The Republic of Uganda

Ministry Of Health

National Medical Equipment Policy

4th Edition

2009

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National Medical Equipment Policy, 4th Edition, 2009
Kampala Uganda

Compiled and Produced by:
The National Advisory Committee on Medical Equipment
Ministry of Health, Kampala

Technical Editing,
Typesetting and Printing by:
Logik Media, P.O. Box 22271 Kampala Uganda

March 2009

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ACRONYMS

BP	Blood Pressure
BRS	Basic Radiological system
CE	Conformite Europeenne
CRS	Computed Radiological System
CT	Computer Tomography Scanner
CWS	Central Workshop
DDHS	District Directorate of Health Services
DIN	Deutche Industrie Norm
ECG	Electrocardiogram
EEG	Electroencephalography
ENT	Ear, Nose, Throat
ESR	Erythrocyte Sedimentation Rate
GH	General Hospital
GoU	Government of Uganda
HCII	Health Centre Level 2
HCIII	Health Centre Level 3
HCIV	Health Centre Level 4
HCT	Heamatocrit
HID	Health Infrastructure Division
HMIS	Health Management Information System
HSD	Health Sub District
ICU	Intensive Care Unit
IEC	International Electro Commission
ISO	International Standards Organization
IUD	Insertion and Drainage
JICA	Japan International Cooperation Agency
LCD	Liquid Crystal Display
MCH	Maternal Child Health
MOH	Ministry of Health
MRI	Magnetic Resonance Imaging System
NACME	National Advisory Committee on Medical Equipment
NDA	National Drugs Authority
NRH	National Referral Hospital

NRMH	National Referral Mental Hospital
OPD	Out Patient Department
PCB	Polychlorinated Biphenyl
PCR System	Polymerase Chain Reaction Test System
PET System	Positron Emission Tomography and Related Equipment System
PHC	Primary Health Care
PPDA	Public Procurement and Disposal Authority
RRH	Regional Referral Hospital
SPECT	Single Photon Emission Computed Tomography and Related System
UNBS	Uganda National Bureau of Standards
UPS	Uninterrupted Power Supply
VDRL	Venereal Disease Research Laboratory (Syphilis Test)
WHO	World Health Organization

FOREWORD

In 1989, the then Hon. Minister of Health appointed a National Advisory Committee on Medical Equipment (NACME) to prepare a policy to guide the sector on acquisition and management of medical equipment. The committee produced the first National Medical Equipment Policy in 1991 which assisted both government and non government agencies to rationalize procurement and management of medical Equipment.

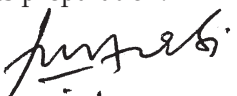
Over the years, the medical equipment policy and guidelines have been reviewed to update equipment specifications so as to conform to new technological advancements and medical techniques. The second and third editions of the Medical Equipment Policy and Guidelines came out in 2000 and 2003 respectively.

This fourth edition has been structured to provide guidance on:

- Medical equipment management cycle.
- Standard list of equipment for each healthcare level
- Detailed technical specifications for recommended medical equipment

The guidelines and lists of essential equipment for each healthcare level are a result of extensive discussions and consultations with a number of stakeholders. Equipping of health facilities in Uganda should therefore be carried out based on the principles set out in this policy to ensure rationalized and coordinated equipping of health facilities.

It is my pleasure to write this foreword to the fourth edition of Medical Equipment Policy and Guidelines, 2009 and to thank the Chairman, Members of the National Advisory Committee on Medical Equipment and all those who participated in one way or the other in its preparation.



Dr Sam Zaramba
DIRECTOR GENERAL OF HEALTH SERVICES

CHAPTER 1

1.0 INTRODUCTION

Medical equipment represents a substantial asset in the health care delivery system and needs to be managed efficiently. Moreover, the way in which it is purchased, managed and used can influence the quality of health care delivered to patients. Medical equipment can pose a risk to patients and staff, particularly if used improperly.

Appropriate daily, periodic and corrective maintenance of medical equipment is key to achieving safe and cost-effective management of medical equipment. Adequate operation and daily maintenance budgets should be allocated to Health Facilities. In order to guide investments, sufficient advisory and supervisory capacity needs to be developed by HID and in all the health facilities operated by PNFPs. Operation and maintenance capacity development should be systematically in line with the increasing demand.

It is difficult for low income countries to procure cost-effective equipment for their health care sectors. The challenge therefore is for the country to incorporate the experiences gained over the years into this Medical Equipment Policy.

This is the fourth edition of the National Medical Equipment Policy. The first edition containing a summary of the work of the National Advisory Committee on Medical Equipment and its various subcommittees was issued in March 1991.

The second and third editions came out in 2002 and 2003 respectively and incorporated WHO Policy Guidelines on health technology. Standard lists of equipment and furniture were also prepared for each health care level. The committee consulted a number of stakeholders in order to come up with the new policy which was prepared in three volumes namely:

Volume 1:	Medical Equipment Policy
Volume 2:	Lists of Medical Equipment and Furniture for each health care level

Volume 3: Specifications for the Equipment and Furniture

The cost factor has been stressed in the Policy. The Standard List has incorporated cost estimates for each item. Guidelines regarding donations, safety of users and patients, and disposal have been emphasized.

Verification of medical equipment on delivery to determine compliance to specifications is an important function of the Committee. Members of the Committee will be available for inspection, verification and commissioning demanded by all users of equipment in the country.

The Committee would like to thank all the people who took active interest in proper management of equipment procured by the government at a high cost. Without the health workers and public support, the life of the equipment in the health units would have been seriously curtailed.

Lastly, I would like to thank all the members of the National Advisory Committee on Medical Equipment and the various working groups for their contributions. Appreciation is extended to JICA for supporting the review process and for funding a Short-Term Consultant, Eng. D.M.K Katesigwa to assist the Committee. Special thanks go to Eng. Dr. John Tumwesigye - Secretary NACME, and Ms Akiko Niwa - the Project Coordinator Health Infrastructure Management Improvement Project for coordinating the assignment.

Dr. E. K. Naddumba
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CHAPTER 2

2.0 SITUATION ANALYSIS

Current trends indicate that a number of medical equipment are increasingly being deployed in the districts to increase the diagnostic and treatment capabilities of primary health care facilities. Major equipment such as X-ray, Ultrasound units, and Laboratory analyzers are reaching facilities below the general hospital level, and the rate of such acquisition and deployment is increasing. On the other hand, the capability to manage and maintain medical equipment in Uganda remains rather weak. This weakness is particularly serious in the districts. The growth in capabilities to manage or maintain medical equipment has lagged far behind the rate of acquisition of equipment.

Analysis of the current situation reveals severe shortfalls especially regarding the following:

- Regulatory framework for medical equipment
- Equipment acquisition within the health sector
- Equipment utilization by the health personnel
- Equipment maintenance
- Equipment disposal

2.1 Policy Implementation and Management

All health workers are responsible for ensuring that equipment is used and stored properly and that problems are reported in such a way that the health facility is able to learn from them. However at the national level, the Ministry of Health, through Health Infrastructure Division, Clinical Services Department and National Advisory Committee on Medical Equipment have been mandated to give appropriate clinical and technical advice to the Ministry of Health.

At referral levels the management of medical equipment is the responsibility of the respective administrative and technical departments. The referral hospitals are now semi-autonomous bodies which are self accounting. At the district level the District Health Officers are directly responsible for the management of medical equipment. However the maintenance support services are still being coordinated by Regional Workshops established under Regional Referral Hospitals and the HID which has the responsibility of supervising the activities of Regional Workshops.

NDA, as the regulatory body in the country, is mandated to monitor equipment imported into the country for both Government and Non government Health Facilities. NDA should monitor all equipment importation into the country to ensure that the equipment being acquired is safe.

2.2 National Advisory Committee on Medical Equipment (NACME)

The main objective for appointing NACME was to review the country's medical equipment needs and determine the appropriate policy on procurement, maintenance and rehabilitation and disposal of medical equipment.

The original terms of reference of NACME still apply. These include formulation of policy on procurement, standardization, maintenance and rehabilitation, and disposal of medical equipment, bearing in mind cost-effectiveness and appropriateness of technology.

Presently the task of NACME is advisory while Health Infrastructure Division is responsible for the implementation of a multitude of tasks including maintenance.

2.3 Health Infrastructure Division (HID)

The division has two major sections with the mandate to formulate policies and guidelines on medical equipment

and manage medical equipment among others. These sections are:

i) Civil Engineering Section
ii) Electrical and Mechanical Engineering Section

Civil Engineering Section

All building and architectural activities of the MOH are coordinated by this section. Specific responsibilities on medical equipment include supervision of pre-installation works and ensuring that fixed medical equipment is installed correctly.

Electrical and Mechanical Engineering Section

Both the electrical and mechanical engineering sections have a role in the management of medical equipment. The sections are responsible for preparing specifications and ensuring that the ministry procures equipment that conform to national and international standards and that the procured equipment is appropriate and acceptable by the users.

Some of the activities related to Medical Equipment in the section are:

i) Supervision and Monitoring on management of the complete life cycle of medical equipment and furniture in public health facilities. The Electrical and Mechanical section is also responsible for implementation of medical equipment policy on every occasion of medical equipment procurement

ii) Since the establishment of NACME the position of Secretary, taking care of the executive work for the Committee, has been an Electrical/Mechanical engineer in the Health Infrastructure Division. The detailing of standard lists and the required updating of specifications to a large extent is the responsibility of the Electrical/Mechanical Engineer.

iii) Specification and quantification for equipment procurement in the health sector is another prominent task that requires a thorough insight in the medical equipment field.

Central Medical Workshop (CWS)

The Central Medical Workshop was established under HID to supervise all Regional Workshops established under Regional Referral Hospitals as well as to play a role of Support Supervisory Services for medical equipment maintenance in the Central Region. In addition to the role of providing maintenance services in the Central Region, other activities include:

i) Support supervision for all Regional Workshops directed by the Electrical and Mechanical Engineering Section of HID on maintenance and repair activities, accountability, detailing and preparing of the quarterly and year budgets.

ii) Providing guidance in the procurement of spare parts.

iii) Capacity development activities of all regional workshops are coordinated from the Central Workshop directed by the Electrical and Mechanical Engineering Section of HID. This involves human resource development, supervisory activities and further technical support.

iv) Support health facilities, districts and Regional Workshops in updating medical equipment inventory data

2.4 National Referral Hospitals

At the National Referral levels, the engineering and administration departments are responsible for equipment management.

2.5 Regional Referral Hospitals

At Regional Referral Hospitals, the management of medical equipment is the responsibility of the Hospital Administrator and respective Regional Workshop Manager. The Regional Workshops are located within the regional hospitals. They have responsibilities to maintain medical equipment at the relevant health facilities in the region. The workshops are responsible for maintenance outreach support services within the catchment area as a role of Support Supervisory Services of Regional Referral Hospital.

2.6 District Health Services

At the district level, the management of medical equipment is the responsibility of the District Health Officer and the respective in-charges of the health units. District Engineers in Local Government are also responsible for the entire work of Health Infrastructure Development and Management.

Staffing levels of medical equipment maintenance personnel in districts are still low. Furthermore, there is a countrywide shortage of human resource of medical engineering personnel in both private and public sectors. To fill the gap, the Regional Workshops are mandated to support health facilities in the relevant districts to ensure periodical maintenance and repair of medical equipment.

The current contribution system to Regional Workshop funding mechanism has resulted in malfunction of routine and corrective maintenance in health facilities. To optimize utilization of scarce human resources on medical equipment maintenance and to counter lack of maintenance culture in the sector, the Ministry of Health should create a budget item for the Regional Workshops under relevant Regional Referral Hospitals to cater for the Outreach Support Services of medical equipment maintenance and repair for General hospitals, HCIV, HCIII and HCII in the respective regions.

CHAPTER 3

3.0 POLICY CONTEXT

The awareness to regulate the complex issues related to the planning and management of medical equipment and furniture in health facilities in Uganda dates back from 1985. This resulted into the appointment of the first National Advisory Committee on Medical equipment in 1989 and the production of the first National Medical Equipment Policy document in 1991. The implementation of the procurement guidelines and the establishment of the Engineering Unit in the Ministry of Health have to a large extent been achieved. Because of continuous changes in both economical and technological frameworks, it is necessary that updates to the policy be made whenever it becomes necessary. The first and second updates were done in 2000 and 2003 respectively.

Over these last two decades, approaches to health care and patient management have changed and continue to change dramatically, mainly because of the remarkable progress made in medical technology. The increasingly important role technology plays in medicine is evident in every day clinical and public health practice.

This rapid growth in technology contributes to greater diagnostic precision, less time needed for investigations, treatment and rehabilitation, less stress to patients and consequently increasing life expectancy.

Despite the fact that these advances, innovations and increasing investments in new medical technology has brought about significant advances in patient care, medical technology often involves increasing health costs.

In many countries of the region, demands on the health care system are increasing, while at the same time costs are on the rise, and thus the gap between needs and resources is widening resulting in a serious economic burden. The high cost is mainly due to the cost of the development of modern technology and translation of the research findings into a workable technology.

Because of the high cost involved in research and development, which is largely taking place in industry in the developed world, consumers including those in developing countries have to adopt to the changing technology and at increased costs.

This simply means that methodologies and equipment are dictated more by the suppliers with greater commercial pressure to use new technologies. Besides the pressure exerted by manufacturers, there is often internal pressure to import modern health technology. Strategies adopted by industry have influenced, and continue to influence, the marketing of technologies. These strategies are also dictated towards increasing their profits in the already saturated market in the industrialized countries.

The cost of health care globally has been an area of concern in the past two decades. One reason for this is the ever increasing cost of medical supplies, equipment and logistical support.

It is for this reason that countries in the developing world have to re-examine their health budget with a view of diverting resources to the most cost effective strategies. The need for this has been more apparent in Uganda, where extensive damage had been inflicted on the health system. The need for setting priorities has been paramount.

The National Medical Equipment Policy should enable the medical equipment planners to set priorities and acquire the most cost effective equipment for the health sector.

The National Medical Equipment Policy was developed and is continuously being updated to complement the National Health Policy in guiding provision of health care services delivery. The Medical Equipment Policy should ensure that medical equipment

is acquired, utilised, maintained and decommissioned and disposed off efficiently to enhance health care service delivery and to minimize risks associated with the equipment management.

Specifically the policy guides management of various stages of equipment life cycle that include acquisition, utilization, maintenance and disposal.

CHAPTER 4

4.0 POLICY OBJECTIVE

The overall goal of the health sector policy in Uganda is the attainment of good standard of health by all people in Uganda, in order to promote a healthy and productive life. The National Health Policy emphasizes that good quality health care shall be assured through cost-effective interventions targeted at the most important health problem of the population, with an optimal mix of appropriate health technology and trained human resources, which are affordable and sustainable.

The delivery of such modern health care services heavily depends on medical equipment for diagnosis, life support, patient monitoring and for delivery of therapies.

The Medical Equipment Policy should ensure that medical equipment is acquired, utilised, maintained and decommissioned and disposed off efficiently to enhance health care service delivery and to minimize risks associated with the equipment management.

4.1 General Objective

The main objective of the policy is to ensure equipment and furniture are managed economically, efficiently, effectively, and sustainably.

4.2 Specific Objectives

The specific objectives of the policy are;

i) To guide acquisition of medical equipment and furniture

ii) To guide utilization, regulation and quality assurance of medical equipment and furniture

iii) To guide maintenance of medical equipment and furniture.

iv) To guide monitoring and evaluation of performance of medical equipment and furniture.

v) To guide disposal of medical equipment and furniture

CHAPTER 5

5.0 GUIDING PRINCIPLES

The guiding principles address the processes in management of medical equipment. It is the responsibility of every one to ensure that the guidelines are followed. The guidelines address issues in respect of the life cycle of the equipment, right from acquisition to disposal.

5.1 Acquisition

The issues to consider before and during acquisition include: planning, procurement, inspection, installation, commissioning and disposal.

5.1.1 Planning

During initial equipment planning the following conditions should be met to help in the decision process:

- Demonstrated clinical needs
- Available qualified users or arrangements to train users if the capacity is lacking.
- Assessment of safety and space requirements for the new equipment to be installed.
- Approved and reassured source of recurrent operating budget.
- Confirmed maintenance services and support
- Disposal needs and environmental safeguards

5.1.2 Procurement

In the procurement phase, the need to standardize

on models or manufacturers of equipment should be considered. Furthermore, it should be a requirement in the contract agreement that the supplier provides operating and service manuals, carries out operation and service training for users and technicians, and guarantees availability of essential spare parts for at least five (5) years.

Although international procurement guidelines dictate procurement through international competitive tendering with generic description of the equipment, standardization should be emphasized. The first level of standardization is reached by the use of clear generic specifications that safeguard the standardization on a certain level of technology.

For sophisticated equipment like the x-ray machines, CT scanners, Ultrasound scanners, patient monitors, Dialyses machines, etc, specification by brand/model names maybe used to guarantee standardization, cost effective training and development of capacities in operation and maintenance within Uganda.

A higher level of standardization with greater managerial and economical benefits should be achieved through planning and procuring significant quantities of the same make and model of certain equipment.

5.1.3 Inspection

All incoming equipment, including donated equipment, should be carefully inspected for possible shipment damage, compliance with specifications in the purchase contract, compliance with international environmental and safety regulations, delivery of standard accessories, spare parts, and operating and service manuals.

Evaluation of performance of equipment after commissioning and before acceptance is crucial for effective and sustainable use of equipment. Verification

and evaluation requires clinical and technical knowledge of medical equipment which may not be available in the recipient facility. NACME usually supports health facilities to verify the specifications before installation, and equipment performance after installation.

5.1.4 Installation and Commissioning

i) All medical equipment should be installed in accordance with the Manufacturers' specifications as well as Building/Electrical and Occupational Health and Safety specifications. New equipment should be tested and commissioned by the supplier prior to being placed in service and also following any repairs and modifications. Periodic testing and safety checks should be carried out for all medical equipment as specified by the manufacturers.

ii) All newly commissioned equipment by suppliers should be handed over to the hospital administration with duly signed commissioning certificates detailing the equipment name, brand/model, serial numbers, and details of the operational and functional tests carried out. The commissioning certificate should form part of the final Contract Completion Report.

iii) Upon receipt, a designated administration officer (or a medical maintenance Technician) should tag the equipment with the proper inventory code. Once the unit has been accepted, the warranty period commences. Acceptance testing usually consists of testing by users and designated administration officers, including the medical maintenance technician. The manager responsible for use of the equipment should arrange for acceptance testing with the supplier who should carry out User Training for the health workers and technicians.

iv) An appropriate and stable power supply system is essential. The electric voltage should be 240V + 10% and 50 Hz, and electric plugs should be DIN (European) 3 pin grounded to avoid electrical hazard or shock. All major electric appliances should come with both the Uninterrupted Power Supply (UPS) system and the surge protector to ensure continuous medical support in case of power shutdown or outages.

The following specific installation and commissioning procedures should be used for specialised Medical Equipment:

v) X-ray Installation: Diagnostic X-ray systems should be installed in accordance with the International regulations. Radiation protection tests should be carried out for new x-ray installations before they are authorized for human use.

vi) Electrical equipment, such as ECGs, Defibrillators, etc., shall include a grounding system to provide protection against shock.

vii) Medical gases: The installation of gas systems requires the services of experts. Unqualified personnel such as plumbers, electricians or mechanical fitters who are unfamiliar with medical gas or anyone not trained in the installation of anesthesia gases and equipment should be prohibited from carrying out such installations.

viii) Sterilization Equipment: Upon completion of installation, complete orientation and demonstration, including calibration and testing the processes of the sterilizers should be carried out.

5.1.5 Donated Equipment

In Uganda, a significant proportion of equipment is acquired through donations from various agencies. However, to pursue safe and cost-effective management of medical equipment, it is recommended that all donors should ensure that their donations comply with this policy. The evaluation of potential recipients is crucial to the successful donation and avoiding receipt of equipment which is not on the standard medical equipment list.

The following guidelines should be followed by all those donating medical equipment and those responsible for accepting donated equipment.

i). All equipment to be donated should be based on stated needs of the country and should be relevant to the health services provided in Uganda. In this regard, the donors should consult with the Ministry of Health or the intended recipients in the country.

ii). Donations of medical equipment or other related equipment intended for use in the health sector should be shipped with the prior consent of the Ministry of Health and the intended recipients in Uganda.

iii). All donated equipment should be obtained from reliable sources and should comply with quality standards of both the donor country and Uganda with two years guarantee and should be on the standard list for the particular health care level.

iv). For electrical equipment, the electrical needs should be determined prior to shipping. Donors should verify with recipients that the electrical needs could be met in Uganda. Only equipment that use 240V/50Hz should be accepted.

v). After arriving in Uganda, all donated medical equipment should have a useful life of at least

two years. Exceptions could be made if the donor organization and the recipient in Uganda determine that the equipment to be received could be utilized in the short term until a more permanent arrangement for similar equipment is put in place.

vi). Each donated piece of equipment to be used in the health sector should have labels in English and should be easily understood by health professionals and other users. The label on the container should include the name of the item, serial number, and the name of manufacturer.

vii). Donated equipment should be packed in accordance with international shipping regulations and should be accompanied by a detailed packing list which specifies the contents of each numbered carton by quantity, serial number, weight and any special storage conditions.

viii). The value of the donated equipment should be provided. In order to estimate the value of the donated equipment, consideration should be given to the cost of the equivalent in Uganda or to the wholesale world-wide cost of the specific equipment. Value must take into consideration of whether it is used or new equipment.

ix). Cost of international and local transport, warehousing, port clearance and appropriate storage and handling should be paid for by the donor agency, unless specifically agreed otherwise with the Ministry of Health or the recipient in advance.

5.2 Regulation, Operation and Quality

5.2.1 Medical Equipment Regulation

National Drug Authority (NDA) and Uganda National Bureau of Standards (UNBS) are currently

the Government Regulatory bodies responsible for the protection of the population against unsafe and inappropriate medical equipment. NACME is the advisory body in the Ministry of Health on Policy development and implementation.

The legal framework for appropriate medical equipment management in Uganda has not yet fully been developed. In the meantime, Health Infrastructure Division of Ministry of Health should continue to monitor equipment management as NDA develops the legal framework.

5.2.2 Operation of Medical Equipment

All health workers are responsible for ensuring that equipment is used well and maintained properly. Problems related to malfunctioning should be reported in time for correction. Operation and maintenance units should receive adequate funds for implementation of the policy.

i) Equipment User Training

Training users on safe and effective use of medical equipment should be carried out during installation and servicing of the equipment. Even if the type of newly installed equipment is well known to the staff in the health facility, continuous training on the safe and effective use of the equipment should be conducted as a part of installation.

ii) Application Training

For the new specialised equipment e.g. Ultrasound Machine, X-ray Unit, or Full automatic autoclave, significant application training should be conducted. The training should be incorporated in the supply contract.

The beneficiary health facilities should be responsible for selection of trainees.

iii) Training of Trainers

In order to improve equipment care, handling and first line maintenance, Hospitals, HSDs, and Districts should designate User Trainers in their respective institutions. These User Trainers should be retrained and equipped to train others in the following:

a) Operation, care and handling of basic medical equipment.

b) Basic medical equipment maintenance.

c) Basic equipment inventory management

d) Handover Reports preparation and equipment management.

e) Equipment performance monitoring and evaluation.

User Trainers should also carry out support supervision on equipment management as part of the routine support supervision and monitoring. Central and Regional Workshops supported by the HID should organize Training of Trainers in the Districts and General Hospitals.

5.2.3 Medical Equipment Safety

Medical equipment in use should be tested and cleared for safety by qualified technical persons or institutions mandated to regulate the use of such equipment. The suppliers of the equipment should take responsibility for carrying out the recommended safety and quality assurance tests before commissioning the equipment, and to provide application training to ensure the correct use of equipment. In this section, the specific areas of safety are highlighted and this policy should

be implemented through the entire cycle of medical equipment management ranging from planning to decommissioning.

i) Electrical Safety

- Medical equipment and working environment should be electrically safe. Scheduled inspections and safety tests should be carried out on all electrically operated equipment at specified intervals and the corresponding limits should comply with International Occupational Health and Safety Standards.

- Grounding performance tests for electric equipment should be conducted to ensure that any leakage of current to internal organs in cases on insulation failure is within internationally acceptable limits. The current leakage limits should not exceed International Safety Standards, measured from equipment chassis to ground.

ii) Radiation Safety

Radiology departments should be designed to provide a safe environment for the health workers and patients. New x-ray machines should be tested and commissioned in accordance with the manufacturers' procedures to meet national and international safety standards.

- Lead aprons should be worn by all X-ray staff and a dosimeter should be worn outside of the apron at the collar/neck region so that exposure to the head, neck, eyes and thyroid can be measured. A second dosimeter should be worn under the apron to record possible inner exposure.

- Regular testing and calibration of radiation safety equipment shall be carried out to ensure safety of the health workers and patients.

- There should be inspections by relevant external bodies to ensure compliance to set safety limits.

iii) Environmental and Occupational Safety

- Equipment and consumables used in medical care should not contaminate the local environment as per Occupational Health and Safety Guidelines.

- Cell phone usage inside hospitals should be prohibited in operating rooms, emergency rooms and Intensive Care Unit, as cell phones transmit signals that interfere with certain types of medical equipment. The Medical Superintendents and health centre in-charges should enforce adherence to the "no cell phone" policy within the critical areas of the medical facility.

iv) Workers Safety and Infection Control

Health workers have the responsibility to protect patients and themselves against safety hazards that are potentially caused by use of medical equipment. Prevention of cross infection mediated by medical equipment is a crucial issue in all health facilities.

Health workers have the responsibility to ensure that the work place is free of safety hazards. The health facility managers should;

- Provide staff with protective clothing e.g. X-ray protective apron, face mask, etc. and promote awareness of biohazards.

- Have warning signs for mechanical and electrical hazards e.g. high voltage power supplies, high pressure gas tanks, etc.

- Take appropriate steps to ensure that the Medical Facility complies with all applicable safety standards/procedures/guidelines.

- Make every effort to ensure that every activity within the Medical Facility is safe for workers and patients.

All personnel assigned to the Medical Facility should be familiar and comply with the Infection Control Policy. The Infection Control Policy should be embraced by all health workers including maintenance personnel who may come in contact with potentially infectious materials in performance of their duties. There is always a risk of contracting infection through technical work like servicing or using equipment in laboratories.

v) Medical Gases Safety

To ensure Safety use of gas cylinders, the following procedures should be adhered to.

- Full and empty gas cylinders should be separated and "FULL" and "EMPTY" signs posted on each cylinder.

- . Flammable gas cylinders should be stored separately within the storage area and should not be stored with oxidizing agents. Cylinders should not be operated or stored close to medical air compressors, vacuum pumps or heat sources.

- Flammable compressed gases storage areas should be separated from the buildings.

5.2.4 Quality Assurance

UNBS, NDA are responsible for regulating the equipment imported into the country while NACME is responsible for monitoring the performance and safety of medical equipment imported into Uganda. Equipment imported into Uganda should conform to international standards e.g. ISO, IEC, CE mark.

i) Quality Control Recalls, Warnings

The Regional and Hospital based maintenance workshops are responsible for processing recall/ warning/ alert messages related to medical equipment. Depending on the reports from the Regional and Hospital based maintenance workshops, HID should coordinate actions, disseminate information, and ensure corrective action.

Should potentially hazardous situations arise in the hospitals, the users should report to the Hospital and Regional Workshops the type of equipment involved (Name, Model Number, Serial Number, etc.) the nature of the problem, and the action taken to correct the problem.

The responsible maintenance workshops should schedule, document and carryout corrective action on defective equipment.

ii) Calibration of Diagnostic Equipment

Calibration should be carried out to ensure the parameters are within the manufacturers' specifications and to ensure equipment meets applicable regulations. In specific areas like X-ray departments or Laboratories, the calibration should be carried out as a part of daily or

periodic maintenance. Both departmental workers e.g. Radiographers, Laboratory Technicians and maintenance engineer/technicians should fully understand and follow the Manufacturers' instructions for calibration. Appropriate materials e.g. Reagent, Testing material, Testing Software, etc should always be available.

5.3 Maintenance

Maintenance is categorized into three groups: daily, periodic and corrective maintenance. Daily maintenance is a part of daily operation and is performed by health workers who use the equipment. This should be strengthened through user training. Periodic maintenance is periodical (once a month, once a quarter, or after a number of hours of operation) service to prevent defects before they occur. Corrective maintenance means repair after the equipment has failed.

5.3.1 Daily Maintenance

Users of equipment should carry out daily maintenance (first line maintenance) on any particular equipment. User – level maintenance includes checks like cleaning, proper storage and performing operation checks. Daily maintenance ensures that the equipment does not deteriorate and prolongs its life span.

5.3.2 Periodic Maintenance and Corrective Maintenance

At the referral hospital level, the maintenance workshop managers are responsible for the Periodic and Corrective Maintenance under supervision of Medical Superintendents and Hospital Administrators. However, the capacity of medical equipment maintenance staff in districts is still inadequate. To fill the gap, the regional maintenance workshops are mandated to support health facilities in the districts to ensure periodical and corrective maintenance are

carried out and should be considered as an outreach activity by the higher level facility.

Health facility administration and other relevant institutions could arrange for maintenance contracts between the facility and private companies that offer equipment maintenance services. However, the responsibility of monitoring and evaluation of the contracted services remain with regional maintenance workshop managers and the procurers of the services. The monitoring and evaluation by regional maintenance workshop managers should be clearly stated in the contracts. The regional maintenance workshop managers are responsible for reporting the results of monitoring and evaluation to the Health Infrastructure Division.

5.3.3. Maintenance Contracts Management

Manufacturers of sophisticated equipment like X-ray machines, CT scanners, Ultrasound scanners, Patient monitors, Dialyses machines, Automatic Laboratory Equipment, etc, recommend to have maintenance contracts with their agents in the country or in neighboring countries. The manufacturers often guarantee the equipment safety and performance only if company qualified engineers or technicians carry out periodic and corrective maintenance.

In such cases, the most convenient way is to have maintenance contracts when the equipment are procured. Procurements of sophisticated equipment including donations should be examined for possibility of having fair maintenance contracts within the supply contracts. In case the funds available are only enough for initial investment, alternative funds should be secured for maintenance contracts.

5.4 Monitoring and Evaluation

The Ministry of Health implements Health Management Information System (HMIS) for various purposes including monitoring, evaluations and analysis for better health care delivery management.

The health facility ranging from HC IIs to National Referral Hospitals, DHOs and HSDs are required to submit the HMIS forms to the Resource Centre directly or via relevant sections of the Ministry of Health.

The medical equipment inventory on the HMIS form is an important tool in medical equipment management for health facility in-charges and administrations.

The central and regional maintenance workshops are required to submit their quarterly workshop reports to the Health Infrastructure Division. The quarterly reports should include information on records of periodic and corrective maintenance, medical equipment disposals, monitoring of maintenance contracts, and accountability.

5.5 Disposal of Medical Waste

The reasons for disposal include obsolescence, uneconomical use, and lack of spare parts. Maintenance workshop managers should report to the health facility in-charges or designated administration officers any equipment that is due for decommissioning and disposal. The workshop managers should advise on the risk that could arise from continuous use of the equipment.

Accordingly, the health facility in-charges and designated administration officers should report the cases to the accounting officers to initiate the disposal process.

Disposal procedures of medical equipment should be in line with the Environment Laws of Uganda, and PPDA Regulations.

When the equipment is due for disposal, International Standards and Guidelines should be followed. Many types of medical equipment used in hospitals are designated as special or hazardous waste and should not be disposed of like any waste that is not hazardous. Such items contain hazardous components that are restricted from disposal in a usual manner of non hazardous waste. Some of the items include:

- Radiotherapy equipment
- Mercury-containing products such as Sphygmomanometers, Thermometers, etc.
- Polychlorinated Biphenyl (PCB)-containing products
- Smoke Detectors
- Asbestos-containing equipment

ANNEXES

ANNEX 1: List of Participants

Medical Equipment Stakeholders Conference 12th-13th February 2009

	Name	Institution	Title
1	Dr.Sam Zaramba	Ministry of Health	Director General of Health Services
2	Dr.Jacinto Amandua	Clinical Services	Commissioner
3	Ms.Christine Mubiru	Policy Analysis Unit	Principal Policy Anaalyst
4	Dr.Jackson Amone	Integrated Curative	Assistant Commissioner
5	Mr. Martin Oteba	Pharmacy	Ag. Assistant Commissioner
6	Dr.E.K. Naddumba	NACME member	Senior Consultant, Orthopaedic
7	Ms.Edith Nshimye	NACME member	Principle Nursing Officer
8	Dr.J.V.B. Tindimwebwa	NACME member	Senior Consultant, Anaesthesia
9	Dr.Sam Kalisoke	NACME member	Senior Consultant, Obstetric & Gynaecology
10	Dr.Fred Mboli	NACME member	Dental Surgeon, Principle Medical Officer
11	Eng.Sitra Mulepo	NACME member	Senior Engineer/ Medical Equipment
12	Dr.C.Magimbi	NACME member	Medical Consultant, Ophthalmology
13	Mr.Steven Aisu	NACME member	Laboratory Technologist
14	Eng.Dr. John Tumwesigye	NACME member	"Senior Engineer/ Medical Equipment Workshop Manager, Central Wabigalo"
15	Prof. Michael Kawooya	NACME member	Radiologist

16	Dr. Gakwaya	NACME member	Senior Consultant/ Surgeon
17	Dr. David Basangwa	NACME member	Medical Consultant/ Psychiatry
18	Eng. E. Kataaha	NACME member	Senior Engineer
19	Dr. G.Tumweheire	NACME member	Senior Consultant, ENT
20	Dr. Okui A P	Clinical Services	Senior Medical Officer
21	Eng.Paul Kariba	Health Infrastructure Division	Health Engineer
22	Dr. Stanly Bubikire	Disability and Rehabilitation Section	Principal Medical Officer
23	Dr. Omujal Francis	National Clinical Research Laboratory	Research Officer
24	Mr. Ninyenda Francis	National AIDs Control Program	
25	Dr. Miriam .G. Mutabazi	UNFPA	
26	Dr. G. Wanyana	Reproductive Health	Principle Medical Officer
27	Mr. Claes Broms	HSPS III	Senior Advisor
28	Ms. Idill Robleh	Clinical Services	
29	Eng. D.M.K. Katesigwa	HIMP	Co-opted Member of NACME
30	Mr. Testuo Seki	JICA	Chief Resident Representative
31	Mr. Shintaro Takano	JICA	Resident Representative
32	Dr. Takuji Date	HIMP	Short Term TA,
33	Ms. Akiko Niwa	HIMP	Project Coordinator
34	Dr. Muwanga	Entebbe General Hospital	Medical Superintendent

35	Ms. Kasozi A	Gombe General Hospital	Senior Hospital Administrator
36	Dr. Kamya	Kawolo General Hospital	Medical Superintendent
37	Dr. Namwoyo Tukei	Soroti Regional Referral Hospital	Opthalmologist
38	Dr. Ojoome Vincent	Mbale Regional Referral Hospital	Medical Superintendent
39	Dr. Wanume	Jinja Regional Referral Hospital	Medical Superintendent
40	Dr. Olaro Charles	Fort Portal Regional Referral Hospital	Medical Superintendent
41	Prof. E. Mutakooha	Mbarara National Referral Hospital	Senior Consultant Surgeon
42	Dr. Tendo Stephen	Mbarara National Referral Hospital	Anaesthesiologist
43	Dr. Byakika Sarah	Jinja DHO	DHO
44	Dr. Okumu David	Tororo DHO	DHO
45	Ms. Kyobutungi Maude	Wakiso Health Centre IV	Registered Nurse
46	Dr. Adah Nakinga	Bushenyi Health Centre IV	In-charge
47	Mr. Shaban Kadir	Bwijinga Health Centre IV	Laboratory Technologist
48	Dr. Faith Juryagyenda	Kitante Medical Clinic	In-charge
49	Mr. Andrew Bamulumrye	Kawempe Health Centre IV	Laboratory Technologist
50	Dr. Bingi Chris	Mukono HC IV	In-charge
51	Ms. Deborah Katehangwa	Jinja Regional Referral Hospital	Regional User Trainer

52	Ms. Mary Tibamwenda	Hoima Regional Referral Hospital	Regional User Trainer
53	Ms. Caroline Omoya	Gulu Regional Referral Hospital	Regional User Trainer
54	Ms. Anne Olaro	Masaka Regional Referral Hospital	National User Trainer
55	Dr. Onen Thomas	Butakika Hospital	Senior Consultant
56	Dr. Nakwagala Fred	Mulago	Medical Officer
57	Dr. Muhumuza M.E.	Mulago	Neurosurgeon
58	Dr. Rose Byanyima	Mulago	Consultant, Radiology
59	Mr. P. Ayika	Mulago	SMLT
60	Sr. Sarah Kabenge	Mulago	Obstetrician
61	Dr. Catherine Kabenge	Mulago	Dental Surgeon
62	Dr. J.D. Kigula Mugambe	Mulago	Senior Consultant
63	Mr. Ngompek Gilbert	Mulago	Biomedical Technician
64	Dr. J. O. Omagino	Mulago	Consultant
65	Ms. Egwanyu Nancy	Mulago	Principle Physiotherapist
66	Ms. E. Nassuna	Mulago	Principle Physiotherapist
67	Mr. Wegoye Philip	Mulago	Principle Radiographer
68	Dr. Wambete J	Mulago	Consultant, ENT Surgeon
69	Dr. Mugisha Jeniffer	Mulago	Medical Officer
70	Ms. Likichoru J	Mulago	Clinical Officer
71	Ms. Nassuma Edith	Mulago	Senior Principle Nursing Officer
72	Mr. Muzira D	Mulago	Orthopaedic Technologist
73	Mr. Beene Richard	Mulago	Senior Orthopaedic Technologist

74	Dr. D. Wamala	Mulago	Consultant
75	Ms. Fiona Bell	Mulago	Speech Language Therapist
76	Mr. Sam Byamukama	UNHAME	Secretary
77	Mr. Joel Akabway	UNHAME	Public Secretary
78	Dr. Karongo	UPDF	Director, Technical
79	Dr. J.W.Kimbowa	Mednet	Medical Director
80	Dr. C.Sagala	Mednet	Director, Operation
81	Dr. Daniel Isooba	AFDB	
82	Mr. Apollo Muhairwe	NDA	Executive Secretary
83	Mr. Apollo Angole	NDA	
84	Mr. James Segawa	MEC, Philips Uganda	Director
85	Mr. Karl Mock	Simed	Manager
86	Mr. Qiu Xue Yong	Sino Africa	Manager
87	Mr. James Karugaba	Sino Africa	
88	Mr. Ahimbisibwe C	MEC, Philips Uganda	
89	Mr. Solomon Butandwa	The Weekly Message	Reporter
90	Eng. D.M.K.Katesigwa	HIMP	Co-opted Member of NACME
91	Mr. Testuo Seki	JICA	Chief Resident Representative
92	Mr. Shintaro Takano	JICA	Resident Representative
93	Dr. Takuji Date	HIMP	Short Term TA,
94	Ms. Akiko Niwa	HIMP	Project Coordinator

ANNEX 2:

List of Nacme Members on 31st December 2008

1.	Dr. Edward. Naddumba	Senior Consultant / Orthopaedics	Chairman
2.	Mrs. Edith N. Nshimye	Principal Nursing Officer	Member
3.	Dr. Gregory Tumweheire	Senior Consultant, ENT	Member
4.	Dr. Michael Kawooya	Assoc. Prof. Department of Radiology	Member
5.	Eng. Sitra Mulepo	Senior Engineer	Member
6.	Mr. Aisu Steven	Ag. Principal Laboratory Technologist	Member
7.	Dr. David Basangwa	Consultant Psychiatrist	Member
8.	Eng. Edward Kataaha	Senior Hospital Engineer	Member
9.	Dr. Christopher Magimbi	Consultant, Opthalmology	Member
10.	Dr. J.V.B. Tindimwebwa	Lecturer/Head, Aneasthesiology	Member
11.	Dr. Gakwaya	Senior Consultant, Surgeon	Member
12.	Dr. Fred Mboli	PMO – Dental Surgeon	Member
13.	Dr. Sam Kalisoke	Senior Consltant Obs/Gyanecologist	Member
14.	Eng. Dr. John Tumwesigye	Senior Engineer (Mech)	Secretary