Sub-speciality Credentialing and Training in Paediatric Intensive Care

Introduction
Paediatric Intensive Care is multidisciplinary in nature crossing departmental and speciality lines inasmuch as the problems encountered in the critically ill patient encompasses different aspects of different specialities.

The paediatric intensivist is a specialist whose knowledge is of necessity broad involving all aspects of management of the critically ill child and whose base of operation is the ICU.

Over the years a number of important new modalities and therapies have been developed and a greater number is expected to emerge in the future creating new hopes for the patients and challenges the intensivists.

The benefits of having intensivists run the ICUs providing coverage 24hrs a day i.e a closed system where the intensivists direct patient care with input from the relevant speciality is proven beyond doubt in many studies.

Objective

The objective of training is to produce paediatric intensivists who are specially qualified in the care of the critically ill child in totality managing a wide range of disorders such as cardiopulmonary disorders, brain injury, polytrauma, sepsis, multiorgan system failure, postoperative patients and organ transplantation.

1. Entry criteria

The candidate who wishes to pursue training in Paediatric Intensive Care in the Ministry of Health must have the following requirements:

- a basic medical degree which is recognised by the Malaysian Medical council,
  AND
- a recognised postgraduate qualification in Paediatric Medicine which is registrable under the General Paediatrics Specialist register or
- a recognised postgraduate qualification in Anaesthesiology which is registrable under the Anaesthesiology Specialist register
  AND
- At least 4 years experience in paediatric medical practice

2. Duration of training programme (total of 3 years)

First year of training
6 months anaesthesiology (for paediatricians) or 6 months general paediatrics (for anaesthesiologists)
3 months paediatric cardiac intensive care
3 months in neonatal intensive care

Second year of training
1 year in a gazetted local paediatric intensive care unit
Third year of training
1 year full time in an accredited paediatric intensive care unit overseas

3. Training contents and modalities

Necessary core skills and knowledge
Specially trained in Paediatric Intensive Care, whether coming from a background in paediatrics, or anaesthesia will be expected by the end of their specialty training to be able to satisfy the Committee that they have gained training, experience and knowledge in a number of areas of clinical practice relevant to the care of critically ill children. These are detailed below. Much of the core training can most readily be acquired prior to entering a Paediatric Intensive Care programmes in posts (preferably at Medical Officer level) which include exposure to the relevant clinical disciplines eg Anaesthesiology, Neonatology:

Detailed understanding and experience will be required in the following

General:
1. Developmental physiology from birth to adolescence.
2. Understanding of the principles of developmental assessment.

Resuscitation:
3. Resuscitation and management of critically ill children from birth to adolescence to include a detailed knowledge and practical experience of the care management of children with impairment of each of the major organ systems (e.g. cardiac, respiratory, renal, haematological, metabolic; neurological and infection problems.
4. Resuscitation and management of patients with multiple trauma, particularly head, chest and abdominal injuries.
5. Recognition and where possible management of different types and degree of burns, smoke inhalation and airway burns.

Respiratory and cardiac:
8. The physiology, practicalities and limitations of available techniques of assisted ventilation and their application, including the use of nitric oxide, high frequency ventilation and recruitment techniques.
9. Indications for and principles of management of extracorporeal membrane oxygenation and other cardiac assist devices.

Neurology
10. Assessment, management and prognosis of brain injury.
Intravenous fluid therapy and nutrition:
11. Clear and comprehensive understanding of fluid and electrolyte balance.
12. Understanding and familiarity with the principles of intravenous nutrition.
13. Understanding of nutritional and metabolic effects of surgery and trauma.
14. Enteral nutrition in the critically ill child.

Pharmacology:
15. Pharmacology of drugs, including anaesthetic drugs, inotropes and vaso-active drugs used in paediatric intensive care.
17. Management of drug overdose and ingestion of other toxic substances.
18. Therapeutic drug monitoring.

Patient monitoring:
20. Principles of operation of intensive care equipment and of clinical measurement techniques, together with understanding of their limitations.
21. Appropriate use and interpretation of investigations (e.g. radiology, ultrasound, laboratory medicine).

Psychological, legal and ethical aspects of intensive care:
22. Communicating with patients, families and staff.
23. The role of parents in care and decision making.
25. Diagnosis and management of brain stem death.
27. The wider aspects of care of the child after non-accidental injury.

Transport of the critically ill child:
28. Stabilization of the critically ill neonate, infant and child for transport.
29. Use of portable monitoring equipment.
30. Emergency procedures during transport.
31. Audit of transport.
Certain specific practical skills will be necessary including:

32. Advanced paediatric trauma and cardiac life support.


34. Intubation and care of the airway of the intubated and unconscious patient (including techniques for difficult intubation and long term airway management.

35. Managing the emergency surgical airway.

36. Percutaneous vascular access techniques, with particular references to central line placement and arterial cannulation.

37. Intraosseous infusion techniques.

38. Insertion of chest drain and aspiration of pleural effusions.

39. Insertion of lines for dialysis and haemofiltration.

40. Aspiration of pericardial effusions.

Certain additional skills (e.g. insertion of intracranial pressure monitoring devices, emergency tracheotomy and bronchoscopy) are valuable, but are unlikely to be acquired by the majority of trainees.

Organizational Skills
Trainees should also gain experience in the organization and managerial skills necessary for the running of a paediatric intensive care unit and be actively involved in staff training and their development

Audit and Clinical Research
Involvement in clinical audit throughout postgraduate training is essential. The candidate should be actively involved in the development of audit criteria within paediatric intensive care, and be thoroughly familiar with the use of illness of severity scores and risk scores.

Review and Evaluation of Progress of Training
Log Book on training and professional development provided by the committee Quarterly assessment and yearly documentation of performance by supervisors in accordance with the format provided
An exit interview conducted by the Paediatric Intensive Care Subspecialty Committee when deemed necessary
4. Training Centres and Trainers/Supervisors

Criteria for recognition of PICUs for training
A Paediatric Intensive Care Unit is a specialized facility designed, equipped and staffed, exclusively for the management and treatment of critically ill children ranging from infancy to adolescence

Only hospitals with designated PICU can be considered for training in paediatric intensive care. A suitable training programme should be submitted for approval by the committee.

There should be a suitable case mix and patient throughput to provide a comprehensive experience in paediatric intensive care

This should be undertaken in a minimum of 8 bedded PICU and managing at least 200 intubated patients per year. (This number may include patients given non invasive ventilations )

A consultant experienced in intensive care should be available during working hours and to provide coverage during out of office hours

A balance of expertise is encouraged there being anaesthetist and paediatricians..

A good retrieval system should be provided within the region covered by the PICU.

5. Paediatric Intensive Care Subspecialty Committee

The committee shall be made up of the following members who will make decision on the training programme, the criteria for accreditation and the suitability of candidates to be accredited as paediatric intensivists. It shall consist of representations of paediatric intensivists from the Ministry of Health, Universities and relevant bodies.

Membership to the Committee will be by appointment of the Chairperson of the National Credentialing Committee upon the recommendation of the College of Paediatrics of the Academy of Medicine of Malaysia. The term shall be 2 years at the end of which committee members are eligible for reappointment
6. **Criteria for accreditation of Paediatric Intensivist in Malaysia**

1. Any doctor can request to be registered if he/she fulfils ALL of the following requirements:

   i) A recognised basic medical degree recognized by the Malaysian Medical Council

   ii) A recognised postgraduate qualification. One of the following paediatric postgraduate degrees recognised by the Malaysian Paediatric Specialty Board

   - Master of Paediatrics awarded by Universiti Malaya, Universiti Kebangsaan Malaysia or Universiti Sains Malaysia
   - MRCP(UK) up to year 2000
   - MRCPCH by the Royal College of Child Health UK
   - MRCPI
   - FRACP
   - M.Med in Paediatrics (Singapore)
   - Any other equivalent paediatric postgraduate degrees recognised by the Malaysian Paediatric Specialty Board on a case by case basis

2. Completed postgraduate training in Paediatric Intensive Care in recognised training centres

   - Completion of a minimum of 3 years in Paediatric Intensive Care both locally and overseas which fulfilled the criteria stipulated by the Paediatric Intensive Care Subspecialty Committee, under the supervision of Paediatric Intensivist trainers who fulfilled the criteria stipulated under the Paediatric Intensive Care Subspecialty Committee.

   - This period of training does not include the time the applicant spent during her housemanship nor the period when undergoing training for the basic paediatric postgraduate degrees

   - The candidate must furnish evidence of satisfactory completion of Paediatric Intensive Care subspecialty training such as:
      - Log book of core procedures and patients seen
      - Portfolio with supporting document where relevant eg a valid certificate of completion of training, published research papers or abstracts, certificates of attendances at workshops, courses
      - Satisfactory supervisors reports on Paediatric Intensive Care clinical core competency

The above criteria would be reviewed from time to time.
Note
For any doctor with training and working experience as a paediatric intensivist overseas, his case may be considered on a case by case basis. A curriculum vitae and supporting documents with recommendations from 2 paediatric intensivists will be required.
He should also complete at least one period of not less than six months under a supervisor in a accredited Malaysian Hospital followed by a satisfactory report from the appointed supervisor

List of accredited trainers
There are at present only three accredited trainers with one each in UKM and UMMC and 1 in the Ministry of Health.

Dato’ Dr Teh Keng Hwang
Professor Dr Lucy Lum Chai See
Associate Professor Dr Tang Swee Fong

List of accredited training centers
The centres currently accredited to be training centres would be Hospital Sultanah Bahiyah, Alor Setar, Institue Paediatrics, UMMC and UKM. Centres will be added when the criteria is fulfilled.

Trainee Commitments
The Trainee should discuss the training requirements with the supervisor and a timetable and programme drawn up. The programme should cover the areas specified in the section on core content. The trainee should attend ward rounds, case conferences, radiological conferences, mortality and morbidity conferences, journal clubs. He is expected to carry out a research proposal.
## Core Procedural Skills of Subspecialists on Completion of Fellowship/Subspecialty Training

**Name of Subspecialty:** Pediatric Intensive Care

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<thead>
<tr>
<th>No</th>
<th>Procedures</th>
<th>Minimal training necessary for competence</th>
<th>Maintenance of competence</th>
<th>Please indicate ( ) the procedures that a generalist can perform with the required minimum training</th>
<th>Minimal training necessary for a generalist to perform the procedure competently</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>High Frequency Oscillation</td>
<td>Working as a specialist for 6 months in a tertiary centre where HFOV has been used on at least 12 patients,</td>
<td>Ventilating at least 12 cases a year on HFOV</td>
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<tr>
<td>2</td>
<td>Use of Nitric Oxide in newborn and pediatric patient</td>
<td>Working as a specialist for 6 months in a tertiary centre and has used NO therapy in at least 6 patients</td>
<td>Using NO in at least 6 patients a year</td>
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<td>3</td>
<td>Conventional Mechanical ventilation of the critically ill child</td>
<td>Working as a specialist for 6 months in a unit which ventilates at least 200 patients per year</td>
<td>Ventilating at least 200 patients a year</td>
<td>√</td>
<td>Working as a specialist for 6 months in a unit which ventilates at least 50 new cases a year</td>
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<td>4</td>
<td>Central venous catheter</td>
<td>Working as a specialist for 6 months in an</td>
<td>Inserting at least 12</td>
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<td>Working as a specialist for 6 months in an</td>
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<td><strong>cannulation</strong></td>
<td>PICU and has performed at least 12 CVCs of which at least 2 internal jugular</td>
<td>CVCs a year</td>
<td>√</td>
<td>PICU and has performed at least 6 CVCs</td>
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<tr>
<td><strong>Peritoneal dialysis or Continuous veno hemofiltration</strong></td>
<td>Working as a specialist in a PICU for 6 months and has done at least 4 dialysis per year and 2 CVVH</td>
<td>Insert at least 4 peritoneal catheters or perform 2 CVVH per year</td>
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<tr>
<td><strong>Noninvasive ventilation</strong></td>
<td>Working as a specialist in a PICU for 6 months and has done at least 10 noninvasive ventilations per year</td>
<td>Instituted at least 10 noninvasive ventilation</td>
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<td><strong>Basic echocardiography</strong></td>
<td>20 echocardiographic examinations</td>
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<tr>
<td><strong>Insertion of chest tube</strong></td>
<td>Minimum successful procedures – 10</td>
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<td><strong>Bronchoscopy</strong></td>
<td>Observed or carried out at least 6 bronchoscopy</td>
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<td><strong>Intubation</strong></td>
<td>Successful intubations (rapid sequence intubation) in at least 50 patients</td>
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<td>√</td>
<td>Working as a specialist for 6 months in a unit which ventilates at least 50 new cases a year</td>
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Appendix A

Checklist and criteria for accreditation of centre for Paediatric Intensive Care

A. Paediatric Intensive Care work load and services
   1. Number of ventilated cases per year ___________per year
   2. Number of patients on High frequency oscillations ___________per year
   3. Provides care and laboratory services Yes (   ) No (   )
   4. Provides non invasive ventilation Yes (   ) No (   )

B. Training facilities for Paediatric Intensive Care
   1. Total number of accredited paediatric intensivists in the hospital _____________
   2. Meeting room with audiovisual aids Yes (   ) No (   )
   3. A medical library on site Yes (   ) No (   )
   4. Access to Medline and literature search Yes (   ) No (   )

C. Educational activities in paediatric intensive care
   (Please furnish a copy of weekly or monthly teaching activities)
   1. Number of teaching ward rounds with paediatric intensivist/week __________
   2. Number of hours / week of rostered paediatric intensive education __________
   3. Applicant was able to attend at least 70% of the educational opportunities
      Yes (   ) No (   )
   4. Number of conferences and workshops attended per year ________________
   5. Applicant has at least 6 on call duties in the PICU Yes (   ) No (   )

D. Clinical cases see log book

E. A supervisor for training of paediatric intensivist is one who has fulfilled the following criteria
   1. appointed as a paediatric intensivist for at least 2 years
   2. works in a accredited training centre
   3. appointed as a supervisor by the Paediatric Intensive Care subspecialty committee
Appendix B

Report on the level of achievement of Paediatric Intensive Care key competencies by supervisors / referees

(Each supervisor/referee must submit a separate report)

Candidates Name: ____________________________________________

Candidates Identification Number

Period of training from _____________ to __________________________

Placement
1. __________________________ Dates from _______ to _____________
2. __________________________ Dates from _______ to _____________
3. __________________________ Dates from _______ to _____________
4. __________________________ Dates from _______ to _____________

Supervisor
1. __________________________
2. __________________________
3. __________________________

Report

I hereby certified that the above information is true and accurate

Signature of supervisor: _______________________________________

Date or Report ________________________
Log Book
The trainee will be assessed in the following:

a) Practical procedures and skills, and organ system support
b) Patient management: assessment, investigation, monitoring and diagnosis
   compassionate family orientated care
c) Transport and stabilization
d) Cardiopulmonary resuscitation skills (PALS certification)
e) Communication skills and Attitudes

In these assessments the trainee will be expected to support the demonstration of clinical skills with knowledge of the relevant areas as described in the core curriculum. This will include the establishment of a safe environment for critically ill patients inside and outside the PICU, relief of patient suffering with judicious use of sedation and appropriate drugs. The trainee should develop management plans and modify them accordingly to patient outcome.

a) Practical procedures and skills, and organ system support

Name of trainee: _______________________________
The trainee:
Yes   No   Comments

Plans procedures, and prepares working environment appropriately

Ability to use vasoactive drugs and fluids appropriately

Performs aseptic insertion of tunneled iv feeding catheters

Performs insertion of chest tube safely and aseptically

Performs tracheal intubation of a patient in PICU

Establishes a critically ill patient on mechanical ventilation

Prescribes hypnotics, analgesics and neuromuscular blockers safely

Manages fluid balance in patients receiving renal replacement therapy

Uses suitable antimicrobial regimes for pneumonia and septic shock

This assessment was completed satisfactorily

If NO give reasons

Signature of trainer

Name

Date
b) Patient management: assessment, investigation, monitoring and diagnosis, compassionate family oriented care

Name of trainee: _______________________________

<table>
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<tr>
<th>The trainee:</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
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<tr>
<td>Ensures physiological safety as a priority</td>
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<td>Is able to elicit relevant history from available sources</td>
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<tr>
<td>Able to conduct an effective physical examination</td>
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<tr>
<td>Requests and carries out relevant clinical investigations</td>
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<tr>
<td>Discusses and evaluates differential diagnosis</td>
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<tr>
<td>Discusses appropriate management strategies</td>
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<tr>
<td>Evaluates patients responses and modifies treatment as appropriate</td>
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<tr>
<td>Interprets Xrays and Arterial blood gas correctly</td>
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<tr>
<td>Ensures effective information transfer between on call staff</td>
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<td>Understands and implements infection control practices</td>
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<tr>
<td>Knows limitations and when to seek senior help</td>
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<td>Is caring and responsible towards patient</td>
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This assessment was completed satisfactorily  
If NO give reasons

Signature of trainer

Name

Date

c) Assessment of cardiopulmonary resuscitation

Name of trainee: _______________________________

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<tr>
<th>The trainee:</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
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<tr>
<td>Demonstrates bag and mask ventilation</td>
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<tr>
<td>Demonstrates satisfactory intubation and Positive pressure ventilation</td>
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<tr>
<td>Demonstrate cardiac compression and coordination with bag mask</td>
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<td>Interprets cardiac arrhythmias on ECG monitor</td>
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</table>
Knows indications for defibrillation
Demonstrates correct use of defibrillator
Knows the use of appropriate use of drugs during resuscitation
Takes a lead role during CPR
Ensures correct recording of CPR drugs and events
This assessment was completed satisfactorily
If NO give reasons

Signature of trainer
Name
Date

d) Audit, Research
Name of trainee: ________________________________
The trainee: Yes     No     Comments
Able to supervise junior colleague in procedures
Presents a topic discussion at the departmental meeting
Carry out an audit project
Participates in PICU data collection
This assessment was completed satisfactorily
If No give reasons

e) Admission, discharge, follow up and end of life care
Name of trainee: ________________________________
The trainee: Yes     No     Comments
Understands appropriateness of admissions to PICU
Assesses factors influencing discharge from PICU
Ensures adequate information transfer before discharge
Follow up patient in ward after discharge
Discusses factors influencing treatment intensity decisions
Shows sensitivity in discussions with patient and family
Supports colleagues in implementing limitation/withdrawal
Supports family during limitation/withdrawal
Performs brain stem death tests
Describes principles of obtaining consent to donation
Liaison with the transplant coordinator
This assessment was completed satisfactorily

If No give reasons

Signed
Name
Date

**f) Special circumstances**

Name of trainee: ____________________

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<tr>
<th>The trainee:</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
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<tr>
<td>Demonstrate ventilatory strategies of ARDS/ALI</td>
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<tr>
<td>Demonstrates cardiovascular management of sepsis/shock</td>
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<tr>
<td>Describes principles of infection control in paediatric intensive care</td>
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<td>Stabilises a patient following elective cardiopulmonary bypass</td>
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<td>Discusses complications occurring within 24 hours of cardiac surgery</td>
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<td>Stabilises a patient following elective craniotomy</td>
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<td>Discusses management of acute intracranial hypertension</td>
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<td>Performs the primary and secondary survey of a trauma patient</td>
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<td>Interprets results of Arterial blood gas correctly</td>
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<td>Discusses stabilization, transfer of patient with fulminant liver failure</td>
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<tr>
<td>Discusses principles of management of immunocompromised patient</td>
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<td>This assessment was completed satisfactorily</td>
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Signed
Name
Date
g) **Assessment of communication skills, attitudes and behaviour**

Please tick the appropriate box. This form should be filled once a year or when the trainee leaves the hospital or module.

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<thead>
<tr>
<th>Attitude or behaviour</th>
<th>Satisfactory</th>
<th>Cause for concern</th>
<th>Examples (please give date)</th>
<th>Initials of Assessors (dates)</th>
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<tbody>
<tr>
<td>Communication skills (with parents &amp; relatives)</td>
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<tr>
<td>Communication skills (with staff)</td>
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<td>Reliability</td>
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<td>Punctuality</td>
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<td>Control of moods</td>
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<td>Personal presentation</td>
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<td>Social behaviour</td>
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<td>Conscientiousness</td>
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<td>Initiative</td>
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<td>Assertiveness</td>
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Confidence

Departmental involvement

Team work

Honesty

Record keeping

**Documentation of competence in the complementary specialties (Anaesthesia etc) at Medical Officer level.**

The training may be undertaken in different hospitals and hence competency must be documented carefully. The assessments should include all the items listed and signed by the relevant assessors.

The purpose of this speciality training in general anaesthesia is to gain proficiency in the use of anaesthetic agents’ sedative drugs and endotracheal intubation. This knowledge, training and experience will be further enhanced during the 1 year PICU training. The trainees will be able to intubate children of all ages who required PIC, manage the difficult airway and use inhalational agents and will know when to call assistance from their anaesthetic colleagues.

The trainee will be assessed in the following areas:

- **a)** Preoperative assessments
- **b)** General anaesthesia for ASA I or II patients including equipment and anaesthetic machine check.
- **c)** Rapid sequence induction.
- **d)** CPR skills
- **e)** Knowledge of basic sciences, physiology, pharmacology
- **f)** Behaviour of gases, breathing systems and equipments used in anaesthesia and intensive care
- **g)** Communication skills, clinical judgement, attitudes and behaviour.
- **h)** Confirmation of satisfactory completion of training in anaesthetic module

No trainee can deliver anaesthesia initially without immediate supervision. After a satisfactory performance as assessed the trainees can then undertake cases delegated to them and be given increased clinical responsibility by working on call with local or distant supervision.
i) Assessment of Pre–operative assessment of patients

Name of trainee: _______________________________

The trainee: Yes No

Communicates satisfactorily with patients/parents

Obtains relevant history and physical examination

Assesses the airway

Understands the preoperative investigations

Explains the anaesthesia clearly

Discusses pain and explains the postoperative analgesia clearly

Prescribes preoperative medication as needed

Understands the ASA classification

This assessment was completed satisfactorily

If NO give reasons

Signed …………………………….

Name  …………………………….

Date  …………………………….

ii) Assessment of the ability to administer a general anaesthetic competently to elective ASA 1 or 11 patients

Name of trainee: _______________________________

The trainee: Yes No

Properly prepares the anaesthetic room and operating theatre

Conducts a preoperative equipment check satisfactorily

Has properly prepared patient for surgery

Choose an appropriate anaesthetic technique

Establishes IV access

Establishes ECG and pulse oximetry in the anaesthetic room
Measures BP prior to induction
Preoxygenate as necessary
Induces anaesthesia satisfactorily
Manages airway competently I) Face mask
II) LMA
Maintains and monitors anaesthesia satisfactorily
Conducts emergence and recovery safely
Good record keeping
Prescribes analgesia appropriately
This assessment was completed satisfactorily
If NO give reasons

Signed
Name
Date

iii) Assessment of anesthesia with Endotracheal intubation

Name of trainee: _______________________________
The trainee: Yes No
Assesses the airway properly
Understands factors of a difficult airway
Satisfactory use of a laryngoscope
Correct placement of the endotracheal tube
Demonstrates correct placement by auscultation
observation
capnography
This assessment was completed satisfactorily
If NO give reasons
Signed
Name Date
iv) Assessment of Rapid Sequence Intubation (RSI)

**Name of trainee:** _______________________________

<table>
<thead>
<tr>
<th>The trainee must demonstrate:</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Preparation of the anaesthetic room and operating theatre</td>
<td></td>
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<tr>
<td>Satisfactorily checking the anaesthetic machine, sucker etc Preparation of patient</td>
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<tr>
<td>Understands mandatory period for preoperative fasting</td>
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<tr>
<td>Understands the indication for RSI</td>
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<tr>
<td>An adequate explanation of RSI to patient including the cricoid pressure</td>
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<tr>
<td>To the assistant how to apply cricoid pressure</td>
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<td></td>
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<tr>
<td>Proper pre oxygenation of the patient</td>
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<tr>
<td>Undertaking of the RSI</td>
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<tr>
<td>Correct placement of the tube</td>
<td></td>
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<tr>
<td>This assessment was completed satisfactorily</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If No give reasons

Signed

Name

Date

Confirmation of satisfactory completion of 6 months module in anaesthesia

**Name of trainee**

**Period of training (dates and place)**

Signature of assessor

Name

Date