

Capacity Building Plan

Background

Capacity building is an important element of the project aimed at improving Uganda's hospital facilities, and thereby the referral health care system. Besides infrastructural works, the delivery and installation of medical equipment, maintenance services to 14 referral hospitals, training and related capacity building activities will ensure the effectiveness and sustainability of the project.

Objectives

Within the scope of the overall project, the capacity-building program has the following objectives:

1. To ensure effective clinical use of the equipment installed;
2. To ensure a continuous supply of trained specialized nursing staff;
3. To ensure sustainability of the investment by improving maintenance capacity.

Methodology

The capacity-building program will consist of a short-term component and a long-term component. All training courses under the short-term component will consist of a well-balanced mix of theoretical knowledge and practical skills, based on principles of adult learning and using participatory approaches to involve participants as much as possible in their own learning process and thus maximize the impact of knowledge and skills acquired in their day-to-day activities. The focus of the long-term component is on curricula upgrading of existing curricula at two nursing colleges in Uganda, and will consist of the same well-balanced mix of theoretical knowledge and practical skills, together with a teachers training program.

For most of the proposed short-term training courses within the capacity-building program, a Train the Trainers approach (TOT) will be applied. The participants to the Train the Trainers courses will be selected from the staff members of the five teaching Hospitals in Uganda outside Kampala (Mbarara NRH, Gulu RRH, Kabale RRH, Masaka RRH, Mbale RRH). Trained staff from these Teaching Hospitals will share their knowledge and capacities with their peers all over the country. This will not only ensure appropriateness of training content and methods but also guarantee sustainability of capacity building efforts because the knowledge and skills acquired will stay in Uganda. Trainings can thus be replicated when deemed necessary by the MOH, independently from the current project.

Each Train the Trainer course will have the following objectives:

- Prepare a team of trainers to deliver training in project hospitals;
- Coaching of training execution in terms of content and process;
- Provide training content to participants; and
- Refresh and strengthen knowledge on teaching skills and course content.

The content of each TOT will thus range from refreshing knowledge on the course topics (general obstetric care, emergency neonatal care, neonatal intensive care, accident & emergency care etc.) to effective communication in teaching, participatory training methods, and different types of training aids and how to use them. Trained trainers will thereafter have gained the competency to provide training for their target group.

Programme

The capacity-building program will focus on four main areas:

1. Buttonology/ Application;
2. Clinical skills (short-term);
3. Clinical skills (long-term);

4. Maintenance skills.

Buttonology

Buttonology is the practical on-site training that the equipment supplier will provide for each major piece of equipment installed in order to familiarize the users with its functions. Buttonology will be carried out on the spot during installation and commissioning of the equipment in each project hospital and does not involve a classroom setting. This training comprises the explanation of understanding how to operate a piece of equipment, i.e. which button does what -hence the name buttonology- and does not go into the equipment's clinical uses and options (which will be part of the subsequent clinical skills training).

Buttonology is a service that is included in the services of installing and commissioning of the medical equipment. Therefore, this will be provided by the contractor who is responsible for the supply and installation of each piece of equipment. The costs of buttonology are included in the equipment price. Since it does not take place in a classroom setting, no exact numbers of people to be trained or training plans can be provided. However, the contractor will be held accountable for adequate planning of equipment installation so that hospitals can make sure staff who will operate the equipment will be present during installation and can receive the functional instructions as well as ask questions pertaining to the way of operating the equipment.

Since buttonology is part of the hand-over protocol, explanation of basic technical first aid/ trouble shooting will also be part of this commissioning activity.

Therefore, although it is mentioned here for the purpose of completeness, buttonology is not further included in the institutional strengthening activity plan and budget.

Clinical Skills (short-term)

Clinical skills training is applied training aimed at improving the practical skills of health care workers in various clinical fields. Within the scope of the project, it is directly linked to ensuring the efficient use of new medical equipment to achieve a maximum result in the diagnosis and treatment of patients. During the hands-on sessions of the practical skills training, participants are stimulated to put the theory they learn directly into practice, using the new equipment and/or manikins (life-sized anatomical human models) in a skills lab. Skills labs give the participants a realistic experience of establishing a diagnosis or performing a procedure within a safe environment where errors can be made without compromising patient safety. The necessary equipment for these skills labs (training aids and manikins) will be provided within the context of the project and remain with the MOH (nursing colleges) after finalizing the training program to ensure its continuous use in other training contexts.

The courses will be executed in various modules. In the first session, theory and skills will be practiced in a skills lab environment, but also real life situations will be seen where possible. The next modules will be planned after a period in which the participants have been practicing their skills in their working situation. The successive modules will combine daily practice of the participants with new knowledge and skills and will help them to deal with complex situations that participants may encounter.

The following twelve clinical skills training courses will be executed under the project:

Newborn Care, Emergency Care and Surgery Care

1. Training of Trainers – General Obstetric Care
2. General Obstetric Care
3. Training of Trainers - Paediatric Care
4. Paediatric Care

5. Training of Trainers - Neonatal Intensive Care
6. Neonatal Intensive Care
7. Training of Trainers - A&E nursing
8. A&E nursing
9. Training of Trainers – ICU
10. ICU nursing
11. Training of Trainers - OT nursing
12. OT nursing

Diagnostics

1. Ultrasound
2. Mammography
3. Computed Tomography
4. MRI

Number of nursing staff to be trained

To estimate the number of nursing staff that need to be trained, the required number of specialized nursing staff per department has been taken in consideration. Example: each referral hospital will receive a 6-bed ICU department, so each hospital will need 24 ICU nurses (24 hours service, 8 hours working roster, 5 days working per week). For each nursing specialty, the same approach has been used to calculate the number of staff that is needed to run the departments.

Number of imaging staff to be trained

To calculate the number of radiographers that need to be trained on ultrasound, mammography, CT and MRI, the approach to calculate the needed number of staff was easier, since these services are not offered on a 24 hours base. For Ultrasound each hospital needs 2 trained staff members (radiographers, midwives or nurses), for Mammography 2 trained radiographers are needed, for CT three (3) radiographers per hospital are needed and for MRI four (4) radiographers are needed per hospital.

Table 1 Staff needed per specialty

NICU		A&E	ICU	OT	Obs	Paed	US	Mam	CT	MRI
Arua	12	6	24	3	6	4	2	2	3	
F Portal	12	6	24	3	6	4	2	2	3	
Gulu	12	6	24	3	6	4	2	2	3	4
Hoima	12	6	24	3	6	4	2	2	3	
Jinja	12	6	24	3	6	4	2	2	3	
Kabale	12	6	24	3	6	4	2	2	3	
Lira	12	6	24	3	6	4	2	2	3	
Masaka	12	6	24	3	6	4	2	2	3	
Mbale	12	6	24	3	6	4	2	2	3	4
Moroto	12	6	24	3	6	4	2	2	3	
Mubende	12	6	24	3	6	4	2	2	3	
Soroti	12	6	24	3	6	4	2	2	3	
Naguru	12	6	24	3	6	4	2	2	3	
Mbarara	12	6	24	3	6	4	2	2	3	4
TOTAL	168*	84	336*	42	84	56	28	28	42	12

*actual number needed, training will commence during the project and needs be to continued

To facilitate ongoing training, each of the nursing courses will commence with a Train-the- Trainers course, whereby for each specialty 3 staff members from the Teaching Hospitals outside Kampala will be trained. Future staff turnover or other staff changes can be dealt with this way.

Below, each of the sixteen clinical skills short courses are described in detail, including the target groups and the general content of the training programs.

Training of Trainers - General obstetric care

Objective: to prepare participants for general obstetric care training, in terms of content and skills

Target group: midwives and (maternal) nurses from the five Teaching Hospitals

Total number of participants: 15 (3 from each teaching hospital)

Course content:

- adult learning and effective educational methods;
- course materials and their uses;
- refreshing knowledge and skills related to general obstetric care and equipment to be installed in labour rooms.

Duration of the course: 5 days (one module)

Venue: Mbale RRH

Clinical skills - General obstetric care

Objective: to improve general obstetric care in maternity wards and labour rooms

Target group: midwives and maternal nurses

Total number of participants: 84 (6 from each referral hospital)

Course content: the course will focus on the following topics related to general obstetric care and the new equipment to be installed:

- recognizing and acting on signs of complications;
- basic treatment for eclampsia and other common complications,
- oxygen therapy techniques for mother & child;
- cardiotocography techniques;
- vacuum extractor techniques;
- infusion pump techniques;
- patient monitoring / ICU techniques;
- baby/infant resuscitation techniques;
- basic instrument sterilization techniques.

Duration of the course: 10 days (two modules)

Venue: Mbale RRH, Masaka RRH

Training of Trainers – Paediatric Nursing

Objective: To prepare participants for Paediatric Nursing skills training, in terms of content and skills

Target group: paediatric nurses or general from the five Teaching Hospitals

Total number of participants: 15

Course content:

- adult learning and effective educational methods;
- course materials and their uses;
- refreshing knowledge and skills related to paediatric care and equipment to be installed under the project.

Duration of the course: 5 days (one module)

Venue: Mbarara NRH

Clinical skills – Paediatric Nursing

Objective: to improve care for the paediatric patient in all circumstances

Target group: paediatric nurses, or nurses working at a paediatric department

Total number of participants: 56 (4 from each referral hospital)

Course content: the course will focus on the following topics related to (emergency) paediatric care and the equipment to be installed:

- dealing with paediatric complications;
- the sick child and its family;
- common presentations in the paediatric patient;
- emergency techniques;
- patient monitoring / ICU techniques;
- basic instrument sterilization techniques and usage of autoclaves.

Duration of the course: 10 days (two modules)

Venue: Mbarara NRH

Training of Trainers - Neonatal Intensive Care

Objective: To prepare participants for neonatal care training, in terms of knowledge, skills and process

Target group: maternal nurses and qualified nurses working in a NICU environment

Total number of participants: 15 (3 from each Teaching Hospital)

Course content:

- adult learning and effective educational methods;
- course materials and their uses;
- refreshing knowledge and skills related to neonatal care and equipment to be installed on NICUs and nurseries.

Duration of the course: 5 days (one module)

Venue: Gulu RRH

Clinical skills - Neonatal Intensive Care

Objective: To improve care to neonates that need intensive treatment

Target group: maternal nurses, qualified nurses working in a NICU environment

Total number of participants: 84 (6 from each referral hospital)

Course content: the course will focus on the following topics related to neonatal care and the equipment to be installed in the Neonatal Intensive Care wards:

- identification of clinical signs;
- neonatal resuscitation;
- incubator techniques and equipment use;
- cardiac, respiratory and vital sign monitoring for neonates;
- oxygen therapy for neonates;
- neonatal distress;
- asphyxia;
- thermoregulation;
- infection control and hygiene;
- kangaroo care;
- breastfeeding for the neonate.

Duration of the course: 20 days (four modules)

Venues: Gulu RRH, Mbarara NRH

Training of Trainers – Accident & Emergency nursing

Objective: To prepare participants for executing training in terms of knowledge, skills and process

Target group: clinical officers and qualified nurses from the five Teaching Hospitals

Total number of participants: 15

Course content:

- adult learning and effective educational methods;

- course materials and their uses;
- refreshing knowledge and skills related to casualty care and triage related to equipment to be installed at the casualty departments (e.g. defibrillators).

Duration of the course: 5 days (one module)

Venue: Masaka RRH

Clinical skills – Accident & Emergency nursing

Objective: To achieve reliable and effective care for casualty victims and other emergency patients

Target group: clinical officers, qualified nurses

Total number of participants: 64 (6 per referral hospital)

Course content: the course will focus on the following topics related to casualty care:

- clinical observation;
- triage;
- clinical reasoning;
- ABCDE approach;
- airway management;
- respiratory emergencies;
- shock;
- fluid management.

Duration of the course: 10 days (two modules)

Venue: Masaka RRH

Training of Trainers – Intensive Care Nursing

Objective: To prepare participants to execute training related to effective and reliable care of critically ill patients

Target group: Intensive care nurses, High Dependency Care nurses

Total number of participants: 15 (3 from each Teaching Hospital)

Course content:

- adult learning and effective educational methods;
- course materials and their uses;
- refreshing and adding knowledge and skills related to the care for the critically ill patient.

Duration of the course: 5 days (one module)

Venue: Mbarara NRH.

Clinical skills – Intensive Care Nursing

Objective: to enhance the knowledge and skills of registered nurses related to care of the critically ill patient

Target group: qualified nurses, clinical officers

Total number of participants: 84 (6 from each referral hospital)

Course content: the course will focus on the following topics related to High Dependency and Intensive care:

- clinical observation;
- clinical reasoning;
- airway management and ventilation;
- O2 management;
- endo-tracheal intubation;
- mechanical ventilation;
- respiratory distress;
- circulation management;
- infection control and hygiene;
- fluid management;

- hemodynamic monitoring;
- cardiac diseases;
- pain management;
- neurologic diseases.

Duration of the course: 20 days (four modules)

Venue: Mbarara NRH

Training of Trainers – OT Nursing

Objective: To prepare participants for executing training related to assisting the surgeon during surgery

Target group: qualified nurses working at the OT

Total number of participants: 10 (2 from each Teaching Hospital)

Course content:

- adult learning and effective educational methods;
- course materials and their uses;
- refreshing and adding knowledge and skills related to nursing assistance at the operating theatre.

Duration of the course: 5 days (one module)

Venue: Mbale RRH

Clinical skills – OT Nursing

Objective: to enhance the knowledge and skills of qualified nurses related to assisting the surgeon during surgery

Target group: qualified nurses working at the OT

Total number of participants: 56 (4 from each referral hospital)

Course content: the course will focus on the following topics related to operating theatre nursing:

- hand wash/ hand scrub;
- hygiene;
- handling of sterile goods;
- instrumentation;
- patient positioning and draping;
- minimally invasive surgery;
- electro-surgery.

Duration of the course: 5 days (one module)

Venue: Mbale RRH

Clinical skills – Ultrasound

Objective: to teach the knowledge and skills needed to perform reliable ultrasound scans of the abdominal and obstetric patient

Target group: radiographers, qualified nurses and midwives

Total number of participants: 28 (2 from each referral hospital)

Course content: the course will focus on the following topics related to performing reliable ultrasound scanning:

- ultrasound physics;
- image orientation;
- ultrasound abdominal anatomy;
- methodical scanning of the abdominal organs;
- most common abdominal pathologies that can be recognized by ultrasound;
- obstetric scanning in the first, second and third trimester;
- foetal growth;
- obstetric measurements;

- common foetal anomalies;
- the placenta.

Duration of the course: 50 days (five modules of 10 days)

Venue: Kampala

Clinical skills – Mammography

Objective: to teach the knowledge and skills needed to perform breast examination

Target group: radiographers

Total number of participants: 28 (2 from each referral hospital)

Course content: the course will focus on the following topics related to mammography:

- radiation safety;
- patient positioning;
- image recognition;
- practical skills breast positioning;
- breast pathology;
- patient communication.

Duration of the course: 5 days (one module)

Venue: Kampala

Clinical skills – Computed Tomography

Objective: to teach the skills and knowledge needed to perform reliable CT scans

Target group: radiographers and radiologists

Total number of participants: 28 (2 from each referral hospital)

Course content: the course will focus on the following topics related to CT

- patient positioning;
- quality assurance & Image processing;
- image rendering;
- sectional anatomy;
- brain diagnostics;
- abdominal diagnostics;
- brain pathology and CT;
- abdominal pathology and CT;
- skeletal and joints diagnostics;
- trouble shooting.

Duration of the course: 30 days (six modules)

Venue: Kampala

Clinical skills - MRI

Objective: to teach the skills and knowledge needed to perform reliable MRI scans

Target group: radiographers and radiologists

Total number of participants: 12 (4 from each referral hospital that receives an MRI)

Course content: the course will focus on the following topics related to MRI scanning

- patient positioning;
- patient safety and protocols;
- staff safety and protocols;
- quality assurance & Image processing;
- image rendering;
- brain diagnostics;
- muscle & skeletal diagnostics;
- cardiovascular diagnostics;
- cancer diagnostics;

- interpreting specialized MRI scans such as diffusion MRI, magnetization transfer MRI or functional MRI;
- trouble shooting;
- dicom 3.0 basics/PACS.

Duration of the course: 30 days (six modules)

Venue: Kampala

An overview of all clinical skills training courses, including the number of participants, the number of training sessions and training days, is provided in the table below:

Table 2 Clinical skills training

	no. of participants	no. weeks per training	no. groups	total (wks)
Newborn & Paediatric Health				
TOT General Obstetric Care	15	1	1	1
General Obstetric Care	84	2	7	14
TOT Paediatric Care	15	1	1	1
Paediatric Care	56	2	5	10
TOT Neonatal Intensive Care	15	2	1	2
Neonatal Intensive Care	84*	4	7	28
Emergency and Intensive Care				
TOT Accident & Em Nursing	15	1	1	1
Accident & Em Nursing	84	2	7	14
TOT Intensive Care nursing	15	2	1	2
Intensive Care nursing	84*	4	7	28
Surgery Care				
TOT OT Nursing	10	1	1	1
OT Nursing	56	1	5	5
Diagnostic Skills				
Ultrasound	28	10	2	20
Mammography	28	1	4	4
Computed Tomography	28	6	6	36
MRI	12	6	1	6
TOTAL trained	629			

*under the project budget not all staff that are needed for this specialty can be trained, however, the fact that each training will be delivered together with local trainers, creates the possibility for continuous training

Source: AMPC, 2019

Clinical skills (long-term)

The long-term training package consists of the upgrading of the curricula of nursing programs at two nursing colleges in Uganda together with the set-up of skills labs at these colleges. The curriculum upgrade will focus mainly on the nursing specialties that are being taught under the short-term package:

- ICU nursing;
- NICU nursing;
- A&E nursing;
- General obstetric nursing;
- Paediatric nursing;
- Operating theatre nursing.

At each of the two nursing colleges, the existing curricula at these colleges will be enhanced/upgraded with the above nursing specialties. Enrolment in specialized nursing courses will be for graduated nurses. The teaching staff will receive teacher training, which will enable them to improve their didactical skills and their professional nursing knowledge. The setting-up of a well-

equipped skills lab at these nursing colleges will enable students to practice the skills needed for each specialty in a safe environment.

The final aspect of the long-term training package is a clinical exchange programme at ICU and NICU departments abroad for selected nurses. This will further enhance their knowledge and skills since they will be exposed to a clinical setting outside Uganda. After return to Uganda, these nurses will share their newly gained knowledge and skills with their peers.

Maintenance

Adequate and timely maintenance is importance to prolong the active lifetime of medical equipment. Full maintenance services on the medical equipment to be installed under the project, will be provided for a period of four years within the scope of the project. Maintenance training for hospital technical staff is essential to ensure continuity in maintenance after the project ending, thus ensuring a sustainable project impact. The maintenance part of the capacity-building program consists of training technical staff based at the referral hospitals in the skills to maintain the equipment that will be installed under the project. Furthermore, the maintenance workshops at the referral hospitals will be strengthened with basic tools and equipment for repair as well as calibration equipment. All technical maintenances skills trainings will be carried out at Kyambogo University in Kampala.

Maintenance - technical skills training

Objective: to improve equipment performance and minimize equipment downtime

Target group: biomedical engineers, technicians or craftsmen

Total number of participants: 26 (2 from each referral hospital)

Course content: the course will focus on the practical issues that will arise at hospital level regarding repairs and maintenance of project equipment including:

- basic functionality of the project's equipment;
- basic repair techniques;
- spare parts control;
- problem shooting;
- practical workshops with equipment.

Duration of the course: 10 days (two modules)

Venue: Kampala

Maintenance training - OVERSEAS

Objective: to improve equipment downtime of CT and MRI scanners

Target group: biomedical engineers

Total number of participants: 8

Course content: the overseas training will focus on maintaining the CT scanners and MRI scanners that will be delivered under the project, including:

- understanding the technical details of CT and MRI scanners;
- diagnosing technical problems in CT and MRI scanners;
- problem shooting;
- basic repairs to CT and MRI scanners.

Duration of the course: 20 days (four weeks abroad)

Venue: Eindhoven and Best

Timeframe

Training and capacity building activities will commence in the first year as soon as the actual implementation of the projects starts. The implementation phase and operations & maintenance phase will overlap in the fourteen project hospitals. After the necessary works have been carried out

and equipment has been installed in the first hospitals (implementation phase), for these hospitals the operation & maintenance phase will already start, while in other hospitals the implementation phase needs to commence. Activities such as the equipping of the maintenance workshops and the acquisition of clinical skills training materials (skills labs) for the nursing colleges will also start as soon as possible to enable the implementation of the first clinical training rounds.

Please find below an approximate timeframe for the capacity-building program. The exact planning will be the responsibility of the turnkey contractor of the project who will synchronize the capacity building timeframe with the construction and installations works at each of the 14 Referral hospitals.

Table 3 Timeframe capacity building program

	Year 1	Year 2	Year 3	Year 4
Buttonology				
Clinical Skills				
Maintenance				
Maintenance overseas training				
Curriculum upgrade				
Clinical exchange programme				

Source: AMPC, 2019

Budget

The total budget of the Capacity Building program is EUR 4.686.000. Please find below an overview of the total budget per training type or activity:

Table 4 Investment capacity building program

Clinical Skills	Budget
Ultrasound	320.000
Mammography	64.000
Computed Tomography	576.000
MRI	96.000
TOT General Obstetric Care	20.000
General Obstetric Care	224.000
TOT Paediatric Care	20.000
Paediatric Nursing	160.000
TOT Neonatal Intensive Care	40.000
Neonatal Intensive Care	448.000
TOT Intensive Care	40.000
Intensive Care Nursing	448.000
TOT A&E nursing	20.000
A&E Nursing	224.000
TOT Operating Theatre Nursing	20.000
OT Nursing	80.000
Clinical Skills Training Aids and Manikins (skills lab)	598.000
Curriculum Upgrade	220.000
Teacher training	200.000
Teachers exchange program	220.000

Clinical Skills	Budget
<i>Subtotal</i>	<i>4.038.000</i>
Maintenance	
Maintenance Technical Skills	48.000
Maintenance CT and MRI overseas training	600.000
<i>Subtotal</i>	<i>648.000</i>
TOTAL	4.686.000