Estimation of repair cost	Correct: 5, Incorrect: 0	5
	Estimation of replacement cost	Correct: 5, Incorrect: 0	5
	Calculation of operational percentages	Correct: 5, Incorrect: 0	5
F3-2	Update of ME condition	75%~100% = 30; 50%~75% = 20; 25%~50% = 10; 0%~25% = 0	30
		<b>TOTAL</b>	100

Note:

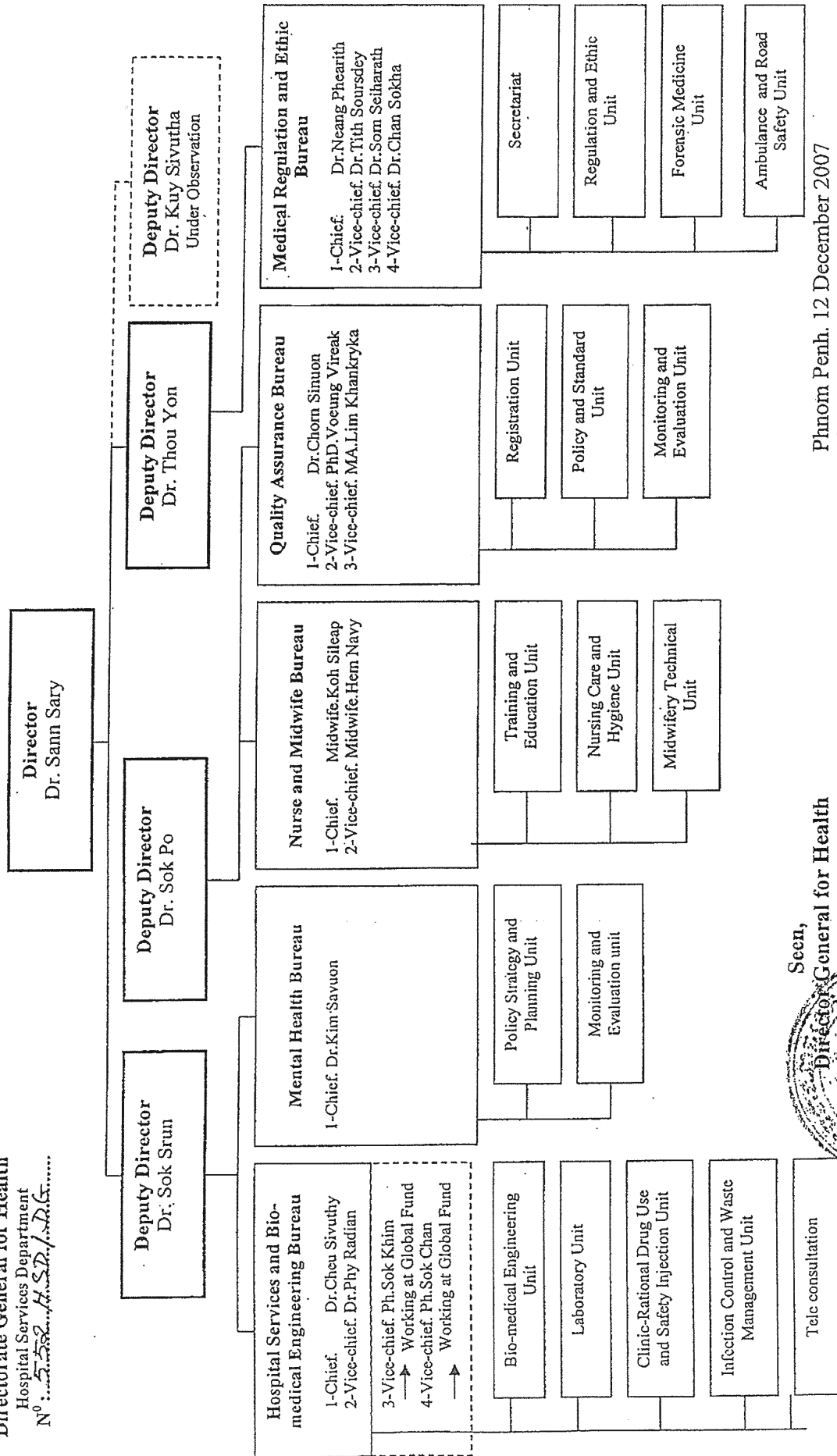
>> Necessary full set means all forms except F2-2, for second semiannual report (December)

>> Necessary full set means all forms except F1-1, F2-1, F2-2 and F3-1, for first semiannual report (June)

Result of Evaluation on ME Management

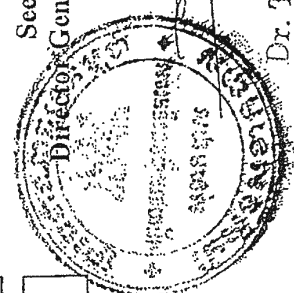


ORGANOGRAM OF HOSPITAL SERVICES DEPARTMENT



Seen,  
 Director General for Health

Phnom Penh, 12 December 2007  
 Director of Department



*[Handwritten signature]*

Dr. SANN SARY

Dr. TEP LUN



## Terms of Reference of Bureaus and Units under Hospital Services Department

### 1. Overall duty of all units under each bureau

#### \* Policy

- Take responsibility of development of the policy, regulation, guidebook, and guideline on the field concerned.
- Disseminate above references to the target institutions.
- Consider and design further strategy (long term target) in accordance with current progress or development at all units.
- Review and revise the policy, regulation, and guideline upon needs arise.

#### \* Coordination

- Coordinate and cooperate well with donors such as UNICEF, WHO, URC, GTZ, PSI, USAID, French Cooperation, BTC, JICA, etc., to implement the project under instruction and advise of the director of the department.
- Coordinate with all medical institutions including PHD, OD, referral hospital, health center and private clinics
- Assist ministry of health's leader in establishing of committee or health working group for development of policy and other strategy.

#### \* Monitoring and Evaluation

- Monitor the progress of implementation and achievement of the policy, regulation and guideline, etc., which has been issued.
- Collect and analyze above monitoring and evaluation result, and utilize it for further activities. Make a report and submit to director of HSD through chief of bureau.

#### \* Reporting

- Participate in making quarterly report and action plan for the next quarter of every unit for every end of March, June, September, and December and submit to chief of bureau. Chief of bureau combine all reports and submit to director of HSD for approval.

#### \* Staff Allocation

- Allocate staffs' work to each own unit by consideration of their experience or capacity.
- Provide necessary training to the staffs at their work place.

#### \* Budget Arrangement

- Make appropriate and precise annual budget plan with AOP necessary implementation of each activities.
- Monitor the operational plan in 6 months whether is it implemented or not?

## 2. Detail Terms of Reference of Units under Hospital Services and Bio-medical Engineering Bureau

### 2.1 Clinic-rational Drug Use and Safety Injection Unit

- Organize-develop the instruction on complementary activities and minimum package of activities by collaboration with institutions concerned the ministry of health.
- Instruct the hospitals to have well clinical, para-clinical, diagnosis activities and treatment.
- Monitor and evaluate the implementation of CPA and MPA Guidelines of referral hospital and health center.
- Conduct collaboration for study visit in referral hospital where have good management activities.
- Establish standard of drug use in whole country.
- Supervise of drug use at hospitals and record indicators regarding inpatients for evaluation of hospital activities and drug use.
- Provide clinical training on rational drug use in collaboration with department of Drug, Food, Medical Materials and Cosmetics
- Provide MTP strategic training and follow up MTP implementation for proper rational drug use.
- Provide IGD strategic for proper rational drug use by
- Collaborate with referral hospitals, health centers for safety injection implementation in order to reduce risk of infection on patients, hospitals and community.

### 2.2 Infection Control and Waste Management Unit

- Develop policy, guidelines and regulation for monitoring infection control waste management in hospitals and health centers.
- Provide training on waste management strategy.
- Monitor and evaluate the implementation of monitoring for infection disease and waste management.

### 2.3. Laboratory Unit

- Make annual required plan about laboratory reagent for referral hospitals, national hospitals, national programs, national centers and national institutions and including national blood transfusion center.
- Make quarterly distribution plan of the laboratory reagent to referral hospitals, national hospitals, national programs, national centers and national institutions in whole country.
- Supervise various laboratories on management and usage of laboratory reagent.
- Develop laboratory technical guidebook for some referral hospitals.
- Conduct and coordinate short-term training on laboratory work for some laboratories that have low level of technique.
- Monitor and evaluate ex-trainees
- Collect the number of staffs and ability to analyze all CPA laboratories.

### 2.4. Tele-consultation Unit

- Develop policy for tele-consultation

- Make plan of training for clinician at hospitals to know how to deal tele-consultation nationally and internationally in collaboration with telemedicine partners.
- Monitor and evaluate tele-consultation activities at hospitals where already trained.
- Make annual budget plan for installation of tele-consultation network at national hospitals and referral hospitals in whole country.

## 2.6. Bio-medical Engineering Unit

### A. Policy

- Develop policy, regulation, guideline and document concerned on medical equipment management and maintenance for national and referral hospitals.
- Support well ME utilization and maintenance and repair at national and referral hospitals in order to provide the proper quality and quantity of medical service to the patients.
- Promote the standard list of medical equipment for national and referral hospitals.
- Develop the standard list of medical equipment (MPA kit) for health center.
- Review and revise the policy, regulation, ME standard list and guideline upon needs arise.

### B. Monitoring and Evaluation

- Supervise the management and maintenance of ME at national and referral hospitals and health centers
- Collect information of ME data from CPA3 referral hospitals and some of national hospitals, and register it in the database system.
- Collect ME management report from CPA3 referral hospitals and some of National hospitals twice a year.
- Evaluate and analyze above ME information and ME management report, and utilize for further strategy (AOP).

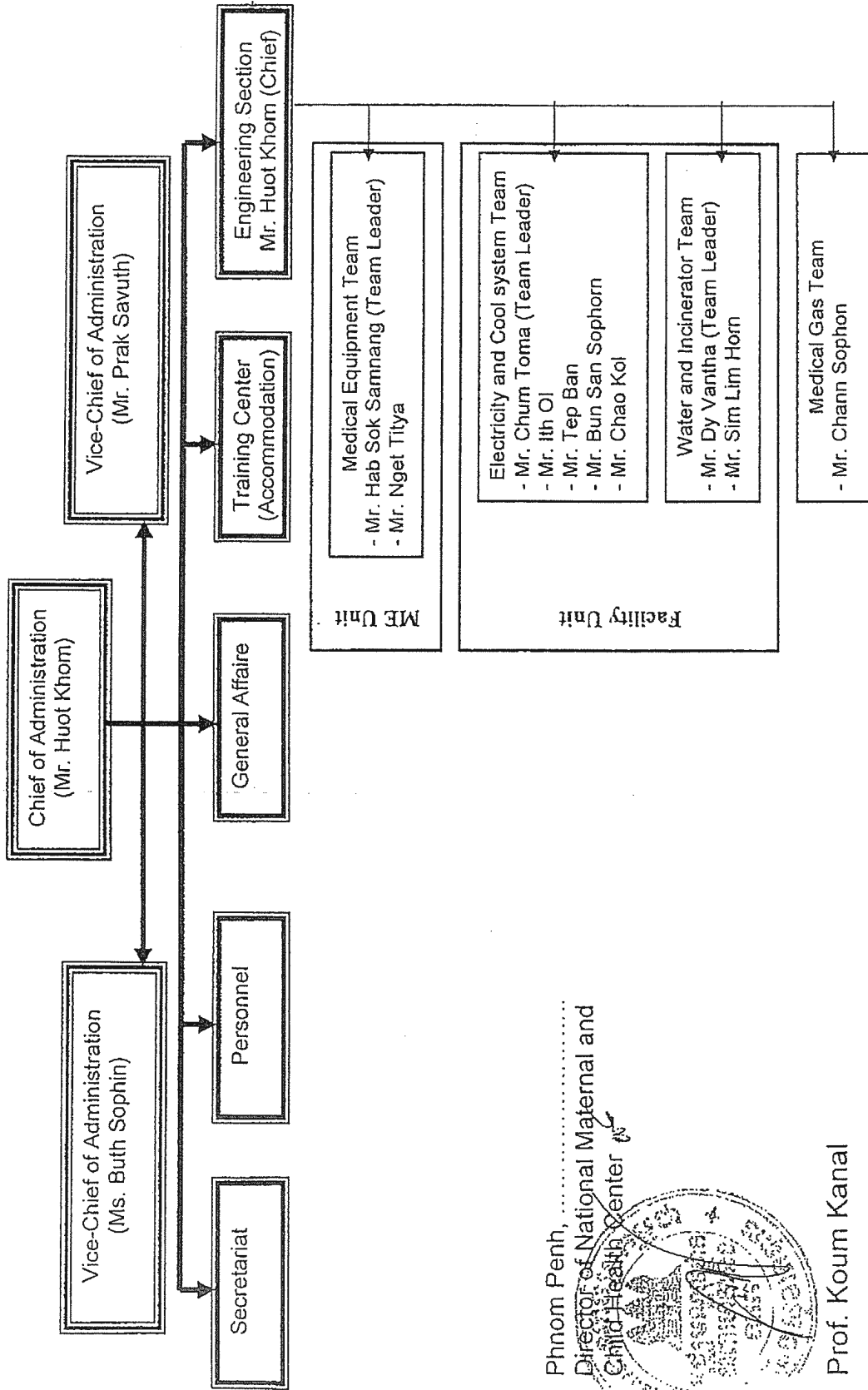
### C. Coordination on the ME management

- Coordinate and work together with National Medical Equipment Workshop at NMCHC for improvement of ME management at national and referral hospitals by the following activities.
  - ✓ ME maintenance service to the hospital.
  - ✓ ME management training (seminar).
  - ✓ ME maintenance training.
  - ✓ Follow-up supervision on ME management and maintenance.
  - ✓ Monitoring of ME management at national and referral hospitals.
- Coordinate and well cooperate with donors.
- Make necessary action plan (AOP), which needed to promote ME management.
- Consider necessity and possibility of establishment of provincial workshop.

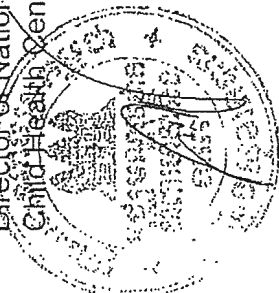
**D. Training**

- Provide necessary training course to staffs of health facilities on ME management, maintenance and operation in order to improve ME utilization more effectively and efficiently.
- Give opportunity to staffs of Bio-medical Engineering Unit to attend necessary domestic and/ or oversea trainings to upgrade their knowledge and skills.

Structure of Engineering Section of the National MCH Center



Phnom Penh, .....  
 Director of National Maternal and  
 Child Health Center



Prof. Koum Kanal

Ministry of Health  
National MCH Center

Kingdom of Cambodia  
Nation Religion King

## Job Description of the Medical Engineering Unit of the national MCH Center

### I- Overall Job Description

#### A- Role:

- Promote and maintain a high ME utilizing rate.
- Provide ME operation with accurate result for medical diagnosis and treatment, high safety.
- Provide a high ability of ME operation and full life span

#### B- Functions:

- 1- Make annual action plan of the Engineering Section.
- 2- Provide preventive maintenance to all medical equipments exist in the hospital:
  - Make regular annual maintenance schedule
  - Perform maintenance according to the schedule
  - Be always ready for inspection and solving any problems, which might happen on medical equipment
- 3- In collaboration with manager, monitor maintenance and operation conditions of the medical equipment.
- 4- Make annual action plan of any works relating to medical equipment.
- 5- Make annual report of Medical Engineering Unit.
- 6- Semiannually report to manager about condition of medical equipment.
- 7- Identify faulty of ME caused by inappropriate operation, and then take counter measure against it or retrain.
- 8- Discuss with departments concerned regarding order and commissioning of new ME.
- 9- Hold monthly meeting, and report the result of the meeting to the Steering Committee of the hospital.

### II- Particular Job Description:

#### a) Job Description of the Chief of Engineering Section

- Lead staff of the section to make annual action plan
- Organize and chair monthly meeting regularly or when necessary
- Attend committees'/ working groups' meeting to discuss engineering issues
- Monitor and evaluate activities of all staffs of Engineering Section
- Coordinate and solve any matters of Engineering Section
- Lead staffs of the Engineering Section to develop maintenance policy, guideline.

#### b) Job Description of Vice-Chief of Engineering Section

- Take responsibility of the chief when the chief is vacant
- Accept report of any regularities, and then solve or report to the chief
- Collect monthly, semiannual and annual report, and then sum up the report

- Directly lead the maintenance team to perform maintenance or installation work
- Participate in making plan of ME with working groups/ committees concerned.

c) Job Description of Team Leader:

- Make monthly, quarterly and semiannual maintenance schedule for one year
- Lead team member to carry out maintenance work according to the schedule regularly or urgently
- Inspect and any ME faulty according to request from wards
- Assist chief in inspection, installation and registration of new arrival of ME
- Participate in related teams to make plan relating to ME, if invited by the chief

d) Job Description of Team Member:

- Perform routine and urgent maintenance
- Collect consumption data and maintenance activity data, and report to the team leader
- Inspect and solve any ME problems according to request from wards, and necessary instruction based on technical and economical ideas.

Date: .....

Seen and Approved  
Director of National Maternal and  
Child Health Center



Prof. Koum Kanal

Phnom Penh, .....  
Chief of Administration Bureau and  
Engineering Section

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke.

MA Huot Khom

A Guide  
To  
NATIONAL MEDICAL EQUIPMENT  
WORKSHOP

Prepared by: Engineering Section of the  
National Maternal and Child Health Center  
With  
Hospital Services Department of the  
Ministry of Health

Supported by JICA MEDEM Project

December 2007



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## Preface

In the name of the Ministry of Health of the Kingdom of Cambodia, I have a great pleasure to introduce the publication of this <A Guide to National Medical Equipment Workshop (NW)>.

The NW, currently located inside of the National Maternal and Child Health Center, has been providing medical equipment maintenance-repair services to health facilities and medical institutions at provinces as well as at Phnom Penh.

Although it cannot fulfill the actual need of health facilities due to limited human and material resources, many lessons learned were abstained through these activities i.e. 1) Donated second hand medical equipments create an in-operative situation due to lack of consumables, etc. 2) Failures due to inadequate maintenance, most of equipment are not maintained. 3) Inappropriate operation causes of equipment failure. 4) Absence of a clear spare parts management system, etc.

Accordingly, the publication includes background, activities and achievements of the NW so far, and also describes its future plan/ long-term strategies for improvement of medical equipment management/ maintenance system in the Kingdom of Cambodia. Thus, it is a guide for not only NW, but also can be a good information and reference for all health facilities, medical institutions and health development partners.

Finally, I would like to express my sincere thank to all people concerned for their efforts enabling to successful publication of A Guide to National Medical Equipment Workshop. Special thank and gratitude to the people and the government of Japan for their technical and financial support always to the National Medical Equipment Workshop and the Ministry of Health.

Phnom Penh, .....  
Secretary of State, Ministry of Health

## Acknowledgement

In the name of Chief of Engineering Section and on behalf of the National Maternal and Child Health Center, I would like to express my sincere thanks and acknowledgement to all people for their physical and conceptual efforts and supports leading to successful publication of this Guide to National Medical Equipment Workshop as follows:

- 1- H.E. Prof. Eng Huot, Secretary of State, MoH
- 2- Dr. Chi Mean Hea, Deputy Director General for Health, MoH
- 3- Prof. Koum Kanal, Director, National MCH Center
- 4- Dr. Sann Sary, Director, Hospital Services Department, MoH
- 5- Dr. Sok Srun, Deputy Director, Hospital Services Department, MoH
- 6- Dr. Cheu Sivuthy, Chief, Hospital Services and Bio-medical Engineering Bureau, MoH
- 7- Staff of Engineering Section of National MCH Center
- 8- Staff of Bio-medical Engineering Unit, MoH
- 9- Mr. Takeshi MATSUO, Chief Advisor, JICA MEDEM Project
- 10- Mr. Hak Sihun, Associate Advisor, JICA MEDEM Project
- 11- Staff of JICA MEDEM Project

December, ..... 2007  
Chief of Administrative Bureau and  
Engineering Section  
National MCH Center

MA Huot Khom

## I- Background

Various kinds of medical equipments are being used at health facilities (national and provincial levels) and medical institutions in the Kingdom of Cambodia. Some is sophisticated equipments.

Some of above-mentioned equipments are applied directly with patients. Such equipment, even a minor fault might cause serious problems to users and patients, therefore, they must be always kept in good working condition with reliability and safety. In order to keep them in this condition; personnel with background of biomedical engineering and appropriate technology are needed for carrying out appropriate management and maintenance (including repair, commissioning, monitoring and update, etc.) of the equipment.

With physical and conceptual support of JICA MCH Project, Medical Equipment Unit was established in 1999 as one of components of Engineering Section of the National Maternal and Child Health Center (NMCHC). The Medical Equipment Unit has been carrying out maintenance and repair of medical equipment in NMCHC as <in-house service>. Therefore, the equipment utilization rate in NMCHC is high (about 90%).

From the viewpoint of the above mentioned, Ministry of Health (MoH) has learned and recognized the importance of medical equipment management and maintenance. Therefore, in the Medical Equipment Seminar held in April 2002, MoH recommended that the existing Medical Equipment Unit in NMCHC should be promoted to be National Medical Equipment Workshop (hereafter NW). Finally, MoH has decided to establish the NW in May 2002, which covers governmental national hospitals and health institutions located in Phnom Penh areas, if requested, in provinces as well. NW has been providing several categories of services i.e. maintenance, repair, training, installation, consultation, etc. In these recent years, NW closely works with MoH and JICA MEDEM Project for promotion of ME management and preventive maintenance.

## II- National Medical Equipment Workshop at a Glance

### 1- About Personnel

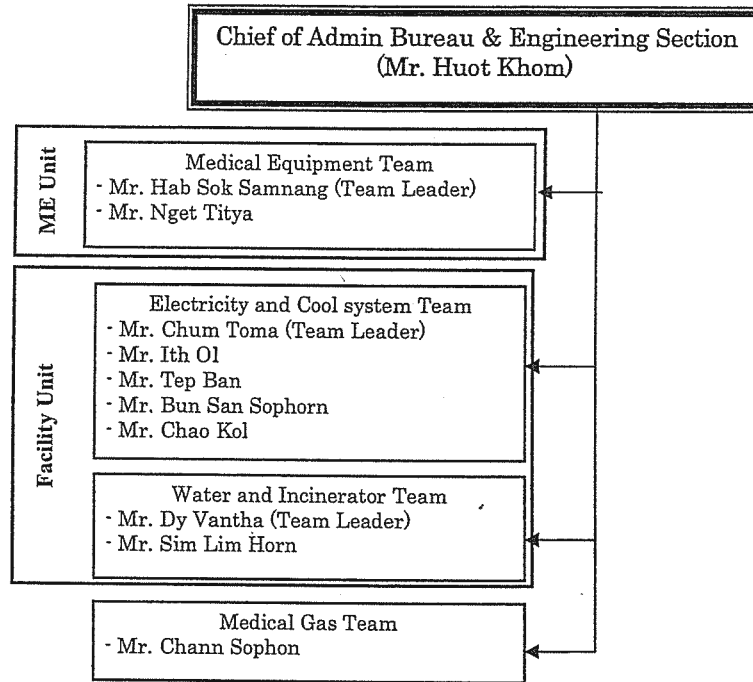
Personnel of the NW are from Medical Equipment (ME) Unit and Facility Unit of Engineering Section of the NMCHC. The following is the name list of personnel of the NW:

- 1- Chief of NW (Mr. Huot Khom, Chief of Administration Bureau and Engineering Section)
- 2- Team Leader (Mr. Hak Sok Samnang, Chief of ME Unit)
- 3- Team Member (Mr. Nget Titya, Staff of ME Unit)
- 4- Team Member (Mr. Chum Toma, Chief of Facility Unit)
- 5- Team Member (Mr. Bunsan Sophorn, Staff of Facility Unit)

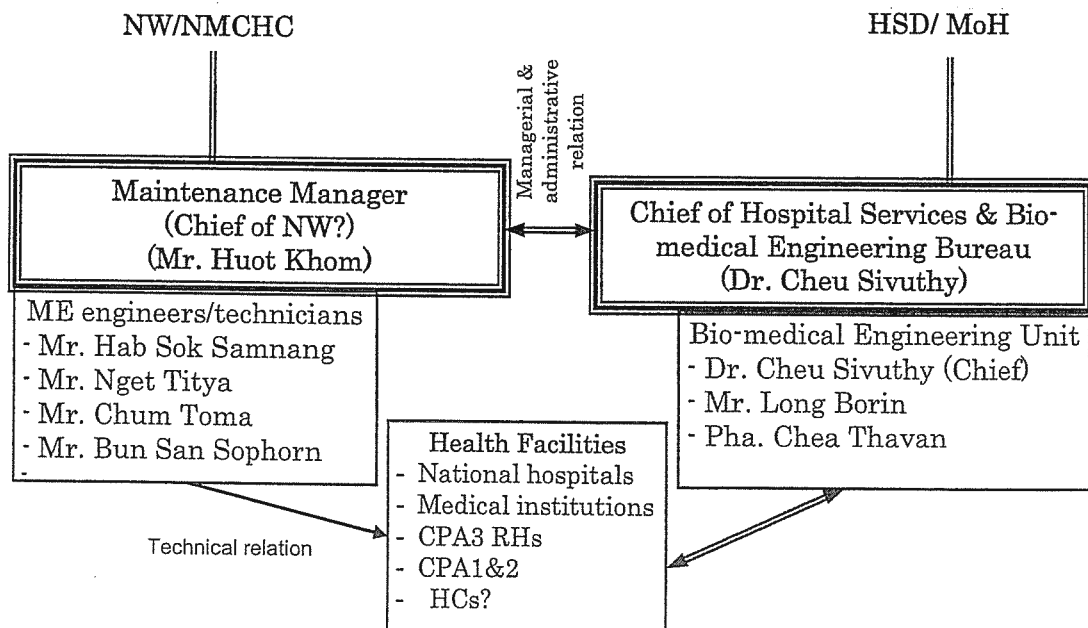
2- Structure:

For easier understanding, here shows not only structure of the NW itself but also structure of Engineering Section of the NMCHC.

a) Structure of Engineering Section of the NMCHC



b) Structure of the NMEW



### 3- Job descriptions of the NW:

#### A- Overall Role:

- Disseminate the concept of ME management and preventive maintenance to all health facilities in the whole country.
- Assist national and referral hospitals to improve maintenance and operation condition of ME.

#### B- Role in details:

- 1- Maintain all properties belonging to the National ME Workshop i.e. office equipments, maintenance tools and instruments, documents, etc.
- 2- Develop ME maintenance, operation manual in Khmer.
- 3- Provide services (including maintenance, repair, consultation, installation of new arrival ME, etc.) requested by health facilities or by MoH.
- 4- Develop training curriculum and training handout for technical training on ME maintenance.
- 5- Develop ME Maintenance Guidebook and ME Management Manual.
- 6- Make plan and organize training on ME management and maintenance.
- 7- Conduct supervision to ME managers, Deputy ME managers and ME technicians, and give feedback to them.
- 8- Organize brush up training, refreshment training and any other events for ME technicians in order to give additional instruction, exchange experiences and upgrade their ME maintenance technique.
- 9- Conduct necessary researches or survey to identify problems regarding ME maintenance and operation.
- 10- Give feedback or take counter measures to reflect the result of researches and survey mentioned above.
- 11- Communicate, facilitate and cooperate with concerned organizations, NGO, IOs, agents and manufacturers to improve and upgrade knowledge and skill of ME maintenance.
- 12- Make spare parts purchase plan for its annual activity.
- 13- Find spare parts purchase route for ME.
- 14- Manage stock and move in-move out of spare parts.
- 15- Together with BEU, analyze ME database collected from target hospitals for further improvement of ME management and maintenance. Maintain and upgrade ME database.
- 16- Make annual report and submit to MoH.
- 17- Take any actions necessary for improvement of ME management and maintenance at health facilities.

### 4. Activities and Achievements:

Personnel of the NMEW have two roles; first is routine maintenance of all medical equipments being used in the NMCHC (hereafter referred to as in-house services), and second is provision of ME maintenance to other national and referral hospitals (hereafter referred to as external services). External services have been carrying out in collaboration with the Hospital Services Bureau, Hospital Services Department of the Ministry of Health.

**Note: Maintenance here includes preventive maintenance and repair**

## a) Summary activities of the NW:

- 1) Attended a lecturer of x-ray training (4 months course) at TSMC
- 2) Provided user training (Handy Doppler) to medical staff from some referral hospitals
- 3) With HSD of MoH and JICA MEDEM Project, designed ME database for target hospitals and for MoH
- 4) With HSD of MoH and JICA MEDEM Project, developed ME Maintenance guidebook
- 5) With HSD of MoH and JICA MEDEM Project, developed training curriculum for Technical Training on ME Maintenance
- 6) Provided Technical Training on ME Maintenance
- 7) Conducted monitoring and supervision regarding ME management and maintenance to national and referral hospitals
- 8) With HSD of MoH and JICA MEDEM Project, developed ME Management Manual
- 9) Participated as trainers/instructors of the ME Management Training Seminar, etc.
- 10) Provided ME maintenance, installation and consultation services to other national and referral hospitals, refer to table below:

## b) Summary achievements

Number of Activity/ Year	2003	2004	2005	2006
Number of preventive maintenance	00	00	00	00
Number of repair	20	20	14	17
Number of installation	01	01	1	5
Number of consultation	04	04	1	0
<b>Total</b>	<b>25</b>	<b>25</b>	<b>16</b>	<b>22</b>

- Training curriculum, ME maintenance guidebook and training handout, were developed and used for Technical Training on ME Maintenance, etc.
- ME managers and Deputy from 4 NHs and 18 CPA3 RHs were trained.
- Until end of December 2007, 18 ME technicians from NHs and CPA3 RHs were trained
- Some of national hospitals and CPA3 referral hospital could perform ME maintenance by themselves (according to the result of the monitoring).

## c) Reasons why number of maintenance activity is not so high:

There were several factors that NW could not perform many maintenance activities:

1. NW has not been widely promoted
2. Some hospitals had no budget to pay for the service
3. Some hospitals where have enough budget or sponsor, directly contact private company
4. Moreover, staff number is not enough, since routine works in NMCHC also need to be carried out by them. Next page shows summary of routine activities of the staff of NW at the NMCHC.

For reference only

A) Maintenance, repair and installation

Number of Activity/ Year	2003	2004	2005	2006
Number of Maintenance	75	95	108	136
Number of Repair	20	24	13	15
Number of installation	3	0	9	4
<b>Total</b>	<b>98</b>	<b>119</b>	<b>130</b>	<b>155</b>

Note: The number of maintenance listed above is made for routine maintenance and emergency maintenance, which spare parts were used only. It means that actual number of maintenance activity is much higher than described.

B) Other activities:

Beside, many other activities were carried out i.e. spare parts control, inventory check, meeting, making report, training for user, etc.

C) Achievements:

ME Utilizing in NMCHC

	Grand Aid 1993		Grand Aid 1996		JICA Project 1995-2002	
	No. basis	Cost basis	No. Basis	Cost basis	No. basis	Cost basis
1998	62	46	94	95	--	--
1999	85	84	94	91	--	--
2000	86	87	93	91	83	73
2001	89	87	94	91	88	88
2002	89	87	95	91	88	88
<b>All Medical Equipment (Purchased by JICA, MoH , NMCHC, Other )</b>						
2003	93	95				
2004	95	97				
2005	95	89				
<b>2006</b>	<b>97</b>	<b>95</b>				

- ME utilizing rate remains high.
- ME repair rate at NMCHC declines against total number of services.
- User maintenance was introduced at critical area (OT, ICU).



## 5- Financial Management

### 5-1- Services Charge:

When NW provides external services, they might charge according to the service provided. For more detail about service fee, refer to annex-1 (tariff of the ME maintenance services).

### 5-2 Cash flow:

All incomes from external maintenance services are gone to the Accounting Bureau of the NMCHC and allocated in accordance with the financial schemes of the center.

## III- Plan for Improvement and Expansion of the NW Activities

### 1- Definition:

The National Medical Equipment Workshop is a **Think-tank**<sup>o</sup> for medical equipment management, maintenance and operation, under the supervision of MoH.

### 2- Location:

At the present the National Medical Equipment Workshop is located inside of Engineering Section of the NMCHC. The location will may be changed according to availability of budget for construction of the workshop.

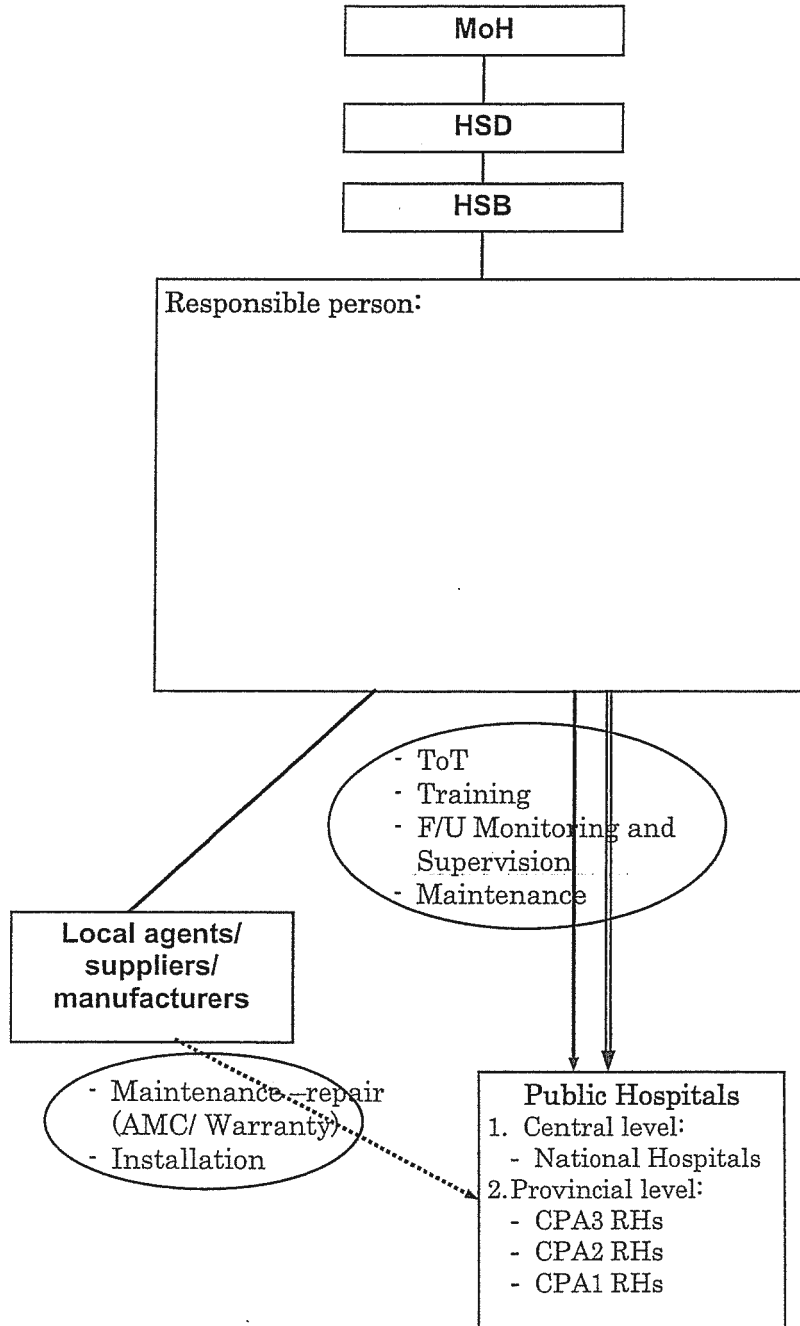
### 3- Personnel management:

It is very difficult to maintain and expand activities of the NW with the existing number of staff and working system; therefore, NW has the following plan regarding personnel:

- 1- Recruit more staff for the NW.
- 2- Delegate some works i.e. ME maintenance follow up and supervision, organizing training for ME technicians at CPA3/CPA2/CPA1 RHs, organizing user training, etc., to the selected ex-trainees (ME technicians) who have sufficient knowledge and experience.
- 3- Involve local agent/ supplier any relevant activities when necessary.
- 4- Domestic and/ or oversea training should be provided to staff of the NW to upgrade their knowledge and skills

<sup>o</sup> A group of experts who provide advices and ideas on political, social or economic issues

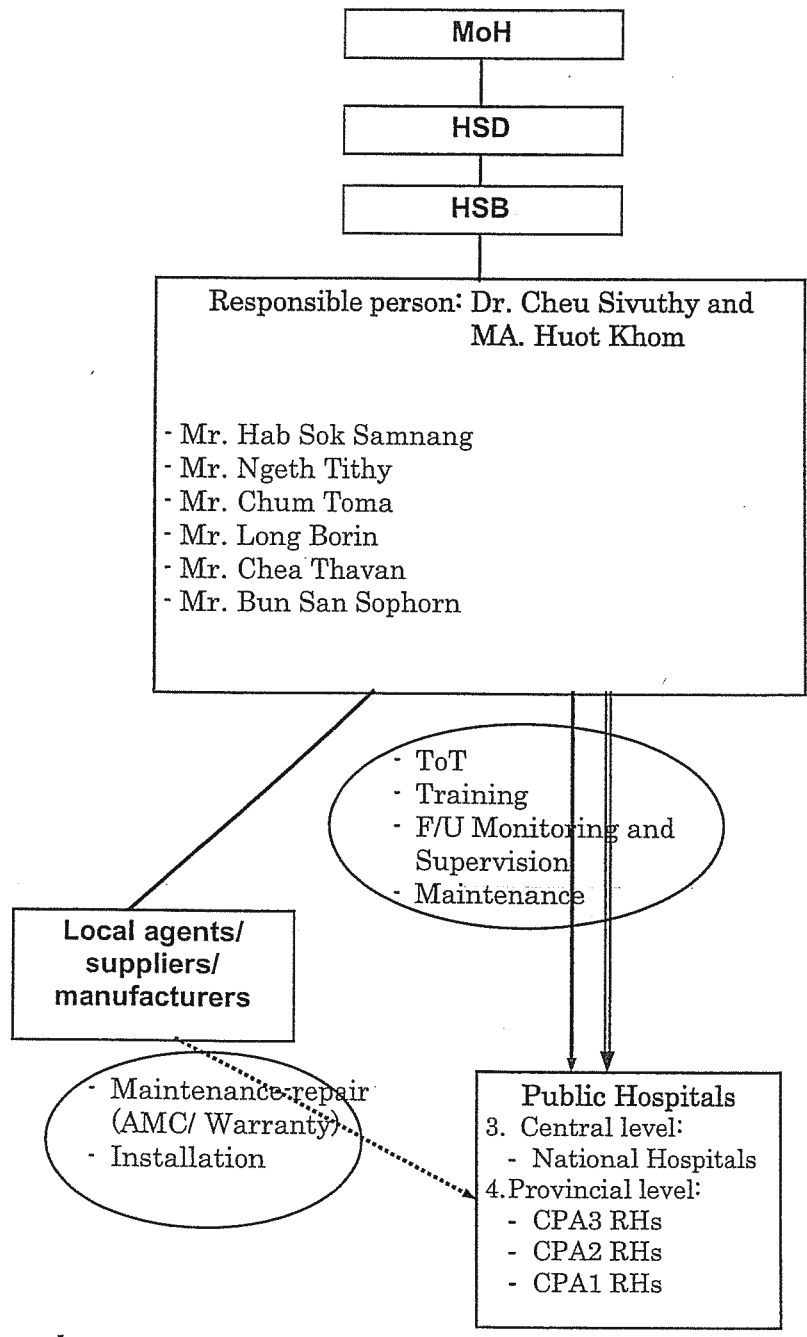
4- Component of NW Team  
A- Component



Legends:

- = : Managerial & administrative relation
- : Technical relation
- ... : Indirect/ irregular relation

Component of NW team with name list of responsible person



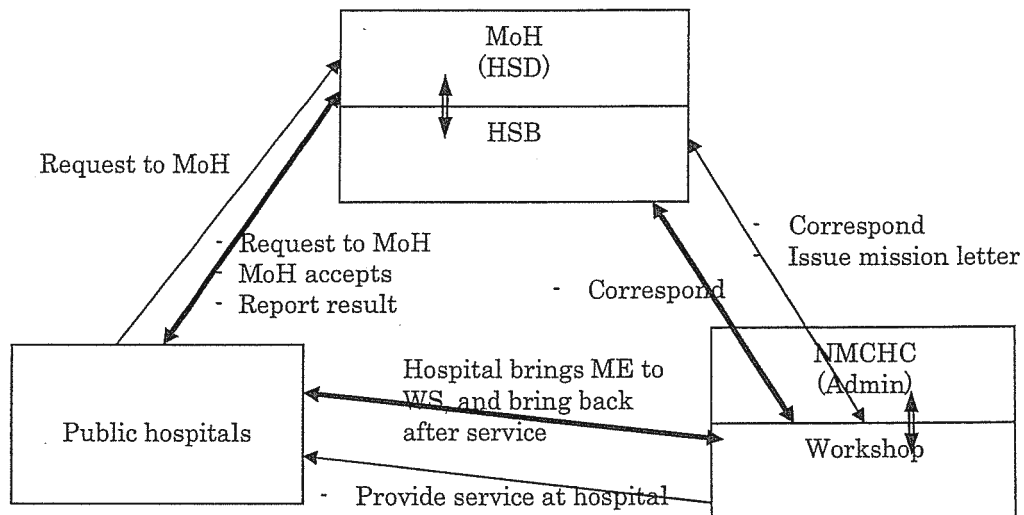
Legends:

- = : Managerial & administrative relation
- : Technical relation
- ... : Indirect/ irregular relation

## B- ME Services and Document Flow

As long the NW is located inside of the NMCHC the service flow and document flow should be defined as follows:

### 1) Service Flow:



### Explanation of the flow:

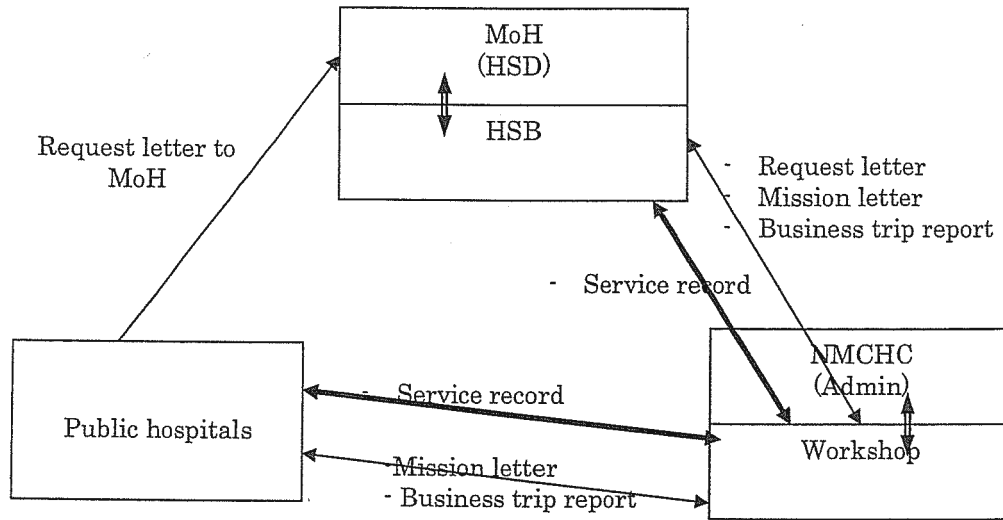
#### + Service at hospital:

1. Hospital requests to MoH
2. MoH correspond workshop, if available issues mission letter
3. Workshop staff provides service at the hospital and report the result to MoH

#### + Service at the workshop

1. Hospital requests to MoH
2. MoH correspond workshop, if okay inform to hospital
3. Hospital bring ME to workshop
4. Workshop register in registration book (refer to annex-2: sample of registration book), provides service and reports the result to MoH
5. Hospital bring back the ME

## 2) Document Flow:

**Explanation of the flow:****+ Service at hospital:**

1. Hospital makes request letter and submit to MoH
2. MoH registers and corresponds workshop, if available issues mission letter
3. With mission letter, workshop staff provides service at the hospital
4. After service, workshop staff makes business trip report (sign by technician and chief of NW) and fills in service record (sign by technician and representative of the hospital)
5. A copy of service record (refer annex-3: sample of service record) keep in hospital
6. A copy of business trip report and service record keep in NW
7. Original of business trip report and service record submit to MoH (HSB)

**+ Service at the workshop**

1. Hospital makes request letter and submit to MoH
2. MoH registers and corresponds workshop, if available inform hospital to bring ME to the workshop
3. After service, workshop staff fills in service record (sign by technician and chief of NW)
4. A copy of service record keep in NW and another copy send to the hospital together with ME
5. Original of service record submit to MoH (HSB)

## 5- Long-term Goal:

All medical equipments at national and referral hospitals are well managed, regularly maintained and correctly operated.

## 6- Expected Outputs:

By 2013:

- ME Management Working Group are established at national and referral hospitals;
- Better quality of ME maintenance services are provided to national and CPA3 referral hospitals and some of CPA2&1 referral hospitals;
- TOT are provided to ME managers, Deputy ME Mangers and ME Technicians at some of the national and CPA3 referral hospitals;
- ME managers, Deputy ME Mangers and ME Technicians at some of the national and CPA3 referral hospitals are able to provide Technical Training on ME Maintenance to ME technicians at CPA2 & CPA1 referral hospitals;
- ME mangers, Deputy ME Manager, ME Technicians and ME users are properly trained;
- Regular monitoring and supervision are conducted, and proper feedback and technical advice are given on time to all people concerned.

## 7. Expected outcomes:

On 2013:

- All medical equipments will be kept safety and reliability to give accurate information to medical staff for providing correct diagnosis and treatment to patients;
- Medical equipment failure rate and repair rate will be reduced. Indicators will be defined based on base-line study by some years;
- Medical equipment will be kept for long term use. Indicators will be defined based on base-line study by some years;
- Unnecessary expense for repair and renewal of equipment will be reduced. Indicators will be defined based on base-line study by some years;
- High equipment utilizing rate will be maintained.

## 8. Terms of References of the NW:

A) Overall role

A-1) Summary:

Take responsibility for development of necessary documents and implementation of necessary activities on ME management, maintenance and operation to achieve outputs and long-term goal of the NW.

## A-2) Details:

Descriptions	Responsible organization
<b>A-2-1 Policy, Guideline:</b>	
- Develop policy, regulation, guideline and document concerned on medical equipment management for national and referral hospitals.	- HSB - (MCH)
- Develop policy, guideline on medical equipment maintenance and operation based on national/ international standard.	- MCH - (HSB)
- Introduce policy, regulation, guideline and document on medical equipment management, maintenance and operation to national and referral hospitals	- HSB & - MCH
- Promote the standard list of medical equipment to national and referral hospitals	- HSB
- Develop the standard list of medical equipment (MPA kit) for health centers	- HSB
- Review and revise policies, regulations, standard list and guidelines on medical equipment management, maintenance and operation upon needs arise.	- HSB & - MCH
<b>A-2-2) Planning</b>	
- Make necessary action plan (AOP), which needs to promote medical equipment management and maintenance	- HSB & - MCH
- Discuss with organizations/ agencies concerned for a better plan	- HSB & - MCH
- Consider necessity and possibility of establishment of provincial workshop	- HSB
<b>A-2-3) Coordination:</b>	
- Coordinate with all organizations, NGOs, IOs concerned for better and smoother implementation of ME management, maintenance and operation	- HSB & - MCH
- Coordinate with local agents/suppliers and manufacturers regarding maintenance-repair, training and supply of ME, spare parts, consumables, etc.	- MCH & - HSB
- Coordinate with PHD/ODs, national and referrals hospitals any relevant ME management, maintenance and operation activities	- HSB & - MCH
- MCH and HSB must well correspond and work together for improvement of management, maintenance and operation of medical equipment at national and referral hospitals of the following activities: <ul style="list-style-type: none"> <li>▪ ME maintenance services</li> <li>▪ ME management training</li> <li>▪ ME maintenance training</li> <li>▪ Monitoring and supervision of ME management, maintenance and operation</li> </ul>	- HSB & - MCH

▪ Coordination and cooperation with donors	
<b>A-2-4) Monitoring and Supervision:</b>	
- Develop monitoring and evaluation tools	- HSB & - MCH
- Monitor and supervise management and maintenance of ME at national and referral hospitals	- HSB & - MCH
- Monitor and supervise management and maintenance of ME at national and referral hospitals and health centers	- HSB
- Give feedback according to the result of monitoring and supervision	- HSB & - MCH
- Collect information of ME data from national and CPA3 referral hospitals, and register it in the database system	- HSB
- Collect ME management reports from national and CPA3 referral hospitals twice a year	- HSB
- Evaluate and analyze the above ME information and ME management reports, and then utilize for further strategy (AOP)	- HSB - (MCH)
<b>A-2-5) Training</b>	
- Provide necessary training to staffs of national and referral hospitals on ME management, maintenance and operation, in order to improve ME utilization more effectively and efficiently.	- HSB & - MCH
- Provide TOT for selected ME technicians of national and CPA3 referral hospitals	- MCH - (HSB)
- Assist selected ME technicians of national and CPA3 referral hospitals to develop training curriculum for ME technicians and users of CPA2 & CPA1 referral hospitals.	- MCH - (HSB)
<b>A-2-6) Maintenance Services</b>	
- Give technical advice regarding ME maintenance and/ or operation when necessary.	- MCH
- Provide ME services (maintenance, repair, installation, consultation, etc.) to national and referral hospitals upon their request. The services may be carried out at the workshop or at the site.	- MCH - (HSB)
<b>A-2-7) Staffing</b>	
- Allocate staff according to his/her knowledge and skills and by considering scope of work	- HSB & - MCH
- Give opportunity to staffs to attend in-house/ on the job training and/ or oversea training to upgrade their knowledge and skills	- HSB & - MCH
- Evaluate activity of staff	- HSB & - MCH
- Motivate staffs who works well	- HSB & - MCH
<b>A-2-8) Financial management (needs further discussion)</b>	
- All necessary budgets for ME management, maintenance and operation should be managed by .....	



- Income from ME maintenance-repair services should be kept at .....	
- A clear income and expense of report should be made by ..... and submit to ..... every .....	
<b>A-2-9) Studies/ Survey</b>	
- Conduct necessary studies/ survey on ME maintenance and operation, and share the result among people concerned	- MCH - (HSB)
<b>A-2-10) Reporting</b>	
- Make semiannual and annual report of the NMEW	- HSB & - MCH
- Submit the report MoH and share it among stakeholders	- HSB & - MCH

**Note:**

- HSB&MCH means they have to work together and/or they have the same activity.
- HSB (MCH) means HSB is in-charge and MCH assists or advices.
- MCH (HSB) means MCH is in-charge and HSB assists or advices.
- HSB means to be done by HSB only
- MCH means to be done by MCH only

**B- Particular Terms of References of the NW****B-1 Manager of NW**

- Manage all staffs of the NW and their activities
- Lead all staff members to make AOP
- Lead all staff members to develop policies, regulations, guidelines and documents concerned on ME management, maintenance and operation.
- Manage all properties of the NW
- Manage financial resources for ME maintenance-repair activity
- Develop internal discipline of the NW, and then submit for authorization
- Monitor and evaluate activity of all staffs of NW
- Coordinate with HSB and all organizations concerned
- Organize and chair regular meeting
- Organize training, seminar, workshop, etc. upon need arise
- Report the progress of the NW activities to the organizations/ agencies concerned.
- Attend any relevant meetings of Working Group/ Taskforce/ Committees
- Join monitoring and supervision trip when necessary
- Take any other necessary action/ countermeasure for smooth movement of the NW.

**B-2 Deputy Manager of NW**

- Assist the chief regarding management of the staffs and their activities
- Take responsibilities of the chief when the chief is vacant
- Join monitoring and supervision trip when necessary
- Assist chief for all managerial and administrative works
- Perform any relevant works as assigned by the chief
- Take any other necessary action/ countermeasure for smooth movement of the NW.

**B-3 Team Leader**

- Lead the team members in providing ME maintenance services
- Provide ME maintenance-repair services directly
- Join monitoring and supervision trip
- Monitor and assess activity of the team member and report to the chief
- Conduct team member to collect necessary data for making report
- Be a trainer of ToT for selected ME technicians from NHs and CPA3 RHs
- Directly assist NHs and CPA3 RHs regrinding preparation of training
- Train junior staff or ME technicians of the NW
- Report the progress activity at regular meeting, or report to the chief when necessary
- Take any other necessary action as assigned by the chief

**B-4) Team Members**

- Provide ME maintenance-repair services
- Join monitoring and supervision trip
- Collect necessary data for making report
- Be a trainer of ToT for selected ME technicians from NHs and CPA3 RHs
- Directly assist NHs and CPA3 RHs regrinding preparation of training
- Report the progress activity to the team leader always
- Take any other necessary action as assigned by the chief and team leader.

**9- Financial Management**

- A pool fund for ME should be established.
- Income from ME services (user fee) should be allocated properly as follows:
  - + 39% for running cost; for purchase of spare parts, tools, etc.
  - + 1% pays to national treasury;
  - + 60% for staff incentive; the incentive should be divided into two categories, basic and direct incentive and it should be allocated as below:
    - ++ Basic incentive: 50% of the above 60% shall be paid to all staffs of the NW according to their position
    - ++ Direct incentive: The another 50% will be paid directly to staff who directly produces income

- User fee allocation should be done monthly.
- Equity fund or compensation for ME services should be established, and the ideas should be among organizations and people concerned.

IV- List of Annex:

- Annex-1: Tariff of the ME Services by NW

## - Annex-1: Tariff of the ME Services by NW

Group of Equipment	Service Fee	
	Service Scheme	Cost
<b>Group 2: e.g.,</b> - Laryngoscope, - Stethoscope, - Digital weighing machine	<Repair>	R8,000
<b>Group 3: e.g.,</b> - Blood pressure meter, - Foot type suction unit, - Examination light stand, - simple examination table	<Repair>	R12,000
<b>Group 4: e.g.,</b> - Binocular microscope, - Colposcope, - Centrifuge, - Light source for gastroscope, - Suction unit, - Simple sterilizer, - Electromotor operating table, - Operating lamp, - Oxygen concentrator, - Phototherapy unit, - Infant warmer	<b>&lt;Maintenance&gt;</b> 1) Visual/functional inspections 2) Lubrication  <b>&lt;Repair&gt;</b> 1) Change of electronic components/ devices (e.g., ICs, Transistors, Diodes, Capacitors, Resistors, PCBs) 2) Change of switches, 3) Change of lamp, monitor brushes  <b>&lt;Installation&gt;</b> Except operating table/ Lamp	R20,000 R30,000  R60,000 R30,000 R20,000  R40,000
<b>Group 5: e.g.,</b> - Patient monitor, - Infant incubator, - Servo-infant warmer, - ECG equipment, - CTG monitor, - Doppler fetus detector, - Pulse oximeter, - High pressure steam sterilizer, - Dental unit, - Spectrophotometer, - Flame photometer, - Ultra-centrifuge,	<b>&lt;Maintenance&gt;</b> 1) Visual/functional inspections 2) Lubrication  <b>&lt;Repair&gt;</b> 1) Change electronic components/ devices (e.g., ICs, Transistors, Diodes, Capacitors, Resistors, PCBs) 2) Change of switches 3) Change lamps, heaters 4) Change transducers	R60,000 R70,000  R80,000  R50,000 R30,000 R80,000

<p>Life Support Equipment</p> <div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li>- Anesthesia apparatus</li> <li>- Ventilator</li> <li>- Servo ventilator</li> <li>- Defibrillator</li> <li>- Electro-surgical unit</li> <li>- Infusion/transfusion pumps</li> </ul> </div>	<p>&lt;Installation&gt; Except high pressure steam sterilizer, Dental units</p> <p>&lt;Maintenance&gt; 1) Visual/functional inspections 2) Overall inspection including performance inspection</p> <p>&lt;Repair&gt; 1) Change of electronic components/devices 2) Change of switches,</p> <p>&lt;Installation&gt;</p>	<p>R80,000</p> <p>R60,000 R100,000</p> <p>R80,000 R60,000 R90,000</p>
<p>Group 6: e.g.,</p> <ul style="list-style-type: none"> <li>- General X-ray equipment</li> <li>- Mobile X-ray equipment</li> <li>- Ultrasonic diagnostic equipment</li> </ul>	<p>&lt;Maintenance&gt; 1) Visual/functional inspections 2) Lubrication</p> <p>&lt;Repair&gt; - Change of electronic components/devices (e.g., ICs, Transistors, Diodes, Capacitors, Resistors, Relays) - Change of Transducers</p> <p>&lt;Installation&gt; Except general X-ray equipment</p>	<p>R40,000 R70,000</p> <p>R90,000 R60,000</p> <p>R100,000</p>

**Total service cost**

1. Diagnosis, cost estimation and consultation  
Free of charge
2. In case of Maintenance  
<Service at NMCHC >= Service fee + Spare part cost  
<Service at the site >= Service fee + Spare parts cost + Transportation cost  
(Including per diem and accommodation)
3. In case of Repair  
<Service at NMCHC >= Service fee + Spare parts cost  
<Service at the site >= Service fee + Spare parts cost + Transportation cost  
(Including per diem and accommodation)
4. In case of Installation  
= Service fee + Transportation cost (including per diem and accommodation)

**Conditions that can charge the service fee to clients**

1. Good quality of maintenance/ repair techniques
  2. Accountability – Explain service contents what has been done clearly on the report and oral with background of engineering science ( i.e., theory and principle of equipment )
  3. Guarantee reliability and safety of equipment after servicing
  4. Good communication with clients
  5. Good respectability to clients

Table of Future vision and Target

	2005 (Before project)	Dec. 2007 (At present)	By Dec. 2008 (Project end)	By 2012 (After 5 y project)	By 2018 (After 10 y project)
ME condition	-No data	-78% of use at target hospitals	-80% of use at target hospitals	-90% of use at CPA3 hospitals	-95% of use at all hospitals
MOH administration				-Assemble ME management committee	-Central workshop establishes if possible
HSD administration	-Lack of personnel	-Appropriate personnel assigned		-Feasibility study on Central workshop	
Quarterly activity report	-Not existed	-HSB Submitted to DD	-HSB submitted to DD periodically -HSD submit to DG periodically	-All bureau submit to DG through DD	
ME database	-Not existed	MEEMIS is developed	-Data is collected 2 times	-Feedback to AOP and strategy	-All hospital involved -Collect data 2/year
ME management report	-Not existed	-Report set is developed -Disseminated in the seminar	-Almost of target hospital submit	-All target hospital submit on time	-CPA1 is involved
ME management manual	-Not existed	-Draft is developed -Disseminated to CPA3 hospital and 4 NH	-Authorized -Promoted widely	-Revised -PHD is involved -Compile as policy	
NW administration	-Under NMCHC	-Under NMCHC	-Under NMCHC -Combine with HSB staff	-NW account is opened -NW staff gain incentive -Remote NW establishes at CPA3	-NW becomes think-tank -Provide TOT for MEM and MET
Hospital administration	NH CPA			-Prepare budget for ME management at target hospital	Prepare budget for ME management at all hospital
ME management	Listed but no activated	-Officially assigned -22 person is trained	-Submit ME management report -80% of target hospital earns 70% of score	-PHD is involved -CPA2 is involved -Integrate to hospital management	-OD is involved -All hospital submit ME management report
ME maintenance	Listed only some hospital	-Officially assigned -18 person is trained -Start preventive maintenance	-22 person is trained -Nomination remote NW staff -NW provides TOT -80% of target hospital earns 70% of score	-All CPA3 gain 90% of score -Remote NW provide training for CPA2 hospitals -2 <sup>nd</sup> MET of CPA3 is trained -Regulation on MET post is made	-Remote NW works -All hospital assign MET
User operation				-Agent service increase -Execute user training by remote NW	-User training includes ME maintenance

## ANNEX-12: Project Design Matrix (PDM)

Title: Promotion of Medical Equipment Management System

Duration: January, 2006–December, 2008

Target Area: Whole Cambodia

Version: PDM4 (January 2008)

Target Group: Medical equipment managers and technicians at target NHs and CPA3 RHs

Indirect Beneficiary: Patients of NHs and CPA3 RHs

Super Goal: Basic maintenance of medical equipment is conducted at all RHs

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption
<p><b>[Overall Goal]</b> Basic maintenance of medical equipment is conducted at NHs and CPA3 RHs.</p>	<ul style="list-style-type: none"> <li>* Operable rate of medical equipment is improved for all medical equipment at NHs and CPA3RHs.</li> <li>* Estimated equipment life is fulfilled for all medical equipment at NH and CPA3 RHs.</li> <li>* Number of preventive maintenance are increased while repair cost is decreased, during the estimated equipment life.</li> <li>* Number of minor repair service by maintenance workshops at CPA3RH makes constant increase, while the one of NW decreases.</li> </ul>	<ul style="list-style-type: none"> <li>* Annual activity report of NHs and CPA3RHs</li> <li>* Inventory data at HSD</li> <li>* Accounting book of NH and CPA3RHs</li> <li>* Annual activity report of PHDs, HSD and NW</li> </ul>	<ul style="list-style-type: none"> <li>* Medical equipment maintenance managers and technicians are assigned at OD, CPA1 and CPA2 RHs, and Project activities are extended to them.</li> </ul>
<p><b>[Project Purpose]</b> Basic maintenance and management activities for medical equipment are introduced at target NHs and CPA3 RHs, by following the instruction of MOH and by receiving technical guidance of NW.</p>	<ul style="list-style-type: none"> <li>* Target NHs and CPA3 RHs submit annual activity report on medical equipment management to MOH through PHD.</li> <li>* Based on the instruction manuals and checklist of medical equipment, periodical check and maintenance are conducted at target NHs and CPA3 RHs.</li> <li>* Medical equipment management procedure are prepared and followed at target NH and CPA 3 RH.</li> </ul>	<ul style="list-style-type: none"> <li>* Maintenance activity plan of NHs, CPA 3 RHs.</li> <li>* Reports from NHs, CPA 3 RHs.</li> </ul>	<ul style="list-style-type: none"> <li>* Refresher training is provided to ex-participants</li> <li>* Training is provided to managers of PHDs.</li> <li>* Medical personnel at NHs and CPA3 RHs improve the knowledge on medical equipment usage.</li> </ul>

<p><b>【Outputs】</b></p> <p>1. Administrative instruction of HSD of MoH on medical equipment management for target NHs and CPA3 RHs is strengthened, with technical guidance of NW .</p> <p>2. Technical skill of medical equipment technicians in target NHs and CPA3 RHs is improved.</p> <p>3. Management skill of medical equipment managers in target NHs, CPA3 RHs is improved.</p>	<p>For Output 1</p> <ol style="list-style-type: none"> <li>Inventory is completed and regularly updated.</li> <li>Monitoring trip by HSD and maintenance service by NW are regularly conducted, and findings are fed back to their activity plans.</li> <li>HSD prepares annual work plan by considering available human resources, financial resources, and materials.</li> <li>HSB of HSD prepares quarterly report of their activities, and analyzes the progress.</li> <li>HSD and NW are able to conduct training for medical equipment manager and technician.</li> </ol> <p>For Output 2 and 3</p> <ol style="list-style-type: none"> <li>Number of trainees and instructors trained.</li> <li>Number and types of training courses.</li> <li>Number and types of developed manuals, checklist, curriculum and training handouts.</li> <li>Difference in scores of pre-test and post-test conducted in the training course makes constant progress.</li> <li>Project team's monitoring results for ex-participants make constant progress.</li> </ol>	<p>* Project report of HSD and NW</p> <p>* Inventory data</p> <p>* Annual report of HSD and NW</p> <p>* Training report (i.e., test results, supervision results, and questionnaire survey results)</p>	
<p><b>【Activity】</b></p> <ol style="list-style-type: none"> <li>Design and introduce the medical equipment inventory.</li> <li>Enhance knowledge of HSD staff on medical equipment management administration .</li> <li>Verify and give advices on existing policy guidelines (i.e. policy document, implementation plan &amp; guideline, and basic maintenance) on medical equipment management, based on the experience from project activities, as needs arise.</li> <li>Provide on-site guidance to medical equipment managers and technicians at target NHs and CPA3 RHs.</li> <li>Conduct regular monitoring and evaluation on all above activities .</li> <li>Give advice to MOH and donors for appropriate supply of new medical equipment to hospitals.</li> <li>Prepare an appropriate Annual Operation Plan (AOP) for the following year.</li> </ol>	<p><b>【Input】</b></p> <p>Japanese Side        &lt;Personnel&gt;        Long-term experts (HSD and NW)</p> <p>Short-term experts 2. NH and CPA 3 RH</p> <p>&lt;Equipment and Materials&gt;        Basic maintenance 1. Training facilities (at NMCHC)</p>	<p>* Majority of trained medical equipment maintenance managers and technicians continue working for the position.</p> <p>* Main counterpart members remain working for the Project</p>	



<p>2-1. Develop the medical equipment maintenance manuals and checklist to target NHs and CPA3 RHs (i.e. medical equipment inventory, activity record, inspection standard, and reporting).</p> <p>2-2. Conduct needs assessment on medical equipment technicians at target NHs and CPA3 RHs.</p> <p>2-3. Provide technical training of trainers (TOT) for NW staff.</p> <p>2-4. Develop training curriculum (i.e. preventive maintenance, maintenance planning, inventory management, minor repair, and reporting) for medical equipment technicians of target NHs and CPA3 RHs.</p> <p>2-5. Prepare training handout for medical equipment technicians of target NHs and CPA3 RHs.</p> <p>2-6. Provide the technical training for medical equipment technicians at HSD, target NHs and CPA3 RHs.</p> <p>2-7. Evaluate the above (2-6.) technical training.</p> <p>2-8. Conduct follow-up supervision for the ex-trainees at their workplace.</p> <p>2-9. Hold blush-up meetings with medical equipment technicians of target NHs and CPA3 RHs at NW to promote usage of maintenance manuals and checklist.</p> <p>3-1. Provide TOT for HSD staff for medical equipment management training program.</p> <p>3-2. Develop the medical equipment management manual to target NHs and CPA3 RHs (i.e. inventory management, management of technicians, maintenance planning, and reporting protocol).</p> <p>3-3. Conduct training needs assessment of medical equipment managers at target NHs and CPA 3 RHs.</p> <p>3-4. Develop training curriculum for medical equipment managers of target NHs and CPA 3 RHs.</p> <p>3-5. Provide training for medical equipment managers of target NHs and CPA 3 RHs.</p> <p>3-6. Evaluate the above (3-5.) training.</p> <p>3-7. Provide follow-up supervision for the ex-trainees at their workplace.</p> <p>3-8. Hold blush-up meetings with medical equipment managers and directors of target NHs, and CPA3 RHs at HSD to promote usage of management manual.</p>	<p>Necessary equipment for Project Office</p> <p>&lt;Training in Japan&gt;</p> <p>2. Project offices (both at MOH and NMCHC)</p> <p>&lt;Budget&gt; Local cost for government staff including salary and facilities. Water, electricity and gas supply for project offices.</p>	<p><b>【Pre-Condition】</b></p> <p>* Appropriate medical equipment managers and technicians are assigned at target NH and CPA 3 RH</p>
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Abbreviation: National workshop: NW; Hospital service department: HSD; Hospital service bureau: HSB; Provincial Health Department: PHD; Referral Hospital: RH; Training of Trainers: TOT; Ministry of Health: MOH; Operational District: OD; Complementary Package of Activities: CPA

ANNEX 13: Plan of Operation (PO)

Activities	2006												2007												2008												Implementer	Experts in charge	Note
	1 2 3 4 5 6 7 8 9 10 11 12												1 2 3 4 5 6 7 8 9 10 11 12												1 2 3 4 5 6 7 8 9 10 11 12														
	Administrative instruction of HSD of MoH on medical equipment management for target NH and CPA3 RH is strengthened with technical guidance of NW.																																						
1-1. Design and introduce the medical equipment inventory.	↑																																HSD	C&S1					
1-2. Enhance knowledge of HSD staff on medical equipment management administration						○																												HSD	C	↑			
1-3. Verify and give advices on existing policy guidelines on medical equipment management, based on the experience from project activities, as needs arise.																																		HSD	C	↑			
1-4. Provide on-site guidance to medical equipment managers and technicians at target NHs and CPA3 RHs.																																		HSD	C&S2,4				
1-5. Conduct regular monitoring and evaluation on all above activities																																		HSD	C	↑			
1-6. Give advice to MOH and donors for appropriate supply of new medical equipment to hospitals.																																		HSD	C	↑			
1-7. Prepare an appropriate Annual Operation Plan (AOP) for the following year.																																		HSD	C	↑			
1-8. Hold Joint Coordination Committee (JCC)																																○		MOH	C				

2. Technical skill of medical equipment maintenance staff in target NH and CPA3 RHs improved.											
2-1.	Develop the medical equipment maintenance manuals and checklist to target NHs and CPA3 RHs (i.e. medical equipment inventory, activity record, inspection standard, and reporting).										NW&HSD S1,2
2-2.	Conduct needs assessment on medical equipment technicians at target NHs and CPA3 RHs.										NW&HSD S1
2-3.	Provide technical training of trainers (TOT) for NW staff										NW S1,2
2-4.	Develop training curriculum (i.e. preventive maintenance, maintenance planning, inventory management, minor repair, and reporting) for medical equipment technicians of target NHs and CPA3 RHs.										NW&HSD S1,2,4
2-5.	Prepare training handout for medical equipment technicians of target NHs and CPA3 RHs.										NW&HSD S1,2,4
2-6.	Provide the technical training for medical equipment technicians at HSD, target NHs and CPA3 RHs.										NW&HSD S2,4
2-7.	Evaluate the above (2-6.) technical training.										NW&HSD S2,4
2-8.	Conduct follow-up supervision for the ex-trainees at their workplace.										NW&HSD S2,4
2-9.	Hold bluish-up meetings with medical equipment technicians of target NHs and CPA3 RHs at NW to promote usage of maintenance manuals and checklist.										NW&HSD S4

3. Management skill of medical equipment managers in target NH, CPA3 RH, and PHD is improved.												
3-1.	Provide TOT for HSD staff for medical equipment management training program.										HSD	S3
3-2.	Develop the medical equipment management manual to PHDs, target NHs and CPA3 RHs (i.e. inventory management, management of technicians, maintenance planning, and reporting protocol). Conduct training needs assessment of medical equipment managers at PHD, NH and CPA 3 RH										HSD	S3
3-3.	Develop training curriculum for medical equipment managers of PHDs, target NHs and CPA 3 RHs.										HSD	S1
3-4.	Provide training for medical equipment managers of PHDs, target NHs and CPA 3 RHs.										HSD	S3
3-5.	Evaluate the above (3-5.) training.										HSD	S3
3-6.	Provide follow-up supervision for the ex-trainees at their workplace										HSD	S3
3-7.	Hold bluish-up meetings with medical equipment managers and directors of PHDs, target NHs, and CPA3RHs at HSD to promote usage of management manual.										HSD	S3,4
3-8.											HSD	S4

C: Chief Advisor, S1: Maintenance of medical equipment, S2: Training planning, S3: Management system, S4: Evaluation and monitoring

## Financial Report of ME Management Seminar 2

### Total Expense of ME Management Seminar (2nd Course)

	Organization	Amount (US\$)	Percentage
1	MoH (HSSP)	8,507.14	96%
2	JICA	346.01	4%
	Total	8,853.15	

### Details of Expenses of Each Organization

1. MoH (HSSP)		(US\$)
Per diem, Accommodation, Transportation for Directors (1 day)		2,031.18
Per diem, Accommodation, Transportation for ME working groups (3 days)		5,938.71
Tea Break		277.29
Training Materials (Provision items)		209.96
Banner		50.00
<b>Total</b>		<b>8,507.14</b>

2. JICA		(US\$)
Training Materials (Stationary)		152.50
Copy Fee		105.51
Lecturer Fee		88.00
<b>Total</b>		<b>346.01</b>

The achievement of cost-share between MoH and JICA is positive outcome of this training. MoH requested HSSP to support this training, and then we got financial support from HSSP. 96% of workshop expenses were provided by HSSP. This factor is big advantage to consider sustainability of MoH activities.

92 participants (30 PHD and Hospital directors and 62 ME working group members) were joined this workshop. We provided 1-day seminar for PHD and Hospital directors and 3- day seminar for ME working group members. MoH (HSSP) supported per diem, accommodation and transportation fee.

Regarding materials, MoH (HSSP) prepared provision item (Training files) and JICA provided document copy fee and stationary fee.

Lecture and assistant fee were paid by JICA.

Name list of Counterparts

