FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
Minsty of Health

Intensive Care Unit Implementation Guideline

EMRGENCY AND CRITICAL CARE
SERVICE DIRECTORATE

march 2018

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Acknowledgment

The Federal Ministry of Health would like to acknowledge the following individuals and their organizations in technical working groups and for their contribution to the workshop and in order to the complete this implementation guideline.

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Acronym

ABG	Arterial Blood gas
ACLS	Advanced Cardiac Life Support
ACCM	American Collage of Critical care Medicine
ACCM	Academy of Certified Case Managers
BLS	Basic Life Support
CVP	Central Venous Pressure
CC	Critical Care
ER	Emergency Room
ECG	Electrocardiography
FMHACA	Food, Medicine and Health care Administration and Control Authority
FMOH	Federal Ministry of Health
GP	General practitioner
HDU	High Dependence unit
ICU	Intensive Care Unit
LOC	Loss of Consciousness
NICU	Neonatal intensive care unit
SOP	Standard operating procedure
TASM	Tikur Anbessa Specialized Hospital

1.Background

1.1 Introduction

An intensive care unit (ICU) is a highly specified and sophisticated area of a hospital which is specifically designed, staffed, located, furnished and equipped, dedicated to management of critically sick patients, injuries or complications (1). It is a department with dedicated medical, nursing, pharmacy and other staffs.

It operates with defined policies, protocols and procedures and should have its own quality control, education, and training and research programs. It is a separate specialty and can no longer be regarded purely as part of anesthesia, medicine, surgery or any other specialty. It has to have its own separate team of physicians, nurses, pharmacists and other staff who are tuned to the requirement of the specialty.

The modern concept of intensive care is said to have been pioneered by an anesthesiologist in Denmark over half a century ago during the polio pandemic. Since then, intensive care units (ICUs) have significantly improved the quality of care and outcomes of critically ill and injured patients, predominantly in high resource settings (2).

Providing acute care to critically ill patients is a global enterprise, regardless of health system capacity. However, the high cost of trained healthcare workers, infrastructure, and supplies has limited the development of intensive care units (ICUs) in low-income countries.

The burden of critical illness in low-income countries is large and likely to increase with growing urbanization, emerging epidemics and access to hospitals.

In sub-Saharan Africa, ICUs have varying qualities and quantities of infrastructure necessary for the provision of proper critical cares services (3, 4). The reported disease characteristics and mortality rates of patients admitted to ICUs in sub-Saharan Africa vary widely from one population to another (5).In addition, intensive care medicine of critical service in sub- Saharan Africa are poorly developed or almost still in infancy. Specialty intensive care units (ICUs), like neurological and coronary ICU are still a novel concept.

Historically the concept of ICU in Ethiopia was started at Lelit Tsehay hospital (Army hospital) in 1956 and followed by Tikur Anbesa Specialized Hospital in 1993 by treating septic abortion and malaria cases then with myocardial infarction patients in a medical ICU. Currently different hospitals have expanded with additional ICUs nationally.

In Ethiopia even if the challenges during the development of critical care service are enormous, ICU development is catching up. After initiation of promotion, education and training programs, there has been significant growth in this area. Still much needs to be done in further infrastructure, human resource development, guidelines formation and research that are relevant to Ethiopian circumstances.

An acceptable and logistically feasible quality service can be provided in health care delivery of the critically ill. Implementation guidelines can be adopted for designing ICU services which may be good for primary, general and tertiary hospitals.

Critical care is a major initiative that is currently being undertaken by the Ministry of Health, to improve the emergency system through increasing accessibility to advanced emergency services like ICU, Burn Unit, Trauma Centers and Poison Centers in selected hospitals nationally.

Strengthening of ICU service has started since 2014 by FMOH; ICU medical equipment's was procured and distributed to 20 hospitals. Strengthening activities are being done for those hospitals that have already started giving the service and initiation of critical care is being performed at other hospitals. Parallel different short term ICU training programs and long term academic programs like critical care nursing , emergency and critical care, anesthesiology and critical care, pulmonology and critical care programs are currently running (6) .

Realizing the need for critical care, many Private and govenmental of hospitals in the country have engaged in the process of establishing ICUs. Therefore the FMOH has prepared this guideline to be used as an input in the initiation of the service and to aid in the quality improvement of the service already being given.

1.2 Rationale

Intensive care service is one of the main medical services that should be provided by health facilities both in private and governmental hospitals by virtue of its capacity to support other clinical disciplines and to provide adequate and appropriate care for critically ill patients. Advancement of surgery, increasing workload and higher public expectations are among the factors that have made the provision of intensive care one of the major challenges in developing country hospital services. Furthermore, lack of intensive care beds in public hospitals and staffing constraints have posed major problems that need to be addressed prudently in order to ensure better, more accessible and higher quality medical care in the future. In addition to this Federal Ministry of Health planned the second GTP to provide Compassionate and Respectful Care (CRC) services, Quality and Equity of Care though the country, so preparing the implementation manual will help to meet the above agenda.

In Ethiopia more than 40 hospitals have started providing ICU service and due to the increasing need more centers are on the way of initiating the service. More over due to the increasing pattern of trauma and NCD, there is a need for expansion of intensive care service in hospitals. But due to the lack of a standardized guideline the quality of service being given is severely compromised. No clear delineation has been made as of yet regarding the level of critical care that can be given by different facilities. There is no clear document available for hospital management and ICU staff regarding the implementation of ICU service. Hence, the need arises for a national guideline to improve and strengthen the services already being given and to aid in the establishment of critical care services in more centers.

The availability of this ICU implementation guide will provide guidance to all relevant parties on the development of a system that is more coordinated and efficient in providing standardized care to critically ill patients. This national ICU implementation guideline will also benefit healthcare managers in formulating local hospital policies and procedures, coordinating interdepartmental collaboration, and planning for facilities and service development, thereby ensuring that national intensive care service are utilized optimally.

2. Scope

The guideline is intended to be used by policy makers, facility managers and health care providers working at all levels (primary, secondary and tertiary) of public and private health facilities.

3. Objectives

3.1 General Objective

- To ensure quality intensive care in the country through introduction of standardized guiding document.

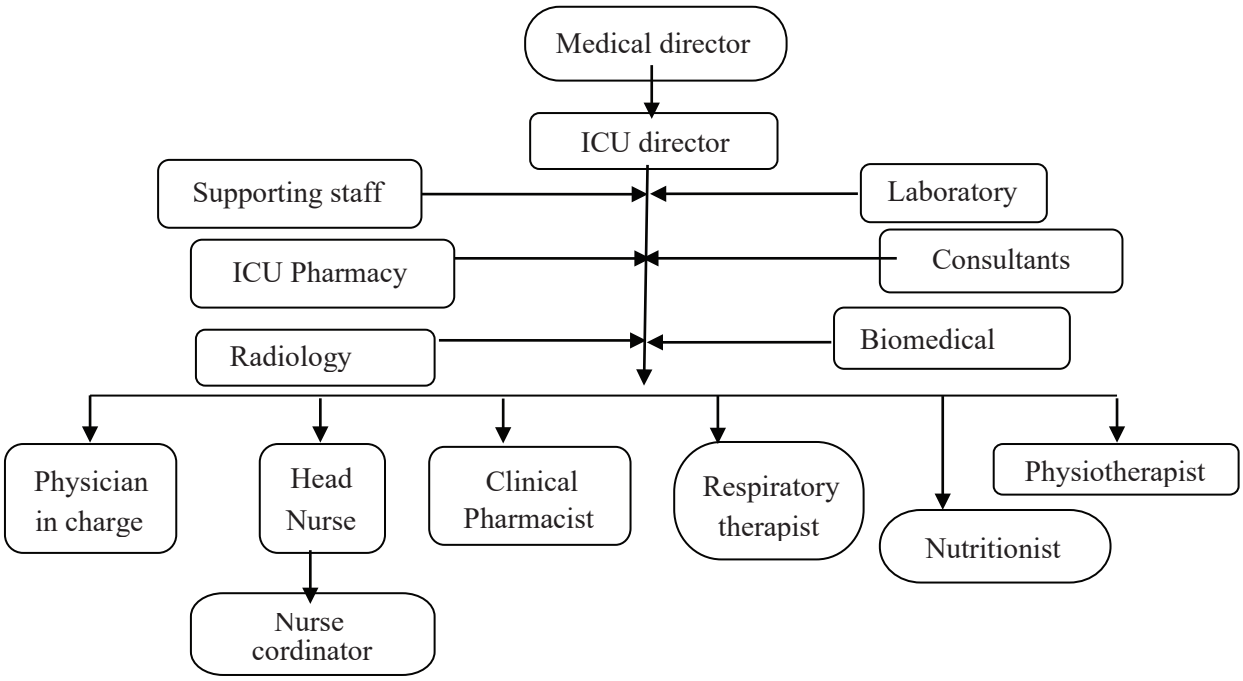
3.2 Specific Objectives

- To develop a reference document for establishing and managing of ICUs at different levels of care in all health facilities in the country.
- To ensure the establishment of minimum standard ICU services in the country
- To ensure a quality improvement program of the ICU service being given in the country by creating ICU operational policy.
- To promote an evidence-based, patient centered and cost-effective management plan for patients in ICUs.

4. Organization

4.1 General ICU

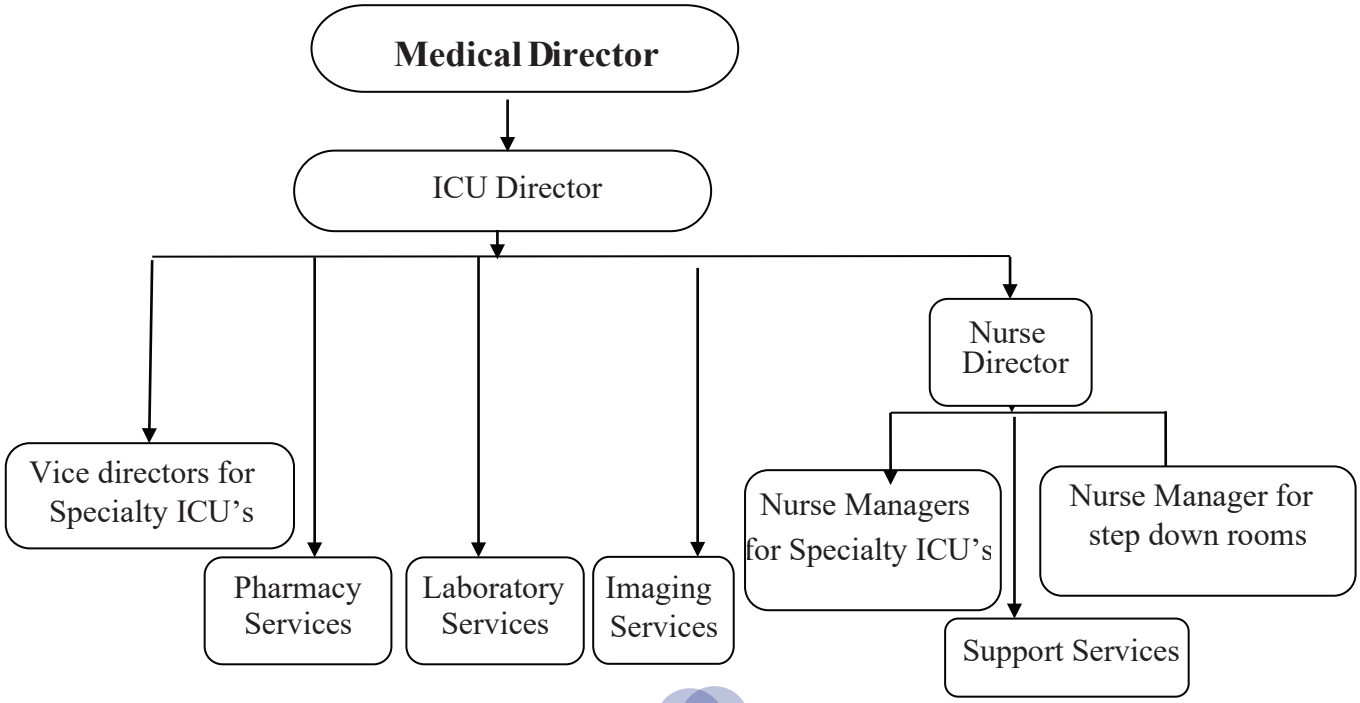
The Organizational Chart



4.1.1 It is a multidisciplinary unit, headed by an ICU director.
4.1.2 The unit is to be provided with its own complement of staff including nurses and doctors.
4.1.3 Nurse in-charge.
4.1.4 Nurses to patient ratio 1: 1.
4.1.5 Pharmacist (at least one)

4.2 Specialized ICU (CICU, NICU etc.)

The Organizational Chart



4.2.1 The administrative and clinical head of a specialized ICU is the head of that particular specialty with anesthetists providing necessary support.

4.2.2 Guidelines on the management of the specialist unit will be developed by the unit concerned

4.3 Management Team

4.3.1 The management team is responsible for continuous care of patients in the ICU. Specialists and other doctors may provide advice on management to this team.

4.3.2 The team is responsible for the management of patients. Other relevant consultants are called in to assist in the management of these cases. In the highest levels, II & III consultants are supposed to be in the ICU within 30 minutes of patient admission or consultation?

4.3.3 Other functions of the team include:

(i) Upgrading of ICU services.
(ii) Acquisition and standardization of ICU equipment.
(iii) Maintenance of equipment.
(iv) Training of doctors and paramedical ICU staff, responsible for preparing treatment protocols, research and CME (7).

4.4 System: A variety of studies reported in the literature have documented

more favorable outcomes when ICU patients are managed in a closed system compared with an open system. So we suggest that ICUs should follow this closed system.

5. Structure of an ICU

➢ Can be divided in to four major parts.

1. Patient care area: patient rooms
2. Clinical support zone: pharmacy, lab, store room, procedure area, radiology lobby
3. Unit support zone: nursing office, medical office, utility, lockers etc
4. Family support zones: relative areas, family lounge, counseling room (14).

5.1 Setting

The ICU should be designed in such a way that it is a healing environment to patients. But for clinical reasons, the ICU should be easily accessible to the departments from which patients are usually admitted, such as the accident and emergency department, operating theatres, recovery room, surgical and medical wards.

Careful setting of departments can help to minimize the distances patients are moved. Where there is a lot of patient flow, large lifts and extra-wide corridors are mandatory.

5.2 Size

The size of the room depends on the number of ICU beds. FMHACA guidelines state that 8mx10m size ICUs should be prepared for four beds. We recommend that 10-12m2 per bed would suffice for ICUs depending on the number of beds that the ICU has.

a) The header of beds shall be 1 m away from the wall
b) There shall be a 2m wide free traffic area by side of beds and between any two beds.
c) There shall be a nurse station within the ICU having a computer and a computer point, telephone and telephone point, cabinets and shelves, and lockers for controlled drugs.
d) There should be a separate physical area devoted to nursing management for the care of the interme diate patient.

5.3 Design

A high standard of intensive care medicine is influenced by good design and adequate space. Whenever renovations or new structures are being planned there are certain features which must be considered. The total area of the ICU should be 2.5-3 times the patient care area.

5.3.1 Patient area

The unit should be fully air-conditioned depending on the weather of the area as temperature control is part of ICU care. The patient area should contain an open area for several beds together, plus at least one cubicle. The absence and presence of a cubicle depends on how the ICU is designed. Various physical arrangements are possible with at least 20m2 floor areas for each bed and 2.5m of unobstructed corridor space beyond the working area. Adequate separation of beds is a major aspect of infection control. In any multi-bed area, beds should be positioned to maximize patient privacy. And also there must be adequate access to the head of each bed.

At least one wash basin with elbow or foot-operated taps for every six beds is recommended. Soap should be readily available at each washbasin and refilled at all times. To decrease all infection risks all staff should have sanitizers at hand too. At least one single room capable of isolation procedures should be available for every six beds. Each isolation room should have its own wash basin.

For the psychological well-being of patients and staff, windows with access to natural light allowing a clear day/night distinction and bed access to the exterior are desirable features. A clock at each bed space is useful for patient orientation. These features have been shown to reduce the incidence of ICU delirium, a condition associated with higher mortality.

5.3.2. Working area – the working area must include adequate space for staff to work in comfort while maintaining visual contact with patients. Adequate space must be allowed for patient monitoring, resuscitation equipment and medical storage areas (including a refrigerator). The unit needs space for a mobile X -ray machine, and associated equipment. The X-ray viewing facilities

must enable simultaneous viewing of multiple X -rays. There should be adequate room for telephones and other communication systems, computers and data collection equipment and storage of stationery.

5.3.3 Environment – the unit should have appropriate air conditioning which allows control of temperature, humidity and air change.

5.3.4 Pharmacy/drug preparation area – there shall be a separate and clean room for aseptic and rapid drug and fluid preparation. In addition, it will serve as a station for clinical pharmacists working in the ICU. This room should be equipped with adequate shelves and a refrigerator for drug storage, adequate table, chair, materials and supplies for drug preparation. Entrance should be limited to authorized personnel as an aseptic environment for fluid and drug preparation shall be maintained.

5.3.5 Equipment storage area – e.g. for monitors, ventilators, infusion pumps, dialysis equipment, disposables, fluids, drip stands, trolleys, blood warmers, suction apparatus, linen, large items of special equipment.

5.3.6 Equipment storage area: There shall be a soiled utility/sluice room which acts as a storage area for contaminated materials until they are disposed of and a temporary station for equipment until it is disinfected and cleaned. The soiled utility room shall have a deep bowel sink, a hand wash basin with hot and cold water, plus cabinet and shelves.

5.3.7 Store room: There shall be an ICU supply room (store) at least 4m x 4m in size used for storage of consumables and spare equipment. It shall be equipped with cabinets and shelves. Materials shall be labeled, arranged in order, ready for use (charged) with good lighting and ventilation but away from extreme heat.

5.3.8 Staff facilities – should be close to the patient area and have adequate communication with it. They should allow for relaxation and debriefing during breaks.

5.3.9 Seminar rooms – should be situated close to the patient area with adequate communication and be equipped with seating, audio visual aids, wall boards and other teaching aids. This can be included in the medical office or staff lounge area.

5.3.10. Nursing offices – separate offices must be provided at least for the Nurse in Charge and Nurse Educator/s.

5.3.11 Medical offices – for senior doctors should be available..

5.3.12. Family member's area – must be a separate waiting area (with drinks dispenser, radio, television and comfortable seating desirable) and a separate area for distressed relatives must be available and overnight rooms for relatives should also be considered. It should also have a protected area for family counseling by the ICU staff (family meeting room).

5.3.13 laboratory – should have blood gas machine that allows stat measurement of blood gases, simple electrolytes, hemoglobin and facility to measure blood glucose in the level II & III ICU levels. The area should be functional 24/7.

5.3.14. Library facilities – functional computer with internet access to electronic medical information should be available 24 hours a day -within the ICU. This can be placed in the nurse or physician station for ease of access by the health professionals (1, 8, 9 and 10).

6. Open vs. Closed ICUs

Some critical care centers define their ICUs as "open" or "closed" or a combination of both types of units. In the open system, although nursing, pharmacy, and respiratory therapy staffs are ICU based, the physicians directing the care of the ICU patient may have obligations at a site distant from the ICU such as outpatient and inpatient areas and the operating room. They may or may not choose to consult an intensivist to assist in management. In some of these ICUs, critical care consultation is mandatory for all patients. In the closed system, care is provided by an ICU-based team of critical care physicians, nurses, pharmacists, respiratory therapists, and other health professionals. A variety of studies reported in the literature have documented more favorable outcomes when ICU patients are managed in a closed system compared with an open system. There are several advantages to a closed system including coordinated care of multiple organ systems by ICU providers who are continuously available at bedside, as well as standardization of practice for all critical care patients. The American College of Critical Care Medicine ACCM recommends that the intensivist and the ICU patient's primary care physician and consultants proactively collaborate in the care of all patients.

In both systems, an intensivist must be given the authority to intervene and directly care for the critically ill patient in urgent and emergent situations (11).

7. Intermediate (Step-Down, Transitional) Care Units

These types of units may be useful and are dependent on types of patients served by the hospital, types of staff available to manage patients in these units, and geographic realities of the hospitals' ICUs .They have advantages and disadvantages depending on whether they are freestanding in a hospital area distant from the ICU, adjacent to the ICU, or integrated within the ICU. Intermediate care units may not be appropriate for all critical care centers (12).

8. Category of ICU Care

Definition of Levels of Care

It is recommended that all hospitals determine the level of critical care services offered in keeping with their mission and goals as well as regional needs for this service. Three levels of care are proposed to accommodate university teaching hospital, general hospitals, and primary hospitals with limited critical care capabilities.

8.1 Level of Care I (LOC-I):/ICU Critical Care in Emergency Department

Hospitals that have level I capabilities have the ability to provide initial stabilization of critically ill patients but are limited in the ability to provide comprehensive critical care. These hospitals require written policies addressing the transfer of critically ill patients to critical care centers that are capable of providing the comprehensive critical care required (level III or level II)). These facilities may continue to admit and care for a limited number of ICU patients for whom care is routine and consistent with hospital and community resources

Because level I centers are limited in their ability to provide comprehensive critical care, wording small ICUs focus on the stabilization and conduct mechanical ventilation for patients before transfer to a comprehensive critical care center (level III or II). As a result, the guidelines outlined previously for level II and III centers, although desirable, are not always applicable. Level I centers require an on-site physician 24 hours/day who can manage emergencies, can secure the airway, can establish rapid. Intravenous access and provide , is qualified in Advanced Cardiac Life Support(ACLS), Emergency Triage and Assessment and Treatment (ETAT) or Pediatric Advanced Life Support(PALS) , Advanced Trauma Life Support Trainings (ATLS) or have equivalent trainings or subspecialty training in critical care medicine.

All age groups including pediatrics will be seen except those with age less than 1 month since this age will be handled in a separate NICU or new born corner. It is common and acceptable for general practitioner, emergency physicians, anesthesiologists, pediatricians, general internists, and general surgeons to fulfill this role. Physician to patient ratio here is no more than for 1:4. A critical care trained nurse and respiratory therapist should be available on site, 24 hours per day. If respiratory therapies are available also cover the place for 2 hours. Essential pharmacy services should be provided by pharmacists if not clinical pharmacists. With the exception of highly specialized services, basic services for stabilizing, monitoring, and treating critically ill patients should be available. Detailed transport policies and expertise in the transport of patients are essential for these centers

Human resources:

- require an on-site physician 24hours/day who can manage emergencies
- Physicians: GP/ or other specialists who are appropriately trained in critical care like ACLS, PALS, ETAT, BLS, advanced airway training. Anesthesiologists, Pulmonary & critical | care medicine, pediatric emergency and critical physician or Emergency physician also can be part of the team if available.
- Nurses: Emergency and critical care trained nurses ,Nurse to patient ratio should be 1:1
- Pharmacists/clinical pharmacists trained in ICU care
- Other support staff
- CC trained nurse 2:1

Medical equipment:

- Electrocardiogram
- Mechanical ventilator
- Beds with removable headboard and adjustable position
- Adequate lighting for bedside procedures
- Suction machines including Yankauer tips ,
- Non-invasive monitors
- Emergency resuscitative equipment
- Continuous pulse oximetry
- Continuous end-tidal CO2 monitoring
- Arterial line monitoring
- 24-huors monitoring and the provision of oxygen
- Nasal cannula, non-re breather masks
- Bag valve mask
- Oxygen concentrators, oxygen cylinder ,concentrator with its flow meter
- Except for emergency tracheostomy and its care all ventilator care is non-invasive e.g. CPAP.
- Non-invasive positive pressure ventilation (e.g. BiPAP, CPAP) machines if not available locally made ones can be used
- High-flow nasal cannula
- Nebulizer
- Insert tons of airway equipment here such as direct laryngoscopes, Glide Scopes, bougies, etc.]
- Portable ultrasound with color and pulse wave Doppler capability, linear and phased array probes
- Equipment to support hemodynamically unstable patients, including infusion pumps, blood warmer, pressure bags,
- Sterile gowns and sterile drapes
- Central venous catheters, arterial catheters
- Transvenous pacemaker kits and external pacemaker device
- Chest tubes / pigtail catheters, chest drainage systems
- Thoracentesis kit
- Paracentesis kit
- Hypo/hyperthermia blankets
- Foley catheters
- Insert tons of wound care supplies
- Weight Scales
- X ray will be shared from department

8.2 Level of Care II (LOC-II)

- Level II critical care centers have the capability to provide comprehensive critical care but may not have resources to care for specific patient populations (e.g., cardiothoracic surgery, neuro-surgery and trauma).

- Although these centers may be able to deliver a high quality of care to most critically ill patients transfer agreements must be established in advance for patients with specific problems. The ICUs in level II centers may or may not have an academic mission.

- Level II centers are unable to provide critical care for specific areas of expertise For example; level II centers may lack neurosurgical expertise, a cardiac surgical program, or a trauma program. Nevertheless, these centers provide comprehensive critical care for their unique patient population. Therefore, with the exception of services and personnel in the areas of expertise that they lack, these centers have the same organizational structures as outlined for level III centers. These centers require policies and procedures that address transport to a level III center when appropriate. Criteria for transfer should be specific and readily available to hospital personnel so that delays in definitive care are avoided.

- All ages of patients including pediatric patients (1 month to 18 years) should be included. Patients with less than 1 month will be handled in a separate NICU mechanical ventilation is required and unavailable in the NICU. Pediatric patients will receive care in a separate room from adults at this level. There could be a consideration of mothers room for the children.

- Minimum requirement:

  Human resources:

  - Physicians: anesthesiologist (pediatric or adult) or intensivist or pulmonary & critical care Subspesialist or emergency medicine specialist or appropriately trained physician
  - Respiratory therapist
  - Nutritionist
  - Physiotherapist
  - Anesthetists should be present for 24 hour service
  - Physician-patient ratio no more than 1:4
  - Nurses: emergency and critical care trained nurses or the clinical nurses who are appropri ately trained in an ICU course
  - Nurse to patient ratio should be 1:1

- Clinical pharmacists (adequate number to provide drug and fluid preparation services in the ICU pharmacy, provide pharmaceutical care and drug information services in the bedside for the ICU team).

- Other supportive staff

- **Medical equipment and level of care:**

- All of the LOC 1 equipment and ventilators, portable X-ray, telemetry, central monitors, ultrasound with phased array and linear probes, capnometer, ABG analyzer, ICU beds, GlideScope , pericardio centesis set, other consumables

8.3 Level of care III (LOC-III): Located in a major tertiary hospital

These critical care centers have ICUs that provide comprehensive care for a wide range of disorders requiring intensive care. They require the continuous availability of sophisticated equipment, specialized nurses, and physicians with critical care training. Support services including pharmacy services, respiratory therapy, nutritional services, pastoral care, and social services are needed. Although most of these centers fulfill an academic mission in a teaching hospital setting, some may be community hospital based.

- **Human resources:**

- The critical care services for the center are led by an intensivist. Pediatric patients are cared for by a pediatric intensivist or pediatric emergency specialist. It should ideally be covered 24 hours a day by intensivist

- ICU patient management is directed by physicians specialized in anesthesiology (adult) or inten sivist or pulmonary/critical care or emergency medicine specialist or appropriately trained physician.

- ICU medical staff members should participate on the institution's Management committee, QI committee & Ethics committee

- Nurse: patient ratio should be 1:1

- Nurse Manager has to be trained in critical care. .

- All physicians should be trained in ACLS, BLS,PALS,ATLS … & Advanced airway Management trained

- Staff to patient ratio, dictated by patient condition & hospital guidelines

- Sub specialists should be available in 30 minutes

- Support personnel includes patient assistant, clerks, biomed

- Lab services: 24 hours per day to provide basic hematology, chemistry, ABG & toxicology analysis

- ICU pharmacy: Clinical pharmacist, adequate number ,24/7 with drug admixture service with unit dose system (CC training)

- Physician patient ratio of no more than 1: 4 patients.
- ICU Pharmacy services with dedicated clinical pharmacists/pharmacists providing drug admix ture services through unit dose system
- Nutritionist must be available in 30 minutes.
- A dedicated Physiotherapist for the ICU is mandatory
- A dedicated respiratory therapist for ICU is mandatory
- Bioengineers dedicated to the ICU

- **Medical equipment:**

All of the LOC 2 equipment and

- CT scan/ MRI, other interventions- distant
- Continuous ECG, CVP, pulse oximeter monitoring, Electrocardiogram continuous arterial pres sure monitoring
- Inter/ Intra facility transfer protocols
- Organ donation
- Telemedicine capability
- Policies & protocols (family education, end of life, IP) (1, 8, 10 and 13).

9. ICU Equipment (1 and 10)

• Electrocardiogram • Continuous arterial pressure monitoring (invasive and noninvasive) • Central venous catheters, arterial catheters, temporary hemodialysis catheters, intraosseous needles and insertion devices • Central venous pressure monitoring • Transcutaneous oxygen monitoring or pulse oximetry for all patients receiving supplemental oxygen • Equipment to maintain the airway, including laryngoscopes and endotracheal tubes • Temporary pacemakers (transvenous and transcutaneous) • Temperature monitoring device • Pulmonary artery pressure monitoring. • Cardiac output monitoring. Continuous and intermittent dialysis and ultrafiltration. • Peritoneal dialysis. • Fiberoptic bronchoscopy. • Intracranial pressure monitoring • Ultrasound with Doppler and cardiac probes	• Beds with removable headboard and adjustable position, specialty beds • Adequate lighting for bedside procedures • Suction • Emergency resuscitative equipment • Equipment to support hemodynamically unstable patients, including infusion pumps, blood warmer, pressure bags, and blood filters • Hypo/hyperthermia blankets • Scales • Continuous electroencephalogram monitoring capability • Positive and negative pressure isolation rooms • Immediate access to information • Equipment to ventilate, including Ambu bags, ventilators, oxygen, and compressed air • Continuous waveform capnography

10. ICU Operational Policy

10.1. Purpose

10.1.1. To define the Intensive Care Unit (ICU) services within Ethiopia

10.2. Aims of the Service

10.2.1 To provide a high quality, evidence based patient centered intensive care provision to the popula tion of Ethiopia.

10.2.2 To provide access to a team of Specialist Consultants Nurses and pharmacists, to facilitate a man agement plan for critically ill patients with various conditions.

10.2.3 To provide emergency assessment and resuscitation as required for patients within the hospital setting.

10.2.4 To improve health outcomes for those suffering with short and long term reversible conditions

10.3. Scope of the Service

10.3.1 The ICU cares for patients requiring Intensive Care Therapy. This incorporates advanced organ support, resuscitation and monitoring

10.3.2 The ICU provides both elective and emergency adult beds.

10.3.3 The service is provided 24 hours per day, 7 days a week maintaining the ability to provide uninter rupted intensive care.

10.3.4 The ICU rooms that accommodate 5-10% of total beds of a hospital. There should be multiple isolation rooms to be utilized for patients with confirmed/suspected cases of diseases that require airborne isolation such as tuberculosis.

10.3.5 This service is also responsive to inpatient consultation requests from other clinical teams to facil\ itate appropriate specialist management in the care of critical conditions to ensure appropriate and realistic outcomes for the patient.

10.3.6 All care provided is in accordance with current best practice and data relating to performance is submitted for external audit by Federal and/or Regional Health Bearue allowing comparison of our performance against national figures.

10.4. Staffing

10.4.1 Staffing Profile

10.4.1.1 The service is delivered by a team comprising of

- Intensive Care Consultants (intensivist, anesthesiologist and critical care specialist, pulmonary and critical care specialist, emergency and critical care specialist, pediatric emergency and critical care specialist)
- ICU trained (short term) Physician, nurse and Health Officer
- Emergency and critical care nurses
- Emergency and critical care nurse practitioners
- ICU trained pharmacists/clinical pharmacists

- Respiratory therapist
- Physiotherapist
- Biomedical technicians
- Data clerk
- Nutritionist(dieticians)
- House keeper
- Security guards
- ICU Secretary
- Social workers
- Patient assistants

10.4.1.2 The nurse: patient ratio varies depending on the level of the patient. One to one nursing is required in Level 3 patients. And, for level 2 patients a ratio of 1:2 is also acceptable.

10.4.1.3 The case mix and hence nurse: patient ratio will determine the unit's flexibility to the number of patients who can be safely cared for.

10.5. Training and Education

10.5.1 All staff within the ICU will have some level of ICU training.

10.5.3 ICU staff will be able to demonstrate Continuing Professional Development as required by FMHACA.

10.5.4 The unit is fully compliant with all training and educational requirements for its staff.

10.5.5 The unit runs a minimum of one day orientation for all new staff.

10.5.6 The unit provides a teaching room for staff to utilize educational resources

10.5.7 Weekly teaching is provided for all medical staff and any nursing staff who are able to attend.

10.5.8 Morning session/round/ will be undertaken everyday by nurses, physicians and clinical pharmacists

10.6. Admissions process

All patients that fulfill admission criteria for ICU intervention will be admitted. Admission of a patient to the ICU must be decided by ICU Director/Consultant or Physician in charge on duty. If the case is difficult to make a decision by Physician in Charge, the ICU director will decide the admission. If a decision is made to admit a patient to the ICU, the nurses must be informed beforehand to get prepared.

Before accepting referral for admission to the ICU from other hospital, there should be early communication and once a decision is made, the liaison office should be informed for facilitation of transfer. If many patients are competing for admission to the ICU, the following five questions must always be addressed so that one may make an appropriate decision.

Factors that must be considered in the assessment of a possible admission to the ICU:

1. Primary diagnosis & the other active medical problems

2. Prognosis of the underlying condition/ is recovery still possible?

3. Age, life expectancy & expected quality of life post discharge

4. Wishes of the patient &/ or relatives

5. Availability of the required treatment, technology & professional

We encourage collaborative patient centered care. However the ICU is defined as a closed unit. This means that when patients are admitted into the ICU, they are under the care of the ICU team. It is expected that members of the primary referring team will liaise daily with the ICU team to discuss the patient's management. However it is up to the ICU team to make final decisions.

10.7. ICU rounds and Medical cover

10.7.1 The ICU is a consultant or ICU trained professionals led service. There is a dedicated consultant or ICU trained professionals at all times in charge of the ICU. They must always be immediately contactable and available.

10.7.2 Consultant led multidisciplinary ward rounds take place twice a day (morning and afternoon).

10.7.3 A robust written handover system is mandatory to ensure continuity of care for this complex patient group.

10.7.4 Nursing handover is led by the nurse in charge at every shift and a one to one handover at the bedside for the nurse responsible for the patient's care

10.7.5 A consultant to consultant handover is routine when there is a change in the consultant in charge. This may be done in person or verbally.

10. 7.6 This ward round are also attended by the nurse and clinical pharmacist in charge and patient assistants so any patients requiring transfer to other areas such as CT scan that day can be coordinated.

10.7.7 Each ward round must be documented with a clear plan and objectives for the patient's care.

10.7.8 Resuscitation crash carts are equipped and refilled by the designated staff according to the check list. See appendix I.

10.8. Discharge Process

Patients in the ICU will be evaluated and considered for discharge based on the reversal of the indication for admission disease or resolution of the unstable physiologic condition that prompted admission to the unit, and it is determined that the need for complex intervention exceeding general patient care unit capabilities is no longer needed.

10.8.1 The ICU consultant will decide which patients no longer require critical care. They are then responsible for liaising with the nurse in charge such that a bed can be se- cured. This process will usually occur at ward round times.

10.8.2 Patients should be discharged from the ICU to other wards at any time of day to ensure availability of ICU beds for incoming patients.

10.8.3 To ensure timely discharge, the unit relies upon good communication with the liaison office facili tated by the Lead Nurse. The nurse in charge will attend bed meetings to facilitate this and to give a situation update.

10.8.4 During the night shift, the consultant on call is responsible for liaising with the nurse in charge to enable them to identify patients that are likely fit for discharge the following morning assuming set parameters are met. This allows the liaison office to be informed at the earliest opportunity and ensures the flow of elective surgical patients requiring a bed the following day.

10.9. Medical discharge process

10.9.1 A detailed comprehensive medical discharge summary form must accompany the patient to the ward. The ICU consultant is responsible for reviewing the content of the summary.

10.9.2 A new drug chart and if appropriate a “Do Not Resuscitation (DNR)” form must also be complet ed to transfer with the patient.

10.9.3 A verbal handover is also required to the receiving team. In the case of a non-elective admission, the ICU consultant where possible should aim to verbally discuss the patient with the consultant or senior team member who will be taking on further care of the patient. This should include any discussions regarding ceiling of care or possible need for readmission.

10.9.4 If the patient subsequently moves to the ward out of regular hours, then the on call team should be contacted for a verbal handover.

10.9.5 Documentation of who the patient has been handed over to must occur. A discharge medication list should be documented and discharge medication counseling should be given.

10.1O. Nursing discharge process

10.10.1 The nurse caring for the patient in the ICU is responsible for completing the nursing discharge documentation.

10.10.2 The patient’s next of kin must be notified that the patient is moving to another ward and identify the ward they are moving to.

10.10.3 The nurse will then accompany the patient to the ward with a patient assistant and verbally handover to the receiving nurse on the ward. The nurse will ensure that all belongings, notes, discharge summaries and drug chart accompany the patient.

10.11 Counseling Service

10.11.1 Patients and relatives may find their stay on the ICU to be difficult to cope with. This may be due to receiving bad news or a drastic change in a person's lifestyle. Religious or professional coun selors can be contacted at all times to provide psychological and spiritual care to our patients and their relatives

10.11.2 Alternatively a referral may be appropriate to the psychotherapy and counseling service. The nurse looking after the patient can make the referral to the service without delay.

10.12. Relatives and visitors

10.12.1 Visiting hours are limited to twice a day and to 1-2 visitors/ patient. In the Pediatric ICU and especially in NICU, mothers are encouraged to stay for bonding and breastfeeding.

10.12.2 Visitors are not allowed to see patients during medical procedures.

10.12.3 Relatives can be allowed to see critically ill patients at any time with the consent of the doctor/ Nurse in-charge.

10.12.4 It is important that relatives of our patients are regularly updated and informed of their relatives' progress at least once per day. It is encouraged to speak to relatives in the quiet room and not at the bedside in order to maintain privacy and dignity.

10.12.5 Relatives should only be spoken to by senior medical and nursing staff to ensure accurate infor mation is relayed. Conversations must always be documented and if possible the nurse caring for the patient should also be present.

10.12.6 Visiting times for patients are depending on the institutions time frame. A maximum of 2 relatives at a time are allowed to visit. These rules may be relaxed if a patient is very unwell and at the end of their life, in which case there is open visiting and no more than 2 visitors allowed at a time. This should be the discretion of the nurse or physician in charge.

10.12.7 Children are allowed to visit relatives in the ICU if deemed appropriate by the nurse or physician in charge. This is supported by the nurses and the psychotherapy team may be involved if required.

10.12.8 There should be visitors/families waiting room/area close to the ICU with comfortable environ ment.

10.13. Ethical Issues

10.13.1 End of life care

- End of life care Policy should be considered in accordance with the national guidelines that will be implemented in the near future. Also the guideline should include do not resuscitate protocol.

- Patients' relatives should be given the opportunity to view their loved one with tubes removed such as breathing tubes once they have passed away. This may not be possible if the patient needs to be referred to the coroner.

- If a patient dies in the ICU, proper death summary should always be written and the original document should be kept in the ICU.

10.13.2 Equality and Diversity

11.2.1 The Trust is committed to the provision of a service that is fair, accessible and meets the needs of all individuals.

11.2.2 Every patient will be treated with dignity and privacy. Curtains will be secured around a bedside with a 'no entry' sign clip to ensure privacy is maintained.

11.2.3 The unit runs the trust equality and diversity training as part of its in house mandatory update for all staff. Appendix 2, Equality Impact assessment Form (EIA)

10.13.3 Consent

Formal written and/or verbal consent should be considered as per the consent policy of the country for all procedures done in the ICU.

10.13.4 Code of Dress

- All staff working in ICU should wear standard ICU attire at all time.

- Visitors should wear disposable gowns and slippers when entering ICU and to wear cap and masks if the patient is in the isolation cubicle.

10.14. Clinical Governance

10.14.1 All care is delivered in accordance with current best practice and data relating to performance is submitted for external audit by FMHACA allowing comparison of our performance against national figures.

10.14.2 Departmental audit meetings are held every 3 months. Every junior doctor is expected to carry out an audit during their ICU placement.

10.14.3 Regular Morbidity and mortality meetings are held every week.

10.15 Meetings

10.15.1 Weekly ICU team meetings occur to discuss the progress and plans for patients with extended length of staying including ceiling of care and no return to ICU post dis- charge if appropriate.

10.15.2 Monthly senior leadership team meetings are held to discuss operational processes, as well as regular updates on mandatory training, budgets and patient safety issues.

10.16 Facilities and equipment requirement

10.16.1 Key Operational Requirements

- Staff refreshments
- Fully equipped ICU area
- Access to Clinical Operations Team to facilitate patient transfers from ICU.
- Dedicated office space
- Access to ICT
- Emergency Bed Service
- Hard and Soft FM services.
- Knowledgeable and skilled nursing staff
- Administrative support
- ICU specialist Consultants leading the Unit medical team.
- Hygiene facilities for HDU patients
- Staff rest and handover area
- Relative consultation area /Seminar room for unit teaching
- Kitchen facilities

10.16.2 Equipment Requirements

❖ For the ICU to work efficiently and effectively and maintain high standards of patient care, modern electrically powered patient beds with pressure relieving mattresses are provided

❖ Well maintained and serviced monitoring equipment and ventilators are coordinated by the biomedical technicians.

❖ The unit also requires transfer equipment, i.e. monitors and ventilators and a supply of portable O2 cylinders.

❖ Each of the 15 bed areas are equipped with:

- Dragger beam for electrical, air and oxygen supplies, and suction vacuum.
- Cardiac monitor with allied Slave monitor
- Ventilator
- Infusion pumps and syringe drivers
- Digital thermometer
- Bedside trolley to store all essential items for patient care and requirements
- Electrical bed with pressure relieving mattress
- Computer and trolley
- Power Outlets
- Portable oxygen cylinder and emergency Ambu bag

10.17. Infection Prevention

10.17.1 The service will be delivered in accordance with and compliance to the Infection Prevention Poli cies.

10.17.2 The unit has regular updates from the Microbiology consultant and infection control team regard ing any positive microbiology results and changes in therapy required as a result. The unit has a minimum of one side room should a patient require barrier nursing measures.

10.17.3 Monthly infection control and environmental audits are carried out to comply with Trust policy.

10.18. Key Relationships

10.18.1 Key Relationships with Other Departments

- As a secondary support service, good working relationships with all medical teams referring patients are essential. This is best achieved by early discussion of problems at Consultant level to determine appropriate and timely admissions.

- Other Key Relationships as listed below.

  • Liaison officer
  • Social workers
  • Pathology
  • Neurophysiology
  • Pharmacy
  • Patient Assistant
  • Medical Records
  • Imaging, MRI/CT/X-ray- Radiology services
  • Medical Emergency Ward
  • Accident and Emergency
  • Pain Clinic Service
  • Occupational Therapy
  • Physiotherapy
  • Microbiology
  • Psychotherapy
  • Department of Clinical Technology
  • Transplant Coordinator
  • Specialist Referral Hospitals
  • Counseling Service
  • Facilities Management
  • Police
  • University and allied training facilities
  • Library

10.18.2 Inter institutional Relationship

Consultation and resource sharing between different institutions should be considered based on need and agreement

10.19. Key Requirements for Facilities Management (FM)

10.19.1 The unit has a dedicated cleaning service for ongoing cleaning and rapid but effective bed space decontamination for the efficient use of beds. There is a service level agreement in place.

10.19.2 For HDU patients there is an appropriate catering service.

10.19.3 Our complex equipment is maintained by a team of dedicated biomedical technicians; they also act to maintain specialist stock levels and assist with introduction of new equipment and facilitate staff training and competency documentation. The technicians are also available in assistance with the transfer of critically ill patients

10.19.4 The patient assistants provide an essential service to the unit. There is also a pod system for trans fer of items around the hospital.

10.19.5 The unit has a dedicated ICU pharmacist who helps maintain drug stock levels and facilitates access to non-stock items.

10.19.6 Bathroom and toilet facilities to meet the hygiene needs for HDU patients.

10.19.7 A daily stock system is required to maintain safe and effective levels of stock to accommodate the needs of all patients. And allow for immediate response to major incidents

10.20. Environmental requirements

10.20.1 The patients within the ICU require very close observation and examination at all times and so good natural lighting is the ideal. We have windows, but additional adjustable lighting is required for the unit and each bed space.

10.20.2 Natural lighting is very important to maintain patient's normal diurnal rhythms to re- duce undue stress.

10.20.3 The unit cannot have open windows and to maintain safe heating levels is air conditioned throughout.

10.20.4 Walls are neutral in color and allow a wipe down surface.

10.21. Security Requirements

10.21.1 Data Security

- o The service will be delivered in accordance with and compliance to the national and ethical guide lines

- o Data sharing agreements will be drawn up to cover all data sharing accordance with national and regional guidelines.

o Patient identifiable information will only be sent out of the hospital accordance with national and regional guidelines.

10.21.2 Security for Patients

o The service will be delivered in accordance with and compliance to the upcoming national patients' right and safety policy.

o The unit has security preventing unwanted access. Each patient is cared for by a nominated nurse for each shift who will maintain a safe environment.

o The ICU is only accessible by swipe card or manned TV entry system or with available restrictive mechanism.

10.21.3 Security for Staff

o The service will be delivered in accordance with and compliance to the upcoming national staff safety and insurance policy.

10.21.4 Medical Records Security

o All patients medical records will be managed confidentially at all times and stored securely in locked office or outpatient facility whilst not in use.

o All movement of patient records will be accurately tracked in accordance with the national and regional guideline.

o All new documentation will be secured into the folder prior to it leaving the department.

10.22. Compliance to policy, SOP and treatment guidelines

10.22.1The service will be delivered in accordance with and compliance to the national and regional standards and guideline and each hospital should develop its own SOP according to hospital capacity. This is covered by the in house mandatory training.

10.23. Fire safety

10.23.1 The service will be compliant with the upcoming fire safety policy, fire Evacuation Policy and other local fire plans and procedures. This is covered by the in house mandatory training.

10.23.2 The detail of these items will then be developed as part of the separate Fire Safety

Work Program.

10.24. ICT Requirements

10.24.1 ICT Requirements for the Unit include:

o Quantity of PC's with office based software, available to all staff

o Telephone and internet access throughout the unit
o Pager service for all Clinical Staff

10.24.2 It is vital that new doctors and nurses receive adequate training to allow safe documentation and drug prescribing. This will be incorporated in their local induction.

10.25. Backup and contingency

10.25.1 The unit is an active participant in major incident and accident planning. The role is clearly defined within that plan. In the event of local problems i.e. fire or any related incident we have a plan for patient management that will be assessed and addressed between the nurse in charge for the shift and the consultant.

10.25.2The unit must be able to deal with a sudden increase in the need for ICU beds, such as in the event of outbreaks or multiple causalities. Please see the hospital disaster preparedness plan. Also it should have a backup plan for electricity and water supply.

10.25.3 In the event of IT failure, manually collect patient data and observations, and should have regu larly updated patients prescription forms to follow in this event.

10.25.4 The contingency for reduced staffing due to sickness is to ensure the ICU is appropriately staffed, maintaining patient safety. Confirmation with General Managers is required if we need to staff the ICU during busy periods, so that the allotted staff numbers can be extended.

10.25.5 If a junior doctor is not able to attend due to sickness, an alternative junior will cover the shift. If no one can be identified, the consultant on call will act down and be resident for the night for an agreed fee and another consultant will act as the consultant on call.

10.25.6 If an ICU consultant is sick and unable to work, the night on call will be covered by a colleague if available. If a day session is uncovered, an ICU consultant present in the hospital in another area e.g. theatres, they may need to be pulled out to cover the ICU.

10.26. Repatriations

10.26.1 Patients may require specialist treatment at other hospitals. When these patients are clinically stable and require ongoing critical care, they may be repatriated back to the former hospital. In case of disaster, all patients may temporarily transfer to other hospital.

10.27. Responsibilities

10.27.1 The unit on a day to day basis is managed by the ICU team in charge.

10.27.2 In the unusual event if there is a disagreement between the staffs; there should be a clear line of escalation to the higher hospital officials for solution after discussion with the ICU director. (1, 10, 15, 16)

11. Monitoring, Evaluation and Quality Assurance

11.1 Monitoring system used by FMOH, Regional Health bureaus and Hospital Quality Management Offices

Supportive Supervision

- ❖ To assess the performance of ICU care at different level of service integrated supportive supervision is needed. It will be performed twice per year towards various level of care in the Facilities

- ➢ Annual review

- ➢ ICU and issues related like burn and poisoning, trauma will get priority by the ministry and regional health departments and there will be annual review on selected KPIs like Injury severities, infection, mortality and length of hospitalization.

- ➢ Periodic reports and data bases analysis

- ➢ Hospitals' Quality Management office (QMO)

- ➢ Hospitals will establish interdisciplinary ICU team. The hospitals' QMO will follow the QI process of ICU units and the Morbidity and Mortality peer review will take place twice a year.

- ➢ Protocols, ICU registry and clinical audit should be developed and used for monitoring, evaluation and quality assurance purpose

11.2 Indicators

- ➢ These fundamental quality indicators for critical care should be utilized by FMOH and Hospital Quality Management Office:

1. Compliance with hand hygiene protocols
2. Providing information to families of patients in the ICU
3. Appropriate sedation
4. Appropriate pain management
5. Appropriate sepsis management
6. Early enteral nutrition
7. Prophylaxis for GI bleed in those undergoing invasive mechanical ventilation
8. Inappropriate transfusion of blood products
9. Semi recumbent position for patients on invasive mechanical ventilation

10. Ventilator associated pneumonia

11. Prevention of catheter related bloodstream infections (CRBSI), and catheter associated urinary tract infections (CAUTI)

12. Early administration of acetyl salicylic acid in acute coronary syndrome

13. Early reperfusion therapy in STEMI

14. Monitoring ICP in severe traumatic brain injury with CT findings

15. Surgical intervention within 3 hours in traumatic brain injury with subdural and/or epidural hematoma

16. Perceived Quality Survey at discharge from ICU

17. Presence of ICU trained medical professionals in the ICU

18. Maintaining an adverse events register

19. Length of stay

20. Tracheotomy rate

21. Mortality rate

22. Pressure ulcer

23. Rational use of antibiotics (development of drug resistance)

24. Readmission rate

25. Re-intubation rate

26. Fall rate

27. Presence of CC trained pharmacist/clinical pharmacists

28. Presence of key ICU drugs and supplies

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Appendix 1

EMERGENCY CRASH CART CHECK LIST

Crash Cart Top
Defibrillator with leads
Disposable gloves
Sharps container
(1) package of defibrillator pads

Side
02 tank
Backboard

Drawer 1 – Medication Drawer
(2) Amiodarone
(2) Atropine 0.5 mg and 1 mg
(2) Vasopressin
(2) Calcium gluconate
(1) Dextrose 50% 5ml
(2) Isoproterenol
(4) Epinephrine 1 mg
(3) Lidocaine 100mg
(2) Sodium Bicarbonate 50 mEq
(3) Dopamine
(2) Lasix(furosemide)
(2) Dobutamine
(2) Tridil (nitroglycerin)
(2) Pronestyl
(2) Nitroprusside
(2) Verapamil
(1) Magnesium sulfate

Drawer 2 – Airway Management Drawer
Airways, oral, assorted sizes
Airways, nasal trumpet, assorted sizes
Intubation tray – laryngoscopes, non-disposable and disposable with blades
K-Y jelly (2), viscous lidocaine (1
(2) 10 cc syringes
Stylet
Tape
(2) batteries
ET tubes – sizes 3.0, 6.5, 7.0, 7.5
Yankauer suction
Suction tubing
Suction catheter tray
02 mask with tubing
Nasal cannula
(2) ABG kits

Drawer 3 Venipuncture tubes and equipment

(1) 20 ml syringe
(4) 3 ml syringes
(1) TB syringe
IV start equipment: (4) 18 gauge angiocatheters
(4) 20 gauge angiocatheters
(1) 22 gauge angiocatheters
Tourniquet
Assorted butterflies
3 way stopcock
Assorted needles
Band aids
Betadine swabs
Alcohol swabs
Saline locks
(1) Lidocaine topical solution
(2) Radial artery catheterization set
Tape

Drawer 4

Electrodes
B/P cuff with stethoscope
Assorted sterile gloves
(2) Packages of defibrillator pads
NG tube
(1) 60 ml syringe
Locks

Drawer 5

IV solutions: 1000 ml each of D5W, RL, NS
500 ml each D5W, NS
(2) 100 ml NS
(2) 500 ml Lidocaine 2 grams
(1) Dobutamine
(1) Dopamine
(1) Amiodarone IVPB
Tubing (2) microdrips (60 drops/ml)
(2) macrodrips (15 drops/ml)
(2) Extension sets

Drawer 6 (Bottom)

Tracheostomy tray
Transvenous Packing Electrode kit
Ambu bags, Adult & Pedi
Suction set up (portable cart)

Appendix 2

Equality Impact Assessment Form (EIA)

Clinical Operational Policy for Inpatient and Outpatient Procedures

Equality or human rights concern *(see*	**Does this item have any differential impact on the equality groups listed? Brief description of impact.**	**How is this impact be- ing addressed?**
Gender	The ICU does not have single sex areas. Consideration is given to try to nurse patients of the same sex in the same area if possible. The ICU is exempt from single sex ward policy.	
Language	Language may be seen as a barrier for some patients	Interpreters are made available when required either face to face or via language line. All staff attend in-house training courses on equality and diversity.
Disability	There may be patients, carers or staff who have a disability who use, visit or work within the service area.	The clinical areas are easily accessible by wheelchair and lifts. The nurse stations are accessible on the ward. There is a type talk avail- able. Sign language interpret- ers can be booked if re- quired. Staff carry out moving and handling for all in- patients and day cases and perform risk assessments when neces- sary.

Religion, Faith and Be- lief.	Unique to each individ- ual and dependent on patient, carer or staff needs and/or require- ments.	It is possible to access multi-faith leaders when required.
Sexual Orientation	All people who use, visit or work within the service area treated the same regardless of their sexual orientation.	All staff attends in-house training courses on equality and diversity. Any issues or complaints are fully investigated and responded to within 30 days where appropriate.
Age (Safeguarding Chil- dren)	Adult ICU does not admit patients under the age of 14 routinely. All staff on the ICU have received Safeguarding children training.	Any children visiting a relative on the ICU will be accompanied by an adult, a member of staff and a member of the psychotherapy team if necessary.

Social Class	A number of patients may have difficulty accessing the service due to financial or transport problems.	It can be addressed by social workers
Care provide rs	A number of patients may have difficulty in visiting the hospital.	Encourage staff to be flexible with visiting hours for these members of the public. Encourage staff to talk to their care providers on the telephone if the care provider or relative is unable to visit. Ensure relatives and care providers are involved in the discharge planning process alongside the patient and working in partnership discuss expected discharge dates and care package.